DELISTING PETITION

FOR

VITRIFIED M-AREA

PLATING LINE WASTES

PREPARED FOR:

US DEPARTMENT OF ENERGY,
THE SAVANNAH RIVER SITE
AIKEN, SOUTH CAROLINA

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Date: 29 March 2001

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ACRONYMS

• ALARA	As Low As Reasonably Achievable
• CFR	Code of Federal Regulations
• DETF	Dilute Effluent Treatment Facility (a part of the M-Area LETF)
• DOE	Department of Energy
• DOE-SR	Department of Energy, Savannah River Field Office
• DOT	Department of Transportation
• EPA	Environmental Protection Agency
• FDD	Facilities Disposition Division (a division of WSRC)
• IT/SF	Interim Treatment/Storage Facility (M-Area waste storage tanks)
• LDR	Land Disposal Restrictions
• LETF	Liquid Effluent Treatment Facility in M-Area
• M-Area	The target and fuel production facility at the SRS
• MEP	Multiple Extraction Procedure (10 consecutive TCLP leaches)
• Mark 15	Mixed waste resulting from production of "Mark 15" target elements
• Mixed	Hazardous waste containing radioactive constituents
• MSDS's	Material Safety Data Sheet(s)
• MWSS	Mixed Waste Storage Shed
• NRC	Nuclear Regulatory Commission
• PWIT/SF	Process Waste Interim Treatment/Storage Facility (same as IT/SF)
• RCRA	Resource Conservation and Recovery Act
• SCDHEC	South Carolina Department of Health & Environmental Control
• SCHWMR	South Carolina Hazardous Waste Management Regulations
• SRL	Savannah River Laboratory (now SRTC)
• SRS	Savannah River Site
• SRTC	Savannah River Technology Center
• TCLP	Toxicity Characteristic Leaching Procedure
• USC	United States Code
• UTS	Universal Treatment Standards
• WAC	Waste Acceptance Criteria
• WSRC	Westinghouse Savannah River Company

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MAPS

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EXECUTIVE SUMMARY

The Savannah River Site (SRS) Operations Office of the U.S. Department of Energy (DOE) is submitting this Delisting Petition to the U.S Environmental Protection Agency, Region IV. This petition seeks exclusion of certain solid wastes generated at the Savannah River Site near Aiken South Carolina from the lists of Resource Conservation and Recovery Act (RCRA) hazardous wastes contained in 40 CFR 261.24 and 40 CFR 261.31. This petition is submitted under 40 CFR 260.20, which allows any person to petition the Administrator to modify or revoke any provision of parts 260 through 268, 124, 270, and 271 of title 40 of the Code of Federal Regulations, and under 260.22, which specifically provides generators the opportunity to exclude a waste on a "generator-specific" basis from the lists of hazardous wastes.

This delisting petition is structured as outlined in the 1993 EPA's "Petitions to Delist Hazardous Wastes, A Guidance Manual" (EPA/530-R-93-007). DOE-SRS is petitioning the EPA, per 260.22, to exclude treatment residues, generated by a vitrification process of a listed F006 mixed (hazardous and radioactive) waste from the list of hazardous wastes identified in 40 CFR Part 261.3. The resultant treatment residues will be regulated by 40 CFR 261.3(c)(2)(i) until delisted. When delisting for the RCRA hazardous constituents is complete, the stabilized wasteform will be managed and disposed in a manner consistent with the requirements of the Atomic Energy Act of 1954 (42 U.S.C. 2011 et seq.; hereinafter the AEA) or the Nuclear Regulatory Commission (NRC).

This petition will show that the resultant treatment residues do not:

- meet any criteria for which it was listed;
- exhibit any hazardous waste characteristics as identified in 40 CFR 261 Subpart C; and
- do not exhibit any other factors or additional constituents, which would render it to be considered a RCRA hazardous waste.

This request for a delisting petition is based upon: analytical evaluation of the characteristics of the untreated waste, facility and process descriptions, and data from bench-scale tests (vitrification and cementitious studies), a small scale melter treatability demonstration, and extensive verification analyses on the final vitrified waste-form. The final vitrified product, and some small volumes of cementitious treatability samples, meet all of the proposed delisting concentration limits.

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1.0 ADMINISTRATIVE INFORMATION

1.1 Facility Specifics

Petitioner: U.S. Department of Energy
Savannah River Operations Office (DOE-SR)
Post Office Box A
Aiken, South Carolina 29802

RCRA Number: RCRA Generator ID No. SC 189 000 8989

Facility: Savannah River Site

Facility Contacts:

Name	Title	Telephone
David P. Roberts	DOE-SR, Waste Management Post Office Box A Aiken, South Carolina 29802	803-725-3751
Lynn C. Martin	WSRC, Principal Engineer Environmental Protection Department	803-725-1793
John B. Pickett	WSRC, Principal Technical Advisor Facilities Disposition Division	803-725-3838
	Westinghouse Savannah River Co. Savannah River Site Aiken, SC 29808	

1.2 Petitioner's Interest

The wasteform for which this delisting petition is requested is a mixed (radioactive and hazardous) waste generated at the Savannah River Site, (SRS) near Aiken, South Carolina. The original waste was generated under the purview of Atomic Energy Act (AEA), and is currently managed and controlled by the U.S. Department of Energy (DOE-SR). The SRS complex encompasses approximately 310 square miles in South Carolina, principally in Aiken and Barnwell counties, adjacent to the Savannah River (Figure 1). The site was established by the U.S. Atomic Energy Commission in 1950 to produce plutonium and tritium for national defense, and additional special nuclear materials for other government uses and civilian purposes. For example, SRS produced plutonium-238 (^{238}Pu) for use as an energy source in the U.S. space program. Since 1988, the main focus at the SRS has shifted from production to waste management and environmental restoration activities. The petitioner's interest in this delisting petition is due to the fact that the original metal plating line wastes and the final vitrified wasteform have been or will generated by and under the control of the DOE-SR and Westinghouse Savannah River Company (WSRC). The SRS is co-operated by the WSRC, under contract to the DOE-SR.

1.3 Description of the Proposed Action

The SRS is segregated into several distinct functional operational areas.

The Reactor Materials Department (RMD) or 300 M-Area, (hereinafter called M-Area) was/is located in the northeast section of the SRS (Figure 2). Previous M-Area manufacturing operations produced reactor components, which primarily consisted of:

- aluminum housings (Buildings 320 and 321),
- aluminum canned, depleted uranium targets (Building 313),
- extruded enriched uranium-aluminum alloy fuel tubes (Building 321), and
- lithium-aluminum alloy target tubes and control rods (Building 320).

The locations of these buildings are shown in Figure 3. The manufacturing processes, along with associated support activities, are described in detail in Section 3.

Liquid effluents generated from the M-Area manufacturing operations consisted primarily of aluminum forming and metal finishing residues, including nickel electroplating solutions and solutions from component recovery operations. Process waste effluents comprised rinse waters, stack acid scrubber effluents, and spent process solutions from the three main production buildings and the two support laboratories. Three separate functional facilities included since July 1995 are:

- the Process Waste Interim Treatment/Storage Facility (PWIT/SF), which was an industrial wastewater tank storage facility. Storage in the tanks generated a listed F-006 plating line sludge due to settling and separation of the supernatant and the settled residue,

- the Dilute Effluent Treatment Facility (DETF), which was an industrial wastewater treatment facility. The DETF treated the dilute plating line and laboratory effluents generated in M-Area. The DETF utilized the Best Available Technology Economically Achievable (BATEA) for the aluminum forming and metal finishing industry effluents. Treatment of area wastewaters by the DETF resulted in the generation of a listed F006 mixed waste stream (wastewater treatment sludges from electroplating operations), and

- the Chemical Transfer Facility (CTF), which was a portion of the LETF. Concentrated plating line solutions were neutralized and then transferred to the PWIT/SF storage tanks.

These neutralized sludges were also a listed F006 mixed waste (wastewater treatment sludges from electroplating operations). The filtercake from the DETF also transferred to the IT/SF storage tanks via the CTF.

The Department of Energy - Savannah River (DOE-SR) and WSRC are requesting the United States Environmental Protection Agency (USEPA) for a exclusion for certain wastes (i.e., vitrified residues), as described in 40 CFR 261.3(c)(2)(i), based on;

- the untreated waste characteristics,
- process descriptions of the generation of the untreated waste,
- process description of the final wasteform treatment facility and process,
- laboratory scale treatability study results,
- results from scale-up testing (vitrification) of the waste sludges, and
- analytical verification testing on the final vitrified wasteform .

The F006 mixed wastes were treated (stabilized) in a sub-contractor owned and operated Vendor Treatment Facility (VTF). The VTF utilized vitrification to stabilize the M-Area wastes. The treatment of all of the waste streams was completed February 24, 1999. The VTF has been deactivated and is now shut down. No further use of the VTF is anticipated.

The DOE-SR is submitting this request as justification for delisting the above stabilized waste. Small-scale waste treatment studies using the process of vitrification were conducted and successfully completed. The success of vitrification is attributable to a number of factors including:

- well developed process technologies based on the high level nuclear waste stabilization program (HLVIT);
- the powerful solvating properties of glass melts, particularly borosilicate, and its ability to incorporate a wide range and large amounts of hazardous inorganic and radioactive components;
- the complete destruction of organic compounds at the high vitrification temperatures;
- a stable, homogeneous wasteform that is highly resistant to aqueous corrosion; and
- a high density wasteform resulting in large volume reduction from the original wastes.

1.4 Need and Justification

The above F006 waste sludges were managed as RCRA mixed wastes. The majority of the waste was stored in an industrial wastewater treatment facility tank farm and the remainder within RCRA container storage facilities. The VTF was an approved industrial wastewater treatment facility by the South Carolina Department of Health and Environmental Control (SCDHEC). Treatment residues generated from the vitrification process were packaged in Department of Transportation (DOT) approved containers. The resultant treatment are stored in a RCRA interim status container storage facility while awaiting verification that the analyses are below EPA delisting levels and the approval of the delisting petition.

The final wasteform needs to be delisted to allow disposal as a Low Level Radioactive Waste (LLRW), rather than as a mixed (radioactive and hazardous) waste. The SRS currently has no disposal facilities permitted for the disposal of mixed or hazardous wastes, and has no current plans to construct any such facility at the Savannah River Site. Disposal of the delisted wasteform is currently planned for on-site disposal in a DOE managed LLRW disposal facility. The management of the DOE facility, both engineering and administrative, combined with the physical properties of the vitrified wasteform, will insure that no health or environmental risks will ensue from long term disposal.

Stabilization of these wastes is not only required for compliance with hazardous waste regulations, but was also required by the Federal Facility Compliance Act of 1992 (FFC Act). The FFC Act specifies that each DOE site will develop a Site Treatment Plan (STP) for the treatment of their mixed (hazardous and radioactive) wastes. For the M-Area sludges, the approved STP specified that the sludges would vitrified in a temporary vendor supplied and operated facility.

This petition will show that the vitrified residues generated from the M-Area Vendor Treatment Facility (VTF) do not:

- demonstrate any criteria for which it was listed;
- exhibit any hazardous waste characteristics as identified in 40 CFR 261 Subpart C; and

The final wasteform meets all of the proposed delisting levels.

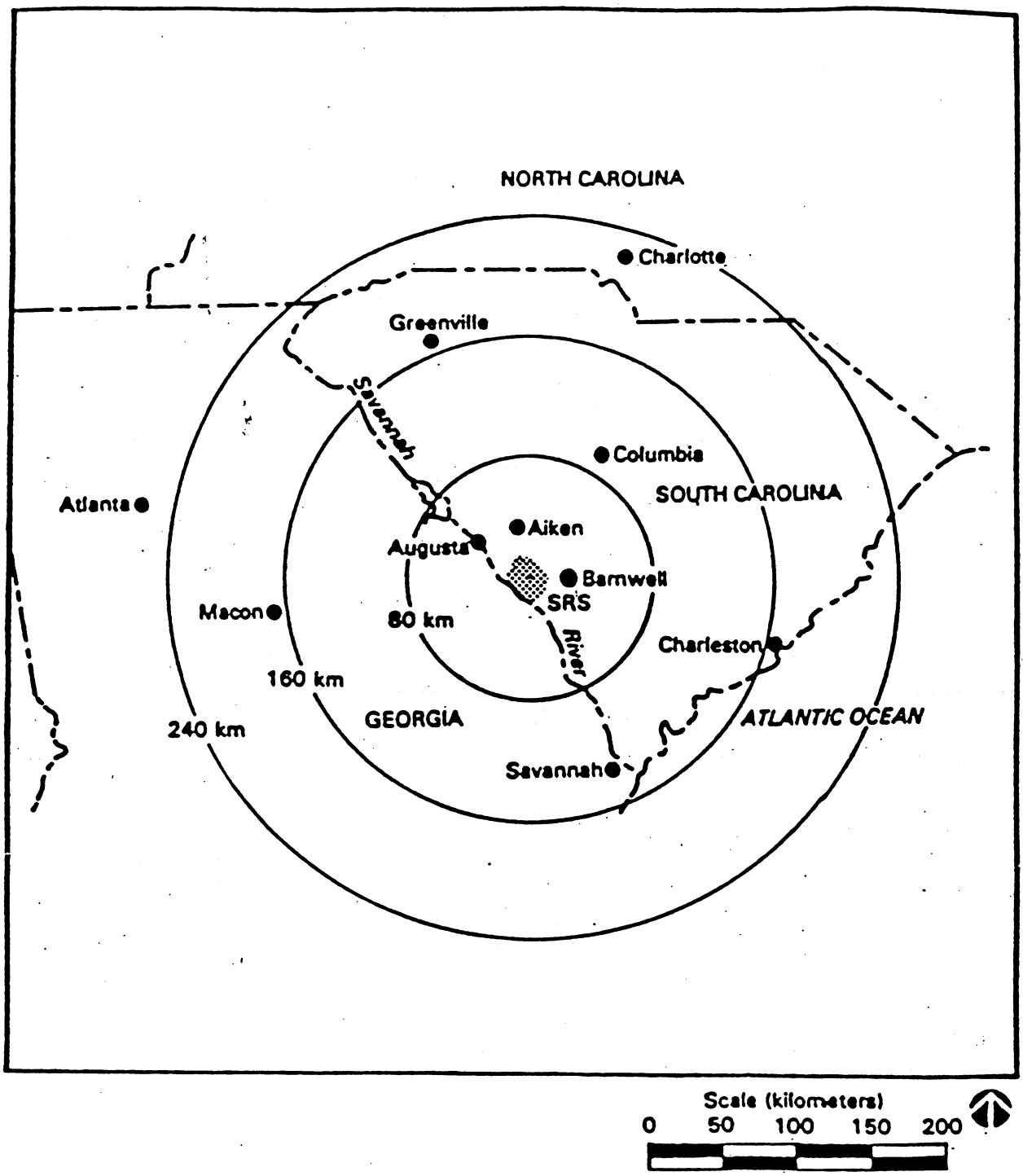


Figure 1. SRS Location in Relation to Surrounding Population Centers

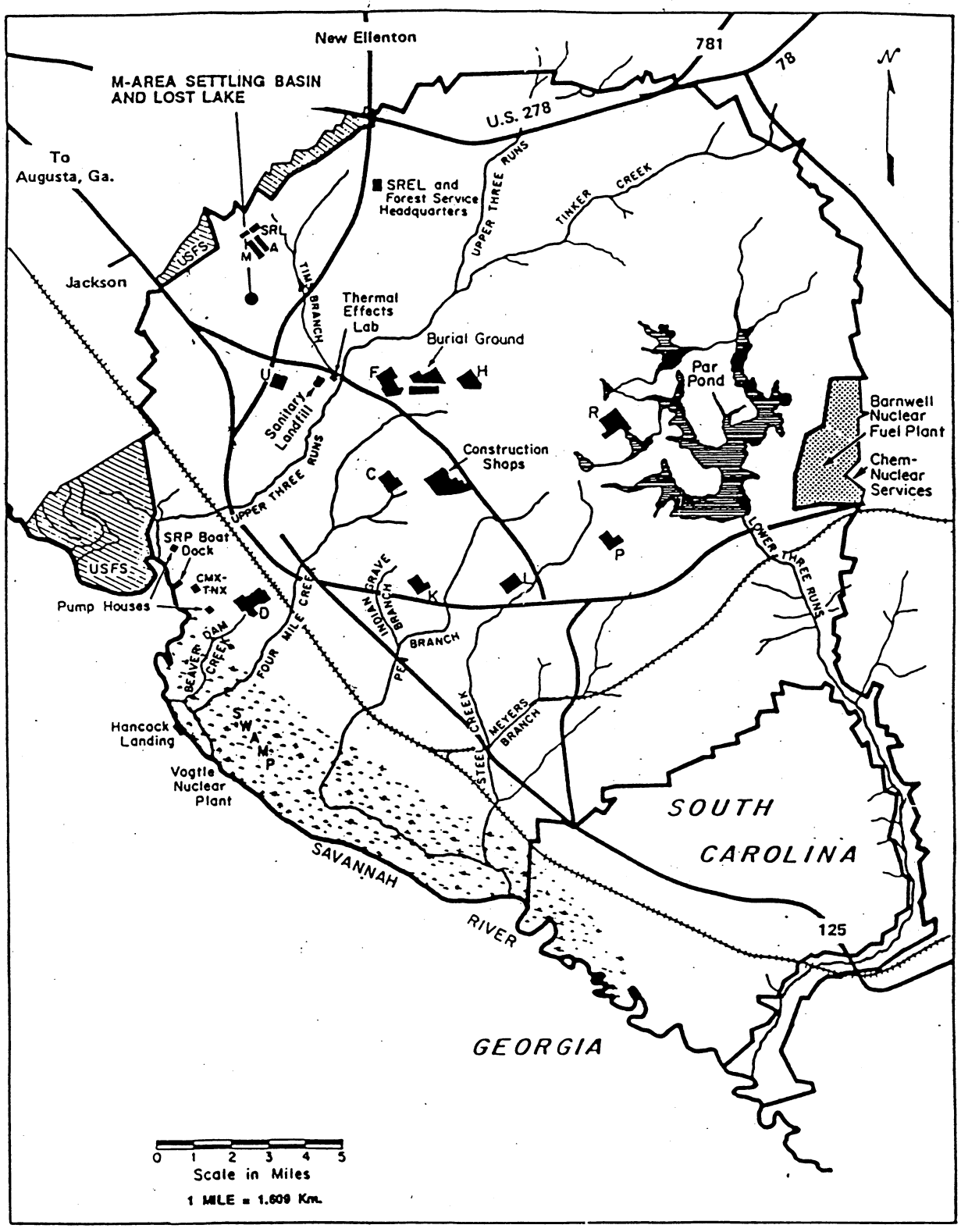


Figure 2. Location of Reactor Materials (M-Area) at Savannah River Site

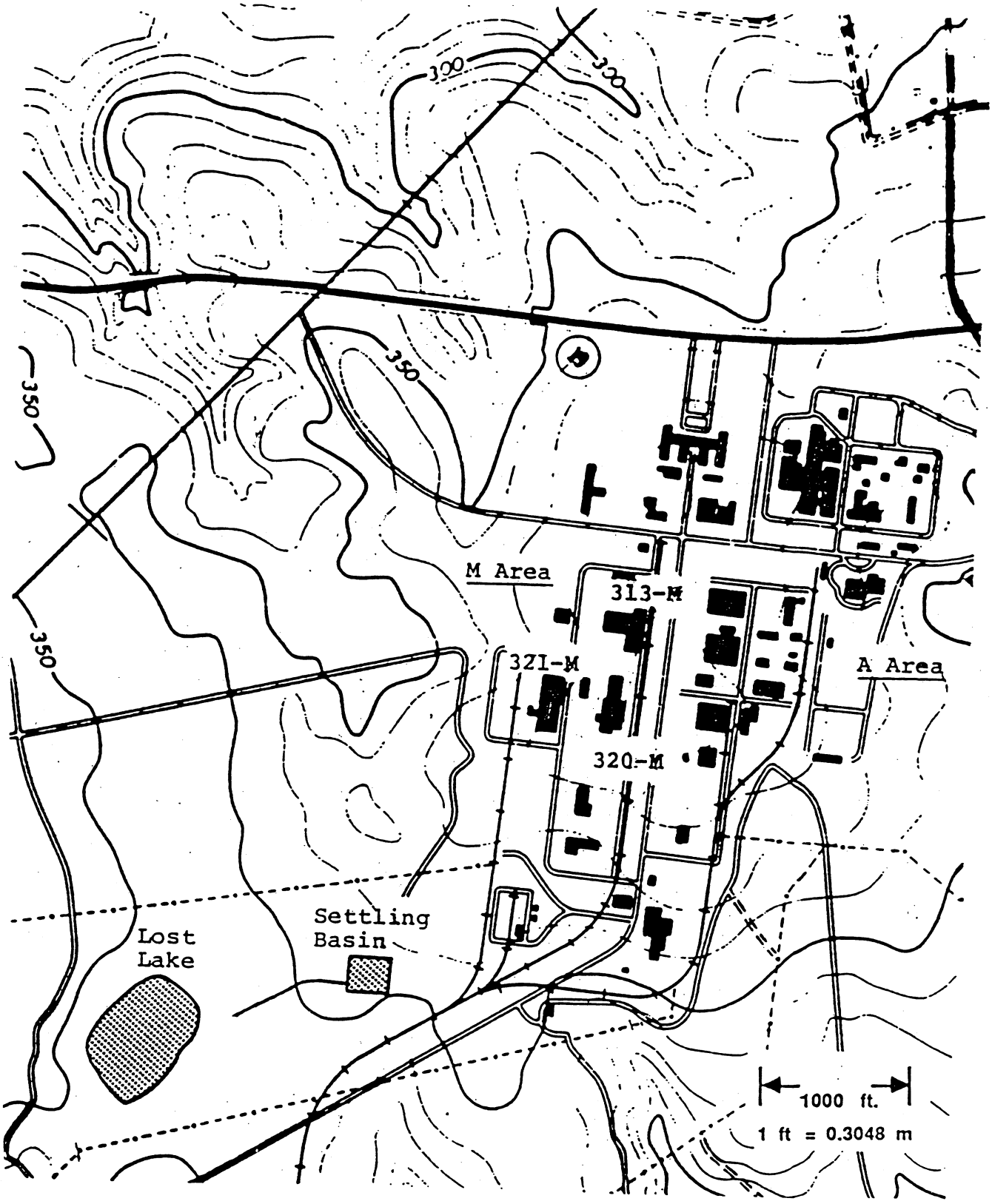


Figure 3 Map of M-Area Buildings and Facilities

1.5 Statement of Certification

This Delisting Petition is submitted pursuant to the U.S. Code of Regulations 40 CFR 260.22, to exclude a waste produced at a particular facility.

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this demonstration and all attached documents, and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the submitted information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

_____ _____

Date

R. A. Cordani_____
WSRC as Co-Operator

Vice President and General Manager
Facilities Disposition Division
Westinghouse Savannah River Co.
Aiken, SC 29808

2.0 WASTE & WASTE MANAGEMENT HISTORICAL INFORMATION

Section 2.0 describes the basis for the waste listing, history of waste generation, the waste volumes and weights, and past and future waste management treatment and disposal.

2.1 Basis for Waste Listing

The petitioned waste is a vitrified solid waste, generated from treatment of the individual waste streams described below. The petitioned waste was generated primarily from a listed F006 plating line sludges plus small amounts of other listed and characteristically hazardous wastes generated at the Savannah River Site. The plating line wastes were blended and mixed to form one homogenous feed tank. The melter feed batches were mixed with glass forming materials, and vitrified in a Joule heated melter. A detailed description of the final wasteform and the vitrification process is provided in Section 3.

The waste streams described in this petition were all described in the DOE-SR's Approved Site Treatment Plan; (WSRC-1996), developed pursuant to the Federal Facility Compliance Act of 1992 (FFC Act, 1992). The waste streams are listed below:

- SR-W004, Filtercake from supernate treatment (from the DETF)
- SR-W005, Mark 15 filtercake (a slightly U-235 enriched material from 313-M)
- SR-W029, Treatability samples from both vitrification and cementitious treatability studies
- SR-W-031, An enriched uranium/chromium solution from the site's Naval Fuels Facility
- SR-W-037, M-Area wastewater sludge from 313-M plating line operations
- Sr-W-038, Sump material from Building 313-M
- SR-W-039, Residual nickel plating solution from 313-M
- SR-W048, Soils from spill remediation and sampling programs
- SR-W054, Enriched uranium solutions, containing lead, from 320-M laboratory, and
- SR-W082, Soils from the excavation of the Chemicals, Metals, and Pesticides(CMP) Pits

The M-Area Plating Line Wastes (W-037) were primarily wastewater treatment sludges generated from electroplating and aluminum forming operations. The wastewaters originated from electroplating processes involving nickel plating of depleted uranium slugs, which were then aluminum clad. The majority of the waste stream was considered a listed F006 mixed waste, as it is listed as hazardous per Title 40 CFR §261.3(a)(2)(ii). The waste also contained a radioactive component consisting of source material (i.e., depleted uranium) as defined by the Atomic Energy Act, Title 10 CFR §20.3(a)(15)(i). The primary hazardous constituent of concern is nickel, while the primary radioactive constituent is depleted uranium (i.e., ^{238}U). The sludges also contained significant levels of sodium nitrate and aluminum hydroxide.

Additional wastes generated from the electroplating process or laboratory analysis residues (i.e., Watts Bath Nickel Plating Line Solution, Plating Line Sump Material, Mark 15 filtercake, some treatability test residues (W-029), STP waste streams W-031, W-048, W-082 and laboratory wastes (W-054)) were incorporated with the F006 sludges prior to vitrification.

The wastes were stored at SRS RCRA permitted or interim status facilities and as such have been characterized as required per 40 CFR §264.13(a), §265.13(a), and §268.7(a). These wastes have been characterized using process knowledge, existing published or documented data, and/or analysis of the physical and chemical properties of the wastes.

Sections 2.1.1 through 2.1.10 provide a detailed physical and chemical characterization of each of the Mixed Wastes, which were stabilized in the Vendor Treatment Facility. The SRS Site Treatment Plan (STP) identification numbers are provided for each stream.

2.1.1 M-Area High Nickel Plating Line Sludge (STP W-037)

The M-Area High Nickel Plating Line Sludge F006 sludge was originally stored in six, 35,000 gallon storage tanks (Tanks 1-6) and two, 500,000 gallon storage tanks (Tanks 7 and 8). This sludge resulted primarily from the neutralization of concentrated electroplating solutions and recovery solutions. The concentrated solutions were neutralized in the Chemical Treatment Facility (CTF), and then transferred to the Process Waste Interim Treatment/Storage Facility (PWIT/SF) storage tanks. The neutralization occurred in an industrial wastewater treatment facility and resulted in a wastewater treatment sludge from electroplating operations; hence the sludge is a F006 listed waste. This waste is primarily a mixture of neutralized caustics and acids (i.e., aluminum hydroxide and nitric acid), and metal precipitates.

Filtercake present in the "High Nickel" PWIT/SF sludge resulted from the treatment of dilute effluents from electroplating and recovery operations and treatment of the supernate resulting from a spontaneous separation in the storage tanks. Dilute streams from the M-Area operations were treated in an Industrial Wastewater Treatment Plant, identified as the M-Area Dilute Effluent Treatment Facility (DETF). Hydroxide and phosphates were used to precipitate the plating line constituents from the dilute effluents. The precipitates were then filtered in the DETF using pressure filtration, with diatomaceous earth (DE) or expanded Perlite as filter aids. The resulting filtercake includes the precipitated sludge, and is therefore an F006 listed waste. The filtercake was transferred to the PWIT/SF tanks 1-8 via the Chemical Transfer Facility (CTF).

After transfer to, and storage in the PWIT/SF tanks, the sludge and filtercake mixture spontaneously separated into a supernate and a concentrated sludge. The sludges were sampled and analyzed in 1986 by an independent off-site laboratory, and were shown not to be characteristically hazardous wastes (Tables 1 & 1A). Additional total constituent analyses of the sludge were conducted by the Savannah River Technology Center (SRTC) from 1988 through 1992. These results are given in Table 1B.

The total volume of sludge plus supernate amounted to ~1,200,000 gallons in 1991. After the supernate was removed and treated (1990 through 1993), the remaining sludge and residual supernate volume in Tanks 1-8 was approximately 435,000 gallons. The volume of filtercake resulting from supernate treatment in Tank No. 10 was approximately 230,000 gallons. Total volume of all the wastes that were treated was approximately 680,000 gallons (Table 19).

Table 1 provides an EP Toxic characterization of the sludge in its untreated form, based on characterization samples collected and analyzed by an independent laboratory in late 1986 and early 1987 (Enwright, 1987a and Enwright, 1988). Table 1A provides a summary of an EP Toxic characterization on a mixture of the sludge and its associated supernate. The Enwright reports on the initial characterization of the M-Area sludges are provided in Appendix A.

Note, these sludge samples from Tanks 1-6 and 8 were collected after the final volumes of waste had been added to Tanks 1-6 and Tank 8.

Table 1B provides the results of an in-depth total constituent analysis conducted by the SRTC of the sludge samples collected by Enwright in 1986/87. (Reference: Jantzen, 1989; provided in Appendix B). Table 1B includes total constituent analyses (conducted by the Savannah River Technology Center - SRTC) for samples from Tanks 7 and 10, collected by M-Area operations personnel in February 1992.

Table 1C provides the results from the analyses of filtercake produced in the DETF in 1986, during treatment of the dilute plating line wastes from Building 313-M (Enwright, 1987b; provided in Appendix A). The DETF filtercake was transferred to Tank No. 7, and mixed with other concentrated plating line effluents from 313-M.

TABLE 1

EP TOXIC LEACHING ANALYSES OF M-AREA INTERIM TANK SLUDGE (mg/L)

		TANK ID										
PARAMETERS	UNITS	1	2	3	4	5	6	8 Port 16	8 17 (top)	8 17 (bot.)	8 Pt. 42	8 Pt. 43
ARSENIC	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
BARIUM	mg/L	0.2	0.2	2	0.7	<0.1	0.2	0.2	0.2	0.2	0.2	0.2
CADMIUM	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
CHROMIUM	mg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
LEAD	mg/L	<0.1	<0.1	0.50	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
MERCURY	mg/L	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
SELENIUM	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
SILVER	mg/L	<0.02	<0.02	<0.02	<0.02	0.07	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
NICKEL	mg/L	2.7	0.7	12.3	10.7	0.4	3.7	7.5	10.2	10.9	11.7	8.4
URANIUM	mg/L	0.02	180	48	45	41	160	0.01	0.59	0.37	0.02	0.01
CYANIDE	mg/L	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
SULFIDE	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
		SLUDGE ANALYSES (TOTAL)										
pH		11.0	12.0	9.6	9.3	12.2	11.0	10.9	11.0	10.8	11.0	10.9
Sp. Gr.		1.18	1.35	1.05	1.15	1.08	1.23	1.28	1.26	1.29	1.23	1.24
TOTAL SOLIDS	%	34	53	7.6	23	14	40	44	40	49	34	40
LAB. ID NO.		44699	44700	44701	44702	44703	44704	44705	44706	44707	44708	44709

Tanks 1-6 sampled in November, 1986 by Enwright Laboratories
Tank 8 sampled in January 1987 by Enwright Laboratories
All Analyses by Enwright Laboratories

References, Enwright, 1987a and 1988 (Provided in Appendix A)

TABLE 1A

EP TOXIC LEACHING RESULTS ON M-AREA INTERIM STORAGE TANK MIXED SLUDGE + SUPERNATANT

PARAMETERS	UNITS	TANK ID. 1	2	3	4	5	6	8 Port 16	8 17 (top)	8 17 (bot.)	8 Pt. 42	8 Pt. 43
ARSENIC	mg/L	<0.005	<0.005	<0.005	<0.005	<0.015	<0.005	<0.005	<0.005	<0.005	<0.005	<0.015
BARIUM	mg/L	0.4	<0.1	1.2	1.7	0.2	<0.1	<0.1	0.2	0.2	0.3	0.3
CADMIUM	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
CHROMIUM	mg/L	<0.05	0.14	<0.05	<0.05	0.12	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
LEAD	mg/L	0.3	<0.2	0.6	<0.1	<0.2	0.3	<0.1	<0.1	<0.1	<0.1	<0.1
MERCURY	mg/L	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
SELENIUM	mg/L	<0.005	<0.005	<0.005	<0.005	<0.010	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
SILVER	mg/L	0.07	0.10	0.03	0.03	0.16	0.08	<0.02	0.03	<0.02	0.03	<0.02
NICKEL	mg/L	2.6	0.8	1.8	4.7	1.3	0.6	0.7	0.4	0.3	2.2	<0.2
URANIUM	mg/L	80	76	11	100	110	110	0.01	0.01	0.02	0.01	0.01
CYANIDE	mg/L	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
SULFIDE	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
TOTAL ANALYSIS OF SLUDGE + SUPERNATANT MIXTURE												
pH		11.8	12.2	10.1	9.2	12.4	11.9	11.6	11.6	11.5	11.7	11.9
Sp. Gr.		1.09	1.13	1.03	1.12	1.09	1.07	1.15	1.13	1.14	1.14	1.15
TOTAL SOLIDS	%	12	20	46	18	15	12	21	20	21	19	19
							PREPARATION OF MIXTURES##					
SUPERNATE	LAB. ID	37576	37577	37578	37579	37580	37581	44710	44711	44711	44712	44713
	(RATIO)	(12.7)	(10.8)	(5.3)	(0.9)	(6.3)	(11.5)	(2.3)	(2.3)	(2.3)	(2.3)	(2.3)
SLUDGE	LAB. ID	44699	44700	44701	44702	44703	44704	44705	44706	44707	44708	44709
	(RATIO)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)

TANK 1-6 SUPERNATE AND SLUDGE SAMPLES COLLECTED BY ENWRIGHT LABORATORY IN NOV., 1986.
TANK 8 SAMPLED BY ENWRIGHT IN JNAUARY, 1987
ANALYSES CONDUCTED BY ENWRIGHT LABORATORY IN 1987.
##SUPERNATE PLUS SLUDGE MIXTURES PREPARED BY MIXING PROPORTIONAL VOLUMES OF SUPERNATE AND SLUDGE.

REFERENCES, ENWRIGHT, 1987A and 1988 (Provided in Appendix A)

TABLE 1B

PWIT/SF SLUDGE; TOTAL CONSTITUENT ANALYSES

Analyte	Elemental Dry wt % Tank 1	Tank 2	Tank 3	Tank 4	Tank 5	Tank 6	Tank 7	Tank 8	Tank 10
Al (ICP)	11.145	7.130	6.383	3.043	9.778	10.013	6.392	10.734	8.896
Ca (ICP)	0.325	0.310	0.304	0.205	0.327	0.497	0.420	0.307	0.351
Fe (ICP)	0.495	0.260	0.655	0.215	0.495	0.740	0.529	0.402	0.870
Mg (ICP)	0.154	0.076	0.069	0.070	0.137	0.188	0.125	0.122	0.122
Mn (ICP)	0.539	1.315	1.025	0.734	0.392	1.535	0.005	0.422	0.035
Na (ICP)	8.830	12.430	15.425	21.555	10.515	9.670	12.292	7.010	7.196
Na (AA)	8.960	14.363	16.713	25.435	10.718	10.228	13.430	7.056	7.433
Li (ICP)	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.001	<0.002	< 0.001
Ni (ICP)	0.695	0.390	0.275	0.055	0.555	0.425	1.871	0.728	0.064
Ni (AA)	0.876	0.556	0.385	0.082	0.758	0.601	1.985	0.990	< 0.060
Si (ICP)	9.613	2.408	3.675	1.631	10.790	12.310	15.869	11.301	24.785
Si (AA)**	16.140	3.140	4.105	3.323	14.030	18.000	17.985	14.715	27.445
Cr (ICP)	0.015	0.013	0.010	0.015	0.015	0.020	< 0.004	0.017	< 0.004
B (ICP)	0.060	0.075	0.025	0.015	0.015	0.010	0.037	0.010	< 0.004
U (D-G)	5.246	4.786	3.229	1.281	3.858	4.080	3.005	5.133	0.045
Sr (ICP)	0.004	0.004	0.005	0.002	0.003	0.006	< 0.000	0.006	< 0.000
Zr (ICP)	0.032	0.010	0.010	0.080	0.010	0.010	< 0.002	0.010	< 0.002
Ti (ICP)	0.040	0.014	0.015	0.017	0.033	0.038	0.024	0.029	0.027
K (AA)	0.122	0.033	0.054	0.021	0.104	0.107	0.580	0.121	2.605
P (ICP)	1.548	1.465	1.953	1.298	1.270	1.135		1.896	1.031
P (Calc IC)*							1.963		
Ba (ICP)	0.008	0.017	0.030	0.032	0.016	0.047	0.000	0.053	0.000
Pb (ICP)	0.161	0.213	0.157	0.136	0.124	0.245	0.156	0.137	0.035
Mo (ICP)	0.011	0.010	0.010	0.010	0.010	0.015	< 0.004	0.009	< 0.004
Zn (ICP)	0.960	2.155	1.720	1.294	0.945	2.875	0.176	0.794	0.172
Cu (ICP)	0.018	0.016	0.014	0.020	0.009	0.026	0.086	0.022	0.003
F (ISE)	< 0.020	< 0.265	< 0.020	< 0.020	< 0.020	< 0.020	0.050	NA	0.060
Cl (ISE)	0.113	0.189	0.142	0.220	0.843	0.060	0.675	0.059	0.310
SO4 (IC)	< 0.500	< 0.500	< 0.500	< 0.500	< 1.310	< 0.500	0.237	< 0.500	< 0.200
NO3 (IC)	14.275	34.660	50.580	59.500	12.000	12.870	15.135	16.376	7.935
PO4 (IC)	2.989	2.375	3.960	1.152	<2.6	0.749	6.019	2.984	3.175
% SOLIDS (105°C)	35.37	38.98	9.24	22.34	32.49	37.12	30.85	38.24	17.56
% SOLIDS (90°C)	34.43	38.54	6.80	19.87	28.29	36.98	N/A	32.39	N/A
Moles of Na	0.390	0.624	0.727	1.106	0.466	0.445	0.584	0.307	0.323
Moles of NO3	0.230	0.559	0.816	0.960	0.194	0.208	0.244	0.264	0.128
Moles of Cl	0.003	0.005	0.004	0.006	0.024	0.002	0.019	0.002	0.009

N/A = Not Analyzed
IC = ion chromatagraph; ICP = inductively coupled plasma sphectrophotometer; ISE = ion selective electrode

MOLAR MASS BALANCE

Al(OH)3	27.06	15.72	12.35	4.73	23.80	24.15	11.90	25.06	21.76
NaNO3	19.57	47.51	69.34	81.57	16.45	17.64	20.75	22.45	10.88
SiO2 **	33.51	5.78	7.86	6.49	29.00	36.97	37.17	30.52	57.59
Na6U7O24	6.89	6.28	4.24	1.68	5.07	5.36	3.95	6.74	0.06
Ca-zeolite	2.99	2.85	2.79	1.88	3.00	4.57	3.86	2.82	3.22
AlPO4	4.75	4.49	5.99	3.98	3.89	3.48	6.02	5.81	3.16
SUM	94.76	82.64	102.57	100.33	81.21	92.18	83.65	93.41	96.67

* The maximum phosphorus concentration was used, based either on the ICP analysis for P, or calculated from the IC analysis for PO4.

**The SiO2 is believed present as an amorphous silica compound.

Ca-zeolite has approximate formula of Ca6(AlSiO4)12•30H2O; Mol.wt +2210 gms/mole

*Ref; Jantzen, 1989.

TABLE 1C

1986 M-AREA DETF FILTERCAKE ANALYSES

TOTAL CONSTITUENT; EP TOXIC and TCLP LEACHING ANALYSES

SAMPLE No.		DETF Filter Cake #1		DETF Filter Cake #1	
Lab No.		86-38682		86-38683	
PARAMETERS	UNITS				
pH		8.0		8.0	
Reactivity					
Cyanide	mg/L	<1		<1	
Sulfide	mg/kg	<10		<10	
Corrosivity		NA		NA	
Ignitability		NA		NA	
		TOTAL, mg/kg		TOTAL, mg/kg	
As	mg/kg	8.2		8.5	
Ni	mg/kg	2000		1500	
Pb	mg/kg	28		24	
U	mg/kg	540		560	
Al	mg/kg	6200		5800	
Zn	mg/kg	180		170	
			LEACHING RESULTS		
		EP TOXIC	TCLP	EP TOXIC	TCLP
ARSENIC	mg/L	<0.001	0.005	<0.001	0.005
BARIUM	mg/L	0.3	0.5	0.4	0.5
CADMIUM	mg/L	<0.01	<0.01	<0.01	<0.01
CHROMIUM	mg/L	<0.05	<0.05	<0.05	<0.05
LEAD	mg/L	<0.1	0.3	<0.1	0.3
MERCURY	mg/L	<0.0005	<0.01	<0.0005	<0.0005
SELENIUM	mg/L	<0.003	<0.003	<0.003	<0.003
SILVER	mg/L	<0.02	<0.0005	<0.02	<0.01
NICKEL	mg/L	9.2	16	8.3	18

No volatiles , semi-volatiles, pesticides, or herbicides were detected above analytical detection limit, except isobutanol and methylene chloride - which are known laboratory contaminants.

Samples collected in in November, 1986 and received by Enwright Labs. 12/5/96

Enwright, 1987b (Reference included in Appendix A)

Note; filtercake generated from treatment of dilute plating line effluents, and transferred to Tank No. 7

2.1.2 M-Area Plating Line Sludge From Supernate Treatment (STP W-004)

Tank 10 Filtercake

The PWIT/SF filtercake also included treatment of the supernate from Tanks 1-8, after the sludge and supernate had separated. The treatment of the supernate was conducted to minimize the amount of final waste to be stabilized. The supernate was treated in the M-Area DETF using phosphates to precipitate the plating line constituents. The precipitates were then filtered using pressure filtration, with expanded Perlite as filtercake. The filtercake was then transferred to PWIT/SF Tank No. 10 via the CTF. The resulting filtercake included the precipitated sludge, and was considered an F006 listed waste (wastewater treatment sludges from electroplating operations). This waste contained a radioactive component consisting of source material (i.e., depleted uranium) as defined by 10 CFR §20.3(a)(15)(i) and was therefore considered a mixed waste.

Table 2 provides the results the analyses of filtercake produced in the DETF in 1989, after Building 313-M had been placed in standby in 1988, although supernate treatment had not been initiated. 320-M and 322-M Laboratories at that time (Pickett, 1992; provided in Appendix C). This filtercake was transferred to Tank 10.

Table 2A provides analytical results on the filtercake transferred via the CTF to Tank 10 in 1992. Supernate was being treated at this time (Ref., Pickett, 1993; provided in Appendix C).

Table 2B provides analytical results on the filtercake transferred via the CTF to Tank 10 in 1993. Supernate was being treated at this time (Ref., Poulos, 1993; provided in Appendix C)

2.1.3 Mark 15 Filter Cake (STP W-005)

This waste was characterized as a listed F006 mixed waste per 40 CFR §261.3 (a)(2)(ii) due to the process generating the waste; wastewater treatment sludges from electroplating operations. This material also contained a radioactive component consisting of source material (i.e., slightly enriched uranium, 1.1% ^{235}U) as defined by 10 CFR §20.3(a)(15)(i) and was therefore considered a mixed waste. This waste was generated during a Building 313-M assembly production campaign, and subsequent uranium recovery process, during April 1983 through July 1983. All of the process liquid effluents generated from the nickel plating line operations, including the plating line tank dumps, acid core recovery tank dumps, and the autoclave cooling and flushing streams, were monitored carefully to ensure that the slightly enriched uranium was efficiently recovered. The acidic process effluents were transferred to the 313-M recovery room, where they were neutralized with sodium hydroxide to a pH of 6-7. The autoclave effluent cooling and flushing streams were transferred to the recovery room hold tank. The precipitates from the neutralization tank and the autoclave effluent solutions were filtered through an in-process plate framed filterpress, drummed, sampled for uranium content, and stored. Process knowledge dictates that this waste is similar in composition to the High Nickel Plating Line Sludge (Section 2.1.1). Each of the 74 stored drums was sampled and analyzed in 1983, to support the planned shipment to Oak Ridge, TN - for recovery of the slightly enriched uranium. The materials were not shipped to or recovered in Oak Ridge, as the Oak Ridge recovery facility became unavailable. The results of the analysis are given below:

Net wt., kgs	Wt. % H_2O	Dry Net wt., kgs	Dry wt % U	Wt U kgs
16,030	35.2	10,390	32.5	3380

TABLE 2

1989 FILTERCAKE ANALYSIS
FILTERCAKE PRODUCED WHEN ONLY 320-M AND 321-M OPERATING
(NO SUPERNANT TREATMENT OR 313-M OPERATIONS)

SAMPLE ID		200040441	200040442	200040443	200040444	200040445	200040448	200040451
SAMPLE DATE		10/21/89	10/21/89	10/22/89	10/22/89	10/24/89	10/25/89	10/26/89
SAMPLE TIME		700	1600	600	1300	830	1300	2110
ENWRIGHT Lab. ID No.		90-F062-01	90-F062-02	90-F062-03	90-F062-04	90-F062-05	90-F062-06	90-F062-07
TOTAL CONSTITUENT CONCENTRATIONS								
	units							
FLASH POINT	(°C)	>100	>100	>100	>100	*	>100	>100
* Insufficent sample								
REACTIVITY								
Cyanide	mg/kg	<2	<2	<2	<2	<2	<2	<2
Sulfide	mg/kg	<50	<100	<50	<100	<100	<150	<100
CORROSIVITY(NACE Coupon test)	mm/yr	<6.35	<6.35	<6.35	<6.35	<6.35	<6.35	<6.35
TOTAL METALS								
As	mg/kg	<0.44	<0.44	<0.49	<0.47	<0.39	<0.42	<0.41
Ba	mg/kg	0.59	0.50	0.48	0.48	0.55	0.76	0.64
Cd	mg/kg	<0.43	<0.44	<0.44	<0.47	<0.39	<0.42	<0.41
Cr	mg/kg	20.6	35.6	<0.70	1.39	<0.63	<0.67	328
Pb	mg/kg	<2.6	<2.65	<2.63	<2.83	<2.34	<2.52	<2.48
Hg	mg/kg	0.082	0.073	0.040	0.088	0.130	0.12	0.12
Se	mg/kg	<0.87	<0.89	<0.88	<0.94	<0.78	<0.84	<0.83
Ag	mg/kg	<0.43	<0.44	<0.44	<0.47	<0.39	0.77	<0.41
Ni	mg/kg	14.1	23.9	<4.39	<4.72	<3.91	<4.20	222
U	mg/kg	67.5	78.5	51.0	103.5	58.5	32	50.5
EP TOXICITY LEACHANT CONCENTRATION								
								EP TOXIC CONCENTRATION
As	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	5
Cd	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	1
Cr	mg/L	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	5
Pb	mg/L	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	5
Hg	mg/L	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.2
Se	mg/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	1
Ag	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	5
Ni	mg/L	0.166	0.198	0.135	0.242	0.172	0.124	0.150	
U	pCI/L	1.6	2.0	0.9	1.2	3.8	0.7	0.6	
@0.003 mg/pCi of depleted U	mg/L*	0.005	0.006	0.003	0.004	0.011	0.002	0.002	

Note, filtercake discharged to Tank No. 10
REFERENCE, PICKET, 1992 (Provided in Appendix C)

TABLE 2A
1992 RCRA FILTERCAKE ANALYSIS

SAAMPLE ID (Date Collected)		10/8/92			10/10/92	
LAB ID (assigned by laboratory)		1	1	1	2	2
	Units					
Ignitability		None Obs.			None Obs.	
pH (on water asssociated with sample)	pH	8.1			8.1	
Corrosivity (coupon test)	mm/yr	<6.35			<6.35	
Reactivity Cyanide (CN)		Not Detected.			Not Detected.	
Sulfide (S)		Not Detected.			Not Detected.	
Total solids	Wt. %	13.8			20.1	
TOTAL CONSTITUENT CONCENTRATIONS						
(Dry wt Basis)						
Al	mg/Kg	68600			45400	
B	mg/Kg	<145			<99.4	
Ca	mg/Kg	<7250			<4790	
Cr	mg/Kg	109			69	
Cu	mg/Kg	36.2			<24.8	
Fe	mg/Kg	2720			1830	
Mg	mg/Kg	<7250			<4790	
Mn	mg/Kg	62.2			43	
Na	mg/Kg	30800			20300	
Ni	mg/Kg	71.2			<39.7	
Si	mg/Kg	1990			1380	
U	mg/Kg	<290			<199	
Zn	mg/Kg	111			70.3	
NO3 (as N)	mg/Kg	5110			4380	
PO4 (as P)	mg/Kg	2610			614	
SO4	mg/Kg	10800			7350	

TCLP METALS							
LAB ID (On Leachant)		3	3	3 Matrix Spike (% Recovery)	4		LIMIT
As	mg/L	0.105		106	<0.100		5.0
Ba	mg/L	<0.200		111	<0.200		100
Cd	mg/L	<0.005		103	<0.005		1.0
Cr	mg/L	<0.010		102	0.015		5.0
Hg	mg/L	<0.0002		102	<0.0002		0.2
Pb	mg/L	<0.090		101	<0.090		5.0
Se	mg/L	<0.100		51.8	<0.100		1.0
Ag	mg/L	<0.010		55	<0.010		5.0
PLUS							
Ni	mg/L	0.11		105	0.107		NA
U	mg/L	<0.200		101	<0.200		NA

TCLP VOLATILES					
LAB ID (On Leachant)		5	6	6 Matrix Spike (%Recovery)	
Benzene	µg/L	<50	<50	111	100000
Carbon Tetrachloride	µg/L	<50	<50	106	500
Chlorobenzene	µg/L	<50	<50	109	100000
Chloroform	µg/L	<50	<50	100	6000
1,2-Dichloroethane	µg/L	<50	<50	128	500
1,1-Dichloroethylene	µg/L	<50	<50	104	700
Methyl Ethyl Ketone (2-Butanone)	µg/L	<100	<100	111	200000
Tetrachloroethylene	µg/L	<50	<50	122	700
Trichloroethylene	µg/L	<50	<50	108	500
Vinyl Chloride	µg/L	<100	<100.	142	200

TABLE 2A (CON'T)

1992 ANNUAL RCRA FILTERCAKE ANALYSIS (Cont')

SAAMPLE ID (Date Collected)		10/8/92			10/10/92		TCLP LIMIT
LAB ID (assigned by laboratory)		1	1	1	2	2	
TCLP ACID/BASE NEUTRALS							
LAB ID (On Leachant)		3	3 Replicate	3 Matrix Spike (% Recovery)	4		
o-Cresol	µg/L	<100	<100	77	<100		200000
m-Cresol +p-Cresol	µg/L	<100	<100	74	<100		200000
1,4-Dichlorobenzene	µg/L	<100	<100	54	<100		7500
2,4-Dinitrotoluene	µg/L	<100	<100	78	<100		130
Hexachlorobenzene	µg/L	<100	<100	103	<100		130
Hexachlorobutadiene	µg/L	<100	<100	47	<100		500
Hexachloroethane	µg/L	<100	<100	47	<100		3000
Nitrobenzene	µg/L	<100	<100	84	<100		2000
Pentachlorophenol	µg/L	<500	<500	93	<500		100000
Pyridine	µg/L	<100	<100	79	<100		5000
2,4,5-Trichlorophenol	µg/L	<500	<500	71	<500		400000
2,4,6-Trichlorophenol	µg/L	<100	<100	64	<100		2000
TCLP HERBICIDES							
2,4-D	µg/L	<10	-	105	<10		10000
2,4,5-TP	µg/L	<5	-	88	<5		1000
2,4,5-T (Extra; Not on TCLP list)	µg/L	<5	-	96	<5		
TCLP PESTICIDES							
Lindane	µg/L	<0.23	-	130	<0.20		400
Total Chlordane	µg/L	<2 3	-	100	<2 0		30
Endrin	µg/L	<0 47		135	<0 40		20
Heptachlor	µg/L	<0.23		105	<0 20		8
Heptachlor Epoxide	µg/L	<0.23		100	<0 20		8
Methoxychlor	µg/L	<2.3		103	<2.0		10000
Toxaphene	µg/L	<4.7	-	-	<4.0		500

Samples collected from CTF slurry hold tank (tank no. 200-18), prior to transfer to IT/SF.
Filtercake was from two separate supernate treatment batches (Batch nos. 119 and 120 from Tank 8).

Reference, Pickett, 1993 (Provided in Appendix C).

TABLE 2B

1993 FILTERCAKE ANALYSIS
FILTERCAKE PRODUCED WHEN SUPERNATE BEING TREATED

GENERATOR SAMPLE ID		Units	1	2	3
Flashpoint			None Obs.	None Obs.	None Obs.
pH			8.2	8.2	8.2
Corrosivity (Coupon Test)		mm/yr	5	5	5
Reactivity	Cyanide (CN)		Negative	Negative	Negative
	Sulfide (S)		Negative	Negative	Negative
Total Solids		Wt. %	26.9	27.2	25.4

TOTAL CONSTITUENT CONCENTRATIONS (dry wt. basis)

Al	mg/Kg	34500	30100	37000
B	mg/Kg	57.8	51.1	57.7
Ca	mg/Kg	<1840	<1820	<1940
Cr	mg/Kg	51.5	44.2	53.6
Cu	mg/Kg	<9.2	<9.1	<9.7
Fe	mg/Kg	1700	1480	1910
Mg	mg/Kg	<1840	<1820	<1940
Mn	mg/Kg	36.2	31.6	40.3
Na	mg/Kg	17500	16300	18400
Ni	mg/Kg	<14.7	<14.6	<15.5
Si	mg/Kg	857	747	895
U	mg/Kg	386	385	410
Zn	mg/Kg	46.5	37.2	49.4
NO3 (as N)	mg/Kg	2100	2600	3070
PO4 (as P)	mg/Kg	3730	14700	14200
SO4	mg/Kg	11700	10900	11900

TCLP METALS

					TCLP LIMITS
Ag	mg/L	<0.01	<0.01	<0.01	5
As	mg/L	<0.1	<0.1	<0.1	5
Ba	mg/L	<0.2	<0.2	<0.2	100
Ca	mg/L	<0.005	<0.005	<0.005	1
Cr	mg/L	<0.01	<0.01	<0.01	5
Hg	mg/L	<0.0002	<0.0002	<0.0002	0.2
Pb	mg/L	<0.090	<0.090	<0.090	5
Se	mg/L	<0.1	<0.1	<0.1	1
Ni	mg/L	<0.1	<0.1	<0.1	N/A
U	mg/L	<0.1	<0.1	0.118	N/A

TABLE 2B Cont'

1993 FILTERCAKE ANALYSIS

TCLP VOLATILES					TCLP LIMITS
Benzene	mg/L	<0.05	<0.05	<0.05	0.5
Carbon Tetrachloride	mg/L	<0.05	<0.05	<0.05	0.5
Chlorobenzene	mg/L	<0.05	<0.05	<0.05	100
Chloroform	mg/L	<0.05	<0.05	<0.05	6
1,2-Dichloroethane	mg/L	<0.05	<0.05	<0.05	0.5
1,1-Dichloroethylene	mg/L	<0.05	<0.05	<0.05	0.7
Methyl Ethyl Ketone (2-Butanone	mg/L	<0.1	<0.1	<0.1	200
Tetrachloroethylene	mg/L	<0.05	<0.05	<0.05	0.7
Trichloroethylene	mg/L	<0.05	<0.05	<0.05	0.5
Vinyl Chloride	mg/L	<0.1	<0.1	<0.1	0.2

TCLP SEMIVOLATILES					TCLP LIMITS
o-Cresol	mg/L	<0.1	<0.1	<0.1	200
m-Cresol + p-Cresol	mg/L	<0.1	<0.1	<0.1	200
1,4-Dichlorobenzene	mg/L	<0.1	<0.1	<0.1	7.5
2,4-Dinitrotoluene	mg/L	<0.1	<0.1	<0.1	0.13
Hexachlorobenzene	mg/L	<0.1	<0.1	<0.1	0.13
Hexachlorobutadiene	mg/L	<0.1	<0.1	<0.1	0.5
Hexachloroethane	mg/L	<0.1	<0.1	<0.1	3
Nitrobenzene	mg/L	<0.1	<0.1	<0.1	2
Pentachlorophenol	mg/L	<0.5	<0.5	<0.5	100
Pyridine	mg/L	<0.1	<0.1	<0.1	5
2,4,5-Trichlorophenol	mg/L	<0.5	<0.5	<0.5	400
2,4,6-Trichlorophenol	mg/L	<0.1	<0.1	<0.1	2

TCLP HERBICIDES					TCLP LIMITS
2,4-D	mg/L	<0.01	<0.01	<0.01	10
2,4,5-TP	mg/L	<0.005	<0.005	<0.005	1
2,4,5-T (Extra - not on TCLP list)	mg/L	<0.005	<0.005	<0.005	N/A

TCLP PESTICIDES					TCLP LIMITS
Chlordane (Total)	mg/L	<0.0011	<0.001	<0.0011	0.03
Endrin	mg/L	<0.00023	<0.00021	<0.00022	0.02
Heptachlor	mg/L	<0.00011	<0.0001	<0.00011	0.008
Heptachlor Epoxide	mg/L	<0.00011	<0.0001	<0.00011	0.008
Lindane	mg/L	<0.00011	<0.0001	<0.00011	0.4
Methoxychlor	mg/L	<0.0011	<0.001	<0.0011	10
Toxaphene	mg/L	<0.0023	<0.0021	<0.0022	0.5

Annual RCRA Filtercake Analyses on Samples Collected 10/14/93

Samples collected from Chemical Transfer Facility (CTF) hold tank (ID # 200-18), prior to transfer to Interim Treatment/Storage Facility (IT/SF). Filtercake was from supernate batch number 93E79.

Note, filtercake discharged to Tank No. 10

Reference, Poulos, 1993 (Provided in Appendix C)

2.1.4 Nickel Plating Line Solution (STP W-039)

The Nickel Plating Line Solution was a Watts Type Nickel Bath consisting of Nickel Sulfate (300 g/l), Nickel Chloride (45 g/l), and Boric Acid (30-37.5 g/l). The Watts Bath solution was used to plate uranium slugs in Building 313-M. Because this solution was used to plate slugs, various contaminants were expected in the solution. In particular lead and uranium were known to contaminate the plating baths; and during normal plating operations, the baths were periodically cycled through a special plating cell to remove these contaminants. When the plating line was placed in standby in 1988, the plating line solution was drained and stored for future use. When the decision was made to "shutdown" Building 313-M in 1991, the solution was analyzed for hazardous constituents. Analytical results for the Extraction Procedure toxicity analyses showed that the solution exceeded the limits for lead. The solution was also considered a California List waste due to the high nickel concentration (>134 mg/l) and low pH (<2). This waste was considered characteristically hazardous for low pH (D002) per 40 CFR §261.22(a)(1) and §261.24(a) for lead (D008). This waste also contained a radioactive component consisting of source material (i.e., depleted uranium) as defined by 10 CFR §20.3(a)(15)(i) and was therefore considered a mixed waste (Pickett, 1990; analytical results provided in Appendix D). A summary of the chemical analyses is given below in Table 3A.

TABLE 3 NICKEL PLATING LINE SOLUTION COMPOSITION

Ingredient	Typical Concentration, g/L
Nickel Sulfate; $NiSO_4 \cdot 6H_2O$	300
Nickel Chloride; $NiCl_2 \cdot 6H_2O$	45
Boric Acid; H_3BO_3	30-37.5

For a Watts plating Bath solution, the initial nickel concentration is ~77 g/L, and the initial pH is 1.3 - 2.2 (Durney, 1984).

TABLE 3A Analytical Results on Stored Watts Bath Solution (Pickett, 1990*)

Constituent	EP Toxic Concentration, mg/L
As	<1.00
Ba	<1.00
Cd	<0.50
Cr	<1.50
Pb	18.1-19.0
Hg	<0.20
Se	<0.50
Ag	<1.00
U	30

*provided in Appendix D

2.1.5 M-Area Sludge Treatability Samples (STP W-029)

This stream was specifically listed as a listed F006 mixed waste per 40 CFR §261.3(c)(2)(i), the derived from rule. High Nickel Plating Line Sludge, filtercake from Supernate Treatment, Mark 15 Filter Cake, and Nickel Plating Line Solution were mixed and then stabilized using both cementitious and vitrification processes to determine the most cost effective treatment technology. The treatability samples also contained a radioactive component consisting of source material (i.e., depleted ([0.2 wt. % U-235] and slightly enriched [1.1 wt. % U-235] uranium) as defined by 10 CFR §20.3(a)(15)(i) and was therefore considered a mixed waste. All of the treatability samples totaled ~250 gallons.

The original plan was to size reduce all of these materials and add them directly to the VTF melter pool. Unfortunately, the VTF replacement melter did not have a direct feed port that was reasonably accessible. Some of the vitrification treatability studies were conducted in ceramic crucibles and some in stainless steel containers. The residual glass adhered tightly to the crucibles or containers and was very difficult to separate. The sub-contract vendor was concerned that some highly refractory crucible materials could be introduced to the melter via direct addition, which could impact the melter or the glass discharge system (gem machine). SRS proposes to delist those treatability samples (which could not be separated from their containers) as a separate stream - where sufficient data is available to demonstrate that the treatability samples meet the proposed delisting limits. Cementitious treatability samples generated during treatability studies conducted during the contract award were size reduced and added to the vitrified waste stream. A small amount (<4 gallons) of cementitious treatability samples generated by SRTC had sufficient data to demonstrate that the samples meet the delisting criteria. These were disposed in 71-gallon containers and were not vitrified with the M-Area sludges.

The treatability samples were generated in a number of different treatability studies. These are discussed in chronological order, by laboratory, with the analytical data presented in the following sections. The final endpoint for each set of samples is indicated.

2.1.5.1 1988 Savannah River Laboratory (SRL) Cement Study

Cementitious studies were conducted in 1988 by the Savannah River Laboratory (now SRTC) to support the preparation of a delisting petition for the M-Area treated sludge (Ref., DOE, 1989). The sludge was treated by a cementitious process, using a mixture of Portland cement, blast furnace slag, fly-ash, sodium hydroxide, and m-Area tank supernate – to form a stable wasteform. Four sludge samples were collected from each of the 8 tanks (32 samples). Each of the samples was mixed in a 1L polypropylene bottles with the stabilization additives. Each of 32 samples was tested by the EP toxicity procedure. The EP Toxic results are given below:

Table 4 EP Toxic Leaching Results on 32 SRL Cement Samples

Constituent	Maximum EP Toxic Concentration, mg/L	Proposed Delist Level mg/L (TCLP)
Ag	<0.5	5.0
As	<0.5	5.0
Ba	2.7	200
Cd	<0.01	0.5
Cr	<0.05	10
Hg	<0.0005	0.2
Pb	0.3	1.5
Se	<0.01	5.0
Ni	2.5	10
NO_3 (as N)	208	1000
Fluoride*	2.2	400

* Calculated; by ratioing total concentration of fluoride (0.04 wt. %) to the amount of nitrate (as N) (3.8 wt. %) times the 208 mg/L maximum EP Toxic level for nitrate (in all 32 samples).

One of the four samples from each of the 8 tanks was also tested by the TCLP procedure. The maximum TCLP result for these 8 samples is given below:

Table 4A TCLP Leaching Results on 8 SRL Cement Samples

Constituent	Maximum TCLP Concentration, mg/L	Proposed Delist Level mg/L (TCLP)
Ag	0.04	5.0
As	0.11	5.0
Ba	0.5	200
Cd	<0.01	0.5
Cr	<0.05	10
Hg	<0.0005	0.2
Pb	<0.1	1.5
Se	<0.05	5.0
Ni	0.81	10
Zn	<0.01	1000
NO3 (as N)	NA	1000
Fluoride	NA	400
Freon	<0.05	NA

The sample residues (the stabilized materials remaining in the thirty-two 1L bottles) were transferred to and stored in the M-Area MWSS. The total volume of treatability samples from this study was less than 4 gallons. The maximum EP Toxic or TCLP result on all of the samples was less than the proposed delisting limit. These cement treatability samples were placed in a 71-gallon drum and stored on the Interim Status storage pad along with the vitrified glass. They were not combined with the M-Area plating line wastes and vitrified.

2.1.5.2 1989 and 1991 SRTC/M-Area Cement Treatability Studies

The Savannah River Technology Center (SRTC) and M-Area personnel conducted additional cementitious treatability studies in 1989 and 1991. The previous study (1988) had indicated that simply mixing the cementitious additives with the M-Area sludge would not meet the proposed LDR treatment standard in effect in 1989 (0.32 mg/L for nickel). The 1989 studies involved washing (rinsing) the M-Area sludge to remove the majority of the sodium nitrate, re-slurring the rinsed sludge, and then mixing the rinsed sludge with cementitious materials. The 1991 study involved additional development to optimize the cementitious treatment process (Pickett, 1993b). The test conditions and TCLP results are provided in Table 4B. The TCLP analyses were conducted on three of the study conditions, which covered a range of the study parameters.

The residual treatability sample materials comprised ~20 gallons, and were stored in the M-Area MWSS. These cement treatability samples were placed in a 71-gallon drum and stored on the Interim Status storage pad with the vitrified glass. They were not vitrified.

TABLE 4B: TCLP RESULTS ON 1991 CEMENT TREATABILITY SAMPLES

Test Conditions	Units	All	Test No. 35	36	39
udge From Tank No		7 & 8	8	7	7
lume of Sludge Feed	L	1 &2	2	2	2
ater Wash Volume	L	0,1, 2	2	2	2
tal Sludge Solids	gms	236, 435, 588	588	435	435
ment Added	gms	0, 79, 117, 157, 236,	236	0	175
ment to Solids Ratio		0, 0.13, 0 .27, 0.40	0.27	0	0
lmer added		Yes/or No	Yes	Yes	Yes
ter Aid (Envirogard)	gms	0, 79, 157	0	0	0
(OH)2	gms	0, 79, 157	0	0	0
ditional Nickel*			Yes	No	No
oubled the normal el in sludge					

	Units	TCLP Results: Range, 22 Different Tests	35	36	39	Delisting Limit
ckel	mg/L	<0.05 -2.91	2.91	<0.050	<0.050	10
rate (as N)*	mg/L	9-296	26.7	9.7	10.5	1000
ver	mg/L		0.139	<0.050	<0.050	5.0
senic	mg/L		<0.50	<0.50	<0.50	5.0
rium	mg/L		<0.050	<0.050	<0.050	200
dmium	mg/L		<0.020	<0.020	<0.020	0.5
romium	mg/L		0.10	0.108	0.101	10
ad	mg/L		<0.50	<0.50	<0.50	1.5
lenium	mg/L		<0.50	<0.50	<0.50	5.0
ercury	mg/L		<0.010	<0.010	<0.010	0.2

One control test, without rinsing to remove the nitrate, had a leach rate of 296 mg/L TCLP.
herwise the highest result was 55 mg/L TCLP.

2.1.5.3 Vitrification Studies Conducted by SRTC in 1992/1993

The Savannah River Technology Center (SRTC) conducted treatability studies on the vitrification of the M-Area sludges from 1992 through 1993. The initial studies demonstrated the feasibility of vitrifying the mixed plating line wastes in a borosilicate or soda lime silica formulations, with very large volume reductions (Jantzen, 1993). The initial samples also demonstrated a durable material, as indicated by the TCLP leaching results:

TABLE 4C-TCLP Leaching Results on Initial SRTC Glass Samples

Constituent	Maximum TCLP Concentration, mg/L	Proposed Delist Level mg/L (TCLP)
Ni	0.74	10
Ba	1.85	200
Pb	<0.2	1.5
Cr	<0.04	5.0

A much wider range of glass testing was then carried out, over a range of waste loadings, and different formulations, to control melt viscosity and durability (Jantzen, 1994). The TCLP results on these glass samples are provided in Table 14, Section 3.2.1.3. All of the TCLP results, on all of the glass samples, were less than the proposed delisting limits. Approximately 6 gallons of glass samples and contaminated crucibles from the initial and expanded SRTC studies were returned to, and stored in, the M-Area MWSS. These vitrified treatability samples were placed in a 71-gallon drum and stored on the Interim Status storage pad with the vitrified sludge. They were not added to the VTF melter and re-vitrified.

2.1.5.4 Initial Crucible Studies by Catholic University of America (CUA) in 1993

Each of the competitive range bidders conducted a treatability study to demonstrate that they could meet the contract specifications (TCLP leaching) for the final treated wasteform. CUA conducted an initial vitrification crucible study in 1993, and the results are discussed in detail in Section 3.2.1.2. The vitrified materials met all of the proposed delisting limits (Table 13). The glass residues amounted to 4-5 gallons, and were returned to and stored in the M-Area MWSS. These glass treatability samples were placed in a 71-gallon drum and stored on the Interim Status storage pad with the vitrified glass. They were not added to the VTF melter and re-vitrified.

2.1.5.5 Vitrification Bench Scale Study Conducted by SRTC at Catholic University in 1994

The SRTC conducted a bench scale treatability study at the Catholic University of America in 1994. The study is discussed in detail in Section 3.2.1.4. The TCLP results are given in Table 16. All of the results are less than the proposed delisting limits. The final glass volume was approximately 30 gallons, and was stored in the M-Area MWSS. These glass treatability samples were placed in a 71-gallon drum and stored on the Interim Status storage pad with the vitrified glass. They were not added to the VTF melter and re-vitrified.

2.1.5.6 Expanded Crucible Studies by Catholic University of America (CUA) in 1994

After the sub-contract to vitrify the M-Area sludge was awarded to GTS Duratek in November of 1993, they conducted additional optimization studies at CUA in 1994. CUA conducted tests on 40 gallons of M-Area sludge, and returned 7-8 gallons of glass and contaminated crucibles to the M-Area MWSS. Duratek and CUA considered this testing "proprietary" and did not provide TCLP results. However, since all of the glass produced by Duratek to date (Table 24) meets the proposed delisting limits, it is reasonable to assume that these treatability samples meet the proposed limits. These glass treatability samples were placed in a 71-gallon drum and stored on the Interim Status storage pad with the vitrified glass. They were not added to the VTF melter and re-vitrified.

2.1.5.7 Initial Studies by Rust Engineering and SEG in 1993

Rust Engineering and SEG conducted treatability studies in 1993 with the M-Area sludge to support their bid proposals. Rust received 30 gallons of sludge, and SEG 50 gallons. Both firms provided TCLP leaching results which certified that the treated waste (using a cementitious process) met the contract specifications of TCLP leaching concentration of 0.32 mg/L for nickel and 70 mg/L nitrate (as N). Detailed leaching analyses were considered procurement sensitive and are not available. Rust and SEG returned a total of approximately 25 gallons of solidified samples, which were stored in the MWSS. Since detailed information was not available on all of the samples, they were size reduced, added to the M-Area sludge feed, and vitrified.

2.1.5.8 Cement Samples From the 1988-1989 Closure of the M-Area Settling Basin

As discussed in the following section (2.2), the effluents from the plating line operations were discharged to a surface impoundment until 1985. This impoundment, the M-Area Settling Basin, was closed under RCRA Interim Status Regulations in 1988-89. The sludge at the bottom of the basin was similar to the current M-Area sludge being vitrified. The Settling Basin sludge was stabilized with gypsum ($CaSO_4$), and closed in place. Samples of the stabilized sludge from the basin were analyzed by the EP toxicity and TCLP procedures in 1989. The samples were stored with the sludge treatability studies in the MWSS. The total volume was less than 1 gallon. These basin samples were size reduced and combined with the M-Area feed to the VTF.

2.1.6 Plating Line Sump Material (STP W-038)

This waste was generated from the one time cleaning of a Building 313-M nickel plating line sump and was considered characteristically hazardous, D007, per 40 CFR §261.24(a), due to chromium levels in excess of the Toxicity Characteristic Leaching Procedure (TCLP) regulatory threshold. This waste also contained a radioactive component consisting of source material (i.e., depleted uranium) as defined by 10 CFR §20.3(a)(15)(i) and was therefore considered a mixed waste. This sump material was combined with the M-Area feed to the VTF. A detailed physical/chemical analyses of this untreated waste is given below.

313-M PLATING LINE SUMP ANALYSIS

Constituent	EP Toxic Concentration, mg/L (GEL, 1988*)
As	<1.00
Ba	<1.00
Cd	<0.50
Cr	6.29-7.14
Pb	3.83-4.51
Hg	<0.20
Se	<0.50
Ag	<1.00
pH	6.3-6.7
TSS	<1 wt. %

*Provided in Appendix E

2.1.7 Uranium/Lead Solution (STP W-054)

This waste stream was a 320-M analytical laboratory residual hydrochloric acid solution, resulting from the analysis of enriched uranium materials. The pH of the solutions ranged from 2 to 6, and the samples contained dissolved lead, at an average concentration of 100 mg/L. This waste was considered characteristically hazardous due to low pH (D002) per 40 CFR §261.22(a)(1) and §261.24(a) for lead (D008). This waste also contained a radioactive

component consisting of source material (i.e., enriched uranium) as defined by 10 CFR §20.3(a)(15)(i) and was therefore considered a mixed waste. The solutions contained ~254 grams of uranium, of which ~161 gm was ^{235}U. The solutions totaled 35 gallons. The 35 gallons of solution were added directly to PWIT/SF Tank No. 7 in July 1994.

2.1.8 Uranium/Chromium Solution (STP W-031)

This waste stream was generated from an on-site laboratory at the SRS Naval Fuels facility. The solution resulted from a "Davis-Grey" technique for analyzing uranium, and also from a clean-out solution from stainless steel duct work (which leached chromium from the steel duct). The total volume was ~80 gallons. This waste was considered characteristically hazardous low pH (D002) per 40 CFR §261.22(a)(1) and §261.24(a) for chromium (D007), with an average concentration of Cr = ~12 mg/L. This waste also contained a radioactive component consisting of source material (i.e., enriched uranium) as defined by 10 CFR §20.3(a)(15)(i) and was therefore considered a mixed waste. The solutions contained ~300 gms of ^{235}U. The solutions were added to the VTF melter feed batch No. 37, in October of 1998.

2.1.9 Soils From Spill Remediation (STP W-048)

STP stream W-048 was mainly soils from previous sampling campaigns and/or soils from the remediation of a suspected mixed waste spill. The total volume of Waste stream W-048 was ~3150 gallons. W-048 comprised seven streams; 3-5, 3-26, 3-30, 3-62, 3-142, 3-44, and 3-46.

Three of the sub-streams were sampled, analyzed, and shown to be non-hazardous – and removed from the STP waste stream W-048 prior to treatment in the VTF.

- 3-142, twenty gallons of soil contaminated with a gasoline spill, and
- 3-44 & 3-46, 2800 gallons of soil potentially contaminated with Hg.

A summary of the available analytical data for each of the W-048 sub-streams treated in the VTF is provided below. These 4 sub-streams totaled ~350 gallons. A detailed analytical report is provided in the Pickett, 1997 reference.

2.1.9.1 Hg Contaminated Soil, Waste Stream, #-3-5

Soil from a process spill, and the process involved the use of Hg as a catalyst. The soil was excavated (~15 gallons) and tested by the TCLP procedure for the hazardous metals. The TCLP results for Hg were slightly higher than the characteristically hazardous limit. The TCLP results for waste stream W-048, #3-5 are given in Table 5A. This waste stream contained no additional hazardous constituents vs. the M-Area plating line sludges.

2.1.9.2 SRL Basin Soil Samples, #3-26

Soil samples collected during sampling of the Savannah River Laboratory seepage basins, ~25 gallons. The soils were categorized as characteristically hazardous based on process knowledge, as some hazardous constituents were present in the soil samples. TCLP testing was not conducted on the samples. The average concentrations of the key chemicals in the soil samples from the Savannah River Laboratory (SRL) seepage basins are given in Table 5B. The concentrations are based on the sampling and analysis of the basin soils conducted in 1983-84, and given in the Bransford, 1984 reference. The SRL samples comprise ~25-30 lbs. It was not deemed cost effective to sample and analyze the materials to define whether or not they were not hazardous. There are no additional hazardous constituents in the SRL basin samples vs. those in the M-Area sludges. These soil samples were added to the VTF feed and vitrified.

2.1.9.3 Soil/sludge Samples From F and H Area Seepage Basins, #3-30

Soil samples collected during sampling of the F and H Area Seepage Basin in 1984-1985; ~35 gallons. The soils were categorized as characteristically hazardous based on process knowledge, as some hazardous constituents were present in the effluents to the seepage basins and in the soil samples. TCLP testing was not conducted on the samples. The samples were in 145 small containers in one 55 gallon drum, and comprised ~36 gallons. The seepage basins had a shallow (2-6") sludge layer, and a contaminated soil down to the water table (30-50 feet). The total concentrations of the hazardous constituents in the basins were determined, and the average concentrations are given in Table 5C. There are no additional hazardous constituents in the F and H Area seepage basin samples vs. those in the M-Area sludges. These soil samples were added to the VTF feed and vitrified.

2.1.9.4 Soil Samples from the OLD TNX Seepage Basin and Overflow Delta, #3-62

Soil samples collected during sampling of the old TNX Area Seepage Basin, ~270 gallons/4000 lbs. They were stored in one B-25 container. These samples were the residual materials from a number of drill cores in the Old TNX seepage basin and its associated overflow delta. The soils were categorized as hazardous based on process knowledge, as some characteristically hazardous constituents were present and depleted uranium had been used in the TNX operations. TCLP testing had not been conducted on the samples when they were generated or stored as mixed wastes. The Old TNX basin was 20' deep, and had a 10' overburden placed on top of it. Seven drill cores in the basin were therefore 30' deep. Twelve core samples taken in the delta downgradient of the basin overflow were 5' deep. All of these cores were sub-sampled, and the remaining cores were archived. The total weight of residual cores was ~4000 lbs., or ~370 gallons. During the initial treatment of this waste stream at the VTF, it was found that the soil and drilling samples had consolidated into a very hard clay-like material. The B-25 container also had metal drilling sleeves and other drilling equipment. After removal and treatment of ~1/3 of the soil (~100 gallons), the soils were sampled, analyzed, and shown to be a non-characteristically hazardous waste. Treatment in the VTF ceased and the soil cores were disposed as low-level radioactive waste. The original soil results are given in Table 5D.

The materials from STP stream W-048 (sub-streams #3-5, 3-26, 3-30, and a portion of 3-62) were added to VTF batch #42 in December of 1998 and vitrified.

2.1.10 Soils From Chemical, Metals, and Pesticides (CMP) Pits (STP Stream W-082)

The Chemicals, Metals, and Pesticides (CMP) pits were used to dispose of SRS wastes between 1971 and 1979 (Scott, 1987). The wastes comprised oils, organic solvents, and small amounts of excess metals, pesticides, and herbicides. The CMP had seven different pits, with different wastes disposed to the various pits. The pits and underlying soils were excavated in 1984, and stored as soils awaiting radioactivity analyses (STP waste stream W-078). The soils were initially stored in ~500 B-25s (90 cubic foot containers), but were repackaged into ~1000 B-12s (45 cu. ft. containers) in the late 1980's. The SRS completed radioactive analysis of the soils in 1997, and found that two of the B-12 containers had detectable radioactive contamination (tritium). The non-radioactive wastes were treated at commercial hazardous waste incinerator, but no treatment existed for soils with these waste codes and tritium. It was decided that thermal treatment of these soils in the VTF would effectively treat the contaminants associated with the two B-12s. The B-12s were labeled as:

- F-027; discarded formulations containing tri-, tetra-, or pentachlorophenol, which may include dibenzo-p-dioxins or benzofurans
- D-016; 2,4-D, and
- D-017; 2,4,5-PT (Silvex)

The soils (~90 cu. ft, or ~650 gallons) were treated in the VTF by direct addition to the melt pool over a period from 2/7/99 through 2/27/99. The treated glass was "Batch 44", and produced 12, 71-gallon drums of glass. This glass, and all subsequent glass poured or removed from the melter, was labeled as F-006 and F-028 (residues from the thermal treatment of F-027 wastes). The final glass was not labeled as D-16 or D-17 as those characteristically hazardous constituents cannot withstand the 1150°C glass melt temperatures (neither can the dioxins or furans). The final total constituent analyses, discussed in Chapter 5.3.1, and provided in Table 30, demonstrate that the vitrified waste does not contain detectable amounts of these constituents. Therefore, TCLP delisting limits were not proposed for these compounds, as they are not present in the final vitrified wasteform.

2.1.11 M-Area Stabilized Sludge

All of the waste streams described above (except for a small volume of treatability samples) were stabilized into a durable, vitreous wasteform.

The glass is a boro-almino-silicate formulation. The formulation was initially developed in treatability studies conducted by the Savannah River Technology Center (SRTC) (Jantzen, 1992; reference provided in Appendix B). The formulation of the M-Area glass was based on information previously generated to support the development of a vitrified wasteform for the SRS High Level Radioactive waste, which is being treated in the on-site Defense Waste Processing Facility (DWPF). In 1992, the results of the SRTC vitrification and cementitious studies were included in a Request for Proposals for independent suppliers to treat and stabilize the M-Area sludges. A contract was awarded in November 1993 to GTS Duratek, Columbia, MD to provide the facility and to stabilize the wastes. GTS Duratek proposed a vitrification process to treat the wastes. Duratek conducted their own treatability studies with M-Area wastes during the contract placement (WSRC, 1995), which is discussed in Section 3.2.1.4. Additional results of a scale-up study conducted in 1994 by SRTC are discussed in Section 3.2.1.5.

2.1.11.1 Volume of M-Area Vitrified Waste

The final net weight of glass was ~2,174,686 lbs. At a specific gravity of 2.4 (20 lbs./gallon), the volume of glass was calculated to be 108,680 gallons (538 yd^3).

2.1.12 Last Filtercake From DETF

The filtercake generated during the filtration and treatment of the VTF off-gas condensate in the M-Area DETF was defined as a listed F-006 hazardous waste. Since the filtercake was an expanded Perlite, which is primarily a silica material, the DETF filtercake was recycled back to the VTF, to reduce the amount of virgin silica added to the melter feed. After the final batch of filtercake was produced and recycled to the melter, additional rinses of the DETF were conducted, with all of the rinse water returned to the VTF melter. The last melter off-gas condensates were also returned to the VTF melter feed. The final step was to evaporate the remaining liquids in the melter until only glass remained. After these rinses, no F-006 wastes remained in the process equipment downstream of the melter. In a previous Delisting Petition (Rev. 1), the "last batch of DETF filtercake" was included in the petition as a separate waste stream. The "last batch" of DETF filtercake was treated in the VTF, and is therefore deleted from this Delisting Petition.

Table 5E provides summary information concerning quantity, form, and regulatory identifiers of the above waste streams.

Table 5A

TCLP ANALYTICAL RESULTS ON WASTE STREAM W-048
Hg CONTAMINATED SOIL, SUB-STREAM 3-5
ONE 55-GALLON DRUM

WSRC SAMPLE ID NUMBER		M3-5-209573-01	M3-5-209573-02	3-5-1	TCLP
GEL REPORT DATE		11/27/97	11/27/97	2/27/97	LIMIT
GEL LABORATORY ID #	Units	9610165-01	9610165-02	9702050-01	mg/L
		INITIAL SAMPLES		RESAMPLE	
Mercury	mg/L	0.421	0.796	< 0.000148	0.2
Silver	mg/L	< 0.0078	< 0.0078	< 0.0078	5
Arsenic	mg/L	< 0.042	< 0.042	< 0.042	5
Barium	mg/L	0.296	0.516	0.644	100
Cadmium	mg/L	0.031	0.029	0.027	1
Chromium	mg/L	0.022	0.0168	< 0.0287	5
Lead	mg/L	< 0.036	< 0.036	0.052	5
Selenium	mg/L	< 0.084	< 0.084	< 0.084	1
VOLATILE ORGANICS					
1,1-Dichloroethylene	mg/L	< 10	< 10	< 10	0.7
1,2-Dichloroethane	mg/L	< 0.01	< 0.01	< 0.01	0.5
1,4-Dichlorobenzene	mg/L	< 0.01	< 0.01	< 0.01	7.5
2-Butanone	mg/L	< 0.02	< 0.02	< 0.02	200
Benzene	mg/L	< 0.01	< 0.01	< 0.01	0.5
Carbon Tetrachloride	mg/L	< 0.01	< 0.01	< 0.01	0.5
Chlorobenzene	mg/L	< 0.01	< 0.01	< 0.01	100
Chloroform	mg/L	< 0.01	< 0.01	< 0.01	6
Tetrachloroethylene	mg/L	< 0.01	< 0.01	< 0.01	0.7
Trichloroethylene	mg/L	< 0.01	< 0.01	< 0.01	0.5
Vinyl Chloride	mg/L	< 0.01	< 0.01	< 0.01	0.2
EXTRACTABLE ORGANICS					
2,4,6-Trichlorophenol	mg/L	< 0.05	< 0.05	< 0.05	400
2,4-Dinitrotoluene	mg/L	< 0.05	< 0.05	< 0.05	0.13
Hexachlorobenzene	mg/L	< 0.05	< 0.05	< 0.05	0.13
Hexachlorobutadiene	mg/L	< 0.05	< 0.05	< 0.05	0.5
Hexachloroethane	mg/L	< 0.05	< 0.05	< 0.05	3
Nitrobenzene	mg/L	< 0.05	< 0.05	< 0.05	2
Pentachlorophenol	mg/L	< 0.05	< 0.05	< 0.05	100
Pyridine	mg/L	< 0.05	< 0.05	< 0.05	5
m,p-Cresol	mg/L	< 0.05	< 0.05	< 0.05	200
o-Cresol	mg/L	< 0.05	< 0.05	< 0.05	200

SITE TREATMENT PLAN ID #SR-W048; WASTE MANAGEMENT WASTE STREAM ID #3-26

CHEMICAL CONSTITUENT INVENTORIES IN THE SRL SEEPAGE BASIN SAMPLES

One 55 gallon drum, with 400 lbs of samples (~25 gallons)*

CHEMICAL	TOTAL BASIN** INVENTORY kgs	AVERAGE*** CONCENTRATION mg/kg (ppm)	SAMPLE INVENTORY# gms
Arsenic	340	6	1.1
Cadmium	15	0.26	0.05
Chromium	730	13	2.3
Lead	190	3	0.6
Mercury	18	0.32	0.1
Nickel	140	2	0.4
Silver	6	0.11	0.02

* These samples assumed to be the excess sediments from the SRL Basins sampling program (page 5-4, Ref. 1)

** Total inventory from Ref. 1, Appendix B

Total volume (kgs) of soil in the 4 SRL Basins used to calculate inventories =
= density (1.3 g/cm3) x depth 20 ft x 30cm/ft x 79,200 ft2 x (0.093 x E4 cm2/ft2) = 57E6 kgs

***Average concentration = total inventory (kg constituent)/ kgs soil (57E6 kgs) x 1E6 mg/kg

#Sample inventory = average concentration (mg/kg) x kgs of stored samples (400 lbs/2.2lbs/kg
= mg/kg of constituent x 180 kgs x 0.001gm/mg = total gms

Ref. 1; Bransford, J. L., et. al.; "Technical Data Summary, Chemical Charaterization of Sediments and Groundwater at the SRL Seepage Basins", DPSTD-84-110, 9/84.

Table 5C

SITE TREATMENT PLAN ID #SR-W048; WASTE MANAGEMENT WASTE STREAM ID #3-30

CHEMICAL CONSTITUENT INVENTORIES IN F AND H BASIN SAMPLES

One 55 Gallon drum, with 145 Quart Containers, ~36 Gallons

F-Area Basin Samples

CHEMICAL	AVERAGE CONCENTRATION@ Sludge µg/g (ppm)	Soil µg/g (ppm)	TOTAL BASIN INVENTORY* Kgs	AVERAGE CONCENTRATION** µg/g (ppm)
Barium	15	<Background	3	<Background
Cadmium	<2	<Background	1	<Background
Chromium	40	<Background	7	<Background
Lead	<5	2	114	1.99
Mercury	<2	1	60	1.05
Nitrate (as N)	200	<100	5700	100

*Total F Basin; Sludge = 0.175 E6 kgs, Soils = 57 E6 kgs

** Total Average Concentration = (kgs constituent/total kgs of sludge and soil) x 1,000,000 to calculate µg/g

H-Area Basin Samples

CHEMICAL	AVERAGE CONCENTRATION@ Sludge µg/g (ppm)	Soil µg/g (ppm)	TOTAL BASIN INVENTORY* Kgs	AVERAGE CONCENTRATION** µg/g (ppm)
Cadmium	<2	<Background	1	<Background
Chromium	1050	<Background	440	<Background
Lead	95	<Background	41	0.30
Mercury	10	1	145	1.06
Nitrate (as N)	400	<Background	14000	102
Silver	6	<Background	2.5	0.02

*H Basin Sludge = 0.4 E6 kgs, Soils = 137 E6 kgs

** Total Average Concentration = (kgs constituent/total kgs of sludge and soil) x 1,000,000 to calculate µg/g

@ Reference; Looney, 1986, "Selection of Chemical Constituents and Estimation of Inventories for Environmental Analysis of SRP waste sites", 3/87.

Table 5D

SITE TREATMENT PLAN ID #SR-W048; WASTE MANAGEMENT WASTE STREAM ID #3-62

CHEMICAL INVENTORIES IN OLD TNX SEEPAGE BASIN and OVERFLOW DELTA SAMPLES
ONE B-25, WITH 4000 LBS, 370 GALLONS of SAMPLE CORES

	AVERAGE CONCENTRATION*		TOTAL SAMPLE INVENTORY	
CHEMICAL	Basin*	Delta**	Basin#	Delta##
	mg/kg (ppm)	mg/kg (ppm)	gms	gms
Chromium	56	30	67	11
Lead	11	40	13	14
Mercury	2	3	2	1
Nitrate (as N)	1,115	2	1,338	1
Silver	1.5	1	2	0.4
Nickel	36	6	43	2

* Reference; Looney, 1987. DPST-86-291, Table 710.1, p A-138

*Average of the seven cores collected in the TNX basin, per DPST-86-291, page A-140

**Averageconcentration of the 12 cores collected in the TNX delta, per DPST-86-291, page A-141

Seven 30' cores were collected inside the basin (210'); two 20 ft background cores were collected (40'), and twelve 5' cores (60)' were collected in the seepage basin overflow delta

The total stored sample weight in Lot 3-62 = ~4000 lbs (~1800 kgs)

Therefore, seepage basin samples = 210'/310' x 1800kgs = 1200 kgs,
and overflow delta = 60/310 x 1800 = 350 kgs
The background samples are assumed to be in the B-25, but are non-contaminated

#Total inventory in basin samples = average mg/kg x 1200 kg of basin samples/1000mg/gm

##Total inventory in delta samples = average mg/kg x 350 kg of delta samples/1000mg/gm

Table 5E

SUMMARY INFORMATION ON ALL WASTE STREAMS TREATED

Wastestream Name	STP #	Phyiscal Form	WW or Non WW	% Total Solids	EPA Hazardous ID #	Primary Regulated Constituent(s)	SRS Storage Location	Volume Gallons	Weight lbs.
M-Area High Nickel Plating Line Sludge	W-037	Sludge	Non WW	25-35	F-006	Ni, Pb	PWIT/SF Tanks 1-8	435,000	~4.3E6
M-Area Sludge From Supernate Treatment	W-004	Sludge	Non WW	15-20	F-006	Ni, Pb	PWIT/SF Tank 10	226,000	~2E6
Mark 15 Filtercake	W-005	Solid	Non WW	65	F-006	Ni	MWSS	3700	35,350
Ni Plating Line Solution	W-039	Liquid	WW	5	D-002/D-008	Ni, Pb	MWSS	1200	13,600
Treatabilty Samples	W-029	Solid	Non-WW	100	F-006	Ni, Pb	MWSS	200	1080
Plating Line Sump Solution	W-038	Liquid	WW	1-2	D-007	Cr	709-2N	100	800
Uranium/Lead Solution	W-054	Liquid	WW	1-2	D-002/D-008	Pb	PWIT/SF Tank # 7	35	Note 1
Uranium/Chromium Solution	W-031	Liquid	WW	1-2	D-002/D-007	Cr	709-2N	80	650
Soils From Spills/Sampling	W-048	Solid	Non WW	100	Various	Cr, Pb, etc.	709-2N	350	4800
Soil From CMP Pits	W-082	Solid	Non WW	100	F-027, D-16, and D-17	Note 2	709-2N	600	6000
M-Area Vitrified Waste	NA	Solid	Non WW	100	F-006/F-028	All of Above	315-4M	108,680	2.17E+06

Notes and Definitions
STP # is SRS Site Treatment Plan ID Number
WW is "WasteWater, defined as <1% Total Organic Carbon and <1% Total Suspended solids
Note 1; The 35 gallons of U/Pb solution from 320-M lab. was added directly to Tank 7 in 1994
Note 2; the constituents are dibenzo-p-dioxins or benzofurans, 2,4-D, and 2,4,5-PT (silvex)
MWSS is "Mixed Waste Storage Shed", Building 316-M RCRA Interim Status Container Storage
709-2N = SRS RCRA Part B permitted Hazardous Waste Storage Facility
315-4M = M-Area RCRA Interium Status Container Storage Area

Sludge = any solid, semi-solid or liquid from an industrial WW treatment plant
Solid; Contains no free liquid

2.2 History of M-Area Waste Generation and Disposal

1952 -1958

M-Area production facilities were built in 1952 to provide fuel and target tubes for the SRS reactors for the production of weapons-grade plutonium 239 and tritium. Spent process solutions and rinse solutions from facility operations were discharged directly to an on-site surface stream, Tims Branch. The solid wastes from the 321-M and 320-M operations were collected and disposed to the SRS Low Level Radioactive waste burial ground. The concentrated process solutions from the 313-M uranium plating line operations were neutralized, filtered through an in-process plate framed filterpress, drummed, sampled for uranium content, and disposed to the SRS Low Level Radioactive Waste (LLRW) burial ground. Dilute rinses from the uranium plating line operations and treated effluents from the uranium recovery operations were discharged to a process sewer, and then to an on-site surface stream, Tims Branch (Evans, et. al., 1992)

1958 - 1973

In 1958, the M-Area Settling Basin was constructed to contain the effluents from enriched uranium production operations in Building 321-M (See Section 3.3.1 for a detailed description of the 321-M operations). The process effluents from Building 321-M were routed to the Settling Basin in 1958. Primary effluents consisted of spent solvents (trichloroethylene & tetrachloroethylene), spent process solutions, and rinsewaters.

The solid wastes from the 313-M uranium plating line operations were filtered, and disposed to the SRS Low Level Radioactive Waste (LLRW) burial ground. The dilute process rinses and the liquid effluents from the 313-M uranium recovery operations, effluents from the other production facility (320-M), and laboratory effluents were discharged to a surface stream (Tims Branch).

1973 - 1985

In 1973 one of the 313-M process sewer lines was connected to the main sewer line to the settling basin. This diverted about half of the 313-M discharges to the Settling Basin. In 1975 all 313-M process discharges (rinses, spent nickel plating baths) from the plating line operations were routed to the M-Area settling basin - to reduce radioactive discharges to waters of the state. All discharges from 320-M, including the laboratory effluents, were also diverted to the basin in 1975 (Marine, 1984). Solid waste from the 313-M recovery operations continued to the LLRW burial ground. The effluents from the 313-M uranium recovery operations were discharged to a surface stream (Tims Branch).

1985 to Present

In mid-1983, Congress mandated through the Supplemental Appropriations Act of 1984 (U. S. Senate, 1983) that the use of the M-Area Settling Basin be discontinued in two years. To comply with the Act, construction of the M-Area Liquid Effluent Treatment Facility (LETF) began in July 1984. Since July 1985, all M-Area process operation effluents were discharged to the LETF.

The LETF was composed of three closed-coupled treatment facilities:
- the Dilute Effluent Treatment Facility (DETF), an Industrial Wastewater Treatment Plant;
- the Chemical Transfer Facility (CTF); and
- the Process Waste Interim Treatment/Storage Facility (PWIT/SF).

The DETF utilized the Best Available Technology Economically Achievable (BATEA) for the aluminum forming and metal finishing industries. The M-Area plating line and aluminum forming dilute rinses, evaporator overheads, and laboratory sink effluents were treated in the DETF and released via a National Pollutant Discharge Elimination System (NPDES) permitted

outfall. Wastewater treatment sludges generated from both CTF and DETF operations were characterized as a RCRA listed F006 mixed waste. Approximately 1,200,000 million gallons of F006 mixed wastes were generated from 1985 through 1995, with ~670,000 gallons remained to be treated after 1995. The remainder of the waste initially stored in the PWIT/SF, a supernate which separated from the residual precipitate, was treated in the DETF and released via a National Pollutant Discharge Elimination System (NPDES) permitted outfall.

The concentrated acids from the 313-M plating line operations were neutralized in the CTF, and the neutralized solutions transferred to PWIT/SF storage tanks. Caustic (aluminum hydroxide solutions) generated in uranium core recovery operations was neutralized with nitric acid. Some of the caustic recovery solution was transferred directly to the PWIT/SF tanks, to maintain the pH in a caustic region (11 - 13), sufficient to prevent the corrosion of the carbon steel tanks.

Section 3.1.11 provides a detailed description of the LETF, including the PWIT/SF, the CTF, and the DETF.

F006 wastes were restricted from land disposal on May 8, 1990. However, due to a national capacity extension for mixed wastes granted by the Environmental Protection Agency (EPA), disposal and/or storage was not prohibited until May 8, 1992 (EPA, 1990). The M-Area mixed wastes were added to the Land Disposal Restriction - Federal Facility Compliance Agreement (LDR-FFCA) between EPA and DOE, on March 13, 1991 to allow continued storage of these wastes until a stabilization/solidification facility became operational. This facility (the VTF) subsequently treated the wastes to meet the applicable LDR treatment standards prior to land disposal, and as the objective of this Petition, to the levels which will allow "delisting" as a hazardous waste.

2.2.1 *Waste Stream Generation and Storage*

A summary of the history of generation of each waste stream treated is given below:

M-Area High Nickel Plating Line Sludge (STP W-037; Tanks 1-8)

This waste was primarily generated from June 1985 through September of 1988. Additional low volumes of filtercake from supernate treatment were mixed with this waste in 1995. These wastes were transferred to and stored in PWIT/SF, Tanks 1-8. Rinse water and dilution (flush) water were added to the storage tanks during the VTF treatment operations, but no new sludge was generated from plating line operations.

M-Area Plating Line Sludge From Supernate Treatment (STP W-004; Tank 10)

In October of 1988, the 313-M plating line operations were placed in standby, and only dilute rinses from 321-M and 320-M, and 320-M laboratory effluents were treated in the DETF through June 1990. The DETF filtercake was transferred to PWIT/SF Tank 10. Supernate treatment was initiated in June of 1990 and the resulting filtercake from the supernate treatment was defined as an F006 waste and transferred to and stored in PWIT/SF Tank No. 10. Supernate treatment was completed in April 1995.

Mark 15 Filter Cake (STP W-005)

This waste was generated during a Building 313-M assembly production campaign, and subsequent uranium recovery process, during April 1983 through July 1983. This material was stored in the M-Area MWSS, Building 316-M, until treated in the VTF.

Nickel Plating Line Solution (STP W-039)

This nickel plating line solution was generated when Building 313-M was placed in "standby" in September 1988. The material was declared a hazardous waste when Building 313-M was formally "shutdown" on February 4, 1992. This material was stored in the M-Area MWSS, Building 316-M, until treated in the VTF.

M-Area Sludge Treatability Samples (STP W-029)

Cementitious waste treatment studies were initiated in April 1988. Vitrification studies were initiated in March 1992. Treatability testing was conducted at both on-site and off-site laboratories. The residual treatability samples were returned to M-Area and stored in the MWSS, Building 316-M. The sub-contractor operating the VTF generated additional treatability samples in 1994. All of the treatability samples were stored in the M-Area MWSS, Building 316-M, until treated in the VTF or transferred directly to final storage.

Plating Line Sump Material (STP W-038)

This material was generated when Building 313-M was placed in "standby" in October 1988. It was transferred to and stored in the SRS RCRA Part B permitted storage facility (Building 709-2N). It was returned to M-Area and treated in the VTF.

Uranium/Lead Solution (STP W-054)

This solution was generated from the analysis of enriched uranium dross materials in the 320-M Laboratory, between 1986 and 1988. It was stored in a "satellite accumulation area" in the 320-M laboratory until July 1994; when it was added to PWIT/SF Tank No. 7.

Uranium/Chromium Solution (STP-031)

This solution was generated in the SRS Naval Fuels production facility between 1990 and 1992. It has been stored in the SRS Hazardous Waste Storage Facility (Building 709-2N). It was transferred to M-Area and treated in the VTF.

Soils From Chemicals, Metals, and Pesticides Pits Excavation

The surface soils from a waste disposal site called the Chemicals, Metals, and Pesticides Pits (CMP Pits) were excavated in 1984 (Scott, 1987). All of the soils were placed in B-25's and stored at the SRS RCRA hazardous waste storage facility. The B-25s were repackaged in "B-12s" in the early 1990's. A radionuclide assessment determined that two of the approximately 1000 B-12's had tritium levels above analytical detection limit. These two B-12's contained soils that were labeled as F-027, D-16, and D-17 hazardous wastes. The two B-12's were transferred to and treated in the VTF in early 1999.

DETF Filtercake

The VTF off-gas condensates, and dilute rinses from the VTF were treated in the co-located DETF, an industrial wastewater treatment facility. The treated effluents from the DETF were released to surface streams, via an NPDES permitted outfall. The metals in the VTF off-gas condensate and rinses were precipitated and filtered using an expanded Perlite filter aid in a plate/frame filter press. The resulting filtercake was returned to the VTF to replace virgin silica make-up materials. No filtercake remained at the end of the VTF operations.

M-Area Stabilized Sludge

The M-Area mixed wastes were vitrified in a facility called the Vendor Treatment Facility (VTF). The VTF started mixed waste vitrification in October 1996. Treatment of all of the M-Area mixed wastes, including the residual materials generated from "clean closure" of the PWIT/SF tanks, was completed March 22, 1999.

The vitrified wasteform is stored on the M-Area Mixed Waste Storage Pad (MAP), Building 315-4M, while the delisting petition is submitted and evaluated.

2.3 Initial Waste Volume and Weights

The descriptions of the wastes to be stabilized are given above in Sections 2.1.1 through 2.1.10. A summary of the volumes and weights is given in Table 5. Those volumes were fixed quantities. Off-gas condensates from the VTF melter were treated in the M-Area DETF. The filtercake generated from that treatment was returned to and used in the VTF. The total volume of this filtercake was less than 50,000 gallons, and was similar to the filtercake generated during supernate treatment. Reuse of the filtercake reduced the need to add virgin silica glass forming agents.

The volumes of the materials stored in the PWIT/SF tanks were obtained by physically measuring the depth of the material in each tank, and calculating the total volume of sludge based on the geometry of the tank. The volumes of the other waste streams, which were all stored in smaller containers, was determined by the volume of the container, e.g.; a 55 gallon was assumed to contain 50 gallons of material.

The weight of the sludge stored in Tanks 1-10 was calculated based on the volume of sludge, and its respective density. The weights of the materials stored in the MWSS (Sections 2.1.3-2.1.5) were determined by weighing each container on a Toledo Indicator Scale (Model #8142) to obtain the gross weights. The net weight for those waste streams was determined by subtracting the container tare weights. The weights of the M-Area sump (2.1.6), the Naval Fuels (2.1.8), and the solutions were estimated based on the volume and specific gravity. The weights of the soils (2.1.9 and 2.1.10 were based on the volume of soil and specific gravity.

2.3.1 M-Area Stabilized Sludge

The final volume of the M-Area stabilized sludge was 108,680 gallons (538 cu. yards).

The vitrified glass was generated as flattened ovoids, which were stored in 71-gallon carbon steel square drums for final disposal. The packing density of the ovoids in the drums was approximately 52%, resulting in ~200,000 gallons as drummed waste.

The weight of the stabilized sludge is based on the net weight of the final glass; 2,174,686 lbs. or ~1000 metric tons.

2.4 Waste Management History and Disposal Methods

2.4.1 *Past and Present Management*

As previously discussed in Section 2.2, prior to 1985, the M-Area plating line effluents were transferred to an un-lined surface impoundment (the M-Area Settling Basin) or to a process sewer and thence to on-site surface stream. The filtered materials were transferred to the on-site Low Level Radioactive Waste burial ground (LLRW). The liquid effluents transferred to the basin from 1958 until 1985 contained heavy metals, which precipitated in the basin as a sludge. Some small fraction of the metals were carried-over to a naturally occurring surface lake, called a "Carolina Bay". The Carolina Bay had no surface outlet. The materials deposited in the Carolina Bay were excavated, mixed with the sludge remaining in the settling basin, and all of the wastes were stabilized with gypsum ($CaSO_4$). The surface impoundment was closed as a landfill under RCRA interim status regulations (Colven, 1987).

From 1985 to the present, all mixed wastes generated in M-Area have been stored in on-site RCRA permitted or interim status storage facilities, either storage tanks or containers. None of the mixed wastes discussed in this petition were otherwise treated or disposed, either on- or off-site, as treatment facilities to stabilize the mixed wastes to meet the RCRA F006 treatment standards or the Land Disposal Restriction regulations did not exist at that time. The storage locations for each separate waste stream were discussed previously, in Sections 2.2.1 to 2.2.11.

One M-Area mixed waste stream, Used Filter Paper Take-Up rolls, was shredded, in order to prepare it for subsequent incineration in the on-site SRS Consolidated Incinerator Facility (CIF). The shredding occurred under a "Temporary Authorization", granted by the South Carolina Department of Health and Environmental Control (SCDHEC), but treatment during the shredding step did not meet the LDR standards. The UFPTU rolls had been stored in either the MWSS, Building 316-M or the SRS Waste Management Container Storage Facility, 709-2N prior to the shredding operation. The shredded material was stored in the SRS Waste Management Container Storage Facility, 709-2N, until the CIF became operational and the UFPTU rolls were incinerated. Neither the UFPTU rolls, nor the resulting stabilized incinerator residues, were a part of the wastes considered in this delisting petition.

2.4.1.1 Description of Building 316-M Mixed Waste Container Storage Shed

The Mixed Waste Storage Shed (MWSS) is a RCRA interim status container storage facility, permitted in March 1991. The MWSS, Building 316-M, is used for the storage of hazardous and mixed wastes. The storage shed measures 120' by 50' overall with a 100' by 40' storage capacity within the containment fencing. The storage building is an above grade, zero release facility in accordance with all applicable Environmental Protection Agency and South Carolina Department of Health and Environmental Control standards.

The concrete pad within the building serves as the storage area. The pad is curbed on three sides. The fourth side of the pad is built to a sufficient elevation to ensure positive drainage to the static sumps within the pad. Twelve static sumps are located throughout the pad. An interior curb divides the pad into two equal halves, with six sumps in each half. The sumps are divided into sets of three, which are then connected in common.

Wastes stored in the facility are packaged in approved containers, generally 55 gallon drums and large steel boxes (typically B-25 type, 90 cu. ft./box). The maximum storage capacity is equivalent to approximately 560 fifty-five gallon drums. The facility is inspected every seven days by qualified WSRC personnel. The facility operates under RCRA interim status. Storage at this facility may include, but is not limited to the following wastes: F006; F-listed solvents; D001 through D043; P-listed; U-listed. This facility has never experienced a release outside of containment.

2.4.2 *Future Management of the Petitioned Waste*

2.4.2.1 Near Term Management

The vitrified treatment residues are packaged in 2852, 71-gallon square drums; 13, 55-gallon stainless steel drums; 62, B-12 containers (45 cu. ft.), and the original failed melter from the VTF. These containers are managed within the M-Area Pad (MAP) - until the delisting petition is evaluated. The MAP is a RCRA interim status container storage facility for physically solid wastes. The storage facility is inspected every 7 days by WSRC operations personnel. Completed inspection procedures are documented will be maintained at the facility for a period of 3 years and then transferred for permanent retrievable storage for the lifetime of the facility. . The vitrified wasteform meets all applicable LDR Universal Treatment Standards. The vitrified waste form will be stored in this 315-4M facility, or potentially another on-site RCRA storage facility until transferred to permanent disposal facility.

During the VTF operations, the original melter failed and was replaced. All of the ports to the failed melter were welded shut, the melter was removed from the VTF, and transferred to the M-Area Pad. The failed melter contains ~15,600 lbs. of glass (~780 gallons) and other process equipment contaminated with glass. The failed melter will be disposed as Low Level Radioactive waste when the delisting petition is approved.

Description of Building 315-4M M-Area Container Storage Pad (MAP)

The Building 315-4M storage pad (MAP) is a RCRA interim status permitted container storage facility to be used for the storage of stabilized waste. The storage pad measures 135' by 200' overall, with a 134' by 199' storage area within the curbed area.

The concrete pad serves as the storage area. The pad expresses a 0.6 percent grade, running East to West. The pad is curbed on all four sides, with the exception of a 23' access way on the south side. Curbing prevents run on to the facility and serve to direct rainwater to a storm water drain, located on the west portion of the pad, emptying to Outfall M-001. The pad is completely fenced in, with a lockable access gate on the south side and an emergency exit on the north side.

The stored waste is packaged in approved containers, generally DOT Type A 7A 71 gallon square steel drums, DOT 1A2 55 gallon drums, and large steel boxes (typically B12 type, 45 cu. ft./box). No liquid or multiphasic wastes are stored on the pad.

2.4.2.2 Future Management and Disposal

If this delisting petition is approved, the petitioned waste will be managed as a Low Level Radioactive Waste (LLRW) and disposed in a low level radioactive waste disposal facility, under the purview of the Atomic Energy Act. The disposal of all of the SRS generated radioactive wastes, after treatment to meet the LDR standards, is discussed in the Approved Site Treatment Plan (ASTP) prepared to meet the FFC Act of 1992 (WSRC, 1996).

The DOE currently operates Low Level Radioactive Waste (LLRW) disposal facilities at its Savannah River Site, Nevada Test Site, and Hanford Site. It is anticipated that the petitioned waste will be disposed at the SRS, in either above ground disposal vaults (called the E-Area Vaults - EAV), or in unlined trenches, if the waste meets Performance Assessment criteria specified in the DOE Order 5820.2A. The E-Vaults or the trench will be covered with an engineered barrier, to minimize rainwater infiltration, and subsequent groundwater impact. Other potential environmental impacts, such as intruder scenarios, are also considered as a part of the Performance Assessment.

Off-site NRC licensed LLRW disposal facilities may also be considered for final disposal of the petitioned waste.

3.0 PROCESS AND WASTE MANAGEMENT INFORMATION

Section 3.1 provides information on all processes and raw materials contributing to the petitioned waste. Information is provided with respect to the processes generating and contributing to the waste, and how hazardous constituents might enter the waste. Section 3.2 provides a description of the final treatment process (vitrification) used to treat the individual streams. None of the waste streams to be treated, nor the petitioned waste itself, were ever managed in land-based waste management units.

3.1 General Information

This section describes the general operations, manufacturing and waste treatment processes, process materials, waste management operations and other facility operations which contributed to the petitioned waste.

The 300 M-Area is located in the northwest section of the Savannah River Site, which is located in Aiken and Barnwell counties, South Carolina. (Figure 2). The Savannah River Site is considered to be one RCRA facility by the state regulator, SCDHEC. The 300 M-Area Reactor Materials facility is a portion of this SRS RCRA facility, and the vast majority of the wastes included in this delisting petition were generated in the M-Area. Only those waste treatment or storage facilities located in M-Area are described in this document.

3.1.1 General Operations Information

M-Area manufacturing operations began in November, 1952 and produced nuclear reactor components consisting of aluminum housings, nickel plated and aluminum canned depleted uranium metal targets, extruded enriched uranium-aluminum alloy fuel tubes, and lithium-aluminum alloy target tubes and control rods. Target and fuel fabrication processes occurred within three primary facilities:

- Building 313-M; Depleted Uranium Target Slug Production Facility,
- Building 320-M; Lithium-Aluminum Target Fabrication Facility, and
- Building 321-M; Enriched Uranium Fuel Fabrication Facility.

The 313-M and 320-M operations facilities that generated the majority of the wastes were placed in "standby" in 1988. The production activities in Buildings 313-M and 320-M were shutdown in a safe, environmentally sound manner on February 4, 1992 and May 13, 1993 respectively. Building 321-M completed enriched uranium de-inventory activities and was shut-down in October, 1995. No further electroplating or weapons production support manufacturing operations are planned for the M-Area facilities.

In addition to production facilities, M-Area operated two support laboratories and various bulk chemical storage facilities. Building 320-M, a wet chemical laboratory, routinely analyzed M-Area solutions for process control. Building 322-M, a metallurgical laboratory, routinely monitored the quality of SRS and M-Area raw materials and products. Both laboratories completed shutdown activities in 1995.

3.1.2 Waste Management Overview

Wastes generated from the M-Area manufacturing operations consisted primarily of aluminum forming and metal finishing effluents, including nickel electroplating operations. Process waste effluents contained rinsewaters, stack acid scrubber effluents, and spent process solutions from the three production buildings and two support laboratories. The majority of wastes described in this petition were generated in the M-Area Liquid Effluent Treatment (LETF) starting in June, 1985. The M-Area LETF was constructed in order to comply with the 1984 Federal

Appropriations Act, which required the DOE to discontinue the use of a land-based treatment facility, the M-Area Seepage Basin, by November, 1985 (U. S. Congress, 1983).

The LETF utilized the Best Available Technology Economically Achievable (BATEA) for the aluminum forming and metal finishing industries. The LETF consisted of three close-coupled treatment facilities: the Dilute Effluent Treatment Facility (DETF) - an Industrial Wastewater Treatment Plant; the Chemical Transfer Facility (CTF); and the Process Waste Interim Treatment/Storage Facility (PWIT/SF) - a wastewater tank storage farm. Note: the PWIT/SF was granted RCRA interim status as a tank storage facility in 1986. The PWIT/SF reverted to industrial wastewater permit status when the VTF wastewater treatment permit was approved by SCDHEC in March 1996.

Starting in June of 1985, the process wastes from the M-Area operations were either treated in the M-Area Dilute Effluent Treatment Facility (DETF) or stored and treated in the Process Waste Interim Treatment/Storage Facility (PWIT/SF). The majority of wastes described in this petition were all treated and generated in the LETF and subsequently stored in the PWIT/SF. A few thousand gallons of wastes not stored in the PWIT/SF are described separately.

With the cessation of electroplating activities the operation of the CTF was no longer required and was subsequently shutdown May 2, 1992. Both the DETF and PWIT/SF have been deactivated. Descriptions of these facilities and identification of all hazardous wastes generated from their operations, as appropriate, are provided in Section 3.1.11.

M-Area also operates two RCRA interim status container storage facilities for hazardous and mixed wastes, the Mixed Waste Storage Shed (MWSS), Building 316-M and the M-Area Pad (MAP), Building 315-4M. An Air Stripper for remediation of chlorinated hydrocarbon groundwater contamination is also operational in M-Area, but does not contribute to the wastes discussed in this petition.

3.1.3 Regulatory Status

M-Area operates under the Standard Industrial Classification (SIC) code of 2819. The listing below provides the regulatory status of M-Area facilities (during the treatment period):

RCRA permitted facilities: SRS RCRA Part Permit SCI890008989
- Mixed Waste Storage Shed (Interim status)
- M-Area Pad (Interim status)
- M-Area Settling Basin (Permitted closure in place as a landfill)
- M-Area Monitoring Wells (Permitted Post Closure of the Settling Basin)
- M-1 Air Stripper (Permitted groundwater remediation)

Clean Water Act permitted facilities: SRS CWA NPDES Permit SC0000175
- Liquid Effluent Treatment Facility
  - US DOE/Savannah River Plant Construction Permit (for the LETF) No. 10,287, Aiken County, 7/20/84
  -US DOE Construction Permit, Sludge Storage Tanks, M-Area LETF, Savannah River Plant No. 10,287, Aiken County, 7/23/85
- Vendor Treatment Facility (VTF)
  - SRS M-Area Mixed Waste Vendor Treatment Facility, SRS M-Area, Aiken County, Operations Approval Letter, March 28, 1996.
- Process Waste Interim Treatment/Storage Facility (PWIT/SF)

Note, the above wastewater facilities completed closure per a SCDHEC approved closure plan, and the final inspection was conducted 8/25/99.

Clean Air Act permitted facilities:

- 610-GPM M-1 Air Stripper
- Vendor Treatment Facility; SRS CAA Permit 00800041-M-CE, M-CG and M-CJ
  - US DOE SRS, Aiken, SC Construction Permit No. 0080-0041-M-CG, 7/28/95

A request to void the VTF air permits was transmitted to SDDHEC on 7/27/99.

Descriptions of these facilities (Pickett, 1987) and identification of all hazardous wastes generated from their operations are provided in Section 3.4 .

3.1.4 Manufacturing and Laboratory Processes/Waste Generation

3.1.4.1 Building 313-M Slug Fabrication Facility

3.1.4.1.a *Building 313-M Operations*

Building 313-M Slug Fabrication Facility began operations in November, 1952 and produced two sizes of aluminum clad uranium targets (i.e., slugs) required for site reactors. The uranium slugs were produced from natural uranium (0.72% ^{235}U) from 1955 through 1966 and depleted uranium (0.14 to 0.38% ^{235}U) from 1967 through 1988. Depleted uranium (0.20% ^{235}U) was the overall primary feed material. Two campaigns using slightly enriched uranium (i.e., 1.1% ^{235}U) occurred in 1972 and 1983.

The depleted uranium cores (slugs) were received from the National lead of Ohio (NLO) facility in Fernald, Ohio. The uranium cores were cleaned with a hot nitric acid bath, water rinsed, then treated by a phosphoric acid and hydrochloric acid anodic etch bath. After further rinsing in nitric acid and water rinse, then sodium bicarbonate and water rinsing, the slugs were nickel plated using a standard Watts' bath process (i.e., nickel chloride, nickel sulfate and boric acid). Nickel plating the uranium cores allowed the subsequent aluminum canning operation to form a complete metallic bond. The plated cores, approximately 22.9 cm long by 5.1 cm to 7.6 cm in diameter (inner and outer core, respectively), were then water rinsed and air dried. The slug treatment and nickel plating operations are shown in Figure 4.

Aluminum cans and caps were received from an off-site manufacturer and underwent quality assurance inspection. The cans were then flared to accommodate the upper print of the Hot Dye Size Bonding (HDSB) process during sizing operations. The aluminum components were then initially degreased with hot 1,1,1-trichloroethane (TCA). Onsite M-Area degreasing operations with 1,1,1-trichloroethane ceased October 2, 1987. Thereafter, the off-site manufacturer of the aluminum components performed degreasing operations prior to shipment to SRS. The aluminum components were etched to specified dimensions in a hot solution of sodium hydroxide and sodium nitrate, de-smutted in cold nitric acid, followed by a cold phosphoric acid bath surface treatment. The aluminum components were water rinsed and air dried.

The nickel plated uranium cores were placed into the clean aluminum cans and the caps placed on top of the cores. The "assemblies" were dipped into a carbon and water mixture (i.e., Aquadag®), air dried, and placed into an argon-filled furnace. The blackened cans were pre-heated, lubricated with Fiske 604, then sized (i.e., Hot Die Size Bonded -HDSB) - thereby allowing the aluminum to bond to the nickel. The resultant bonded "slugs" were placed into a quench tank to cool, transferred to a cut-off saw station which trimmed the excess (flash) from the cans. The bonded slugs were cleaned with a high-pressure walnut shell blast (i.e., Pangboan Shell Blasting machine). Finally, an Arco Trimmer-Welder station machined the top end of the slugs and arc welded the inner and outer diameters of the slugs. A schematic diagram of the HDSB process is given in Figure 5.

After production steps were completed, the slugs were subjected to five non-destructive examinations; cap thickness, weld overhang, length, ^{235}U content, and visual inspection. Unacceptable slugs were transferred to the reject station. Acceptable slugs were transferred to the bond tester to determine any non-bonded areas between the nickel plated cladding and the aluminum can. The slugs were then cleaned in the final nitric acid etch station.

Accepted slugs then entered the final integrity test, a steam autoclave. Here, the slugs were exposed to saturated steam at 150 psig for 40 hours as a final test for aluminum cladding integrity, prior to shipment to SRS reactors. Exposure to the steam autoclave also produced an aluminum oxide film on the slug surface which prevented corrosion and reaction with the reactor moderator (i.e., D_2O).

Plated cores and slugs which failed inspection and/or the autoclave steam test were recovered for recycle. The aluminum cladding was removed by dissolution in hot sodium hydroxide and sodium nitrate. The nickel cladding on the uranium core was then removed by hot nitric acid. The recovered uranium cores were water rinsed and returned to the supplier (i.e., National Lead of Ohio, Fernald Ohio) for recycle.

M-Area process dies and tooling were cleaned in the 313-M tool cleaning racks. Aluminum was etched from die surfaces with hot sodium hydroxide. Tools were degreased in TCA or Spartan SP cleaner (9% glycol ether, 4.5% nonanoyl phenol ethoxylate, 1% nitrotriacetic acid salt, and 4% sodium hydroxide). PVC coatings were removed with Micorstip B (dicloromethane).

3.1.4.1.b *313-M Process Wastes*

A qualitative material balance diagram depicting the Building 313-M waste streams generated and resultant treatment disposal pathways is given in Figure 6. The treatment and disposal of the M-Area wastes prior to 1985 was discussed previously in Section 2. Only the wastes generated since 1985 and treated/stored in the M-Area Liquid Effluent Treatment Facility are described below.

The spent nitric acid pre-etch solutions, phosphoric/hydrochloric acid anodic etch, nitric acid post-etch solutions, bicarbonate rinses, wastewater from purification of spent plating baths, recovery solutions (both sodium hydroxide and nitric acid baths), and concentrated rinsewaters were pumped to the Chemical Transfer Facility (CTF) for neutralization or evaporation. Uranium containing rinsewaters were evaporated, with the dilute overheads going to the DETF and the concentrated "bottoms" going to the CTF. Other dilute rinsewaters from 313-M were sent directly to the Dilute Effluent Treatment Facility (DETF). Neutralized slurry from the CTF and filtercake from the DETF were combined in the CTF and transferred to the PWIT/SF storage tanks.

A schematic flow diagram of the LETF is given in Figure 7.

Spent Watts' bath solutions were circulated through dummy etching plates to remove metallic impurities. The stainless steel dummy plates were removed routinely and cleaned in hot nitric acid. The solutions from the dummy etch plates were filtered through activated carbon and Filterbestos® (a cellulose based filter media), regenerated, and reused. Sludges generated from the filtration treatment, as well as spent dummy plate cleaning acid and sodium bicarbonate solutions, were discharged to the CTF. The spent etching bath filters were discharged to the LLRW burial ground.

Steam condensate, cooling water and flush water flow from the autoclave sump were also pumped to the CTF for treatment. These discharges were filtered in an Oberlin® pressure filter, using diatomaceous earth as a filter aid. The filtercake was transferred to the PWIT/SF. The press filtrate was polished in Mott® sintered metal filters (0.5 micron) to remove particulate

UO_2, and transferred to the DETF discharge hold tank for discharge via the NPDES permitted outfall.

Contact quench waters from HDSB operations were initially treated by use of an oil separator which removed standing oil, then treated by an in-process Oberlin Filterpress. Effluents were then transferred to the DETF. The decanted oil was containerized for on-site energy recovery. Walnut shells generated from cleaning the aluminum clad materials were managed as non-hazardous, non-radioactive (Sanitary Landfill) waste. Rinsewaters containing residual walnut shells were discharged directly to the DETF via the process sewer.

M-Area process dies and tooling were cleaned as needed in the Building 313-M tool cleaning tanks. Small volumes of spent tool-cleaning solutions and rinsewaters were discharged to the CTF or DETF. Spent non-radioactive 1,1,1-trichloroethane, and associated solvent rags, were managed as a RCRA hazardous waste, transferred to an on-site RCRA permitted container storage facility for subsequent shipment to an off-site RCRA permitted incinerator. Solvent contaminated radioactive rags were transferred to on-site permitted storage facility, for eventual treatment in an on-site RCRA incinerator. Use of 1,1,1-trichloroethane in Building 313-M was discontinued in 1987.

No liquid solvents were discharged to the process sewers. All degreaser sumps were analyzed to ensure no solvent was present before pumping to the process sewers.

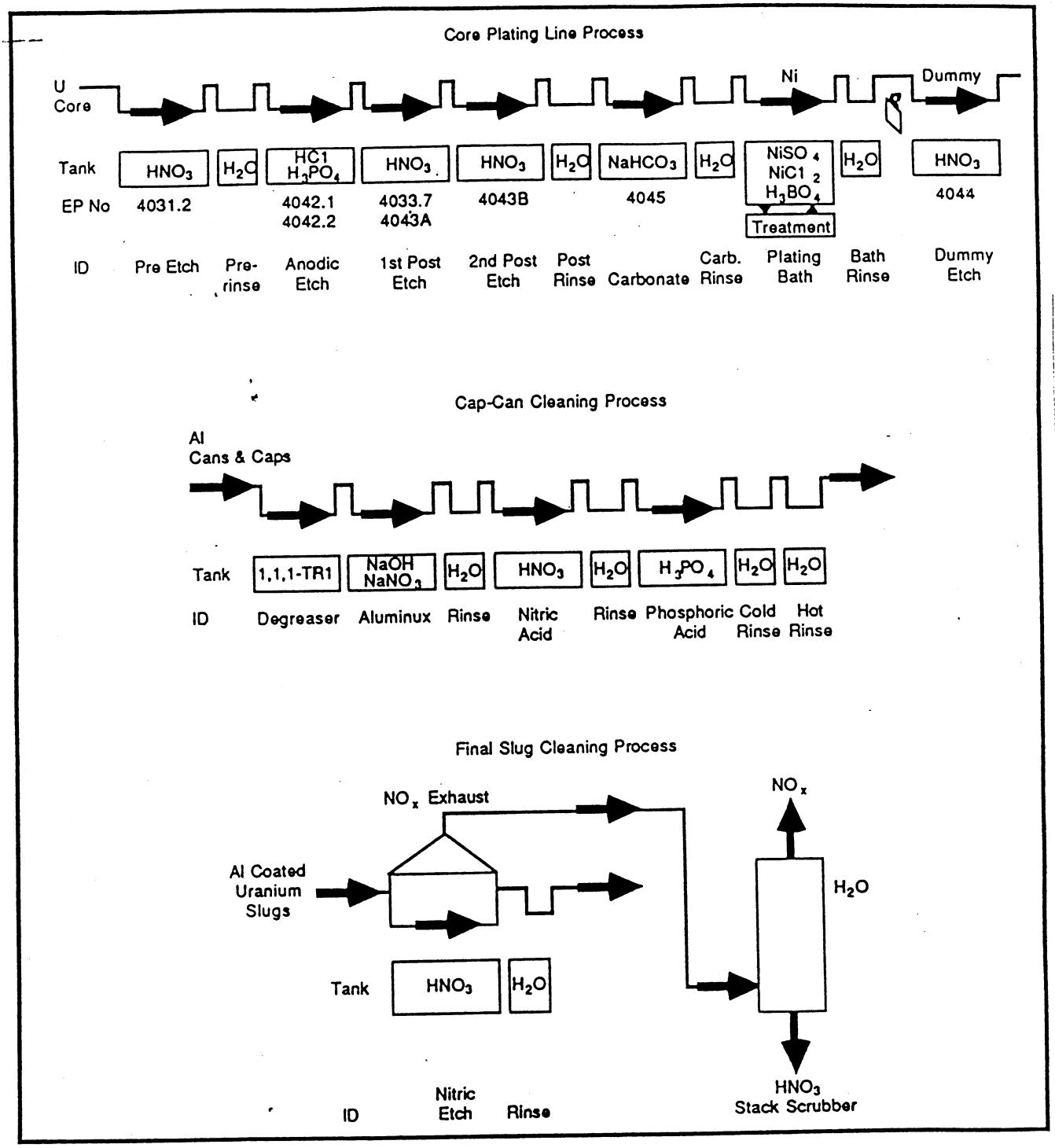


Figure 4. Building 313-M Process Details

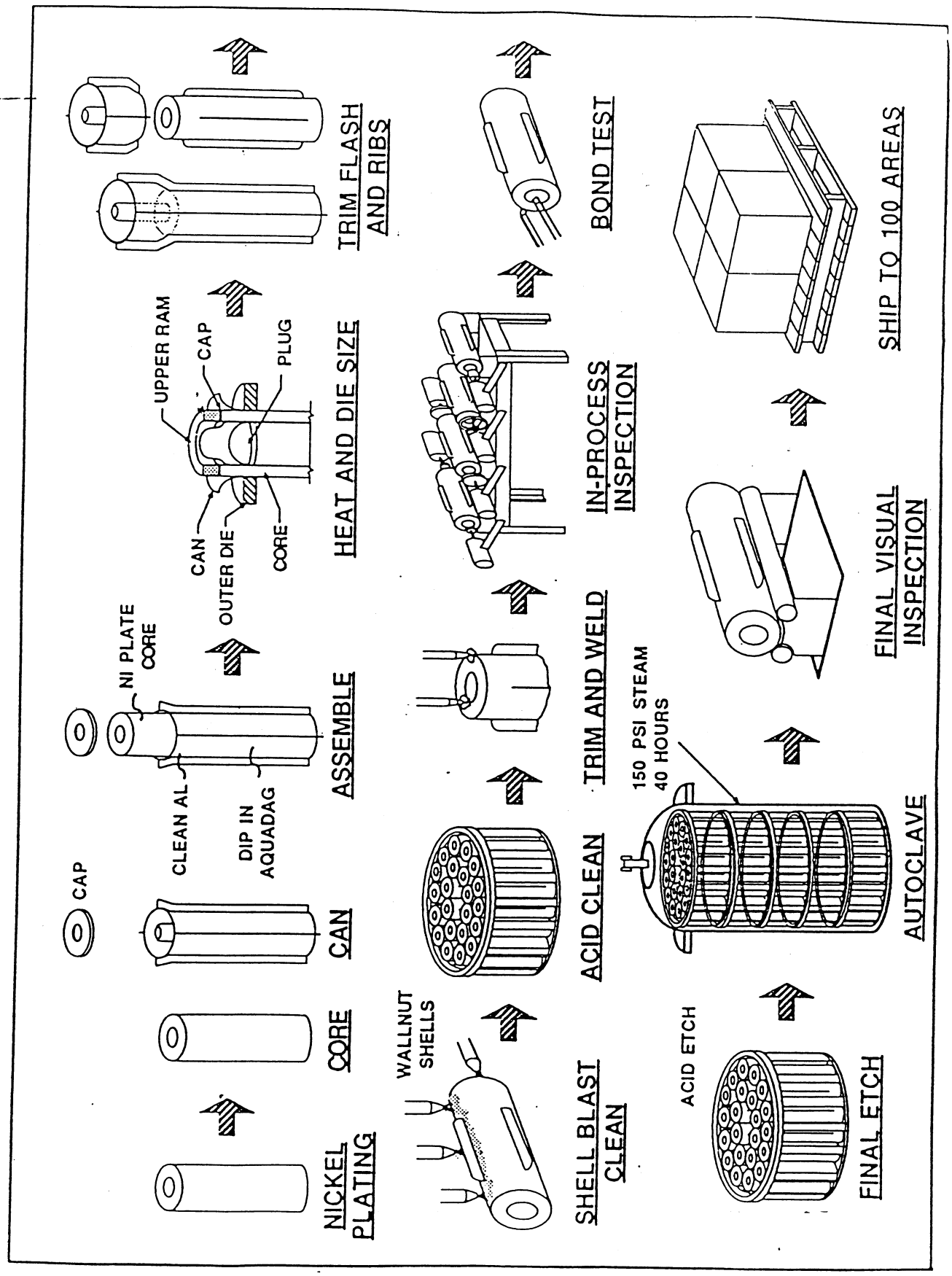


Figure 5. Building 313-M Hot Die Size Bonding Process Flow Diagram

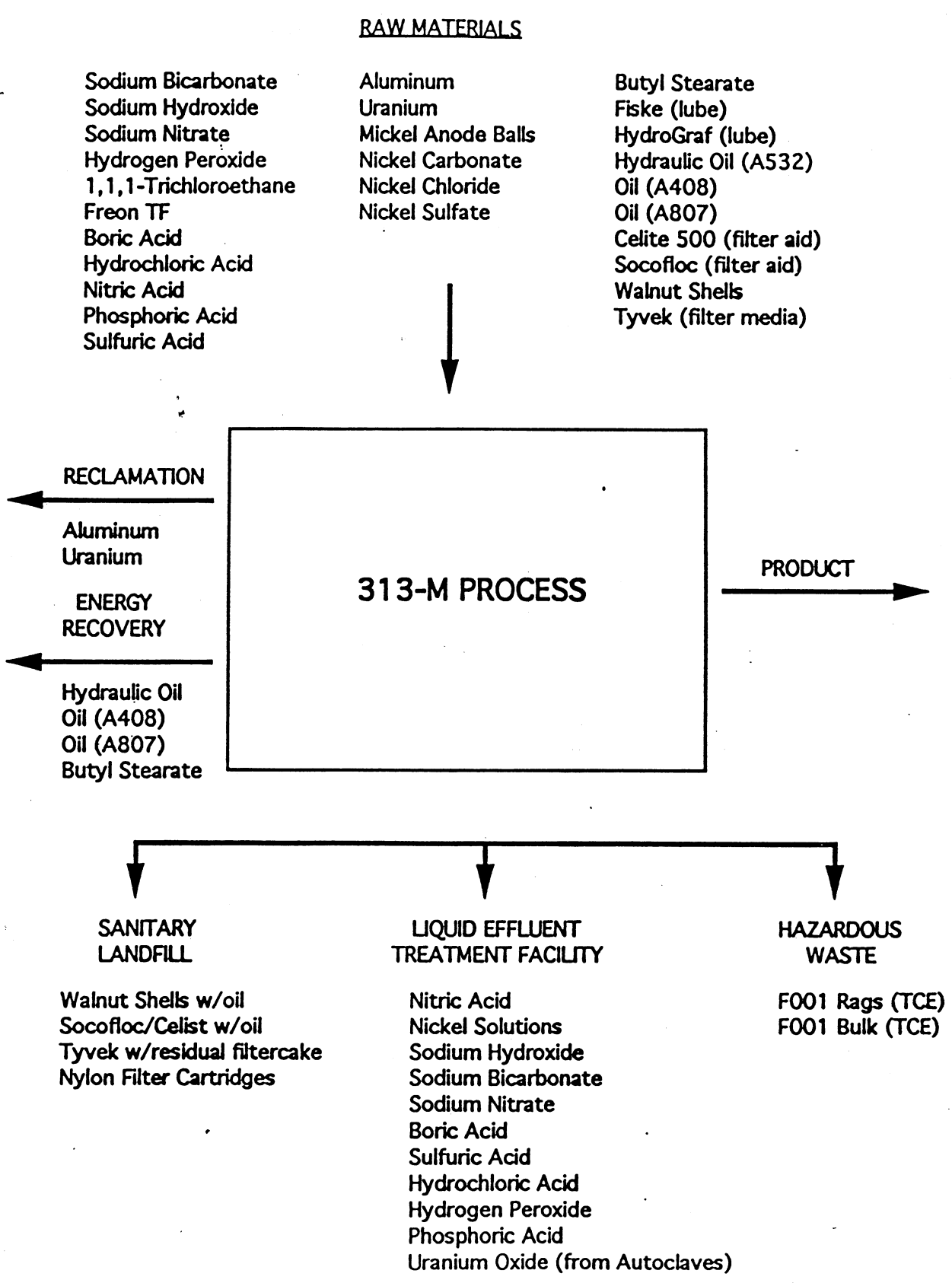


Figure 6. Building 313-M Qualitative Material Balance

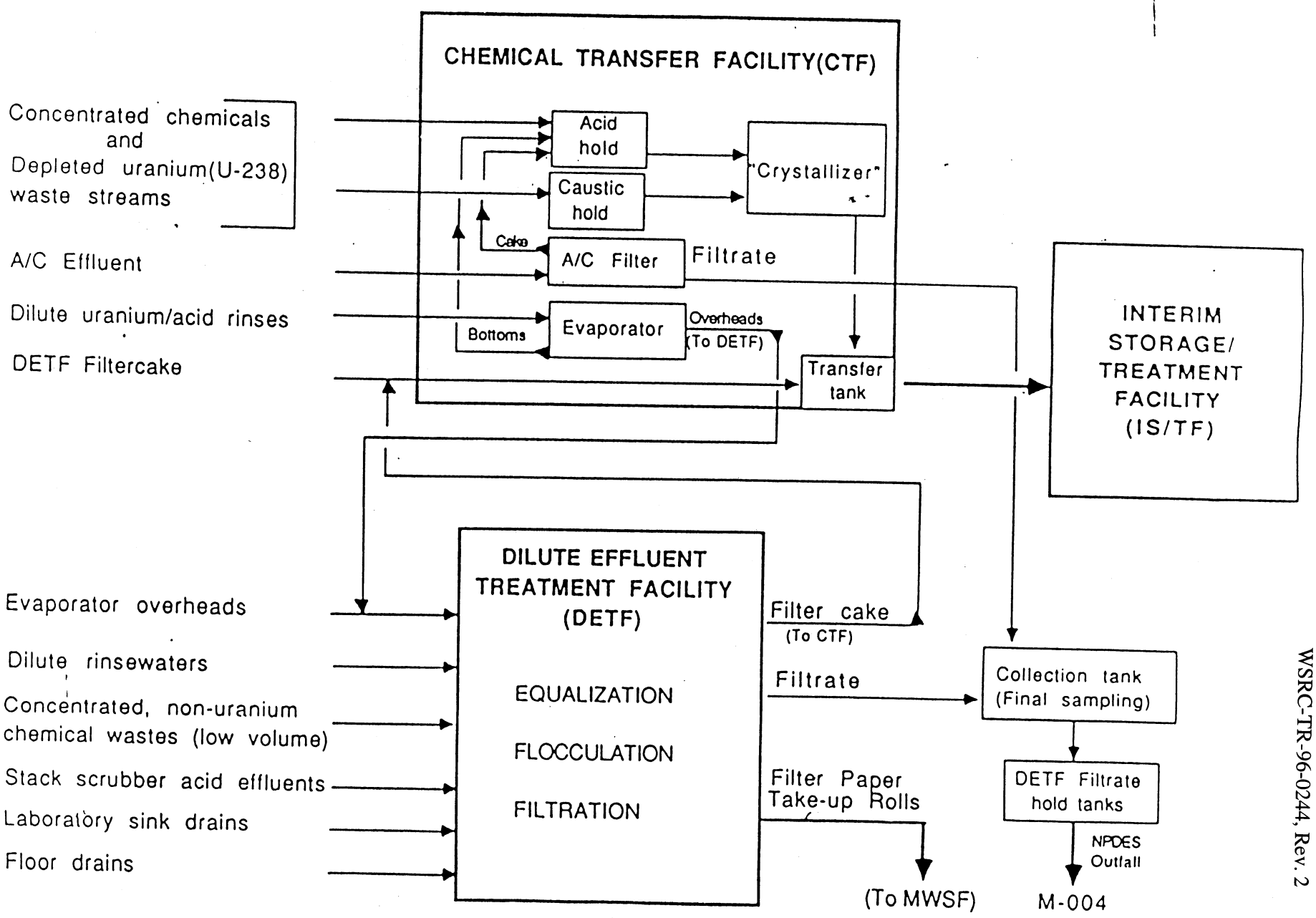


Figure 7 M-Area Liquid Effluent Treatment Facility

3.1.4.2 Building 320-M Target Fabrication Facility

3.1.4.2.a *Building 320-M Target Fabrication Facility Operations*

The Building 320-M fabrication processes began operations in January 1953 and produced lithium-aluminum control rods, lithium-aluminum target tubes (lithium-aluminum alloys vary from 0.5% to 3.5% lithium content), and aluminum housing tubes for site reactors. Figure 8 provides a process flow diagram of production operations.

A lithium-aluminum alloy charge was prepared based on calculations of the lithium and aluminum content required to achieve the desired alloy. The charge was melted in an air-melt furnace, then cast into billets. A saw was used to remove the dross from the casting. The alloy bars were then extruded into bars or logs at elevated temperatures. The bars were cut into sections on an extrusion press run-out table. The alloy bars were straightened and the diameter reduced by cold swaging. The bars were machined into control rod pins and target cores, respectively. The components were then sequentially cleaned in 1,1,1-trichloroethane (until October 2, 1987), then sodium hydroxide etch, water rinse, nitric acid desmutt, cold and then hot water rinse, and air dried. The pins were inspected and assembled into an aluminum tube called raincoat tubing. Connectors and fittings were swaged into the tubing to bring the tube and pins into intimate contact with each other. An atmosphere of helium was introduced during swaging into the pin-tubing assembly, now referred to as a "rod". The rod assembly ends were machined and the ends of the rods welded to form a control rod (approximately 5.5 m long by 2.5 cm diameter). The precision of the weld was tested by a helium leak tester. The assembled control rods were then chemically cleaned as described above and then examined on the Nuclear Test Gauge (NTG). The rods were then returned to the magnaformer for the attachment of fittings and received a final inspection prior to shipment to site reactors.

The process for the lithium/aluminum target tube fabrication was very much the same as for control rods through the extrusion step. After extrusion, the alloy logs were cut into sections identified as "cores". The cores were machined to specification, then chemically cleaned as described above. The cores were assembled into billets, and transferred to Building 321-M for coextrusion into Li/Al target billets. The target tubes were returned to Building 320-M and tested on the NTG.

A variety of aluminum tube housings and inserts which supported fuel and target slugs, tubes, and control rods were also fabricated in Building 320-M. These operations, including surface cleaning, are the same as described above for the control rods and target tube fabrication.

3.1.4.2.b *320-M Process Wastes*

A qualitative material balance diagram depicting the Building 320-M waste streams generated and resultant treatment disposal pathways appears in Figure 9. All spent aqueous solutions and rinsewaters generated from Building 320-M cleaning tank operations, as well as all floor drains, were discharged to the DETF via the process sewer. Non-contact steam condensate, non-contact cooling water, and rainwater were discharged directly, via the storm sewer, to the NPDES permitted outfall A-014.

Lithium/aluminum scrap was recycled, while the lithium-aluminum dross was characterized as non-hazardous waste and disposed of to the on-site Sanitary Landfill. Oil generated from the extrusion press was containerized for on-site energy recovery. The 1,1,1-trichloroethane was recovered by process distillation. Historically, concentrates from the degreaser and still, as associated solvent rags, were managed as a RCRA hazardous waste, transferred to an on-site RCRA permitted container storage facility for shipment to an off-site RCRA permitted incinerator. Use of 1,1,1-trichloroethane in Building 320-M was discontinued in 1987. No liquid solvents were discharged to the process sewers. All degreaser sumps were analyzed to ensure no solvent was present before pumping to the process sewers.

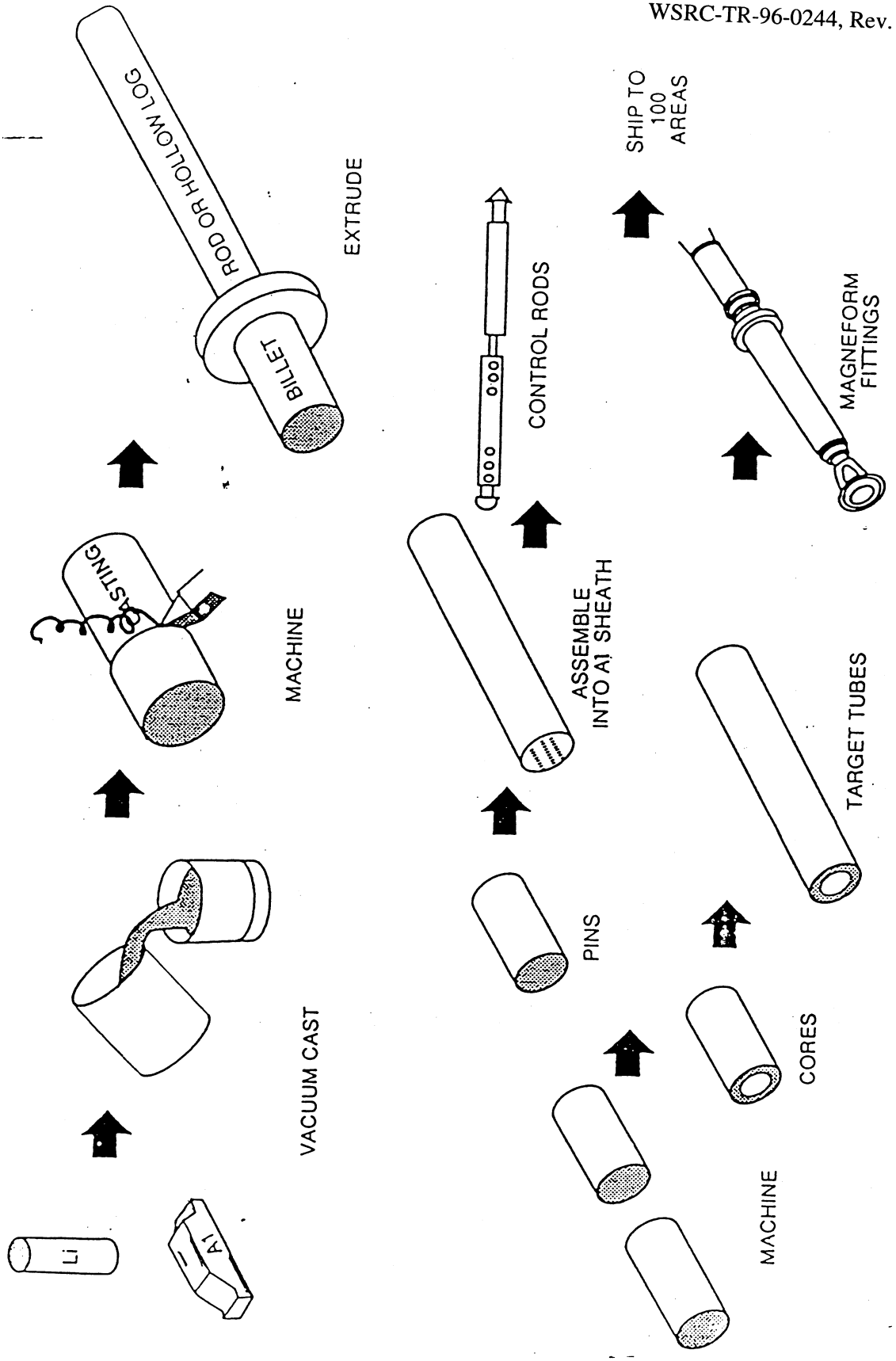


Figure 8. Building 320-M Li/Al Tubes and Rods Process Flow Diagram

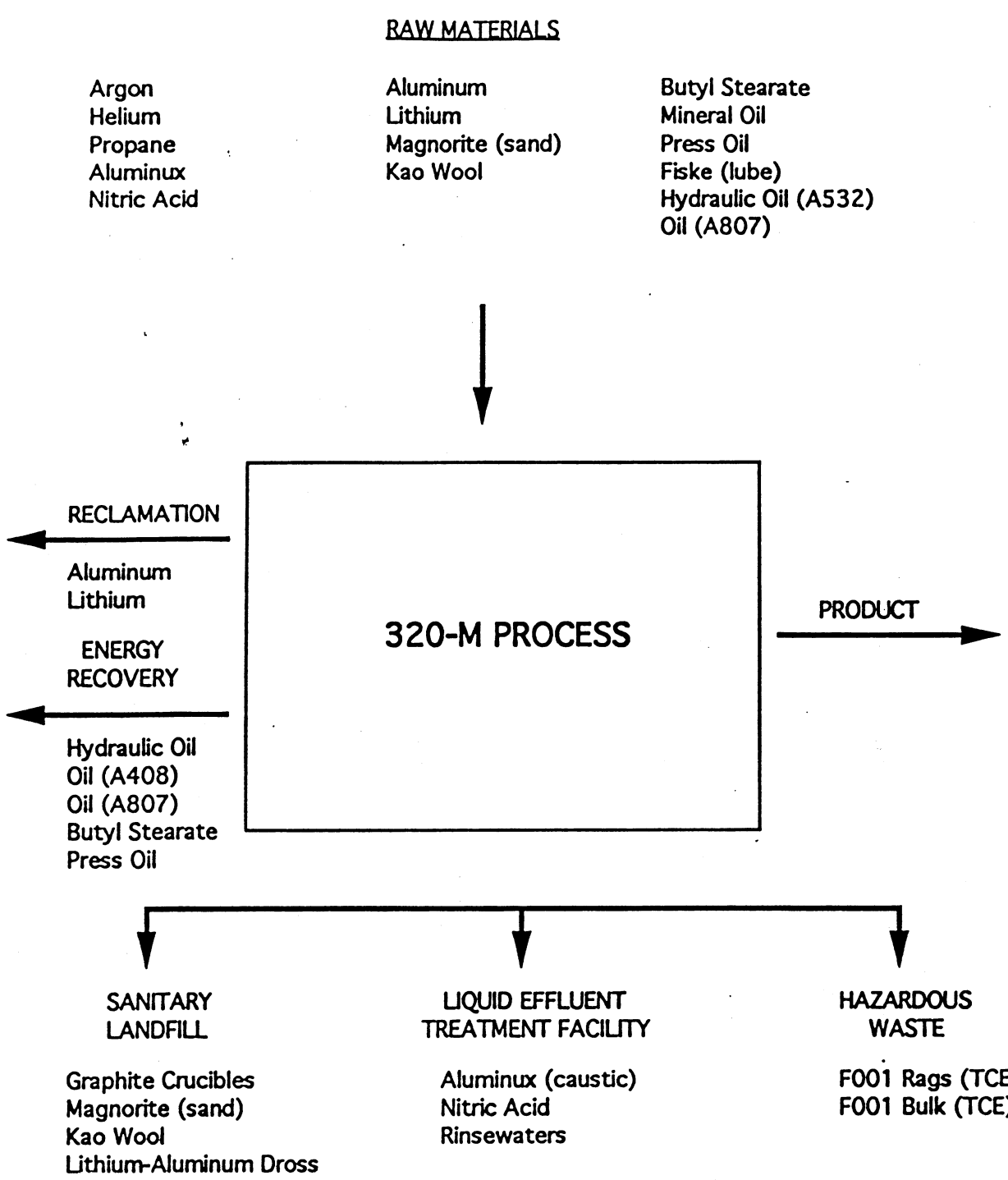


Figure 9. Building 320-M Qualitative Material Balance

3.1.4.3 Building 321-M Fuel Fabrication Facility

3.1.4.3.a *Building 321-M Fuel Fabrication Facility Operations*

The Building 321-M Fuel Fabrication Facility began operations in September, 1957 and produced enriched uranium-aluminum fuel tubes as "driver" assemblies in SRS reactors. The process flow diagram for Building 321-M operations appears in Figure 10. The process was a combination of foundry and tube mill operations. As in Building 313-M the preparation of the materials in Building 321-M prior to assembly was a two step process as the material preparation differs for aluminum components and the uranium core. Core preparation began with calculating the charge weight of enriched ^{235}U and high purity aluminum ingots. The charges were melted by induction heating in graphite crucibles. The molten uranium-aluminum alloy was then cast in tubular graphite molds. The castings were machined into cores and assembled inside clean aluminum housing components. The assembled billets were seal-welded, heated and outgassed in a vacuum oven. The outgassed billets were heated in an induction furnace and extruded through dies which lubricated with lead-oil into a tubular log (lead-oil was replaced with tin-oil as a lubricant for this process April 11, 1988).

The aluminum clad surface of the billets were then cleaned in hot 1,1,1-trichloroethane (1,1,1-trichloroethane was replaced with 1,1,2-trichloro-1,2,2-trifluoroethane on October 29, 1987 - Freon®) and sequentially rinsed in hot sodium hydroxide, cold water, nitric acid de-smut, cold water rinse, hot water rinse, then air dried. The billets were sawed, machined, and assembled inside clean aluminum housing components with magnesium-aluminum alloy end plugs to form pre-extrusion billets. The pre-extrusion billets were heated, outgassed, dipped in a carbon solution, reheated, and extruded into inner, middle, and outer fuel tubes (~18 feet by 1-1/2 to 3 inch diameters). End scrap was removed by a cut-off saw, then the aluminum surface of the billet cleaned as described above. The billets were drawn through oil lubricated dies, stretch straightened, cleaned (i.e., degreased, water rinsed, and air dried). The billets were inspected with a flouroscope to determine both the exact location of the core end as well as examination for high and low density spots. The billets were cut and machined to specification. The billets were then assembled, end fittings installed and magneformed, and the assemblies were hand cleaned with Magnaflux (i.e., 1,1,1,-trichloroethane; note, this step was not replaced with Freon®). The billets then underwent a final inspection prior to shipment to site reactors.

Target billets with lithium-aluminum alloy cores from logs fabricated in Building 320-M (See Section 3.2.2.1) were also welded and extruded in Building 321-M. These lithium-aluminum billets were processed similarly to the uranium-aluminum core billets (i.e., tube cleaning and fabrication operations).

3.1.4.3.b *321-M Process Wastes*

A qualitative material balance diagram depicting the Building 313-M waste streams generated and resultant treatment disposal pathways appears in Figure 11. All spent solutions and rinse waters from Building 321-M were discharged to the DETF. Floor washings were collected in a "mop sink" and filtered to remove uranium fines, the effluent was then transferred to the DETF. Uranium-aluminum alloy scrap (i.e., floor sweepings) were packaged for shipment to Oak Ridge for re-processing. Non-contact steam condensate, non-contact cooling water, and rainwater were discharged directly, via the storm sewer, to the NPDES permitted outfall A-014.

1,1,1-trichloroethane (prior to September 17, 1987) was purified by distillation and recycled. Concentrates from the degreaser and/or still were sent to permitted SRS hazardous waste storage facility, prior to eventual off-site incineration.
Spent Freon® (post October 29, 1987) was sent to permitted SRS hazardous waste storage facility, prior to eventual off-site incineration.

The waste extrusion press lubricant (i.e., lead powder/oil mixture) was collected from the extrusion press sump and sent to the SRS hazardous waste storage facility for off-site incineration. The extrusion press sump itself was managed as a RCRA Staging Area (i.e., 90 day accumulation area). The lead was replaced with tin on April 11, 1988. Spent tin oil was sent to on-site energy recovery. Spent solvent rags were managed as hazardous wastes at the point of generation, then transferred to the 316-1M Staging Area prior to shipment to SRS RCRA permitted storage. Use of 1,1,1-trichloroethane in Building 321-M was discontinued in 1987.

No liquid solvents were discharged to the process sewers. All degreaser sumps were analyzed to ensure no solvent was present before pumping to the process sewers.

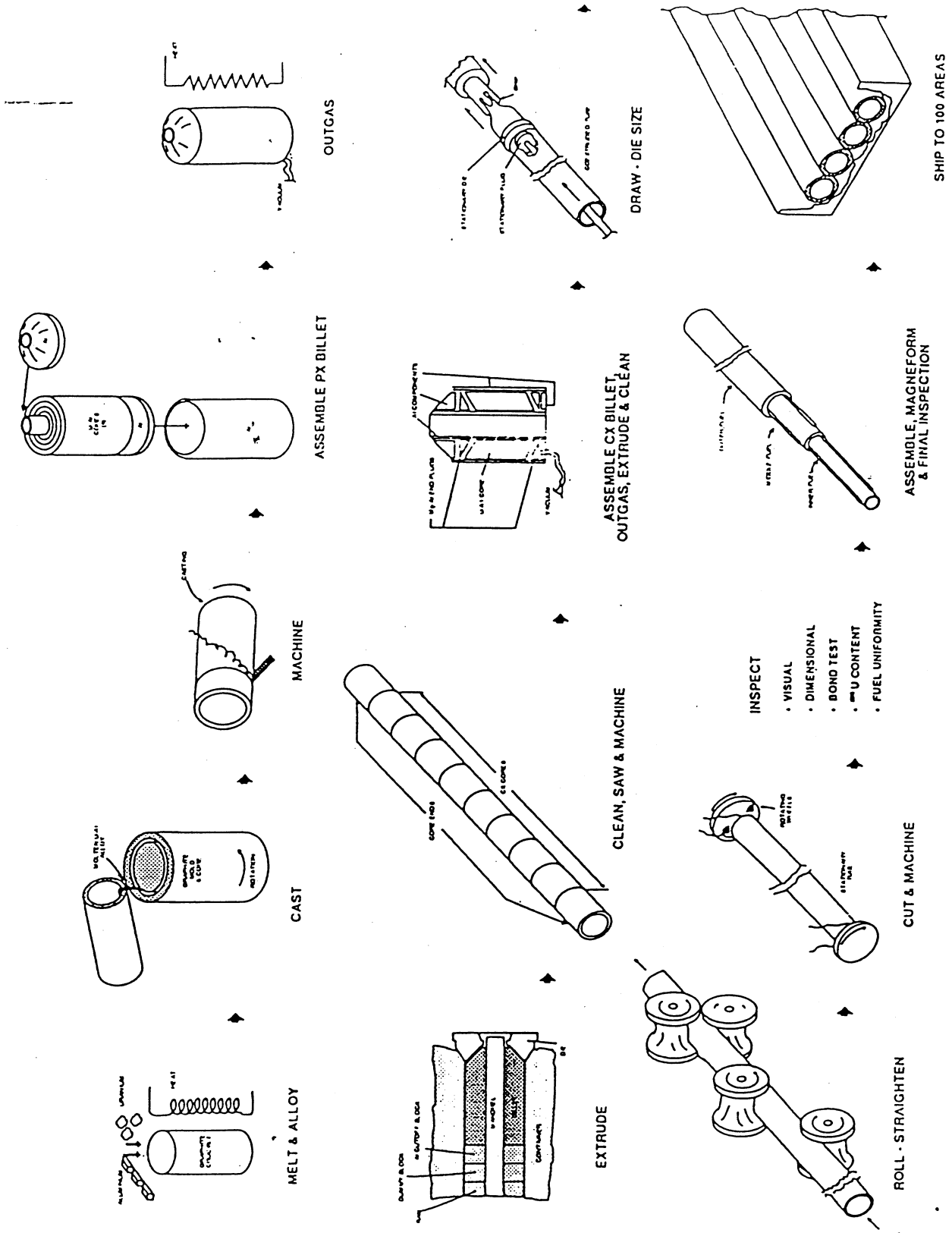


Figure 10. Building 321-M Fuel Fabrication Process Flow Diagram

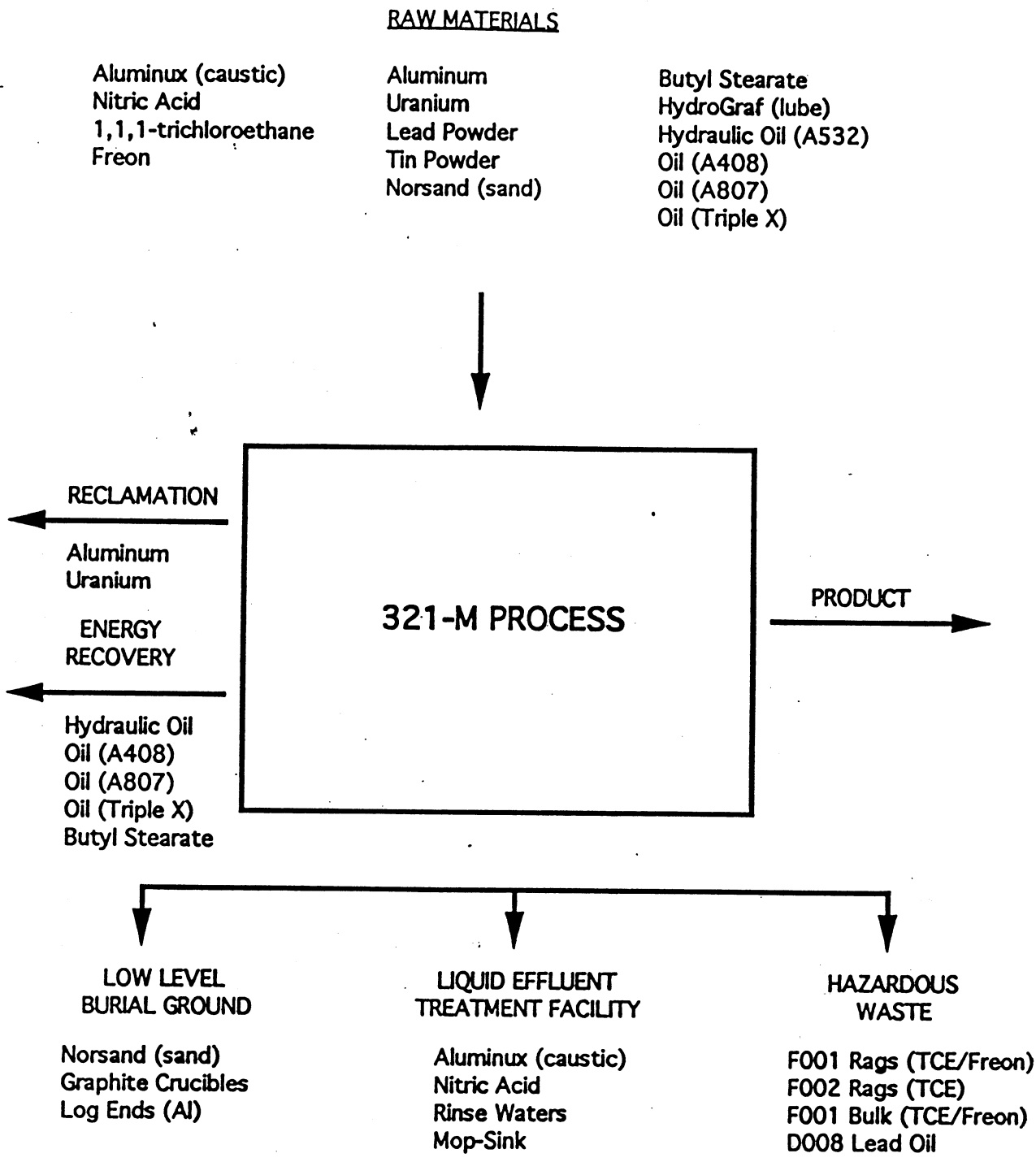


Figure 11. 321-M Qualitative Material Balance

3.1.4.4 Building 320-M Wet Chemistry Laboratory

3.1.4.4.a *Building 320-M Laboratory Operations*

The Building 320-M Wet Chemistry Laboratory was located in the north wing of the Building 320-M Target Fabrication Facility and has completed transition activities for shutdown. The laboratory was a SCDHEC certified wastewater analytical laboratory and routinely analyzed M-Area process solutions. In addition to routine quality control analyses, the laboratory was responsible for acceptance testing of a variety of essential materials throughout the SRS (e.g., ion exchange resins, nitric acid, diesel fuel, lubrication oils, and uranium metal). The laboratory also prepared and standardized SRS laboratory reagents.

The bulk of the sample load involved the identification and characterization of numerous types of aluminum alloy materials used in the fabrication of fuel and target assemblies. Tests were required before and after fabrication. Another important analytical responsibility was well water monitoring in support of 300-M groundwater remediation efforts for chlorinated hydrocarbon contaminants and support for the M-1 Air Stripper.

3.1.4.4.b *320-M Laboratory Wastes*

Liquid effluents were routinely transferred to the DETF via the process sewer. The volume of the laboratory effluents were less than 1% of the total annual flow to the DETF. Small quantities of hazardous wastes generated from analyses were temporarily stored within various laboratory RCRA Satellite Areas, then transferred to permitted SRS hazardous waste storage for eventual shipment to an off-site permitted treatment facility or awaiting treatment on-site.

A list of the chemicals used in the 320-M Laboratory is given in Appendix I.

3.1.4.5 Building 322-M Metallurgical Laboratory

3.1.4.5.a *Building 322-M Metallurgical Laboratory Operations*

The Building 322-M Metallurgical Laboratory provided metallurgical support for M-Area production facilities and has completed transition activities for shutdown. The laboratory consisted of enriched uranium metal preparation rooms, a concrete storage vault, grinding and polishing rooms, examination rooms, and a photography laboratory.

The laboratory provided routine destructive analyses of as-received uranium cores and finished target slugs. Destructive evaluations were performed on various products including; uranium slugs, uranium-aluminum fuel tubes, lithium-aluminum target tubes and control rods, aluminum components, and stainless steel pinch and reclamation welds. Special samples representing process or material changes and out of specification products were also evaluated. Facilities for heat treating, corrosion testing, melting-casting, and autoclave testing were available for non-routine evaluations. In addition the laboratory provided site-wide assistance in the form of failure analysis, quantitative metallography, calibration of process equipment, and certification of welds and structural members.

3.1.4.5.b *322-M Laboratory Wastes*

Liquid effluents were routinely generated to the DETF via the process sewer. The volume of the laboratory effluents were less than 1% of the total annual flow to the DETF. Small quantities of hazardous wastes generated from analyses were temporarily stored within various laboratory RCRA Satellite Areas, then transferred to permitted SRS hazardous waste storage for eventual shipment to either an off-site permitted treatment facility or awaiting treatment on-

site. All scrap waste generated from the enriched uranium analysis was collected and returned to Oak Ridge for reprocessing.

A list of the chemicals used in the 320-M Laboratory is given in Appendix I.

It should be noted that the 320-M and 322-M Laboratories contained hundreds of analytical chemicals and chemical standards. The release of these materials to the LETF was carefully controlled to ensure that all NPDES release criteria were achieved. The MSDSs for these chemicals are NOT included in this petitions, due the extreme number. Rather, the final vitrified waste form was tested for all "Appendix VIII" constituents to determine which hazardous constituents should be monitored.

3.1.5 M-Area SPCC Facilities

During the treatment period M-Area had nineteen facilities which could potentially discharge oil (e.g., tank leaks or overflows, hose breaks or ruptures, equipment malfunctions, etc.) into navigable waters of the United States. Some of these facilities were closed at the end of the VTF treatment. To minimize the threat of release, a SRS Spill Prevention Control and Countermeasures Plan (SPCC Plan) was prepared in accordance with 40 CFR §110 & §112. As required under 40 CFR §112.5, this plan is reviewed and evaluated at least every three years and is amended whenever there is a change in facility design, construction, operation, or maintenance that materially affects the potential discharge of oil into or upon navigable waters of the United States. A release from these facilities would be contained in dikes or diversionary structures, where provided, and cleaned up using approved procedures. These facilities still in use are inspected weekly by trained personnel. Table 6 provides an overview of each facility. Map A (attached) identifies the location of each facility and provides and overview of the general drainage pattern in the event of a release.

Table 6.
LIST OF SPILL PREVENTION CONTROL AND COUNTER MEASURE PLAN FACILITIES

No.	Building No.	Description
1*	320-M	1,600 gallon extrusion press sump
2*	321-M	2,145 gallon extrusion press sump
3	316-1M	Covered concrete diked pad for 55 gallon drums of lube oil
4	782-1M	150 gallon steel tank for standby diesel fuel
5	352-4M	275 gallon steel tank for standby diesel fuel(next to 322-M)
6	320-M	25 steel tank for standby diesel fuel (basement of 320-M)
7	320-M	600 steel tank for standby diesel fuel(next to 320-M)
8	431-M	25 steel tank for standby diesel fuel (north of 341-M)
9	431-M	250 steel tank for waste oil (north of 341-M)
10	352-11M	300 steel tank for standby diesel fuel (north of 321-M)
11	320-M	125 gallon transformer southeast of 320-M
12	352-4M	Two 390 gallon transformers west of 322-M
13	532-5M	610 gallon transformer south of 313-M
14	352-6M	165 gallon transformer north of 321-M
15	352-7m	Two 285 gallon transformers east of 321-M
16	352-9M	250 gallon transformer northeast of 315-M
17	352-10M	210 gallon transformer southwest of 730-M
18	M-834-600-60	300 gallon transformer west of 341-M
19	-	600 gallon transformer southwest of 324-M
20	-	165 gallon transformer east of 701-4M
21	-	Three 100 gallon transformers east of 782-1M

* out-of -service

3.1.6 M-Area BMP Facilities

M-Area had seven facilities operating (during the treatment period) which could potentially discharge hazardous and/or toxic pollutants (e.g., tank leaks or overflows, hose breaks or ruptures, equipment malfunctions, etc.) into navigable waters of the United States. To minimize the threat of release, the SRS Best Management Plan (BMP) was prepared in accordance with 40 CFR §125 and NPDES permit conditions. As required by 40 CFR §125 this plan will be amended whenever there is a change in facility design, construction, operation, or maintenance which materially affects the facility's potential for the discharge of significant amounts of hazardous or toxic pollutants into waters of the United States or in the event the plan proves ineffective in achieving this objective.

A release from these facilities would be contained in dikes or diversionary structures, where provided, and cleaned up using approved procedures. The one facility still in operation is inspected weekly by trained personnel. Table 7 provides an overview of each facility. Map B (attached) identifies the location of each and provides and overview of the general drainage pattern in the event of a release.

Table 7. M-AREA BEST MANAGEMENT PLAN (BMP) FACILITIES

No.	Building No.	Description
1*	321-M	6,500 gallon storage tank for 50% nitric acid, north of 321-M
2*	341-M	1,250 gallon storage tank for waste nitric acid, inside 341-M
3*	341-M	1,250 gallon storage tank for waste caustic, inside 341-M
4*	313-M	12,250 gallon storage tank for 50% nitric acid, west of 313-M
5*	313-M	10,500 gallon storage tank for 50% sodium hydroxide, west of 313-M
6*	341-M	8,500 gallon storage tank for 50% sodium hydroxide, west of 341-M
7	316-1M	A covered shed, housing ~ 8800 gallons of Freon FR®, hydrogen peroxide, aluminux, nitric acid, soap, saw coolant, and phosphoric acid
8*	341-M	Drums of 50% alum and 93.2% sulfuric acid, stored inside 431-M
9*	341-M	Three make-up tanks; alum (200 gal.), sulfuric acid (1650 gal.), and caustic (3,500 gal.), inside 341-M
10*	313-M	Five process tanks; waste caustic (6,420 gals.), waste acid (6,420 gals.), waste acid (3,200 gals), neutralization (4,560 gals.), and slurry/ transfer (5,000 gal.)*

* out-of-service

3.1.7 Waste Treatment Processes

Waste Treatment Overview

Liquid effluents generated from the M-Area manufacturing operations consisted primarily of aluminum forming and metal finishing processes, including nickel electroplating operations. Process waste effluents contained rinsewaters, stack acid scrubber effluents, and spent process solutions from the three production buildings and two support laboratories.

Since July, 1985, process wastewaters have been discharged to the M-Area Liquid Effluent Treatment Facility (LETF). Previous discharges of process wastewaters were to the M-Area Settling Basin (See Section 2.2). The LETF utilizes the Best Available Technology Economically Achievable (BATEA) for the aluminum forming and metal finishing industries. The LETF consisted of three close-coupled treatment facilities: the Dilute Effluent Treatment Facility (DETF), an Industrial Wastewater Treatment Plant (IWTP); the Chemical Transfer Facility

(CTF); and the Process Waste Interim Treatment/Storage Facility (PWIT/SF), a tank storage farm. With the cessation of electroplating activities the operation of the CTF was no longer required and was subsequently shutdown May 2, 1992. Both the DETF and PWIT/SF are no loner operational. Descriptions of these facilities and identification of all hazardous wastes generated from their operations, as appropriate, are provided in Section 3.1.11 below.

M-Area also operates two RCRA interim status container storage facilities for hazardous and mixed wastes, the Mixed Waste Storage Shed (MWSS) and the M-Area Pad (MAP). An Air Stripper for remediation of chlorinated hydrocarbon groundwater contamination is also operational.

3.1.7.1 Liquid Effluent Treatment Facility (LETF)

Since July 1985, area process wastewaters have been discharged to the M-Area Liquid Effluent Treatment Facility (LETF). The LETF utilizes the Best Available Technology Economically Achievable for the aluminum forming and metal finishing industries. The LETF was composed of three closed-coupled treatment facilities:

- Dilute Effluent Treatment Facility (DETF), an Industrial Wastewater Treatment Plant
- Chemical Transfer Facility (CTF), and
- Process Waste Interim Treatment/Storage Facility (PWIT/SF), a wastewater tank farm.

With the cessation of electroplating activities the chemical operations in the CTF were no longer required and it was subsequently shutdown May 2, 1992. Both the DETF and PWIT/SF were shutdown at the completion of waste treatment in February 1999. Figure 7 provides an overview of the LETF.

Wastewater treatment sludges generated from both CTF and DETF operations were characterized as a RCRA listed F006 mixed waste. Approximately 1.2 million gallons were generated from M-Area operations between 1985 and 1988. Approximately 660,000 gallons remained in the PWIT/SF awaiting vitrification. The remainder of the waste, a supernate which separated from the residual precipitate, was previously treated in the DETF. Liquid effluents generated from the DETF were released via a National Pollutant Discharge Elimination System permitted outfall while the solids effluents (i.e., filtercake) were returned to the PWIT/SF. Sections 3.1.7.1.a -3.1.7.1.c individually describes the components of the LETF.

3.1.7.1.a *Dilute Effluent Treatment Facility (DETF)*

The DETF was a batch operation, end-of-pipe industrial wastewater treatment facility, utilizing metal precipitation, flocculation, and filtration technologies for the treatment of dilute area wastewaters. This facility employed a metal hydroxide precipitation process pre June 1990 (pre-supernate treatment) and then a metal phosphate precipitation process post June 1990 (supernate treatment). The process flow diagram for the DETF is shown in Figure 12.

Dilute wastewaters from the aluminum cleaning lines of area production buildings and laboratories were received in the DETF collection sump [concentrated plating line effluents were discharged directly to the PWIT/SF, after treatment in the CTF (See Section 3.4.3.2)]. The dilute wastewaters were pumped, via the process sewer, to the DETF Oil Skimmer and Collection Sump. The wastewater was then pumped to one of two 60,000 gallon equalization tanks until a tank level of 70% was attained. Aluminum sulfate (alum) was then added, if needed, to remove phosphates from the wastewater. The pH was then adjusted with 10% sodium hydroxide or 10% sulfuric acid to 8.0 - 8.5 for optimum metals precipitation. The formation of the precipitates proceeded by the following controlling metal hydroxide precipitation reactions:

$$Al^{+3} + 3\,OH^{-} \rightarrow Al(OH)_3 \leftrightarrow AlO_3^{-} + H_2O + H^{+}$$

$$Ni^{+2} + 2\,OH^{-} \rightarrow Ni(OH)_2$$

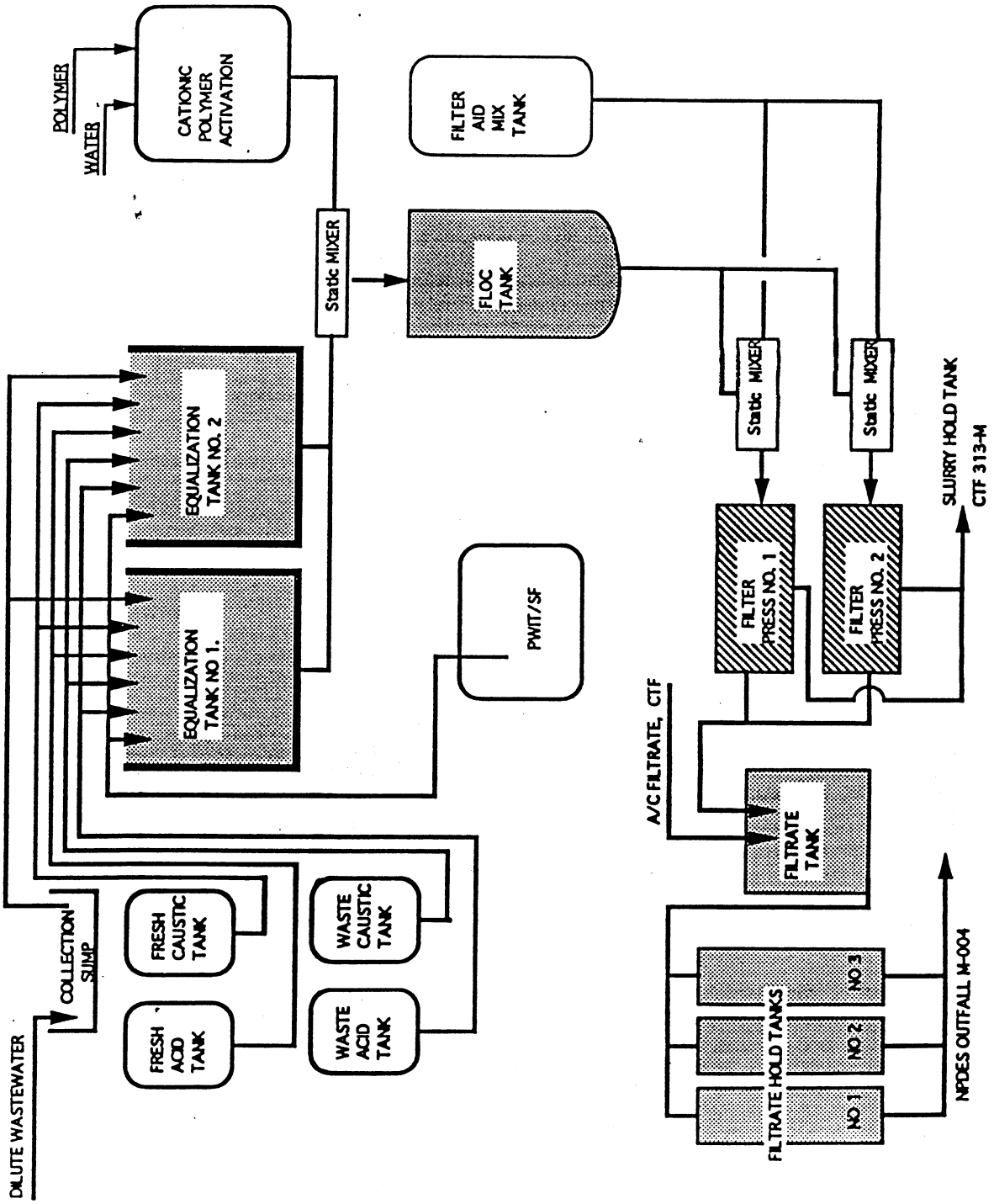


FIGURE 12 PROCESS FLOW DIAGRAM OF THE DETF

After neutralization, the wastewater was sampled to measure for pH and Total Suspended Solids (TSS) concentration, as well as orthophosphate concentration. If the orthophosphate concentration exceeded the NPDES discharge guideline, aluminum sulfate (alum) was added as needed to precipitate aluminum phosphate. The treated wastewater was then fed to the flocculation/filtration system. From the floc tank the wastewater was pumped through a static mixer, where Diatomaceous Earth (DE) or expanded perlite was added to the wastewater to enhance filtration. From the static mixer the wastewater flowed to the Oberlin® pressure filter. The DE was injected into the static mixer at an optimum weight ratio of filter aid to TSS concentration in the wastewater.

The Oberlin® pressure filter is the primary unit in the wastewater treatment process and is shown in Figure 13. Two filters operated in tandem at an average wastewater flow of 20-24 gallons per minute during peak M-Area production.

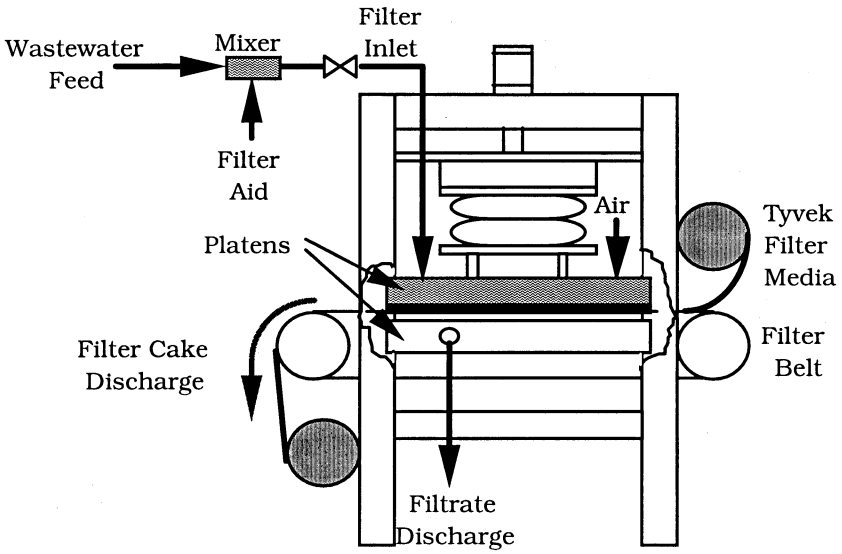


FIGURE 13: OBERLIN PRESSURE FILTER DIAGRAM

The wastewater/filter aid mixture entered the pressure filter and was distributed over a thin 24 square foot sheet of Tyvek® 1042B filter media which had a 2 micron nominal particle removal rating. As the filter cake accumulated, the pressure in the upper platen increased. At 30 psig the wastewater inlet valve closed completing the feed cycle, and the index cycle began. Air discharged residual wastewater from the upper platen back to the floc tank and dried the filter cake. The filter then opened (the upper platen was lifted up), and the media support belt advanced discharging the cake. New media was drawn from a supply roll into the filter, as the spent media was collected on a re-roller. The filter closed (the upper platen was lowered) and the next cycle began.

During the filtration cycle, the filtrate was collected in the filtrate tanks, analyzed and then discharged to a NPDES permitted Outfall. The filter cake was collected in 55 gallon drums via a screw conveyor, where it was then transported to the CTF. At the CTF, the drums were conveyed into the slurry hold tank and mixed with concentrated aqueous chemical wastes (spent process solutions adjusted to pH 8.5-12.0). Finally, the mixture was pumped to the PWIT/SF tanks for storage.

In June 1990, the PWIT/SF tanks contained all of the slurried waste generated from the CTF and the DETF, approximately 1.2 million gallons. Tanks 1-6 (35,000 gallon tanks) and tanks 7 and 8 (500,000 gallon tanks) were full. Tank 10 was in the process of being filled. The waste in the tanks had separated into 2 phases, a clear supernatant (supernate) and a dense sludge. Waste characterizations revealed that the uranium had undergone a chemical conversion at pH 12.5 to an insoluble sodium uranate ($Na_6U_7O_{24}$ or $Na_2U_2O_7$), which precipitated from the supernate with other heavy metals. The sludge, which was approximately 30% of the total volume of the tanks, was largely sodium and/or calcium zeolite (filter aid), aluminum hydroxide, sodium nitrate, silicon oxide (sand), and uranium and heavy metal precipitates. The supernate was a clear, slightly yellow liquid and was very similar to the rinsewater that the DETF processed, except that it contained a higher concentration of aluminum, phosphate, and nitrate.

Process developments to chemically stabilize and solidify the waste at the PWIT/SF were begun in 1989. Decanting the supernate and processing it through the DETF would greatly reduce the volume of hazardous waste requiring solidification/stabilization for permanent disposal. Treatability studies in 341-M Laboratory developed the process for the treatment of supernate mixed with M-Area dilute wastewater. SCDHEC approved the LETF permit modification to treat supernate in May 1990. The first transfer of supernate (2.8 vol. % supernate) from the PWIT/SF Tank 8 to the DETF equalization tank was made on May 28, 1990.

The excess phosphate in the supernate changed the DETF process from metal hydroxide precipitation to less soluble metal phosphate precipitation.

To efficiently process wastewater with the higher phosphate concentration, the DETF equalization tank was filled to 30% and the supernate was then added. The batch was adjusted to pH 3 using waste acid and/or sulfuric acid to solubilize all of the metals and remove excess carbonate as volatile CO_2. This was to ensure that the metals rapidly precipitated to the metal phosphate form during treatment. Due to the high phosphate concentration in the supernate, sufficient alum was added to later precipitate the remaining phosphate as aluminum phosphate during pH adjustment. The tank was then filled to 70% with dilute M-Area wastewater and neutralized with waste caustic and/or sodium hydroxide to a pH of 8.0 - 8.5. From this point, the process proceeded as it had prior to supernate processing.

On the third supernate batch, which contained 3.4 vol. % supernate, a polymer system was implemented to improve the performance of the DETF. A PolyBlend® system was used to activate the cationic polymer (Praestol® K144L) and inject it into the existing in-line static wastewater mixer upstream of the flocculation tank (Figure 14). The polymer pump received a signal from the control room proportional to the wastewater flow from an existing magnetic flow meter. A controller on the PolyBlend® reciprocating metering pump adjusted its stroke frequency in proportion to the signal received from the control room. As a result, the rate that the polymer was drawn from the polymer supply could easily be proportioned to the wastewater flow and the measured TSS concentration.

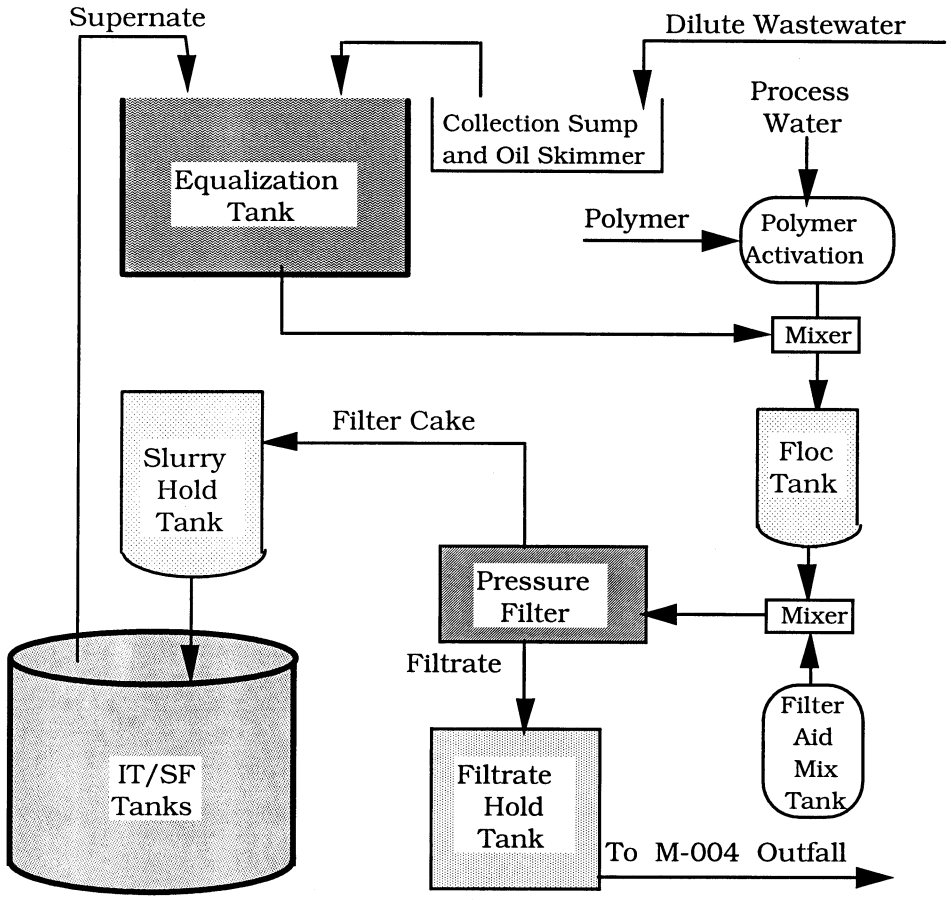


FIGURE 14 : PROCESS FLOW DIAGRAM OF THE DETF WITH SUPERNATE AND POLYMER ADDITION

The pump then injected the polymer into the system's mixing chamber for activation with process water, which was controlled by a rotameter. The activated polymer was injected into the wastewater through a static mixer and the mixture was collected in the floc tank. The DETF operation proceeded as before except that the polymer system had been added.

With the completion of supernate treatment in April, 1995 the DETF reverted to the original metal hydroxide precipitation process. The DETF was subsequently clean flushed. It should be noted that the DETF reverted to metal phosphate precipitation in support of the Vendor Treatment Process for treatment of the off-gas condensate.

3.1.7.1.b *Chemical Transfer Facility (CTF)*

The Chemical Transfer Facility (CTF) was designed to handle all radioactively contaminated effluents from the Building 313-M Target Slug Production Facility, as well as all concentrated M-Area process chemicals. The CTF was divided into three sections; Autoclave Wastewater Treatment, Evaporator, and Wastewater Neutralization. With the completion of supernate treatment the slurry transfer line was clean-flushed and permanently shutdown. A description of these processes are outlined below.

Figure 15 provides a flow diagram for the CTF Autoclave Wastewater Treatment process. This process collected steam condensate from autoclave testing of target slugs containing uranium dioxide (UO_2) solids. The condensate was initially flow-equalized, then the wastewater was fed to an Oberlin pressure filter. Filter aid was injected into an in-line static mixer before entering

the filter. The filtercake generated from the pressure filter was then transported to the Acid Hold Tank (see Wastewater Neutralization, below).

The filtrate collected in a hold tank before it was filtered in Mott® polishing filters. These two sintered metal filters removed fine particles that were not removed by the pressure filters. While one Mott® filter prefills with filtrate, the other enters an air blowdown phase, which removes collected solids from the filter tubes. The solids blown out of the filters are drained to the sump and returned to the equalization tank, where they are eventually removed by the pressure filter. The polished filtrate was transferred to the DETF filtrate hold tank for temporary storage and analysis prior to discharge from the M-004 outfall.

Figure 16 provides a flow diagram for the CTF Evaporator process. Radioactively contaminated wastewaters from the Building 313-M sumps and rinsewater tanks where received into the evaporator equalization tank. The wastewater was preheated with 50 pound steam to approximately 220°F and injected into a two-phase (liquid-vapor) flash tank. Liquid bottoms were pumped through a single-phase heat exchanger (Evaporator) which was heated with 50 pound steam to approximately 220°F. A pressure-reducing orifice allowed the liquid to "flash" to vapor as the wastewater returned to the flash tank. Bottoms cycled through this loop until the contaminants were concentrated and collected in the Bottoms Hold Tank, which was pumped to the Acid Hold Tank (see Wastewater Neutralization, below). Flow to the bottoms hold tank was controlled by specific gravity.

The vapor phase from the Flash Tank was cooled through a condenser and collected in the Condensate Hold Tank. It was further cooled in an aftercooler prior to transfer to the process sewer. Spent steam from the evaporator and preheater, and cooling water from the condenser and aftercooler, were analyzed in-line for conductivity as they were pumped to the A-014 outfall, verifying that no process chemicals had leaked through the equipment.

Figure 17 provides a flow diagram for the CTF Wastewater Neutralization process. Concentrated spent acid and caustic wastewaters were received in their respective hold tanks. The Acid Hold Tank also received filtercake from the Autoclave Wastewater Treatment process and the concentrated bottoms from the Evaporator process. Waste caustic was transferred to the Crystallizer, where it was neutralized to pH 8.5 - 11 with the waste acid from the Acid Hold Tank. A small amount of caustic was then transferred to the Crystallizer and diluted with process water to pH 8.5 - 11. Cooling coils removed heat generated from the acid-caustic chemical reaction. Cooling water was then analyzed in-line for conductivity as it was pumped to the A-014 outfall, verifying that no process chemicals had leaked through the equipment. The resulting slurry was pumped to the Slurry Hold Tank, where it was mixed with the DETF filtercake and pumped to the PWIT/SF for storage pending treatment and ultimate disposal. Recirculation prevented the potential pluggage of the lines with settled solids, normally suspended in the slurry during transport.

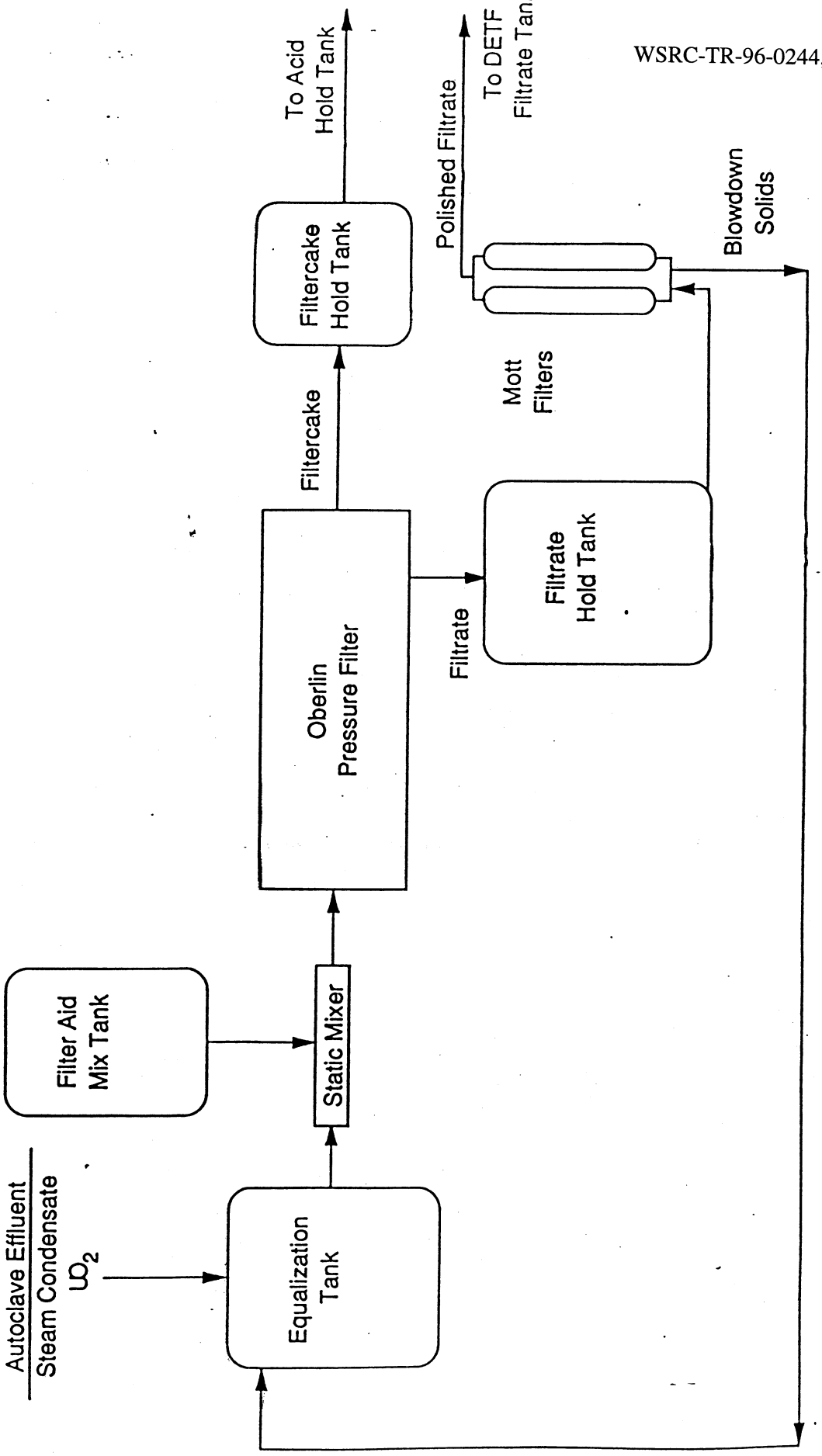


FIGURE 15; FLOW DIAGRAM FOR THE CTF AUTOCLAVE WASTEWATER TREATMENT PROCESS

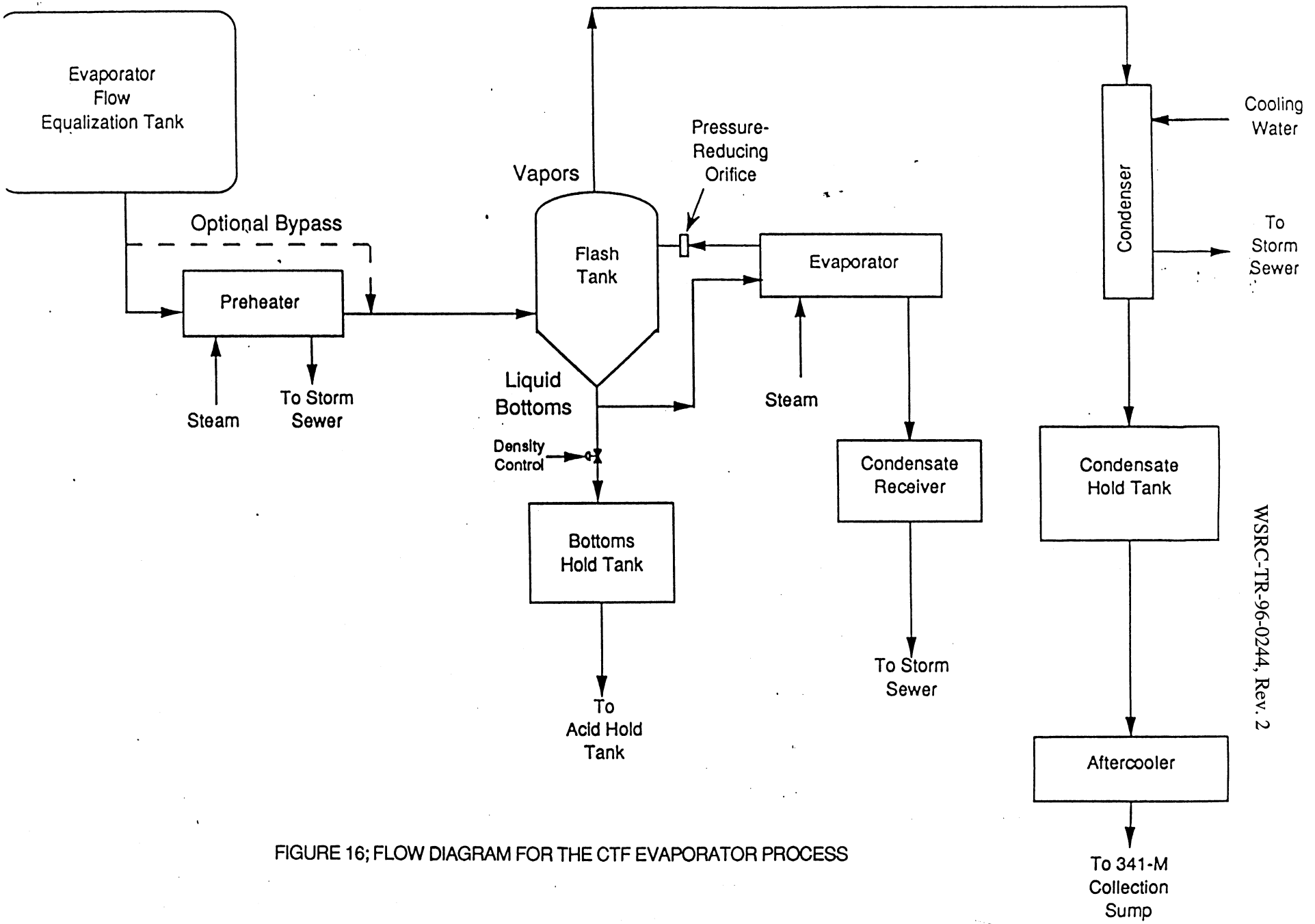


FIGURE 16; FLOW DIAGRAM FOR THE CTF EVAPORATOR PROCESS

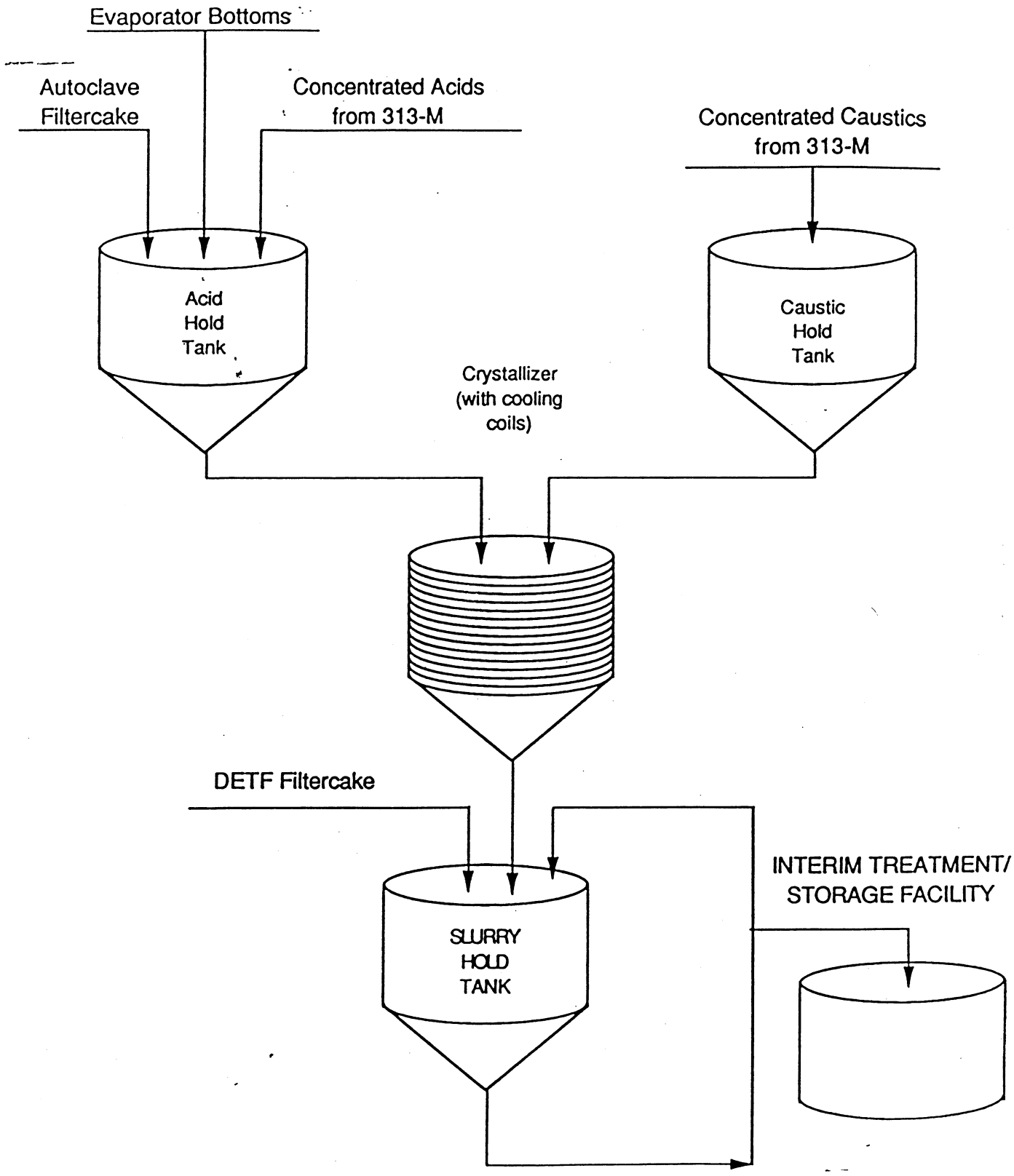


FIGURE 17; FLOW DIAGRAM FOR THE CTF WASTEWATER NEUTRALIZATION PROCESS

3.1.7.1.c *Bldg. 341-1M, Process Waste Interim Treatment/Storage Facility (PWIT/SF)*

The PWIT/SF was a wastewater tank storage and treatment facility consisting of six 35,000 gallon tanks (Tanks 1-6) located inside Building 341-1M and four 500,000 gallon tanks (Tanks 7-10) located outside, adjacent to Building 341-1M. Tank 9 was never used, but was designated as a backup tank for emergency transfers. The PWIT/SF was located in an area south of the DETF (Bldg. 341-M). Building 341-1M is a totally enclosed corrugated steel structure. The six 35,000 gallon tanks are each 40 feet in length and 12 feet in diameter. They are horizontally mounted on steel and concrete saddle support structures inside a concrete containment dike, which measures 100 feet by 60 feet by 4.5 feet high. The containment area slopes to a sump, which measures 1.5 feet deep by 4 feet square. The dike is capable of containing 201,900 gallons of liquid, which is nearly the capacity of all six tanks.

The 500,000 gallon tanks are covered carbon steel vertical tanks with a nominal capacity of 500,000 gallons. The design capacity (to the bottom of the overflow line into the annulus) is 495,000 gallons. The operating capacity depth was maintained approximately 3 inches below the overflow line. The tanks are constructed on concrete, steel-reinforced pads with a diameter of 69 feet (the tank diameter is 67 feet). The tanks are double walled tanks for secondary containment. The radius of the primary tank is 31 feet. The radius from the center of the primary tank to the outer wall of the secondary tank is 33 feet 6 inches, leaving an annular space of 30 inches. Leak detection devices are installed within the annuli of each tank to detect any leakage between the tank walls.

The PWIT/SF temporarily stored the slurried F006 mixed waste. Treatment in the PWIT/SF occurred through both chemical interactions, which precipitated uranium and facilitated phase separation, and through volume reduction, where supernate in the PWIT/SF was removed and treated in the DETF. The remaining sludge was stored in the PWIT/SF tanks awaiting permanent solidification/stabilization by the Vendor Treatment Process. This PWIT/SF was inspected daily by qualified personnel and inspection records were maintained for the lifetime of the facility. This facility never experienced a release outside of containment.

3.1.8 Building 316-M Mixed Waste Storage Shed (MWSS)

The Mixed Waste Storage Shed (MWSS) is a RCRA interim status container storage facility, permitted in March, 1991. The 316-M storage shed is used for the storage of hazardous and mixed wastes. The storage shed measures 120' by 50' overall with a 100' by 40' storage capacity within the containment fencing. The storage building is an above grade, zero release facility in accordance with all applicable Environmental Protection Agency and South Carolina Department of Health and Environmental Control standards. The concrete pad within the building serves as the storage area. The pad is curbed on three sides. The fourth side of the pad is built to a sufficient elevation to ensure positive drainage to the static sumps within the pad. Twelve static sumps are located throughout the pad. An interior curb divides the pad into two equal halves, with six sumps in each half. The sumps are divided into sets of three, which are then connected in common.

Wastes stored in the facility are packaged in approved containers, generally 55 gallon drums and large steel boxes (typically a B-25 type; 90 cu. ft./box). The maximum storage capacity is equivalent to approximately 560 fifty-five gallon drums. The facility is inspected every seven days by qualified personnel. Storage at this facility may include, but is not limited to the following wastes: F006; F-listed solvents; D001 through D043; P-listed; U-listed. This facility has never experienced a release.

3.1.9 Building 315-4M M-Area Pad (MAP)

The Building 315-4M storage pad is a RCRA interim status permitted container storage facility to be used for the storage of solid wastes. The storage pad measures 135' by 200' overall, with a 134' by 199' storage area within the curbed area. The concrete pad serves as the storage area. The pad expresses a 0.6 percent grade, running East to West. The pad is curbed on all four sides, with the exception of a 23' access way on the south side. Curbing prevents run on to the facility and serves to direct rainwater to a storm water drain, located on the west portion of the pad, emptying to Outfall M-001. The pad is completely fenced in, with a lockable access gate on the south side and an emergency exit on the north side.

The stored waste is packaged in approved containers, generally DOT Type A 7A 71 gallon square steel drums, DOT 1A2 55 gallon drums, and/or large steel boxes (typically B25 type, 90 cu. ft./box or B-12 type, 45 cu. ft./box). No liquid or multiphasic wastes are to be stored on the pad. The facility is inspected every seven days by qualified personnel.

3.1.10 Process Materials

The primary and auxiliary process chemicals previously used in the manufacturing processes (target and fuel fabrication) are summarized in Table 8. Material Data Safety Sheets (MSDS) are provided in Appendix F-1 and F-2 for those chemicals. None of these chemicals are currently used, as the manufacturing operations are shutdown. Note: the MSDS's for many of the low volume chemicals present in M-Area during the target and fuel production manufacturing activities are NOT included. These include common cleaning agents, paints, glues, and other commonly used chemicals. Instead of trying to determine what, if any hazardous constituents might be present in the stored waste resulting from these materials, a total constituent analysis for all of 40 CFR 261 Appendix VIII constituents was conducted on the final vitrified waste form.

The primary chemicals currently utilized in the Dilute Effluent Treatment Facility are listed in Table 9, and the MSDS's for these chemicals are given in Appendix G. Note, as above, MSDS's for common cleaning agents, paints, glues, and other low use chemicals are not included in the delist petition. A total constituent analysis for all of 40 CFR 261 Appendix VIII constituents was conducted on the final vitrified wasteform to determine what hazardous constituents should be considered.

A list of the chemicals used in the vitrification treatment process is given in Table 10 and MSDS's are provided in Appendix H for those chemicals. Note, as above, MSDS's for common cleaning agents, paints, glues, and other low use chemicals to be utilized in the vitrification treatment process are not included in the delist petition, as these will be similar to the chemicals that have been used in M-Area in the past. The total constituent analysis for all Appendix VIII constituents was conducted on the final vitrified wasteform to determine what hazardous constituents should be considered.

3.1.11 Laboratory Chemicals

A complete listing of Building 320-M and 322-M laboratory chemicals and materials are provided in Appendix I, by facility. Due to the low volume discharges of any of these chemicals to the DETF and the PWIT/SF storage facility (< 1% annualized flow), the MSDS's are not included in this petition. Rather, a total constituent analysis for all of 40 CFR 261 Appendix VIII constituents was conducted on the final vitrified waste form, to determine if any additional hazardous constituents should be included in this petition.

TABLE 8; PREVIOUSLY USED PROCESS CHEMICALS
A- PRIMARY PROCESS CHEMICALS

Note; the annual usage rate for these chemicals is not provided, as they are no longer in use. All chemical residuals are in the stored wastes.

Process/Building	Trade Name	Chemical Description	Remarks
313-M, 320-M, 321-M	Aluminum	Base Metal	Used to encapsulate cores, 321-M and to prepare Li/Al and U/Al assemblies
313-M, 321-M	Aluminux R	Alkaline etchant for aluminum	Used as a cleaning agent
313-M, (Core Plating Line Process)	Boric Acid	Hydrogen borate, weak acid	Used in plating solution
313-M, Cap-Can Cleaning Process	Chlorothene VG Solvent	1,1,1-Trichloroethane	Used as degreasing agent until September 1987
CTF*	Diatomaceous Earth	Silica	Used as a filter aid in CTF
313-M (Hot Die Size Bonding Process)	Fiske Lubricant	Aluminum and graphite in mineral oil	HDSB press lubricant
321-M	Freon TF R	Trichlorotrifluoroethane	Used as machining lubricant, and used as degreasing agent in 321-M after September 1987
313-M, 321-M	GRAFO R	Graphite in mineral oil	Used as a heat transfer medium for aluminum extrusion or bonding
313-M (Core Plating Line Process)	Hydrochloric Acid	Hydrochloric Acid	Used in anodic etching solution
321-M	Lead	Base metal	Used to lubricate extrusion press until April 10, 1988
320-M, 321-M	Lithium	Base metal	Alloyed with Al to form Li/Al assemblies
313-M (Core Plating Line Process)	Nickel slugs	Base metal	Used in plating bath
313-M (Core Plating Line Process)	Nickel carbonate hydrate	Nickel (II) carbonate hydrate	Used in treatment of plating bath solution

TABLE 8: PREVIOUSLY USED PROCESS CHEMICALS, CONTINUED
A- PRIMARY PROCESS CHEMICALS

Process	Trade Name	Chemical Description	Remarks
313-M (Core Plating Lien Process)	Nickel chloride	Nickelous chloride hexahydrate	Used in plating solution
313-M (Core Plating Line Process)	Nickel (II) sulfate, hexahydrate	Inorganic salt	Used in plating solution
313-M, 320-M, 321-M	Nitric acid	Inorganic acid	Used in cleaning and etching solutions
313-M (Core Plating Line Process & Cap-Can Cleaning Process)	Phosphoric acid	Mineral acid	Used in anodic etching solutions
313-M, 320-M, 321-M	Rando oil HD 68	Hydraulic oil	Used as an industrial lubricant
313-M, 320-M, 321-M, CTF	Sodium hydroxide	Inorganic base	Used in etching and cleaning, and neutralization in CTF
313-M (Core Recovery Process)	Sodium nitrate	Sodium nitrate	Used in core recovery solution
313-M (Hot Die Size Bonding Process)	Solka-Floc R	Cellulose; filter aid	Used to remove oils from recycled quench water
321-M	Tin	Base metal	Used to lubricate extrusion press after April 11, 1988
313-M, 320-M, 321-M	1,1,1-Tricholoroethane (inhibited 1,1,1-Tricholoroethane)	1,1,1-Tricholoroethane	Used as degreasing agent until September 1987
313-M, 321-M	Uranium	Actinide metal; core metal	Core metal

*CTF = Chemical Transfer Facility

TABLE 8: PREVIOUSLY USED PROCESS CHEMICALS: CONTINUED
B. AUXILIARY PROCESS CHEMICALS**

Charcoal	Activate carbon	Used to purify the plating bath solution
CINDOL R	Aqueous detergent	Tube assembly wetting agent
Doubleteam R	Synthetic coolant	Used as a cleaning agent
Filterbestos R	Cellulose; filter aid	Used to purify the plating bath solution
Hydrogen peroxide	Hydrogen peroxide	Used in plating bath adjustment
Isopropyl alcohol	Alcohol	Used as a cleaning agent
Monolec Industrial Lubricant	Petroleum hydrocarbon	Used as an industrial lubricant
W & B Coolant	Fatty acid soap	Grinding and polishing agent

**Chemicals used in low volumes; i.e., approximate volumes consumed less than 100 gallons/year.

TABLE 9: PROCESS CHEMICALS CURRENTLY USED IN THE DETF

Building 341-M	Trade Name	Chemical Description	Remarks	Approximate Annual use, lbs
DETF	Aluminum Sulfate	Aluminum alum, aluminum sulfate solid, aluminum salt (3:2), octadeca hydrate	Used in DETF as precipitant/coagulant	50,000
DETF	PerFLO 30	Perlite; fused sodium potassium aluminum silicate	Used as a filter aid in pressure filters in DETF	100,000
DETF	Praestol F290	Organic polymer	Used in DETF as floculating agent	2,000
DETF	Sodium Hydroxide	Inorganic base	Used in DETF as pH control, and precipitating agent	50,000
DETF	Sodium Phosphate	Inorganic acid; disodium hydrogen phosphate	Used in DETF as precipitating agent	25,000
DETF	Sulfuric acid	Inorganic acid	Used in DETF as pH control	50,000

TABLE 10: CHEMICALS PLANNED TO BE USED (OR POTENTIAL USE) IN THE VTF

Building 341-8M	Trade Name	Chemical Description	Remarks	Approximate Annual use, kgs*
VTF	Boric Acid	Inorganic acid	Used in VTF as as glass forming agent	100,000
VTF	Calcium carbonate	Limestone, inorganic solid	Used in VTF as as glass forming agent	<100,000**
VTF	Calcium sulfate	Gypsum, inorganic solid	Used in VTF as as glass forming agent	<100,000**
VTF	Chromium oxide	Inorganic solid	Present in furnace lining brick	NA
VTF	Cupric oxide	Inorganic solid	Used in VTF as as glass forming agent	<5000**
VTF	Diatomaceous Earth	Diatomite, Celite	Used in VTF in bag house as filter aid	30,000
VTF	Hydrochloric acid	Muratic Acid, inorganic acid	Used in VTF to control pH in scrubber solution	<10,000**
VTF	Hydrogen peroxide	Hydrogen peroxide, 30%	Used in VTF in off-gas control and NOx treatment	50,000
VTF	Iron hydroxide	Inorganic slurry	Used in VTF as as glass forming agent	<5000**
VTF	Ferric oxide	Inorganic solid	Used in VTF as as glass forming agent	35,000
VTF	Lithium carbonate	Inorganic solid	Used in VTF as as glass forming agent	95,000
VTF	Magnesium carbonate	Inorganic solid	Used in VTF as as glass forming agent	<100,000**
VTF	Manganese dioxide	Inorganic solid	Used in VTF as as glass forming agent	2,000
VTF	Sodium carbonate	Inorganic solid, soda ash	Used in VTF as as glass forming agent	<5,000**
VTF	Sodium fluoride	Inorganic solid	Used in VTF as as glass forming agent	<5,000**
VTF	Sodium hydroxide	Caustic soda	Used in VTF as as glass forming agent and to control pH in scrubber solution	200,000
VTF	Sodium sulfate	Inorganic solid	Used in VTF as as glass forming agent	<5,000**

TABLE 10: CHEMICALS PLANNED TO BE USED (OR POTENTIAL USE) IN THE VTF (CONTINUED)

Building 341-8M	Trade Name	Chemical Description	Remarks	Approximate Annual use, kgs*
VTF	Silca gel	Inorganic solid, amorphous silicon dioxide	Used in VTF as as glass forming agent	185,000
VTF	Sulfuric acid	Inorganic acid	Used in VTF to control pH in scrubber solution	50,000
VTF	Titanium dioxide	Inorganic solid	Used in VTF as as glass forming agent	<5,000**
VTF	Urea	Inorganic solid	Used in VTF to reduce NOx emmsions	100,000
VTF	Zirconium silicate	Inorganic solid, zircon	Used in VTF as as glass forming agent	110,000

* Also the total anticipated usage, since the time to treat the M-Area wastes is approximately one year
** Designates chenical which may be potentially used, but are not currently planned.

3.2 Special Information - Vendor Treatment Facility (VTF)

This Section provides process information relevant to the final vitrified wasteform. Treatment of all of the M-Area wastes and those soils and mixed wastes discussed previously was completed 2/24/99. Information is provided with respect to bench scale (crucible studies) and pilot scale studies conducted on the M-Area waste sludges. The facility was built and operated by an independent sub-contractor to Westinghouse Savannah River Co. (GTS Duratek, of Columbia, MD) hence the "Vendor Treatment Facility" (VTF) appellation. A description of the process and facility which vitrified the petitioned wastes is provided. Analytical results on the final vitrified wasteform, i.e.; TCLP results provided by the vendor to demonstrate compliance with the terms of the sub-contract are given in Table 24. All of the TCLP laboratory results are provided in Appendix M.

The formulation and production of the final vitrified wasteform was based on the technology developed for vitrification of the High Level Radioactive Waste (HLW) at the SRS. The M-Area was chemically similar to HLW, except that the only radionuclide present is uranium. Bench scale (crucible) studies were conducted by SRTC to ensure that the final glass would meet the delisting levels, using a wide range of waste loading and formulations. The sub-contractor employed an independent laboratory (Catholic University of America (CUA), in Washington, DC) to confirm the SRTC crucible studies. In addition, SRTC conducted a scale up treatability study using CUA's 10 kg/day small scale melter. All leaching results, both crucible and scale-up, were one to two orders of magnitude (10 to 100x) lower than the proposed delisting levels.

Although the full scale production facility operated at 5000-6000 kgs/day, vs. the small scale treatability studies, the glass formulation and final durability were not affected by the higher throughput, as evidenced by the leaching results (Table 24). This is due partly to the long residence time of the waste in the melter (an average of 2.5 days), such that a homogenous final material is produced and to the glass formulation.

Additional validation samples taken during the treatment of the waste confirmed that the final wasteform meets all the proposed leaching levels. These results are discussed in Section xx, and all of the laboratory analytical results are provided in Appendix M.

Overview

The M-Area wastes were solidified/stabilized using the process of vitrification by an on-site vendor. The Vendor Treatment Facility (VTF) melter utilized modern vitrification technology to convert a liquid mixed waste into a stable, leach resistant glass. The VTF melter was an electric joule-heated glass melter with a nominal glass production capacity of five to six tons/day. The M-Area wastes were blended with glass forming additives and then fed directly into the glass melter. There, the water was evaporated, inorganic salts are decomposed, and the mixture dissolved into a molten glass bath. The hazardous constituents become atomistically bonded into the glass matrix, providing a low volume and extremely durable wasteform.

Electrical current passing through the molten glass generated the heat necessary to keep the glass molten and provide heat to react the waste feed stream. Nominally, the glass bath was controlled to a temperature of 1150°C +/- 50°C (2100°F +/- 90°F), and was discharged through either of two side exiting pour spouts. The discharge pour spouts were activated by an airlift for controlled glass discharge. The pour spouts were closed coupled to "gem machines" which produced flattened ovoids of glass, approximately 1/2 to 3/4" in diameter. The "gem machine" fed the solidified glass gems, or pellets, directly to carbon steel drums for containment and storage of the discharged glass. The melter was equipped with an air bubbling and stirring system, which increased the melter production capacity and oxidized any organic or metallic inclusions in the waste feed stream.

The melter was close coupled to a multistage off-gas treatment system, which maintained the melter at a constant negative pressure and entrained and treated melter emissions. Emissions consisted mostly of water vapor, anionic oxides, various decomposition products of the feed, and particulates. Two packed bed scrubber towers removed particulates and treated emission gasses. A bag filter and High Efficiency Particulate Air (HEPA) filter functioned for the further removal of particulates and was designed to operate at a minimum efficiency of 99.97% for particulates of 0.3 micron or greater. Liquids generated from the melter off-gas scrubber were treated by the M-Area DETF and discharged directly to Outfall M-004 in compliance with the existing NPDES permit.

3.2.1 Bench-Scale and Pilot-Scale Treatability Studies

This section includes information concerning bench scale and pilot scale studies conducted on vitrification of the M-Area plating line sludges.

3.2.1.1 Initial SRTC Bench Scale (Crucible) Treatability Studies

Vitrification treatability studies on the M-Area plating line sludges were initiated in 1991 by the Savannah River Technology Center (SRTC). These studies indicated that the sludges could be transformed into highly durable boro-silicate or soda-lime glass wasteforms, with large volume reductions of 75-90%. Two glass formulations were tested in 1992, with the TCLP leaching results for the main hazardous constituents of concern given below in Table 11 (Jantzen, 1993). Both types of glasses were well below the concentrations needed for a delisting petition. The boro-silicate glass had a better leaching result for nickel, which is the primary hazardous constituent of concern in the M-Area wastes, so the boro-silicate family of glasses was selected for the majority of the follow-on vitrification tests.

Table 11, Initial TCLP Results on M-Area Glasses

Type glass	Waste Loading, %	TCLP, mg/L			
		Ba	Cr	Ni	Pb
Boro-silicate	70	1.85	<0.04	0.17	<0.2
Soda-Lime Silica	70	1.40	<0.04	0.74	<0.2
Proposed Delisting Levels (using a DAF of 100)		200	10	10	1.5

3.2.1.2 Bench Scale (Crucible) Studies by Catholic University of America (CUA)

A fifty-gallon composite sample of the M-Area plating line wastes was prepared for shipment to an off-site vendor for a demonstration of the vendor's ability to meet the TCLP leaching requirements for a vitrified wasteform. This was to allow the vendor to respond to a Request For Proposal (RFP) to stabilize the M-Area wastes. Composite samples of Tanks 7 and 8 were prepared by collecting one sample from each of the four top access ports on top of Tanks 7 and 8. Each of the four samples was collected from the entire depth (~6 feet of sludge) to obtain a representative sample. The 4 individual port samples from tanks 7 & 8 were then mixed to form a composite Tank 7 and Tank 8 sample. Since Tank 10 had been homogenized by internal mixing agitators, only one sample was collected from Tank 10. In addition, samples of the stored Mark 15 filtercake and the M-Area plating line solutions were collected. All of these individual samples were mixed in their respective proportions into one homogeneous 55-gallon sample. Fifty gallons were then shipped in ten, 5-gallon containers to the off-site laboratory. Five gallons were retained for on-site SRS characterization.

The homogeneous sample was shipped to the Vitreous State Laboratory of the Catholic University of America in December 1992 for bench-scale studies. The treatability study was conducted by the laboratory in March 1993 (WSRC, 1995b). The ten, 5-gallon samples were

re-mixed after receipt at the treatability laboratory to ensure homogeneity, before removing sub samples for analyses. The solid content was determined by drying the samples at 450° C and 900° C for 4 hours prior to chemical analysis. This the relevant basis for vitrification; i.e., carbonates, hydroxides, etc. are decomposed to the corresponding oxides, and the volatile materials are decomposed and/or volatilized (water, nitrates, sulfates).

Small samples were completely dissolved in HF/HNO_3 prior to elemental analysis by Direct Current Plasma (DCP) spectroscopy. The dried sludge samples were also dissolved in a two step digestion procedure ($NaOH/HNO_3$) prior to analysis for fluoride by an ion selective electrode. The results were converted into an oxide basis and are listed in Table 12.

Table 12; Chemical Analysis of 1992 M-Area Sludge Sample by CUA

Oxide	Normalized Oxide %	Oxide	Normalized Oxide %
Al_2O_3	19.34	B_2O_3	0.09
BaO	0.03	CaO	0.57
Fe_2O_3	1.13	K_2O	2.22
Li_2O	0.04	MgO	0.28
MnO_2	0.06	Na_2O	7.45
NiO	0.95	P_2O_5	5.05
SiO_2	58.74	SrO	0.004
TiO_2	0.1	Total	100
U_3O_8	3.92	F^-	O.5
ZrO_2	0.011		

A series of crucible melts were made by CUA to determine the best glass composition from the dried sludge and a variety of additives. The batches were melted in platinum/gold or clay crucibles usually for 1-2 hours at 1150° C with continuous stirring. After preparation, the glasses were analyzed by total dissolution, Direct Current Plasma (DCP) spectroscopy and ion chromatography. The composition study was designed to establish a database that permits the optimization of the wasteform composition with respect to (i) viscosity, (ii) conductivity, (iii) durability, (iv) phase stability, (v) cost of additives, and (vi) waste loading.

Both conductivity and viscosity were measured at temperatures to span the range of likely processing parameters. Typical constraints used for joule-heated ceramic melter processing of high-level nuclear wastes are 20 Poise < viscosity < 80 Poise, and 0.15 S/cm < conductivity < 0.55 S/cm. The viscosity bounds represent increased corrosion (< 20 P) and slow throughput (> 80 P) and limitations due to the conductivity of the melter lining itself (< 0.15 S/cm) and due to current density limitations of the electrodes (> 0.55 S/cm). This study showed that glasses satisfying these constraints could be processed successfully in the M-Area VTF melter.

The density of the sludge as received was measured and determined to be 1.09 g/cm3. The density of the glass was determined to be 2.44 g/cm3. The volume reduction is shown below:

Sludge sample = 278 gm /1.09 gm/cm^3 = 255 cm^3
Dried sludge (at 450°C) = 18 dry wt. % solids; (278 gm x 0.18) = 50 gm oxides
Additives = 50 gm
Final volume of glass = 41 cm^3 (100 gm glass, at 2.44 gm/cm^3)
Volume percent; sludge to glass = 41 cm^3/255 cm^3 = 16%
Volume reduction; initial sludge to final glass = 84%

The treatability glasses from the M-Area sludge were subjected to the EPA Toxicity Characteristic Leaching Procedure (TCLP) by Catholic University. Leachate solutions were analyzed for the eight TCLP metals (i.e., As, Ba, Cd, Cr, Pb, Hg, Ag, Se) plus Ni. Organics were not evaluated, as organics compounds are completely destroyed at the high temperatures at which vitrification occurs and by process knowledge there are no significant levels of organics present in the sludge.

The TCLP results of the CUA treatability study are given in Table 13 (WSRC, 1995).

Table 13 - CUA TCLP Results on M-Area Glasses From 1992 Sludge Sample

Element	TCLP, mg/L	Proposed Delisting Level, mg/L*
Ag	<0.001	20
As	0.048	5
Ba	0.37	200
Cd	<0.001	0.5
Cr	<0.001	10
Hg	<0.001	0.2
Pb	0.18	1.5
Se	<0.001	5
Ni	0.006	10

* (DAF of 100)

It may be seen that the glass TCLP leaching results are 10 to 1000 times lower than the proposed delisting limits.

3.2.1.3 Expanded SRTC Bench Scale (Crucible) Studies by SRTC

The Savannah River Technology Center (SRTC) initial studies were expanded in 1993, by extending the crucible studies to study the folowing variables:

- Waste composition (high silica, nominal, and low silica)
- Waste loading, oxide basis (70-90%)
- Boro silicate and soda-lime silica glass compositions
- Additives; Borax, sodium oxide, boric acid, and lithium and calcium carbonate)

The test matrix was described in Jantzen, 1994. The results in this discussion are limited to the boro-silicate glasses, which melt at 1150° to 1200°C, due to the limitations of the Duratek 5000® melter.

Three potential waste compositions were selected in 1993 for these crucible tests. At that time, the estimated final volume of sludge (not including the supernate) in Tanks 1-8 was assumed to be ~244,000 gallons. The "high silica", "nominal", and "low silica" mixtures resulted from the intent to blend all of the tanks to make one or two large blends. The final volume of filtercake (resulting from treatment of the supernate in Tanks 7 and 8), which would be stored in Tank 10, was estimated for three different the final Tank 10 volumes to be combined with the Tanks 1-8 volume of 244,000 gallons. The Perflo® and diatomaceous earth comprising the filtercake in Tank 10 is primarily silica and alumina (~85 oxide wt. %). The filtercake in Tank 10 is therefore a primary source of the silica and alumina needed to prepare a durable boro-silicate glass from the M-Area plating line sludge in Tanks 1-8 (which has ~50 oxide wt. % silica and alumina).

1993 Estimated Volumes of Tank 10 Filtercake - After Supernate Treatment

Mixtures	Tank 10, Estimated Gallons, % Solids, and Density
• high silica level	-450,000 gallons of Tank 10 filtercake, at 30% solids and 1.2 s.g.
• nominal silica	-412,000 gallons of Tank 10, at 17% solids and 1.1 s.g. and,
• low silica	-200,000 gallons of Tank 10, at 17% solids and 1.1 s.g.

The % waste loading, type of additive used, and the TCLP leaching results for those glasses which melted at 1150° to 1200°C are given in Table I4. All of the results are summarized vs. the proposed delisting levels below:

TCLP Results Summary for Expanded SRTC Crucible Study

Constituent	Test Results Range, mg/L	Proposed Delisting Level*
Nickel	0.10 - 2.3	10
Lead	<0.001 - 0.032	1.5
Chromium	<0.020	10
Ba	0.01 - 0.28	200
Ag	<0.001 - 0.012	20
Cd	<0.001 - 0.003	0.5

Se and As were not detected;
* (DAF = 100)

The TCLP leachant concentrations for these constituents were below the proposed delisting levels by factors of 4 to 1000 for all of the test formulations.

TABLE 14; M-AREA VITRIFIED WASTE TCLP RESULTS, SRTC EXPANDED CRUCIBLE STUDIES

Sample Id	% WASTE LOADING	FORMULATION	MELT TEMP., °C	TCLP, mg/L Ni	Pb	Ba	Cr	Ag	As	Cd	Se
Proposed Delisting Levels				10	1.5	200	10	20	ND	0.5	ND
	"NOMINAL" WASTE COMPOSITION										
MN-1	90	B2O3	1400	0.08	0.029	0.129	< 0.003				
MN-2	80		1260	0.13	0.032	0.119	< 0.002				
MN-8	80		1150	0.14	0.026	0.176	< 0.002				
MN-3	70		1150	0.43	< 0.016	0.12	< 0.007				
MN-4	90	BORAX	1400	0.08	< 0.003	0.11	< 0.005				
NM-5 (or 5A)	80	(30 %Na20	1150	0.118	< 0.005	0.128	< 0.002	0.007	< 0.12	< 0.002	< 0.068
NM-5B	80	70% B2O3)	1150	0.11	0.028	0.127	< 0.002				
MN-6	70		1150	0.274	< 0.014	0.10	< 0.005	< 0.001	< 0.027	< 0.002	< 0.028
MN-7	90	50% Na2O	1400	0.09	< 0.003	0.121	< 0.008				
MN-9	70	50%B2O3	1200	0.20	< 0.023	0.132	< 0.0001				
MN-15	85	70% Na20	1200	0.10	0.039	0.187	< 0.0002				
NM-16	75	30% B2O3	1150	0.12	< 0.016	0.276	< 0.005				
MN-10	90	50% Li2O	1200	0.08	< 0.017	0.132	< 0.006				
MN-11	80	50% B2O3	1150	0.013	0.032	0.116	< 0.007				
MN-12	70		1150	1.08	< 0.026	0.0147	< 0.02				
MN-13	85	70% Li2O	1150	0.17	< 0.001	0.081	< 0.017				
MN-14	75	30% B2O3	1150	2.26	0.031	0.155	< 0.026				
	"HIGH SILICA" WASTE COMPOSITION										
MHSi-5A	80	BORAX	1150	0.12	< 0.004	0.17	< 0.002				
MHSi-5B	80	(30 %Na20		0.188	< 0.007	0.119	< 0.008	< 0.002	< 0.07	< 0.001	< 0.009
		70% B2O3)									
	"LOW SILICA" WASTE COMPOSITION										
MLSi-4	90	BORAX	1400	0.145	< 0.003	0.10	< 0.005	< 3E-04	< 0.059	< 0.002	< 0.003
MLSi-5A	80	(30 %Na20	1150	0.216	< 0.006	0.20	< 0.003	0.012	< 0.12	0.003	< 0.007
MLSi-5B	80	70% B2O3)	1150	0.19	< 0.007	0.12	< 0.008	< 0.003	< 0.07	< 0.001	< 0.010
MLSi-5-AL-A	80		1150	0.089	< 0.002	0.012	< 0.007	< 0.004	< 0.021	< 0.003	< 0.053
MLSi-7	90	50% Na2O	1400	0.17	< 0.012	0.168	< 0.007				
MLSi-8B	80	50%B2O3	1150	0.20	0.014	0.196	< 0.004				
MLSi-8A	80		1150	0.26	< 0.006	0.160	< 0.002	< 0.005	< 0.046	< 0.002	< 0.005
MLSi-9	70		1150	0.41	< 0.011	0.143	< 0.016	< 0.006	< 0.054	< 8E-04	< 0.033
MLSi-10	90	50% Li2O	1200	0.44	0.033	0.157	< 0.006	< 0.004	< 0.053	0.003	< 0.051
MLSi-11C	80	50% B2O3	1150	0.45	0.007	0.21	< 0.01				
MLSi-11A	80		1150	0.39	< 0.009	0.137	< 0.01	0.006	< 0.04	< 2E-04	< 0.027

ND = Not Detected in TCLP leachant

3.2.1.4 Scale Up Studies by SRTC, Conducted at Catholic University of America (CUA)

The SRTC conducted a scale-up vitrification study on the M-Area waste sludge at the Vitreous State Laboratory (VSL) of Catholic University of America (CUA), in September of 1994. The scale-up study was conducted to meet a milestone of a Department of Energy's EM -50 Office of Technology Development (OTD) program, "Vitrification Demonstration on an Actual Mixed Waste Stream". Four hundred kilograms of the M-Area waste was processed in CUA's 10 kg/day glass melter. The scale-up testing involved both of the original proposed mixtures of the M-Area sludge: i.e.; Tank 8 plus 1/2 of the volume of the filtercake in Tank No. 10 and Tank 7 plus 1/2 of the volume of the filtercake in Tank No. 10. The glass formulations were provided by the SRTC to Catholic University, utilizing a high waste loading (~80%) and a minimum number of additives (no more than 2-3). This glass formulation allowed the most cost effective vitrification, with the lowest volume of final wasteform per unit volume of sludge treated.

The SRTC formulations were tested immediately following a treatability study conducted on the CUA 10 kg melter for GTS Duratek, with the purpose of testing the off-gas control system for the proposed M-Area VTF. The glass formulations during the Duratek off-gas testing phase were not intended to be an optimum glass formulation, and no leaching (TCLP) or total constituent results were determined for the glass produced during those tests.

The total constituent results for the SRTC glass formulations, as produced vs. time, are given in Table 15. These results reflect the fact that the glass melter performs as if it were a continuously stirred batch reactor, with the glass output changing fractionally as a new waste input is added. In the case of the CUA 10 kg melter, and the proposed GTS Duratek 5000 kg Duramelter®, three to five melter volumes are required to reach 100% equilibrium with a new waste stream addition. In the case of the replacement of the Tank 8 + Tank 10 formulation with the Tank 7 + 10 formulation, 98% of the glass reflected the new waste feed after ~50 kgs of glass were produced (i.e.; 5 melter "turnovers"). WSRC analyzed the scale-up treatability glasses for the following:

1) Complete TCLP, including Ni, for two of the glass samples
2) Partial TCLP (metals plus Ni), for 5 additional samples
3) Multiple Extraction Procedure (MEP) for RCRA metals and Ni on two samples;
4) Total constituent analysis using a modified Appendix IX scan, including tentatively identifiedcompounds from Appendix VIII on two samples;
5) Total cyanides and sulfides.

The full and partial TCLP results for the scale-up melter study are presented in Table 16 and demonstrated that the final wasteform will meet all of the proposed delisting levels for the metals which are present. The following hazardous metals were detected in the initial TCLP testing (Tables 14) and the scale-up testing (Table 16): Ni, Pb, Ba, Cr, Ag, and Cd. Arsenic, Se, and Hg were not detected above analytical detection limits. No hazardous organic constituents were detected above the analytical detection limit in the TCLP testing.

The MEP results from the scale-up test are provided in Table 17. The MEP results indicate that the vitrified waste will be highly durable under long term leaching. The same metals were detected, or not detected as in the initial TCLP leaching tests, with the exception that Hg was reported in 2 of the 18 MEP leachants.

The total constituent concentrations, for the Appendix VIII scan are given in Table 18. The GEL Laboratory results on the scale-up melter tests (laboratory reports, QA reports, and résumé's of laboratory personnel) are provided in Appendix J.

TABLE 15, OTD TEST GLASS CONSTITUENT CONCENTRATIONS, OXIDE WT. %

ole Number	MIC4-144	MIC-149C	MIC5-9A	MIC5-13A	MIC5-21A	MIC5-42A	MIC5-42C
	Tank 8 + 10 mixture		Tank 7+10 (with residual 8 + 10 mixture)				
NK 8 / 7 WASTE	100/0	100/0	55/45	25/75	10/90	2/98	0/100
TC FORMULATION	25	60	78	90	96	99	100
A FORMULATION	75	40	22	10	4	1	0
		OXIDE, WT. % (ONLY THOSE > 0.1 wt. %)*					
3	12.5	14.7	16.2	14.9	15.0	15.3	15.5
	9.9	9.7	8.6	8.5	8.3	8.5	8.5
	0.6	0.8	0.7	0.7	0.6	0.6	0.5
3	0.3	0.3	0.2	0.1	0.1	0.1	0.1
3	2.6	1.9	1.4	1.1	1.0	1.1	1.0
	0.9	1.1	1.7	1.8	2.1	2.2	2.2
	3.3	4.0	4.1	4.2	4.2	4.4	4.4
	0.9	0.8	0.7	0.5	0.4	0.3	0.3
	16.1	16.7	14.3	13.3	12.8	12.9	12.9
	0.6	0.8	0.7	0.6	0.6	0.6	0.6
	2.2	0.5?	0.1?	0.2?	0.8?	3.3	3.4
	39.4	42.2	44.7	47.0	47.4	47.8	48.0
	2.9	3.5	2.5	1.8	1.5	1.4	1.4
**	3.7	2.0	1.1	0.5	0.3	0.1	0.1

C total constituent analyses

2 Calculated based on 5% ZrO2 in initial CUA formulation x % CUA formula in final glass

TABLE 16: TCLP RESULTS ON SMALL MELTER SCALE-UP DEMONSTRATION

WSRC Sample Number GEL Lab Number	Units	MIC4-144 9508327-01	MIC4-149C 9508477-07	MIC5-9A 9508327-02	MIC5-13A 9508327-03	MIC5-21A 9508327-04	MIC5-42A 9508327-05	MIC5-42C 9508477-02	Proposed Delisting Levels, mg/L
Tank No.		8/7	8/7	8/7	8/7	8/7	8/7	8/7	
% Tank 8 / 7 waste		100/0	100/0	75/25	50/50	10/90	2/98	-/100	
% SRTC Formulation		25	60	70	80	90	99	100	
Silver	mg/L	U 0.00726	0.0162	0.0134	0.0107	0.0102	0.0106	0.0117	20
Arsenic	mg/L	< 0.0421	< 0.0421	< 0.0421	< 0.0421	< 0.0421	< 0.0421	< 0.0421	5
Barium	mg/L	0.134	0.262	0.154	0.156	0.0022	0.157	0.172	200
Cadmium	mg/L	< 0.0033	< 0.0033	< 0.0033	< 0.0033	< 0.0033	< 0.0033	< 0.0033	0.5
Chromium	mg/L	0.036	0.0406	0.0208	0.0102	0.00656	0.00866	0.00944	10
Nickel	mg/L	0.195	0.343	0.169	0.164	0.135	0.145	0.123	10
Lead	mg/L	< 0.0364	U 0.0234	< 0.0364	U 0.0129	U 0.0162	< 0.0364	< 0.0364	1.5
Selenium	mg/L	U 0.00291	< 0.0841	< 0.0841	U 0.0435	< 0.0841	< 0.0841	U 0.0235	5
Mercury	mg/L	< 0.000148	U 0.00004	< 0.000148	< 0.000148	< 0.000148	< 0.000148	< 0.000148	0.2
Cyanide, Reactive	mg/kg	-	< 0.624	-	-	-	-	< 0.623	
Sulfide, Reactive	mg/kg	-	< 0.250	-	-	-	-	< 0.249	
1,1-Dichloroethylene	mg/L	-	< 10.0	-	-	-	-	< 10.0	
1,2-Dichloroethane	mg/L	-	< 0.0100	-	-	-	-	< 0.0100	
1,4-Dichlorobenzene	mg/L	-	< 0.0100	-	-	-	-	< 0.0100	
2-Butanone	mg/L	-	< 0.0500	-	-	-	-	< 0.0500	
Benzene	mg/L	-	< 0.0100	-	-	-	-	< 0.0100	
Carbon Tetrachloride	mg/L	-	< 0.0100	-	-	-	-	< 0.0100	
Chlorobenzene	mg/L	-	< 0.0100	-	-	-	-	< 0.0100	
Chloroform	mg/L	-	< 0.0100	-	-	-	-	< 0.0100	
Tetrachloroethylene	mg/L	-	< 0.0100	-	-	-	-	< 0.0100	
Trichloroethylene	mg/L	-	< 0.0100	-	-	-	-	< 0.0100	
Vinyl Chloride	mg/L	-	< 0.0100	-	-	-	-	< 0.0100	
2,4,5-Trichlorophenol	mg/L	-	< 0.0500	-	-	-	-	< 0.0500	
2,4,6-Trichlorophenol	mg/L	-	< 0.0500	-	-	-	-	< 0.0500	
2,4-Dinitrotoluene	mg/L	-	< 0.0500	-	-	-	-	< 0.0500	
Hexachlorobenzene	mg/L	-	< 0.0500	-	-	-	-	< 0.0500	
Hexachlorobutadiene	mg/L	-	< 0.0500	-	-	-	-	< 0.0500	
Hexachloroethane	mg/L	-	< 0.0500	-	-	-	-	< 0.0500	
Nitrobenzene	mg/L	-	< 0.0500	-	-	-	-	< 0.0500	
Pentachlorophenol	mg/L	-	< 0.0500	-	-	-	-	< 0.0500	
Pyridine	mg/L	-	< 0.0500	-	-	-	-	< 0.0500	
m,p-Cresol	mg/L	-	< 0.0500	-	-	-	-	< 0.0500	
o-Cresol	mg/L	-	< 0.0500	-	-	-	-	< 0.0500	
2,4,5-TP	mg/L	-	< 0.00250	-	-	-	-	< 0.00250	
2,4-D	mg/L	-	< 0.00500	-	-	-	-	< 0.00500	
Chlordane	mg/L	-	< 0.00625	-	-	-	-	< 0.00625	
Endrin	mg/L	-	< 0.00125	-	-	-	-	< 0.00125	
Heptachlor & Hep. Epoxide	mg/L	-	< 0.00125	-	-	-	-	< 0.00125	
Methoxychlor	mg/L	-	< 0.0125	-	-	-	-	< 0.0125	
Toxaphene	mg/L	-	< 0.0250	-	-	-	-	< 0.0250	
gamma-BHC	mg/L	-	< 0.000625	-	-	-	-	< 0.000625	

U : Calculated result which is below the detection limit

TABLE 17: MULTIPLE EXTRACTION PROCEDURE (MEP) RESULTS FOR SMALL MELTER SCALE UP DEMONSTRATION

MIC4-149C		Extract 1	Extract 2	Extract 3	Extract 4	Extract 5	Extract 6	Extract 7	Extract 8	Extract 9
GEL Lab Number	Units	9508477-11	9508477-12	9508477-13	9508477-14	9508477-15	9508477-16	9508477-17	9508477-18	9508477-19
Silver	mg/L	0.0146	0.0163	0.0148	0.0155	0.0155	0.0131	0.0138	0.0146	0.0153
Arsenic	mg/L	< 0.0421	< 0.0421	< 0.0421	< 0.0421	< 0.0421	< 0.0421	< 0.0421	< 0.0421	< 0.0421
Barium	mg/L	0.0382	0.0632	0.0566	0.0433	0.0406	0.0381	0.0610	0.0634	0.0700
Cadmium	mg/L	< 0.00330	< 0.00330	< 0.00330	< 0.00330	< 0.00330	< 0.00330	< 0.00330	< 0.00330	< 0.00330
Chromium	mg/L	0.0778	0.0727	0.0870	0.0800	0.0849	0.0776	0.0740	0.0754	0.0730
Nickel 0.34	mg/L	0.537	0.636	0.604	0.516	0.555	0.514	0.470	0.453	0.433
Lead	mg/L	U 0.0122	U 0.0344	U 0.0217	U 0.0318	U 0.0213	U 0.0224	U 0.0289	U 0.0199	U 0.0018
Selenium	mg/L	< 0.08410	U 0.02780	< 0.08410	U 0.00023	U 0.01110	U 0.03310	U 0.05520	< 0.08410	U 0.00635
Mercury	mg/L	< 0.000148	< 0.000148	< 0.000148	< 0.000148	< 0.000148	0.000410	< 0.000148	< 0.000148	< 0.000148

MIC5-42C		Extract 1	Extract 2	Extract 3	Extract 4	Extract 5	Extract 6	Extract 7	Extract 8	Extract 9
GEL Lab Number	Units	9508477-20	9508477-21	9508477-22	9508477-23	9508477-24	9508477-25	9508477-26	9508477-27	9508477-28
Silver	mg/L	0.0127	0.0114	0.0140	0.0123	0.0119	0.0157	0.0122	0.0154	0.0173
Arsenic	mg/L	< 0.0421	< 0.0421	< 0.0421	< 0.0421	< 0.0421	U 0.0113	< 0.0421	< 0.0421	< 0.0421
Barium	mg/L	0.0311	0.0302	0.0536	0.0321	0.0768	0.0570	0.0386	0.1170	0.0325
Cadmium	mg/L	< 0.00330	< 0.00330	< 0.00330	< 0.00330	< 0.00330	< 0.00330	< 0.00330	U 0.00075	< 0.00330
Chromium	mg/L	0.0183	0.0215	0.0292	0.0200	0.0213	0.0239	0.0281	0.0281	0.0253
Nickel 0.12	mg/L	0.430	0.453	0.391	0.378	0.444	0.356	0.389	0.355	0.345
Lead	mg/L	U 0.0062	U 0.0045	U 0.0147	U 0.0142	U 0.0197	U 0.0243	U 0.0300	U 0.0110	U 0.00765
Selenium	mg/L	< 0.08410	< 0.08410	U 0.02230	U 0.00996	U 0.02450	U 0.01910	U 0.04540	< 0.08410	U 0.01920
Mercury	mg/L	< 0.000148	< 0.000148	< 0.000148	< 0.000148	0.000870	< 0.000148	< 0.000148	< 0.000148	< 0.000148

U : Calculated result; which is below the detection limit

TABLE 18: APPENDIX IX ANALYSIS FOR SMALL MELTER SCALE UP TEST

TANK NO.		7	8
GEL Lab Number	Units	9508477-04	9508477-03
METALS			
Arsenic	mg/Kg	6.39	3.95
Lead	mg/Kg	50.2	34.6
Antimony	mg/Kg	U 0.642	< 0.994
Selenium	mg/Kg	5.06	6.77
Thallium	mg/Kg	U 0.139	U 1.59
Silver	mg/Kg	2.30	15.3
Aluminum	mg/Kg	72,500	68,100
Boron	mg/Kg	21,400	24,600
Barium	mg/Kg	165	268
Beryllium	mg/Kg	0.933	0.525
Calcium	mg/Kg	2,450	5,040
Cadmium	mg/Kg	0.819	2.14
Cobalt	mg/Kg	8.04	3.64
Chromium	mg/Kg	332	1,140
Copper	mg/Kg	67.9	70.8
Iron	mg/Kg	5,510	11,000
Lithium	mg/Kg	25,100	23,900
Magnesium	mg/Kg	1,630	4,830
Manganese	mg/Kg	314	177
Sodium	mg/Kg	71,000	108,000
Nickel	mg/Kg	4,390	5,460
Silica	mg/Kg	405,000	347,000
Tin	mg/Kg	4.27	13.5
Vanadium	mg/Kg	< 0.209	< 0.835
Zinc	mg/Kg	142	126
Mercury	mg/Kg	0.0131	0.00315
Uranium	mg/Kg	14,200	33,100
GENERAL CHEMISTRY			
Sulfate as SO4	mg/Kg	U 4.06	U 0.818
Phosphate as PO4	mg/Kg	6,070	910
Chlorides	mg/Kg	< 4,900	< 4,980
VOLATILE ORGANICS			
1,1,1,2-Tetrachloroethane	µg/Kg	< 125	< 125
1,1,1-Trichloroethane	µg/Kg	< 50	< 50
1,1,2,2-Tetrachloroethane	µg/Kg	< 50	< 50
1,1,2-Trichloroethane	µg/Kg	< 50	< 50
1,1-Dichloroethane	µg/Kg	< 50	< 50
1,1-Dichloroethylene	µg/Kg	< 50	< 50
1,2,3-Trichloropropane	µg/Kg	< 125	< 125
1,2-Dibromo-3-chloropropane	µg/Kg	< 125	< 125
1,2-Dibromoethane	µg/Kg	< 125	< 125
1,2-Dichloroethane	µg/Kg	< 50	< 50
1,2-Dichloropropane	µg/Kg	< 50	< 50
1,2-trans-Dichloroethylene	µg/Kg	< 50	< 50
2-Butanone	µg/Kg	< 250	< 250
2-Hexanone	µg/Kg	< 250	< 250
4-Methyl-2-pentanone	µg/Kg	< 250	< 250
Acetone	µg/Kg	< 250	< 250
Acetonitrile	µg/Kg	< 125	< 125
Acrolein	µg/Kg	< 1250	< 1250
Acrylonitrile	µg/Kg	< 1250	< 1250

TABLE 18: APPENDIX IX ANALYSIS FOR SMALL MELTER SCALE UP TEST

TANK NO.		7		8
GEL Lab Number	Units	9508477-04		9508477-03
VOLATILE ORGANICS (CONT)				
Allyl Chloride	µg/Kg	< 125	<	125
Benzene	µg/Kg	< 50	<	50
Bromoform	µg/Kg	< 50	<	50
Carbon Disulfide	µg/Kg	< 50	<	50
Carbon tetrachloride	µg/Kg	< 50	<	50
Chlorobenzene	µg/Kg	< 50	U	3.18
Chlorodibromomethane	µg/Kg	< 50	<	50
Chloroethane	µg/Kg	< 50	<	50
Chloroform	µg/Kg	< 50	<	50
Chloroprene	µg/Kg	< 125	<	125
Dibromomethane	µg/Kg	< 125	<	125
Dichlorobromomethane	µg/Kg	< 50	<	50
Dichlorodifluoromethane	µg/Kg	< 50	<	50
Ethylbenzene	µg/Kg	< 50	<	50
Isobutyl alcohol	µg/Kg	< 250	<	250
Methacrylonitrile	µg/Kg	< 125	<	125
Methyl Bromide	µg/Kg	< 50	<	50
Methylene Chloride	µg/Kg	< 50	<	50
Methyl Iodide	µg/Kg	< 125	<	125
Methyl Methacrylate	µg/Kg	< 250	<	250
Methylene Chloride	µg/Kg	< 50	<	50
Propionitrile	µg/Kg	< 500	<	500
Styrene	µg/Kg	< 50	<	50
Tetrachloroethylene	µg/Kg	< 50	<	50
Toluene	µg/Kg	< 50	<	50
Trichloroethylene	µg/Kg	< 50	<	50
Trichlorofluoromethane	µg/Kg	< 50	<	50
Vinyl Acetate	µg/Kg	< 250	<	250
Vinyl chloride	µg/Kg	< 50	<	50
Xylene(total)	µg/Kg	< 100	<	100
bis(2-Chloromethylethyl)ether	µg/Kg	< 1250	<	1250
cis-1,3-Dichloropropylene	µg/Kg	< 50	<	50
trans-1,3-Dichloropropylene	µg/Kg	< 50	<	50
trans-1,4-Dichloro-2-butene	µg/Kg	< 125	<	125
EXTRACTABLE ORGANICS				
1,2,4,5-Tetrachlorobenzene	µg/Kg	< 166	<	165
1,2,4-Trichlorobenzene	µg/Kg	< 166	<	165
1,2-Dichlorobenzene	µg/Kg	< 166	<	165
1,3-Dichlorobenzene	µg/Kg	< 166	<	165
1,4-Dichlorobenzene	µg/Kg	< 166	<	165
1,4-Dioxane	µg/Kg	< 166	<	165
1,4-Naphthoquinone	µg/Kg	< 166	<	165
1-Naphthylamine	µg/Kg	< 166	<	165
2,3,4,6-Tetrachlorophenol	µg/Kg	< 166	<	165
2,4,5-Trichlorophenol	µg/Kg	< 166	<	165
2,4,6-Trichlorophenol	µg/Kg	< 166	<	165
2,4-Dichlorophenol	µg/Kg	< 166	<	165
2,4-Dimethylphenol	µg/Kg	< 166	<	165
2,4-Dinitrophenol	µg/Kg	< 332	<	330
2,4-Dinitrotoluene	µg/Kg	< 166	<	165

TABLE 18: APPENDIX IX ANALYSIS FOR SMALL MELTER SCALE UP TEST

TANK NO.		7		8	
GEL Lab Number	Units	9508477-04		9508477-03	
EXTRACTABLE ORGANICS, Cont'					
2,6-Dichlorophenol	µg/Kg	<	166	<	165
2,6-Dinitrotoluene	µg/Kg	<	166	<	165
2-Acetylaminofluorene	µg/Kg	<	166	<	165
2-Chloronaphthalene	µg/Kg	<	166	<	165
2-Chlorophenol	µg/Kg	<	166	<	165
2-Methylnaphthalene	µg/Kg	<	166	<	165
2-Naphthylamine	µg/Kg	<	166	<	165
2-Nitrophenol	µg/Kg	<	166	<	165
2-Picoline	µg/Kg	<	166	<	165
2-methyl-4,6-Dinitrophenol	µg/Kg	<	98.3	<	97.7
2-sec-Butyl-4;6,Dinitrophenol	µg/Kg	<	83.3	<	82.8
3,3'-Dichlorobenzidine	µg/Kg	<	1660	<	1650
3,3'-Dimethylbenzidine	µg/Kg	<	830	<	825
3-Methylcholanthrene	µg/Kg	<	49.8	<	49.5
4-Bromophenyl phenyl ether	µg/Kg	<	199	<	198
4-Chloroaniline	µg/Kg	<	166	<	165
4-Chlorophenyl phenyl ether	µg/Kg	<	166	<	165
4-Nitrophenol	µg/Kg	<	332	<	330
4-Nitroquinoline	µg/Kg	<	166	<	165
4-Aminobiphenyl	µg/Kg	<	166	<	165
4-Chloro-3-methylphenol	µg/Kg	<	166	<	165
5-Nitro-o-toluidine	µg/Kg	<	166	<	165
7,12-Dimethylbenz(a)anthracene	µg/Kg	<	166	<	165
Acenaphthene	µg/Kg	<	166	<	165
Acenaphthylene	µg/Kg	<	166	<	165
Acetophenone	µg/Kg	<	166	<	165
Aniline	µg/Kg	<	166	<	165
Anthracene	µg/Kg	<	166	<	165
Aramite	µg/Kg	<	166	<	165
Benzo(a)anthracene	µg/Kg	<	166	<	165
Benzo(a)pyrene	µg/Kg	<	166	<	165
Benzo(b)fluoranthene	µg/Kg	<	166	<	165
Benzo(g,h,i)perylene	µg/Kg	<	166	<	165
Benzo(k)fluoranthene	µg/Kg	<	166	<	165
Benzyl alcohol	µg/Kg	<	166	<	165
Butylbenzylphthalate	µg/Kg	<	166	<	165
Chlorobenzilate	µg/Kg	<	830	<	825
Chrysene	µg/Kg	<	166	<	165
Di-n-Butylphthalate	µg/Kg	U	26.6	U	30.4
Di-n-Octyl phthalate	µg/Kg	<	166	<	165
Diallate	µg/Kg	<	166	<	165
Dibenzo(a,h)anthracene	µg/Kg	<	166	<	165
Dibenzofuran	µg/Kg	<	166	<	165
Diethylphthalate	µg/Kg	<	129	<	128
Dimethoate	µg/Kg	<	830	<	825
Dimethylphthalate	µg/Kg	<	166	<	165
Diphenylamine	µg/Kg	<	56.8	<	56.4
Dosulfoton	µg/Kg	<	166	<	165
Ethyl Methanesulfonate	µg/Kg	<	166	<	165
Ethyl Methacrylate	µg/Kg	<	11000	<	10900
Famphur	µg/Kg	<	166	<	165

TABLE 18: APPENDIX IX ANALYSIS FOR SMALL MELTER SCALE UP TEST

TANK NO.		7		8	
GEL Lab Number	Units	9508477-04		9508477-03	
EXTRACTABLE ORGANICS (CONT)					
Fluoranthene	µg/Kg	<	166	<	165
Fluorene	µg/Kg	<	166	<	165
Hexachlorobenzene	µg/Kg	<	199	<	198
Hexachlorobutadiene	µg/Kg	<	166	<	165
Hexachlorocyclopentadiene	µg/Kg	<	232	<	231
Hexachloroethane	µg/Kg	<	166	<	165
Hexachlorophene	µg/Kg	<	8300	<	8250
Hexachloropropene	µg/Kg	<	166	<	165
Indeno(1,2,3-c,d)pyrene	µg/Kg	<	166	<	165
Isodrin	µg/Kg	<	166	<	165
Isophorone	µg/Kg	<	166	<	165
Isosafrole	µg/Kg	<	166	<	165
Kepone	µg/Kg	<	166	<	165
Methapyrilene	µg/Kg	<	830	<	825
Methyl Methanesulfonate	µg/Kg	<	166	<	165
N-Nitrosodi-n-butylamine	µg/Kg	<	166	<	165
N-Nitrosodiethylamine	µg/Kg	<	166	<	165
N-Nitrosodimethylamine	µg/Kg	<	166	<	165
N-Nitrosodiphenylamine	µg/Kg	<	166	<	165
N-Nitrosodipropylamine	µg/Kg	<	166	<	165
N-Nitrosomethylethylamine	µg/Kg	<	166	<	165
N-Nitrosomorpholine	µg/Kg	<	166	<	165
N-Nitrosopiperidine	µg/Kg	<	166	<	165
N-Nitrosopyrrolidine	µg/Kg	<	166	<	165
Naphthalene	µg/Kg	<	166	<	165
Nitrobenzene	µg/Kg	<	166	<	165
O,O,O-Triehtylphosporothioate	µg/Kg	<	34.9	<	34.7
Pentachlorobenzene	µg/Kg	<	166	<	165
Pentachloroethane	µg/Kg	<	166	<	165
Pentachloronitrobenzene	µg/Kg	<	166	<	165
Pentachlorophenol	µg/Kg	<	266	<	264
Phenacetin	µg/Kg	<	166	<	165
Phenanthrene	µg/Kg	<	166	<	165
Phenol	µg/Kg	<	166	<	165
Pronamide	µg/Kg	<	166	<	165
Pyrene	µg/Kg	<	166	<	165
Pyridine	µg/Kg	<	166	<	165
Safrole	µg/Kg	<	166	<	165
Sulfotepp	µg/Kg	<	166	<	165
Thionazin	µg/Kg	<	166	<	165
a,a-Dimethylphenethylamine	µg/Kg	<	199	<	165
bis(2-chloroethoxy)methane	µg/Kg	<	166	<	165
bis(2-Chloroethyl)ether	µg/Kg	<	166	<	165
bis(2-Ethylhexyl)phthalate	µg/Kg	U	35.5	U	20.5
m,p-Cresol	µg/Kg	<	116	<	116
m-Dinitrobenzene	µg/Kg	<	166	<	165
m-Nitroaniline	µg/Kg	<	259	<	257
o-Cresol	µg/Kg	<	122	<	121
o-Nitroaniline	µg/Kg	<	93	<	92.4
o-Toluidine	µg/Kg	<	166	<	165
p-Dimethylaminoazobenzene	µg/Kg	<	166	<	165

TABLE 18: APPENDIX IX ANALYSIS FOR SMALL MELTER SCALE UP TEST

TANK NO. GEL Lab Number	Units		7 9508477-04		8 9508477-03
EXTRACTABLE ORGANICS (CONT)					
p-Nitroaniline	µg/Kg	<	136	<	135
p-Phenylenediamine	µg/Kg	<	332	<	330
sym-Trinitrobenzene	µg/Kg	<	1070	<	1060
HERBICIDES					
2,4,5-T	µg/Kg	<	4.96	<	4.91
2,4,5-TP	µg/Kg	<	2.48	<	2.46
2,4-D	µg/Kg	<	4.96	<	4.91
PESTICIDES & PCBs					
4,4'-DDD	µg/Kg	<	1.66	<	1.67
4,4'-DDE	µg/Kg	<	0.83	<	0.833
4,4'-DDT	µg/Kg	<	1.66	<	1.67
Aldrin	µg/Kg	<	0.415	<	0.416
Chlordane	µg/Kg	<	4.15	<	4.16
Dieldrin	µg/Kg	<	0.83	<	0.833
Endosulfan I	µg/Kg	<	0.83	<	0.833
Endosulfan II	µg/Kg	<	1.66	<	1.67
Endosulfan sulfate	µg/Kg	<	1.66	<	1.67
Endrin	µg/Kg	<	0.83	<	0.833
Endrin aldehyde	µg/Kg	<	2.08	<	2.08
Heptachlor	µg/Kg	<	0.83	<	0.833
Heptachlor epoxide	µg/Kg	<	0.83	<	0.833
Methoxychlor	µg/Kg	<	8.3	<	8.33
PCB-1016	µg/Kg	<	3.32	<	3.33
PCB-1221	µg/Kg	<	3.32	<	3.33
PCB-1232	µg/Kg	<	3.32	<	3.33
PCB-1242	µg/Kg	<	3.32	<	3.33
PCB-1248	µg/Kg	<	3.32	<	3.33
PCB-1254	µg/Kg	<	3.32	<	3.33
PCB-1260	µg/Kg	<	3.32	<	3.33
Parathion	µg/Kg	<	0.83	<	0.833
Parathion, methyl	µg/Kg	<	0.83	<	0.833
Phorate	µg/Kg	<	0.83	<	0.833
Toxaphene	µg/Kg	<	16.6	<	16.7
alpha -BHC	µg/Kg	<	0.415	<	0.416
beta-BHC	µg/Kg	<	0.83	<	0.833
delta-BHC	µg/Kg	<	0.83	<	0.833
gamma-BHC	µg/Kg	<	0.415	<	0.416

U : Calculated result which is below the detection limit

3.2.2 Waste Feed Preparation

The plating line wastes stored in M-Area partially occupied three 500,000 gallon IT/SF tanks, six 35,000 gallon IT/SF tanks, and one hundred twenty five 55 gallon drums (1,200 gallons of Watts nickel plating bath sludge, 100 gallons of plating sump water, 3,700 gallons of slightly enriched uranium plating wastewater Mark 15 filter cake, and 200-300 gallons of treatability samples). The treatability sample residues were stored in 14 drums along with the aforementioned 125 drums. The compositions of the wastes to be treated were previously described in Section 1.1.

Prior to vitrification, the wastes in the six 35,000 gallon tanks were added to Tank No 7. and 500,000 gallon tanks were blended into one large "macro" batch of waste feed. The contents of 500,000 gallon tank No. 10 (DETF filter cake from supernate treatment) were evenly split to the new inventory of tank 7 and the existing inventory of the 500,000 gallon tank 8. The final heals in Tanks 1-6 were manually removed (by shoveling) and eventually transferred to the melter feed batches. Sludge transfer in Tanks 7 and 8 was accomplished by slurring the sludge with high pressure water and pumping out. After the first 4 initial batches of melter feed from Tank No. 7 were completed, the contents of Tank 8 were transferred to Tank 7. The sludge was allowed to settle from the supernate and flush waste, and the supernate was returned to Tank 8. Tank 7 became the main macro feed batch for the entire process. Flush water and some residual supernate present in all the tanks were incorporated into the blended wastewater sludge batch. A schematic of the blending strategy is given in Figure 18.

Since the Mark 15 drummed wastes contained a substantial quantity of slightly enriched uranium, the Mark 15 material was removed from the storage drums, slurried and pumped directly to the melter feed preparation tank #1, along with the tank 7 mixture. Similarly, the drummed Watts Plating Solution was added to Tank 1. The DETF filtercake generated from treatment of the VTF off-gas condensate was also be added to tank 1 with the Tank 7 sludge mixture.

The volumes of the various wastes are given in Table 19. The compositions of the sludge in Tanks 1-10 was previously given in Table 1B. Table 20 gives the composition of the major constituents in the supernate in Tanks 7, 8, and 10. Table 21 gives the calculated dry wt. of all of the constituents in the tanks, based on the volumes and compositions in the tanks. Table 22 presents the calculated composition of the "macro batch" as readied for vitrification.

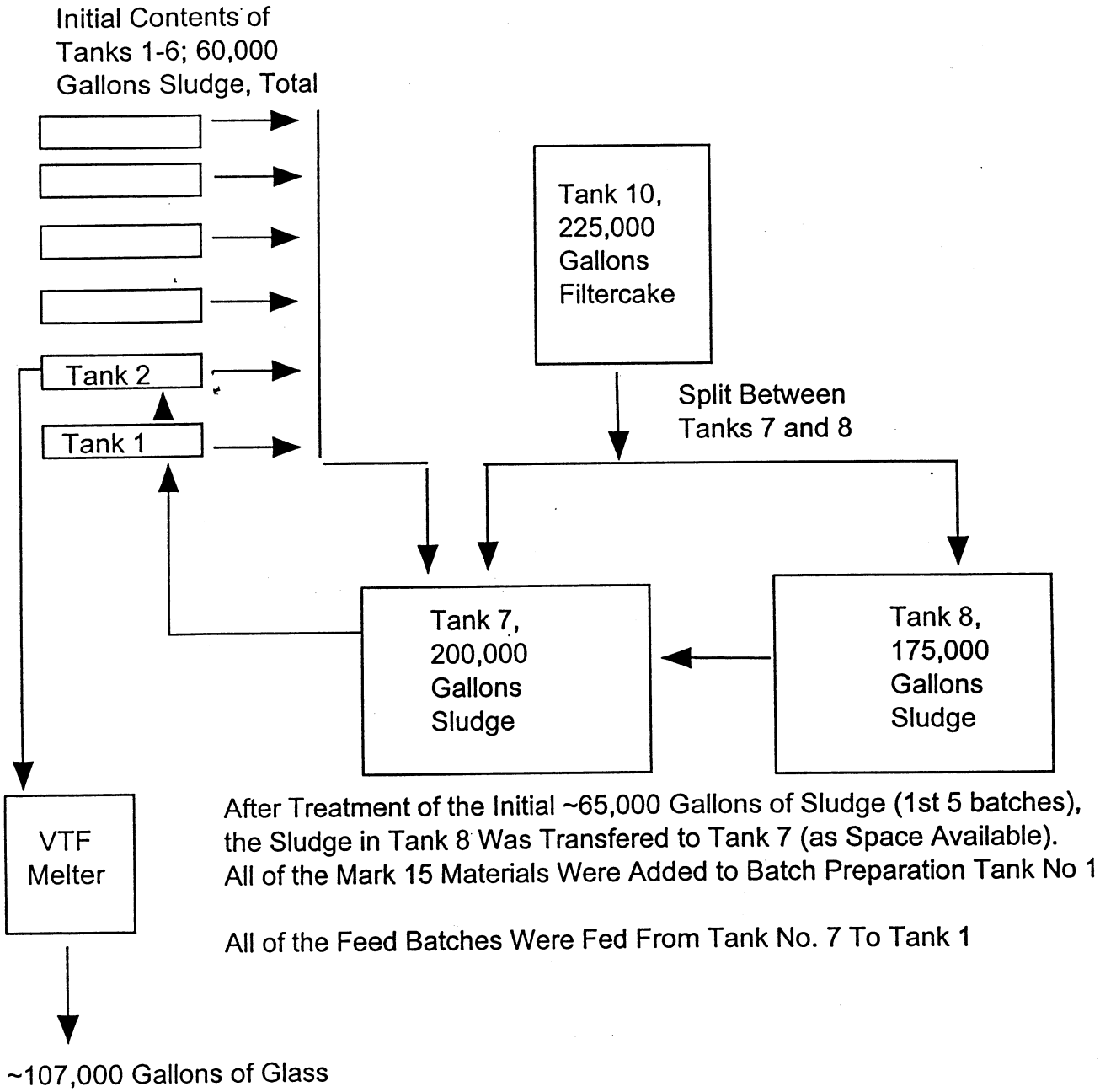


FIGURE 18

MIXING STRAGEGY FOR M-AREA PLATING LINE WASTES

TABLE 19, VOLUMES OF M-AREA MIXED WASTES TO BE TREATED

IT/SF Materials.	TOTAL VOLUME (GALS)	SLUDGE VOLUME (GALS)		% SOLIDS	Sp. Gr. kg/L	
Tank No						
1	5775	5775		35	1.18	
2	10279	10279		39	1.35	
3	10713	10713		9	1.05	
4	18437	18437		22	1.15	
5	7762	7762		32	1.08	
6	5416	5416		37	1.23	
Additional Filtercake	2165	*				
Sub-total(1 thru 6)	(60,547)	(58,382)				
7	197,148	174,648	**	31	1.21	##
8	177,275	154,775	**	38	1.24	
10	226,280	228,445	*	17	1.10	##
Tanks 7, 8, &10	600,703	557,868				
MWSS Materials						
Watts plating bath	1200			5 - 10	1.2	
Mark 15	3700			50	-	
Sump solution	100			1-2	-	
Total	666,250					
Treatability samples	~200***					
Enriched U/Cr solution	20***					

*2165 Gallons of filtercake included with Tank 10 volume (for mass calculations)

** 22,500 gallons of supernate (~1 foot depth) assumed in Tanks 7 and 8 (each)

***volume of treatability samples is ~200 gallons, EU/Cr solution is ~20 gallons. These will be measured and added to the final volume when treated.

Estimated specific gravity, the other values are measured

TABLE 20

Approximate Composition of Supernate

Major Constituents Only

Element	mg/L Tank 7	Tank 8	Tank 10
Al (ICP)	1500	1000	30
Ca			
Fe			
Mg			
Mn			
Na (based on NO3)	26000 *	26000 *	3000 *
Na			
Li			
Ni			
Ni			
Si			
Si			
Cr			
B			
U (LS)	35	6	10
Sr			
Zr			
Ti			
K			
P (IC)	2000	2500	50
Ba			
Pb			
Mo			
Zn			
Cu			
F			
Cl (IC)	400	250	400
SO4 (IC)	1500	600	1000
NO3 (IC)	70000	70000	8000

IC = ion chromatagraph; ICP = inductively coupled plasma sphectrophotometer; LS = Laser Scintrex

* Sodium concentration based on moles of nitrate (mg/L NO3 x 23/62 = mg/L Na)

TABLE 21

Calculated Dry Wt.Compositions

Element	Sludge				Supernate**	
	Dry wt., kgs					
	Tanks 1-6	Tank 7	Tank 8	Tank 10	Tank 7	Tank 8
Al	5211	15753	29773	14838	128	85
Ca	222	1034	850	585		
Fe	283	1303	1114	1450		
Mg	76	309	338	203		
Mn	674	11	1172	58		
Na	9798	30290	19444	12003	2211 *	2211 *
Na						
Li	1	2	6	2		
Ni						
Ni	357	4892	2745	100		
Si						
Si	5996	44321	40816	45778		
Cr	11	10	48	7		
B	27	91	28	7		
U	2591	7405	14239	75	3	1
Sr	3	0	15	0		
Zr	22	5	26	3		
Ti	17	58	79	44		
K	44	1429	335	4345		
P	986	4837	5260	1719*	170	213
Ba	17	0	146	0		
Pb	124	384	381	58		
Mo	8	10	25	7		
Zn	1193	434	2201	287		
Cu	12	212	61	5		
F	64	123	0	100		
Cl	186	1663	164	517	34	21
SO4	439	585	1387	334	128	51
NO3	23466	37297	45424	13235	5954	5954
Total Dry wt, kgs	71,033	246,431	277,380	166,798	8,627	8,535

- at 105°C for sludge, which includes oxides and hydroxides in sludge
- supernate dry wt. includes only constituents analyzed

* Sodium concentration based on moles of nitrate (mg/L NO3 x 23/62 = mg/L Na)

** Tank 10 superante included with filtercake/sludge in dry wt. summary.
Tanks 1-6 not included due to low volume of supernate

TABLE 22

Calculated Combined Dry Wt. Compositions

Element	Dry Wt. kgs All Tanks 1-6+7+8+10 # + supernate	Dry Wt % All Tanks 1-6+7+8+10 # + supernate	Dry Wt. kgs + Plating Line Sol. & Mark 15	Dry Wt % + Plating Line Sol. & Mark 15
Al	65788	8.44	65788	8.40
Ca	2691	0.35	2691	0.34
Fe	4149	0.53	4149	0.53
Mg	926	0.12	926	0.12
Mn	1914	0.25	1914	0.24
Na	75958	9.74	75958	9.69
Na				
Li	11	0.00	11	0.00
Ni				0.00
Ni	8095 ##	1.04 ##	8445 @@	1.08 @@
Si				
Si	136911	17.56	136911	17.47
Cr	75	0.01	75	0.01
B	153	0.02	153	0.02
U	25253 ###	3.24 ###	28648 @@	3.66 @@
Sr	18	0.00	18	0.00
Zr	56	0.01	56	0.01
Ti	199	0.03	199	0.03
K	6153	0.79	6153	0.79
P	13185	1.69	13185	1.68
Ba	163	0.02	163	0.02
Pb	948	0.12	948	0.12
Mo	50	0.01	50	0.01
Zn	4116	0.53	4116	0.53
Cu	290	0.04	290	0.04
F	288	0.04	288	0.04
Cl	2586	0.33	2586	0.33
SO4	2923	0.37	2923	0.37
NO3	131330	16.84	131330	16.76
Total Dry wt. kgs	779,793 @		783,538 @@	

- at 105°C for sludge, which includes oxides and hydroxides in sludge
- supernate dry wt. includes only constituents analyzed

Gram-moles of Na / 100 g dry wt. waste	0.424
Gram-moles of NO3 / 100 g dry wt. waste	0.272
Gram-moles of Cl / 100 g dry wt. waste	0.009

MOLAR MASS BALANCE

Al(OH)3	18.79
NaNO3	23.09
SiO2 **	36.48
Na6U7O24	4.25
Ca-zeolite	3.17
AlPO4	5.19
SUM	90.97

#A density of 1.1 kg/L and a % solids of 17% was used to calculate the Dry Wt. kgs and wt% for the addtional filtercake in Tank 10.
Current volume of 220,000 gals. sludge in Tank 10 plus ~50,000 gals. additional ~275,000 gals.
The total dry wt. does not include any separate supernate from Tanks 1-6 (due to the low volume)
and the supernate from Tank 10 (Included with filtercake)
An estimated 350 kgs of nickel from the nickel plating solution is NOT included
###Calculated U = 24,265 kgs. Accountability value is 25,253 kgs.
###3395 kgs of uranium (from Mark 15 accountability) is NOT included
@ additional accountability wt. of Uranium included (25,253 - 24,265 = 988 kgs)
@@ Weight of Mark 15 Uranium and Plating Line solution nickel included

3.2.3 Sludge Vitrification

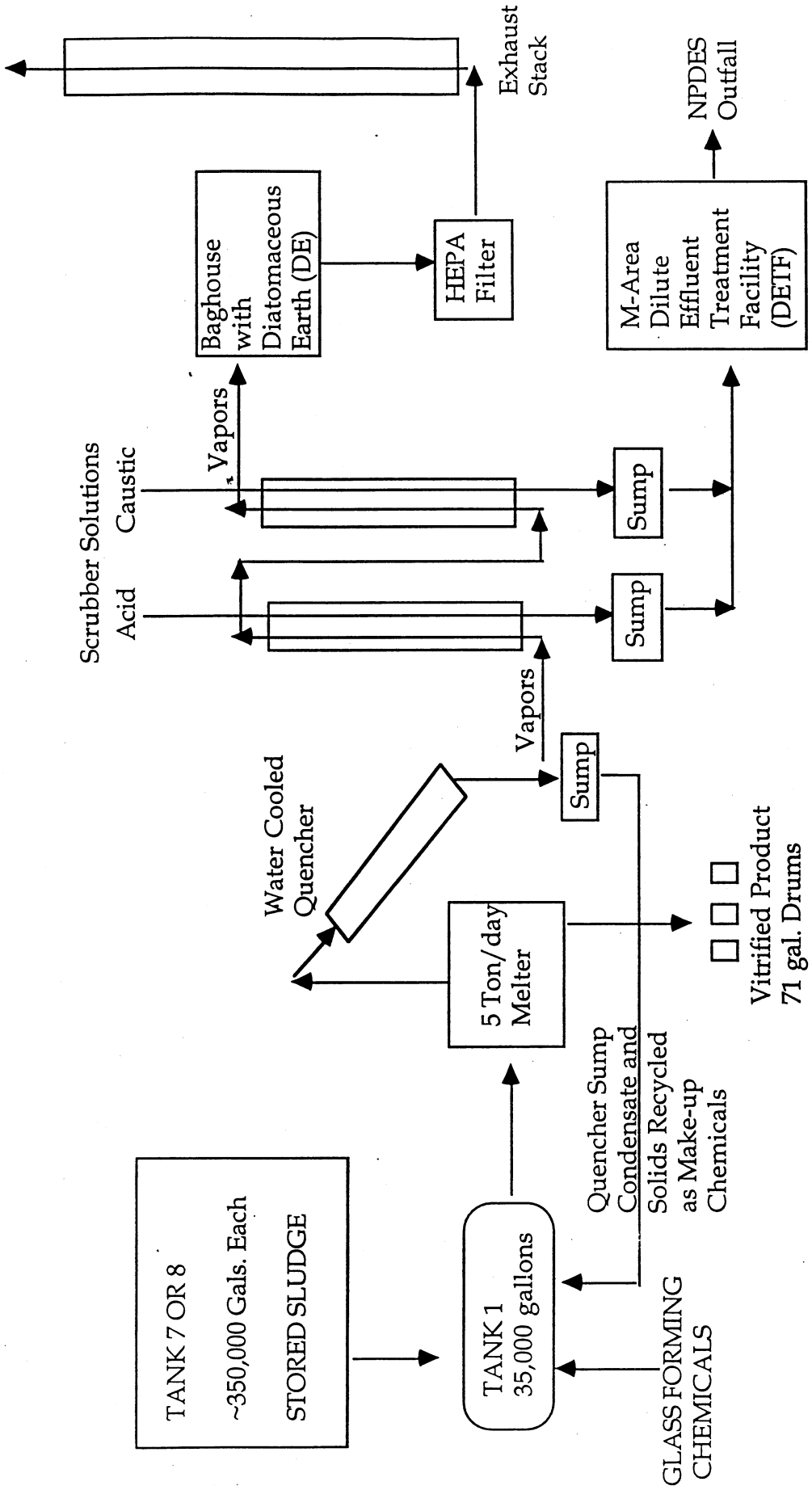
3.2.3.1 Melter Feed Preparation

An overall schematic of the vitrification process is given in Figure 19. As vitrification proceedsed, the wastewater sludge was transferred forward by diversion of the circulating sludge using submersible pumps in Tanks 7 to the feed preparation Tank 1.

The chemical additives needed to form glass were primarily sand, boric acid or borax, sodium carbonate, and lithium carbonate or hydroxide. These additives, along with sugar, which was used to reduce NO_X in the melter, were be added to 20,000 gallon batches of the sludge in the feed preparation Tank 1 (35,000 gallon capacity). The chemicals to be utilized in the vitrification process are given in Appendix H. The dry chemical addition system consisted of a bulk bag unloader, a solids conveyor, and a batch emulsifying mixer which will drew the dry chemicals into solution while maintaining the system under vacuum. The prepared feed was pumped from Tank 1 to Tank 2 (35,000 gallon capacity), from which it continuously circulated by pump through the feed system to fill the staging feed tank (500 gallon capacity) at the melter. From the agitated staging tank, the treated wastewater sludge was continuously metered by pumps into the melter via feed tubes that were cooled by process water jackets. The next sludge feed batch then began preparation in Tank No. 1.

To ensure mixing of the wastewater sludge and the chemical additives, pumps continuously circulated the solution to eductors in Tanks 1 and 2, respectively. These pumps also transfered the sludge between these tanks. Two top mounted agitators on each Tanks 1 and 2 also ensured uniform mixing.

Direct manual addition to the melter itself was used only for the CMP Pit soils, in order to prevent the contamination of the entire feed system with the F-027 waste hazardous constituents. The VTF diatomaceous earth filtercake from the in-line wastewater filter, diatomaceous earth from the off-gas bag filters, and the DETF filter cake were returned directly to the melter feed preparation Tank 1. Other debris and residues which could not be treated via the vitrification process were managed in accordance with all applicable laws and regulations.



M-AREA VENDOR TREATMENT FACILITY (VTF) PROCESS FLOW FLOW DIAGRAM

Figure 19

3.2.3.2 Vitrification

The waste feed slurry mixture was pumped from the staging tank to a single stage vitrification unit. Here, the slurry entered the melter through water cooled entrance ports and was deposited on the surface of a bath of molten glass. Heat from the glass bath was transferred vertically through the accumulated feed pile and evaporated free water from the slurry, calcined inorganic salts to metal oxides, and fused the resultant mixture into a uniform melt, which mixed with the molten glass inventory.

The VTF Melter was an all electric, joule-heated, refractory-lined facility. The melt basin held 515 gallons of molten glass in a chamber that was about 4.2 ft wide by 9.0 ft long by 1.6 ft deep. The glass was maintained at 2102°F ±90°F (1150°C ±50°C) by means of three Inconel 690 electrodes. Two electrodes were mounted on opposite walls of the melter and a third electrode was located in the center of the glass pool, parallel to the wall electrodes and well below the melt surface. There was a small area beneath the center electrode which allowed glass to flow under it creating a common glass pool. There was also a common plenum space above the melt pool that vented to a single off-gas system. A set of ceramic heaters mounted in the roof of the plenum aided in melter start-up and glass temperature control.

The glass pool was discharged through two side exiting pour spouts. Each pour spout was activated by an airlift, for controlled glass discharge. The pour spouts were close coupled to gem machines to produce glass pieces resembling flattened marbles (gems) about 1.5 cm diameter. These gem machines were close coupled to steel hoppers or drums for containing the discharged glass.

The VTF Melter was also equipped with an air bubbling and stirring system, which accelerated melter production capacity, and oxidized any organic and metallic inclusions in the waste feed stream. The power system provided for the VTF Melter limited production to a maximum capacity of 7.5 tons glass per day. The mass balance for normal plant operations was based on the 5 tons (nominal) glass per day.

The VTF melter was coupled to a multistage off-gas treatment system, which maintained the melter at a constant slightly negative pressure (-5 in. w.c.) and entrained and treated emissions resulting during processing. The reactions that occurred when the slurry entered the melter generated steam, a variety of gases (N_2, CO_2, SO_2, NO_x, and trace halides), and particulates. Any organic species in the feed were oxidized. Metal carbonates and sulfates are oxidized, generating CO_2 and SO_2. The pilot glass melter tests also demonstrated that about 40 to 50% of the nitrogen in the feed chemicals (i.e., present as sodium nitrate, $NaNO_3$) thermally dissociated in the melter, forming nitrogen gas (N_2). With the addition of sugar to the feed mixture, a total of 75-80% of the NO_3^- was converted to N_2 gas in the melter plenum. The remainder exited the plenum to the off-gas system as NO_x gas.

A summary of the total mass flow through the process is given in Figure 20 This provides a reference for the partitioning of the various mass flows through the process.

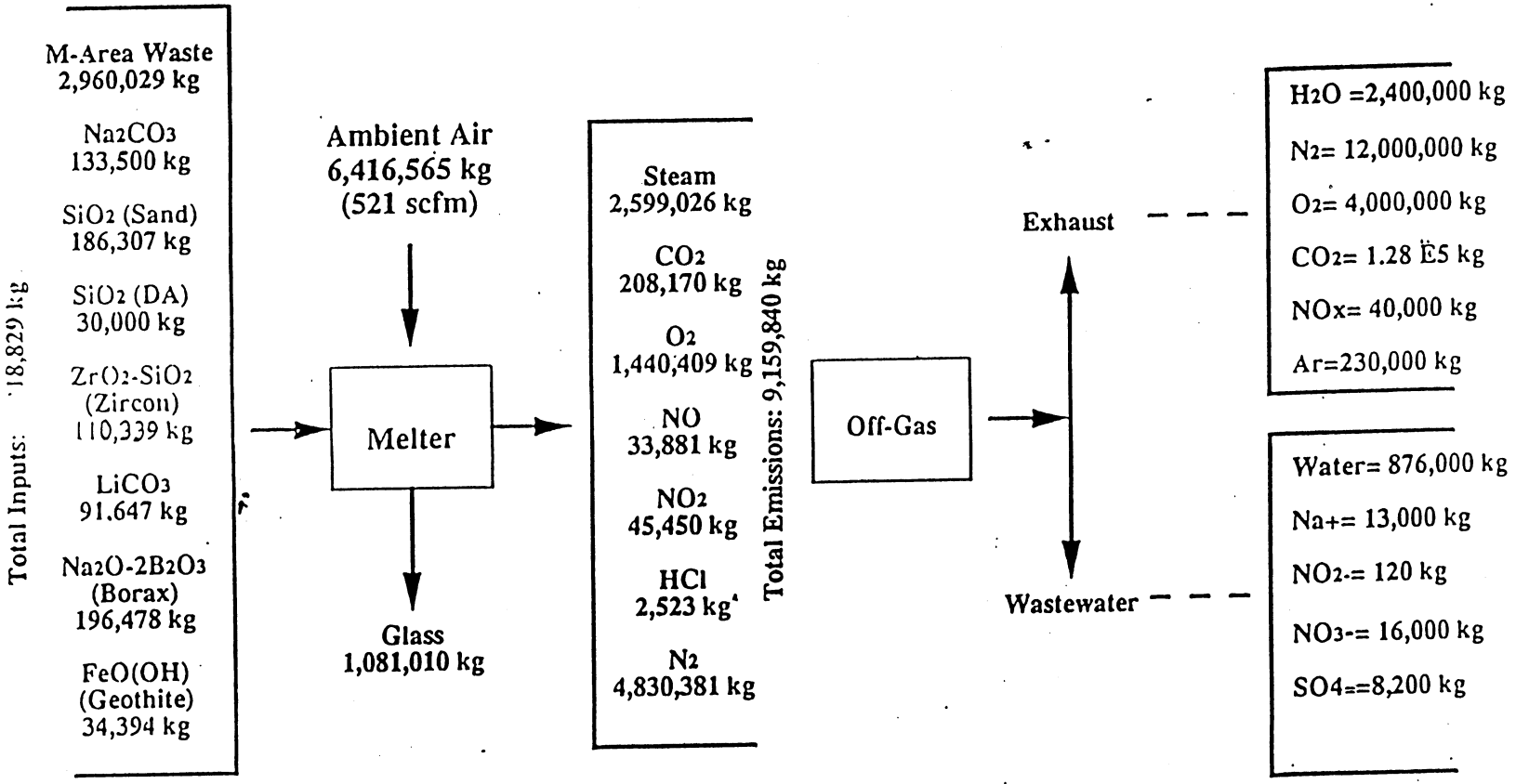


Figure 4
The Effects of Dilution Air on Melter Emissions

Figure 20, Schematic Diagram of VTF Mass Balance

3.2.3.3 Melter Off-Gas System

The off-gas system was composed of a water spray quencher followed by two aqueous based packed bed scrubber towers connected in series. The quencher liquids, circulated by pumps, were acidic or basic depending on the chemistry of the feed and the particulate from the melter. The quencher tank catch basin liquids, which will contain some particulate carry over form the melt pool, were recirculated to the melter, via the feed make-up tank. The liquids of the first scrubber and second scrubber were treated in the DETF. Following the packed bed scrubbers was a mist eliminator and a diatomaceous earth (DE) baghouse, to minimize solid particle carry over to the final High Efficiency Particulate Absorption (HEPA) filtration units. The DE will be recycled in the melter to minimize secondary waste streams. The HEPA filters were eliminated after the first few batches, as the amount of uranium present after the baghouse did not require the HEPA filtration to meet the Air Quality limits.

3.2.2.4 VTF Effluents/DETF Treatment

Due to the high solubility and low total mass of gases generated in the melter, removal efficiency for all species present in the waste feed by the combined acidic-basic scrubber system was high (except for carbon dioxide). The VTF off-gas condensates were cooled and conditioned to ensure that the solutions met the DETF acceptance criteria. After analysis of each batch, the conditioned wastewater was transferred from the VTF to the DETF equalization tanks. The calculated masses of the major constituents in this stream are given in Table 23.

Table 23; Scrubber Catch Basin Effluent Return to DETF

Component	Baseline (kg)	Urea(kg)	Peroxide(kg)
H_2O	876,059	866,108	900,043
Na^+	13,483	7,749	27,274
NH_4^+	0	7,746	0
CO_3^-	3	3	3
$SO_4^=$	8,204	30,687	8,204
NO_3^-	16,142	3,390	4,681
NO_2^-	121	25	351
Cl^-	1,939	1,939	1,935

The NPDES permit limits for the treated effluents to Outfall M-004 were reliably achieved. The DETF filtercake resulting from the treatment of the VTF off-gas was recycled to the VTF to act as silicaceous feed material.

3.2.2.5 Glass Leaching Results Conducted by GTS Duratek

The vendor sampled the glass from five of the last 10 drums of glass produced from each feed batch. Each of the five samples were tested by the TCLP procedure, at an off-site laboratory, to demonstrate compliance with the contract specifications. The data are provided in Table 24. All analyses are less than the proposed delisting limits. All of the analytical laboratory reports are provided in Appendix L.

TCLP RESULTS PROVIDED BY GTS DURATEK

Sludge Batch #	Drum #	Date Produced	TCLP RESULTS, mg/L Cr	Ni	Pb	Comments
1	32	12/21/96	0.39	0.29	0.0019	
	34	12/23/96	0.41	0.29	0.0019	
	36	1/4/97	0.45	0.32	0.0017	
	38	1/7/97	0.43	0.31	0.0013	
	40	1/13/97	0.57	0.42	0.0017	
2	70	2/4/97	0.13	0.17	<DL	
	72	2/4/97	0.15	0.20	<DL	
	74	2/4/97	0.16	0.22	<DL	
	76	2/6/97	0.14	0.19	<DL	
	79	2/10/97	0.13	0.18	<DL	
3	110	2/28/97	0.12	0.27	0.0014	
	112	2/28/97	0.13	0.29	0.0017	
	114	2/28/97	0.16	0.36	0.0023	
	116	3/1/97	0.15	0.38	0.0011	
	118	3/1/97	0.13	0.30	0.0015	
4	160	3/26/97	0.086	0.20	0.0036	
	162	3/28/97	0.085	0.20	0.0031	
	164	3/28/97	0.071	0.18	0.0031	
	166	3/29/97	0.080	0.18	0.0035	
	168	3/31/97	0.065	0.16	0.0029	Last Glass Produced from Melter No.1
5	176	12/14/97	<0.03	0.32	0.0026	1st Batch From New Melter
	184	12/19/97	<0.03	0.21	< 0.0020	
	192	12/20/97	<0.03	0.25	< 0.0020	
	200	12/22/97	0.040	0.28	< 0.0020	
	208	12/24/97	0.044	0.19	< 0.0020	
	216	12/26/97	0.046	0.17	< 0.0020	
	224	12/30/97	0.042	0.23	< 0.0020	
	232	12/31/97	0.041	0.18	< 0.0020	
	240	1/2/98	0.043	0.25	< 0.0020	
6	308	2/12/98	0.020	0.28	0.0029	
	310	2/12/98	0.020	0.30	0.0035	
	312	2/12/98	0.019	0.24	0.0028	
	314	2/12/98	0.018	0.28	0.0031	
	316	2/12/98	0.019	0.18	0.0022	
7	360	2/16/98	0.008	0.20	0.0013	
	362	2/17/98	0.013	0.22	0.0015	
	364	2/17/98	0.014	0.25	0.0016	
	366	2/17/98	0.011	0.20	0.0015	
	368	2/17/98	0.012	0.24	0.0016	
8	410	2/23/98	0.0071	0.15	0.0013	
	412	2/23/98	0.0094	0.18	0.0015	
	414	2/23/98	0.061	0.20	**0.057**	Pb data not consistent
	416	2/23/98	0.0097	0.20	0.0044	with previous results
	418	2/23/98	0.0087	0.18	0.0023	
9	492	3/5/98	0.012	0.13	0.0026	
	494	3/5/98	0.035	0.15	0.0034	
	496	3/6/98	0.069	0.15	0.0028	
	498	3/6/98	0.033	0.12	0.0025	
	500	3/6/98	0.26	0.27	0.0029	

TABLE 24, continued

Sludge Batch #	Drum #	Date Produced	Cr	Ni	Pb	Comments
10	562	NA	0.17	0.16	0.0047	
	564	NA	0.075	0.14	0.0026	
	566	NA	0.051	0.15	0.0028	
	568	NA	0.25	0.14	<0.0020	
	570	NA	0.075	0.16	0.0019	
11	624	3/20/98	0.008	0.17	0.0020	
	626	3/21/98	0.014	0.17	0.0021	
	628	3/21/98	0.024	0.15	0.0021	
	630	3/21/98	0.023	0.14	0.0026	
	632	3/22/98	0.039	0.14	0.0020	
12	708	3/29/98	0.034	0.17	0.002	
	710	3/30/98	0.014	0.16	0.0024	
	712	3/30/98	0.021	0.15	0.0019	
	714	3/30/98	0.031	0.19	0.0021	
	716	4/1/98	0.034	0.18	0.0021	
13	798	4/11/98	0.022	0.25	0.0020	
	800	4/11/98	0.015	0.18	0.0017	
	802	4/12/98	0.013	0.18	0.0019	
	804	4/12/98	0.016	0.25	0.0023	
	806	4/12/98	0.014	0.21	0.0024	
14	882	4/24/98	0.009	0.27	0.0071	
	884	4/24/98	0.010	0.26	0.0067	
	886	4/25/98	0.009	0.25	<0.0020	
	888	4/25/98	0.0098	0.31	<0.0020	
	890	4/25/98	0.0064	0.26	<0.0020	
15	952	5/3/98	0.028	0.31	0.0019	
	954	5/3/98	0.032	0.44	0.0024	
	956	5/3/98	0.022	0.26	<0.0004	
	958	5/3/98	0.029	0.22	0.0004	
	960	5/3/98	0.041	0.23	<0.0004	
16	1024	5/9/98	0.041	0.19	0.0054	
	1026	5/9/98	0.043	0.20	0.0072	
	1028	5/10/98	0.051	0.23	0.011	
	1030	5/10/98	0.008	**0.001**	0.0050	Data suspect; Ni too low
	1032	5/10/98	0.027	0.23	0.0054	
17	1104	5/16/98	0.028	0.16	0.0052	
	1106	5/16/98	0.027	0.16	0.0065	
	1108	5/17/98	0.038	0.17	**0.027**	Pb data not consistent
	1110	5/17/98	0.036	0.17	0.0062	
	1112	5/17/98	0.034	0.17	0.0045	
18	1194	5/29/98	0.0084	0.19	0.0064	
	1196	5/29/98	0.0061	0.21	0.0044	
	1198	5/29/98	0.0060	0.20	0.0034	
	1200	5/30/98	0.0059	0.19	0.0030	
	1202	5/30/98	0.0056	0.21	0.0030	
19	1274	6/7/98	<0.030	0.27	**0.020**	Pb data not consistent
	1276	6/7/98	<0.030	0.30	0.0020	
	1278	6/8/98	<0.030	0.28	0.0020	
	1280	6/8/98	<0.030	0.34	0.0038	
	1282	6/8/98	<0.030	0.25	0.0021	
20	1334	6/14/98	0.0045	0.40	0.0062	
	1336	6/14/98	0.0062	0.48	0.0060	
	1338	6/15/98	0.0071	0.45	0.0062	
	1340	6/15/98	0.0077	0.52	0.0086	
	1342	6/15/98	0.0085	0.46	0.0061	

TABLE 24, continued
TCLP RESULTS, mg/L

			Cr	Ni	Pb	
21	1426	6/24/98	0.0046	0.42	0.0052	
	1428	6/24/98	0.0039	0.37	0.0047	
	1430	6/24/98	0.0036	0.38	0.0046	
	1432	6/25/98	0.0039	0.33	0.0046	
	1434	6/25/98	0.0041	0.41	**0.122**	Pb data not consistent
22	1504	7/1/98	0.011	0.40	0.0069	
	1506	7/1/98	0.013	0.45	0.0089	
	1508	7/1/98	0.011	0.41	0.0135	
	1510	7/1/98	0.010	0.44	0.0061	
	1512	7/1/98	0.010	0.46	0.0082	
23	1598	7/12/98	0.0089	0.48	0.0058	
	1600	7/12/98	0.0094	0.48	0.0056	
	1602	7/12/98	0.0098	0.45	0.0062	
	1604	7/12/98	0.0094	0.44	0.0053	
	1606	7/12/98	0.0092	0.46	0.0055	
24	1666	7/18/98	0.0040	0.66	0.0065	
	1668	7/18/98	0.0027	0.63	0.0075	
	1670	7/19/98	0.0046	0.64	0.0067	
	1672	7/19/98	0.0042	0.55	0.0057	
	1674	7/19/98	0.0035	0.73	0.0063	
25	1718	7/25/98	0.0043	0.47	<0.0034	Note; Mark 15 started 7/20/98
	1720	7/25/98	<0.0037	0.51	<0.0034	
	1722	7/26/98	<0.0037	0.44	<0.0034	
	1724	7/26/98	<0.0037	0.46	<0.0034	
	1726	7/26/98	<0.0037	0.45	<0.0034	
26	1772	8/3/98	0.0069	0.39	0.0053	
	1774	8/3/98	0.0067	0.44	0.0040	
	1776	8/3/98	0.0013	0.077	0.0011	All data suspect (too low)
	1778	8/3/98	0.0063	0.45	0.0040	
	1780	8/3/98	0.0062	0.39	0.0044	
27	1850	8/11/98	<0.0030	0.37	0.0025	
	1852	8/11/98	<0.0030	0.38	0.0051	
	1854	8/12/98	0.0032	0.40	0.0025	
	1856	8/12/98	0.0032	0.45	0.0029	
	1858	8/12/98	0.0033	0.41	0.0027	
28	1932	8/19/98	0.0064	0.48	0.0048	
	1934	8/19/98	0.0054	0.40	0.0029	
	1936	8/19/98	0.0045	0.38	0.0026	
	1938	8/20/98	0.0054	0.33	0.0036	
	1940	8/20/98	0.0055	0.33	0.0036	
29	2016	8/27/98	0.0067	0.54	0.0039	
	2018	8/27/98	0.0067	0.52	0.0038	
	2020	8/27/98	0.0055	0.43	0.0033	
	2022	8/28/98	0.0063	0.43	0.0034	
	2024	8/28/98	0.0068	0.58	0.0056	
30	2082	9/5/98	<0.0030	0.57	0.0019	
	2084	9/6/98	<0.0030	0.50	<0.0015	
	2046	9/6/98	<0.0030	0.59	0.0040	
	2088	9/6/98	<0.0030	0.59	<0.0016	
	2090	9/7/98	<0.0030	0.52	0.0029	
31	2142	9/13/98	<0.0030	0.48	0.0038	
	2144	9/13/98	<0.0030	0.43	<0.0016	
	2146	9/13/98	<0.0030	0.46	<0.0016	
	2148	9/13/98	<0.0030	0.40	<0.0016	
	2150	9/13/98	<0.0030	0.46	<0.0016	

TABLE 24, continued

Sludge Batch #	Drum #	Date Produced	Cr	Ni	Pb	Comments
32	2184	9/20/98	0.011	0.36	0.0048	
	2186	9/21/98	0.011	0.37	0.0056	
	2188	9/21/98	0.010	0.36	0.0040	
	2190	9/21/98	0.0098	0.35	0.0093	
	2192	9/22/98	0.011	0.37	0.0047	
33	2242	9/30/98	0.014	0.27	0.012	
	2244	9/30/98	0.015	0.26	0.0032	
	2246	9/30/98	0.015	0.26	0.0045	
	2248	9/30/98	0.014	0.26	0.0039	
	2250	9/30/98	0.014	0.26	0.0026	
34	2308	10/8/98	0.014	0.26	0.0046	
	2310	10/8/98	0.014	0.26	0.0029	
	2312	10/8/98	0.012	0.28	0.0029	
	2314	10/10/98	0.014	0.29	0.038	
	2316	10/10/98	0.015	0.30	0.0037	
35	2372	10/17/98	<0.006	0.28	0.0049	
	2374	10/17/98	0.0071	0.28	<0.0030	
	2376	10/18/98	0.0076	0.27	0.0033	
	2378	10/18/98	0.0074	0.27	0.023	
	2380	10/18/98	0.0096	0.29	0.0038	
36	2438	10/27/98	0.0081	0.41	0.0049	
	2440	10/27/98	0.0083	0.45	0.0048	
	2442	10/27/98	0.010	0.44	0.0036	
	2444	10/28/98	0.0082	0.45	0.0036	
	2446	10/28/98	0.0095	0.50	0.0038	
37	2484	11/5/98	0.016	0.28	0.0037	
	2486	11/5/98	0.016	0.28	0.0041	
	2488	11/5/98	0.017	0.25	0.011	
	2490	11/6/98	0.018	0.29	0.0035	
	2492	11/6/98	0.016	0.27	0.0032	
38	2540	11/12/98	0.010	0.29	0.0040	
	2542	11/13/98	0.010	0.29	0.0033	
	2544	11/13/98	0.0098	0.27	0.0033	
	2546	11/13/98	0.011	0.28	0.0037	
	2548	11/14/98	0.011	0.31	0.010	
39	2604	11/23/98	0.011	0.34	0.0096	
	2606	11/23/98	0.013	0.39	0.0060	
	2608	11/24/98	0.0098	0.43	0.0071	
	2610	11/24/98	0.011	0.41	0.0075	
	2612	11/24/98	0.0098	0.43	0.0052	
40	2652	12/3/98	0.017	0.43	0.0031	
	2654	12/4/98	0.021	0.44	0.0043	
	2656	12/5/98	0.019	0.40	0.0028	
	2658	12/5/98	0.023	0.45	0.0029	
	2660	12/6/98	0.019	0.46	0.0054	
41	2688	12/16/98	0.0074	0.34	0.0034	
	2690	12/16/98	0.0063	0.30	0.0026	
	2692	12/17/98	0.0048	0.24	0.0025	
	2694	12/18/98	0.0049	0.27	0.0030	
	2696	12/18/98	0.0041	0.32	0.0027	
42	2724	12/26/98	0.018	0.39	0.0066	
	2726	12/27/98	0.019	0.35	0.0039	
	2728	12/29/98	0.021	0.34	0.12	Pb data not consistent
	2730	12/31/98	0.021	0.39	0.0044	
	2732	12/31/98	0.023	0.36	0.0039	

TABLE 24, continued

Sludge Batch #	Drum #	Date Produced	Cr	Ni	Pb	U	Comments
43	2806	1/28/99	0.017	0.098	0.014	0.36	
	2808	2/1/99	0.016	0.083	0.006	0.32	
	2812	2/6/99	0.018	0.070	0.004	0.19	Last Drum was 2813
44	2818	2/10/99	0.014	0.031	0.000	0.077	W-082 treated 2/7-2/24/99
(W-082)	2820	2/20/99	0.016	0.062	0.003	0.15	Drums 2814 to 2825+2904
"45"	2862	3/29/99	0.110	0.97	<.003	0.46	Turnover started 2/24/99
Turnover	2863	3/30/99	0.042	0.064	<.003	0.074	Drums 2826 to 2884, plus
	2864	3/30/99	0.023	0.031	<.003	0.046	drums 2905 and 2906
	2883	4/18/99	0.012	0.036	<.003	0.055	
	2884	4/18/99	0.011	0.035	<.003	0.054	
							Melter drain had drums 2891 through 2903

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4.0 ANALYTICAL PLAN DEVELOPMENT

This section identifies the constituents of concern, and specifies the analytes that will be tested. The sampling plan for those analytes is described in the Section 5, as the sampling protocol is dependent on the constituents to be tested and the processing conditions.

4.1 Identification of Constituents of Concern

4.1.1 Oil and Grease

Oil and grease will not be analyzed in the final wasteform glass, as these materials will be volatilized or combusted at the glass melting temperature of 1150°C. Oil and grease have been used in M-Area, but oil and grease have never been detected in the M-Area wastes to be treated. Oil and grease are not considered constituents of concern in the treated wastes.

4.1.2 TCLP analyses for the TC Metals, Nickel, and Cyanide

Silver, barium, chromium, nickel, and lead were detected in the TCLP leachants from the SRTC expanded crucible scouting studies (Table 14, Section 3.2.1.3).

TCLP leaching for the Toxicity Characteristic (TC) metals of concern and nickel was conducted on the final glass wasteform from the glass scale-up melter test (Table 16, Section 3.2.1.4). Cyanide was determined to be less than the analytical detection limit by a distilled water leach method. Again, only silver, barium, chromium, nickel, and lead were detected in the TCLP leachant at concentrations above the method detection levels.

TCLP testing was conducted on the final vitrified wasteform by the subcontract vendor, for Pb, Cr, Ni, and nitrate – as these are the constituents of with the highest total concentrations in the final vitrified wasteform (See Table 24). Nitrate was never detected in the final vitrified TCLP tests. Lead, Cr, and Ni were present above analytical detection limits.

4.1.3 Other Potential Inorganic Constituents of Concern

The primary inorganic constituents of concern are those inorganic constituents associated with F-006 plating line sludges. The only F-006 constituent used in the M-Area plating line operations was nickel. Neither cadmium, chromium, lead, silver, nor cyanide were used in the M-Area plating line operations. However, all inorganic constituents from the Appendix VIII list in 40 CFR 261 were identified as being potential constituents of concern, due to the large number and variation of the chemicals used in the M-Area analytical laboratories and which could therefore be present in the M-Area wastes, or final wasteform (see Appendix I).

The following Appendix VIII inorganic constituents have been identified as being present above analytical detection limit in the waste sludge (Table 12 or 22), glass from the scale-up melter test (Table 18), or glass from the final confirmation tests (Tables 30 and 31): Arsenic, Barium, Beryllium, Cadmium, Chromium, Lead, Mercury, Nickel, Selenium, and Silver.

Two other potential inorganic constituents on the Appendix VIII list were considered, antimony and thallium. However, neither antimony nor thallium were detected above detection limit in the small melter scale-up tests and in the final glass confirmation testing (Tables 18, 30, and 31). Therefore, they were not included as constituents of concern, and TCLP analyses were not conducted on the confirmatory glass samples.

4.1.4 Ignitability, Corrosivity, and Reactivity

Ignitability and corrosivity tests were not conducted on the final glass wasteform, since, as the glass will not melt until >1000°C, it cannot be ignitable or corrosive under standard conditions. Reactive sulfide and cyanide analyses showed those constituents to be less than 0.25 ppm and 0.62 ppm, respectively (Table 16, Section 3.2)

4.1.5 Total Constituent and TCLP Analyses for Organic Constituents

All organic constituents from the Appendix VIII list in 40 CFR 261 were identified as being potential constituents of concern, due to the large number and variation of the chemicals used in the M-Area operations processes and analytical laboratories, and which could therefore be present in the M-Area wastes, or final wasteform (see Appendices F, G, and I).

The EPA Handbook "Vitrification Technologies for Treatment of Hazardous and Radioactive Waste" (EPA, 1992), indicates destruction efficiencies of >99.999% for most organic compounds. No organic constituents will be present in the final wasteform, due to the high melting temperature of the molten glass. However, to demonstrate that there are no organic constituents of concern in the final M-Area wasteform, a full scan for all of the Appendix VIII constituents, for which there are SW 846A analytical procedures, was conducted on glass samples from the scale-up melter tests and final glass confirmation samples. Analyses for acetone, ethybenzene, isophorone, 4-methyl-2-pentanone, styrene, and total xylenes were also included in the test scan of the glass from the scale-up melter test. A total constituent concentration analysis for the Freon® (1,2,2-trichloro-1,1,2-trifluoroethane) - used as a degreasing agent and cooling agent in the M-Area operations - was not conducted on the scale-up melter glass samples, but was conducted on the final confirmation samples. No chloro/fluoro methane compounds, of any kind, including Freon®, were detected in the total constituent scan.

A mixed waste soil labeled as D-16, D-17, and F-027 was treated at the end of the vitrification campaign. These waste codes correspond to the following constituents:

- F-027; discarded formulations containing tri-, tetra-, or pentachlorophenol, which may include dibenzo-p-dioxins or dibenzofurans
- D-16; 2,4-D, (2,4-dichlorophenoxyacetic acid), and
- D-17; 2,4,5-PT [2-(2,4,5-trichlorophenoxy) propionic acid], (silvex).

These compounds were included in the Appendix VIII confirmation testing on the final glass, and were not detected above the analytical detection limit. Therefore, they were not included as constituents of concern, and TCLP analyses were not conducted.

TCLP analyses were not conducted for any other the Appendix VIII organic constituents, as none of the organic constituents were detected above the analytical quantitation limit in the total constituent analysis (Table 18, Section 3.2 and Table 30.

4.2 Identification of Constituents of Concern for Special Waste Categories

No petroleum industry processes contributed to the wastes to be treated, or the wasteform to be delisted.

None of the wastes to be treated has ever been contained in a land-disposal unit.

The leachable metal concentrations for the final stabilized wasteform was quantified by conducting the Multiple Extraction Procedure (MEP), SW-846 Method 1320, on samples from the scale-up melter tests. The results were given in Table 17, Section 3.2. The Multiple Extraction Procedure is a leaching test which analyzes the same initial sample by 10 consecutive leaches. Method 1320 calls for the original EP leaching procedure, but the more recent Method 1311 was used instead of the EP procedure. The same metals (silver, barium, chromium, nickel, and lead) that were detected in the initial TCLP leaching results for the SRTC crucible scouting studies were also detected in the MEP tests (with the exception of mercury, which was detected twice in the 18 MEP tests.) The MEP concentration levels were all significantly below the proposed delisting levels, demonstrating the long-term durability of the vitrified wasteform. Similar results were found on the MEP tests conducted on the final glass samples, i.e.; the MEP concentration levels were all significantly below the proposed delisting levels (Tables 33a, 33b and 33c).

4.3 Engineering Analysis to Determine Constituents of Concern

As stated previously, the large number of chemicals present in M-Area, and the associated laboratories, made the elimination of specific chemicals very difficult, especially organic chemicals. Therefore, a total chemical analysis for all Appendix VIII constituents (with SW 846 analytical protocols) was conducted on the glass samples resulting from the scale-up melter tests (Table 18, Section 3.2) and the final glass confirmation samples (Table 30).

The constituents of concern in the vitrified M-Area waste are based on those constituents which were determined to be present in the sludge, the initial scale-up melter glass treatability test, or the final glass confirmation tests.

In addition to the Appendix VIII hazardous constituents, those inorganic materials which have EPA Drinking Water "Maximum Contaminant Levels (MCLs) and could be present in the M-Area waste or final glass were considered. Two additional constituents were identified: fluoride and nitrate.

Fluoride was detected in the sludge analyses conducted by Catholic University (Table 12) and the sludge analyses conducted by SRTC (Table 22). Fluoride is not expected to remain in the glass at the melt temperature of 1150 and it was not detected in any of the final glass confirmation samples (Table 30). It would be expected in the cement treatability samples.

Nitrate was present in the cement treatability samples (Table 4-2).

4.4 Identifying Constituents for Which TCLP Testing Will Be Conducted

TCLP verification leaching analyses were conducted on all those Appendix VIII or Drinking Water constituents which were detected as present at above the analytical quantitation limit in the treatability or final wasteform samples. The list of proposed constituents, and the proposed delisting limits are given in Table 26.

The proposed delisting limits are based on a DAF (Dilution Attenuation Factor) of 100. This is according to guidance in the EPA's Delisting Guidance Manual (EPA, 1993). The DAF is based on the final volume of waste to be disposed. In the case of the M-Area wastes, the final volume is approximately 538 yd^3, as discussed in Section 2.1.10. The DAF for a waste volume disposal of less than 1000 yd^3/yr is 100 (EPA, 1993). Assuming that all of the vitrified waste is disposed to a DOE or NRC LLRW disposal facility in one year, the glass volume is well below 1000 yd^3.

TABLE 26: Proposed Constituents for TCLP Testing and Proposed Delist Limit

Hazardous Constituents To Be Tested	EPA Drinking Water MCL mg/L	Proposed Delist TCLP Concentration level, mg/L
Arsenic	0.05	5
Barium	2	200
Beryllium	0.004	0.4
Cadmium	0.005	0.5
Chromium	0.1	10
Lead	0.015	1.5
Mercury	0.002	0.2
Nickel	0.1	10
Selenium	0.05	5
Silver*	0.05*	5
Non-Hazardous Constituents (Not Appendix VIII constituents)		
Nitrate (as N)**	10	1000
Fluoride#	4	400

* Silver was deleted from EPA's Primary Drinking water MCL's in 1991.
** Nitrate was not detected in any final total constituent analyses on the glass confirmatory tests, but was present in the small amount of cement treatability samples.
# Fluoride was not detected in the final total constituent analyses on the glass confirmatory tests, but could be present in the cement treatability samples

A full Appendix VIII scan was conducted on the final glass wasteform, which confirmed that no other Appendix VIII or Drinking water inorganic or organic constituents are present above the analytical estimated quantitation limit (EQL). The sampling plan (and frequency) is discussed in Section 5.

4.5 Appropriate Analytical Test Methods

Analyses will be in compliance with all applicable EPA protocols and procedures.

Table 27: Analytical Methods

Parameter	EPA Manual SW-846[a]	EPA Water Methods	ASTM[b]
Nitrate (as N)	9200	300, 353.1	416
Phosphate (Phosphorus)		365.1-365.4	424F
Calcium (Ca)	7140/6010B		
Chloride (Cl)	9250/9056/6010		
Cyanides	9010 (Distilled water uptake SW-846 Chapter 7)		
Silicon (Si)	3050/6010/6010B		
Paint Filter Liquids Test	9095		
TCLP	1311		
MEP	1320 (with TCLP 1311)		
Metals			
Arsenic (As)	6010 or 6010B		3030D
Barium (Ba)	6010 or 6010B		3030D
Boron (B)	6010 or 6010B		3030D
Cadmium (Cd)	6010 or 6010B		3030D
Chromium (Cr) Total	6010 or 6010B		3030D
Lead (Pb)	6010 or 6010B		316A
Mercury (Hg)	7040, 7041,7470, 7471A		320A
Selenium (Se)	6010, or 6010B		
Silver (Ag)	6010 or 6010B		3030D
Antimony (Sb)	6010, or 6010B		
Nickel (Ni)	7520/6010, or 6010B		
Zinc (Zn)	6010/7950/7951 or 6010B		
Pesticides	8080, 8081A, or 8250		
Herbicides	8150, 8151A, or 8250		
Volatile Organics;	8020, 8024, 8240, or 8260B		
Semivolatile Organics	8010, 8120, 8040, 8090, 8250, or 8270C		

[a]U.S. Environmental Protection Agency, 1982. *Test Methods for Evaluating Solid Waste. SW-846*, Office of Water and Waste Management, Washington, DC.

[b]ASTM - American Society for Testing Materials, 1982. *Annual book of ASTM Standards*, Parts 15, 19, 831, Philadelphia, PA.

4.6 Appropriate Quality Control Protocols

Matrix Spike & Matrix Spike Duplicate Analyses

Matrix Spike and Matrix Spike Duplicate analyses will be performed by the analytical laboratory on confirmation samples at the frequency recommended in the SW 846 protocols.

Method Blank Analyses

Method Blank analyses will be performed by the analytical laboratory on the verification samples at the frequency recommended in the SW 846 protocols.

Surrogate Spikes

Surrogate Spikes for the appropriate organic compounds will be performed by the analytical laboratory on the verification samples as recommended in SW 846 protocols.

Field QC Analyses

Field QC samples will be conducted as appropriate. The final vitrified glass samples were not exposed to contamination with sample preservatives or any other chemical compounds.

5.0 SAMPLING PLAN and FINAL VERIFICATION RESULTS

5.1 Sampling Objectives

The primary objectives of any sampling plan are to obtain valid information that can be used to describe the chemical and physical nature of the material. The sampling plan described in this delisting petition is limited to the verification that the final vitrified M-Area waste meets the delisting criteria. A summary of the sampling and analyses conducted to control the waste treatment process is included, while the verification samples on the final wasteform will verify that the process was operated to meet the wasteform acceptance criteria and delisting limits. The sampling plan included the following considerations:

- compliance with the representativeness of the samples, as required in 40 CFR 260.22(h), i.e.; characterizing any temporal or spatial variability in the final wasteform,
- meeting the data quality assurance objectives defined in SW 846,
- familiarity with the analytical parameters defined in the analytical plan development (Section 4 of this petition), and
- the storage and mixing of the wastes, and generation of the final wasteform.

5.2 Appropriate Sampling Strategy

The sampling strategy for the M-Area vitrified wastes is based on three underlying assumptions:

1) All of the wastes to be treated have been characterized and were stored in tanks or containers. No new wastes, other than those described in this delisting petition, were introduced into the wasteform described in this petition, and

2) The wastes will be blended to the extent possible to form one "macro" feed blend. The total volume of waste to be treated (~670,000 gallons) exceeded the available volume in any one M-Area storage tank. The wastes were mixed one of the large 500,000 gallon tanks (No. 7), as volume was available. The additional wastes added to Tank 7 had been well characterized, so no additional characterization of the wastes to be treated is needed to support the delisting petition. Some small volume waste streams, as described previously, were introduced directly to Feed tank No. 1, or in the case of the W-082 soil, directly to the melter. The volumes of these waste streams were too small to significantly affect the uniformity of a feed or melter batch. Each feed batch was analyzed by the sub-contractor to ensure compliance with contract specifications for the final glass product. This process ensured that all of the glass met the proposed delisting limits, and

3) It is assumed that there were some compositional differences in the macro batch, and that there were some temporal concentration variations in the final wasteform as the waste is treated. This is addressed in the sampling plan.

5.2.1 Waste Treatment Process

5.2.1.1 Master Blend and Feed Batch Preparation

The blending scenario for the M-Area wastes is discussed in Section 3.2. The various waste streams were blended, and mixed primarily in Tank 7, using in-tank agitators and high throughput TOYO® recirculating pumps (300-400 gallons/minute throughput). These operations were intended to produce a homogeneous mixture in Tank 7. The calculated composition of a "master" blend batch of all M-Area wastes is given in Table 22. Due to the total volume of the wastes, all of the wastes could not be blended to make one homogenous blend, which would also assume "perfect" mixing. It was anticipated that some vertical and/or horizontal non-uniformity's would remain in each tank after mixing, due to the size of the tanks (~60 feet in diameter, and 15-16 feet deep). The sludge was transferred to a smaller feed tank (35,000 gallon capacity) in small batches (~15,000 to 20,000 gallons of sludge per feed batch). Glass forming additives were added, resulting in a melter feed batch of approximately 30,000 gallons. Each of these feed batches varied from batch to batch to some degree, due to the macro batch's non-uniformity, and variations in glass former addition and mixing. Each melter feed batch was analyzed after the glass forming additives were added and mixed. That ensured that the final glass wasteform would the glass waste acceptance criteria, before transferring the waste batch to the melter.

The final concentrations in the glass of hazardous constituents of concern did not vary sufficiently to affect the glass leaching, since the total masses of the hazardous constituents are low, compared to the masses of silica, sodium, aluminum, boron, and other glass forming ingredients in the final glass (see Table 15). The TCLP data in Table 24 indicates that the batch formulations and concentrations of the hazardous constituents did with time; for example the TCLP values for nickel varied from 0.04 to 0.97 mg/L. The highest single TCLP for nickel (0.97 mg/L) was still 10 times less than the proposed delisting limit of 10 mg/L.

Glass analyses conducted by the subcontractor for process control purposes found that nickel oxide (NiO) varied from ~0.15 to 1.50 dry wt.%. Uranium oxide (U_3O_8), which is a major component of the waste, varied from 0.32 to 6.88 dry wt.%. The TCLP leaching data for nickel (and uranium) did not directly correspond to the variation in the total constituent concentration, as the leaching of the glass was also affected by the chemical durability of the glass. The M-Area glass is a very durable material, but the durability is a complex function of all of the glass forming constituents (Si, Al, Na, B, etc.), so the TCLP leach rate does not strictly correlate with the glass concentrations. The M-Area glasses from the plating line sludge is more durable than the durability specified for the glass containing the High Level Radioactive waste produced at the Savannah River Site DWPF.

5.2.1.2 Melter Batches

The sampling of the final glass wasteform to determine its acceptability is complicated by the fact that the glass melter acted as continuous batch reactor. The addition of a new feed batch to a joule heated glass melter of the design used by GTS Duratek takes approximately 5 melter "turnovers" to reach full equilibrium with the new batch. I.e., approximately five melter "turnovers" are needed to flush out 100% of the existing inventory in the melter and replace it with a new feed batch inventory. This process

causes the final wasteform to be more uniform, due to the blending and mixing in the melt pool, but makes sampling of a separate sludge feed batch more difficult.

The Duramelter 5000® has a melt volume of 1950 liters. At density of 2.6 kg/L, this = ~5000 kg. The nominal throughput for the melter was ~5 tons/day, or one melter volume per day, at nominal throughput. Assuming each batch of feed contained 15,000 gallons of sludge, this would result in ~2250 gallons of glass (84% volume reduction), or 8,500 liters x 2.6 kg/L = 22,000 kg (22 metric tons). At nominal daily throughput of 5000 kg, it took approximately 4+ days to treat one sludge feed batch, so the melter may not have reached total 100% equilibrium from any one feed batch. The melter equilibrium for a new batch, at a 5 ton/day operating rate, is assumed to be:

1st day = 25%, 2nd = 50%, 3rd = 75%, 4th = 90%, 5th = +98%.

The sampling plan and frequency were therefore designed to differentiate between feed batches as accurately as possible.

When a lower or higher throughput was used, or operational difficulties occurred, or the waste loading varied, then the time needed to treat a batch varied, as did the time to reach maximum turnover. Therefore, the sampling strategy was based on a feed batch basis. After preparation, the melter feed batch was transferred from Tank 1 to Tank 2. The feed mixture in Tank No. 2 was continuously circulated to a small (500 gallon) melter feed tank, which was located over the top of the melter. The volume of the feed blend in Tank No. 2 was continuously monitored, to ensure uninterrupted treatment. The glass samples were collected from 5 of the last 10 drums of glass beads produced from a specific feed batch. These samples were used both for the sub-contractor's TCLP compliance testing and for the confirmatory Appendix VIII and TCLP analyses. As indicated in Table 24, the number of drums per batch has varied from 40 to 80, depending on batch size.

5.2.2 Process Control Sampling Plan

In order to demonstrate compliance of a feed batch with the WSRC Waste Acceptance Criteria (WAC), each glass batch was sampled when its concentration was the highest in the melter and final glass beads. Five of the last ten drums from each feed batch were sampled to provide the most representative samples of a particular feed batch for TCLP contract compliance testing. The contract Waste Acceptance Criteria (WAC) were:

TCLP Leaching, mg/L

Constituent	WAC	Proposed Delist Level
Nickel	5.0*	10
Lead	0.37*	1.5
Chromium	0.86*	10
Nitrate (as N)	500	1000

*The SRS contract waste acceptance criteria were based on 1994 levels of the Universal Land Disposal Restrictions regulations, and were intentionally lower than the Delisting level, to provide a conservative approach for the glass quality and durability.

5.2.2.1 Process Control Statistical Analysis

The following statistical formula were used to determine wasteform acceptance by WSRC for each melter feed batch (EPA, 1989). The average/mean (y) and standard deviation (s) for the actual sample analyses were determined, and the waste must meet the WAC at a 95% probability. The 95% confidence factor was determined using a one-tailed t statistic:

upper confidence factor (CF) = $t_{95 \text{ for } n-1} * (s/n^{1/2})$

The acceptability of a wasteform batch was determined by:

when the mean (y) is less than or equal to (< or =) [the acceptance limit - the confidence factor (CF)].

For example, with a sample number n = 4, mean (y) = 2.5, std dev. (s) = 0.37 and $t_{95\%}$ confidence level statistic for n-1 = 2.353, then for nickel;

$CF = 2.353 * 0.37/4^{1/2} = 0.44.$

Then, 5.0 mg/L (WAC) - 0.44 = 4.56.

Since the mean, y (2.5) is < 4.56 ; the batch is acceptable.

This type of analysis was conducted for each constituent with specified Waste Acceptance Criteria (WAC). Any batch that did not meet the waste acceptance criteria was to be retreated/reworked. All of the batches met the Waste Acceptance Criteria; therefore none had to be reworked.

The process control TCLP sampling results are included in this Delisting Petition (Table 24, and Appendix L), but the subcontractor was not required to follow and submit ALL QA documentation required by the delisting petition guidelines. Therefore, the submission of the contract acceptance results is provided for information only, without intending to meet the Quality Assurance requirements of a delisting petition.

5.2.3 Delisting Verification Sampling Plan

In addition to the sampling conducted by the sub-contractor - to demonstrate compliance with the contractual waste acceptance criteria - WSRC conducted an independent analysis to verify that the final wasteform met the proposed delisting criteria. The delisting verification sampling had two objectives:

- To demonstrate, through total constituent testing that only those constituents of concern identified in this petition are present (as discussed in Section 4), and

- To verify that the TCLP leachant concentration for the constituents of concern met the proposed delisting limits.

The verification sampling and analysis encompassed two phases:

A *Total Constituent Verification*

The final vitrified wasteform prepared from the macro feed batch was tested to demonstrate that there were no additional constituents of concern (other than those previously identified).

Five samples of glass beads were collected from the last ten drums of every other batch. The glass from 6 to 7 batches was composited and mixed for full Appendix VIII testing. This provided 8 overall composites for the Appendix VIII tests. The samples were tested using all appropriate SW 846 protocols, and all of the QA documentation required by a delisting petition is included.

No constituents of concern other than those previously identified were determined to be present above the analytical quantitation limit.

B *TCLP and MEP Verification*

TCLP test verification was conducted on representative samples from the entire treatment process, using a "grab sampling" technique. Grab sampling is the preferred type of sampling to demonstrate compliance with the Land Disposal Restrictions (LDR) Universal Treatment Standards (UTS) (EPA, 1997). The verification samples for TCLP and MEP testing utilized grab samples.

Each melter feed batch had 15,000 to 20,000 gallons of sludge; except for the final "turnover" batch, during which only glass forming additives were added, and the melter was flushed. Overall there were 45 melter feed batches. The TCLP verification sampling was conducted on grab samples from approximately every third batch, with 16 batches in total. All of the constituents of concern identified in this delisting petition were determined by the TCLP testing. The TCLP verification sampling utilized all applicable SW 846 protocols, and all QA documentation required by a delisting petition was submitted with the TCLP results

Multiple Extraction Procedure (MEP) testing was conducted on three composite glass samples, for all constituents of concern. The MEP verification sampling utilized all applicable SW 846 protocols, and all QA documentation required by a delisting petition is submitted with the MEP results. The MEP procedure (Method 1320) uses a synthetic "acid rain" leachant. This is intended simulate the leaching that a wasteform would undergo from repetitive precipitation of acid rain on an improperly designed sanitary landfill. The pH of the "acid rain" leachant is 3.0+/-0.2 pH. The pH of the standard TCLP leachant (Method 1311) is 4.93 +/- 0.05 pH. The standard TCLP leachant is intended to simulate the leachate generated by rainfall leaching through a properly constructed solid or hazardous waste landfill.

For the purposes of this Delisting Petition, the multiple extractions of the MEP test were conducted with the standard 4.93 pH leachant solution. This is due to the fact that the radioactive waste will be disposed in a Low Level Radioactive Waste disposal facility. These facilities conform to DOE or NRC requirements to minimize rainfall contact with the buried wastes. I.e., these M-Area wastes, when disposed, will not be subject to "acid rain" leaching. Therefore the standard TCLP leaching solution was more appropriate to determine the repetitive leaching behavior of the final M-Area wasteform.

Table 28 Sampling Plan Summary

Macro Batch No.	TCLP Acceptance Grab	Total Constituent Verification Composites	TCLP Verification Grab	MEP Verification Grab
		Glass Bead Samples - Feed Batch No. To Be Sampled		
Tank No 7	Every Batch 5 samples per batch	2 and 4	2	
			5	5
			6	
		6, 9, 10, 12	10	
			12	
		14, 15, 16, 17, 18	15	
			18	
		19, 21, 22, 24	21	21
			25	
		25, 26, 27, 28, 30	26	
			30	
		32, 33, 34, 35, 36	33	
			37	
		37, 39, 41, 43	39	
			41	41
		44	44	
Total Samples	~225 Grab	8 Composites	16 Grab	3 Grab

5.2.3.1 Sample Collection, Storage, and Management

The glass beads or "gems" were produced as flattened ovoids, approximately 1/2 to 3/4 inch in diameter, and 1/2 inch thick. The size varied, both due to process control variability, and due to the fact that different size beads are desirable, to increase the packing efficiency in the storage drums. During the final drain of the melter in order to lower the residual glass in the melter as much as possible, to allow visual inspection of the melter walls below the melt line. The final drain generated thirteen; 55 gallon drums of “solid” glass, rather than “gems”. The final batch (gems) was tested by the subcontractor for TCLP analysis, prior to the molten glass discharge. As expected, the Ni leachant concentrations decreased significantly (Table 24), as the waste was flushed out by the glass forming chemicals.

The glass gems were sampled using a trowel or scoop, at the completion of filling each drum to be sampled - prior to installing the drum cover. Any fines present in the drum were included representatively. Each storage drum has a unique identification number, including feed batch number and a sequential drum number. Date and time of collection were maintained in a sample collection logbook.

The sample bottles had a similar nomenclature. Composited samples were identified by the feed batch numbers. Individual drum samples used to form a composite sample are given below (Table 29).

The sample bottles were polypropylene, of sufficient volume to provide the analytical laboratory with a enough sample. The samples were controlled via a Chain-of-Custody (C of C) protocol. Due to the presence of depleted uranium, the samples were considered "radioactive" by Department of Transportation (DOT) regulations, and were shipped to the analytical laboratory as such.

The sub-contractor personnel initially sampled the waste. The subcontract Field Technician or Sampler(s) had successfully completed a two-year technical degree program, and had at least one year experience in conducting the specifications of the treatment contract. The samples were transferred to WSRC for storage until composite samples were prepared and submitted to the analytical laboratory. WSRC personnel prepared the final composite samples from the samples, and shipped them to the analytical laboratory.

The resume' and qualifications of the person who designed the sampling plan and quality control plan, prepared the composite samples, and shipped them are included in Appendix K.

5.2.4 Actual Delisting Verification Sampling

There were 45 feed batches, including the final flushing of the melter with glass forming materials (no waste added). Seven composite glass samples were collected over the course of the treatment, and submitted for a full EPA Appendix VIII analysis (for those compounds which have approved SW 846 analytical procedures). An eighth composite was collected during the treatment of the W-082 waste stream, Batch 44 (which had hazardous waste codes D-16, D-17, and F-027).

The composite samples were prepared by combining relatively equal amounts of glass beads from each batch, as shown above, mixing thoroughly, and placing each composite sample into a plastic sample container. Each composite sample weighed ~1 kg, to provide enough material for the Appendix VIII and a detailed radionuclide analyses (needed for SRS waste disposal purposes). Glass remaining from each composite mixture was archived, in case the laboratory needed more material.

TABLE 29 COMPOSITE and TCLP BATCH/DRUM NUMBERS

Composite I. D. No.	Batches Combined	Drum Numbers
Comp.' 1	2 & 4	79, 120
Comp.' 2	6, 9, 10, 12	286, 488, 534, 700
Comp.' 3	14, 15, 16, 17, 18	858, 922, 1022, 1080, 1180
Comp.' 4	19, 21, 22, 24, 24	1288, 1358, 1520, 1608, 1632
Comp.' 5	25, 26, 27, 28, 30	1682, 1732, 1826, 1902, 2106
Comp.' 6	32, 33, 34, 35, 36	2178, 2198, 2294, 2364, 2416
Comp.' 7	37, 39, 41, 43	2458, 2562, 2662, 2734
Comp.' 8	44	2814, 2815, 2821, 2832

TCLP Sample I. D. No	Batch No.	Drum Number
1	2	74
2	5	150 (MEP Conducted)
3	6	252
4	10	536
5	12	692
6	15	908
7	18	1140
8	21	1404 (MEP Conducted)
9	25	1700
10	26	1754
11	30	2032
12	33	2468
13	37	2468
14	39	2596
15	41	2686(MEP Conducted)
16	44 (W-082)	2822

The "TCLP" verification samples were collected by taking one grab sample from approximately every third batch. Each sample weighed ~200 gms, to provide enough material for the TCLP analyses. Glass remaining from each TCLP sample was archived, in case the laboratory needed more material.

5.3 Verification Sampling Results

5.3.1 Total Constituent Concentration Results

The full Appendix VIII (IX) test results are provided in Table 30. No additional hazardous constituents were detected in the verification samples vs. the initial treatability study glass samples (Table 18). As expected, no organic compounds were detected in the verification samples (including Freon® (1,2,2-trichloro-1,1,2-trifluoroethane, tri-, tetra-, or pentachlorophenol, dibenzo-p-dioxins or benzofurans, 2,4-D, (2,4-dichlorophenoxy-acetic acid), or 2,4,5-PT [2-(2,4,5-trichlorophenoxy) propionic acid], (silvex). Neither nitrate nor ammonia was detected in the glass samples.

In addition, all of the constituents of concern (except for Hg) were re-analyzed in each of the sixteen TCLP samples (Table 31). No other constituent(s) of concern was identified.

5.3.2 *TCLP Results*

The TCLP verification leaching analyses were conducted on the proposed constituents for TCLP testing, as given in Table 26. The TCLP results, for the 16 grab samples, are given in Table 32. All constituents of concern were less than the analytical detection limit or laboratory reporting limits (except for nickel). All of the constituents of concern (except nickel) had TCLP leaching levels lower than the delisting limits, by a factor of 100. Including the TCLP leaching results in Tables 24 and 32, the TCLP leaching results for nickel ranged from 10 to 30 times lower than the delisting limit.

5.3.3 MEP Results

The MEP results (9 successive TCLP leaches after the initial TCLP test) are given in Tables 33a, 33b, and 33c. Again, the only constituent of concern above detection limit or laboratory reporting limit is nickel. The multiple extraction results demonstrated the high durability of the glass wasteform to repeated leachant extractions. The nickel leachant concentration was lower in all of the nine subsequent extractions than it was in the initial TCLP test.

5.4 Conclusion

The final confirmatory testing proved conclusively that the final vitrified wasteform meets the proposed delisting TCLP leaching limits, by a least a factor of 10.

All of the laboratory results are provided in Appendix M, along with short resumes of the laboratory technicians who conducted the analyses.

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TABLE 30: APPENDIX VIII/IX VERIFICATION RESULTS

Composite Sample No GEL Lab Number	Units	COMP.' 1 9907679-65	COMP.' 2 9907679-66	COMP.' 3 9907679-68	COMP.' 4 9907679-69	COMP.' 5 9907679-71	COMP.' 6 9907679-72	COMP.' 7 9907679-1	COMP.'8 9907679-2	Potential Constituent of Concern	Above Detection Limit
METALS											
Mercury	mg/Kg	U <0.002	U <0.002	U <0.002	U <0.002	U <0.002	U <0.02	U <0.002	U <0.002	Yes	No
Silver	mg/Kg	7.4	11.5	5.3	6.0	10.2	10.2	8.3	1.5	Yes	Yes
Aluminum	mg/Kg	40,800	57,300	58,000	71,100	65,800	52,100	66,200	55,500		
Arsenic	mg/Kg	2.37	4.84	2.01	2.42	2.54	2.09	1.81	1.52	Yes	Yes
Boron	mg/Kg	21,400	31,300	30,300	33,800	34,800	28,400	30,300	27,100		
Barium	mg/Kg	79.6	116.0	101.0	127.0	104.0	83.3	85.3	101	Yes	Yes
Berylium	mg/Kg	0.52	0.73	0.67	0.82	0.65	0.52	0.56	1.0	Yes	Yes
Calcium	mg/Kg	1,560	2,180	1,740	2,070	1,730	1,370	1,790	2,890		
Cadmium	mg/Kg	1.3	2.0	1.0	1.2	2.1	1.8	2.4	1.1	Yes	Yes
Cobalt	mg/Kg	8.7	15.9	7.41	13	19.8	11.8	17	4.0		
Chromium	mg/Kg	293	401	131	163	224	218	443	449	Yes	Yes
Copper	mg/Kg	33.4	63.1	39.6	78.9	85	49	63	57		
Iron	mg/Kg	18,700	23,200	13,500	16,100	21,500	22,400	20,800	17,600		
Potassium	mg/Kg	5,460	7,150	9,330	11,100	7,570	5,590	4530	5780		
Magnesium	mg/Kg	3,580	5,130	3,880	4,720	4,960	4,450	5,130	4,770		
Manganese	mg/Kg	280	346	288	357	368	354	292	274		
Molydenum	mg/Kg	2.4	3.6	2.3	2.9	3.7	3.4	2.9	3.0		
Sodium	mg/Kg	76,200	107,000	94,200	114,000	122,000	101,000	100,000	82,200		
Nickel	mg/Kg	4,450	6,270	3,990	6,130	9,800	6,420	8,680	1,540	Yes	Yes
Lead	mg/Kg	53.5	74.9	59.2	99.2	94.0	61.5	76.0	33.6	Yes	Yes
Antimony	mg/Kg	U <19.1	U <18.5	U <18.50	U <18.90	U <18.3	U <18.7	U <18.1	U <18.5	Yes	No
Selenium	mg/Kg	U <13.5	U <13.1	U <13.10	U <13.40	U <13.0	U <13.2	U <12.9	U <13.1	Yes	No
Silicon	mg/Kg	4,360	2,630	2,360	1,830	5,390	3,540	5,480	3,240		
Tin	mg/Kg	9.0	12.1	15.8	16.7	9.5	18.7	11.5	9		
Strontium	mg/Kg	20.1	29.5	16.9	20.7	26.4	23	24.2	29.1		
Titanium	mg/Kg	283	338	210	246	333	251	351	747		
Thalium	mg/Kg	U <22.10	U <21.40	U <21.40	U <21.80	U <21.20	U <21.60	U <21	U <21	Yes	No
Uranium	mg/Kg	28,500	43,100	18,300	18,400	34,600	34,600	28,400	4,030		
Vanadium	mg/Kg	26.3	37.1	18.6	22.1	33.3	25.8	35	18.6		
Zinc	mg/Kg	13,900	18,900	15,600	20,100	21,700	19,300	20,000	18,900		
General Chemistry											
Bromide	mg/Kg	U <0.14	U <0.17	U <0.16	U <0.16	U <0.13	U <0.15	U <0.14	U <0.15		
Chloride	mg/Kg	U <0.17	U <0.20	J 0.20	3.41	U <0.16	J 0.81	J 0.22	J 0.51		
Fluoride	mg/Kg	U <0.20	U <0.24	U <0.23	J 0.45	U <0.19	J 0.270	U <0.20	J 0.23	Yes	No
Nitrate (NO3)	mg/Kg	U <0.12	U <0.14	U <0.14	J 0.40	U <0.11	U <0.06	U <0.11	U <0.13	Yes	No
Sulfate (SO4)	mg/Kg	U <0.35	U <0.43	U <0.41	J 7.61	U <0.33	U <0.36	U <0.34	U <0.38		
Ammonia	mg/Kg	U <0.24	U <0.24	J 0.40	J 0.30	U <0.24	U <0.24	0.80	U <0.24	Yes	No*
Phosphate as PO4	mg/Kg	220	344	452	452	328	826	411	204		

*, only one anaylsis above detection/laboratory eporting limit in 24 samples (tables 30 and 31)

5-11

TABLE

Composite Sample No GEL Lab Number	Units	COMP.' 1 9907679-65	COMP.' 2 9907679-66	COMP.' 3 9907679-68	COMP.' 4 9907679-69	COMP.' 5 9907679-71	COMP.' 6 9907679-72	COMP.' 7 9907679-1	COMP.'8 9907679-2	Potential Constituent of Concern	Above Detection Limit
VOLATILE ORGANICS											
1,1,1,2-Tetrachloroethane	µg/Kg	U <0.20	U <0.20	U <0.20	U <0.20	U <0.20	U <0.20	U <0.20	U <0.20		
1,1,1-Trichloroethane	µg/Kg	U <0.10	U <0.10	U <0.10	U <0.10	U <0.10	U <0.10	U <0.10	U <0.10		
1,1,2,2-Tetrachloroethane	µg/Kg	U <0.60	U <0.60	U <0.60	U <0.60	U <0.60	U <0.60	U <0.60	U <0.60		
1,1,2-Trichloroethane	µg/Kg	U <0.30	U <0.30	U <0.30	U <0.30	U <0.30	U <0.30	U <0.30	U <0.30		
1,1-Dichloroethane	µg/Kg	U <0.10	U <0.10	U <0.10	U <0.10	U <0.10	U <0.10	U <0.10	U <0.10		
1,1-Dichloroethylene	µg/Kg	U <0.30	U <0.30	U <0.30	U <0.30	U <0.30	U <0.30	U <0.30	U <0.30		
1,2,3-Trichloropropane	µg/Kg	U <0.40	U <0.40	U <0.40	U <0.40	U <0.40	U <0.40	U <0.40	U <0.40		
1,2-Dibromo-3-chloropropane	µg/Kg	U <0.40	U <0.40	U <0.40	U <0.40	U <0.40	U <0.40	U <0.40	U <0.40		
1,2-Dibromoethane	µg/Kg	U <0.20	U <0.20	U <0.20	U <0.20	U <0.20	U <0.20	U <0.20	U <0.20		
1,2-Dichloroethane	µg/Kg	U <0.20	U <0.20	U <0.20	U <0.20	U <0.20	U <0.20	U <0.20	U <0.20		
1,2-Dichloropropane	µg/Kg	U <0.20	U <0.20	U <0.20	U <0.20	U <0.20	U <0.20	U <0.20	U <0.20		
1,2-trans-Dichloroethylene	µg/Kg	U <0.10	U <0.10	U <0.10	U <0.10	U <0.10	U <0.10	U <0.10	U <0.10		
2-Butanone	µg/Kg	U <3.2	U <3.2	U <3.2	U <3.2	U <3.2	U <3.2	U <3.2	U <3.2		
2-Hexanone	µg/Kg	U <2.8	U <2.8	U <2.8	U <2.8	U <2.8	U <2.8	U <2.8	U <2.8		
4-Methyl-2-pentanone	µg/Kg	U <3.1	U <3.1	U <3.1	U <3.1	U <3.1	U <3.1	U <3.1	U <3.1		
Acetone	µg/Kg	U <10.3	U <10.3	U <10.3	U <10.3	U <10.3	U <10.3	U <10.3	U <10.3		
Acetonitrile	µg/Kg	J 8.8	J 3.70	J 9.60	J 5.70	J 8.54	J 9.85	J 9.4	J 6.2		
Acrolein	µg/Kg	U <4.6	U <4.6	U <4.6	U <4.6	U <4.6	U <4.6	U <4.6	U <4.6		
Acrylonitrile	µg/Kg	U <3.90	U <3.90	U <3.90	U <3.90	U <3.90	U <3.90	U <3.9	U <3.9		
Allyl Chloride	µg/Kg	U <0.40	U <0.40	U <0.40	U <0.40	U <0.40	U <0.40	U <0.40	U <0.40		
Benzene	µg/Kg	U <0.50	U <0.50	U <0.50	U <0.50	U <0.50	U <0.50	U <0.50	U <0.50		
Bromoform	µg/Kg	U <0.30	U <0.30	U <0.30	U <0.30	U <0.30	U <0.30	U <0.30	U <0.30		
Carbon Disulfide	µg/Kg	U <0.30	U <0.30	U <0.30	U <0.30	U <0.30	U <0.30	U <0.30	U <0.30		
Carbon tetrachloride	µg/Kg	U <0.50	U <0.50	U <0.50	U <0.50	U <0.50	U <0.50	U <0.50	U <0.50		
Chlorobenzene	µg/Kg	U <0.30	U <0.30	U <0.30	U <0.30	U <0.30	U <0.30	U <0.30	U <0.30		
Chlorodibromomethane	µg/Kg	U <0.20	U <0.20	U <0.20	U <0.20	U <0.20	U <0.20	U <0.20	U <0.20		
Chloroethane	µg/Kg	U <0.30	U <0.30	U <0.30	U <0.30	U <0.30	U <0.30	U <0.30	U <0.30		
Chloroform	µg/Kg	U <0.10	J 0.64	U <0.10	U <0.10	U <0.10	U <0.10	U <0.10	U <0.10		
Chloroprene	µg/Kg	U <2.0	U <2.0	U <2.0	U <2.0	U <2.0	U <2.0	U <2.0	U <2.0		
Dibromomethane	µg/Kg	U <0.20	U <0.20	U <0.20	U <0.20	U <0.20	U <0.20	U <0.20	U <0.20		
Dichlorobromomethane	µg/Kg	U <0.10	U <0.10	U <0.10	U <0.10	U <0.10	U <0.10	U <0.10	U <0.10		
Dichlorodifluoromethane	µg/Kg	U <1.20	U <1.20	U <1.20	U <1.20	U <1.20	U <1.20	U <1.2	U <1.2		
Ethyl methacrylate	µg/Kg	U <0.40	U <0.40	U <0.40	U <0.40	U <0.40	U <0.40	U <0.40	U <0.40		
Ethylbenzene	µg/Kg	U <0.30	U <0.30	U <0.30	U <0.30	U <0.30	U <0.30	U <0.30	U <0.30		
Isobutyl alcohol	µg/Kg	U <6.3	U <6.3	U <6.3	U <6.3	U <6.3	U <6.3	U <6.3	U <6.3		
Methacrylonitrile	µg/Kg	U <0.90	U <0.90	U <0.90	U <0.90	U <0.90	U <0.90	U <0.9	U <0.9		
Methyl Bromide	µg/Kg	U <0.30	U <0.30	U <0.30	U <0.30	U <0.30	U <0.30	U <0.3	U <0.3		

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Composite Sample No GEL Lab Number	Units	COMP.' 1 9907679-65	COMP.' 2 9907679-66	COMP.' 3 9907679-68	COMP.' 4 9907679-69	COMP.' 5 9907679-71	COMP.' 6 9907679-72	COMP.' 7 9907679-1	COMP.'8 9907679-2	Potential Constituent of Concern	Above Detection Limit
Volatile Organics (Cont')											
Methyl Iodide	µg/Kg	U <0.60	U <0.60	U <0.60	U <0.60	U <0.60	U <0.60	U <0.6	U <0.6		
Methyl Methacrylate	µg/Kg	U <0.40	U <0.40	U <0.40	U <0.40	U <0.40	U <0.40	U <0.40	U <0.40		
Methylene Chloride	µg/Kg	U <1.40	U <1.40	U <1.40	U <1.40	U <1.40	U <1.40	U 3.5	U 3.5		
Pentachloroethane	µg/Kg	U <0.50	U <0.50	U <0.50	U <0.50	U <0.50	U <0.50	U <0.50	U <0.50		
Propionitrile	µg/Kg	U <3.4	U <3.4	U <3.4	U <3.4	U <3.4	U <3.4	U <3.4	U <3.4		
Styrene	µg/Kg	U <0.30	U <0.30	U <0.30	U <0.30	U <0.30	U <0.30	U <0.30	U <0.30		
Tetrachloroethylene	µg/Kg	U <0.40	U <0.40	U <0.40	U <0.40	U <0.40	U <0.40	U <0.40	U <0.40		
Toluene	µg/Kg	U <0.90	U <0.90	U <0.90	U <0.90	U <0.90	U <0.90	U <0.90	U <0.90		
Trichloroethylene	µg/Kg	U <0.30	U <0.30	U <0.30	U <0.30	U <0.30	U <0.30	U <0.30	U <0.30		
Trichlorofluoromethane	µg/Kg	U <0.30	U <0.30	U <0.30	U <0.30	U <0.30	U <0.30	U <0.30	U <0.30	Yes	No
Trichlorotrifluoroethane	µg/Kg	U <10	U <10	U <10	U <10	U <10	U <10	U <10	U <10		
Vinyl Acetate	µg/Kg	U <2.10	U <2.10	U <2.10	U <2.10	U <2.10	U <2.10	U <2.1	U <2.1		
Vinyl chloride	µg/Kg	U <0.40	U <0.40	U <0.40	U <0.40	U <0.40	U <0.40	U <0.40	U <0.40		
Xylenes(total)	µg/Kg	U <0.70	U <0.70	U <0.70	U <0.70	U <0.70	U <0.70	U <070	U <070		
cis-1,3-Dichloropropylene	µg/Kg	U <0.20	U <0.20	U <0.20	U <0.20	U <0.20	U <0.20	U <0.20	U <0.20		
trans-1,3-Dichloropropylene	µg/Kg	U <0.30	U <0.30	U <0.30	U <0.30	U <0.30	U <0.30	U <0.30	U <0.30		
trans-1,4-Dichloro-2-butene	µg/Kg	U <0.50	U <0.50	U <0.50	U <0.50	U <0.50	U <0.50	U <0.50	U <0.50		
1, 2 -Dichlorobenzene	µg/Kg	U <0.50	U <0.50	U <0.50	U <0.50	U <0.50	U <0.50	U <0.50	U <0.50		
1, 3 -Dichlorobenzene	µg/Kg	U <0.40	U <0.40	U <0.40	U <0.40	U <0.40	U <0.40	U <0.40	U <0.40		
1, 4 -Dichlorobenzene	µg/Kg	U <0.60	U <0.60	U <0.60	U <0.60	U <0.60	U <0.60	U <0.60	U <0.60		
2-Chloroethylvinyl ether	µg/Kg	U <4.0	U <4.0	U <4.0	U <4.0	U <4.0	U <4.0	U <4.0	U <4.0		
Appendix IX Extractable Organics (Acid)											
2,3,4,6-Tetrachlorophenol	µg/Kg	U <286	U <286	U <280	U <280	U <284	U <281	U <284	U <284	Yes	No
2,4,5-Trichlorophenol	µg/Kg	U <153	U <153	U <150	U <150	U <152	U <150	U <152	U <152	Yes	No
2,4,6-Trichlorophenol	µg/Kg	U <153	U <153	U <150	U <150	U <152	U <150	U <152	U <152	Yes	No
2,4-Dichlorophenol	µg/Kg	U <176	U <176	U <172	U <172	U <175	U <173	U <175	U <175		
2,4-Dimethylphenol	µg/Kg	U <110	U <110	U <107	U <107	U <109	U <108	U <109	U <109		
2,4-Dinitrophenol	µg/Kg	U <365	U <366	U <358	U <358	U <363	U <360	U <363	U <363		
2,6-Dichlorophenol	µg/Kg	U <31	U <31	U <30	U <30	U <31	U <30	U <31	U <31		
2-Chlorophenol	µg/Kg	U <156	U <157	U <153	U <153	U <155	U <154	U <155	U <155		
2-Nitrophenol	µg/Kg	U <179	U <180	U <176	U <176	U <178	U <177	U <178	U <178		
2-methyl-4,6-Dinitrophenol	µg/Kg	U <100	U <100	U <98	U <98	U <99	U <98	U <100	U <100		
2-sec-Butyl-4,6,Dinitrophenol	µg/Kg	U <329	U <300	U <322	U <322	U <327	U <324	U <327	U <327		
4-Nitrophenol	µg/Kg	U <110	U <110	U <107	U <107	U <109	U <108	U <109	U <109		
4-chloro-3-methyl phenol	µg/Kg	U <126	U <127	U <124	U <124	U <125	U <124	U <125	U <125		
Hexachlorophene	µg/Kg	U <10700	U <10800	U <10500	U <10500	U <10700	U <10600	U <10700	U <10700		

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TABLE

v.2

Composite Sample No GEL Lab Number	Units	COMP.' 1 9907679-65	COMP.' 2 9907679-66	COMP.' 3 9907679-68	COMP.' 4 9907679-69	COMP.' 5 9907679-71	COMP.' 6 9907679-72	COMP.' 7 9907679-1	COMP.'8 9907679-2	Potential Constituent of Concern	Above Detection Limit
Appendix IX Extractable Organics, (Base/Neutral)											
Pentachlorophenol	µg/Kg	U <56	U <57	U <55	U <55	U <56	U <56	U <56	U <56		
Phenol	µg/Kg	U <120	U <120	U <117	U <117	U <119	U <118	U <119	U <119		
m,p-Cresol	µg/Kg	U <153	U <153	U <150	U <150	U <152	U <150	U <152	U <152		
o-Cresol	µg/Kg	U <63	U <63	U <62	U <62	U <63	U <62	U <63	U <63		
1,2,4,5-Tetrachlorobenzene	µg/Kg	U <186	U <186	U <182	U <182	U <185	U <183	U <185	U <185		
1,2,4-Trichlorobenzene	µg/Kg	U <186	U <186	U <182	U <182	U <185	U <183	U <185	U <185		
1,2-Dichlorobenzene	µg/Kg	U <169	U <170	U <166	U <166	U <168	U <167	U <168	U <168		
1,3-Dichlorobenzene	µg/Kg	U <129	U <130	U <127	U <127	U <129	U <128	U <129	U <129		
1,4-Dichlorobenzene	µg/Kg	U <129	U <130	U <127	U <127	U <129	U <128	U <129	U <129		
1,4-Dioxane	µg/Kg	U <61	U <61	U <60	U <60	U <60	U <60	U <60	U <60		
1,4-Naphthoquinone	µg/Kg	U <332	U <333	U <325	U <325	U <330	U <327	U <330	U <330		
1-Naphthylamine	µg/Kg	U <183	U <184	U <179	U <179	U <182	U <181	U <182	U <182		
2,4-Dinitrotoluene	µg/Kg	U <116	U <117	U <114	U <114	U <116	U <114	U <116	U <116		
2,6-Dinitrotoluene	µg/Kg	U <139	U <140	U <137	U <137	U <139	U <137	U <139	U <139		
2-Acetylaminofluorene	µg/Kg	U <332	U <333	U <325	U <325	U <330	U <327	U <330	U <330		
2-Chloronaphthalene	µg/Kg	U <173	U <173	U <169	U <169	U <172	U <170	U <172	U <172		
2-Methylnaphthalene	µg/Kg	U <203	U <203	U <198	U <198	U <201	U <199	U <201	U <201		
2-Naphthylamine	µg/Kg	U <319	U <320	U <312	U <312	U <317	U <314	U <317	U <317		
2-Picoline	µg/Kg	U <402	U <403	U <393	U <393	U <399	U <396	U <399	U <399		
3,3'-Dichlorobenzidine	µg/Kg	U <276	U <276	U <270	U <270	U <274	U <271	U <274	U <274		
3,3'-Dimethylbenzidine	µg/Kg	U <166	U <167	U <163	U <163	U <165	U <164	U <165	U <165		
3-Methylcholanthrene	µg/Kg	U <332	U <333	U <325	U <325	U <330	U <327	U <330	U <330		
4-Bromophenyl phenyl ether	µg/Kg	U <116	U <117	U <114	U <114	U <116	U <114	U <116	U <116		
4-Chloroaniline	µg/Kg	U <153	U <153	U <150	U <150	U <152	U <150	U <152	U <152		
4-Chlorophenyl phenyl ether	µg/Kg	U <146	U <147	U <143	U <143	U <145	U <144	U <145	U <145		
4-Aminobiphenyl	µg/Kg	U <22	U <22	U <21	U <21	U <22	U <21	U <22	U <22		
5-Nitro-o-toluidine	µg/Kg	U <196	U <196	U <192	U <192	U <195	U <193	U <195	U <195		
7,12-Dimethylbenz(a)anthracen	µg/Kg	U <315	U <316	U <309	U <309	U <314	U <311	U <314	U <314		
Acenaphthene	µg/Kg	U <159	U <160	U <156	U <156	U <158	U <157	U <158	U <158		
Acenaphthylene	µg/Kg	U <146	U <147	U <143	U <143	U <145	U <144	U <145	U <145		
Acetophenone	µg/Kg	U <126	U <127	U <124	U <124	U <125	U <124	U <125	U <125		
Aniline	µg/Kg	U <189	U <190	U <185	U <185	U <188	U <186	U <188	U <188		
Anthracene	µg/Kg	U <86	U <87	U <85	U <85	U <86	U <85	U <86	U <86		
Aramite	µg/Kg	U <276	U <276	U <270	U <270	U <274	U <271	U <274	U <274		
Benzo(a)anthracene	µg/Kg	U <66	U <67	U <65	U <65	U <66	U <65	U <66	U <66		
Benzo(a)pyrene	µg/Kg	U <73	U <73	U <72	U <72	U <73	U <72	U <73	U <73		
Benzo(b)fluoranthene	µg/Kg	U <143	U <143	U <140	U <140	U <142	U <141	U <142	U <142		

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TABLE [illegible] Rev.2

Composite Sample No GEL Lab Number	Units	COMP.' 1 9907679-65	COMP.' 2 9907679-66	COMP.' 3 9907679-68	COMP.' 4 9907679-69	COMP.' 5 9907679-71	COMP.' 6 9907679-72	COMP.' 7 9907679-1	COMP.'8 9907679-2	Potential Constituent of Concern	Above Detection Limit
Appendix IX Extractable Organics, (Base/Neutral) Continued											
Benzo(g,h,i)perylene	µg/Kg	U <80	U <80	U <78	U <78	U <79	U <79	U <79	U <79		
Benzo(k)fluoranthene	µg/Kg	U <133	U <133	U <130	U <130	U <132	U <131	U <132	U <132		
Benzyl alcohol	µg/Kg	U <186	U <186	U <182	U <182	U <185	U <483	U <185	U <185		
Butyl benzyl phthalate	µg/Kg	U <90	U <90	U <88	U <88	U <89	U <88	U <89	U <89		
Chlorobenzilate	µg/Kg	U <53	U <53	U <52	U <52	U <53	U <52	U <53	U <53		
Chrysene	µg/Kg	U <53	U <53	U <52	U <52	U <53	U <52	U <53	U <53		
Di-n-Butylphthalate	µg/Kg	U <73	U <73	U <72	U <72	U <73	U <72	U <73	U <73		
Di-n-Octyl phthalate	µg/Kg	U <173	U <173	U <169	U <169	U <172	U <170	U <172	U <172		
Diallate	µg/Kg	U <229	U <230	U <224	U <224	U <228	U <226	U <228	U <228		
Dibenzo(a,h)anthracene	µg/Kg	U <83	U <83	U <81	U <81	U <83	U <82	U <83	U <83		
Dibenzofuran	µg/Kg	U <133	U <133	U <130	U <130	U <132	U <131	U <132	U <132		
Diethyl phthalate	µg/Kg	U <76	U <77	U <75	U <75	U <76	U <75	U <76	U <76		
Dimethoate	µg/Kg	U <266	U <266	U <260	U <260	U <264	U <262	U <264	U <264		
Dimethyl phthalate	µg/Kg	U <110	U <110	U <107	U <107	U <109	U <108	U <109	U <109		
Diphenylamine	µg/Kg	U <286	U <286	U <280	U <280	U <284	U <281	U <284	U <284		
Disulfoton	µg/Kg	U <46	U <46	U <45	U <45	U <46	U <46	U <46	U <46		
Ethyl Methanesulfonate	µg/Kg	U <20	U <20	U <20	U <20	U <20	U <20	U <20	U <20		
Ethyl Methacrylate	µg/Kg	U <30	U <30	U <29	U <29	U <30	U <29	U <30	U <30		
Famphur	µg/Kg	U <53	U <53	U <52	U <52	U <53	U <52	U <53	U <53		
Fluoranthene	µg/Kg	U <66	U <67	U <65	U <65	U <66	U <65	U <66	U <66		
Fluorene	µg/Kg	U <113	U <113	U <111	U <111	U <112	U <111	U <112	U <112		
Hexachlorobenzene	µg/Kg	U <70	U <70	U <68	U <68	U <69	U <69	U <70	U <70		
Hexachlorobutadiene	µg/Kg	U <153	U <153	U <150	U <150	U <152	U <150	U <152	U <152		
Hexachlorocyclopentadiene	µg/Kg	U <193	U <193	U <189	U <189	U <191	U <190	U <191	U <191		
Hexachloroethane	µg/Kg	U <133	U <133	U <130	U <130	U <132	U <131	U <132	U <132		
Hexachloropropene	µg/Kg	U <21	U <21	U <21	U <21	U <21	U <21	U <21	U <21		
Indeno(1,2,3-c,d)pyrene	µg/Kg	U <80	U <80	U <78	U <78	U <79	U <79	U <79	U <79		
Isodrin	µg/Kg	U <146	U <147	U <143	U <143	U <145	U <144	U <145	U <145		
Isophorone	µg/Kg	U <146	U <147	U <143	U <143	U <145	U <144	U <145	U <145		
Isosafrole	µg/Kg	U <22	U <22	U <21	U <21	U <22	U <21	U <22	U <22		
Kepone	µg/Kg	U <97	U <98	U <95	U <95	U <97	U <96	U <97	U <97		
Methapyrilene	µg/Kg	U <159	U <160	U <156	U <156	U <158	U <157	U <158	U <158		
Methyl Methanesulfonate	µg/Kg	U <302	U <303	U <296	U <296	U <300	U <298	U <300	U <300		
N-Nitrosodi-n-butylamine	µg/Kg	U <23	U <23	U <22	U <22	U <23	U <23	U <23	U <23		
N-Nitrosodiethylamine	µg/Kg	U <21	U <21	U <20	U <20	U <21	U <20	U <21	U <21		
N-Nitrosodimethylamine	µg/Kg	U <10	U <10	U <10	U <10	U <10	U <10	U <10	U <10		

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TABLE ...ev.2

Composite Sample No GEL Lab Number	Units	COMP.' 1 9907679-65	COMP.' 2 9907679-66	COMP.' 3 9907679-68	COMP.' 4 9907679-69	COMP.' 5 9907679-71	COMP.' 6 9907679-72	COMP.' 7 9907679-1	COMP.'8 9907679-2	Potential Constituent of Concern	Above Detection Limit
Appendix IX Extractable Organics, (Base/Neutral) Continued											
N-Nitrosodiphenylamine	µg/Kg	U <116	U <117	U <114	U <114	U <116	U <114	U <116	U <116		
N-Nitrosodipropylamine	µg/Kg	U <129	U <130	U <127	U <127	U <129	U <128	U <129	U <129		
N-Nitrosomethylethylamine	µg/Kg	U <73	U <73	U <71	U <71	U <72	U <72	U <72	U <72		
N-Nitrosomorpholine	µg/Kg	U <25	U <25	U <24	U <24	U <24	U <24	U <24	U <24		
N-Nitrosopiperidine	µg/Kg	U <219	U <220	U <215	U <215	U <218	U <216	U <218	U <218		
N-Nitrosopyrrolidine	µg/Kg	U <22	U <22	U <22	U <22	U <22	U <22	U <22	U <22		
Naphthalene	µg/Kg	U <156	U <157	U <153	U <153	U <155	U <154	U <155	U <155		
Nitrobenzene	µg/Kg	U <133	U <133	U <130	U <130	U <132	U <131	U <132	U <132		
O,O,O-Triehtylphosporothioate	µg/Kg	U <232	U <233	U <228	U <228	U <231	U <229	U <231	U <231		
Parathion	µg/Kg	U <166	U <167	U <163	U <163	U <165	U <164	U <165	<165		
Parathion, methyl	µg/Kg	U <266	U <266	U <260	U <260	U <264	U <262	U <264	<264		
Pentachlorobenzene	µg/Kg	U <27	U <27	U <26	U <26	U <26	U <26	U <26	U <26		
Pentachloroethane	µg/Kg	U <45	U <45	U <44	U <44	U <44	U <44	U <44	U <44		
Pentachloronitrobenzene	µg/Kg	U <232	U <233	U <228	U <228	U <231	U <229	U <231	U <231		
Phenacetin	µg/Kg	U <193	U <193	U <189	U <189	U <191	U <190	U <191	U <191		
Phenanthrene	µg/Kg	U <60	U <60	U <59	U <59	U <59	U <59	U <59	U <59		
Phorate	µg/Kg	U <292	U <293	U <286	U <286	U <290	U <288	U <290	U <290		
Pronamide	µg/Kg	U <216	U <216	U <211	U <211	U <215	U <213	U <215	U <215		
Pyrene	µg/Kg	U <73	U <73	U <72	U <72	U <73	U <72	U <73	U <73		
Pyridine	µg/Kg	U <129	U <130	U <127	U <127	U <129	U <128	U <129	U <129		
Safrole	µg/Kg	U <18	U <18	U <17	U <17	U <18	U <17	U <18	U <18		
Sulfotepp	µg/Kg	U <43	U <43	U <42	U <42	U <43	U <43	U <43	U <43		
Thionazin	µg/Kg	U <226	U <226	U <221	U <221	U <224	U <222	U <224	U <224		
a,a-Dimethylphenethylamine	µg/Kg	U <106	U <106	U <103	U <103	U <105	U <104	U <105	U <105		
bis(2-chloroethoxy)methane	µg/Kg	U <169	U <170	U <166	U <166	U <168	U <167	U <168	U <168		
bis(2-Chloroethyl)ether	µg/Kg	U <149	U <150	U <146	U <146	U <149	U <147	U <149	U <149		
bis(2-Chloroisopropyl)ether	µg/Kg	U <103	U <103	U <101	U <101	U <102	U <101	U <102	U <102		
bis(2-Ethylhexyl)phthalate	µg/Kg	U <299	U <300	U <293	U <293	U <297	U <294	U <297	U <297		
m-Dinitrobenzene	µg/Kg	U <30	U <30	U <29	U <29	U <29	U <29	U <29	U <29		
m-Nitroaniline	µg/Kg	U <83	U <83	U <81	U <81	U <83	U <82	U <83	U <83		
o-Nitroaniline	µg/Kg	U <66	U <67	U <65	U <65	U <66	U <65	U <66	U <66		
o-Toluidine	µg/Kg	U <279	U <280	U <273	U <273	U <277	U <275	U <277	U <277		
p-Dimethylaminoazobenzene	µg/Kg	U <209	U <210	U <205	U <205	U <208	U <206	U <208	U <208		
p-Nitroaniline	µg/Kg	U <103	U <103	U <101	U <101	U <102	U <101	U <102	U <102		
p-Phenylenediamine	µg/Kg	U <504	U <505	U <493	U <493	U <501	U <496	U <501	U <501		
sym-Trinitrobenzene	µg/Kg	U <23	U <23	U <23	U <23	U <23	U <23	U <23	U <23		

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TABLI

Composite Sample No GEL Lab Number	Units	COMP.' 1 9907679-65	COMP.' 2 9907679-66	COMP.' 3 9907679-68	COMP.' 4 9907679-69	COMP.' 5 9907679-71	COMP.' 6 9907679-72	COMP.' 7 9907679-1	COMP.'8 9907679-2	Potential Constituent of Concern	Above Detection Limit
Appendix IX Herbicides											
2,4,5-T	µg/Kg	U <0.86	U <0.86	U <0.86	U <0.86	U <0.86	U <0.86	U <0.86	U <0.86	Yes	No
2,4,5-TP	µg/Kg	U <0.99	U <0.99	U <0.99	U <0.99	U <0.99	U <0.99	U <0.99	U <0.99	Yes	No
2,4-D	µg/Kg	U <1.46	U <1.46	U <1.46	U <0.20	U <1.46	U <1.46	U <1.46	U <1.46	Yes	No
Appendix IX PCBs											
PCB-1016	µg/Kg	U <1.22	U <1.22	U <1.22	U <1.22	U <1.22	U <1.22	U <1.22	U <1.22		
PCB-1221	µg/Kg	U <2.82	U <2.82	U <2.82	U <2.82	U <2.82	U <2.82	U <2.82	U <2.82		
PCB-1232	µg/Kg	U <1.63	U <1.63	U <1.63	U <1.63	U <1.63	U <1.63	U <1.63	U <1.63		
PCB-1242	µg/Kg	U <1.67	U <1.67	U <1.67	U <1.67	U <1.67	U <1.67	U <1.67	U <1.67		
PCB-1248	µg/Kg	U <0.91	U <0.91	U <0.91	U <0.91	U <0.91	U <0.91	U <0.91	U <0.91		
PCB-1254	µg/Kg	U <1.16	U <1.16	U <1.16	U <1.16	U <1.16	U <1.16	U <1.16	U <1.16		
PCB-1260	µg/Kg	U <0.94	U <0.94	U <0.94	U <0.94	U <0.94	U <0.94	U <0.94	U <0.94		
Appendix IX PESTICIDES											
4,4'-DDD	µg/Kg	U <0.58	U <0.59	U <0.60	U <0.59	U <0.58	U <0.60	U <0.60	U <0.60		
4,4'-DDE	µg/Kg	U <0.54	U <0.55	U <0.56	U <0.55	U <0.54	U <0.56	U <0.55	U <0.55		
4,4'-DDT	µg/Kg	U <0.78	U <0.80	U <0.81	U <0.80	U <0.79	U <0.81	U <0.80	U <0.80		
Aldrin	µg/Kg	U <0.26	U <0.26	U <0.26	U <0.26	U <0.26	U <0.26	U <0.26	U <0.26		
Chlordane	µg/Kg	U <4.80	U <4.92	U <4.94	U <4.92	U <4.82	U <4.94	U <4.88	U <4.88		
Dieldrin	µg/Kg	U <0.72	U <0.74	U <0.74	U <0.74	U >0.73	U <0.74	U <0.73	U <0.73		
Endosulfan I	µg/Kg	U <0.45	U <0.46	U <0.46	U <0.46	U <0.45	U <0.46	U <0.45	U <0.45		
Endosulfan II	µg/Kg	U <0.67	U <0.69	U <0.69	U <0.69	U <0.67	U <0.69	U <0.68	U <0.68		
Endosulfan sulfate	µg/Kg	U <0.90	U <0.92	U <0.92	U <0.92	U <0.90	U <0.92	U <0.91	U <0.91		
Endrin	µg/Kg	U <0.67	U <0.69	U <0.69	U <0.69	U <0.67	U <0.69	U <0.68	U <0.68		
Endrin aldehyde	µg/Kg	U <0.98	U <1.00	U <1.01	U <1.00	U <0.98	U <1.01	U <0.99	U <0.99		
Heptachlor	µg/Kg	U <0.43	U <0.44	U <0.44	U <0.44	U <0.43	U <0.44	U <0.43	U <0.43		
Heptachlor epoxide	µg/Kg	U <0.21	U <0.22	U <0.22	U <0.22	U <0.22	U <0.22	U <0.22	U <0.22		
Methoxychlor	µg/Kg	U <3.50	U <3.58	U <3.59	U <3.58	U <3.51	U <3.59	U <3.55	U <3.55		
Toxaphene	µg/Kg	U <11	U <11	U <11	U <11	U <11	U <11	U <11	U <11		
alpha -BHC	µg/Kg	U <0.26	U <0.27	U <0.27	U <0.27	U <0.26	U <0.27	U <0.26	U <0.26		
beta-BHC	µg/Kg	U <0.38	U <0.39	U <0.39	U <0.39	U <0.38	U <0.39	U <0.39	U <0.39		
delta-BHC	µg/Kg	U <0.28	U <0.29	U <0.29	U <0.29	U <0.28	U <0.29	U <0.28	U <0.28		
gamma-BHC	µg/Kg	U <0.34	U <0.35	U <0.35	U <0.35	U <0.35	U <0.35	U <0.35	U <0.35		

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TABLE [illegible]

Composite Sample No / GEL Lab Number	Units	COMP.' 1 9907679-65	COMP.' 2 9907679-66	COMP.' 3 9907679-68	COMP.' 4 9907679-69	COMP.' 5 9907679-71	COMP.' 6 9907679-72	COMP.' 7 9907679-1	COMP.'8 9907679-2	Potential Constituent of Concern	Above Detection Limit
F-001 Through F-005 Waste Constituents, Not Included Above											
Ethyl Acetate	µg/Kg	U <1980	U <1760	U <1820	U <2000	U <2020	U <1950	U <1880	U <1880		
Ethyl Ether	µg/Kg	U <3960	U <3530	U <640	U <4000	U <4040	U <3910	U <3750	U <3750		
Methyl Alcohol	µg/Kg	U <3960	U <3530	U <3640	U <4000	U m4040	U <3910	U <3750	U <3750		
n-Butyl Alcohol	µg/Kg	U <3960	U <3530	U <3640	U <4000	U <4040	U <3910	U <3750	U <3750		
Ethylene Glycol Monoethylether	µg/Kg	U <990	U <882	U <909	U <1000	U <1010	U <977	U <938	U <938		
Trichlorotrifluoroethane	µg/Kg	U <10	U <10	U <10	U <10	U <10	U <10	U <10	U <10		
2-Nitropropane	µg/Kg	U <3.30	U <3.30	U <3.30	U <3.30	U <3.30	U <3.30	U <3.30	U <3.30		
Appendix IX CHLORINATED DIBENZO-p-DIOXINS and DIBENZOFURANS								Drum 2826 Batch 44 W-082	Drum 2840 Batch 45 "Turnover"		
1,2,3,4,6,7,8-HeptachloroDioxin	µg/Kg							U <0.34	U <0.35	Yes	No
1,2,3,4,6,7,8-HeptachloroFuran	µg/Kg							U <0.45	U <0.46	Yes	No
1,2,3,4,7,8-HextachloroDioxin	µg/Kg							U <0.31	U <0.31	Yes	No
1,2,3,4,7,8-HexachloroFuran	µg/Kg							U <0.28	U <0.28	Yes	No
1,2,3,7,8-PentachloroDioxin	µg/Kg							U <0.30	U <0.30	Yes	No
1,2,3,7,8-PentachloroFuran	µg/Kg							U <0.27	U <0.27	Yes	No
2,3,7,8-TetrachloroDioxin	µg/Kg							U <0.14	U <0.14	Yes	No
2,3,7,8-TetrachloroFuran	µg/Kg							U <0.28	U <0.28	Yes	No
OctachloroDibenzoDioxin	µg/Kg							U <0.19	U <0.19	Yes	No
OctachloroDibenzoFuran	µg/Kg							U <0.40	U <0.40	Yes	No

U : Analyte was not detected at a concentration higher than the detection limit

J : Analyte was detected at a concentration less than the reporting limit but greater than the detection limit.

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Composite Sample No GEL Lab Number	Units	TCLP-1 9907679-03	TCLP-2 9907679-05	TCLP-3 9907679-17	TCLP-4 9907679-19	TCLP-5 9907679-21	TCLP-6 9907679-23	TCLP-7 9907679-25	TCLP-8 9907679-27
METALS									
Silver	mg/Kg	4.6	6.8	14.2	10.3	8.0	7.5	6.1	5.5
Aluminum	mg/Kg	65,800	54,000	62,300	65,100	64,400	66,200	69,800	71,800
Arsenic	mg/Kg	3.17	5.82	5.52	3.60	2.72	U <2.2	U <2.2	U <2.12
Boron	mg/Kg	40,700	38,800	35,000	32,400	33,000	38,100	38,800	33,700
Barium	mg/Kg	110	281	143	135	136	130	119	128
Berylium	mg/Kg	J 0.94	2.63	J 0.94	J 0.89	J 0.91	J 0.91	J 0.83	J 0.84
Calcium	mg/Kg	2,960	2,690	2,690	3,060	3,620	2,500	2,230	2,260
Cadmium	mg/Kg	J 0.75	J 0.69	J 1.30	J 0.79	J 0.38	J 0.57	J 0.42	J 0.40
Cobalt	mg/Kg	6.73	55.3	24	110	9	9.7	9.85	13.7
Chromium	mg/Kg	1600	311	480	202	189	202	163	162
Copper	mg/Kg	34	77	76	46	40	40	48	75
Iron	mg/Kg	5,040	15,300	26,300	27,400	27,500	19,500	16,500	17,300
Potassium	mg/Kg	15900	10,600	8,570	11,800	13,400	13,100	12,900	13,100
Magnesium	mg/Kg	860	7,610	6,120	5,350	5,240	5,040	4,980	4,830
Manganese	mg/Kg	238	310	390	457	500	391	353	379
Molydenum	mg/Kg	J 3.6	J 1.9	J 4.1	J 3.7	J 3.2	J 3.3	J 2.6	J 2.5
Sodium	mg/Kg	156,000	109,000	118,000	109,000	112,000	111,000	119,000	118,000
Nickel	mg/Kg	2,330	4,250	6,460	4,470	3,970	6,000	4,390	6,040
Lead	mg/Kg	44	48	88	72	68	68	79	107
Antimony	mg/Kg	U <1.85	U <1.81	U <1.87	U <1.91	U <1.78	U <1.85	U <1.87	U <1.78
Selenium	mg/Kg	U <1.31	U <1.29	U <1.32	U <1.35	U <1.26	U <1.31	U <1.32	U <1.26
Silicon	mg/Kg	4,550	5,080	3,170	1,220	5,540	3,930	4,560	3,090
Tin	mg/Kg	23.3	7.7	13.5	20	23.4	23.7	17.9	15.1
Strontium	mg/Kg	13.2	40.3	34.6	30.5	29.5	23.9	19.1	21
Titanium	mg/Kg	194	240	383	311	317	317	244	242
Thalium	mg/Kg	U <0.16	U <2.10	U <2.16	U <2.21	U <2.06	U <2.14	U <2.16	U <2.06
Uranium	mg/Kg	14,300	22,300	46,700	34,400	27,300	26,100	22,000	18,900
Vanadium	mg/Kg	20.1	24.9	44	35	29	27.9	22.4	22.6
Zinc	mg/Kg	163	19,900	20,200	28,500	19,700	21,300	20,100	20,200
General Chemistry									
Bromide	mg/Kg	U <0.16	U <0.16	U <0.14	U <0.15	U <0.17	U <0.16	U <0.15	U <0.15
Chloride	mg/Kg	U <0.19	U <0.19	U <0.17	U <0.18	U <0.20	U <0.19	U <0.17	U <0.18
Fluoride	mg/Kg	U <0.23	U <0.23	U <0.20	U <0.22	U <0.24	U <0.23	U <0.21	U <0.22
Nitrate (NO3)	mg/Kg	U <0.13	U <0.13	U <0.12	U <0.13	U <0.14	U <0.14	U <0.12	U <0.13
Ammonia	mg/Kg	U <0.24	U <0.24	U <0.24	U <0.24	U <0.24	U <0.24	U <0.24	U <0.24
Trichlorotrifluoroethane (FREON)	µg/Kg	U <10	U <10	U <10	U <9.6	U <9.9	U <9.9	U <10	U <9.9

Other F001, F002, F003, F004, and F005 Waste Constituents

All less than analytical detection limit, except for Methylene Chloride

U : Analyte was not detected at a concentration higher than the detection limit

J : Analyte was detected at a concentration less than the reporting limit but greater than the detection limit.

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Composite Sample No GEL Lab Number	Units	TCLP-9 9907679-39	TCLP10 9907679-41	TCLP11 9907679-43	TCLP-12 9907679-45	TCLP-13 9907679-47	TCLP-14 9907679-49	TCLP-15 9907679-51	TCLP-16 9907679-63
METALS									
Silver	mg/Kg	6.1	6.0	9.7	9.3	10.8	12.1	10.8	J 1.8
Aluminum	mg/Kg	70,600	57,500	53,000	49,400	56,100	63,800	68,900	54,000
Arsenic	mg/Kg	U <2.12	U <2.15	2.58	2.63	J 2.33	U <2.2	U <2.2	U <2.23
Boron	mg/Kg	37,500	31,600	33,400	29,800	31,800	32,500	32,800	30,600
Barium	mg/Kg	121	98	93	84	85	99	101	104
Berylium	mg/Kg	J 0.87	J 0.69	J 0.62	J 0.53	J 0.56	J 0.65	J 0.62	J 0.99
Calcium	mg/Kg	21,800	1,760	1,770	1,540	1,750	2,160	2,120	3,190
Cadmium	mg/Kg	J 1.18	J 1.27	J 1.51	J 0.61	J 1.03	J 1.72	J 1.83	J 0.58
Cobalt	mg/Kg	16.7	15.4	24.7	10.9	12.7	20.4	20.3	4.49
Chromium	mg/Kg	174	149	238	240	332	344	385	505
Copper	mg/Kg	87	76	83	42	43	67	69	67
Iron	mg/Kg	14,800	14,700	21,500	24,700	27,500	26,800	24,600	20,000
Potassium	mg/Kg	11900	10,200	6,820	6,580	5,520	5,620	5,920	7,540
Magnesium	mg/Kg	4,950	4,500	4,900	4,800	5,150	5,490	5,510	5,140
Manganese	mg/Kg	332	301	368	408	388	348	323	3040
Molydenum	mg/Kg	J 3.8	J 3.0	J 3.1	J 3.6	J 3.3	J 3.8	J 3.3	J 3.5
Sodium	mg/Kg	134,000	118,000	119,000	107,000	108,000	117,000	114,000	95,200
Nickel	mg/Kg	7,010	6,360	10,600	5,210	6,200	9,370	9,540	1,520
Lead	mg/Kg	12	101	103	65	72	97	90	40
Antimony	mg/Kg	U <0.178	U <1.81	U <1.87	U <1.83	U <1.87	U <1.87	U <1.83	U <1.87
Selenium	mg/Kg	U <0.126	U <1.27	U <1.32	U <1.30	U <1.32	U <1.32	U <1.30	U <1.32
Silicon	mg/Kg	2,420	1,420	7,340	6,110	8,120	3,490	6,380	5,900
Tin	mg/Kg	14.5	10.8	7.86	23.8	6.3	6.0	8.7	9.6
Strontium	mg/Kg	20.4	18	25.2	22.8	25.1	29.1	28.4	30.1
Titanium	mg/Kg	285	190	308	236	288	413	431	726
Thalium	mg/Kg	U <2.06	U <2.08	U <2.16	U <2.21	U <2.16	U <2.16	U <2.12	U <2.16
Uranium	mg/Kg	20,800	21,600	34,300	33,000	38,900	41,300	34,100	3,860
Vanadium	mg/Kg	25.9	21.8	34.3	25.6	34.9	46.1	43.3	19.6
Zinc	mg/Kg	17700	16,600	20,300	19,100	20,900	21,300	20,900	19,800
General Chemistry									
Bromide	mg/Kg	U <0.16	U <0.14	U <0.15	U <0.14	U <0.15	U <0.14	U <0.14	U <0.15
Chloride	mg/Kg	U <0.19	U <0.17	U <0.18	U <0.17	U <0.18	U <0.17	U <0.17	U <0.18
Fluoride	mg/Kg	U <0.23	U <0.20	U <0.22	U <0.20	U <0.22	U <0.21	U <0.21	U <0.22
Nitrate (NO3)	mg/Kg	U <0.14	U <0.12	U <0.13	U <0.12	U <0.13	U <0.12	U <0.12	U <0.13
Ammonia	mg/Kg	U <0.24	U <0.24	U <0.24	U <0.24	U <0.24	U <0.24	U <0.24	U <0.24
Trichlorotrifluoroethane (FREON)	µg/Kg	U <10	U <10	U <10	U <9.96	U <9.96	U <10	U <9.98	U <10.0

Other F001, F002, F003, F004, and F005 Waste Constituents

All less than analytical detection limit, except for Methylene Chloride

U : Analyte was not detected at a concentration higher than the detection limit

J : Analyte was detected at a concentration less than the reporting limit but greater than the detection limit.

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Hazardous Waste Code	Waste Sample Number / GEL Lab Number	Units	TCLP-1 9907679-04	TCLP-2 9907679-06	TCLP-3 9907679-18	TCLP-4 9907679-20	TCLP-5 9907679-22	TCLP-6 9907679-24	TCLP-7 9907679-26	TCLP-8 9907679-28	Delisting Limit
D009	Mercury	mg/L	U <0.00035	U <0.00035	U <0.00035	U <0.00035	U <0.00035	U <0.00035	U <0.00035	U <0.00035	-
D011	Silver	mg/L	J 0.010	J 0.009	J 0.012	J 0.011	J 0.010	J 0.014	J 0.019	J 0.012	20
D004	Arsenic	mg/L	U <0.045	U <0.045	U <0.045	U <0.045	U <0.045	U <0.045	U <0.045	U <0.045	5
D005	Barium	mg/L	J 0.018	J 0.027	J 0.012	J 0.0098	J 0.008	J 0.013	J 0.0087	J 0.011	200
D006	Cadmium	mg/L	U <0.0044	U <0.0044	U <0.0044	U <0.0044	U <0.0044	U <0.0044	U <0.0044	U <0.0044	0.5
D007	Chromium	mg/L	J 0.18	J 0.015	J 0.013	J 0.0065	U <0.0056	J 0.0071	J 0.0096	U <0.0056	10
D008	Lead	mg/L	U <0.016	U <0.016	U <0.016	U <0.016	U <0.016	U <0.016	U <0.016	U <0.016	1.5
D010	Selenium	mg/L	U <0.027	U <0.027	U <0.027	U <0.027	U <0.027	U <0.027	U <0.027	U <0.027	-
NA	Nickel*	mg/L	0.321	0.353	0.358	0.191	0.200	0.413	0.213	0.372	10
NA	Beryllium*	mg/L	U <0.00052	U <0.00052	U <0.00052	U <0.00052	U <0.00052	U <0.00052	U <0.00052	J 0.00081	0.4
NA	Ammonia*	mg/L	U <0.024	U <0.024	U <0.024	U <0.024	U <0.024	U <0.024	U <0.024	U <0.024	-
D029	1,1-Dichloroethylene	mg/L	U <0.007	U <0.007	U <0.007	U <0.007	U <0.007	U <0.007	U <0.007	U <0.007	-
D028	1,2-Dichloroethane	mg/L	U <0.002	U <0.002	U <0.002	U <0.002	U <0.002	U <0.002	U <0.002	U <0.002	-
D027	1,4-Dichlorobenzene	mg/L	U <0.003	U <0.003	U <0.003	U <0.003	U <0.003	U <0.003	U <0.003	U <0.003	-
D035	2-Butanone (MEK)	mg/L	U <0.059	U <0.059	U <0.059	U <0.059	U <0.059	U <0.059	U <0.059	U <0.059	-
D018	Benzene	mg/L	U <0.003	U <0.003	U <0.003	U <0.003	U <0.003	U <0.003	U <0.003	U <0.003	-
D019	Carbon Tetrachloride	mg/L	U <0.002	U <0.002	U <0.002	U <0.002	U <0.002	U <0.002	U <0.002	U <0.002	-
D021	Chlorobenzene	mg/L	U <0.003	U <0.003	U <0.003	U <0.003	U <0.003	U <0.003	U <0.003	U <0.003	-
D022	Chloroform	mg/L	U <0.007	U <0.007	U <0.007	U <0.007	U <0.007	U <0.007	U <0.007	U <0.007	-
D039	Tetrachloroethylene	mg/L	U <0.007	U <0.007	U <0.007	U <0.007	U <0.007	U <0.007	U <0.007	U <0.007	-
D040	Trichloroethylene	mg/L	U <0.006	U <0.006	U <0.006	U <0.006	U <0.006	U <0.006	U <0.006	U <0.006	-
D043	Vinyl Chloride	mg/L	U <0.004	U <0.004	U <0.004	U <0.004	U <0.004	U <0.004	U <0.004	U <0.004	-
D041	2,4,5-Trichlorophenol	mg/L	U <0.013	U <0.013	U <0.013	U <0.013	U <0.013	U <0.013	U <0.013	U <0.013	-
D042	2,4,6-Trichlorophenol	mg/L	U <0.0048	U <0.0048	U <0.0048	U <0.0048	U <0.0048	U <0.0048	U <0.0048	U <0.0048	-
D030	2,4-Dinitrotoluene	mg/L	U <0.007	U <0.007	U <0.007	U <0.007	U <0.007	U <0.007	U <0.007	U <0.007	-
D032	Hexachlorobenzene	mg/L	U <0.015	U <0.015	U <0.015	U <0.015	U <0.015	U <0.015	U <0.015	U <0.015	-
D033	Hexachlorobutadiene	mg/L	U <0.019	U <0.019	U <0.019	U <0.019	U <0.019	U <0.019	U <0.019	U <0.019	-
D034	Hexachloroethane	mg/L	U <0.017	U <0.017	U <0.017	U <0.017	U <0.017	U <0.017	U <0.017	U <0.017	-
D036	Nitrobenzene	mg/L	U <0.017	U <0.017	U <0.017	U <0.017	U <0.017	U <0.017	U <0.017	U <0.017	-
D037	Pentachlorophenol	mg/L	U <0.014	U <0.014	U <0.014	U <0.014	U <0.014	U <0.014	U <0.014	U <0.014	-
D038	Pyridine	mg/L	U <0.017	U <0.017	U <0.017	U <0.017	U <0.017	U <0.017	U <0.017	U <0.017	-
D024/25	m,p-Cresol	mg/L	U <0.009	U <0.009	U <0.009	U <0.009	U <0.009	U <0.009	U <0.009	U <0.009	-
D023	o-Cresol	mg/L	U <0.011	U <0.011	U <0.011	U <0.011	U <0.011	U <0.011	U <0.011	U <0.011	-
D017	2,4,5-TP	mg/L	U <0.009	U <0.009	U <0.009	U <0.009	U <0.009	U <0.009	U <0.009	U <0.009	-
D016	2,4-D	mg/L	U <0.009	U <0.009	U <0.009	U <0.009	U <0.009	U <0.009	U <0.009	U <0.009	-
D020	Chlordane	mg/L	U <0.007	U <0.007	U <0.007	U <0.007	U <0.007	U <0.007	U <0.007	U <0.007	-
D012	Endrin	mg/L	U <0.0004	U <0.0004	U <0.0004	U <0.0004	U <0.0004	U <0.0004	U <0.0004	U <0.0004	-
D031	Heptachlor	mg/L	U <0.007	U <0.007	U <0.007	U <0.007	U <0.007	U <0.007	U <0.007	U <0.007	-
D031	Heptachlor & Hep. Epoxide	mg/L	U <0.00052	U <0.00052	U <0.00052	U <0.00052	U <0.00052	U <0.00052	U <0.00052	U <0.00052	-
D031	Heptachlor Epoxide	mg/L	U <0.005	U <0.005	U <0.005	U <0.005	U <0.005	U <0.005	U <0.005	U <0.005	-
D014	Methoxychlor	mg/L	U <0.0023	U <0.0023	U <0.0023	U <0.0023	U <0.0023	U <0.0023	U <0.0023	U <0.0023	-
D015	Toxaphene	mg/L	U <0.013	U <0.013	U <0.013	U <0.013	U <0.013	U <0.013	U <0.013	U <0.013	-
D013	gamma-BHC (Lindane)	mg/L	U <0.00019	U <0.00019	U <0.00019	U <0.00019	U <0.00019	U <0.00019	U <0.00019	U <0.00019	-
NA	Trichlorotrifluoroethane	mg/L	U <0.011	U <0.011	U <0.011	U <0.011	U <0.011	U <0.011	U <0.011	U <0.011	-

*Note; TCLP analyses for nickel, beryllium, and ammonia were conducted under GEL Log numbers 9908434-1 through 18

U : Analyte was not detected at a concentration higher than the detection limit

J : Analyte was detected at a concentration less than the reporting limit but greater than the detection limit.

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Ha... Waste Code	Work Sample Number / GEL Lab Number	Units	TCLP -9 9907679-40	TCLP -10 9907679-42	TCLP -11 9907679-44	TCLP -12 9907679-46	TCLP -13 9907679-48	TCLP -14 9907679-50	TCLP -15 9907679-52	TCLP -16 9907679-64	Delisting Limit
D009	Mercury	mg/L	U <0.00035	U <0.00035	U <0.00035	U <0.00035	U <0.00035	U <0.00035	U <0.00035	U <0.00035	-
D011	Silver	mg/L	J 0.013	J 0.015	J 0.019	J 0.013	J 0.017	J 0.016	J 0.014	J 0.017	20
D004	Arsenic	mg/L	U <0.045	U <0.045	U <0.045	U <0.045	U <0.045	U <0.045	U <0.045	U <0.045	5
D005	Barium	mg/L	J 0.009	J 0.0089	J 0.0051	J 0.0096	J 0.0066	J 0.0083	J 0.0097	J 0.0082	200
D006	Cadmium	mg/L	U <0.0044	U <0.0044	U <0.0044	U <0.0044	U <0.0044	U <0.0044	U <0.0044	U <0.0044	0.5
D007	Chromium	mg/L	U <0.0056	J 0.0062	J 0.0123	J 0.010	U <0.0056	J 0.0096	J 0.0124	J 0.015	10
D008	Lead	mg/L	U <0.016	U <0.016	U <0.016	U <0.016	U <0.016	U <0.016	U <0.016	U <0.016	1.5
D010	Selenium	mg/L	U <0.027	U <0.027	U <0.027	U <0.027	U <0.027	U <0.027	U <0.027	U <0.027	-
NA	Nickel*	mg/L	0.367	0.347	0.622	0.339	0.281	NA	0.458	0.072	10
NA	Beryllium*	mg/L	U <0.00052	U <0.00052	U <0.00052	U <0.00052	U <0.00052	NA	U <0.00052	J 0.00081	0.4
NA	Ammonia*	mg/L	U <0.024	U <0.024	U <0.024	U <0.024	U <0.024	NA	U <0.024	U <0.024	-
D029	1,1-Dichloroethylene	mg/L	U <0.007	U <0.007	U <0.007	U <0.007	U <0.007	U <0.007	U <0.007	U <0.007	-
D028	1,2-Dichloroethane	mg/L	U <0.002	U <0.002	U <0.002	U <0.002	U <0.002	U <0.002	U <0.002	U <0.002	-
D027	1,4-Dichlorobenzene	mg/L	U <0.003	U <0.003	U <0.003	U <0.003	U <0.003	U <0.003	U <0.003	U <0.003	-
D035	2-Butanone (MEK)	mg/L	U <0.059	U <0.059	U <0.059	U <0.059	U <0.059	U <0.059	U <0.059	U <0.059	-
D018	Benzene	mg/L	U <0.003	U <0.003	U <0.003	U <0.003	U <0.003	U <0.003	U <0.003	U <0.003	-
D019	Carbon Tetrachloride	mg/L	U <0.002	U <0.002	U <0.002	U <0.002	U <0.002	U <0.002	U <0.002	U <0.002	-
D021	Chlorobenzene	mg/L	U <0.003	U <0.003	U <0.003	U <0.003	U <0.003	U <0.003	U <0.003	U <0.003	-
D022	Chloroform	mg/L	U <0.007	U <0.007	U <0.007	U <0.007	U <0.007	U <0.007	U <0.007	U <0.007	-
D039	Tetrachloroethylene	mg/L	U <0.007	U <0.007	U <0.007	U <0.007	U <0.007	U <0.007	U <0.007	U <0.007	-
D040	Trichloroethylene	mg/L	U <0.006	U <0.006	U <0.006	U <0.006	U <0.006	U <0.006	U <0.006	U <0.006	-
D043	Vinyl Chloride	mg/L	U <0.004	U <0.004	U <0.004	U <0.004	U <0.004	U <0.004	U <0.004	U <0.004	-
D041	2,4,5-Trichlorophenol	mg/L	U <0.013	U <0.013	U <0.013	U <0.013	U <0.013	U <0.013	U <0.013	U <0.013	-
D042	2,4,6-Trichlorophenol	mg/L	U <0.0048	U <0.0048	U <0.0048	U <0.0048	U <0.0048	U <0.0048	U <0.0048	U <0.0048	-
D030	2,4-Dinitrotoluene	mg/L	U <0.007	U <0.007	U <0.007	U <0.007	U <0.007	U <0.007	U <0.007	U <0.007	-
D032	Hexachlorobenzene	mg/L	U <0.015	U <0.015	U <0.015	U <0.015	U <0.015	U <0.015	U <0.015	U <0.015	-
D033	Hexachlorobutadiene	mg/L	U <0.019	U <0.019	U <0.019	U <0.019	U <0.019	U <0.019	U <0.019	U <0.019	-
D034	Hexachloroethane	mg/L	U <0.017	U <0.017	U <0.017	U <0.017	U <0.017	U <0.017	U <0.017	U <0.017	-
D036	Nitrobenzene	mg/L	U <0.017	U <0.017	U <0.017	U <0.017	U <0.017	U <0.017	U <0.017	U <0.017	-
D037	Pentachlorophenol	mg/L	U <0.014	U <0.014	U <0.014	U <0.014	U <0.014	U <0.014	U <0.014	U <0.014	-
D038	Pyridine	mg/L	U <0.017	U <0.017	U <0.017	U <0.017	U <0.017	U <0.017	U <0.017	U <0.017	-
D024/25	m,p-Cresol	mg/L	U <0.009	U <0.009	U <0.009	U <0.009	U <0.009	U <0.009	U <0.009	U <0.009	-
D023	o-Cresol	mg/L	U <0.011	U <0.011	U <0.011	U <0.011	U <0.011	U <0.011	U <0.011	U <0.011	-
D017	2,4,5-TP	mg/L	U <0.009	U <0.009	U <0.009	U <0.009	U <0.009	U <0.009	U <0.009	U <0.009	-
D016	2,4-D	mg/L	U <0.009	U <0.009	U <0.009	U <0.009	U <0.009	U <0.009	U <0.009	U <0.009	-
D020	Chlordane	mg/L	U <0.007	U <0.007	U <0.007	U <0.007	U <0.007	U <0.007	U <0.007	U <0.007	-
D012	Endrin	mg/L	U <0.0004	U <0.0004	U <0.0004	U <0.0004	U <0.0004	U <0.0004	U <0.0004	U <0.0004	-
D031	Heptachlor	mg/L	U <0.007	U <0.007	U <0.007	U <0.007	U <0.007	U <0.007	U <0.007	U <0.007	-
D031	Heptachlor & Hep. Epoxide	mg/L	U <0.00052	U <0.00052	U <0.00052	U <0.00052	U <0.00052	U <0.00052	U <0.00052	U <0.00052	-
D031	Heptachlor Epoxide	mg/L	U <0.005	U <0.005	U <0.005	U <0.005	U <0.005	U <0.005	U <0.005	U <0.005	-
D014	Methoxychlor	mg/L	U <0.0023	U <0.0023	U <0.0023	U <0.0023	U <0.0023	U <0.0023	U <0.0023	U <0.0023	-
D015	Toxaphene	mg/L	U <0.013	U <0.013	U <0.013	U <0.013	U <0.013	U <0.013	U <0.013	U <0.013	-
D013	gamma-BHC (Lindane)	mg/L	U <0.00019	U <0.00019	U <0.00019	U <0.00019	U <0.00019	U <0.00019	U <0.00019	U <0.00019	-
NA	Trichlorotrifluoroethane	mg/L	U <0.011	U <0.011	U <0.011	U <0.011	U <0.011	U <0.011	U <0.011	U <0.011	-

U : Analyte was not detected at a concentration higher than the detection limit

J : Analyte was detected at a concentration less than the reporting limit but greater than the detection limit.

*Note; TCLP anayses for nickel, beryllium, and ammonia were conducted under GEL Log numbers 9908434-1 through 18

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TABLE 33a, MULTIPLE EXTRACTION PROCEDURE (MEP) ON TCLP VERIFICATION SAMPLE TCLP-2

TCLP RESULTS, mg/L

Constituent / Sample ID	Hg	Ag	As	Ba	Cd	Cr	Ni	Pb	Se
TCLP-2 GEL 9907679-06	U <0.00035	J 0.009	U <0.045	J 0.027	U <0.0044	J 0.015	0.35	U <0.016	U <0.027
TCLP-2 (1X) GEL 9907679-08	U <0.00035	U <0.0037	U <0.023	J 0.027	U <0.0022	J 0.020	0.26	J 0.011	U <0.014
TCLP-2 (2X) GEL 9907679-09	U <0.00035	U <0.0037	U <0.023	J 0.018	U <0.0022	J 0.016	0.26	U <0.008	U <0.014
TCLP-2 (3X) GEL 9907679-10	U <0.00035	U <0.0037	U <0.023	J 0.020	U <0.0022	J 0.012	0.24	U <0.008	U <0.014
TCLP-2 (4X) GEL 9907679-11	U <0.00035	U <0.0037	U <0.023	J 0.018	U <0.0022	J 0.011	0.23	U <0.008	U <0.014
TCLP-2 (5X) GEL 9907679-12	U <0.00035	U <0.0073	U <0.045	J 0.034	U <0.0044	J 0.019	0.22	J 0.018	U <0.027
TCLP-2 (6X) GEL 9907679-13	U <0.00035	U <0.0073	U <0.045	J 0.034	U <0.0044	J 0.018	0.23	U <0.016	J 0.029
TCLP-2 (7X) GEL 9907679-14	U <0.00035	U <0.0073	U <0.045	J 0.023	J 0.0083	J 0.015	0.24	U <0.016	U <0.027
TCLP-2 (8X) GEL 9907679-15	U <0.00035	U <0.0073	U <0.045	J 0.017	U <0.0044	U <0.0056	0.25	U <0.016	J 0.032
TCLP-2 (9X) GEL 9907679-16	U <0.00035	J 0.0088	U <0.045	J 0.018	U <0.0044	J 0.014	0.24	U <0.016	U <0.027
Delisting Limit		20	5	200	0.5	10	10	1.5	

Nickel was not analyzed on initial TCLP-2 leachant, it was reanalyzed, GEL ID # 9908434-02

U : Analyte was not detected at a concentration higher than the detection limit
J : Analyte was detected at a concentration less than the reporting limit but greater than the detection limit.

TABLE 33b, MULTIPLE EXTRACTION PROCEDURE (MEP) ON TCLP VERIFICATION SAMPLE TCLP-8

TCLP RESULTS, mg/L

Constituent / Sample ID	Hg	Ag	As	Ba	Cd	Cr	Ni	Pb	Se
TCLP-8 GEL 9907679-28	U <0.00035	J 0.012	U <0.045	J 0.011	U <0.0044	U <0.0056	0.37	U <0.016	U <0.027
TCLP-8 (1X) GEL 990767930	U <0.00035	U <0.0037	U <0.023	J 0.009	U <0.0022	J 0.0036	0.22	U <0.008	U <0.014
TCLP-8 (2X) GEL 9907679-31	U <0.00035	U <0.0037	U <0.023	J 0.007	U <0.0022	J 0.0045	0.20	J 0.0089	U <0.014
TCLP-8 (3X) GEL 9907679-32	U <0.00035	U <0.0037	U <0.023	J 0.011	U <0.0022	J 0.0046	0.20	U <0.008	U <0.014
TCLP-8 (4X) GEL 9907679-33	U <0.00035	U <0.0037	U <0.023	J 0.008	U <0.0022	J 0.005	0.21	J 0.012	U <0.014
TCLP-8 (5X) GEL 9907679-34	U <0.00035	U <0.0073	U <0.045	J 0.0082	U <0.0044	U <0.0056	0.18	U <0.016	U <0.027
TCLP-8 (6X) GEL 9907679-35	U <0.00035	U <0.0073	U <0.045	J 0.0054	U <0.0044	J 0.0071	0.19	U <0.016	U <0.027
TCLP-8 (7X) GEL 9907679-36	U <0.00035	U <0.0073	U <0.045	J 0.0065	U <0.0044	U <0.0056	0.20	U <0.016	U <0.027
TCLP-8 (8X) GEL 9907679-37	U <0.00035	U <0.0073	U <0.045	J 0.0066	U <0.0044	U <0.0056	0.20	U <0.016	U <0.027
TCLP-8 (9X) GEL 9907679-38	U <0.00035	U <0.0073	U <0.045	U <0.0051	U <0.0044	U <0.0056	0.20	U <0.016	U <0.027
Listing Limit		20	5	200	0.5	10	10	1.5	

Nickel was not analyzed on initial TCLP-2 leachant, it was reanalyzed, GEL ID # 9908434-08

U: Analyte was not detected at a concentration higher than the detection limit
J: Analyte was detected at a concentration less than the reporting limit but greater than the detection limit.

TABLE 33c, MULTIPLE EXTRACTION PROCEDURE (MEP) ON TCLP VERIFICATION SAMPLE TCLP-15

TCLP RESULTS, mg/L

Constituent / Sample ID	Hg	Ag	As	Ba	Cd	Cr	Ni	Pb	Se
CLP-15 EL 9907679-52	U <0.00035	J 0.0144	U <0.045	J 0.0097	U <0.0044	J 0.0124	0.46	U <0.016	U <0.027
CLP-15 (1X) EL 9907679-54	U <0.00035	U <0.0037	U <0.023	J 0.0079	U <0.0022	J 0.0109	0.33	U <0.008	U <0.014
CLP-15 (2X) EL 9907679-55	U <0.00035	U <0.0037	U <0.023	J 0.0052	U <0.0022	J 0.0123	0.34	U <0.008	U <0.014
CLP-15 (3X) EL 9907679-56	U <0.00035	U <0.0037	U <0.023	J 0.0086	U <0.0022	J 0.0098	0.29	U <0.008	U <0.014
CLP-15 (4X) EL 9907679-57	U <0.00035	U <0.0037	U <0.023	J 0.0040	U <0.0022	J 0.0098	0.32	U <0.008	U <0.014
CLP-15 (5X) EL 9907679-58	U <0.00035	U <0.0073	U <0.045	U <0.0051	U <0.0044	J 0.0075	0.30	U <0.016	U <0.027
CLP-15 (6X) EL 9907679-59	U <0.00035	U <0.0073	U <0.045	U <0.0051	U <0.0044	J 0.0062	0.31	U <0.016	U <0.027
CLP-15 (7X) EL 9907679-60	U <0.00035	U <0.0073	U <0.045	J 0.0069	U <0.0044	U <0.0056	0.31	U <0.016	U <0.027
CLP-15 (8X) EL 9907679-61	U <0.00035	U <0.0073	U <0.045	J 0.0077	U <0.0044	U <0.0056	0.33	U <0.016	U <0.027
CLP-15 (9X) EL 9907679-62	U <0.00035	U <0.0073	U <0.045	U <0.0051	U <0.0044	U <0.0056	0.33	U <0.016	U <0.027
elisting Limit		20	5	200	0.5	10	10	1.5	

ickel was not analyzed on initial TCLP-2 leachant, it was reanalyzed, GEL ID # 9908434-15

: Analyte was not detected at a concentration higher than the detection limit
: Analyte was detected at a concentration less than the reporting limit but greater than the detection limit.

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6.0 GROUND-WATER MONITORING INFORMATION

The wastes described in this delisting petition have never been managed in a land-based waste management unit. The treated (vitrified) waste has not and will have been managed in a land-based management unit prior to delisting and disposal. Therefore, the submission of ground-water monitoring data to support this delisting petition is not required.

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7.0 REFERENCES

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APPENDICES

A	1986/1987 ENWRIGHT LABORATORY SAMPLING AND ANALYSES
B	SRTC INTERNAL REPORTS
C	1989, 1992, AND 1993 DETF RCRA FILTERCAKE ANALYSIS REPORTS
D	WATTS PLATING SOLUTION INFORMATION
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F1	MSDS'S FOR PREVIOUSLY USED CHEMICALS; PRIMARY PROCESS CHEMICALS
F2	MSDS'S FOR PREVIOUSLY USED CHEMICALS; AUXILIARY PROCESS CHEMICALS
G	MSDS'S FOR CHEMICALS CURRENTLY USED IN THE DETF
H	MSDS'S FOR CHEMICALS TO BE USED IN THE VTF
I	MSDS'S FOR CHEMICALS PREVIOUSLY USED IN THE M-AREA LABORATORIES
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K	RESUME` OF SAMPLING PLAN PREPARER AND DELIST PETITION PRIMARY AUTHOR
L	GTS DURATEK TCLP DATA FOR EACH BATCH
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APPENDIX A

1986/1987 ENWRIGHT LABORATORY SAMPLING AND ANALYSES

1 September 3, 1987 - Sampling Methods Report
2 October 29, 1987 - First Phase Analytical Report
3 February 3, 1998 - Final Sludge and Supernate Analysis Report

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ENWRIGHT
ASSOCIATES INC.

September 3, 1987

Mr. John Pickett
Building 320-3M
E.I. DuPont de Nemours & Co., Inc.
Savannah River Plant
Aiken, South Carolina 29808

Subject: Sampling Methods For M-Area Delisting Project;
DuPont P.O. No. AX 0720919

Dear John:

Find enclosed the subject sampling methods. Since this effort was performed prior to my rejoining Enwright, finalization took somewhat longer than I had envisioned. I wanted to ensure that my review of project documentation and discussions with project personnel were thorough prior to issuance. Sorry for the delay.

If you have any questions or comments, please call. We are waiting to hear from you concerning retrieval of precipitant samples.

Very truly yours,

ENWRIGHT ASSOCIATES, INC.

Dave McCartney

David E. McCartney, Ph.D.
Project Manager

kdw

Enclosure

25 Woods Lake Road (29607) • Post Office Box 5287 • Greenville, South Carolina 29606 • (803)232-8140

METHODS EMPLOYED FOR
WASTE DELISTING SAMPLING
SAVANNAH RIVER PLANT; M-AREA
DUPONT P.O. NO. AX0720919

Enwright Laboratories, Inc. was contracted by E.I. DuPont, Savannah River Plant to collect and analyze samples of wastewater sludges form M-area metals plating operations. The objective of the program was to collect and analyze waste samples from the M-area Interim Storage Tanks and DETF process to determine the feasibility of petitioning the Administrator of EPA to delist the wastes, thereby, eliminating them from the stringent requirements of the Resource Conservation and Recovery Act. A parallel objective was to collect and analyze samples according to a plan which EPA would find adequate upon retroactive inspection, if a delisting petition is filed. Accordingly, the intent was to sample and analyze the wastes using the most valid, acceptable methods available. This plan was directed toward that end.

SAMPLE COLLECTION

On November 18, 1986, the field crew arrived at the 700 area. Enwright's field crew consisted of the following personnel:

Mr. William Tabor
Dr. Steven L. Hoeffner
Mr. Ed E. Wannemacher

The field crew dressed out in protective clothing using boot covers, gloves, safety glasses and face shields, hard hats and personal dosimetry monitors (dosimetry was provided by SRP). Mr. Hank Drannon, of SRP, initiated the sampling program and

insured that sampling was conducted in the proper tanks. The identification of the tanks as designated by SRP was as indicated on Figure 1.

Beginning with horizontal Tank #1, the team first measured the depth of the liquid and solid layers within the tank. To determine sludge bed depth a sounding was taken to locate both the bottom of the sludge bed and the liquid/solid interface. On November 19, the crew then collected samples of the undisturbed liquid above the settled sludge, designated as SUPERNATANT. An automatic peristaltic pump sampler was used to collect samples of the liquid. This was accomplished by gradually lowering the sampler intake tubing into the liquid layer while the sampler pump was running; thus, a vertically composited sample was collected from the pump output line. To confirm soundings performed on the previous day, a ruled pump intake line was lowered into each tank stepwise until reaching a depth at which sludge was drawn into the pump. The results of these measurements as well as the soundings are presented in Table 1. Supernatant samples were collected in one gallon plastic bottles. A portion of the contents of the 1-gallon bottle were transferred into two, 250-ml plastic bottles (one for metals analysis and the other for radiation screening. A special sample was collected for volatile organics by lowering the peristaltic pump intake to mid-depth and filling 100 ml vials (outfitted with a septum cap) to exclude any air bubbles.

Samples of the undisturbed sludge designated as PRECIPITANT were collected using one of two techniques. The preferred procedure was utilization of a 2" diameter hollow PVC pipe which was lowered into the tank down to the sludge bed. The top of the pipe was capped and lowered until contact with the sludge bed was made. The pipe was then uncapped and a sludge sample was cored from the bed. After penetrating the sludge bed and upon reaching the

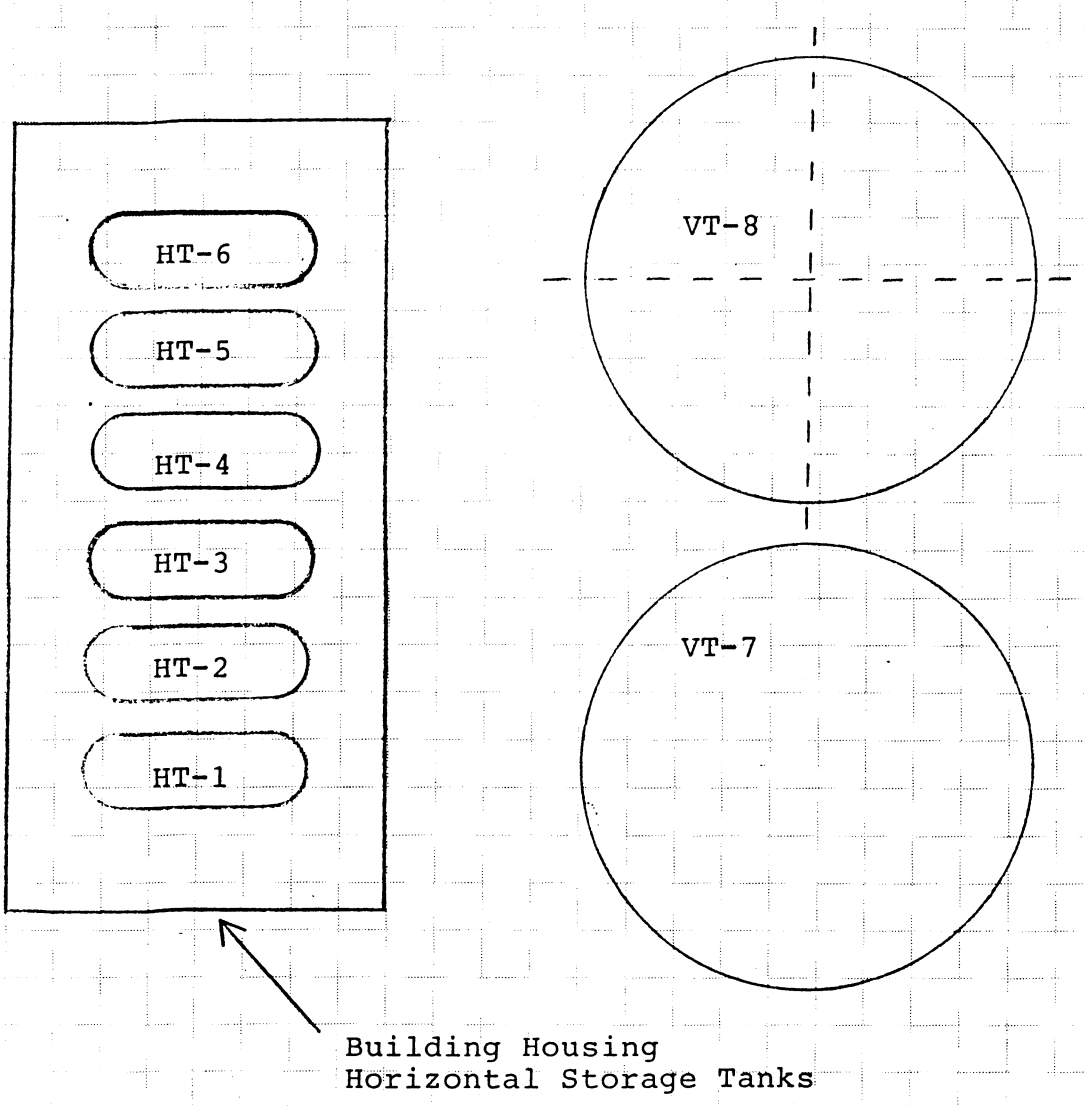
ENWRIGHT ASSOCIATES, INC. DESIGN COMPUTATIONS

JOB NAME DuPont - SRP JOB NO 86710 00 104

SUBJECT M-Area
Interim Storage Tank Layout

WORK BY McCartney CHECKED BY _____ DATE 8-25-87 PAGE ____ OF ____

Figure 1 - Layout of M-Area Interim Storage Tanks

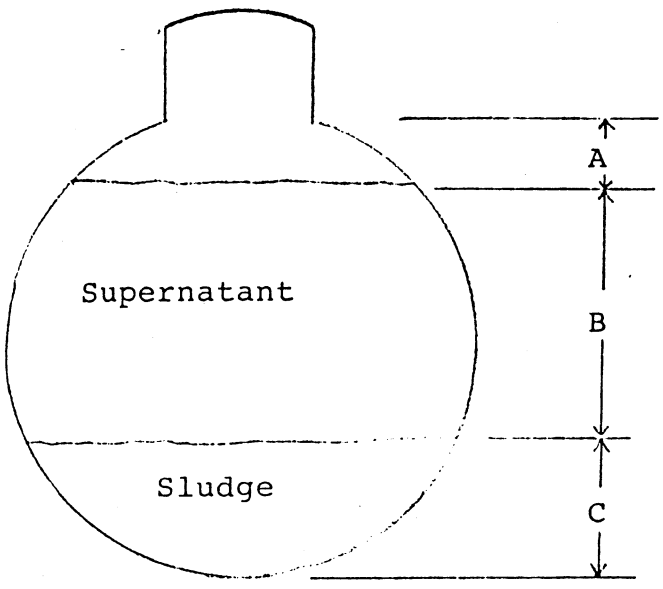


HT = Horizontal Storage Tank
VT = Vertical, 500,000 gal. Storage Tank

Table 1
Results of Soundings
Horizontal Tanks 1-6

Tank ID.	pH	Freeboard Depth A	Supernatant Depth B	Sludge Depth C*	Description
Tank 1	12.0	13"	(S)10'6" (P) 9'	(S) <1" (P)1'5"	Very thin or no sludge
Tank 2	12.7	8"	(S) 9'3" (P) 7'	(S)1'7" (P)3'10"	Medium, soft evenly distributed
Tank 3	10.6	12"	(S) 8'3" (P) 8'	(S)2'3" (P)2'6"	Fluffy, Slight resistance
Tank 4	9.6	7"	(S) 5'0" (P) 5'	(S)5'11" (P)5'11"	Medium firm, weight sinks easily
Tank 5	12.9	8"	(S) 8'9" (P) 8'6"	(S)2'1" (P)2'4"	Firm, solid, evenly distributed
Tank 6	12.7	12"	(S) 9'0" (P) 6'	(S)1'6" (P)4'6"	Firm, evenly distributed

*(S) - Measurement based upon sounding.
(P) - Measurement based upon lowering of calibrated pump line.



A+B+C = 11'6"

bottom of the tank, the top of the pipe was recapped and then pulled to the surface. The sludge remaining inside the tube was extruded and collected in a 5-gallon bucket. Several cores were taken and composited in the bucket then transferred to a ~~1,000 ml~~ 197 glass bottle with teflon lined lid. Due to the firmness of some of the sludges, not all precipitant samples could be collected by using this method. As alternatives to the PVC coring tube, a dredge was used or thinner sludge was collected using a peristaltic pump. The procedure employed for each of the six (6) horizontal tanks follows:

Tank 1	-	Peristaltic Pump
Tank 2	-	Large Ponar Dredge
Tank 3	-	La Motte Bottom Sampling Dredge
Tank 4 to 6	-	Coring/Extrusion by PVC Pipe

A listing of those samples collected from the horizontal tanks is presented in Table 2. Vials to be analyzed for volatile organics were immediately forwarded to Enwright Laboratories. All other samples were left in the custody of Mr. Hank Drannon of SRP.

On January 20, 1987, the field team which consisted of Steve Hoeffner and Bill Tabor returned to M-Area to sample the large vertical 500,000 gallon storage tank (tank 8). Tank soundings were again made with the results summarized in Table 3. Due to the size of this tank, several additional procedures were used to collect the samples. Supernatant and Precipitant were collected in each quadrant. A peristaltic pump was used to collect Supernatant samples. The Precipitant in the storage tank was collected with a petite-Ponar dredge which was lowered by rope into the tank.

A supplemental sampling program was conducted at the 500,000 gallon tank to determine stratification within the tank. Using a peristaltic pump, a sample of the Supernatant was collected at every five foot increment of depth to a depth of 15 feet. Two

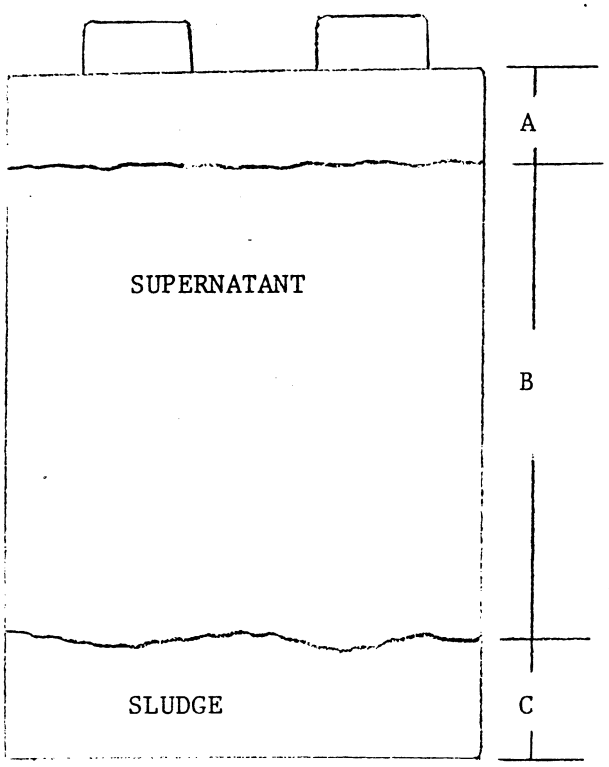
Table 2
Listing of Samples Collected From
Horizontal Storage Tanks; M-Area

Tank No.	Sample Description	Sample Containers
1	Supernatant	1-gal. plastic, 2-250 ml plastic, 2-100 ml glass
1	Precipitant	3-qt. glass, 4-250 ml plastic, 2-½ gal. plastic, 1-gal. plastic
2	Supernatant	1-gal. plastic, 2-250 ml plastic, 2-100 ml glass
2	Precipitant	4-qt. glass, 1-250 ml plastic
3	Supernatant	1-gal. plastic, 2-250 ml plastic, 2-100 ml glass
3	Precipitant	3-qt. glass, 1-250 ml plastic
4	Supernatant	1-gal. plastic, 2-250 ml plastic, 2-100 ml glass
4	Precipitant	2 qt. glass, 1-250 ml plastic
5	Supernatant	2-gal. plastic, 3-250 ml plastic, 4-100 ml glass
5	Precipitant	3-qt. glass, 1-250 ml plastic
6	Supernatant	1-gal. plastic, 2-250 ml plastic, 2-100 ml glass
6	Precipitant	3-qt. glass, 1-250 ml plastic

Table 3
Results of Soundings
Vertical Tank 8

Port ID.	pH	Freeboard Depth A	Supernatant Depth B*	Sludge Depth C*	Descriptio
Port 16		3'6"		(S) 7'6"	
Port 17	12.1	3'6"	(S) 14'0" (P) 15'	(S)7'6" (P)6'6"	Firm but n packed
Port 42		3'6"		(S) 6'0"	
Port 43		3'6"		(S) 5'6"	

* (S) - Measurement based upon sounding
(P) - Measurement based upon lowering of calibrated pump line.



A+B+C = 25'

sludge samples were collected from varying yet unspecified depths by a "hard" and "soft" drop of the Ponar dredge. Determination of chemoclines and/or stratification will be based upon analytical parameters to be defined at a later date.

A listing of those samples collected from the large vertical tank is presented in Table 4. Vials to be analyzed for volatile organics were immediately forwarded to Enwright Laboratories for analysis. All remaining samples were left in the custody of Mr. Hank Drannon of SRP.

In addition to sampling the Interim Storage Tanks, the Enwright field team collected sludge samples from the Dilute Effluent Treatment Facility (DETF) filter press (stored in 55-gallon drums) and forwarded these to Enwright for analysis.

DATA RECORDS

The following information was recorded in a bound field notebook and transposed onto this Field Sampling Report.

1. Date/time of sampling
2. Sampler's name
3. Location of sample
4. Method of sampling
5. Field measurements
6. Field notes

Each bottle was also affixed with a sample identification label.

Table 4
Listing of Samples Collected From
Vertical Storage Tank #8; M-Area

Sample ID	Sample Description	Container
Port 16	precipitant grab	qt. glass
Port 16	precipitant grab	qt. glass
Port 16	supernatant composite	250 ml. plastic
Port 16	supernatant composite	1 gal. plastic
Port 16	supernatant grab	100 ml. glass
Port 16	supernatant grab	100 ml. glass
Port 17	supernatant grab	100 ml. glass
Port 17	supernatant grab	100 ml. glass
Port 17	supernatant composite	1 gal. plastic
Port 17	precipitant grab-bottom	qt. glass
Port 17	precipitant grab-bottom	qt. glass
Port 17	precipitant grab surface	qt. glass
Port 17	precipitant grab surface	qt. glass
Port 17	precipitant for radioactivity	250 ml. plastic
Port 17	precipitant for radioactivity	250 ml. plastic
Port 17	supernatant composite	250 ml. plastic
Port 17	supernatant composite (0-5ft.)	250 ml. plastic
Port 17	supernatant composite (5-10ft.)	250 ml. plastic
Port 17	supernatant composite (10-15ft.)	250 ml. plastic
Port 17	supernatant composite (15ft.)	250 ml. plastic
Port 42	precipitant grab	qt. glass
Port 42	precipitant grab	qt. glass
Port 42	supernatant composite	1 gal. plastic
Port 42	supernatant composite	250 ml. plastic
Port 42	supernatant grab	100 ml. glass
Port 42	supernatant grab	100 ml. glass
Port 43	precipitant grab	qt. glass
Port 43	precipitant grab	qt. glass
Port 43	supernatant composite	1 gal. plastic
Port 43	supernatant composite	250 ml. plastic
Port 43	supernatant grab	100 ml. glass
Port 43	supernatant grab	100 ml. glass
DETF Filter Cake #1	grab	qt. glass
DETF Filter Cake #2	grab	qt. glass

ENWRIGHT
LABORATORIES

October 29, 1987

Mr. John Pickett
E.I. DU PONT DE NEMOURS & CO., INC.
Savannah River Plant
Building 320-M
Aiken, S.C. 29808

Re: First Phase Analytical Report for 300-M Area Sampling Effort;
Du Pont P.O. No. AX 0720919

Dear John:

Please find enclosed the final analytical report for horizontal tank supernatants, DETF filter cake and vertical tank volatile organic analyses.

The tank sludges and remaining supernatant samples arrived at our laboratory and were logged-in on October 26, 1987. We are awaiting word from you regarding specifications of the analytical regimen to be employed.

Please call if you need to discuss these results and/or are ready to specify the analytical regimen.

Sincerely,

ENWRIGHT LABORATORIES, INC.

David E. McCartney

David E. McCartney, Ph.D.
Project Manager

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Enclosures

25 Woods Lake Road (29607) • Post Office Box 5287 • Greenville, South Carolina 29606 • (803)235-0707

ENWRIGHT LABORATORIES

CERTIFICATE OF ANALYSIS

CLIENT: E.I. DuPont - Savannah River Plant

PROJECT: Delisting

DATE RECEIVED: 12/5/86

DATE COMPLETED: 10/28/87

DATE REPORTED: 10/29/87

Note Results in mg/L, unless otherwise noted gpp

LAB NO. / SAMPLE ID:	86-37576 Tank 1 Supernatant	86-37577 Tank 2 Supernatant	86-37578 Tank 3 Supernatant	86-37579 Tank 4 Supernatant
Parameters:				
1,1,1-Trichloroethane (ug/l)	<5	<5	<5	<5
Aluminum	1,800	6,300	110	25
Nickel	0.91	1.3	0.32	1.1
Copper	0.51	0.87	<0.10	0.24
Lead	0.65	1.2	<0.50	<0.50
Cadmium	<0.01	<0.01	<0.01	<0.01
Chromium	<0.50	<0.50	<0.50	<0.50
Zinc	<0.10	0.38	<0.10	<0.10
Sodium	24,000	34,000	10,000	20,000
Uranium	8.0	42	63	180
Nitrate Nitrogen	12,000	18,000	6,500	19,000
Total Phosphate as Phosphorus	2,300	1,700	100	42
pH (units)	12.3	12.9	10.5	9.6
Viscosity (cSt)	1.2	1.5	1.1	1.1
Specific Gravity	1.06	1.12	1.02	1.07
Total Solids	97,000	162,000	42,000	119,000
Selenium (ug/l)	<10	<100	<10	<10
Arsenic (ug/l)	76 (1)	63 (1)	150 (2)	41 (2)

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E.I. DuPont - Savannah River Plant
Delisting
Laboratory Report, Page 2

LAB NO. SAMPLE ID:	86-37580 Tank 5 Supernatant	86-37581 Tank 6 Supernatant	86-37582 Tank 5 (dup.) Supernatant	86-37583 DI Blank
Parameters:				
1,1,1-Trichloroethane (ug/l)	<5	<5	<5	<5
Aluminum	4,400	1,900	4,500	—
Nickel	1.1	0.93	0.71	—
Copper	1.6	0.54	1.7	—
Lead	1.0	0.55	1.0	—
Cadmium	<0.01	<0.01	<0.01	—
Chromium	<0.50	<0.50	<0.50	—
Zinc	1.0	<0.10	1.0	—
Sodium	24,000	18,000	22,000	—
Uranium	23	12	23	—
Nitrate Nitrogen	12,000	13,000	12,000	—
Total Phosphate as Phosphorus	2,100	2,100	2,500	—
pH (units)	12.8	12.4	12.9	—
Viscosity (cSt)	1.2	1.1	1.2	—
Specific Gravity	1.08	1.06	1.08	—
Total Solids	118,000	101,000	115,000	—
Selenium (ug/l)	<100	<10	—	—
Arsenic (ug/l)	99 (1)	1,300 (2)	—	—

(1) Analyzed by hydride method.

(2) Analyzed by direct aspiration at 193.7 nm wavelength and thus subject to positive interference caused by aluminum.

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LAB NO.	86-38682	86-38683
SAMPLE ID:	DETF Filter Cake #1	DETF Filter Cake #
Parameters:		
Toxic Extraction Procedure:		
Arsenic (ug/l)	<1	<1
Barium	0.3	0.4
Cadmium	<0.01	<0.01
Chromium	<0.05	<0.05
Lead	<0.1	<0.1
Silver	<0.02	<0.02
Selenium (ug/l)	<3	<3
Mercury (ug/l)	<0.5	<0.5
Nickel	9.2	8.3
Total Digest:		
Arsenic (mg/kg)	8.2	8.5
Nickel (mg/kg)	2,000	1,500
Lead (mg/kg)	28	24
Uranium (mg/kg)	540	560
Aluminum (mg/kg)	6,200	5,800
Zinc (mg/kg)	180	170

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LAB NO. SAMPLE ID:	86-38682 DETF Filter Cake #1	86-38683 DETF Filter Cake #2
Parameters:		
pH (units)	8.0	8.0
Reactivity Determined by:		
Cyanide	<1	<1
Sulfide (mg/kg)	<10	<10
Corrosivity	NA	NA
Ignitability	NA	NA
Toxicity Characteristic Leaching Procedure:		
Arsenic (ug/l)	5	5
Barium	0.5	0.5
Cadmium	<0.01	<0.01
Chromium	<0.05	<0.05
Lead	0.3	0.3
Silver	<0.01	<0.01
Selenium (ug/l)	<3	<3
Mercury (ug/l)	<0.5	<0.5
Nickel ~~(ug/l)~~ (mg/L)	16	18

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LAB NO. SAMPLE ID:	86-38682 DETF Filter Cake #1	86-38683 DETF Filter Cake #
Parameters:		
Toxicity Characteristic Leaching Procedure: (Con't)		
Volatiles: (ug/l)		
Acrylonitrile	<50	<50
Benzene	<5	<5
Carbon Disulfide	<5	<5
Carbon Tetrachloride	<5	<5
Chlorobenzene	<5	<5
Chloroform	<5	<5
1,2-Dichlorobenzene	<5	<5
1,4-Dichlorobenzene	<5	<5
1,2-Dichloroethane	<5	<5
1,1-Dichloroethylene	<5	<5
Isobutanol	1,000	1,000
Methylene Chloride	6.9	<5
Methyl Ethyl Ketone	<50	<50
Pyridine	<5	<5
1,1,1,2-Tetrachloroethane	<5	<5
1,1,2,2-Tetrachloroethane	<5	<5
Tetrachloroethylene	<5	<5

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LAB NO. SAMPLE ID:	86-38682 DETF Filter Cake #1	86-38683 DETF Filter Cake #2
Parameters:		
Toxicity Characteristic Leaching Procedure: (Con't)		
Volatiles: (ug/l) (Con't)		
Toluene	<5	<5
1,1,1-Trichloroethane	<5	<5
1,1,2-Trichloroethane	<5	<5
Trichloroethylene	<5	<5
Vinyl Chloride	<10	<10
Semivolatiles: (ug/l)		
Bis(2-Chloroethyl)ether	<10	<10
o-Cresol	<10	<10
m-Cresol	<10	<10
p-Cresol	<10	<10
2,4-Dinitrotoluene	<10	<10
Hexachlorobenzene	<10	<10
Hexachlrobutadiene	<10	<10
Hexachloroethane	<10	<10
Nitrobenzene	<10	<10
Pentachlorophenol	<10	<10

E.I. DuPont - Savannah River Plant
Delisting
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LAB NO.	86-38682	86-38683
SAMPLE ID:	DETF Filter Cake #1	DETF Filter Cake #
Parameters:		
Toxicity Characteristic Leaching Procedure: (Con't)		
Semivolatiles: (ug/l) (Con't)		
Phenol	<10	<10
2,3,4,6-Tetrachlorophenol	<10	<10
2,4,5-Trichlorophenol	<10	<10
2,4,6-Trichlorophenol	<10	<10
Pesticides & Herbicides: (ug/l)		
Chlordane	<0.5	<0.5
2,4-D	<0.5	<0.5
Endrin	<0.1	<0.1
Heptachlor	<0.5	<0.5
Lindane	<0.1	<0.1
Methoxychlor	<0.2	<0.2
Toxaphene	<0.5	<0.5
2,4,5-TP (Silvex)	<0.1	<0.1

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LAB NO.	86-38678	86-38679	86-38680	86-38681
SAMPLE ID:	Tank 8 Part 16	Tank 8 Part 17	Tank 8 Part 42	Tank 8 Part 43
Parameters:				
1,1,1-Trichloroethane (ug/l)	<5	<5	<5	<5

The above results are reported in milligrams per liter unless otherwise noted.

Analytical methods are those approved by the U.S. Environmental Protection Agency in SW-846 Test Methods For Evaluating Solid Waste.

Respectfully submitted,

ENWRIGHT LABORATORIES, INC.

Charles H. Reece

Charles H. Reece, Ph.D.
Laboratory Manager

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[redacted]

ENWRIGHT
LABORATORIES

February 3, 1988

Mr. John Pickett
E.I. DU PONT DE NEMOURS & CO., INC.
Savannah River Plant
Building 320-3M
Aiken, S.C. 29808

Subject: [redacted]t For M-Area Sludge & Supernatant Analyses;
Du Pont P.O. No. AX 0720919

Dear John:

Enclosed please find the subject report. Note that precipitant samples are indicated with "P" and the mixtures with "P+S" as the matrix designation. The protocol for combining horizontal tank precipitants and sludges to produce mixtures which were intended to simulate the contents of the mixed tanks are shown in Table 1. A simple depth ratio was used to proportion tank 8 precipitant and sludges.

Initial results indicated that a number of precipitant - supernatant mixtures failed to meet the delisting criteria. The samples which failed the criteria were subjected to additional quality control. These quality control measures included rerunning certain metals analyses using background correction and alternate wavelengths to account for interferences. Certain E.P. toxicity extractions were also repeated because it was somewhat difficult to maintain the pH of these very alkaline samples within the proper range. The results of these additional quality control analyses are presented in Table 2.

A review of these data indicates that a number of the higher values originally reported for both nickel and lead were anomalies. These high values appeared to be a result of matrix interferences and difficulties in maintaining pH during EP toxicity extractions.

25 Woods Lake Road (29607) • Post Office Box 5287 • Greenville, South Carolina 29606 • (803)235-0707

February 3, 1988
Page Two

Based upon the results contained in the attached report, horizontal storage tanks Nos. 3 & 4 still do not meet the delisting criteria. Therefore, I continue to hold the opinion that EPA would not consider delisting the entire contents of the M-Area interim storage tanks.

Please contact me should you have any questions concerning this report.

Sincerely,

ENWRIGHT LABORATORIES, INC.

Dave McCartney

David E. McCartney, Ph.D.
Project Manager

rwz

Enclosures

cc: Mr. Ed Wannemacher
Dr. Steve Hoeffner

TABLE 1- PROTOCOL FOR COMBINING PRECIPITANT AND SUPERNATANTS FROM HORIZONTAL STORAGE TANKS; M-AREA; SAVANNAH RIVER PLANT

A	B	C	D	E	F=(E-C)/C
Tank No.	Precip. Depth (ft.)	Precip. Area (sq.ft.)	Precip. + Supernat. Depth (ft.)	Precip. + Supernat. Area (sq.ft.)	Supernat./Precip. Mixing Ratio (Based Upon Area)
1	1.4	7.2	10.4	98.8	12.7 : 1
2	1.6	8.6	10.8	101.4	10.8 : 1
3	2.4	15.7	10.5	99.5	5.3 : 1
4	5.9	53.7	10.9	101.8	0.9 : 1
5	2.2	13.9	10.8	101.3	6.3 : 1
6	1.5	8.0	10.5	99.5	11.5 : 1
8	6.6	NA	14.9	NA	2.3 : 1

Table 2 - Additional Quality Control Analyses; M-Area Precipitant-Supernatant Mixtures

A. QC Reruns On Original EP Toxicity Extracts Using Background Corrections and Alternate Wavelengths:

Lab No.	Sample I.D.	Value Reported on Preliminary Report (mg/l)	Value Obtained for QC Rerun (mg/l)	Revised Value Presented in Final Report (mg/l)
86-37577 + 87-44700	Tank 2 P+S	Pb = 0.6	Pb = <0.2	<0.2
86-37578 + 87-44701	Tank 3 P+S	Pb = 0.6 Ni = 16	Pb = 0.6 Ni = 14	not revised (1.8) *
86-37579 + 87-44702	Tank 4 P+S	Ni = 11.2	Ni = 10.0	(4.7) *
86-37580 + 87-44703	Tank 5 P+S	Pb = 0.9 Ni = 1.3	Pb = <0.2 Ni = 0.3	<0.2 not revised
87-44707 + 87-44711	Tank 8 (Pt.17) P+S	Ni = 9.1	Ni = 1.9	(0.3) *
87-44709 + 87-44713	Tank 8 (Pt.43) P+S	Ni = 4.5	Ni = 4.5	(<0.2) *

* Revised value based upon EP toxicity extraction rerun shown in section B below rather than reruns on original extract.

B. QC Reruns of EP Toxicity Extractions With Extra Care Taken to Maintain pH in Proper Range:

Lab No.	Sample I.D.	Value Reported on Preliminary Report (mg/l)	Value Obtained for QC Rerun (mg/l)	Revised Value Presented in Final Report (mg/l)
86-37578 + 87-44701	Tank 3 P+S	Ni = 16	Ni = 3.3;0.3	1.8 (average)
86-37579 + 87-44702	Tank 4 P+S	Ni = 11.2	Ni = 4.7	4.7
87-44706 + 87-44711	Tank 8 (Pt.17) P+S	Ni = 7.2	Ni = 0.3;0.4	0.4
87-44707 + 87-44711	Tank 8 (Pt.17)	Ni = 9.1	Ni = 0.3;0.2	0.3
87-44709 + 87-44713	Tank 8 (Pt.43)	Ni = 4.5	Ni = <0.2;<0.2	<0.2

NOTE: In neither the original or rerun EP toxicity extraction did the amount of acetic acid added exceed that specified by the EP toxicity protocol.

(Revised 3-15-88)

[redacted]

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CERTIFICATE OF ANALYSIS

CLIENT: Du Pont – Savannah River Plant
PROJECT: Delisting

DATE RECEIVED: 10/26/87
DATE COMPLETED: 1/21/88
DATE REPORTED: 1/22/88

Tank No.	1	2	3	4	5	6
Matrix *	P	P	P	P	P	P
LAB NO.:	87-44699	87-44700	87-44701	87-44702	87-44703	87-44704
Parameters:						
Toxic Extraction Procedure:						
Arsenic (ug/l)	<5	<5	<5	<5	<5	<5
Barium (mg/l)	0.2	0.2	2.0	0.7	<0.1	0.2
Cadmium (mg/l)	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Chromium (mg/l)	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Lead (mg/l)	<0.1	<0.1	0.50	<0.1	<0.1	<0.1
Mercury (ug/l)	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Selenium (ug/l)	<5	<5	<5	<5	<5	<5
Silver (mg/l)	<0.02	<0.02	<0.02	<0.02	0.07	<0.02
Nickel (mg/l)	2.7	0.7	12.3	10.7	0.4	3.7
Uranium (mg/l)	0.02	180	48	45	41	160
Cyanide (mg/l)	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Sulfide (mg/l)	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
pH (units)	11.0	12.0	9.6	9.3	12.2	11.0
Specific Gravity (H_2O=1.0)	1.18	1.35	1.05	1.15	1.08	1.23
Total Solids (%)	34	53	7.6	23	14	40

p = precipitate (or sludge) grab

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Delisting
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Tank No.	8 (Pt. 16)	8 (Pt. 17)	8 (Pt. 17)	8 (Pt. 42)	8 (Pt. 43)
Matrix *	P	P (top)	P (btm)	P	P
LAB NO.:	87-44705	87-44706	87-44707	87-44708	87-44709
Parameters:					
Toxic Extraction Procedure:					
Arsenic (ug/l)	<5	<5	<5	<5	<5
Barium (mg/l)	0.2	0.2	0.2	0.2	0.2
Cadmium (mg/l)	<0.01	<0.01	<0.01	<0.01	<0.01
Chromium (mg/l)	<0.05	<0.05	<0.05	<0.05	<0.05
Lead (mg/l)	<0.1	<0.1	<0.1	<0.1	<0.1
Mercury (ug/l)	<0.5	<0.5	<0.5	<0.5	<0.5
Selenium (ug/l)	<5	<5	<5	<5	<5
Silver (mg/l)	<0.02	<0.02	<0.02	<0.02	<0.02
Nickel (mg/l)	7.5	10.2	10.9	11.7	8.4
Uranium (mg/l)	0.01	0.59	0.37	0.02	0.01
Cyanide (mg/l)	<0.2	<0.2	<0.2	<0.2	<0.2
Sulfide (mg/l)	<0.1	<0.1	<0.1	<0.1	<0.1
pH (units)	10.9	11.0	10.8	11.0	10.9
Specific Gravity (H_2O=1.0)	1.28	1.26	1.29	1.23	1.24
Total Solids (%)	44	40	49	34	40

Du Pont - Savannah River Plant
Delisting
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Tank No.	1	2	3	4	5	6
Matrix *	P+S	P+S	P+S	P+S	P+S	P+S
LAB NOS: (supernatant → / sludge (prec.) →)	86-37576 + 87-44699	86-37577 + 87-44700	86-37578 + 87-44701	86-37579 + 87-44702	86-37580 + 87-44703	86-37581 + 87-44704
Parameters:						
Toxic Extraction Procedure:						
Arsenic (ug/l)	<5	<5	<5	<5	<15	<5
Barium (mg/l)	0.4	<0.1	1.2	1.7	0.2	<0.1
Cadmium (mg/l)	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Chromium (mg/l)	<0.05	0.14	<0.05	<0.05	0.12	<0.05
Lead (mg/l)	0.3	<0.2	0.6	<0.1	<0.2	0.3
Mercury (ug/l)	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Selenium (ug/l)	<5	<5	<5	<5	<10	<5
Silver (mg/l)	0.07	0.10	0.03	0.03	0.16	0.08
Nickel (mg/l)	2.6	0.8	1.8	4.7	1.3	0.6
Uranium (mg/l)	80	76	11	100	110	110
Cyanide (mg/l)	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Sulfide (mg/l)	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
pH (units)	11.8	12.2	10.1	9.2	12.4	11.9
Specific Gravity (H_2O=1.0)	1.09	1.13	1.03	1.12	1.09	1.07
Total Solids (%)	12	20	4.6	18	15	12

Du Pont - Savannah River Plant
Delisting
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Tank No.	8 (Pt. 16)	8 (Pt. 17)	8 (Pt. 17)	8 (Pt. 42)	8 (Pt. 43)
Matrix *	P+S	P(top)+S	P(btm)+S	P+S	P+S
LAB NOS: sludge (Pmt) →	87-44705 +	87-44706 +	87-44707 +	87-44708 +	87-44709 +
supernatant →	87-44710	87-44711	87-44711	87-44712	87-44713
Parameters:					
Toxic Extraction Procedure:					
Arsenic (ug/l)	<5	<5	<5	<5	<15
Barium (mg/l)	<0.1	0.2	0.2	0.3	0.3
Cadmium (mg/l)	<0.01	<0.01	<0.01	<0.01	<0.01
Chromium (mg/l)	<0.05	<0.05	<0.05	<0.05	<0.05
Lead (mg/l)	<0.1	<0.1	<0.1	<0.1	<0.1
Mercury (ug/l)	<0.5	<0.5	<0.5	<0.5	<0.5
Selenium (ug/l)	<5	<5	<5	<5	<5
Silver (mg/l)	<0.02	0.03	<0.02	0.03	<0.02
Nickel (mg/l)	0.7	0.4	0.3	2.2	<0.2
Uranium (mg/l)	0.01	0.01	0.02	0.01	0.01
Cyanide (mg/l)	<0.2	<0.2	<0.2	<0.2	<0.2
Sulfide (mg/l)	<0.1	<0.1	<0.1	<0.1	<0.1
pH (units)	11.6	11.6	11.5	11.7	11.9
Specific Gravity (H_2O=1.0)	1.15	1.13	1.14	1.14	1.15
Total Solids (%)	21	20	21	19	19

Du Pont - Savannah River Plant
Delisting
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Total Constituent Concentrations

Tank No.	8 (Pt. 17)	8 (Pt. 17)	8 (Pt. 17)	8 (Pt. 17)	8 (Pt. 16)
Matrix *	S (0-5')	S (5-10')	S (10-15')	S (15')	S (composite)
LAB NO.:	87-44714	87-44715	87-44716	87-44717	87-44710
Parameters:					
Aluminum (mg/l)	1,800	2,200	2,100	890	2,100
Nickel (mg/l)	1.2	1.2	1.2	1.2	1.2
Uranium (mg/l)	9.1	13	13	6.5	12
Sodium (mg/l)	32,000	34,000	34,000	31,000	30,000
Nitrate Nitrogen (mg/l)	15,000	15,000	18,000	15,000	18,000
Total Phosphate (mg/l)	2,500	2,500	2,400	2,500	2,600
pH (units)	11.9	11.9	11.8	12.0	12.0
Specific Gravity (H_2O=1.0)	1.08	1.08	1.08	1.08	1.09
Total Solids (%)	12	12	12	12	12
Copper (mg/l)	—	—	—	—	0.4
Lead (mg/l)	—	—	—	—	0.9
Cadmium (mg/l)	—	—	—	—	<0.01
Chromium (mg/l)	—	—	—	—	<0.05
Zinc	—	—	—	—	<0.01
Selenium (ug/l)	—	—	—	—	<25
Arsenic (ug/l)	—	—	—	—	<50
Viscosity (cSt)	—	—	—	—	1.05

Key Identification:

* P = Precipitant; P+S = Proportioned Precipitant/Supernatant Mixture.

Sulfide was determined utilizing a lead sulfide procedure (Hach Chemical Co.). Uranium analyses were determined fluorometrically.

All other analytical methods are those approved by the U.S. Environmental Protection Agency.

Respectfully submitted,

ENWRIGHT LABORATORIES, INC.

Charles H. Reece

Charles H. Reece, Ph.D.
Laboratory Manager

rwz

APPENDIX B

SRTC INTERNAL REPORTS

1 C. M. Jantzen to M. J. Plodinec, "Solidification of M-Area Sludge and Supernate into Low Temperature Glass: I. Sludge and Supernate Characterization", DPST-89-351, Savannah River Laboratory, March 1, 1989.

2 C. M. Jantzen to E. W. Holtzscheiter and M. J. Plodinec, "Glass Formulations and Volume Reductions for M-Area Waste Solidification", SRT-GTG-920026, Savannah River Technology Center, May 31, 1992.

Blank

TECHNICAL DIVISION
SAVANNAH RIVER LABORATORY

Keywords: M-area, sludge, supernate, waste, glass

DPST-89-351

cc: E. L. Albenesius, 773-A
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H. E. Sturm, 773-43A
E. G. Orebaugh, 773-43A
C. A. Langton, 773-43A
GTG (9)
SRL Records (4), 773-A

MEMORANDUM

March 1, 1989

TO: M. J. PLODINEC

FROM: C. M. JANTZEN CMJ

SOLIDIFICATION OF M-AREA SLUDGE AND SUPERNATE INTO LOW TEMPERATURE GLASS: I. SLUDGE AND SUPERNATE CHARACTERIZATION

INTRODUCTION AND SUMMARY

Concentrated waste from M-Area operations is currently stored in the Interium Storage/Treatment Facility (IS/TF). The total current volume in storage is ~1,000,000 gallons of which ~15% is a gelatinous hydroxide sludge. The current strategy for treatment and disposal of the supernate and sludge is summarized below:

- the supernate will be decanted from the storage tanks and treated in the M-Area Dilute Effluent Treatment Facility (DETF)
- solidification of the residual sludge as saltstone, and subsequent delisting of the stabilized waste so that it can be disposed of in an industrial landfill

Low temperature glasses are being investigated as an alternative solidification technology for M-Area sludge and/or sludge plus supernate.[1]

Characterization of the sludge and supernate chemistry was required in order to utilize the waste chemistry when formulating glasses. The waste characterization is documented in this study. The advantages of vitrification are discussed.

M.J. Plodinec

DPST-89-351
March 1, 1989

BACKGROUND

A Liquid Effluent Treatment Facility (LETF) was constructed in 1985 to process 300-Area chemical wastes due to the Federally mandated closure of the M-Area seepage basin. The LETF is a complex of three facilities: a Dilute Effluent Treatment Facility (DETF), a Chemical Transfer Facility (CTF), and an interium Storage/Treatment Facility (IS/TF). The DETF processes dilute wastes from the 300-Area processes and then releases the clarified liquid to Tim's Branch.[2,3] The DETF is a conventional water treatment facility which uses precipitation, flocculation, and filtration to remove dissolved metals. These solids are transferred through the Chemical Transfer Facility (CTF) to the IS/TF.

In January 1989 South Carolina Department of Health and Environmental Control (SCDHEC) approved a construction permit for the DETF-IST Supernate Transfer Facility.[3] This will allow the DETF to be used to treat the supernate from the M-Area Interim Storage/Treatment Facility (IS/TF) tanks. There are six 35,000 gallon tanks (Tanks 1-6) and two 500,000 gallon tanks (Tanks 7-8). As of August, 1987 Tanks 1-6 and 8 were full.[4] Tank 7 was filled during 1988. At maximum M-Area production, a volume of ~ 40,000 gallons per month would be added to the IS/TF tanks.[5] Tank 1 is 100 volume % supernate, but tanks 2-6 and 8 have been determined to contain 10-40 volume % supernate/sludge.[6] Supernate treatment is scheduled to begin in mid-1989.

The current strategy for solidification of the sludge is to process the sludge into a "saltstone" type cement in Y-Area.[5] A delisting petition for the stabilized waste will be submitted to EPA in early 1989. Leaching of nitrate from cementitious waste forms is known to be problematic. If the stabilized sludge is not delisted then the sludge and/or the stabilized sludge would remain a hazardous waste and disposal in a permitted RCRA hazardous waste repository would be necessary.

In 1987 stabilization of low-level wastes into low temperature glasses was suggested to the Glass Technology Group by H.S. Eleuterio.[7] In 1988, the SRL Professional Planning Committee also recommended[1] the investigation of converting high nitrate containing (low-level) wastes into a low temperature glass (via a sol-gel technology). The investigation into this new technology was considered timely because of the potential for large waste volume reduction compared to solidification into cement.

M.J. Plodinec

DPST-89-351
March 1, 1989

CURRENT STATUS

In March of 1987 a borophosphate glass was fabricated at 750°C with M-Area slurry (sludge + supernate). About 100 mL of slurry made ~ 10 mL of glass: a waste volume reduction of ~90%.[8] When the DETF-IST Supernate Transfer Facility concept for treatment of M-Area's supernate and subsequent discharge to Tim's branch was initiated, M-Area's waste solidification strategy was altered from solidification of sludge plus supernate to solidification of sludge only. Samples of M-Area sludge were obtained in January, 1988 and the sludge characterization documented in this study was initiated so that low temperature glasses could be formulated.

EXPERIMENTAL

Samples of agitated sludge-supernate from ISF Tanks 6 and 8 were obtained in September, 1987. An agitated aliquot of the sludge-supernate slurry was dissolved in HNO_3 at a pH of 0.45 to insure that the solids heel was dissolved and analyzed. The acidified samples were analyzed by inductively coupled plasma (ICP) for metal cations and by Davis-Gray titration with K dichromate for uranium. The preferred analytic technique for uranium concentrations greater than 1 g/L is the Davis-Gray titration. For samples with <0.1 g/L Laser Syntrex is the preferred technique. For concentrations between 0.1 and 1 g/L both techniques have inherent difficulty. In solutions low in redox containing elements, the Davis-Gray titration can be used at uranium concentrations <1 g/L.

Alkali ions in the sludge-supernate were analyzed by both ICP and atomic adsorption (AA) techniques. Potentially insoluble anions, such as PO_4, were measured as P by ICP analysis on the acidified sludge-supernate samples and as water soluble PO_4 by Ion chromatography (IC). The remaining anions were assumed to be water soluble and were analyzed by IC on unacidified supernate. Chloride and fluoride were measured by Ion Selective Electrode (ISE) due to interferences from the water peak during analysis of Cl by IC. The CO_3 of the samples was determined by precipitating the CO_3, dissolving it in 0.1M HCl, and then titrating with 0.1M NaOH. The specific gravity of the sludge-supernate and the pH of the supernate were also determined.

Sludge samples[9] from ISF Tanks 1-6 and Tank 8 were obtained from M-Area in ~~January, 1988.~~ November 1986 and January, 1987. For each tank the wt% solids were obtained in duplicate from samples dried at 105°C. Additional samples were dried overnight at 90°C to obtain x-ray diffraction (XRD) analyses of the crystalline species. In cases where precursor, poorly crystallized phases were observed in the XRD spectra, the samples were sequentially heated at 300°C and 600°C to crystallize the poorly formed phase(s) and aid in XRD identification.

The chemical analysis of the sludge compositions were determined in duplicate in March, 1988 and in duplicate in November, 1988 because the Ni and K analyses had been omitted in the March analyses. Moreover, the HCl/HF dissolution had been used to determine Si by AA in March and this number was biased higher than the ICP analysis for Si. This bias was attributed to the HF dissolving Si from the glass bead in the nebulizer of the AA. Silica was redetermined by AA from the Na_2O_2 dissolution in November, 1988.

The sludge was completely analyzed by the following techniques:

- Dissolution by Na_2O_2 with an HCl uptake
  - ICP for Al, Ca, Fe, Mg, Mn, Li, Si, Cr, B, Sr, Ti, P, Ba, Pb, Mo, Zn, Cu (March and November, 1988)
  - AA for Si (November, 1988)
- Dissolution by HCl/HF bomb
  - ICP for Na, Ni, Zr (November, 1988)
  - AA for Ni due to Ni interferences on ICP in the presence of U (November, 1988)
  - AA for Na (March and November, 1988)
  - AA for K (November, 1988)
  - AA for Si (March, 1988)
- Uranium by Davis-Gray titration (March, 1988)
- Dissolution by Na_2O_2 with a H_2O uptake
  - IC for SO_4, NO_3, PO_4 (March, 1988)
  - ISE for Cl and F (March, 1988)

Different ICP instruments were used to do the March, 1988 and November, 1988 analyses. The detection limits for each of these instruments is listed in Table 1. The major elements (K, Na, Ca, Mg, Si, Al, and Fe) are accurate to within ±10% at concentrations >1 ppm. Within a factor of two of the detection limits listed (Table 1), the precision of any element is only ±100%.

Perflo and diamateceous earth are high silica containing additives used in M-Area processing. Samples of these additives, which are oxide based, were analyzed only for cations in November, 1988. The following techniques were used:

- H_2O content by drying at 600°C overnight
- Dissolution by Na_2O_2 with an HCl uptake
  - ICP for Al, Ca, Fe, Mg, Mn, Li, Si, Cr, B, Sr, Ti, P, Ba, Pb, Mo, Zn, Cu
- Dissolution by HCl/HF bomb
  - ICP for Na, Ni, Zr
  - AA for Ni, Na, K

XRD analyses were also performed on perflo and diamateceous earth both before and after chemical treatment in order to determine if chemical alteration of these additives was occurring due to the high pH environment in the IS/TF storage tanks. The filter aids were analyzed by XRD before chemical treatment. Then they were treated with 6M NaOH solution for 29 hours, filtered, dried at 80°C overnight, dried an additional 1.5 hours at 200°C, and the XRD analysis repeated.

The details of the analytic procedures are recorded in laboratory notebook DPSTN-4475. The analytic results are recorded in laboratory notebooks DPSTN-4475 and -4725.

RESULTS AND DISCUSSION

Chemical Analysis of the Sludge-Supernate Slurry

Samples of agitated sludge-supernate slurry from ISF Tanks 6 and 8 were dissolved and analyzed in February-March 1987. The pH of the slurry varies from 11.90-12.25 (Table 2). The specific gravity is ~1.10 g/mL while the % solids varies from 10.22 to 11.05. The sludge-supernate slurry contains high concentrations of sodium, nitrate, phosphate and aluminum (Table 2).

The cation analyses by ICP are given in Table 2. Sodium analyzed by ICP and AA gave comparable results (Table 2). Uranium analyses were determined by Davis-Gray titration even though the concentrations were <1 g/L because significant quantitities of other redox species were not present in the slurry (Table 2). Because the uranium concentrations were low Ni, Pb, and Zn were determined by ICP analyses although these elements can have spectral interferences in the presence of uranium.

Acid soluble PO_4, was analyzed as P by ICP on the acidified sludge-supernate samples. Water soluble PO_4 was measured by IC and is lower than the acid soluble PO_4 values listed in Table 2. This implies that water soluble PO_4 is a major constituent of the supernate and that a PO_4 containing solid is a major constituent of the sludge portion of the slurry. The remaining water soluble anions were analyzed by IC while the CO_3 of the samples was analyzed by a precipitation-titration technique.

From the analyses in Table 2, the major elements in the slurry are Na, Al, NO_3, and PO_4. Assuming that the major species are $NaNO_3$, $NaAlO_2$, and Na_3PO_4, the molar anion-cation mass balance at the bottom of Table 2 shows excellent agreement.

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Table 1. Detection Limits of Inductively Coupled Plasma Spectroscopy (ICP) and Atomic Adsorption (AA)

Element	December 1986-October 1988 ppm (Ref. 10)	November 1988-present ppm (Ref. 11)	Technique
Al	0.09	0.025	ICP
Ca	0.03	0.0001	ICP
Cu	0.02	0.003	ICP
Fe	0.01	0.004	ICP
K	0.005	0.005	AA
Mg	0.003	0.0001	ICP
Na	0.06	0.025	ICP
P	0.04	0.03	ICP
Pb	0.07	0.05	ICP
Ru	0.02	0.025	ICP
Si	0.03	0.02	ICP
Ti	0.002	0.003	ICP
Zr	0.002	0.004	ICP

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Table 2. Analyses of M-Area Waste Slurry (Sludge + Supernate)*

Constituent	ISF - Tank 6	ISF - Tank 8 Sample A	ISF - Tank 8 Sample B
	gm/L		
Uranium (D-G titration)	0.596	0.090	0.070
Sodium (ICP)	36.327	36.054	34.616
Sodium (AA)	31.253	37.228	36.308
Aluminum (ICP)	3.57	3.28	2.23
Calcium (ICP)	0.045	0.011	0.010
Iron (ICP)	0.048	0.005	0.006
Magnesium (ICP)	0.004	0.0004	0.0004
Nickel (ICP)	0.193	0.056	0.066
Silicon (ICP)	0.287	0.014	0.010
Potassium (AA)	0.035	0.020	0.020
Chromium (ICP)	0.009	0.004	0.004
Zirconium (ICP)	0.005	0.003	0.003
Titanium (ICP)	0.004	0.002	0.002
Lead (ICP)	0.14	0.061	0.07
Phosphorous (ICP)	3.02	2.19	2.07
Phosphorous (IC)	2.06	1.64	1.25
Nitrate (IC)	59.13	76.32	75.95
Chloride (ISE)	0.22	0.22	0.30
Sulfate (IC)	0.21	0.21	0.72
Carbonate (titration)	5.37	3.24	3.36
pH	12.25	11.92	11.90
Sp Gravity (g/mL)	1.08	1.09	1.12
% Solids	10.35	10.22	11.05
	moles/L		
$\Sigma\ Na^+$	1.6	1.56	1.50
$\Sigma\ NO_3^=, PO_4^{\equiv}, AlO_2^-$	1.37	1.56	1.55

(* after Reference 12: CO_3 values added in this study)

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XRD Analysis of M-Area Sludge and Filter Aids

Sludge samples from ISF Tanks 1-6 and Tank 8 were obtained from M-Area in January, 1988. The liquid was decanted off the samples as recommended by M-Area.[6] The samples were not washed and were dried overnight at 90°C to obtain x-ray diffraction (XRD) analyses of the crystalline species in the sludge. Drying at 90°C evaporates adsorbed water but does not evaporate water of crystallization of hydrated species.

Sludge Analyses

The seven tanks contained varying amounts of $NaNO_3$, $Al(OH)_3$ (both gibbsite and bayerite polymorphs), a Ca-Na Type A zeolite, filter aid, finely dispersed $Na_6U_7O_{24}$, and possibly $NaAl_3(PO_4)_2(OH)_4 \cdot 2H_2O$. The relative amounts of each of the four major phases in each tank is given in Table 3. When sludge from Tank 1 was heat treated at 300°C for 3 hours and reanalyzed, it was found to still be amorphous. Subsequent heat treatment at 600°C overnight, crystallized the finely dispersed and/or poorly crystallized $Na_6U_7O_{24}$ to $Na_2U_2O_7$ (Figure 1). This transformation has been reported previously in the literature[13] and was used to confirm the presense of the poorly crystallized $Na_6U_7O_{24}$.

The $Na_6U_7O_{24}$ phase has previously reported to form when uranium is precipitated from uranyl nitrate solution by sodium hydroxide.[14] It is the primary uranate species which is stable in the presence of excess alkali.[14] Since the M-area waste tanks normally stabilize at a pH of 11-12 (due to excess NaOH used during aluminum dissolution to recover reject slugs), the identification of this sodium uranate is consistent with the chemical environment of the IS/TF tanks. The tanks (#3 and 4) with the lowest pH[7] show no $Al(OH)_3$ and only trace amounts of $Na_6U_7O_{24}$ in the x-ray spectra. Conversly, the tanks (#1, 5, 8) with the highest pH, contain the most $Al(OH)_3$ and sodium uranate. The quantative phase analysis of the tanks is, therefore, consistent with the individual tank environments (Table 3).

Filter Aid Analyses

A Ca-Na Type A zeolite was identified in the M-Area sludges by x-ray analysis. However, zeolite is not used in M-Area processing. Samples of perflo and diamateceous earth were analyzed by x-ray diffraction (XRD) but were amorphous. Samples of these two high silica containing additives were dried at 200°C for an additional 1.5 hours and they remained x-ray amorphous. Unheated perflo and diatomaceous earth were then treated with 6M NaOH solution at room temperature for 29 hours. The solution pH was 13.73. The solution

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Table 3. Phase Identification of the Crystalline Species in M-Area Sludge

Tank ID	$NaNO_3$*	$Al(OH)_3$**	$Na_6U_7O_{24}$***	Ca-Zeolite^t	pH^{ttt}
1	Yes	Yes	Major	Yes	12.0
2	Yes	Trace	Yes	None	12.7
3	Yes	None	Trace	None	10.6
4	Yes	None	Trace	None	9.6
5	Yes	Yes	Major	Yes	12.9
6	Yes	Yes	Yes	None	12.7 12.26^{tt}
8(P42)	Yes	Yes	Major	Trace	12.1 11.92^{tt}
8(P43)	Yes	Yes	Major	Trace	12.1 11.90^{tt}

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* JCPDS #7-271
** JCPDS #29-41
*** JCPDS #20-1161 which is a deleted pattern which is closely related to $Na_2U_{2.5}O_{8.5}$ (#20-1166) or $Na_2U_2O_7$ (#26-973 or #26-974)
t JCPDS #11-589
tt pH of sludge-supernate slurry from Table 2, Reference 12
ttt pH of supernate from Reference 9

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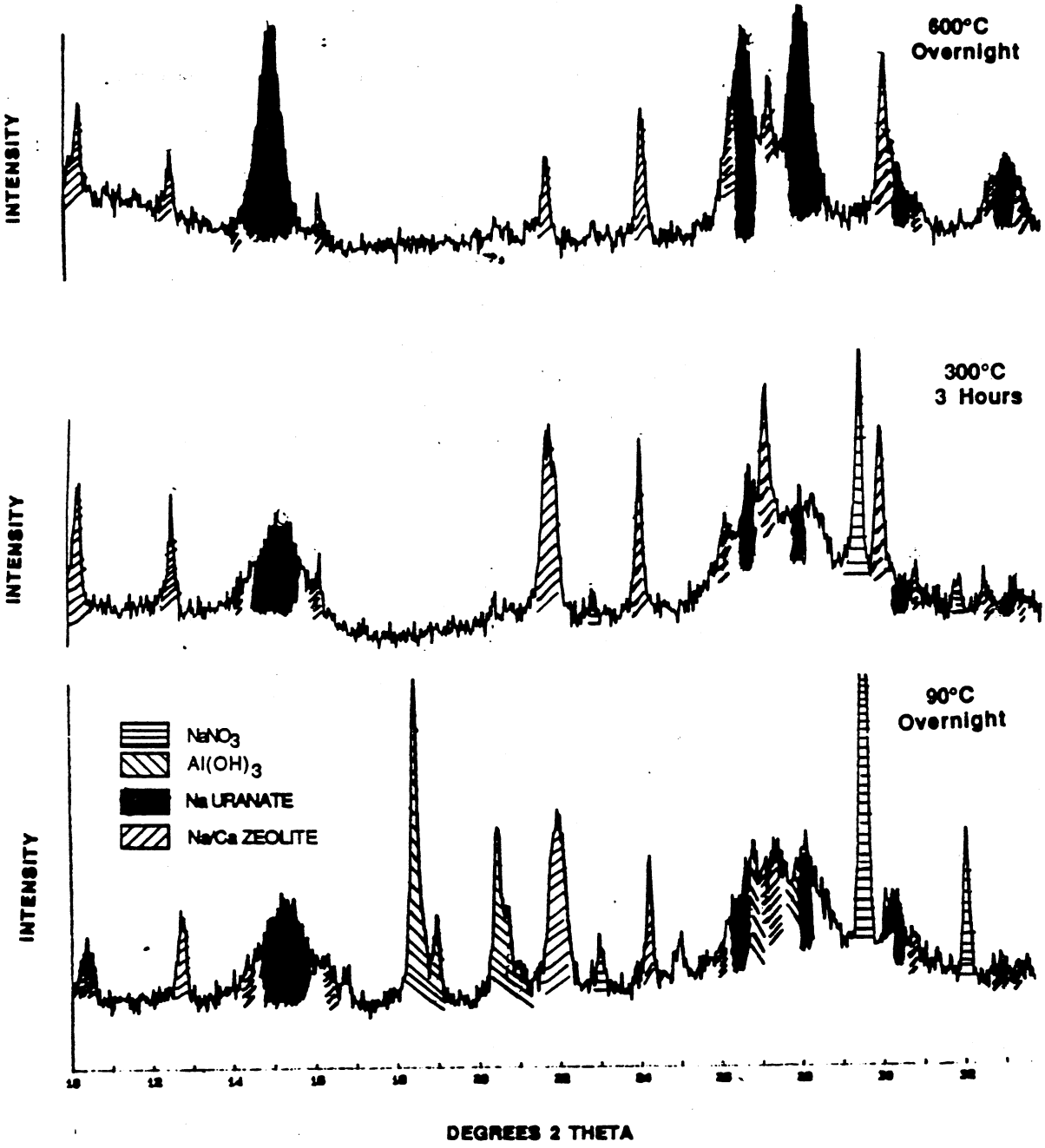

Figure 1. X-ray spectra for a heat treated sequence of Tank 1 sludge. Heating at 300°C and 600°C to enhance the crystallization of the poorly crystallized sodium uranate phase ($Na_6U_7O_{24}$) confirmed the identification of this phase by x-ray analysis.

was filtered off and the solids dried at 80°C for ~ 17 hours. The solids were still wet, and were dried for an additional 1.5 hours at 200°C. The dried solids were identified by x-ray analysis to be Na_2SiO_3 (JCPDS #16-818) and $Na_4Si_3Al_3O_{12}Cl$ (sodalite - JCPDS #20-495), a zeolite.

It is totally consistent that the perflo and diamateceous earth may be chemically altered to a crystalline zeolite type structure due to the high Na content and/or the high pH of the M-Area supernate. Additional support for this hypothesis was achieved by dissolving sludge in 6M HNO_3 and analyzing the undissolved residue. The acid resistant residue in the M-Area sludge is pure SiO_2, the major oxide component of the perflo and diatomaceous earth.

Chemical Analysis of M-Area Sludge and Filter Aids

The chemical analysis of the M-Area sludge was initially determined in duplicate in March, 1988 and a second set of duplicate analyses performed in November, 1988. The data is summarized in Table 4 and the quadruplicate analyses for each tank are given in Appendix I. Different ICP units were used for the March, 1988 and November, 1988 analyses and this accounts for some of the variation in detection limits and some of the large standard deviations (Appendix I).

Sodium was analyzed by ICP in March and November and by AA in the November analyses. The agreement between the various analyses for Na is excellent (Table 4 and Appendix I). Nickel was determined by both ICP and AA in November, 1988. Nickel by ICP is difficult due to interferences in the presence of uranium and AA is the preferred technique for analysis of Ni in the presence of uranium. To ensure that Ni determined by AA did not exhibit an enhancement in the presence of uranium (Table 4 and Appendix I), the uranium was precipitated out of one series of samples and the Ni analyses repeated. The Ni analyses determined by AA in the presence and absence of uranium were the same. Zinc and lead analyses by ICP can also be affected by the presence of uranium but no alternate technique is available for their determination.

Silicon was analyzed by ICP and by AA in both March and November, 1988. In March the silicon concentration had been measured from the HCl/HF dissolution. This number was biased higher than the ICP analyses for Si or the AA analyses for Si from the Na_2O_2 dissolution (November, 1988). This bias was attributed to the HF dissolving Si from the glass bead in the nebulizer of the AA. The results for the average silicon concentration determined by AA is therefore, only the average of the duplicate November analyses. Correspondingly, the AA results for Si in Appendix I are shown as

italics and are not included in the average. Although ICP is the preferred technique for analysis of Si, the ICP results for Si have higher standard deviations (Appendix I) and the November, 1988 AA results for Si are considered more accurate.

Phosphorous is measured as P by ICP for sludges dissolved in Na_2O_2 and HCl. Phosphorous is measured as PO_4 by ICP for sludges dissolved in Na_2O_2 and H_2O. The observed differences in wt % P shown in Table 4 and Appendix I is attributed to differences in the acid soluble and water soluble concentrations of P.

The perflo and diamatacous earth were dried at 600°C overnight to determine their water content. The same dissolution procedures that were used on the M-Area sludge were used on the perflo and diamatecous earth. Anions were not analyzed because these materials are oxide based and oxygen is the only anion present in these solids. A good analysis of an oxide bearing material should sum to 100±5 wt% on an oxide basis.[15]

Tables 5 and 6 give the element and oxide wt% analyses of perflo and diatomaceous earth. The oxide wt% sums are within 100±5 wt% for both of these species. Since these species do not contain uranium and have not been in contact with M-Area wastes, the presence of Zn, Pb, and Ni is considered significant because some of the trace elements observed in the sludge analyses are originating from the processing additives.

Mass Balance Calculations

The x-ray diffraction analysis indicated that the major crystalline phases in the M-Area sludges are $NaNO_3$, $Na_6U_7O_{24}$, $Al(OH)_3$, $AlPO_4$, and a Ca-Na zeolite of the approximate formula $Ca_6(AlSiO_4)_{12}\cdot 30H_2O$ (JCPDS 11-589). The major x-ray amorphous phase was filter aid (perflo and/or dimataceous earth). A mass balance based on these 5 crystalline species and the amorphous filter aid was calculated from the element wt% analyses given in Table 4.

All of the NO_3 was assumed to form $NaNO_3$. All of the U was assumed to form $Na_6U_7O_{24}$. All of the Ca was assummed to form Ca zeolite. All of the acid soluble PO_4 determined by ICP was assumed to form $AlPO_4$. The Al minus the molar amount of Al assigned to $AlPO_4$ was assumed to form $Al(OH)_3$. All of the Si determined by AA minus the amount of Si consumed in the Ca zeolite phase, was assigned to the

amorphous fraction of the filter aids. The average molecular formulas for these species were determined from the normalized oxide mole% analyses given in Tables 5 and 6. The average molecular formulas can be written as follows:

$$\text{perflo} = K_{0.08}Na_{0.08}Al_{0.16}Si_{0.81}O_{1.94}$$

$$\text{diatomaceous earth} = K_{0.06}Na_{0.06}Al_{0.18}Si_{0.61}O_{1.55}\cdot 0.22H_2O.$$

For perflo the average molecular weight is 63.07 and for diatomaceous earth the average molecular weight is 54.47. Since the relative amounts of each filter aid used in any one M-Area tank is unknown, an average molecular weight of 60 grams was used to calculate the contribution of the filter aids to the mass balance.

Table 7 shows a sample calculation for Tank-1 sludge. The resulting mass balance results are summarized in Table 4. The mass balance sums calculated to be between 85-105 mole%. Excess Na over that assigned to $NaNO_3$ and $Na_6U_7O_{24}$ was calculated as moles/100grams. This Na may be partially be from the Na zeolite contribution since only Ca zeolite was accounted for. The Na may also be partially tied up in minor phases such as NaCl and sodium aluminate phases which did not show up during x-ray diffraction analysis due to their low volume fraction. Interestingly, the tanks with excess Na (Tanks 1, 5 and 6) have relatively high pH values, while the tanks such as 3 and 4 which do not have excess Na have lower pH values.

The mass balance summaries (Table 4) agree with the x-ray diffraction analysis (Table 3): tanks 3 and 4 with low pH have less $Al(OH)_3$ and only trace amount of $Na_6U_7O_{24}$ while tanks 1, 2, 5, 6, and 8 contain the most $Al(OH)_3$ and $Na_6U_7O_{24}$. The mass balance also demonstrates that the tanks with the lowest $NaNO_3$ are those with the highest $Na_6U_7O_{24}$ supporting that precipitation of this uranate species occurs preferentially in the presence of excess alkali.[14]

Potential Advantages of Vitrification

Stabilization by vitrification of M-Area waste into a low temperature glass is a promising alternative to stabilization in cement because of the 2X to 19X volume reductions that vitrification could allow. Waste loadings of ~50 wt% dry sludge are achievable in glass. Since the sludge is currently ~30% solids, 100 grams of sludge will form only 60 grams of glass whereas cementitious stabilization will result in 100 grams of sludge producing 200 grams of saltstone. If the sludge and supernate combination were stabilized in glass, ~100 grams of sludge plus

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supernate will give ~ 20 grams of glass (due to NO_3 and H_2O removal), whereas 100 grams of sludge/supernate will produce ~400 grams of saltstone (due to the higher water content).

Vitrification would vaporize nitrate so that leaching of NO_3 from the waste form would be eliminated. Durable glass waste forms would also minimize the leaching of the hazardous Ni and U components of the M-Area sludge.

The M-Area sludge can be readily transformed into a low temperatue glass because:

- the sludge contains significant amounts of Na, PO_4, Si, and Al which are glass-forming species
- additional glass-forming chemicals can be added as solutions, e.g. Na_2SiO_3 or H_3PO_4
- low temperature glasses can be easily fabricated by in-can melting (this technology was extensively developed and demonstrated full scale as the backup process for the Defense Waste Processing Facility, DWPF).[16]

CONCLUSIONS

M-Area sludge and supernate have been characterized. The sludge plus supernate is composed primarily of soluble sodium nitrate, aluminate and phosphate species. The chemical analyses, XRD analyes, and mass balance calculations of the M-Area sludges demonstrated that $NaNO_3$, $Na_6U_7O_{24}$, $Al(OH)_3$, $AlPO_4$, a Ca-Na zeolite, and filter aids used in M-Area processing are the main constituents. Many of the trace elements in the sludge are originating from the filter aids added during processing.

The high concentrations of glass-forming species such as Na, Al, Si and P in the M-Area sludge and supernate indicate that vitrification of this waste may be advantageous compared to solidification in cement.

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Table 4. Summary of M-Area Sludge Analyses and Mass Balance Calculations

Element (wt%)	Tank 1	Tank 2	Tank 3	Tank 4	Tank 5	Tank 6	Tank 8
Al (ICP)	11.145	7.130	6.383	3.043	9.778	10.013	10.734
Ca (ICP)	0.325	0.310	0.304	0.205	0.327	0.497	0.307
Fe (ICP)	0.495	0.260	0.655	0.215	0.495	0.740	0.402
Mg (ICP)	0.154	0.076	0.069	0.070	0.137	0.188	0.122
Mn (ICP)	0.539	1.315	1.025	0.734	0.392	1.535	0.422
Na (ICP)	8.830	12.430	15.425	21.555	10.515	9.670	7.010
Na (AA)	8.960	14.369	16.713	25.435	10.718	10.228	7.056
Li (ICP)	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Ni (ICP)	0.695	0.390	0.275	0.055	0.555	0.425	0.728
Ni (AA)	0.876	0.556	0.385	0.082	0.758	0.601	0.990
Si (ICP)	9.613	2.408	3.675	1.631	10.790	12.310	11.301
Si (AA*)	16.140	3.140	4.105	3.323	14.030	18.000	14.715
Cr (ICP)	0.015	0.013	0.010	0.015	0.015	0.020	0.017
B (ICP)	0.060	0.075	0.025	0.015	0.015	0.010	0.010
U (D-G)	5.246	4.786	3.229	1.281	3.858	4.080	5.133
Sr (ICP)	0.004	0.004	0.005	0.002	0.003	0.006	0.006
Zr (ICP)	0.032	0.010	0.010	0.080	0.010	0.010	0.010
Ti (ICP)	0.040	0.014	0.015	0.017	0.033	0.038	0.029
K (AA*)	0.122	0.033	0.054	0.021	0.104	0.107	0.121
P (ICP)***	1.548	1.465	1.953	1.298	1.270	1.135	1.896
P (Calc IC)**	0.975	0.774	1.291	0.376	<0.848	0.244	0.973
Ba (ICP)	0.008	0.017	0.030	0.032	0.016	0.047	0.053
Pb (ICP)	0.161	0.213	0.157	0.136	0.124	0.245	0.137
Mo (ICP)	0.011	0.010	0.010	0.010	0.010	0.015	0.009
Zn (ICP)	0.960	2.155	1.720	1.294	0.945	2.875	0.794
Cu (ICP)	0.018	0.016	0.014	0.020	0.009	0.026	0.022
F (ISE)	<0.02	<0.265	<0.02	<0.02	<0.02	<0.02	N/A
Cl (ISE)	0.113	0.189	0.142	0.220	0.843	0.060	0.059
SO4 (IC)	<0.50	<0.5	<0.5	<0.5	<1.31	<0.5	<0.5
NO3 (IC)	14.275	34.660	50.580	59.500	12.000	12.870	16.376
PO4 (IC)**	2.989	2.375	3.960	1.152	<2.6	0.749	2.984
% SOLIDS (105°C)	35.370	38.980	9.240	22.340	32.490	37.120	38.235
% SOLIDS (90°C)	34.430	38.540	6.800	19.870	28.290	36.980	32.385
Moles of Na	0.416	0.656	0.695	1.050	0.468	0.406	0.269
Moles of NO3	0.230	0.559	0.816	0.960	0.194	0.208	0.264
Moles of Cl	0.003	0.005	0.004	0.006	0.024	0.002	0.002

*AA Silicon from Na2O2 dissolution; all anions from Na2O2 fusion with H2O uptake (see text)
**water soluble phosphate only
*** acid soluble phosphate
N/A = Not Analyzed

MOLAR MASS BALANCE

Al(OH)3	28.323	16.923	13.535	5.528	25.068	26.088	26.256
NaNO3	19.568	47.511	69.334	81.561	16.449	17.642	22.448
SiO2 (AA)	34.406	6.632	8.696	7.049	29.897	38.338	31.366
Na6U7O24	6.889	6.285	4.240	1.682	5.067	5.357	6.741
Ca-zeolite	2.987	2.851	2.791	1.879	3.001	4.567	2.817
AlPO4	4.745	4.492	5.987	3.979	3.894	3.480	5.815
SUM	96.918	84.695	104.583	101.678	83.376	95.473	95.443
Excess Na (Moles)	0.167	0.079	-0.132	0.085	0.261	0.184	-0.014

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Table 5. Analysis of Perflo Used in M-Area Processing on an Oxide Wt% Basis

SAMPLE ID = PERFLO (DPSTN=4725, ADD# 21312)

	ELEMENT WT%	GRAV FACTOR	OXIDE WT%	NORM OXIDE WT%	M.W.	MOLE FRACTION	NORM OXIDE MOLE %
Al2O3	6.5400	1.8895	12.3573	12.5865	101.9600	0.1212	8.0597
CaO	0.6600	1.3992	0.9235	0.9406	56.0794	0.0165	1.0951
Fe2O3	1.1700	1.4297	1.6727	1.7038	159.6922	0.0105	0.6966
FeO		1.2865	0.0000	0.0000	71.8464	0.0000	0.0000
MgO	0.0700	1.6583	0.1161	0.1182	40.3114	0.0029	0.1915
MnO2	0.3700	1.5825	0.5855	0.5964	70.9374	0.0083	0.5489
Na2O	2.6300	1.3480	3.5452	3.6110	61.9790	0.0572	3.8039
Li2O		2.1525	0.0000	0.0000	29.8774	0.0000	0.0000
NiO		1.2726	0.0000	0.0000	74.7094	0.0000	0.0000
SiO2	34.1000	2.1393	72.9501	74.3028	60.0848	1.2141	80.7398
Cr2O3		1.4616	0.0000	0.0000	151.9974	0.0000	0.0000
B2O3		3.2201	0.0000	0.0000	69.6204	0.0000	0.0000
UO2		1.1344	0.0000	0.0000	270.0388	0.0000	0.0000
ThO2		1.1379	0.0000	0.0000	264.0400	0.0000	0.0000
SrO		1.1826	0.0000	0.0000	103.6194	0.0000	0.0000
ZrO2	0.0100	1.3508	0.0135	0.0138	123.2188	0.0001	0.0073
TiO2	0.0400	1.6680	0.0667	0.0680	79.8988	0.0008	0.0555
K2O	4.0000	1.2046	4.8184	4.9077	94.2034	0.0511	3.4014
Cs2O		1.0602	0.0000	0.0000	281.8094	0.0000	0.0000
Sb2O3		1.1970	0.0000	0.0000	291.4982	0.0000	0.0000
P2O5	0.0400	2.2910	0.0916	0.0933	141.9370	0.0006	0.0429
Nd2O3		1.1660	0.0000	0.0000	336.4782	0.0000	0.0000
La2O3		1.1728	0.0000	0.0000	325.8100	0.0000	0.0000
Y2O3		1.2699	0.0000	0.0000	225.8082	0.0000	0.0000
BaO	0.0400	1.1165	0.0447	0.0455	153.3394	0.0003	0.0194
PbO	0.0900	1.0772	0.0969	0.0987	223.1900	0.0004	0.0289
CeO2		1.2284	0.0000	0.0000	172.1200	0.0000	0.0000
MoO3		1.5003	0.0000	0.0000	143.9382	0.0000	0.0000
ZnO	0.5400	1.2447	0.6721	0.6846	81.3800	0.0083	0.5492
CuO	0.0200	1.2518	0.0250	0.0255	79.5454	0.0003	0.0209
H2O	0.2000		0.2000	0.2037	18.0000	0.0111	0.7389
SUMS			98.1796	100.0000		1.5037	100.0000

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Table 6. Analysis of Diatomaceous Earth Used in M-Area Processing on an Oxide Wt% Basis

SAMPLE ID = DIATOMACEOUS EARTH (DPSTN=4725, ADD#21313)

	ELEMENT WT%	GRAV FACTOR	OXIDE WT%	NORM OXIDE WT%	M.W.	MOLE FRACTION	NORM OXIDE MOLE %
Al2O3	8.5100	1.8895	16.0796	15.5271	101.9600	0.1577	8.5292
CaO	0.6500	1.3992	0.9095	0.8782	56.0794	0.0162	0.8771
Fe2O3	0.6400	1.4297	0.9150	0.8836	159.6922	0.0057	0.3099
FeO		1.2865	0.0000	0.0000	71.8464	0.0000	0.0000
MgO	0.0800	1.6583	0.1327	0.1281	40.3114	0.0033	0.1780
MnO2	0.5700	1.5825	0.9020	0.8710	70.9374	0.0127	0.6877
Na2O	2.4300	1.3480	3.2756	3.1631	61.9790	0.0529	2.8583
Li2O		2.1525	0.0000	0.0000	29.8774	0.0000	0.0000
NiO	0.2400	1.2726	0.3054	0.2949	74.7094	0.0041	0.2211
SiO2	31.4700	2.1393	67.3238	65.0102	60.0848	1.1205	60.5987
Cr2O3		1.4616	0.0000	0.0000	151.9974	0.0000	0.0000
B2O3		3.2201	0.0000	0.0000	69.6204	0.0000	0.0000
UO2		1.1344	0.0000	0.0000	270.0388	0.0000	0.0000
ThO2		1.1379	0.0000	0.0000	264.0400	0.0000	0.0000
SrO		1.1826	0.0000	0.0000	103.6194	0.0000	0.0000
ZrO2	0.0100	1.3508	0.0135	0.0130	123.2188	0.0001	0.0059
TiO2	0.0400	1.6680	0.0667	0.0644	79.8988	0.0008	0.0452
K2O	3.7000	1.2046	4.4570	4.3039	94.2034	0.0473	2.5588
Cs2O		1.0602	0.0000	0.0000	281.8094	0.0000	0.0000
Sb2O3		1.1970	0.0000	0.0000	291.4982	0.0000	0.0000
P2O5	0.1900	2.2910	0.4353	0.4203	141.9370	0.0031	0.1659
Nd2O3		1.1660	0.0000	0.0000	336.4782	0.0000	0.0000
La2O3		1.1728	0.0000	0.0000	325.8100	0.0000	0.0000
Y2O3		1.2699	0.0000	0.0000	225.8082	0.0000	0.0000
BaO	0.0300	1.1165	0.0335	0.0323	153.3394	0.0002	0.0118
PbO	0.1800	1.0772	0.1939	0.1872	223.1900	0.0009	0.0470
CeO2		1.2284	0.0000	0.0000	172.1200	0.0000	0.0000
MoO3		1.5003	0.0000	0.0000	143.9382	0.0000	0.0000
ZnO	0.9000	1.2447	1.1202	1.0817	81.3800	0.0138	0.7445
CuO	0.0200	1.2518	0.0250	0.0242	79.5454	0.0003	0.0170
H2O	7.3700		7.3700	7.1167	18.0000	0.4094	22.1439
SUMS			103.5589	100.0000		1.8490	100.0000

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Table 7. Example of Mass Balance Calculation for M-Area Sludge

	A	B
1		
2		**Tank 1 Average Analysis (wt%)**
3		
4	Al (ICP)	11.145
5	Ca (ICP)	0.325
6	Fe (ICP)	0.495
7	Mg (ICP)	0.154
8	Mn (ICP)	0.539
9	Na (AA*)	8.96
10	Li (ICP)	<0.002
11	NI (ICP)	0.695
12	NI (AA*)	0.876
13	SI (ICP)	9.613
14	SI (AA*)	16.14
15	Cr (ICP)	0.015
16	B (ICP)	0.06
17	U (EXT-SCINT)	5.2457
18	Sr (ICP)	0.005
19	Zr (ICP)	0.0323
20	Ti (ICP)	0.0395
21	K (AA*)	0.1215
22	P (ICP)***	1.5475
23	P (Calc IC)**	0.975
24	Ba (ICP)	0.0077
25	Pb (ICP)	0.161
26	Mo (ICP)	0.0105
27	Zn (ICP)	0.9595
28	Cu (ICP)	0.018
29		
30	F (ISE)	<0.02
31	Cl (ISE)	0.1125
32	SO4 (IC)	<0.50
33	NO3 (IC)	14.275
34	PO4(IC)**	2.9885
35		
36	% SOLIDS (105°C)	35.37
37	% SOLIDS (90°C)	34.43
38		
39	Moles of Na	0.416
40	Moles of NO3	0.23
41	Moles of Cl	0.003
42		
43		
44	**MASS BALANCE**	
45		
46	Al(OH)3	=((B4/26.98)-(B22/30.97))*78
47	NaNO3	=B40*84.995
48	SiO2 (AA)	=((B14/28.08-(B5/40.08)/6))*60
49	Na6U7O24	=((B17/238.029)/7)*2188.14
50	Ca-zeolite	=((B5/40.08)/6)*(2210)
51	AlPO4	=(B22/30.97)*94.97
52		
53	SUM	=SUM(B46:B51)
54		
55	EXCESS moles Na over	
56	NaNO3 and Na-U =	=(B39-B40)-(((B17/238.03)/7)*6)

References Not Included

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APPENDIX I. Detailed M-Area Sludge Analyses for Tanks 1-6 and 8

TABLE A1. M-AREA TANK 1 SLUDGE ANALYSES AS SPECIES WT% DPST-89-351

	TK-1-1	TK-1-2	TK-1-1	TK-1-2	TANK 1	TANK 1
ANALYSIS #	111468	111469	21295	21296	AVERAGE	STANDARD
ANALYSIS DATE	3/1/88	3/1/88	11/1/88	11/1/88		DEVIATION
RECORDED	DPSTN 4475	DPSTN 4475	DPSTN 4475	DPSTN 4475		
Al (ICP)	11.300	11.000	10.850	11.430	11.145	0.267
Ca (ICP)	0.228	0.192	0.530	0.350	0.325	0.152
Fe (ICP)	<0.004	<0.004	0.500	0.490	0.495	0.007
Mg (ICP)	0.143	0.133	0.190	0.150	0.154	0.025
Mn (ICP)	0.238	0.317	1.100	0.500	0.539	0.390
Na (ICP)			8.810	8.850	8.830	0.028
Na (AA)	10.010	9.140	8.590	8.100	8.960	0.819
Li (ICP)	<0.002	<0.002	<0.002	<0.002	<0.002	
Ni (ICP)			0.680	0.710	0.695	0.021
Ni (AA)			0.884	0.868	0.876	0.011
Si (ICP)	6.870	7.190	11.990	12.400	9.613	2.990
Si (AA*)	*19.760*	*21.960*	16.700	15.580	16.140	0.792
Cr (ICP)	0.009	0.010	0.020	0.020	0.015	0.006
B (ICP)	<0.002	<0.002	0.090	0.030	0.060	0.042
U (D-G)	5.180	5.311			5.246	0.093
Sr (ICP)	0.002	0.001	0.010	<0.001	0.004	0.005
Zr (ICP)	0.055	0.054	0.010	0.010	0.032	0.026
Ti (ICP)	0.038	0.040	0.040	0.040	0.040	0.001
K (AA*)			0.124	0.119	0.122	0.004
P (ICP)***	2.200	1.910	1.090	0.990	1.548	0.599
P (Calc IC)**	1.040	0.909			0.975	0.093
Ba (ICP)	0.008	0.007	<0.001	<0.001	0.008	0.001
Pb (ICP)	0.048	0.086	0.320	0.190	0.161	0.122
Mo (ICP)	0.012	0.010	0.010	0.010	0.011	0.001
Zn (ICP)	0.618	0.580	1.760	0.880	0.960	0.550
Cu (ICP)	0.013	0.009	0.020	0.030	0.018	0.009
F (ISE)	<0.02	<0.02			<0.02	
Cl (ISE)	0.113	0.112			0.113	0.001
SO4 (IC)	<0.09	<0.50			<0.50	
NO3 (IC)	13.280	15.270			14.275	1.407
PO4(IC)**	3.190	2.787			2.989	0.285
% SOLIDS (105°C)	35.370				35.370	
% SOLIDS (90°C)	34.430				34.430	
Moles of Na	0.435	0.398			0.416	0.027
Moles of NO3	0.214	0.246			0.230	0.023
Moles of Cl	0.003	0.003			0.003	0.000

AA Silicon values in italics from HCl/HF dissolution; others from Na2O2 dissolution
all anions from Na2O2 fusion with H2O uptake (see text)
*water soluble phosphate only
** acid soluble phosphate

MASS BALANCE

Al(OH)3	28.323
NaNO3	19.568
SiO2 as Filter Aid	34.406
Na6U7O24	6.889
Ca-zeolite	2.987
AlPO4	4.745
SUM	96.918
EXCESS moles Na over NaNO3 and Na-U =	0.167

TABLE A2. M-AREA TANK 2 SLUDGE ANALYSES AS SPECIES WT% DPST-89-351

ANALYSIS #	TK-2-1 111470	TK-2-2 111471	TK-2-1 21297	TK-2-2 21298	TANK 2 AVERAGE	TANK 2 STANDARD DEVIATION
ANALYSIS DATE	3/1/88	3/1/88	11/1/88	11/1/88		
RECORDED	DPSTN 4475	DPSTN 4475	DPSTN 4475	DPSTN 4475		
Al (ICP)	8.010	7.490	6.710	6.310	7.130	0.764
Ca (ICP)	0.119	0.112	0.450	0.560	0.310	0.229
Fe (ICP)	<0.004	<0.004	0.270	0.250	0.260	0.014
Mg (ICP)	0.028	0.024	0.120	0.130	0.076	0.057
Mn (ICP)	<0.004	<0.004	1.300	1.330	1.315	0.021
Na (ICP)			12.470	12.390	12.430	0.057
Na (AA*)	14.780	15.360	13.780	13.530	14.363	0.857
Li (ICP)	<0.002	<0.002	<0.002	<0.002	<0.002	
Ni (ICP)			0.390	0.390	0.390	0.000
Ni (AA*)			0.566	0.546	0.556	0.014
Si (ICP)	2.540	2.430	2.290	2.370	2.408	0.105
Si (AA*)	*11.670*	*9.770*	3.040	3.240	3.140	0.141
Cr (ICP)	0.007	0.006	0.020	0.020	0.013	0.008
B (ICP)	<0.002	<0.002	0.080	0.070	0.075	0.007
U (D-G)	4.718	4.853			4.786	0.095
Sr (ICP)	0.002	0.002	0.001	0.010	0.004	0.004
Zr (ICP)	<0.002	<0.002	0.010	0.010	0.010	0.000
Ti (ICP)	0.009	0.008	0.020	0.020	0.014	0.007
K (AA*)			0.033	0.032	0.033	0.001
P (ICP)***	2.260	1.780	0.920	0.900	1.465	0.670
P (Calc IC)**	0.789	0.760			0.774	0.020
Ba (ICP)	0.031	0.003	<0.001	<0.001	0.017	0.020
Pb (ICP)	0.059	0.074	0.350	0.370	0.213	0.170
Mo (ICP)	<0.004	<0.004	0.010	0.010	0.010	0.000
Zn (ICP)	<0.004	<0.004	2.130	2.180	2.155	0.035
Cu (ICP)	0.011	0.012	0.020	0.020	0.016	0.005
F (ISE)	<0.265	<0.265			<0.265	
Cl (ISE)	0.191	0.187			0.189	0.003
SO4 (IC)	<0.5	<0.5			<0.5	
NO3 (IC)	34.970	34.350			34.660	0.438
PO4(IC)**	2.418	2.332			2.375	0.061
% SOLIDS (105°C)	38.980				38.980	
% SOLIDS (90°C)	38.540				38.540	
Moles of Na	0.643	0.668			0.656	0.018
Moles of NO3	0.564	0.554			0.559	0.007
Moles of Cl	0.005	0.005			0.005	0.000

*AA Silicon values in italics from HCl/HF dissolution; others from Na2O2 dissolution
all anions from Na2O2 fusion with H2O uptake (see text)
**water soluble phosphate only
*** acid soluble phosphate

MASS BALANCE

Al(OH)3	16.923
NaNO3	47.511
SiO2 as Filter Aid	6.632
Na6U7O24	6.285
Ca-zeolite	2.851
AlPO4	4.492
SUM	84.695
EXCESS moles Na over NaNO3 and Na-U =	0.079

TABLE A3. M-AREA TANK 3 SLUDGE ANALYSES AS SPECIES WT% DPST-89-351

	TK-3-1	TK-3-2	TK-3-1	TK-3-2	TANK 3	TANK 3
ANALYSIS #	111472	111473	21299	21300	AVERAGE	STANDARD
ANALYSIS DATE	3/1/88	3/1/88	11/1/88	11/1/88		DEVIATION
RECORDED	DPSTN 4475	DPSTN 4475	DPSTN 4475	DPSTN 4475		
(ICP)	6.600	5.240	4.050	9.640	6.383	2.409
(ICP)	0.154	0.171	0.600	0.290	0.304	0.207
(ICP)	<0.004	<0.004	0.310	1.000	0.655	0.488
(ICP)	0.035	0.019	0.150	0.070	0.069	0.058
(ICP)	<0.004	<0.004	1.510	0.540	1.025	0.686
(ICP)			15.370	15.480	15.425	0.078
(AA*)	16.700	15.260	16.910	17.980	16.713	1.119
(ICP)	<0.002	<0.002	<0.002	<0.002	<0.002	
(ICP)			0.300	0.250	0.275	0.035
(AA*)			0.423	0.346	0.385	0.054
(ICP)	5.060	3.640	3.280	2.720	3.675	0.998
(AA*)	*10.200*	*11.830*	4.550	3.660	4.105	0.629
(ICP)	<0.004	<0.004	0.010	0.010	0.010	0.000
(ICP)	<0.002	<0.002	0.040	0.010	0.025	0.021
(D-G)	3.023	3.434			3.229	0.291
(ICP)	0.002	0.002	0.010	<0.0005	0.005	0.005
(ICP)	<0.002	<0.002	0.010	0.010	0.010	0.000
(ICP)	0.005	<0.001	0.020	0.020	0.015	0.009
(AA*)			0.057	0.051	0.054	0.004
(ICP)***	2.320	2.170	1.280	2.040	1.953	0.463
(Calc IC)**	1.255	1.327			1.291	0.051
(ICP)	0.031	0.029	<0.001	<0.001	0.030	0.001
(ICP)	0.019	0.017	0.390	0.200	0.157	0.178
(ICP)	<0.004	<0.004	0.010	0.010	0.010	0.000
(ICP)	<0.004	<0.004	2.450	0.990	1.720	1.032
(ICP)	0.009	0.007	0.010	0.030	0.014	0.011
(ISE)	<0.02	<0.02			<0.02	
(ISE)	0.142	0.143			0.142	0.001
O4 (IC)	<0.5	<2.0			<0.5	
O3 (IC)	49.500	51.660			50.580	1.527
O4(IC)**	3.850	4.070			3.960	0.156
SOLIDS (105°C)	9.240				9.240	
SOLIDS (90°C)	6.800				6.800	
oles of Na	0.726	0.664			0.695	0.044
oles of NO3	0.798	0.833			0.816	0.025
oles of Cl	0.004	0.004			0.004	0.000

AA Silicon values in italics from HCl/HF dissolution; others from Na2O2 dissolution
all anions from Na2O2 fusion with H2O uptake (see text)
water soluble phosphate only
** acid soluble phosphate

MASS BALANCE SPECIATION

Al(OH)3	13.535
NaNO3	69.334
SiO2 as Filter Aid	8.696
Na6U7O24	4.240
Ca-zeolite	2.791
AlPO4	5.987
SUM	104.583
EXCESS moles Na over NaNO3 and Na-U =	-0.132

TABLE A4. M-AREA TANK 4 SLUDGE ANALYSES AS SPECIES WT% DPST-89-351

	TK-4-1	TK-4-2	TK-4-1	TK-4-2	TANK 4	TANK 4
ANALYSIS #	111474	111475	21301	21302	AVERAGE	STANDARD
ANALYSIS DATE	3/1/88	3/1/88	11/1/88	11/1/88		DEVIATION
RECORDED	DPSTN 4475	DPSTN 4475	DPSTN 4475	DPSTN 4475		
Al (ICP)	1.730	1.200	0.990	8.250	3.043	3.486
Ca (ICP)	0.108	0.030	0.420	0.260	0.205	0.173
Fe (ICP)	<0.004	<0.004	0.040	0.390	0.215	0.247
Mg (ICP)	0.059	0.040	0.100	0.080	0.070	0.026
Mn (ICP)	0.682	0.465	1.320	0.470	0.734	0.403
Na (ICP)			21.110	22.000	21.555	0.629
Na (AA)	24.180	24.080	26.060	27.420	25.435	1.606
Li (ICP)	<0.002	<0.002	<0.002	<0.002	<0.002	
Ni (ICP)			0.080	0.030	0.055	0.035
Ni (AA)			0.114	0.050	0.082	0.045
Si (ICP)	1.070	0.742	0.560	4.150	1.631	1.693
Si (AA)	*2.560*	*2.350*	0.826	5.820	3.323	3.531
Cr (ICP)	<0.004	<0.004	0.010	0.020	0.015	0.007
B (ICP)	<0.002	<0.002	0.020	0.010	0.015	0.007
U (D-G)	1.321	1.240			1.281	0.057
Sr (ICP)	0.002	<0.001	<0.0005	<0.0005	0.002	
Zr (ICP)	0.138	0.093	0.010	<0.004	0.080	0.065
Ti (ICP)	0.023	0.015	0.010	0.020	0.017	0.006
K (AA)			0.023	0.018	0.021	0.004
P (ICP)* **	1.210	1.100	0.270	2.610	1.298	0.970
P (Calc IC)**	0.320	0.432			0.376	0.079
Ba (ICP)	0.033	0.031	<0.001	<0.001	0.032	0.001
Pb (ICP)	0.046	0.016	0.320	0.160	0.136	0.138
Mo (ICP)	0.013	0.007	0.010	0.010	0.010	0.002
Zn (ICP)	1.340	0.927	2.100	0.810	1.294	0.583
Cu (ICP)	<0.004	<0.004	0.010	0.030	0.020	0.014
F (ISE)	<0.02	<0.02			<0.02	
Cl (ISE)	0.171	0.269			0.220	0.069
SO4 (IC)	<0.5	<0.5			<0.5	
NO3 (IC)	50.000	69.000			59.500	13.435
PO4(IC)**	0.980	1.324			1.152	0.243
% SOLIDS (105°C)	22.340				22.340	
% SOLIDS (90°C)	19.870				19.870	
Moles of Na	1.052	1.047			1.050	0.003
Moles of NO3	0.806	1.113			0.960	0.217
Moles of Cl	0.005	0.008			0.006	0.002

*AA Silicon values in italics from HCl/HF dissolution; others from Na2O2 dissolution
all anions from Na2O2 fusion with H2O uptake (see text)
**water soluble phosphate only
*** acid soluble phosphate

MASS BALANCE SPECIATION

Al(OH)3	5.528
NaNO3	81.561
SiO2 as Filter Aid	7.049
Na6U7O24	1.682
Ca-zeolite	1.879
AlPO4	3.979
SUM	101.678
EXCESS moles Na over NaNO3 and Na-U =	0.085

TABLE A5. M-AREA TANK 5 SLUDGE ANALYSES AS SPECIES WT% DPST-89-351

	TK-5-1	TK-5-2	TK-5-2	TK-5-2	TANK 5	TANK 5
ANALYSIS #	111476	111477	21303	21304	AVERAGE	STANDARD
ANALYSIS DATE	3/1/88	3/1/88	11/1/88	11/1/88		DEVIATION
RECORDED	DPSTN 4475	DPSTN 4475	DPSTN 4475	DPSTN 4725		
Al (ICP)	9.540	9.600	10.000	9.970	9.778	0.241
Ca (ICP)	0.151	0.375	0.410	0.370	0.327	0.118
Fe (ICP)	<0.004	<0.005	0.510	0.480	0.495	0.021
Mg (ICP)	0.094	0.102	0.180	0.170	0.137	0.045
Mn (ICP)	0.027	<0.005	0.660	0.490	0.392	0.328
Na (ICP)			11.090	9.940	10.515	0.813
Na (AA)	10.940	10.600	11.580	9.750	10.718	0.762
Li (ICP)	<0.002	<0.002	<0.002	<0.002	<0.002	
Ni (ICP)			0.560	0.550	0.555	0.007
Ni (AA)			0.777	0.739	0.758	0.027
Si (ICP)	10.200	10.300	11.410	11.250	10.790	0.628
Si (AA)	*14.210*	*10.080*	13.990	14.070	14.030	0.057
Cr (ICP)	<0.004	<0.005	0.020	0.010	0.015	0.007
B (ICP)	<0.002	<0.002	0.020	0.010	0.015	0.007
U (D-G)	4.180	3.536			3.858	0.455
Sr (ICP)	0.002	0.004	<0.0005	<0.0005	0.003	0.001
Zr (ICP)	<0.002	<0.002	0.010	0.010	0.010	0.000
Ti (ICP)	0.024	0.029	0.040	0.040	0.033	0.008
K (AA)			0.110	0.097	0.104	0.009
P (ICP)* **	1.570	2.200	0.670	0.640	1.270	0.755
P (Calc IC)**	<0.848	N/A				
Ba (ICP)	0.029	0.036	0.000	0.000	0.016	0.019
Pb (ICP)	0.031	<0.014	0.190	0.150	0.124	0.083
Mo (ICP)	<0.004	<0.005	0.010	0.010	0.010	0.000
Zn (ICP)	<0.004	<0.005	1.070	0.820	0.945	0.177
Cu (ICP)	0.005	0.009	0.010	0.010	0.009	0.002
F (ISE)	<0.02	<0.02			<0.02	
Cl (ISE)	0.843	N/A			0.843	
SO4 (IC)	<1.31	N/A			<1.31	
NO3 (IC)	12.000	N/A			12.000	
PO4(IC)**	<2.6	N/A			<2.6	
% SOLIDS (105°C)	32.490				32.490	
% SOLIDS (90°C)	28.290				28.290	
Moles of Na	0.476	0.461			0.468	0.010
Moles of NO3	0.194	N/A			0.194	
Moles of Cl	0.024	N/A			0.024	

N/A = Not Analyzed Insufficient Sample
*AA Silicon values in italics from HCl/HF dissolution; others from Na2O2 dissolution
all anions from Na2O2 fusion with H2O uptake (see text)
**water soluble phosphate only
*** acid soluble phosphate

MASS BALANCE SPECIATION

Al(OH)3	25.068
NaNO3	16.449
SiO2 as Filter Aid	29.897
Na6U7O24	5.067
Ca-zeolite	3.001
AlPO4	3.894
SUM	83.376

EXCESS moles Na over NaNO3 and Na-U = 0.261

TABLE A6. M-AREA TANK 6 SLUDGE ANALYSES AS SPECIES WT% DPST-89-351

ANALYSIS #	TK-6-1 111478	TK-6-2 111479	TK-6-1 21305 & 6	TK-6-2 21307	TANK 6 AVERAGE	TANK 6 STANDARD DEVIATION
ANALYSIS DATE	3/1/88	3/1/88	11/1/88	11/1/88		
RECORDED	DPSTN 4475	DPSTN 4475	DPSTN 4725	DPSTN 4725		
Al (ICP)	9.870	9.740	11.020	9.420	10.013	0.698
Ca (ICP)	0.203	0.195	1.180	0.410	0.497	0.466
Fe (ICP)	<0.004	<0.004	0.850	0.630	0.740	0.156
Mg (ICP)	0.102	0.101	0.350	0.200	0.188	0.117
Mn (ICP)	BDL	BDL	2.650	0.420	1.535	1.577
Na (ICP)			11.000	8.340	9.670	1.881
Na (AA)	9.480	9.180	11.980	10.270	10.228	1.256
Li (ICP)	<0.002	<0.002	<0.002	<0.002	<0.002	
Ni (ICP)			0.430	0.420	0.425	0.007
Ni (AA)			0.604	0.597	0.601	0.005
Si (ICP)	10.800	10.700	11.750	15.990	12.310	2.499
Si (AA)	*14.760*	*13.190*	17.800	18.200	18.000	0.283
Cr (ICP)	<0.004	<0.004	0.020	0.020	0.020	0.000
B (ICP)	<0.002	<0.002	<0.009	0.010	0.010	
U (D-G)	4.519	3.640			4.080	0.622
Sr (ICP)	0.004	0.004	0.010	<0.0005	0.006	0.003
Zr (ICP)	<0.002	<0.002	0.010	0.010	0.010	0.000
Ti (ICP)	0.026	0.026	0.050	0.050	0.038	0.014
K (AA)			0.108	0.106	0.107	0.001
P (ICP)***	1.680	1.520	0.650	0.690	1.135	0.541
P (Calc IC)**	0.233	0.255			0.244	0.016
Ba (ICP)	0.048	0.046	<0.001	<0.001	0.047	0.001
Pb (ICP)	0.048	0.021	0.760	0.150	0.245	0.348
Mo (ICP)	<0.004	<0.004	0.020	0.010	0.015	0.007
Zn (ICP)	<0.004	<0.004	5.000	0.750	2.875	3.005
Cu (ICP)	0.012	0.010	0.040	0.040	0.026	0.017
F (ISE)	<0.02	N/A			<0.02	
Cl (ISE)	0.060	0.060			0.060	0.000
SO4 (IC)	<0.5	<0.5			<0.5	
NO3 (IC)	12.650	13.090			12.870	0.311
PO4(IC)**	0.715	0.783			0.749	0.048
% SOLIDS (105°C)	37.120				37.120	
% SOLIDS (90°C)	36.980				36.980	
Moles of Na	0.412	0.399			0.406	0.009
Moles of NO3	0.204	0.211			0.208	0.005
Moles of Cl	0.002	0.002			0.002	0.000

N/A = Not Analyzed Insufficient Sample

*AA Silicon values in italics from HCl/HF dissolution; others from Na2O2 dissolution
all anions from Na2O2 fusion with H2O uptake (see text)

**water soluble phosphate only

*** acid soluble phosphate

MASS BALANCE SPECIATION

Al(OH)3	26.088
NaNO3	17.642
SiO2 as Filter Aid	38.338
Na6U7O24	5.357
Ca-zeolite	4.567
AlPO4	3.480
SUM	95.473
EXCESS moles Na over NaNO3 and Na-U =	0.184

TABLE A7. M-AREA TANK 8-P42 SLUDGE ANALYSES AS SPECIES WT% DPST-89-351

	TK-8-P42-1	TK-8-P42-2	TK-8-P42-1	TK-8-P42-2	TANK 8-P42	TANK 8-P42
ANALYSIS #	111480	111481	21308	21309	AVERAGE	STANDARD
ANALYSIS DATE	3/1/88	3/1/88	11/1/88	11/1/88		DEVIATION
RECORDED	DPSTN 4475	DPSTN 4475	DPSTN 4725	DPSTN 4725		
Al (ICP)	10.900	10.700	10.780	10.770	10.788	0.083
Ca (ICP)	0.183	0.183	0.340	0.560	0.317	0.178
Fe (ICP)	<0.004	<0.004	0.440	0.400	0.420	0.028
Mg (ICP)	0.096	0.087	0.130	0.160	0.118	0.033
Mn (ICP)	<0.004	<0.004	0.440	0.770	0.605	0.233
Na (ICP)			7.590	5.850	6.720	1.230
Na (AA)	6.810	6.730	8.220	7.250	7.253	0.684
Li (ICP)	<0.002	<0.002	<0.002	<0.002	<0.002	
Ni (ICP)			0.740	0.740	0.740	0.000
Ni (AA)			0.959	0.952	0.956	0.005
Si (ICP)	10.900	10.500	11.390	11.510	11.075	0.465
Si (AA)	*14.260*	*14.860*	14.060	15.030	14.545	0.686
Cr (ICP)	0.004	<0.004	0.020	0.020	0.015	0.009
B (ICP)	<0.002	<0.002	0.010	0.010	0.010	0.000
U (D-G)	6.840	6.023			6.432	0.578
Sr (ICP)	0.004	0.004	<0.0005	0.010	0.006	0.003
Zr (ICP)	<0.002	<0.002	0.010	0.010	0.010	0.000
Ti (ICP)	0.022	0.020	0.030	0.040	0.028	0.009
K (AA)			0.124	0.121	0.123	0.002
P (ICP)***	2.730	2.780	1.350	1.310	2.043	0.823
P (Calc IC)**	0.964	1.023			0.993	0.042
Ba (ICP)	0.049	0.051	<0.001	<0.001	0.050	0.001
Pb (ICP)	<0.012	<0.012	0.150	0.220	0.185	0.049
Mo (ICP)	<0.004	<0.004	0.010	0.010	0.010	0.000
Zn (ICP)	<0.004	<0.004	0.770	1.280	1.025	0.361
Cu (ICP)	0.016	0.011	0.040	0.020	0.022	0.013
F (ISE)	N/A	N/A			N/A	
Cl (ISE)	0.059	0.060			0.059	0.001
SO4 (IC)	<0.5	<0.5			<0.5	
NO3 (IC)	15.810	16.750			16.280	0.665
PO4(IC)**	2.955	3.136			3.046	0.128
% SOLIDS (105°C)	34.480				34.480	
% SOLIDS (90°C)	31.650				31.650	
Moles of Na	0.296	0.293			0.294	0.002
Moles of NO3	0.255	0.270			0.263	0.011
Moles of Cl	0.002	0.002			0.002	0.000

N/A = Not Analyzed Insufficient Sample

*AA Silicon values in italics from HCl/HF dissolution; others from Na2O2 dissolution
all anions from Na2O2 fusion with H2O uptake (see text)

**water soluble phosphate only

*** acid soluble phosphate

MASS BALANCE SPECIATION

Al(OH)3	26.043
NaNO3	22.316
SiO2 as Filter Aid	31.000
Na6U7O24	8.446
Ca-zeolite	2.909
AlPO4	6.263
SUM	96.977
EXCESS moles Na over NaNO3 and Na-U =	0.009

TABLE A8. M-AREA TANK 8-P43 SLUDGE ANALYSES AS SPECIES WT% DPST-89-351

	TK-8-P43-1	TK-8-P43-2	TK-8-P43-1	TK-8-P43-2	TANK 8-P43	TANK 8-P43
ANALYSIS #	111482	111483	21310	21311	AVERAGE	STANDARD
ANALYSIS DATE	3/1/88	3/1/88	11/1/88	11/1/88		DEVIATION
RECORDED	DPSTN 4475	DPSTN 4475	DPSTN 4725	DPSTN 4725		
Al (ICP)	10.700	9.500	11.310	11.210	10.680	0.831
Ca (ICP)	0.195	0.291	0.340	0.360	0.297	0.074
Fe (ICP)	0.229	<0.004	0.460	0.460	0.383	0.133
Mg (ICP)	0.122	0.099	0.140	0.140	0.125	0.019
Mn (ICP)	0.065	0.014	0.430	0.450	0.240	0.232
Na (ICP)			6.960	7.640	7.300	0.481
Na (AA)	7.530	3.650	9.130	7.130	6.860	2.308
Li (ICP)	<0.002	<0.002	<0.002	<0.002	<0.002	
Ni (ICP)			0.710	0.720	0.715	0.007
Ni (AA)			0.948	1.100	1.024	0.107
Si (ICP)	11.700	10.400	12.090	11.920	11.528	0.768
Si (AA)	*14.590*	*13.360*	15.140	14.630	14.885	0.361
Cr (ICP)	<0.004	<0.004	0.020	0.020	0.020	0.000
B (ICP)	<0.002	<0.002	0.010	0.010	0.010	0.000
U (D-G)	5.960	1.710			3.835	3.005
Sr (ICP)	0.004	0.006	<0.0005	<0.0005	0.005	0.001
Zr (ICP)	0.007	<0.002	0.010	0.010	0.009	0.002
Ti (ICP)	0.031	0.025	0.030	0.030	0.029	0.003
K (AA)			0.118	0.120	0.119	0.001
P (ICP)* **	2.330	2.040	1.330	1.300	1.750	0.516
P (Calc IC)**	0.955	0.950			0.953	0.004
Ba (ICP)	0.057	0.054	<0.001	<0.001	0.056	0.002
Pb (ICP)	0.042	0.026	0.140	0.150	0.090	0.065
Mo (ICP)	0.005	<0.004	0.010	0.010	0.008	0.003
Zn (ICP)	0.177	<0.002	0.730	0.780	0.562	0.335
Cu (ICP)	0.017	0.012	0.030	0.030	0.022	0.009
F (ISE)	N/A	N/A			N/A	
Cl (ISE)	0.062	0.057			0.059	0.004
SO4 (IC)	<1.0	<1.0			<1.0	
NO3 (IC)	17.450	15.495			16.473	1.382
PO4(IC)**	2.930	2.913			2.922	0.012
% SOLIDS (105°C)	41.990				41.990	
% SOLIDS (90°C)	33.120				33.120	
Moles of Na	0.328	0.159			0.243	0.119
Moles of NO3	0.281	0.250			0.266	0.022
Moles of Cl	0.002	0.002			0.002	0.000

N/A = Not Analyzed Insufficient Sample

*AA Silicon values in italics from HCl/HF dissolution; others from Na2O2 dissolution
all anions from Na2O2 fusion with H2O uptake (see text)

**water soluble phosphate only

*** acid soluble phosphate

MASS BALANCE SPECIATION

Al(OH)3	26.469
NaNO3	22.580
SiO2 as Filter Aid	31.732
Na6U7O24	5.036
Ca-zeolite	2.725
AlPO4	5.366
SUM	93.908
EXCESS moles Na over NaNO3 and Na-U =	-0.036

WESTINGHOUSE SAVANNAH RIVER COMPANY
SAVANNAH RIVER LABORATORY DIVISION

~~DWP-GTC-92-0156~~ DWP 5/31/92
SRT-GTG-920026

cc: N. E. Barnett, 730-M
C. P. Thompson, 730-M
J. B. Pickett, 730-M
H. L. Martin, 730-M
J. L. England, BTC-Rm.419
D. F. Bickford, 773-A
J. T. Carter, 704-1T

MEMORANDUM May 31, 1992

TO: E. W. Holtzscheiter, 773-A
M.J. Plodinec, 773-A

FROM: C.M. Jantzen, 773-A C M Jantzen

GLASS FORMULATIONS AND VOLUME REDUCTIONS FOR M-AREA WASTE SOLIDIFICATION

INTRODUCTION AND SUMMARY

I recommend that glass vitrification be considered for solidification of M-Area Waste. I have investigated these waste compositions and determined that stabilization in glass at waste loadings of ~75 wt% is achievable.

- For M-Area waste, Martin and Pickett have demonstrated that a volume reduction of 75% of the M-Area waste can be achieved by waste water treatment of the supernate.[1] About ~210,000 gallons of F006 waste sludge which is high in nickel and uranium remain to be stabilized. In addition, 425,000 gallons of SiO_2 rich filter aids that were used for the waste water treatment need to be stabilized. These wastes are to be homogenized into one batch of sludge before final stabilization/solidification.

- Over the past three years I have analyzed the sludge and the filter aids in all of the M-area tanks.[2] Using the current and projected tank volume inventories Pickett and I have calculated that the composite waste composition will be that given in Table 1.

- I have demonstrated that blending of the high SiO_2 and Al_2O_3 containing M-Area sludge (Table 1) with $Na_2O + B_2O_3$ at ~ 75% waste loading will form a borosilicate glass. I have also demonstrated that blending with Na_2O and CaO would form a Soda(Na_2O)- Lime(CaO)-Silica(SiO_2) glass (SLS). Vitrification at ~75 wt% waste loading yields a volume reduction of 81% from the volume of wet sludge, e.g. 600,000 gallons of sludge will yield about 125,000 gallons of glass when the water and nitrate are vaporized and the relative densities of the sludge and glass are considered. Waste loadings as low as 50 wt% yield an 70 % volume reduction from the volume of wet sludge, e.g. 600,000 gallons of sludge will yield about 180,000 gallons of glass.

C.M. Jantzen to E.W. Holtzscheiter and M.J. Plodinec May 31, 1992 - Page 2

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Table 1. M-Area Composite Sludge Analyses on a Dry Element and Oxide Weight Percent Basis

ELEMENT	WT%	OXIDE	WT%
Al	8.89	Al_2O_3	16.80
Ca	0.35	CaO	0.49
Fe	0.76	Fe_2O_3	1.09
Mg	0.12	MgO	0.20
Mn	0.10	MnO	0.13
Na	7.78	Na_2O	10.48
Ni	0.34	NiO	0.43
Si	21.72	SiO_2	46.47
Cr	0.04	Cr_2O_3	0.06
B	0.04	B_2O_3	0.13
U	1.10	UO_2	1.25
Ti	0.03	TiO_2	0.05
K	2.02	K_2O	2.43
P	1.17	P_2O_5	2.68
Ba	0.01	BaO	0.01
Pb	0.06	PbO	0.07
Mo	0.04	MoO_3	0.06
Zn	0.29	ZnO	0.36
Cu	0.01	CuO	0.01
SO_4	0.50	SO_4	0.50
NO_3	10.22	NO_3	10.22
SUMS	55.59	SUMS	93.92

MASS BALANCE CALCULATIONS SPECIES WT% *

$Al(OH)_3$	22.76
$NaNO_3$	14.02
SiO_2	46.32
$Na_6U_7O_{24}$	1.45
Ca-zeolite	3.23
$AlPO_4$	3.58
SUM	91.35

Assume 38% = 38 solids

$NO_3 = \frac{62}{85} \times 14\% = 4$ Dry wt %

*Species identified by x-ray diffraction analysis

C.M. Jantzen to E.W. Holtzscheiter and M.J. Plodinec May 31, 1992 - Page 3

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GLASS FORMULATIONS

Of the seven glass formulations that I have melted so far, the three glasses in Table 2 melted at ~1150°C yielding a volume reduction of ~81%. Four initial formulations with 90 wt% waste loading melted in the ~1300°C range. If the waste loading is dropped by the addition of more $Na_2O + B_2O_3$ or more $Na_2O + CaCO_3$ these glasses can be melted at temperatures below 1150°C. Waste loadings of 50 wt% would still yield an 70% volume reduction on a wet sludge basis and these glasses should still be durable enough to pass the EPA TCLP testing. Further optimization of glass formulation, processing temperature, and durability is in progress.

GLASS ID	COMPOSITE DRY SLUDGE (WT%)	ADDITIVE (WT%)	GLASS TYPE
M-5	75	25% Borax (anhydrous)	Borosilicate
M-6	70	15 Borax (anhydrous) 15% Na_2CO_3	Borosilicate
M-7	80	10 $CaCO_3$ 10 Na_2CO_3	Soda-Lime-Silica

VOLUME REDUCTION FOR M-AREA WASTE

Waste water treatment of M-Area waste reduces the volume of the M-Area sludge + supernate by 75 volume %. The remainder will be 38 dry wt% sludge solids with 4 dry wt% NO_3. Evaporation of the NO_3 during vitrification would, therefore leave ~ 34 dry wt% solids remaining for incorporation into glass. Assuming a 75 wt% waste loading, 600,000 gallons of treated sludge could be solidified into 125,000 gallons of glass. This is an overall waste volume reduction of ~81% assuming a glass density of 2.6 kg/L for the final glass. Similarly, a 50 wt% waste loading will result in an overall waste volume reduction of ~70 wt%.

ADVANTAGES OF VITRIFICATION FOR M-AREA WASTE

- Large volume reduction (70 to 81 volume % on a wet sludge basis)
- Glass has been determined to be the BDAT for high level radioactive waste glass[3] and has been shown to pass the TCLP for all elements of concern to the EPA for simulated waste glass[4]
- Glass has a very high potential for being delisted which would save the cost of having to build RCRA hazardous waste/mixed waste storage vaults

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- For borosilicate glass formulations, the process models developed for high level borosilicate waste glasses can be utilized to calculate the glass viscosity and durability as a function of temperature[5]

- The SLS glass forming system is a well known system used to make window glass and it has been extensively studied by glass chemists since 1925.[6-8] Soda-silica glass is known to readily incorporate heavy metals.[9,10] SLS glass formulations have been used for In-Situ Vitrification (ISV) to solidify contaminated soils[11-12] and a barium analog (soda-baria-silica) glass has been used at Fernald to solidify residues from uranium ore processing that contain large amounts of uranium, radium, and lead.[13] For Fernald waste solidification the barium rich glass was chosen due to the high barium content of the waste. SLS glasses have also been successfully fabricated from reactive Na metal formed and contaminated during efforts to develop sodium-cooled fast breeder nuclear reactors.[14] The SLS glass waste forms used for the In-Situ Vitrification (ISV) of contaminated soils,[11-12] the barium analog glass used to vitrify Fernald's uranium processing ash,[13] and the high Pb SLS glasses[15] have all passed the EPA TCLP test.

- NO_3, Cl, SO_4, and CO_3 in the waste are volatilized during vitrification:
the process envisaged would be to slurry feed a melter the sludge/glass former feed of 25-50 wt% solids as is done with high level waste glass. Either a wet scrubber or condenser would be needed on the melter off-gas system to condense the volatile NO_3 to a condensate tank. The condensate would be dilute HNO_3 free of contamination which could be neutralized with $Ca(OH)_2$ or $Mg(OH)_2$ and disposed of via an NPDES outfall or possibly recycled for usage on site.

- Tolerance of glass formulation to variations in waste composition caused by any residual supernate could be adjusted by adding more waste or less sodium.

- New stirred glass melter technology would keep the capital costs of glass fabrication minimal and this could be done as a "turn key" operation in M-Area and be as cost effective as cement stabilization.

- The glass compositions that have been formulated can be melted at lower temperatures than the high level waste glasses which simplifies the melter materials of construction and allows the use of the simpler stirred melter technology.

SRT-GTC-920026

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APPENDIX C

1989, 1992, and 1993 DETF RCRA FILTERCAKE ANALYSIS REPORTS

1 **Pickett To Thompson, "Documentation of 1989 DETF Filtercake Analysis (U)", NMP-RMT-920083, Westinghouse Savannah River Company, March 9, 1992.**

2 **Pickett to Steingard, "Analytical Results on 1992 Annual RCRA Analysis for Filtercake Transferred from DETF to IT/SF Tanks (U)", NMP-MEP-930006, Westinghouse Savannah River Company, February 3, 1993.**

3 **Poulos to Norford, "Analytical Results on 1993 Annual RCRA Analysis for Filtercake Transferred from DETF to IT/SF Tanks (U)", RRD-MEP-930070, Westinghouse Savannah River Company, December 10, 1993.**

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WESTINGHOUSE SAVANNAH RIVER COMPANY NMP-RMT-920083

INTER-OFFICE · MEMORANDUM

March 9, 1992

TO: C. P. Thompson, 730-M
Reactor Materials Engineering and Technology

FROM: J. B. Pickett, 730-M (5-3838)
Reactor Materials Engineering and Technology

Documentation of DETF Filtercake Analyses (U)

Reference: "Characterization of Hazardous Waste Sites: A Methods Manual -- Volume II, Sampling Methods Second Edition", EPA-60/4-84-076.

A series of samples of filtercake from Dilute Effluent Treatment Facility (DETF) were collected and analyzed during a period when no plating line effluents from Building 313-M, nor any supernate from the Interim Treatment/Storage Facility (IT/SF) were being processed. Only effluents from the aluminum forming operations in the production Buildings 320-M and 321-M and from the two analytical support Laboratories 320-M and 322-M were present.

The objective of the sampling program was to demonstrate that the samples did not exhibit any characteristics of a "hazardous waste". The results confirmed that the samples would not be an "EP Toxic" characteristic waste. The filtercake was not a "listed" hazardous waste, as no plating line effluents were being treated.

Sampling and Analytical Results

The samples were collected from the DETF filterpress in October, 1989. The samples were collected by the DETF operators, and stored in 500 ml wide month polypropylene bottles. Chain-of-Custody protocol was maintained, and the samples were held in a locked cabinet at room temperature (in Building 313-M) until shipped to an off-site analytical laboratory.

The samples were analyzed by Enwright Environmental Laboratory, Inc., Greenville, SC. The laboratory utilized EPA SW-846 analytical protocols, and was a SCDHEC certified laboratory. It should be noted that the holding conditions for the samples exceeded the recommended holding times and temperatures (Ref.). The analytical results are however considered completely valid, as the constituents of concern are not lost or mobilized from the filtercake matrix at room temperature holding conditions.

The EP Toxic and total constituent concentration results are summarized in Table 1.

The sampling plan, analytical scope of work, Enwright laboratory analytical results, and analytical results from the Savannah River Laboratory are given in attachments.

CC. N. E. Barnett, 730-M
H. L. Martin, 730-M
Central Files, 703-A*
A. E. Hadden, 730-M
C. R. Stallings, 320-3M*
J. C. Medlin, 730-M, RMET files, 1.3.4, Filtercake sampling*

TABLE 1

DETF FITERCAKE ANALYSES

FILTERCAKE PRODUCED FROM ONLY 320 and 321-M OPERATIONS (NO SUPERNATE OR 313-M PLATING LINE EFFLUENTS)

SAMPLE ID		200040441	200040442	200040443	200040444	200040445	200040448	200040451
SAMPLE DATE		10/21/89	10/21/89	10/22/89	10/22/89	10/24/89	10/25/89	10/26/89
SAMPLE TIME		700	1600	600	1300	830	1300	2110
ENWRIGHT Lab. ID No.		90-F062-01	90-F062-02	90-F062-03	90-F062-04	90-F062-05	90-F062-06	90-F062-07
TOTAL CONSTITUENT CONCENTRATIONS								
	units							
FLASH POINT	(°C)	>100	>100	>100	>100	*	>100	>100
* insufficent sample								
REACTIVITY								
Cyanide	mg/kg	<2	<2	<2	<2	<2	<2	<2
Sulfide	mg/kg	<50	<100	<50	<100	<100	<150	<100
CORROSIVITY(NACE Coupon test)	mm/yr	<6.35	<6.35	<6.35	<6.35	<6.35	<6.35	<6.35
TOTAL METALS								
As	mg/kg	<0.44	<0.44	<0.49	<0.47	<0.39	<0.42	<0.41
Ba	mg/kg	0.59	0.50	0.48	0.48	0.55	0.76	0.64
Cd	mg/kg	<0.43	<0.44	<0.44	<0.47	<0.39	<0.42	<0.41
Cr	mg/kg	20.6	35.6	<0.70	1.39	<0.63	<0.67	328
Pb	mg/kg	<2.6	<2.65	<2.63	<2.83	<2.34	<2.52	<2.48
Hg	mg/kg	0.082	0.073	0.040	0.088	0.130	0.12	0.12
Se	mg/kg	<0.87	<0.89	<0.88	<0.94	<0.78	<0.84	<0.83
Ag	mg/kg	<0.43	<0.44	<0.44	<0.47	<0.39	0.77	<0.41
Ni	mg/kg	14.1	23.9	<4.39	<4.72	<3.91	<4.20	222
U	mg/kg	67.5	78.5	51.0	103.5	58.5	32	50.5
EP TOXICITY LEACHANT CONCENTRATION								EP TOXIC CONCENTRATION
As	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	5
Cd	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	1
Cr	mg/L	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	5
Pb	mg/L	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	5
Hg	mg/L	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.2
Se	mg/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	1
Ag	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	5
Ni	mg/L	0.166	0.198	0.135	0.242	0.172	0.124	0.150	-
U	pCI/L	1.6	2.0	0.9	1.2	3.8	0.7	0.6	-
@0.003 mg/pCi of depleted U	mg/L*	0.005	0.006	0.003	0.004	0.011	0.002	0.002	

Samples analyzed by Enwright Environmental Consulting Laboratories, Greenville, SC.

October 6, 1989

TO: Fred Harter, 305-1M
FROM: Craig R. Johnson, 730-M (X5-4122) Craig R Johnson

FILTERCAKE SAMPLES

Please take samples of the DETF filtercake for laboratory analysis. Fill out the upper section of the attached "chain of custody" form (your copy only). These samples will be sent offsite for analysis.

While processing the next Equalization Batch, please take one grab sample per shift from the top of the drum which is receiving filtercake from the screw conveyor. A 500-ml wide-mouth sample bottle will be of sufficient size, and should be convenient for your operators. After sampling, please fill out and attach a sample label (OSR 14-28) to each bottle.

Lock the samples in the CTF Sample Locker. John Pickett or I will receive all of the samples from you at a later date.

CC: J. W. Runnels, 704-M
R. A. Lee, 730-M
C. P. Thompson, 730-M
H. L. Martin, 730-M
J. B. Pickett, 730-M
F. R. Weitz, 730-M
S. L. Strommen, 730-M

Westinghouse
Savannah River Company

P. O. Box 616
Aiken, SC 29802

900284

SO# ~~89C028~~

March 15,1990

Dr. D. E. McCartney
Enwright Environmental Laboratories
25 Woods Lake Road
Greenville, SC 29606

Re: Analyses Of DETF Filter-Cake Samples

Dear Dr. McCartney:

A total of seven filter cake samples for total and EP extraction analyses have been shipped to you via Federal Express. The analyses are to be conducted under contract AX 720919. Please be sure that the invoice agrees with the most recent price quote on that contract. Also, please call me or Mike Spletzer if you find that the cost of these analyses might exceed the allocated funding for this contract (~$5,800 remaining).

The samples were produced during a period when no nickel plating line solution and no uranium was being processed in the Dilute Effluent Treaatment Facility(DETF). Therefore, we expect the analyses to demonstrate that this material is non-hazardous. The samples are far below the DOT shipping level for radioactive materials (2 nCi/gm - which is equivalent to 6000 ppm depleted uranium), so I expect that you should be able to handle these as non-radioactive. If there are sufficient trace amounts of uranium so that you need to handle the samples as "radioactive", then be sure that the 35% handling surcharge will not exceed the total $'s authorized in the contract.

A specific list of required analyses for each sample is given below:

EP Toxicity Extraction
Extract analysis for As, Cd, Cr, Pb, Hg, Se and Ag, plus Ni and U.
Ignitability, corrosivity, and reactivity (cyanide and sulfide).

Total constituent extraction*
Extract (total) analysis for As, Ba, Cd, Cr, Pb, Hg, Se, Ag, Ni, and U.

Sincerely,

Dr. John B. Pickett,
Reactor Materials Engineering & Technology

* I would expect that those will be a significant amount of undissolved residue due to the silaceous nature of the filter media, but that should not affect the results for the total metal concentrations.

CC: Mike Spletzer, CAB
(Procurement and Materials Management)

SAMPLE TRACKING and CHAIN OF CUSTODY

M- AREA FILTERCAKE SAMPLES FROM BLDG. 341-M

SAMPLE NO. and IDENTIFICATION	DATE & TIME OF SAMPLE	FILTER PRESS NO. (1 or 2)	SAMPLED BY	TYPE OF SAMPLE CONTAINER	COMMENTS
#1 Press 1, Eq #1	10/21/89 7:00AM	1	W. H. Barr	~~500 ML~~ 1000 mL RG	200040441
#2 Press 1 Eq tk #1	10/21/89 4:00pm	1	P. SWYGERT	~~500 ML~~ 1000 mL RG	200040442
#3 Press 1 Eq tk 1	10/22/89 6:00pm	1	W. H. BARR	~~500 ML~~ 1000 mL RG	200040443
#4 Press 1 Eq tk 1	10/22/89 1:00pm	1	P SWYGERT	~~500 ML~~ 1000 mL RG	200040444

RELINQUISHED BY: ~~W. H. Barr~~ PS [signature]
ORGANIZATION: ~~LETF~~ PS LETF
DATE: ~~10/21/89~~ PS 3-21-90
TIME: ~~7:00AM~~ PS 1:15pm

RECEIVED BY: Jackie C. Nedlin
ORGANIZATION: RMET
DATE: 3-21-90
TIME: 1:15pm

RELINQUISHED BY: Jackie C Nedlin
ORGANIZATION: RMET
DATE: 3-21-90
TIME: 1:45pm

RECEIVED BY: B.M. DelVecchio
ORGANIZATION: ADS
DATE: 3/21/90
TIME: 1:45

RELINQUISHED BY:
ORGANIZATION:
DATE:
TIME:

RECEIVED BY:
ORGANIZATION:
DATE:
TIME:

RELINQUISHED BY:
ORGANIZATION:
DATE:
TIME:

RECEIVED BY:
ORGANIZATION:
DATE:
TIME:

SAMPLE TRACKING and CHAIN OF CUSTODY

M- AREA FILTERCAKE SAMPLES FROM BLDG. 341-M

SRL ID

SAMPLE NO. and IDENTIFICATION	DATE & TIME OF SAMPLE	FILTER PRESS NO. (1 or 2)	SAMPLED BY	TYPE OF SAMPLE CONTAINER	COMMENTS
1 - FILTER CAKE	10-24-89 832 PM	1	J.D. BRIDWELL ~~N. WALKER~~	500 ML	200040445
2 - FILTER CAKE	10-25-89 100 PM	1	N. WALKER	500 ML	200040448
3 - FILTER CAKE	10-2[illegible]-89 910 PM	1	J.D BRIDWELL	500 ML	200040451

RELINQUISHED BY: H Walker PS [illegible]
ORGANIZATION: ~~LETF~~ PS LETF
DATE: ~~10-25-89~~ PS 3-21-90
TIME: 1:15 pm

RECEIVED BY: Jackie C. Nedlin
ORGANIZATION: RMET
DATE: 3-21-90
TIME: 1:15pm

RELINQUISHED BY: Jackie Nedlin
ORGANIZATION: 3-21-90 RMET
DATE: 3-21-90
TIME: 1:45 pm

RECEIVED BY: Bm DelVecse
ORGANIZATION: ADS
DATE: 3/21/90
TIME: 1:45

RELINQUISHED BY:
ORGANIZATION:
DATE:
TIME:

RECEIVED BY:
ORGANIZATION:
DATE:
TIME:

RELINQUISHED BY:
ORGANIZATION:
DATE:
TIME:

RECEIVED BY:
ORGANIZATION:
DATE:
TIME:

ENWRIGHT
ENVIRONMENTAL

CERTIFICATE OF ANALYSIS

CLIENT: Westinghouse Savannah River Company DATE RECEIVED: 04/17/90

PROJECT: ADD DATE REPORTED: 05/09/90

LAB CERTIFICATION NO: 23127 P.O. No.: AX277819

LAB NO.:	90-F062-01	90-F062-02	90-F062-03	90-F062-04	90-F062-05	90-F062-06	90-F062-07
SAMPLE ID:	2000-40441	2000-40442	2000-40443	2000-40444	2000-40445	2000-40488	2000-40451
Parameters:							
E.P. Toxicity: (mg/l)							
Arsenic	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Cadmium	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Chromium	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008
Lead	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030
Mercury	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Selenium	<0.010	<0.010	<0.010	<0.020	<0.020	<0.020	<0.020
Silver	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Nickel	0.166	0.198	0.135	0.242	0.172	0.124	0.150
Uranium (pCi/l)	1.6 ± 0.2	2.0 ± 0.3	0.9 ± 0.2	1.2 ± 0.2	3.8 ± 0.4	0.7 ± 0.2	0.6 ± 0.2
" mg/L 3	0.004	0.005	0.002	0.003	0.010	0.002	0.002
Total Constituent Analyses							
Arsenic	<0.436	<0.443	<0.491	<0.473	<0.392	<0.421	<0.414
Barium	0.591	0.496	0.447	0.481	0.500	0.756	0.636
Cadmium	<0.434	<0.442	<0.439	<0.472	<0.391	<0.420	<0.413
Chromium	20.6	35.6	<0.702	1.39	<0.625	<0.672	328
Lead	<2.61	<2.65	<2.63	<2.83	<2.34	<2.52	<2.48
Mercury	0.082	0.073	0.040	0.088	0.131	0.12	0.119
Selenium	<0.871	<0.886	<0.878	<0.944	<0.782	<0.841	<0.827
Silver	<0.434	<0.442	<0.439	<0.472	<0.391	0.773	<0.413
Nickel	14.1	23.9	<4.39	<4.72	<3.91	<4.20	222
Uranium	67.5	78.5	51.0	103.5	58.5	32.0	50.5
Reactivity:							
Cyanide	<2	<2	<2	<5	<2	<2	<2
Sulfide	<50	<100	<50	<100	<100	<150	<100
Flash Point (°C) (1)	>100	>100	>100	>100	*	>100	>100
NACE Coupon (2) Corrosivity (mmpy)	<6.35	<6.35	<6.35	<6.35	<6.35	<6.35	<6.35

gmp 6/22/

* Insufficient sample.

(1) Solid samples were analyzed using a closed-cup apparatus without stirring.

(2) Leachate developed by taking 5 grams of sample, adding 250 ml DI water, mixing for 30 minutes, and allowing to leach overnight. (NACE coupon test, per D.E. McCarthy)

3) 1 ppb (0.001 mg/L depleted U = 0.4 pCi/L gmp 6/22/90

E2CL
Enwright Environmental Consulting Laboratories, Inc.
(25 Woods Lake Rd. 29607) PO Box 17467 Greenville, SC 29606 803 235-0 07

Westinghouse Savannah River Company
Add
Laboratory Report, Page 2

The above results are reported in milligrams per kilogram unless otherwise noted.
Analytical methods are those approved by the U.S. Environmental Protection Agency.

Respectfully submitted,

ENWRIGHT ENVIRONMENTAL
CONSULTING LABORATORIES, INC.

David E. McCartney

for Charles H. Reece, Ph.D.
Laboratory Manager

kgb

WESTINGHOUSE SAVANNAH RIVER COMPANY NMP-MEP-930006

INTER-OFFICE MEMORANDUM

February 3, 1993

TO: J. M. Steingard, 730-M
Interim Treatment/Storage Facility (IT/SF) Systems Engineer
NMPD Engineering, Regulatory Programs, 300 ES&H Group

FROM: J. B. Pickett, 730-M
NMPD Engineering, Regulatory Programs, 300 ES&H Group

Analytical Results on 1992 Annual RCRA Analysis for Filtercake Transferred from DETF to IT/SF Tanks (U)

The annual "RCRA" analysis on the filtercake generated by the M-Area Dilute Effluent Treatment Facility from treatment of supernate in the Interim Treatment/ Storage Facility (IT/SF) tanks has been completed. The filtercake was sampled at the Chemical Transfer Facility (CTF) slurry hold tank, prior to transfer to Tank 10 in the IT/SF, on 10/8/92 and 10/10/92. The samples were transferred to Weston Analytics Laboratory on 11/11/92 for total constituent and Toxicity Characteristic Leaching Procedure (TCLP) analyses. The analyses were conducted under Purchase Requisition AA-01244-N, Task Order 22, for which R. P. Kemmerlin in the Subcontract Technical Representative (STR).

The analytical results are summarized in Tables 1 and 2.

The TCLP results (Table 1) indicate that no Toxic Characteristic constituent exceeds the regulatory concentration.

The summary of the total constituent analysis (Table 2) indicates that the filtercake was not dissolved by the laboratory's dissolution procedure. This is based on a calculation of the molar weight % of the key constituents in the sample, using a Molar Mass Balance technique developed by C. M. Jantzen of SRTC for vitreous or high silica samples. The analytical laboratory confirmed that the dissolution procedure was not specific for silica, and that the silica was probably not dissolved. The Purchase Requisition specifications will be revised to include silica dissolution procedures prior to any subsequent total constituent analysis.

Rev. by D.G.P

CC J. C. Musall, 730-M
F. R. Weitz, 730-M
J. S. Bellamy, 707-F
D. G. Poulos, 730-M
R. P. Kemmerlin, 320-M
J. G. Donnan, 320-M
C. M. Jantzen, 773-A
J. M. Plodinec, 773-A
300 Area Records, 320-3M*
Records Administration, 773-52A*
300 ES&H file, 730-M*
~~3.4.1.92, General Waste Analysis, Keywords~~: IT/SF, RCRA

RECORD AUTHENTICATED BY SIGNATURE Lorene S. Johnson 2/8/93

*Laboratory reports attached.

1.3.4; Filtercake analysis

TABLE 1

ANNUAL RCRA FILTERCAKE ANALYSIS

NMP-MEP-930006
2/3/93

SAAMPLE ID (Date Collected)		10/8/92			10/10/92		
LAB ID (assigned by laboratory)	:	1	1	1	2	2	
	Units						
Ignitability		None Obs.			None Obs.		
pH (on water asssociated with sample	pH	8.1			8.1		
Corrosivity (coupon test)	mm/yr	<6.35			<6.35		
Reactivity Cyanide (CN)		Not Detected.			Not Detected.		
Sulfide (S)		Not Detected.			Not Detected.		
Total solids	Wt. %	13.8			20.1		
TOTAL CONSTITUENT CONCENTRATIONS							
(Dry wt Basis)							
Al	mg/Kg	68600			45400		
B	mg/Kg	<145			<99.4		
Ca	mg/Kg	<7250			<4790		
Cr	mg/Kg	109			69		
Cu	mg/Kg	36.2			<24.8		
Fe	mg/Kg	2720			1830		
Mg	mg/Kg	<7250			<4790		
Mn	mg/Kg	62.2			43		
Na	mg/Kg	30800			20300		
Ni	mg/Kg	71.2			<39.7		
Si	mg/Kg	1990			1380		
U	mg/Kg	<290			<199		
Zn	mg/Kg	111			70.3		
NO3 (as N)	mg/Kg	5110			4380		
PO4 (as P)	mg/Kg	2610			614		
SO4	mg/Kg	10800			7350		
TCLP METALS							
LAB ID (On Leachant)		3	3	3 Matrix Spike (% Recovery)	4		TCLP LIMIT
As	mg/L	0.105		106	<0.100		5.0
Ba	mg/L	<0.200		111	<0.200		100
Cd	mg/L	<0.005		103	<0.005		1.0
Cr	mg/L	<0.010		102	0.015		5.0
Hg	mg/L	<0.0002		102	<0.0002		0.2
Pb	mg/L	<0.090		101	<0.090		5.0
Se	mg/L	<0.100		51.8	<0.100		1.0
Ag	mg/L	<0.010		55	<0.010		5.0
PLUS							
Ni	mg/L	0.11		105	0.107		NA
U	mg/L	<0.200		101	<0.200		NA
TCLP VOLATILES							
LAB ID (On Leachant)		5			6	6 Matrix Spike (%Recovery)	
Benzene	µg/L	<50			<50	111	100000
Carbon Tetrachloride	µg/L	<50			<50	106	500
Chlorobenzene	µg/L	<50			<50	109	100000
Chloroform	µg/L	<50			<50	100	6000
1,2-Dichloroethane	µg/L	<50			<50	128	500
1,1-Dichloroethylene	µg/L	<50			<50	104	700
Methyl Ethyl Ketone (2-Butanone)	µg/L	<100			<100	111	200000
Tetrachloroethylene	µg/L	<50			<50	122	700
Trichloroethylene	µg/L	<50			<50	108	500
Vinyl Chloride	µg/L	<100			<100	142	200

TABLE 1 (CON'T)

ANNUAL RCRA FILTERCAKE ANALYSIS (Cont')

SAAMPLE ID (Date Collected) :		10/8/92			10/10/92		TCLP LIMIT
LAB ID (assigned by laboratory)		1	1	1	2	2	
TCLP ACID/BASE NEUTRALS							
LAB ID (On Leachant)		3	3 Replicate	3 Matrix Spike (% Recovery)	4		
o-Cresol	µg/L	<100	<100	77	<100		200000
m-Cresol +p-Cresol	µg/L	<100	<100	74	<100		200000
1,4-Dichlorobenzene	µg/L	<100	<100	54	<100		7500
2,4-Dinitrotoluene	µg/L	<100	<100	78	<100		130
Hexachlorobenzene	µg/L	<100	<100	103	<100		130
Hexachlorobutadiene	µg/L	<100	<100	47	<100		500
Hexachloroethane	µg/L	<100	<100	47	<100		3000
Nitrobenzene	µg/L	<100	<100	84	<100		2000
Pentachlorophenol	µg/L	<500	<500	93	<500		100000
Pyridine	µg/L	<100	<100	79	<100		5000
2,4,5-Trichlorophenol	µg/L	<500	<500	71	<500		400000
2,4,6-Trichlorophenol	µg/L	<100	<100	64	<100		2000
TCLP HERBICIDES							
2,4-D	µg/L	<10	-	105	<10		10000
2,4,5-TP	µg/L	<5	-	88	<5		1000
2,4,5-T (Extra; Not on TCLP list)	µg/L	<5	-	96	<5		-
TCLP PESTICIDES							
Lindane	µg/L	<0.23	-	130	<0.20		400
Total Chlordane	µg/L	<2.3	-	100	<2.0		30
Endrin	µg/L	<0.47	-	135	<0.40		20
Heptachlor	µg/L	<0.23	-	105	<0.20		8
Heptachlor Epoxide	µg/L	<0.23	-	100	<0.20		8
Methoxychlor	µg/L	<2.3	-	103	<2.0		10000
Toxaphene	µg/L	<4.7	-	-	<4.0		500

Samples collected from CTF slurry hold tank (tank no. 200-18), prior to transfer to IT/SF.
Filtercake was from two separate supernate treatment batches (Batch nos. 119 and 120 from Tank 8).

TABLE 2

NMP-MEP-930006
2/3/93

Filtercake Mole % Calculations

Element	Dry wt % 1	Dry wt % 2
Al	6.860	4.450
Ca	< 0.720	< 0.470
Fe	0.270	0.180
Mg	< 0.720	< 0.470
Mn	< 0.001	< 0.001
Na	3.080	2.030
Ni	< 0.001	< 0.001
Si	0.199	0.140
Cr	0.011	0.007
B	< 0.001	< 0.001
U	< 0.003	< 0.002
Zn	0.010	0.007
Cu	< 0.001	< 0.001
SO4	1.080	0.740
NO3	2.259	1.949
PO4	0.780	0.180
% SOLIDS (105°C)	13.80	20.10
Moles SO4/100 gms sample	0.011	0.007
Moles of Na/100 gms sample	0.134	0.088
Moles of NO3/100 gms sample	0.036	0.031

MOLAR MASS BALANCE	MOLAR WT %		MOLAR WT % If Si not dissolved	
Al(OH)3	19.83	12.87	19.83	12.87
NaNO3	3.10	2.67	~~32.10~~	2.67
SiO2*	0.43	0.30	~ 75.00	~ 75.00
NaSO4	1.33	0.91	1.33	0.91
Extra Na	1.99	1.14	1.99	1.14
Fe(OH)3	0.53	0.35	0.53	0.35
SUM	27.21	18.24	~~130.78~~ ~101	92.94

3.10 %

*Note: the procedure used to dissolve the filtercake sample was not specific for silica. It is assumed that the filteraid, a potassium/sodium/aluminum silcate did not dissolve, since the filtercake is ~75% silica.

WESTINGHOUSE SAVANNAH RIVER COMPANY
INTER-OFFICE MEMORANDUM

ESH-ALW-93-0005

JANUARY 7, 1992

TO: Dr. J.B. PICKETT, 730-M

FROM: R.P. KEMMERLIN, 320-M Lab, (5-1143)

AA01244N - WESTON ANALYTICS SUBCONTRACT (U)

SUBJECT: WESTON ANALYTICS REPORT TRANSMITTAL

Attached is a report for Release Order **#22** from Weston Analytics for **INORGANICS** run on **Batch 9211L637.**

Please recognize that these may be partial results.

If you have any questions please call me at 5-1143.

Thank you.

cc: w/o att: S.M. Campbell, 979-W

WESTON
MANAGERS DESIGNERS CONSULTANTS

ROY F. WESTON, INC.
LIONVILLE ANALYTICAL LABORATORY
ANALYTICAL CASE NARRATIVE

Client: WSRC-TASK 22
RFW #: 9211L637

W.O. #: 00345-031-022-9999-00
Date Received: 11-12-92

INORGANIC

The following is a summary of the quality control results and a description of any problems encountered during the analysis of this batch of samples:

1. All sample holding times as required by 40CFR136 were met.

2. All preparation blank results were below the required detection limit.

3. All laboratory control standards (blank spikes) were within the control limits of 80-120%.

4. All calibration verification checks were within the required control limits of 90-110%. Calibration verification is performed using independent standards.

5. Replicate results are summarized on the Inorganic Precision Report contained within this document. All results were within the 20% RPD guidance limit.

6. The analytical methods applied by the laboratory, unless otherwise requested, for all inorganic analyses are derived from the USEPA Method for Chemical Analysis of Water and Wastes (USEPA 600/4-79-020) and Standard Methods for the Examination of Water and Wastewater 16 ed. Methods for the analysis of solid samples are derived from Test Methods for Evaluating Solid Waste (USEPA SW846).

7. The Cyanide and Sulfide spot test results are negative. Nitrate, Phosphate and Sulfate are reported on a dry weight basis.

J. Peter Hershey, Ph.D.
Laboratory Manager
Lionville Analytical Laboratory

12.29.92
Date

kls/i11-637

ROY F. WESTON
INORGANICS DATA SUMMARY REPORT
PHYSICAL TESTING OBSERVATIONS

Analyte:	**Observation:**
Flashpoint (IFLSH)	No flash point observed. Test flame extinguished at: 120°F for sample 9211L637-001 112°F for sample 9211L637-002 Xylene was used to determine the accuracy of the flashpoint apparatus. The Xylene will flash at 80°F +/- 2°F. For this test, the Xylene flashed at 80°F. Sample #9211L650-001 changed the color from blue to green.

pas\7-92\pto.pg2

ROY F. WESTON, INC.
GLOSSARY OF TERMS - INORGANIC REPORTS

DATA QUALIFIERS

U - Indicates that the parameter was not detected at or above the reported limit. The associated numerical value is the sample detection limit.

* - Indicates that the original sample result is greater than 4x the spike amount added. The USEPA-CLP has determined that spike results on samples where this occurs may be unreliable and therefore, the control limits are not applicable.

ABBREVIATIONS

MB - Method or preparation blank.
MS - Matrix Spike.
MSD - Matrix Spike Duplicate.
REP - Sample Replicate.
LC - Indicates a method LCS or Blank Spike.
NC - Not calculable, result below the detection limit.

A suffix of -R or -S following these codes indicates a replicate or spike analysis respectively.

ANALYTICAL METAL METHODS

As :	EPA 206.2	SE	:	EPA 270.2
Pb :	EPA 239.2	ICP Scan	:	EPA 200.7
Hg :	EPA 245.1	All Others	:	EPA 200.7
Tl :	EPA 279.2	EP Leachates	(except Hg)	200.7
Ba:	EPA 208.2			

The analytical methods applied by the laboratory for the determination of drinking water are found in 5.2.1.

NOTES

The laboratory prepares a matrix spike at one per 20 frequency for TCLP samples. The Federal Register recommends that all matrix spikes be prepared at greater than 50% of the indigenous analyte concentration.

Holding times for soil samples have not been promulgated by the USEPA.

For solid samples, all results are reported on a dry weight basis.

The range for mercury solid laboratory control standards is 66.9% to 133.8%.

ROY F. WESTON INC.

INORGANIC DATA SUMMARY REPORT 12/21/92

CLIENT: WSRC-TASK 22 WESTON BATCH #: 9211L637
WORK ORDER: 00345-031-022-9999-00

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT
-001	FILTERCAKE SLURRY(4)	% Solids	13.8	%	0.10
		Corrosivity	6.35 u	mm/yr	6.35
		Nitrate, as N	5110	MG-N/KG	72.5
		pH	8.1	PH UNITS	0.010
		Phosphate, as P	2610	MG/KG	144
		Sulfate	10800	MG/KG	362
		Total Solids	167000	MG/L	20.0
-002	FILTERCAKE SLURRY(4)	% Solids	20.1	%	0.10
		Corrosivity	6.35 u	mm/yr	6.35
		Nitrate, as N	4380	MG-N/KG	49.7
		pH	8.1	PH UNITS	0.010
		Phosphate, as P	614	MG/KG	85.8
		Sulfate	7350	MG/KG	248
		Total Solids	214000	MG/L	20.0

ROY F. WESTON INC.

INORGANIC METHOD BLANK DATA SUMMARY PAGE 12/21/92

CLIENT: WSRC-TASK 22 WESTON BATCH #: 9211L637
WORK ORDER: 00345-031-022-9999-00

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT
BLANK10	92LNS223-MB1	Nitrate, as N	0.10 u	MG-N/KG	0.1(
BLANK20	92LNS223-MB2	Nitrate, as N	0.10 u	MG-N/KG	0.1(
LCSS0	92LWP120-LCS	Phosphate, as P	2.0 u	MG/KG	2.0
BLANK10	92LWP120-MB1	Phosphate, as P	2.0 u	MG/KG	2.0
BLANK20	92LWP120-MB2	Phosphate, as P	2.0 u	MG/KG	2.0
BLANK10	92LICW59-MB1	Sulfate	2.5 u	MG/KG	2.5
BLANK10	92LSS249-MB1	Total Solids	5.0 u	MG/L	5.0
BLANK10	92LNS224-MB1	Nitrate, as N	0.10 u	MG-N/KG	0.1(
BLANK20	92LNS224-MB2	Nitrate, as N	0.10 u	MG-N/KG	0.1(

ROY F. WESTON INC.

INORGANIC ACCURACY REPORT 12/21/92

CLIENT: WSRC-TASK 22 WESTON BATCH #: 9211L637
WORK ORDER: 00345-031-022-9999-00

SAMPLE	SITE ID	ANALYTE	SPIKED SAMPLE	INITIAL RESULT	SPIKED AMOUNT	%RECOV
LCSS0	92LWP120-LCS	Phosphate, as P	404	2.0 u	423	95.6
BLANK10	92LWP120-MB1	Phosphate, as P	24.0	2.0 u	25.0	95.8
		Phosphate, as P MSD	50.1	2.0 u	50.0	100
BLANK20	92LWP120-MB2	Phosphate, as P	24.5	2.0 u	25.0	98.0
		Phosphate, as P MSD	51.2	2.0 u	50.0	102
BLANK10	92LICW59-MB1	Sulfate	23.4	2.5 u	25.0	93.7
		Sulfate	23.4	2.5 u	25.0	93.8
BLANK10	92LNS224-MB1	Nitrate, as N	5.0	0.10u	5.0	100
		Nitrate, as N MSD	5.5	0.10u	5.0	109
BLANK20	92LNS224-MB2	Nitrate, as N	5.2	0.10u	5.0	103

ROY F. WESTON INC.

INORGANIC DUPLICATE SPIKE REPORT 12/21/92

CLIENT: WSRC-TASK 22 WESTON BATCH #: 9211L637

WORK ORDER: 00345-031-022-9999-00

SAMPLE	SITE ID	ANALYTE	SPIKE#1 %RECOV	SPIKE#2 %RECOV	%RPD
BLANK10	92LWP120-MB1	Phosphate, as P	95.8	100	4.4
BLANK20	92LWP120-MB2	Phosphate, as P	98.0	102	4.4
BLANK10	92LICW59-MB1	Sulfate	93.7	93.8	0.064
BLANK10	92LNS224-MB1	Nitrate, as N	100	109	8.4

ROY F. WESTON INC.

INORGANIC PRECISION REPORT 12/21/92

IENT: WSRC-TASK 22 WESTON BATCH #: 9211L637
ORK ORDER: 00345-031-022-9999-00

AMPLE	SITE ID	ANALYTE	INITIAL RESULT	REPLICATE	%RPD
001REP	FILTERCAKE SLURRY(4)	% Solids	13.8	13.7	0.58
		pH	8.1	8.1	0.25
002REP	FILTERCAKE SLURRY(4)	Total Solids	214000	212000	0.63
LANREP	92LWP120-MB2	Phosphate, as P	2.0 u	2.0 u	NC

Roy F. Weston, Inc. - Lionville Laboratory
INORGANIC ANALYTICAL DATA PACKAGE FOR
WSRC-TASK 22

DATE RECEIVED: 11/12/92 RFW LOT # :9211L637

CLIENT ID /ANALYSIS	RFW #	MTX	PREP #	COLLECTION	EXTR/PREP	ANALYSIS
FILTERCAKE SLURRY(4)						
% SOLIDS	001	SE	92LRS280	11/08/92	11/19/92	11/20/92
% SOLIDS	001 REP	SE	92LRS280	11/08/92	11/19/92	11/20/92
CORROSIVITY	001	SE	92LCC002	11/08/92	11/30/92	12/01/92
FLASH POINT	001	SE	92LFP043	11/08/92	11/23/92	11/23/92
MISCELLANEOUS TEST	001	SE	92CNS01	11/08/92	12/03/92	12/03/92
MISCELLANEOUS TEST1-	001	SE	92CNS01	11/08/92	12/03/92	12/03/92
NITRATE	001	SE	92LNS223	11/08/92	12/03/92	12/03/92
PH	001	SE	92LRP012	11/08/92	11/13/92	11/13/92
PH	001 REP	SE	92LRP012	11/08/92	11/13/92	11/13/92
TOTAL PHOSPHATE	001	SE	92LWP120	11/08/92	11/27/92	11/27/92
SULFATE	001	SE	92LICW59	11/08/92	12/11/92	12/11/92
TCLP	001	SE	92LTO119	11/08/92	11/17/92	11/18/92
TCLP LEACHATE	001	SE	92LTV067	11/08/92	11/17/92	11/18/92
TOTAL SOLIDS	001	SE	92LSS249	11/08/92	11/16/92	11/17/92
% SOLIDS	002	SE	92LRS281	11/10/92	11/20/92	11/21/92
CORROSIVITY	002	SE	92LCC002	11/10/92	11/30/92	12/01/92
FLASH POINT	002	SE	92LFP043	11/10/92	11/23/92	11/23/92
MISCELLANEOUS TEST	002	SE	92CNS01	11/10/92	12/03/92	12/03/92
MISCELLANEOUS TEST1-	002	SE	92CNS01	11/10/92	12/03/92	12/03/92
NITRATE	002	SE	92LNS224	11/10/92	12/04/92	12/04/92
PH	002	SE	92LRP012	11/10/92	11/13/92	11/13/92
TOTAL PHOSPHATE	002	SE	92LWP120	11/10/92	11/27/92	11/27/92
SULFATE	002	SE	92LICW59	11/10/92	12/11/92	12/11/92
TCLP	002	SE	92LTO119	11/10/92	11/17/92	11/18/92
TCLP LEACHATE	002	SE	92LTV067	11/10/92	11/17/92	11/18/92
TOTAL SOLIDS	002	SE	92LSS249	11/10/92	11/16/92	11/17/92
TOTAL SOLIDS	002 REP	SE	92LSS249	11/10/92	11/16/92	11/17/92
LAB QC:						
NITRATE	MB1	S	92LNS223	N/A	12/03/92	12/03/92
NITRATE	MB1 BS	S	92LNS223	N/A	12/03/92	12/03/92
NITRATE	MB1 BSD	S	92LNS223	N/A	12/03/92	12/03/92
NITRATE	MB2	S	92LNS223	N/A	12/03/92	12/03/92
NITRATE	MB2 BS	S	92LNS223	N/A	12/03/92	12/03/92

Roy F. Weston, Inc. - Lionville Laboratory
INORGANIC ANALYTICAL DATA PACKAGE FOR
WSRC-TASK 22

DATE RECEIVED: 11/12/92 RFW LOT # :9211L637

CLIENT ID /ANALYSIS	RFW #	MTX	PREP #	COLLECTION	EXTR/PREP	ANALYSIS
TOTAL PHOSPHATE	LCS	S	92LWP120	N/A	11/27/92	11/27/92
TOTAL PHOSPHATE	LCS BS	S	92LWP120	N/A	11/27/92	11/27/92
TOTAL PHOSPHATE	MB1	S	92LWP120	N/A	11/27/92	11/27/92
TOTAL PHOSPHATE	MB1 BS	S	92LWP120	N/A	11/27/92	11/27/92
TOTAL PHOSPHATE	MB1 BSD	S	92LWP120	N/A	11/27/92	11/27/92
TOTAL PHOSPHATE	MB2	S	92LWP120	N/A	11/27/92	11/27/92
TOTAL PHOSPHATE	MB2 REP	S	92LWP120	N/A	11/27/92	11/27/92
TOTAL PHOSPHATE	MB2 BS	S	92LWP120	N/A	11/27/92	11/27/92
TOTAL PHOSPHATE	MB2 BSD	S	92LWP120	N/A	11/27/92	11/27/92
SULFATE	MB1	S	92LICW59	N/A	12/11/92	12/11/92
SULFATE	MB1 BS	S	92LICW59	N/A	12/11/92	12/11/92
SULFATE	MB1 BSD	S	92LICW59	N/A	12/11/92	12/11/92
TOTAL DISSOLVED SOLI	MB1	W	92LSS249	N/A	11/16/92	11/17/92
TOTAL SOLIDS	MB1	W	92LSS249	N/A	11/16/92	11/17/92
TOTAL SUSPENDED SOLI	MB1	W	92LSS249	N/A	11/16/92	11/17/92
NITRATE	MB1	S	92LNS224	N/A	12/04/92	12/04/92
NITRATE	MB1 BS	S	92LNS224	N/A	12/04/92	12/04/92
NITRATE	MB1 BSD	S	92LNS224	N/A	12/04/92	12/04/92
NITRATE	MB2	S	92LNS224	N/A	12/04/92	12/04/92
NITRATE	MB2 BS	S	92LNS224	N/A	12/04/92	12/04/92

PM: Diane Dan Cellino ans Reg Test w/ Hits S-boards

WESTON Analytics Use Only

92/1L637

Custody Transfer Record/Lab Work Request

WESTON

Page 1 of 1

Client WSRC - TASK 22

Est. Final Proj. Sampling Date NOVEMBER 9, 1992

Work Order # WSRC - TASK # 22 00345-031-022-9999-00

Project Contact/Phone # J.B. PICKETT (803) 725-3838

AD Project Manager DIANE THOMAS

QC STD Del STD TAT 30 DAY

Date Rec'd 11/12/92 Date Due 12/12/92

Account # WSRC22STD

Refrigerator #

#/Type Container	Liquid				4	4	4			4					
	Solid														
Volume	Liquid				1L	1L	1L			1L					
	Solid				125ml	500ml	250ml			250ml					
Preservatives					1	1	1	Cyanide							

ANALYSES REQUESTED →	ORGANIC							INORG							
	VOA	BNA	Pest/PCB	Herb	TCLV	TCLP	metals	Metal	CN	PH TS NO3	SO4 PO4T	TASH Icorp	Imsc Imsc1		

MATRIX CODES:	Lab ID	Client ID/Description	Matrix QC Chosen (✓) MS	MSD	Matrix	Date Collected	Time Collected	WESTON Analytics Use Only: 8260VT	8270ST	8270ST	8270ST	TCLV	TCLP	See Below	RCRA (As, Ba, Cd, Cr, Pb, Hg, Se, Ag, U-, Ni)		IPH ITS IN03	SO4 IPO4T	IASH Icorp Icorc	Imsc Imsc1		
S - Soil SE - Sediment SO - Solid SL - Sludge W - Water O - Oil A - Air DS - Drum Solids DL - Drum Liquids L - EP/TCLP Leachate WI - Wipe X - Other F - Fish	1	Filtercake/Slurry (4)	RAD		SL	11/9/92	1800					X	X	X			X	X	X	X	
	2	Filtercake/Slurry (4)	RAD		SL	11/10/92	1000					X	X	X			X	X	X	X	
	003	Filtercake/Slurry (4)	recd 001		W	11/18/92			X	X	X				X						
	004	Filtercake/Slurry (4)	recd 002		W	11/18/92			X	X	X				X						
	005	Filtercake/Slurry (4)	recd 001		W	11/18/92		X													
	006	Filtercake/Slurry (4)	recd 002		W	11/18/92		X													
		leachate metal = RCRA + U-, Ni																			
		orig Reunten																			

FIELD PERSONNEL: COMPLETE ONLY SHADED AREAS

Special Instructions:

No ID on Bottles

metals = Al, B-, Ca, Cr, Cu, Fe, Mg, Mn, Ni Si, Na, U-, Zn

Imsc = Cyanide Spot Test

Imsc1 = Sulfide Spot Test

DATE/REVISIONS:

11/19/92 1. WO# = 00345-031-022-9999-00

1 2. Cancel Icorp and Add Icorc by

3. Capan Method

11/23/92 4. Leachate data added to COC

12/1/92 5.

6.

WESTON Analytics Use Only

Samples were:
1) Shipped X or Hand Delivered ___
Airbill # 133430975
2) Ambient or Chilled
3) Received in Good Condition (Y) or N
4) Labels Indicate Properly Preserved (Y) or N
5) Received Within Holding Times (Y) or N

COC Tape was:
1) Present on Outer Package (Y) or N
2) Unbroken on Outer Package (Y) or N
3) Present on Sample (Y) or N
4) Unbroken on Sample (Y) or N

COC Record Present Upon Sample Rec't (Y) or N

Discrepancies Between Samples Labels and COC Record? (Y) or N

NOTES: No ID on Bottles on 11/23 Rec'd on 12/1

Relinquished by	Received by	Date	Time
VAN Ericmem	B. FAIR	11-8-92	2238
D.C. Rol	C. Hamm	11/9/92	915

Relinquished by	Received by	Date	Time
Walter Johnson	D. Sg. Parks	11-4-92	0747
C. Hamm	R. Nix	11/9/92	0930

RFW 21-

596a

WESTON Analytics Use Only

Custody Transfer Record/Lab Work Request

WESTON

Page ____ of ____

Client WSRC
Est. Final Proj. Sampling Date 11/10/92
Work Order # RO #22
Project Contact/Phone # J.B. Pickett 803/725-4087
AD Project Manager Diane Thomas
QC ____ Del ____ TAT ____
Date Rec'd ____ Date Due ____
Account # ____

Refrigerator #		
#/Type Container	Liquid	
	Solid	
Volume	Liquid	
	Solid	
Preservatives		

ANALYSES REQUESTED →

ORGANIC							INORG						
VOA	BNA	Pest/PCB	Herb				Metal	CN					

WESTON Analytics Use Only

MATRIX CODES:
S - Soil
SE - Sediment
SO - Solid
SL - Sludge
W - Water
O - Oil
A - Air
DS - Drum Solids
DL - Drum Liquids
L - EP/TCLP Leachate
WI - Wipe
X - Other
F - Fish

Lab ID	Client ID/Description	Matrix QC Chosen (✓) MS	MSD	Matrix	Date Collected	Time Collected
	Filterlake/Slurry (4)			SL	11/10/92	1000 hrs

FIELD PERSONNEL: COMPLETE ONLY SHADED AREAS

Special Instructions:

DATE/REVISIONS:
1. ____
2. ____
3. ____
4. ____
5. ____
6. ____

WESTON Analytics Use Only

Samples were:
1) Shipped ___ or Hand Delivered ___ Airbill # ____
2) Ambient or Chilled
3) Received in Good Condition Y or N
4) Labels Indicate Properly Preserved Y or N
5) Received Within Holding Times Y or N

COC Tape was:
1) Present on Outer Package Y or N
2) Unbroken on Outer Package Y or N
3) Present on Sample Y or N
4) Unbroken on Sample Y or N
COC Record Present Upon Sample Rec't Y or N

Discrepancies Between Samples Labels and COC Record? Y or N
NOTES:

Relinquished by	Received by	Date	Time
[signature]	J.D. Bridwell	11/10/92	1133
D.G. Pavlos	C. Howell	11/11/92	915

Relinquished by	Received by	Date	Time
Walter Gahnes	D.G. Pavlos	11-11-92	0748
C. Howell			

RFW 21-21-001/A-7/91

____ L372 ____ L373 ____ L375 ____ L377 ____ L378 Ref# ____ Cooler# ____

381-596a

WESTINGHOUSE SAVANNAH RIVER COMPANY
INTER-OFFICE MEMORANDUM

ESH-ALW-93-0033

JANUARY 29, 1992

TO: Dr. J.B. PICKETT, 730-M RPK

FROM: R.P. KEMMERLIN, 320-M Lab, (5-1143)

AA01244N - WESTON ANALYTICS SUBCONTRACT (U)

SUBJECT: WESTON ANALYTICS REPORT TRANSMITTAL

Attached is the report for Release Order **#22** from Weston Analytics for **METALS** for batch **9211L637.**

Please recognize that these may be partial results.

If you have any questions please call me at 5-1143.

Thank you.

cc: w/o att: S.M. Campbell, 979-W

Ray Sieny of Weston analytics called 2/2/93.
They used EPA SW 846, Procedure 3050
to dissolve the samples for Total constituent.
This procedure is <u>not</u> specific for silicon.
2/4/93

RECEIVED
JAN 2 9 1993
R. P. KEMMERLIN

WESTON
MANAGERS DESIGNERS CONSULTANTS

ROY F. WESTON, INC.
LIONVILLE ANALYTICAL LABORATORY
ANALYTICAL CASE NARRATIVE

Client : WSRC-TASK 22
RFW# : 9211L637

W.O. #: 00345-031-022-9999-00
Date Received: 11-12-92

METALS

The following is a summary of the quality control results and a description of any problems encountered during the analysis of this batch of samples:

1. This narrative covers the analysis of two (2) sludge samples and two (2) water samples.

2. The samples were prepared and analyzed based on the methods listed in the attached glossary.

3. All analyses were performed within the required holding times.

4. All Initial and Continuing Calibration Verifications (ICV/CCV's) were within control limits.

5. All Initial and Continuing Calibration Blanks (ICB/CCB's) were within control limits.

6. All Preparation/Method Blanks were below or equal to Reporting Limits.

7. All ICP Interference Check Samples (ICSA and ICSAB) were within control limits.

8. All Laboratory Control Samples (LCS) were within the 80-120% control limits.

9. All Duplicate Laboratory Control Samples were within the 20% Relative Percent Difference (RPD) control limits.

10. The extract from sample 003 was selected as the matrix spike for this analytical batch. Nickel was not spiked.

Raymond A. Siery
Inorganic Section Manager

1.18.93
Date

kls/m11-637

ROY F. WESTON, INC.
GLOSSARY OF TERMS - INORGANIC REPORTS

DATA QUALIFIERS

U - Indicates that the parameter was not detected at or above the reported limit. The associated numerical value is the sample detection limit.

* - Indicates that the original sample result is greater than 4x the spike amount added. The USEPA-CLP has determined that spike results on samples where this occurs may be unreliable and therefore, the control limits are not applicable.

ABBREVIATIONS

MB - Method or preparation blank.
MS - Matrix Spike.
MSD - Matrix Spike Duplicate.
REP - Sample Replicate.
LC - Indicates a method LCS or Blank Spike.
NC - Not calculable, result below the detection limit.

A suffix of -R or -S following these codes indicates a replicate or spike analysis respectively.

ANALYTICAL METAL METHODS

As	: EPA 206.2	Se	:	EPA 270.2
Pb	: EPA 239.2	Ba	:	EPA 208.2
Hg	: EPA 245.1	ICP Scan	:	EPA 200.7
Tl	: EPA 279.2	All Others	:	EPA 200.7

EP Leachates (except Hg) 200.7

The analytical methods applied by the laboratory for the determination of drinking water are found in 5.2.1.

NOTES

Holding times for soil samples have not been promulgated by the USEPA.

For solid samples, all results are reported on a dry weight basis.

The range for mercury solid laboratory control standards is 66.9% to 133.8%.

ROY F. WESTON INC.

INORGANIC DATA SUMMARY REPORT 01/13/93

LIENT: WSRC-TASK 22 WESTON BATCH #: 9211L637
ORK ORDER: 00345-031-022-9999-00

AMPLE	SITE ID	ANALYTE	RESULT		UNITS	REPORTING LIMIT
001	FILTERCAKE SLURRY(4)	Aluminum, Total	68600		MG/KG	290
		Boron, Total	145	u	MG/KG	145
		Calcium, Total	7250	u	MG/KG	7250
		Chromium, Total	109		MG/KG	14.5
		Copper, Total	36.2	u	MG/KG	36.2
		Iron, Total	2720		MG/KG	145
		Magnesium, Total	7250	u	MG/KG	7250
		Manganese, Total	62.2		MG/KG	21.7
		Sodium, Total	30800		MG/KG	7250
		Nickel, Total	71.2		MG/KG	58.0
		Silicon, Total	1990		MG/KG	145
		Uranium, Total	290	u	MG/KG	290
		Zinc, Total	111		MG/KG	29.0

ROY F. WESTON INC.

INORGANIC DATA SUMMARY REPORT 01/13/93

CLIENT: WSRC-TASK 22 WESTON BATCH #: 9211L637
WORK ORDER: 00345-031-022-9999-00

SAMPLE	SITE ID	ANALYTE	RESULT		UNITS	REPORTING LIMIT
-002	FILTERCAKE SLURRY(4)	Aluminum, Total	45400		MG/KG	199
		Boron, Total	99.4	u	MG/KG	99.4
		Calcium, Total	4970	u	MG/KG	4970
		Chromium, Total	69.0		MG/KG	9.9
		Copper, Total	24.8	u	MG/KG	24.8
		Iron, Total	1830		MG/KG	99.4
		Magnesium, Total	4970	u	MG/KG	4970
		Manganese, Total	43.0		MG/KG	14.9
		Sodium, Total	20300		MG/KG	4970
		Nickel, Total	39.7	u	MG/KG	39.7
		Silicon, Total	1380		MG/KG	99.4
		Uranium, Total	199	u	MG/KG	199
		Zinc, Total	70.3		MG/KG	19.9

ROY F. WESTON INC.

INORGANIC DATA SUMMARY REPORT 01/13/93

LIENT: WSRC-TASK 22 WESTON BATCH #: 9211L637
ORK ORDER: 00345-031-022-9999-00

AMPLE	SITE ID	ANALYTE	RESULT		UNITS	REPORTING LIMIT
003	FILTERCAKE SLURRY(4)	Silver, TCLP Leachate	10.0	u	UG/L	10.0
		Arsenic, TCLP Leachate	105		UG/L	100
		Barium, TCLP Leachate	200	u	UG/L	200
		Cadmium, TCLP Leachate	5.0	u	UG/L	5.0
		Chromium, TCLP Leachate	10.0	u	UG/L	10.0
		Mercury, TCLP Leachate	0.20	u	UG/L	0.20
		Nickel, TCLP Leachate	110		UG/L	10.0
		Lead, TCLP Leachate	90.0	u	UG/L	90.0
		Selenium, TCLP Leachate	100	u	UG/L	100
		Uranium, TCLP Leachate	200	u	UG/L	200

ROY F. WESTON INC.

:INORGANIC DATA SUMMARY REPORT 01/13/93

CLIENT: WSRC-TASK 22 WESTON BATCH #: 9211L637
WORK ORDER: 00345-031-022-9999-00

SAMPLE	SITE ID	ANALYTE	RESULT		UNITS	REPORTING LIMIT
-004	FILTERCAKE SLURRY(4)	Silver, TCLP Leachate	10.0	u	UG/L	10.0
		Arsenic, TCLP Leachate	100	u	UG/L	100
		Barium, TCLP Leachate	200	u	UG/L	200
		Cadmium, TCLP Leachate	5.0	u	UG/L	5.0
		Chromium, TCLP Leachate	15.6		UG/L	10.0
		Mercury, TCLP Leachate	0.20	u	UG/L	0.2
		Nickel, TCLP Leachate	107		UG/L	10.0
		Lead, TCLP Leachate	90.0	u	UG/L	90.0
		Selenium, TCLP Leachate	100	u	UG/L	100
		Uranium, TCLP Leachate	200	u	UG/L	200

ROY F. WESTON INC.

INORGANIC METHOD BLANK DATA SUMMARY PAGE 01/13/93

IENT: WSRC-TASK 22
RK ORDER: 00345-031-022-9999-00

WESTON BATCH #: 9211L637

MPLE	SITE ID	ANALYTE	RESULT		UNITS	REPORTING LIMIT
ANK1	92L7455-MB1	Aluminum, Total	40.0	u	MG/KG	40.0
	Method Blank	Boron, Total	20.0	u	MG/KG	20.0
		Calcium, Total	1000	u	MG/KG	1000
		Chromium, Total	2.0	u	MG/KG	2.0
		Copper, Total	5.0	u	MG/KG	5.0
		Iron, Total	20.0	u	MG/KG	20.0
		Magnesium, Total	1000	u	MG/KG	1000
		Manganese, Total	3.0	u	MG/KG	3.0
		Sodium, Total	1000	u	MG/KG	1000
		Nickel, Total	8.0	u	MG/KG	8.0
		Silicon, Total	20.0	u	MG/KG	20.0
		Uranium, Total	40.0	u	MG/KG	40.0
		Zinc, Total	4.0	u	MG/KG	4.0
ANK1	92L7481-MB1	Silver, TCLP Leachate	10.0	u	UG/L	10.0
		Arsenic, TCLP Leachate	100	u	UG/L	100
		Barium, TCLP Leachate	200	u	UG/L	200
		Cadmium, TCLP Leachate	5.0	u	UG/L	5.0
		Chromium, TCLP Leachate	10.0	u	UG/L	10.0
		Nickel, TCLP Leachate	10.0	u	UG/L	10.0
		Lead, TCLP Leachate	90.0	u	UG/L	90.0
		Selenium, TCLP Leachate	100	u	UG/L	100
		Uranium, TCLP Leachate	200	u	UG/L	200
ANK1	92C0358-MB1	Mercury, TCLP Leachate	0.20	u	UG/L	0.20
ANK2	92C0358-MB2	Mercury, TCLP Leachate	0.20	u	UG/L	0.20

Reporting Limit on Total constituent analysis derived by (for Al) 40 mg/Kg / 0.138 dry wt ≥ 290 mg/Kg for wet sample

(40 / 0.201 = 199)

ROY F. WESTON INC.

INORGANIC ACCURACY REPORT 01/13/93

CLIENT: WSRC-TASK 22
WORK ORDER: 00345-031-022-9999-00

WESTON BATCH #: 9211L63

SAMPLE	SITE ID	ANALYTE	SPIKED SAMPLE	INITIAL RESULT	SPIKED AMOUNT	%RE
-003	FILTERCAKE SLURRY(4)	Silver, TCLP Leachate	2760	10.0 u	5000	5
		Arsenic, TCLP Leachate	5380	105	5000	10
		Barium, TCLP Leachate	111000	200 u	100000	11
		Cadmium, TCLP Leachate	1030	5.0 u	1000	10
		Chromium, TCLP Leachate	5110	10.0 u	5000	10
		Mercury, TCLP Leachate	205	0.20u	200	10
		Nickel, Leachate	105	110	0	
		Lead, TCLP Leachate	5030	90.0 u	5000	10
		Selenium, TCLP Leachate	1040	100 u	2000	5
		Uranium, TCLP Leachate	5030	200 u	5000	10

ROY F. WESTON INC.

INORGANIC DUPLICATE SPIKE REPORT 01/13/93

CLIENT: WSRC-TASK 22 WESTON BATCH #: 9211L637
WORK ORDER: 00345-031-022-9999-00

SAMPLE	SITE ID	ANALYTE	SPIKE#1 %RECOV	SPIKE#2 %RECOV	%RPD
LCS2	92L7455-LC2	Aluminum, LCS	104	106	2.4
		Boron, LCS	98.8	100	1.6
		Calcium, LCS	103	104	1.6
		Chromium, LCS	104	105	1.1
		Copper, LCS	104	103	0.39
		Iron, LCS	101	108	6.1
		Magnesium, LCS	102	103	0.97
		Manganese, LCS	101	106	4.1
		Sodium, LCS	103	103	0.37
		Nickel, LCS	104	104	0.50
		Silicon, LCS	110	111	0.29
		Uranium, LCS	101	101	0.00
		Zinc, LCS	104	105	0.81
LCS2	92L7481-LC2	Silver, LCS	113	111	2.3
		Arsenic, LCS	103	102	1.2
		Barium, LCS	107	105	2.1
		Cadmium, LCS	100	93.6	6.8
		Chromium, LCS	106	104	2.3
		Nickel, LCS	104	103	0.95
		Lead, LCS	104	102	1.3
		Selenium, LCS	101	98.5	2.0
		Uranium, LCS	92.8	93.7	0.98
LCS2	92C0358-LC2	Mercury, LCS	100	101	0.68

method spike

ROY F. WESTON INC.

INORGANIC LABORATORY CONTROL STANDARDS REPORT 01/13/93

SAMPLE	SITE ID	ANALYTE	SPIKED SAMPLE	SPIKED AMOUNT	UNITS	%RECO
LCS1	92L7455-LC1	Aluminum, LCS	1040	1000	MG/KG	104
		Boron, LCS	988	1000	MG/KG	98.8
		Calcium, LCS	5140	5000	MG/KG	103
		Chromium, LCS	104	100	MG/KG	104
		Copper, LCS	259	250	MG/KG	104
		Iron, LCS	1010	1000	MG/KG	101
		Magnesium, LCS	5110	5000	MG/KG	102
		Manganese, LCS	152	150	MG/KG	101
		Sodium, LCS	5140	5000	MG/KG	103
		Nickel, LCS	415	400	MG/KG	104
		Silicon, LCS	1100	1000	MG/KG	110
		Uranium, LCS	1010	1000	MG/KG	101
		Zinc, LCS	208	200	MG/KG	104
LCS2	92L7455-LC2	Aluminum, LCS	1060	1000	MG/KG	106
		Boron, LCS	1000	1000	MG/KG	100
		Calcium, LCS	5220	5000	MG/KG	104
		Chromium, LCS	105	100	MG/KG	105
		Copper, LCS	258	250	MG/KG	103
		Iron, LCS	1080	1000	MG/KG	108
		Magnesium, LCS	5160	5000	MG/KG	103
		Manganese, LCS	158	150	MG/KG	106
		Sodium, LCS	5160	5000	MG/KG	103
		Nickel, LCS	417	400	MG/KG	104
		Silicon, LCS	1110	1000	MG/KG	111
		Uranium, LCS	1010	1000	MG/KG	101
		Zinc, LCS	210	200	MG/KG	105
LCS1	92L7481-LC1	Silver, LCS	566	500	UG/L	113
		Arsenic, LCS	10300	10000	UG/L	103
		Barium, LCS	5340	5000	UG/L	107
		Cadmium, LCS	250	250	UG/L	100
		Chromium, LCS	530	500	UG/L	106
		Nickel, LCS	2080	2000	UG/L	104
		Lead, LCS	2590	2500	UG/L	104
		Selenium, LCS	10100	10000	UG/L	101
		Uranium, LCS	4640	5000	UG/L	92.8
LCS2	92L7481-LC2	Silver, LCS	553	500	UG/L	111
		Arsenic, LCS	10200	10000	UG/L	102

ROY F. WESTON INC.

INORGANIC LABORATORY CONTROL STANDARDS REPORT 01/13/93

AMPLE	SITE ID	ANALYTE	SPIKED SAMPLE	SPIKED AMOUNT	UNITS	%RECOV
CS2	92L7481-LC2	Barium, LCS	5230	5000	UG/L	105
		Cadmium, LCS	234	250	UG/L	93.6
		Chromium, LCS	518	500	UG/L	104
		Nickel, LCS	2060	2000	UG/L	103
		Lead, LCS	2560	2500	UG/L	102
		Selenium, LCS	9850	10000	UG/L	98.5
		Uranium, LCS	4680	5000	UG/L	93.7
CS1	92C0358-LC1	Mercury, LCS	5.0	5.0	UG/L	100
CS2	92C0358-LC2	Mercury, LCS	5.0	5.0	UG/L	101

Roy F. Weston, Inc. - Lionville Laboratory
INORGANIC ANALYTICAL DATA PACKAGE FOR
WSRC-TASK 22

DATE RECEIVED: 11/12/92 RFW LOT # :9211L637

CLIENT ID /ANALYSIS	RFW #	MTX	PREP #	COLLECTION	EXTR/PREP	ANALYSIS
FILTERCAKE SLURRY(4)						
ALUMINUM, TOTAL	001	SE	92L7455	11/08/92	11/18/92	11/19/92
BORON, TOTAL	001	SE	92L7455	11/08/92	11/18/92	11/19/92
CALCIUM, TOTAL	001	SE	92L7455	11/08/92	11/18/92	11/19/92
CHROMIUM, TOTAL	001	SE	92L7455	11/08/92	11/18/92	11/19/92
COPPER, TOTAL	001	SE	92L7455	11/08/92	11/18/92	11/19/92
IRON, TOTAL	001	SE	92L7455	11/08/92	11/18/92	11/19/92
MAGNESIUM, TOTAL	001	SE	92L7455	11/08/92	11/18/92	11/19/92
MANGANESE, TOTAL	001	SE	92L7455	11/08/92	11/18/92	11/19/92
SODIUM, TOTAL	001	SE	92L7455	11/08/92	11/18/92	11/19/92
NICKEL, TOTAL	001	SE	92L7455	11/08/92	11/18/92	11/19/92
SILICON, TOTAL	001	SE	92L7455	11/08/92	11/18/92	11/19/92
URANIUM, TOTAL	001	SE	92L7455	11/08/92	11/18/92	12/02/92
ZINC, TOTAL	001	SE	92L7455	11/08/92	11/18/92	11/19/92
ALUMINUM, TOTAL	002	SE	92L7455	11/10/92	11/18/92	11/19/92
BORON, TOTAL	002	SE	92L7455	11/10/92	11/18/92	11/19/92
CALCIUM, TOTAL	002	SE	92L7455	11/10/92	11/18/92	11/19/92
CHROMIUM, TOTAL	002	SE	92L7455	11/10/92	11/18/92	11/19/92
COPPER, TOTAL	002	SE	92L7455	11/10/92	11/18/92	11/19/92
IRON, TOTAL	002	SE	92L7455	11/10/92	11/18/92	11/19/92
MAGNESIUM, TOTAL	002	SE	92L7455	11/10/92	11/18/92	11/19/92
MANGANESE, TOTAL	002	SE	92L7455	11/10/92	11/18/92	11/19/92
SODIUM, TOTAL	002	SE	92L7455	11/10/92	11/18/92	11/19/92
NICKEL, TOTAL	002	SE	92L7455	11/10/92	11/18/92	11/19/92
SILICON, TOTAL	002	SE	92L7455	11/10/92	11/18/92	11/19/92
URANIUM, TOTAL	002	SE	92L7455	11/10/92	11/18/92	12/02/92
ZINC, TOTAL	002	SE	92L7455	11/10/92	11/18/92	11/19/92
SILVER, TCLP LEACHAT	003	W	92L7481	11/18/92	11/24/92	11/30/92
SILVER, TCLP LEACHAT	003 MS	W	92L7481	11/18/92	11/24/92	11/30/92
ARSENIC, TCLP LEACHA	003	W	92L7481	11/18/92	11/24/92	11/30/92
ARSENIC, TCLP LEACHA	003 MS	W	92L7481	11/18/92	11/24/92	11/30/92
BARIUM, TCLP LEACHAT	003	W	92L7481	11/18/92	11/24/92	11/30/92
BARIUM, TCLP LEACHAT	003 MS	W	92L7481	11/18/92	11/24/92	11/30/92
CADMIUM, TCLP LEACHA	003	W	92L7481	11/18/92	11/24/92	11/30/92
CADMIUM, TCLP LEACHA	003 MS	W	92L7481	11/18/92	11/24/92	11/30/92
CHROMIUM, TCLP LEACH	003	W	92L7481	11/18/92	11/24/92	11/30/92

Roy F. Weston, Inc. - Lionville Laboratory
INORGANIC ANALYTICAL DATA PACKAGE FOR
WSRC-TASK 22

DATE RECEIVED: 11/12/92 RFW LOT # :9211L637

CLIENT ID /ANALYSIS	RFW #	MTX	PREP #	COLLECTION	EXTR/PREP	ANALYSIS
CHROMIUM, TCLP LEACH	003 MS	W	92L7481	11/18/92	11/24/92	11/30/92
MERCURY, TCLP LEACHA	003	W	92C0358	11/18/92	11/24/92	11/25/92
MERCURY, TCLP LEACHA	003 MS	W	92C0358	11/18/92	11/24/92	11/25/92
NICKEL, TCLP LEACHAT	003	W	92L7481	11/18/92	11/24/92	11/30/92
NICKEL, TCLP LEACHAT	003 MS	W	92L7481	11/18/92	11/24/92	11/30/92
LEAD, TCLP LEACHATE	003	W	92L7481	11/18/92	11/24/92	11/30/92
LEAD, TCLP LEACHATE	003 MS	W	92L7481	11/18/92	11/24/92	11/30/92
SELENIUM, TCLP LEACH	003	W	92L7481	11/18/92	11/24/92	11/30/92
SELENIUM, TCLP LEACH	003 MS	W	92L7481	11/18/92	11/24/92	11/30/92
URANIUM, LEACHATE	003	W	92L7481	11/18/92	11/24/92	12/02/92
URANIUM, LEACHATE	003 MS	W	92L7481	11/18/92	11/24/92	12/02/92
SILVER, TCLP LEACHAT	004	W	92L7481	11/18/92	11/24/92	11/30/92
ARSENIC, TCLP LEACHA	004	W	92L7481	11/18/92	11/24/92	11/30/92
BARIUM, TCLP LEACHAT	004	W	92L7481	11/18/92	11/24/92	11/30/92
CADMIUM, TCLP LEACHA	004	W	92L7481	11/18/92	11/24/92	11/30/92
CHROMIUM, TCLP LEACH	004	W	92L7481	11/18/92	11/24/92	11/30/92
MERCURY, TCLP LEACHA	004	W	92C0358	11/18/92	11/24/92	11/25/92
NICKEL, TCLP LEACHAT	004	W	92L7481	11/18/92	11/24/92	11/30/92
LEAD, TCLP LEACHATE	004	W	92L7481	11/18/92	11/24/92	11/30/92
SELENIUM, TCLP LEACH	004	W	92L7481	11/18/92	11/24/92	11/30/92
URANIUM, LEACHATE	004	W	92L7481	11/18/92	11/24/92	12/02/92

LAB QC:

ALUMINUM LABORTORY	LC1 BS	S	92L7455	N/A	11/18/92	11/19/92
BORON LABORATORY	LC1 BS	S	92L7455	N/A	11/18/92	11/19/92
CALCIUM LABORATORY	LC1 BS	S	92L7455	N/A	11/18/92	11/19/92
CHROMIUM LABORATORY	LC1 BS	S	92L7455	N/A	11/18/92	11/19/92
COPPER LABORATORY	LC1 BS	S	92L7455	N/A	11/18/92	11/19/92
IRON LABORATORY	LC1 BS	S	92L7455	N/A	11/18/92	11/19/92
MAGNESIUM LABORATORY	LC1 BS	S	92L7455	N/A	11/18/92	11/19/92
MANGANESE LABORATORY	LC1 BS	S	92L7455	N/A	11/18/92	11/19/92
SODIUM LABORATORY	LC1 BS	S	92L7455	N/A	11/18/92	11/19/92
NICKEL LABORATORY	LC1 BS	S	92L7455	N/A	11/18/92	11/19/92
SILICON LABORATORY	LC1 BS	S	92L7455	N/A	11/18/92	11/19/92
URANIUM LABORATORY	LC1 BS	S	92L7455	N/A	11/18/92	12/02/92
VANADIUM LABORATORY	LC1 BS	S	92L7455	N/A	11/18/92	11/19/92
ZINC LABORATORY	LC1 BS	S	92L7455	N/A	11/18/92	11/19/92

Roy F. Weston, Inc. - Lionville Laboratory
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WSRC-TASK 22

DATE RECEIVED: 11/12/92 RFW LOT # :9211L637

CLIENT ID /ANALYSIS	RFW #	MTX	PREP #	COLLECTION	EXTR/PREP	ANALYSIS
ALUMINUM LABORTORY	LC2 BS	S	92L7455	N/A	11/18/92	11/19/92
BORON LABORATORY	LC2 BS	S	92L7455	N/A	11/18/92	11/19/92
CALCIUM LABORATORY	LC2 BS	S	92L7455	N/A	11/18/92	11/19/92
CHROMIUM LABORATORY	LC2 BS	S	92L7455	N/A	11/18/92	11/19/92
COPPER LABORATORY	LC2 BS	S	92L7455	N/A	11/18/92	11/19/92
IRON LABORATORY	LC2 BS	S	92L7455	N/A	11/18/92	11/19/92
MAGNESIUM LABORATORY	LC2 BS	S	92L7455	N/A	11/18/92	11/19/92
MANGANESE LABORATORY	LC2 BS	S	92L7455	N/A	11/18/92	11/19/92
SODIUM LABORATORY	LC2 BS	S	92L7455	N/A	11/18/92	11/19/92
NICKEL LABORATORY	LC2 BS	S	92L7455	N/A	11/18/92	11/19/92
SILICON LABORATORY	LC2 BS	S	92L7455	N/A	11/18/92	11/19/92
URANIUM LABORATORY	LC2 BS	S	92L7455	N/A	11/18/92	12/02/92
VANADIUM LABORATORY	LC2 BS	S	92L7455	N/A	11/18/92	11/19/92
ZINC LABORATORY	LC2 BS	S	92L7455	N/A	11/18/92	11/19/92
ALUMINUM, TOTAL	MB1	S	92L7455	N/A	11/18/92	11/19/92
BORON, TOTAL	MB1	S	92L7455	N/A	11/18/92	11/19/92
CALCIUM, TOTAL	MB1	S	92L7455	N/A	11/18/92	11/19/92
CHROMIUM, TOTAL	MB1	S	92L7455	N/A	11/18/92	11/19/92
COPPER, TOTAL	MB1	S	92L7455	N/A	11/18/92	11/19/92
IRON, TOTAL	MB1	S	92L7455	N/A	11/18/92	11/19/92
MAGNESIUM, TOTAL	MB1	S	92L7455	N/A	11/18/92	11/19/92
MANGANESE, TOTAL	MB1	S	92L7455	N/A	11/18/92	11/19/92
SODIUM, TOTAL	MB1	S	92L7455	N/A	11/18/92	11/19/92
NICKEL, TOTAL	MB1	S	92L7455	N/A	11/18/92	11/19/92
SILICON, TOTAL	MB1	S	92L7455	N/A	11/18/92	11/19/92
URANIUM, TOTAL	MB1	S	92L7455	N/A	11/18/92	12/02/92
VANADIUM, TOTAL	MB1	S	92L7455	N/A	11/18/92	11/19/92
ZINC, TOTAL	MB1	S	92L7455	N/A	11/18/92	11/19/92
SILVER LABORATORY	LC1 BS	W	92L7481	N/A	11/24/92	11/30/92
ARSENIC LABORATORY	LC1 BS	W	92L7481	N/A	11/24/92	11/30/92
BARIUM LABORATORY	LC1 BS	W	92L7481	N/A	11/24/92	11/30/92
CADMIUM LABORATORY	LC1 BS	W	92L7481	N/A	11/24/92	11/30/92
CHROMIUM LABORATORY	LC1 BS	W	92L7481	N/A	11/24/92	11/30/92
NICKEL LABORATORY	LC1 BS	W	92L7481	N/A	11/24/92	11/30/92
LEAD LABORATORY	LC1 BS	W	92L7481	N/A	11/24/92	11/30/92
SELENIUM LABORATORY	LC1 BS	W	92L7481	N/A	11/24/92	11/30/92
URANIUM LABORATORY	LC1 BS	W	92L7481	N/A	11/24/92	12/02/92
VANADIUM LABORATORY	LC1 BS	W	92L7481	N/A	11/24/92	11/30/92

Roy F. Weston, Inc. - Lionville Laboratory
INORGANIC ANALYTICAL DATA PACKAGE FOR
WSRC-TASK 22

DATE RECEIVED: 11/12/92 RFW LOT # :9211L637

CLIENT ID /ANALYSIS	RFW #	MTX	PREP #	COLLECTION	EXTR/PREP	ANALYSIS
SILVER LABORATORY	LC2 BS	W	92L7481	N/A	11/24/92	11/30/92
ARSENIC LABORATORY	LC2 BS	W	92L7481	N/A	11/24/92	11/30/92
BARIUM LABORATORY	LC2 BS	W	92L7481	N/A	11/24/92	11/30/92
CADMIUM LABORATORY	LC2 BS	W	92L7481	N/A	11/24/92	11/30/92
CHROMIUM LABORATORY	LC2 BS	W	92L7481	N/A	11/24/92	11/30/92
NICKEL LABORATORY	LC2 BS	W	92L7481	N/A	11/24/92	11/30/92
LEAD LABORATORY	LC2 BS	W	92L7481	N/A	11/24/92	11/30/92
SELENIUM LABORATORY	LC2 BS	W	92L7481	N/A	11/24/92	11/30/92
URANIUM LABORATORY	LC2 BS	W	92L7481	N/A	11/24/92	12/02/92
VANADIUM LABORATORY	LC2 BS	W	92L7481	N/A	11/24/92	11/30/92
SILVER, TCLP LEACHAT	MB1	W	92L7481	N/A	11/24/92	11/30/92
ARSENIC, TCLP LEACHA	MB1	W	92L7481	N/A	11/24/92	11/30/92
BARIUM, TCLP LEACHAT	MB1	W	92L7481	N/A	11/24/92	11/30/92
CADMIUM, TCLP LEACHA	MB1	W	92L7481	N/A	11/24/92	11/30/92
CHROMIUM, TCLP LEACH	MB1	W	92L7481	N/A	11/24/92	11/30/92
NICKEL, TCLP LEACHAT	MB1	W	92L7481	N/A	11/24/92	11/30/92
LEAD, TCLP LEACHATE	MB1	W	92L7481	N/A	11/24/92	11/30/92
SELENIUM, TCLP LEACH	MB1	W	92L7481	N/A	11/24/92	11/30/92
URANIUM, TOTAL	MB1	W	92L7481	N/A	11/24/92	12/02/92
VANADIUM, TCLP LEACH	MB1	W	92L7481	N/A	11/24/92	11/30/92
MERCURY LABORATORY	LC1 BS	W	92C0358	N/A	11/24/92	11/25/92
MERCURY LABORATORY	LC2 BS	W	92C0358	N/A	11/24/92	11/25/92
MERCURY, TOTAL	MB1	W	92C0358	N/A	11/24/92	11/25/92
MERCURY, TOTAL	MB2	W	92C0358	N/A	11/24/92	11/25/92

pm: Diane Dale Wellborn ans Any Test with the S-boxes ok

WESTON Analytics Use Only
92112637

Custody Transfer Record/Lab Work Request

WESTON

Page 1 of 1

Client WSRC - TASK 22

Est. Final Proj. Sampling Date NOVEMBER 9, 1992

Work Order # WSRC - TASK # 22 00345-031-022-9999-00

Project Contact/Phone # J.B. PICKETT (803) 725-3838

AD Project Manager DIANE THOMAS

QC STD Del STD TAT 30 DAY

Date Rec'd 11/12/92 Date Due 12/12/92

Account # WERC228TD

Refrigerator #

#/Type Container	Liquid				4	4	4			4				
	Solid				1/6L	1/6L	1/6L			1/6L				
Volume	Liquid				125ml	500ml	250ml			250ml				
	Solid				1	1	1			1				
Preservatives														

ANALYSES REQUESTED →	ORGANIC							INORG						
	VOA	BNA	Pest/PCB	Herb	TCLV	TCLP	metals	Metal	CN	PH TS NO3	SOH RHT	TASH Icorp	Imsc Imsc1	

MATRIX CODES:	Lab ID	Client ID/Description	Matrix QC Chosen (✓) MS	MSD	Matrix	Date Collected	Time Collected	WESTON Analytics Use Only: 8260VT	8270T	8270T	8270T	TCLV	TCLP	See below	RCRA Metals (U-, Ni)		IPH ITS INSOL	SOH TROHT	TASH Icorp Icorc	Imsc Imsc1	
S - Soil SE - Sediment SO - Solid SL - Sludge W - Water O - Oil A - Air DS - Drum Solids DL - Drum Liquids L - EP/TCLP Leachate WI - Wipe X - Other F - Fish	1	Filtercake/Slurry (4)	RAD		SL	11/9/92	1800					X	X	X			X	X	X	X
	2	Filtercake/Slurry (4)	RAD		SL	11/10/92	1000					X	X	X			X	X	X	X
	003	Filtercake/Slurry (4)			W	11/18/92			X	X	X				X						
	004	Filtercake/Slurry (4)			W	11/18/92			X	X	X				X						
	005	Filtercake/Slurry (4)			W	11/18/92		X													
	006	Filtercake/Slurry (4)			W	11/18/92		X													
		leachate metal = RCRA + U-, Ni																			
		orig Reunten																			

FIELD PERSONNEL: COMPLETE ONLY SHADED AREAS

Special Instructions:

No ID on Bottles

metals = Al, B-, Ca, Cr, Cu, Fe, Mg, Mn, Ni Si, Na, U-, Zn

Imsc = Cyanide Spot Test

Imsc1 = Sulfide Spot Test

DATE/REVISIONS:

11/19/92 1. WO# = 00345-031-022-9999-00

1 2. Cancel Icorp and Add Icorc by

3. Carpan Method

11/23/92 4. Leachate data added to COC

12/1/92 5.

6.

Relinquished by	Received by	Date	Time
VANERICMEM	B. FAIR	11-8-92	2238
Dale			

Relinquished by	Received by	Date	Time
Walter Johnson	D. Sc. Parks	11-4-92	0747

Discrepancies Between Samples Labels and COC Record? (Y) or N

NOTES:

WESTON Analytics Use Only

Samples were:
1) Shipped X or Hand Delivered
Airbill # 133943095
2) Ambient or (Chilled)
3) Received in Good Condition (Y) or N
4) Labels Indicate Properly Preserved (Y) or N
5) Received Within Holding Times

COC Tape was:
1) Present on Outer Package (Y) or N
2) Unbroken on Outer Package (Y) or N
3) Present on Sample (Y) or N
4) Unbroken on Sample (Y) or N

COC Record Present Upon Sample Rec't (Y) or N

RFW 21-4

96a

WESTINGHOUSE SAVANNAH RIVER COMPANY
INTER-OFFICE MEMORANDUM

ESH-ALW-93-0018

JANUARY 19, 1993

TO: Dr. J.B. PICKETT, 730-M

FROM: R.P. KEMMERLIN, 320-M Lab, (5-1143)

AA01244N - WESTON ANALYTICS SUBCONTRACT (U)

SUBJECT: WESTON ANALYTICS REPORT TRANSMITTAL

Attached is a report for Release Order **#22** from Weston Analytics for **CHLORINATED HERBICIDE** run on **Batch 9211L637.**

Please recognize that these may be partial results.

If you have any questions please call me at 5-1143.

Thank you.

cc: w/o att: S.M. Campbell, 979-W

GLOSSARY OF HERBICIDE DATA

DATA QUALIFIERS

U = Indicates that the compound was analyzed for but not detected. The minimum detection limit for the sample (not the method detection limit) is reported with the U (e.g., 10U).

J = Indicates an estimated value. This flag is used in cases where a target analyte is detected at a level less than the lower quantification level. If the limit of quantification is 10 ug/L and a concentration of 3 ug/L is calculated, it is reported as 3J.

B = This flag is used when the analyte is found in the associated blank as well as in the sample. It indicates possible/probable blank contamination. This flag is also used for a TIC as well as for a positively identified TCL compound.

E = Indicates that the compound was detected beyond the calibration range and was subsequently analyzed at a dilution.

I = Interference.

ABBREVIATIONS

BS = Indicates blank spike in which reagent grade water is spiked with the CLP matrix spiking solutions and carried through all the steps in the method. Spike recoveries are reported.

BSD = Indicates blank spike duplicate.

MS = Indicates matrix spike.

MSD = Indicates matrix spike duplicate.

DL = Indicates that recoveries were not obtained because the extract had to be diluted for analysis.

NA = Not Applicable.

DF = Dilution Factor.

NR = Not Required.

SP = Indicates spiked compound.

RECEIVED
JAN 19 1993
R. P. KEMMERLIN

WESTON
MANAGERS DESIGNERS CONSULTANTS

ROY F. WESTON, INC.
LIONVILLE ANALYTICAL LABORATORY
ANALYTICAL CASE NARRATIVE

Client: WSRC-TASK 22
RFW #: 9211L637

W.O. #: 00345-031-022-9999-00
Date Received: 11-12-92

CHLORINATED HERBICIDE

The set of samples consisted of two (2) leachate samples generated on 11-18-92 from sludge samples collected on 11-08,10-92.

The samples were extracted on 11-23-92 and analyzed according to criteria set forth in Method 8150 for Chlorinated Phenoxy Acid Herbicide target compounds on 12-18,19-92.

The following is a summary of the QC results accompanying these sample results and a description of any problems encountered during their analyses:

1. All surrogate recoveries were within the range of 105% to 112%.

2. All matrix spike recoveries were within the range of 88% to 105%.

3. All blank spike recoveries were within laboratory control chart warning limits.

J. Peter Hershey, Ph.D.
Laboratory Manager
Lionville Analytical Laboratory

01-14-93
Date

jkd/her/11-637ch.cn

Roy F. Weston, Inc. - Lionville Laboratory
HERBICIDES BY GC, TCLP LEACHATE
Report Date: 01/11/93 11:46

RFW Batch Number: 9211L637 Client: WSRC-TASK 22 Work Order: 0345-31-22-9999 Page: 1

	Cust ID:	FILTERCAKE SLURRY(4)		FILTERCAKE SLURRY(4)		FILTERCAKE SLURRY(4)		PBLK		PBLK BS		LCHBLK	
Sample	RFW#:	003		003 MS		004		92LE1971-MB1		92LE1971-MB1		92LTO119-LB1	
Information	Matrix:	WATER		WATER		WATER		WATER		WATER		WATER	
	D.F.:	1.00		1.00		1.00		1.00		1.00		1.00	
	Units:	ug/L		ug/L		ug/L		ug/L		ug/L		ug/L	
Surrogate:	2,6-D	106	%	112	%	108	%	105	%	110	%	108	%
			fl		fl		fl		fl		fl		fl
2,4-D		10	U	105	%	10	U	10	U	105	%	10	U
2,4,5-TP (Silvex)		5.0	U	88	%	5.0	U	5.0	U	93	%	5.0	U
2,4,5-T		5.0	U	96	%	5.0	U	5.0	U	99	%	5.0	U

U= Analyzed, not detected. J= Present below detection limit. B= Present in blank. NR= Not requested. NS= Not spiked.
%= Percent recovery. D= Diluted out. I= Interference. NA= Not Applicable. *= Outside of EPA CLP QC

Roy F. Weston, Inc. - Lionville Laboratory
HBGT ANALYTICAL DATA PACKAGE FOR
WSRC-TASK 22

DATE RECEIVED: 11/12/92 RFW LOT # :9211L637

CLIENT ID	RFW #	MTX	PREP #	LEACH DATE	EXTR/PREP	ANALYSIS
FILTERCAKE SLURRY(4)	003	W	92LE1971	11/18/92	11/23/92	12/18/92
FILTERCAKE SLURRY(4)	003 MS	W	92LE1971	11/18/92	11/23/92	12/19/92
FILTERCAKE SLURRY(4)	004	W	92LE1971	11/18/92	11/23/92	12/19/92
LAB QC:						
PBLK	MB1	W	92LE1971	N/A	11/23/92	12/18/92
PBLK	MB1 BS	W	92LE1971	N/A	11/23/92	12/18/92
LCHBLK	LB1	W	92LE1971	N/A	11/23/92	12/18/92

pm: Diane Dalp called and they Test with the S-boards

WESTON Analytics Use Only: 92112637

Custody Transfer Record/Lab Work Request

WESTON

Page 1 of 1

Client: WSRC - TASK 22
Est. Final Proj. Sampling Date: NOVEMBER 9, 1992
Work Order #: WSRC-TASK # 22 [illegible]
Project Contact/Phone #: J.B. PICKETT (803) 725-3838
AD Project Manager: DIANE THOMAS
QC: STD Del: STD TAT: 30 DAY
Date Rec'd: 11/12/92 Date Due: 12/12/92
Account #: WERC22STD

Refrigerator #

#/Type Container	Liquid				4	4	4			4					
	Solid				1/6L	1/4L	1/6			1/6L					
Volume	Liquid				125ml	500ml	250ml			250ml					
	Solid														
Preservatives					1	1	1								

ANALYSES REQUESTED

ORGANIC				INORG		PH TS NO3	SOH RHT	TASH Icorp	TMSC Imsc1		
VOA	BNA	Pest/PCB	Herb	Metal	CN						
TCLV	TCLP	metals									

MATRIX CODES:	Lab ID	Client ID/Description	Matrix QC Chosen (✓) MS	MSD	Matrix	Date Collected	Time Collected	WESTON Analytics Use Only: OSOUT	O8OST	O4OST	OTHBST	TCLV	TCLP	See Below	RCRAT (U, Ni)		IPH ITS INSN	SOH IPHT	TASH Icorp ICORC	TMSC Imsc1		
S - Soil SE - Sediment SO - Solid SL - Sludge W - Water O - Oil A - Air DS - Drum Solids DL - Drum Liquids L - EP/TCLP Leachate WI - Wipe X - Other F - Fish	1	Filtercake/slurry (4)	RAD		SL	11/9/92	1800					X	X	X			X	X	X	X	
	2	Filtercake/Slurry (4)	RAD		SL	11/10/92	1000					X	X	X			X	X	X	X	
	003	Filtercake/Slurry (4) TCLP of 001			W	11/18/92			X	X	X				X						
	004	Filtercake/Slurry (4) TCLP of 002			W	11/18/92			X	X	X				X						
	005	Filtercake/Slurry (4) received 001			W	11/18/92		X													
	006	Filtercake/Slurry (4) received 002			W	11/18/92		X													
		leachate metal = RCRA + U, Ni																			
		orig Reumtten																			

FIELD PERSONNEL: COMPLETE ONLY SHADED AREAS

Special Instructions:

No ID on Bottles

metals = Al, B, Ca, Cr, Cu, Fe, Mg, Mn, Ni, Si, Na, U, Zn

Imsc = Cyanide Spot Test
Imsc1 = Sulfide Spot Test

DATE/REVISIONS:

11/19/92 1. WO# = 00345-031-022-9999-00
1 2. Cancel ICorp and Add ICorc by
3. Capan Method
11/23/92 4. Leachate data added to COC
12/1/92 5.
6.

Relinquished by	Received by	Date	Time
VAN ERICKSEN	B. FAIN	11-8-92	2238
Walter Johnson	D. S. Parkes	11-4-92	0747

Discrepancies Between Samples Labels and COC Record? (Y) or N
NOTES:

WESTON Analytics Use Only

Samples were:
1) Shipped X or Hand Delivered ___ Airbill # 133430935
2) Ambient or Chilled
3) Received in Good Condition (Y) or N
4) Labels Indicate Properly Preserved (Y) or N
5) Received Within Holding Times (Y) or N

COC Tape was:
1) Present on Outer Package (Y) or N
2) Unbroken on Outer Package (Y) or N
3) Present on Sample (Y) or N
4) Unbroken on Sample (Y) or N

COC Record Present Upon Sample Rec't (Y) or N

RFW 21

596a

WESTINGHOUSE SAVANNAH RIVER COMPANY
INTER-OFFICE MEMORANDUM

ESH-ALW-92-0074

DECEMBER 29, 1992

TO: Dr. J.B. PICKETT, 730-M

FROM: R.P. KEMMERLIN, 320-M Lab, (5-1143) RPK

AA01244N - WESTON ANALYTICS SUBCONTRACT (U)

SUBJECT: WESTON ANALYTICS REPORT TRANSMITTAL

Attached is a report for Release Order **#22** from Weston Analytics for **TCLP PESTICIDES** run on **Batch 9211L637.**

Please recognize that these may be partial results.

If you have any questions please call me at 5-1143.

Thank you.

cc: w/o att: S.M. Campbell, 979-W

RECEIVED
DEC 29 1992
R. P. KEMMERLIN

WESTON

ROY F. WESTON, INC.
LIONVILLE ANALYTICAL LABORATORY
ANALYTICAL CASE NARRATIVE

Client: WSRC-TASK 22
RFW #: 9211L637

W.O. #: 00345-031-022-9999-00
Date Received: 11-12-92

TCLP PESTICIDE

The set of samples consisted of two (2) leachate samples generated on 11-18-92 from sludge samples collected on 11-08,10-92.

The samples were extracted on 11-23-92 and analyzed according to criteria set forth in Method 8080 for TCLP Pesticide target compounds on 12-09-92.

The following is a summary of the QC results accompanying the sample results and a description of any problems encountered during their analyses:

1. One (1) of six (6) DBC surrogate recoveries was outside EPA QC limits. The DBC surrogate recovery for the laboratory blank 92LE1967-MB1 (173%) was outside the EPA QC limit of 154%.

   It appears that the laboratory blank was inadvertently double surrogated during the extraction process.

2. All blank spike recoveries were within the range of 85% to 105%.

3. All matrix spike recoveries were within the range of 90% to 135%.

4. The following samples required two-fold dilutions because they contained high levels on non-target compounds:

Sample ID	Dilution
FILTERCAKE SLURRY (4)	2
FILTERCAKE SLURRY (4), MS	2

Sonia Ath Brownthurst

J. Peter Hershey, Ph.D.
Laboratory Manager
Lionville Analytical Laboratory

12-23-92
Date

sma/pcb/11-637p.cn

WESTON

GLOSSARY OF PEST/PCB DATA

DATA QUALIFIERS

U = Indicates that the compound was analyzed for but not detected. The minimum detection limit for the sample (not the method detection limit) is reported with the U (e.g., 10U).

J = Indicates an estimated value. This flag is used in cases where a target analyte is detected at a level less than the lower quantification level. If the limit of quantification is 10 ug/L and a concentration of 3 ug/L is calculated, it is reported as 3J.

B = This flag is used when the analyte is found in the associated blank as well as in the sample. It indicates possible/probable blank contamination. This flag is also used for a TIC as well as for a positively identified TCL compound.

E = Indicates that the compound was detected beyond the calibration range and was subsequently analyzed at a dilution.

I = Interference.

ABBREVIATIONS

BS = Indicates blank spike in which reagent grade water is spiked with the CLP matrix spiking solutions and carried through all the steps in the method. Spike recoveries are reported.

BSD = Indicates blank spike duplicate.

MS = Indicates matrix spike.

MSD = Indicates matrix spike duplicate.

DL = Indicates that recoveries were not obtained because the extract had to be diluted for analysis.

NA = Not Applicable.

DF = Dilution Factor.

NR = Not Required.

SP = Indicates spiked compound.

Roy F. Weston, Inc. - Lionville Laboratory
Pesticide by GC, TCLP Leachate
Report Date: 12/17/92 12:19

RFW Batch Number: 9211L637 Client: WSRC-TASK 22 Work Order: 0345-31-22-9999 Page: 1

Sample Information	Cust ID:	FILTERCAKE S LURRY(4)	FILTERCAKE S LURRY(4)	FILTERCAKE S LURRY(4)	PBLK	PBLK BS	LCHBLK
	RFW#:	003	003 MS	004	92LE1967-MB1	92LE1967-MB1	92LTO119-LB1
	Matrix:	WATER	WATER	WATER	WATER	WATER	WATER
	D.F.:	2.00	2.00	2.00	1.00	1.00	1.00
	Units:	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
Surrogate: Di-n-butylchlorendate		74 %	96 %	90 %	173 * %	105 %	93 %
Heptachlor		0.23 U	105 %	0.20 U	0.10 U	85 %	0.11 U
alpha-Chlordane		2.3 U	90 %	2.0 U	1.0 U	80 %	1.1 U
gamma-Chlordane		2.3 U	100 %	2.0 U	1.0 U	95 %	1.1 U
gamma-BHC (Lindane)		0.23 U	130 %	0.20 U	0.10 U	90 %	0.11 U
Endrin		0.47 U	135 %	0.40 U	0.20 U	105 %	0.22 U
Methoxychlor		2.3 U	103 %	2.0 U	1.0 U	100 %	1.1 U
Toxaphene		4.7 U	4.9 U	4.0 U	2.0 U	2.0 U	2.2 U
Heptachlor Epoxide		0.23 U	100 %	0.20 U	0.10 U	95 %	0.11 U

U= Analyzed, not detected. J= Present below detection limit. B= Present in blank. NR= Not requested. NS= Not spiked.
%= Percent recovery. D= Diluted out. I= Interference. NA= Not Applicable. *= Outside of EPA CLP QC

Roy F. Weston, Inc. - Lionville Laboratory
PEST/PCB ANALYTICAL DATA PACKAGE FOR
WSRC-TASK 22

DATE RECEIVED: 11/12/92 RFW LOT # :9211L637

CLIENT ID	RFW #	MTX	PREP #	LEACH DATE	EXTR/PREP	ANALYSIS
FILTERCAKE SLURRY(4)	003	W	92LE1967	11/18/92	11/23/92	12/09/92
FILTERCAKE SLURRY(4)	003 MS	W	92LE1967	11/18/92	11/23/92	12/09/92
FILTERCAKE SLURRY(4)	004	W	92LE1967	11/18/92	11/23/92	12/09/92
LAB QC:						
PBLK	MB1	W	92LE1967	N/A	11/23/92	12/09/92
PBLK	MB1 BS	W	92LE1967	N/A	11/23/92	12/09/92
LCHBLK	LB1	W	92LE1967	N/A	11/23/92	12/09/92

pm: Diane Daub called and Greg Test with the S. boonefolks

WESTON Analytics Use Only: 9211L637

Custody Transfer Record/Lab Work Request

WESTON

Page 1 of 1

Client: WSRC - TASK 22
Est. Final Proj. Sampling Date: NOVEMBER 9, 1992
Work Order #: WSRC-TASK #22 00345-031-022-9999-00
Project Contact/Phone #: J.B. PICKETT (803) 725-3838
AD Project Manager: DIANE THOMAS
QC: STD Del: STD TAT: 30 DAY
Date Rec'd: 11/12/92 Date Due: 12/12/92
Account #: WERC228TD

Refrigerator #

#/Type Container	Liquid	4	4	4			4						
	Solid												
Volume	Liquid	1/GL	1/AG	1/GL			1/GL						
	Solid	125ml	250ml	250ml			250ml						
Preservatives		1	1	1	Leachate								

ANALYSES REQUESTED

	ORGANIC							INORG						
	VOA	BNA	Pest/PCB	Herb	TCLV	TCLP	metals	Metal	CN	pH TS NO3	SO4 PO4	TASK Icorp	Imsc Imsc1	
WESTON Analytics Use Only	02OUT	02OST	02OST	01HOST	ITCLV	ITCLP	See Below	RCRA Ag, U-, Ni		IPH ITS INSN	ISO4 IPO4	ITASK Icorp	IMSC Imsc1	

MATRIX CODES: S - Soil; SE - Sediment; SO - Solid; SL - Sludge; W - Water; O - Oil; A - Air; DS - Drum Solids; DL - Drum Liquids; L - EP/TCLP Leachate; WI - Wipe; X - Other; F - Fish

Lab ID	Client ID/Description	Matrix QC Chosen (✓) MS	MSD	Matrix	Date Collected	Time Collected													
1	Filtercake/Slurry (4)	RAD		SL	11/9/92	1800					X	X	X			X	X	X	X
2	Filtercake/Slurry (4)	RAD		SL	11/10/92	1000					X	X	X			X	X	X	X
003	Filtercake/Slurry (4) TCLP of 001			W	11/18/92			X	X	X				RCRA Ag, U-, Ni					
004	Filtercake/Slurry (4) TCLP of 002			W	11/18/92			X	X	X				RCRA Ag, U-, Ni					
005	Filtercake/Slurry (4) TCLP of 001			W	11/18/92		X												
006	Filtercake/Slurry (4) TCLP of 002			W	11/18/92		X												
	Leachate metal = RCRA + U, Ni																		
	Orig Reunten																		

FIELD PERSONNEL: COMPLETE ONLY SHADED AREAS

Special Instructions:

No ID on Bottles

metals = Al, B-, Ca, Cr, Cu, Fe, Mg, Mn, Ni, Si, Na, U-, Zn

Imsc = Cyanide Spot Test
Imsc1 = Sulfide Spot Test

DATE/REVISIONS:

11/19/92 1. WO# = 00345-031-022-9999-00
1 2. Cancel ICorp and Add ICorc by
3. Copan Method
11/23/92 4. Leachate data added to COC
12/1/92 5.
6.

Relinquished by	Received by	Date	Time
VAN ERICKSEN	B. FAIN	11-8-92	2238
Walter Johnson	D.S. Parkes	11-4-92	0747

Discrepancies Between Samples Labels and COC Record? (Y) or N
NOTES:

WESTON Analytics Use Only

Samples were:
1) Shipped X or Hand Delivered ___
Airbill # 133430935
2) Ambient or Chilled
3) Received in Good Condition (Y) or N
4) Labels Indicate Properly Preserved (Y) or N
5) Received Within Holding Times

COC Tape was:
1) Present on Outer Package (Y) or N
2) Unbroken on Outer Package (Y) or N
3) Present on Sample (Y) or N
4) Unbroken on Sample (Y) or N

COC Record Present Upon Sample Rec't (Y) or N

1 Dec

RFW 21-4

96a

SAMPLE DISCREPANCY REPORT (SDR)

SDR IN-PROGRESS ROUTING: (see other side)

Initiator: George Saddic
Date: 12/17/92
Client: WSRC
RFW Lot #: 9211L637
Samples: BATCH BLANK

Parameter: 0608T
Matrix: WATER
Prep Batch: 92LE1967
Urgency:
___ Immediate ✓ Other

Category for Discrepancy:
___ Log-In
___ LIMS
✓ Analysis/Sample
___ Project Revision
___ Other:

A. Reason for SDR:

A1a. Requires Verification By (circle): Log-in or Prep Group

___ Missing Sample/Extract
___ Wrong Sample Pulled
___ Improper Bottle Type
___ Container Broken
___ Preservation Wrong
___ Received Past Hold
___ Insufficient Sample
___ Label ID's Illegible

A2. Verified By (circle): Log-in or Prep Group (signature) (date)

A1b.

___ Re-Log: Tech Profile Error..Client Changed Request.. Sampler Error on C-O-C..Transcription Error.. Wrong Test Code, Re-Log As _____
___ Re-Leach: Metals/Inorg/VOA/BNA/Pest/Herb/____
___ Re-Digest: AA/ICP/HG/_____
___ Re-Extract: BNA/PEST/_____
✓ QC Out: SURR/MS..High/Low/<10%/Missing/2X
___ QC Out: B/BS/BSD/LCS/LCS-D...High/Low
___ Hold Time Exceeded: Prep/Analysis/Report
___ Not Amenable to Analysis
___ Other (describe)

9211L637 - MB1 APPEARS TO HAVE BEEN DOUBLE SURROGATED. ALL OTHER SAMPLES + QC ARE WITHIN SURROGATE RECOVERY Criteria.
BLK: DBC = 173%
TCX = 175%

Will include in narrative.

B. PM Instructions For Disposition (signature/date): [signature] 12/21/92

___ Cancel ___ Add ___ Subout Analysis
___ Place On Hold ___ Take Off Hold
___ Change W.O. # to: _____
___ MS/MSD on Sample ____ if enough sample: ORG/INORG
___ MS/DUP on Sample ____ if enough sample: ORG/INORG
___ Change Client name to: _____
___ Wrong Test Code, Re-Log As _____
___ Include in Narrative

___ Other, explain:

C. FINAL ACTION: a clear description of what was done for resolution, when it was done, and by whom it was done

Action Taken:
___ Revision To Chain-of-Custody Completed
___ LIMS Corrections Completed
___ Other, explain

Included in Narr.

Action By (name/date): [signature] 12-21-92
Forward to Pat Feldman, QA for distribution

D. Distribution of Completed SDR (include name):

X Initiator: George Saddic
X Lab Manager: J.Peter Hershey 12/17/92
X Project Mgr: ~~Carol Schrenkel~~ DIANE THOMAS
X Unit Leader: Denise Skrzat
X QA (original): D.S. Therry
___ Log-In: _____
___ Data Reporting: _____
___ Billing: Karen Olsen
X KIRK CROMER
X Corey Schnell

Distributed By: (signature/date)

RFW 21-21-006/E-10/90 (SDR Revision 5.0)

WESTINGHOUSE SAVANNAH RIVER COMPANY
INTER-OFFICE MEMORANDUM

ESH-ALW-92-0062

DECEMBER 21, 1992

TO: Dr. J.B. PICKETT, 730-M

FROM: R.P. KEMMERLIN, 320-M Lab, (5-1143) RPK

AA01244N - WESTON ANALYTICS SUBCONTRACT (U)

SUBJECT: WESTON ANALYTICS REPORT TRANSMITTAL

Attached is a report for Release Order **#22** from Weston Analytics for **TCLP VOLATILES AND TCLP SEMIVOLATILES** run on **Batch 9211L637.**

Please recognize that these may be partial results.

If you have any questions please call me at 5-1143.

Thank you.

cc: w/o att: S.M. Campbell, 979-W

RECEIVED
DEC 21 1992
R. P. KEMMERLIN

ROY F. WESTON, INC.
LIONVILLE ANALYTICAL LABORATORY
ANALYTICAL CASE NARRATIVE

Client: WSRC-TASK 22
RFW #: 9211L637

W.O. #: 00345-031-022-9999-00
Date Received: 11-12-92

GC/MS VOLATILE

The set of samples consisted of two (2) leachate samples generated on 11-18-92 from sludge samples collected on 11-08,10-92.

The samples were analyzed according to criteria set forth in SW 846 Method 8240 for TCLP Volatile target compounds on 11-24,25-92.

The following is a summary of the QC results accompanying these sample results and a description of any problems encountered during their analyses:

1. Leachate samples were analyzed at ten-fold dilutions due to the leachate matrix; however, all TCLP regulatory limits were achieved.

2. One (1) of eighteen (18) surrogate recoveries was outside EPA QC limits. The analyses of samples FILTERCAKE SLURRY (4) and FILTERCAKE SLURRY (4) MS fulfilled the re-analysis requirement for sample FILTERCAKE SLURRY (4) MSD.

3. All matrix spike recoveries were within EPA QC limits.

J. Peter Hershey, Ph.D.
Laboratory Manager
Lionville Analytical Laboratory

12-14-92
Date

kls/mmz/11-637v.cn

GLOSSARY OF VOA DATA

DATA QUALIFIERS

U = Compound was analyzed for but not detected. The associated numerical value is estimated sample quantitation limit which is included and corrected for dilution a percent moisture.

J = Indicates an estimated value. This flag is used either when estimating concentration for tentatively identified compounds where a 1:1 response is assun or when the mass spectral data indicate the presence of a compound that meets identification criteria but the result is less than the specified detection limit greater than zero; for example, if the limit of detection is 10 ug/L and concentration of 3 ug/L is calculated, it is reported as 3J.

B = This flag is used when the analyte is found in the associated blank as well as in sample. It indicates possible/probable blank contamination. This flag is also u for a TIC as well as for a positively identified TCL compound.

E = Indicates that the compound was detected beyond the calibration range and v subsequently analyzed at a dilution.

I = Interference.

X = Additional qualifiers used as required are explained in the case narrative.

NQ = Result qualitatively confirmed but not able to quantify.

ABBREVIATIONS

BS = Indicates blank spike in which reagent grade water is spiked with the CLP mat spike solutions and carried through all the steps in the method. Spike recoveries a reported.

BSD = Indicates blank spike duplicate.

MS = Indicates matrix spike.

MSD = Indicates matrix spike duplicate.

DL = Indicates that surrogate recoveries were not obtained because the extract had t be diluted for analysis.

NA = Not Applicable.

DF = Dilution Factor.

NR = Not Required.

SP = Indicates Spiked Compound.

RFW Batch Number: 9211L637 Client: WSRC-TASK 22 Work Order: 00345-031-022-9999-00 Page: 1a

Sample Information	Cust ID:	FILTERCAKE SLURRY(4)		FILTERCAKE SLURRY(4)		FILTERCAKE SLURRY(4)		FILTERCAKE SLURRY(4)		VBLK		LCHBLK	
	RFW#:	005		006		006 MS		006 MSD		92LVR162-MB1		92LTV067-LB1	
	Matrix:	WATER		WATER		WATER		WATER		WATER		WATER	
	D.F.:	10.0		10.0		10.0		10.0		1.00		10.0	
	Units:	ug/L		ug/L		ug/L		ug/L		ug/L		ug/L	
Surrogate Recovery	Toluene-d8	100	%	102	%	91	%	86 *	%	105	%	97	%
	Bromofluorobenzene	103	%	108	%	95	%	90	%	103	%	104	%
	1,2-Dichloroethane-d4	105	%	103	%	112	%	114	%	102	%	104	%
Vinyl Chloride		100	U	100	U	142	%	145	%	10	U	100	U
1,1-Dichloroethene		50	U	50	U	104	%	103	%	5	U	50	U
Chloroform		50	U	50	U	100	%	100	%	5	U	50	U
1,2-Dichloroethane		50	U	50	U	128	%	125	%	5	U	50	U
2-Butanone		100	U	100	U	111	%	110	%	10	U	100	U
Carbon Tetrachloride		50	U	50	U	106	%	106	%	5	U	50	U
Trichloroethene		50	U	50	U	111	%	108	%	5	U	50	U
Benzene		50	U	50	U	111	%	110	%	5	U	50	U
Tetrachloroethene		50	U	50	U	122	%	116	%	5	U	50	U
Chlorobenzene		50	U	50	U	109	%	101	%	5	U	50	U

*= Outside of EPA CLP QC limits.

Roy F. Weston, Inc. - Lionville Laboratory
VOA ANALYTICAL DATA PACKAGE FOR
WSRC-TASK 22

DATE RECEIVED: 11/12/92 RFW LOT # :9211L637

CLIENT ID	RFW #	MTX	PREP #	LEACH DATE	EXTR/PREP	ANALYSIS
FILTERCAKE SLURRY(4)	005	W	92LVR162	11/18/92	N/A	11/25/92
FILTERCAKE SLURRY(4)	006	W	92LVR162	11/18/92	N/A	11/25/92
FILTERCAKE SLURRY(4)	006 MS	W	92LVR162	11/18/92	N/A	11/25/92
FILTERCAKE SLURRY(4)	006 MSD	W	92LVR162	11/18/92	N/A	11/25/92
LAB QC:						
VBLK	MB1	W	92LVR162	N/A	N/A	11/24/92
LCHBLK	LB1	W	92LVR162	N/A	N/A	11/25/92

WESTON Analytics Use Only: 9211L637

Custody Transfer Record/Lab Work Request

WESTON

Page 1 of 1

Client: WSRC - TASK 22
Est. Final Proj. Sampling Date: NOVEMBER 9, 1992
Work Order #: WSRC-TASK # 22/~~00680-028-022-9999-00~~ 11/14
Project Contact/Phone #: J.B. PICKETT (803) 725-3838
AD Project Manager: DIANE THOMAS
QC: STD Del: STD TAT: 30 DAY
Date Rec'd: 11/12/92 Date Due: 12/12/92
Account #: WSRC22STD

Refrigerator #						4	4	4			4						
#/Type Container	Liquid																
	Solid					1/GL	1/AG	1/GL			1/GL						
Volume	Liquid																
	Solid					125ml	500ml	250ml			250ml						
Preservatives						—	—	—			—						
ANALYSES REQUESTED →		ORGANIC: VOA	BNA	Pest/PCB	Herb	TCLV	TCLP	metals	INORG: Metal	CN	PH TS NO3	SO4 PO4T	IFISH Icorp	Imsc Imsc1			
		WESTON Analytics Use Only: 0624T	0625T	0608T	OHBGT	ITCLV	ITCLP	See below	RCRA Ticw U-, Ni		IPH ITS INSN	ISO4 IPO4T	IFISH ~~Icorp~~ Icorc	Imsc Imsc1			
Lab ID	Client ID/Description	Matrix QC Chosen (✓) MS	MSD	Matrix	Date Collected	Time Collected											
1	Filtercake/slurry (4)	RAD		SL	11/8/92	1800					X	X	X			X	X	X	X
2	Filtercake/Slurry (4)	RAD		SL	11/10/92	1000					X	X	X			X	X	X	X
003	Filtercake/Slurry (4) TCLP of 001			W	11/18/92			X	X	X				X					
004	Filtercake/Slurry (4) TCLP of 002			W	11/18/92			X	X	X				X					
005	Filtercake/Slurry (4) TCLV of 001			W	11/18/92		X												
006	Filtercake/Slurry (4) TCLV of 002			W	11/18/92		X												

MATRIX CODES: S - Soil, SE - Sediment, SO - Solid, SL - Sludge, W - Water, O - Oil, A - Air, DS - Drum Solids, DL - Drum Liquids, L - EP/TCLP Leachate, WI - Wipe, X - Other, F - Fish

leachate metal = RCRA + U-, Ni
Orig Reunition

FIELD PERSONNEL: COMPLETE ONLY SHADED AREAS

Special Instructions:
No ID on Bottles
metals = Al, B-, Ca, Cr, Cu, Fe, Mg, Mn, Ni, Si, Na, U-, Zn
Imsc = Cyanide Spot Test
Imsc1 = Sulfide Spot Test

DATE/REVISIONS:
11/19/92 1. WO# = 00345-031-022-9999-00
2. Cancel Icorp and Add Icorc by
3. Coupon Method
11/23/92 4. Leachate date added to COC
12/1/92 5.
6.

WESTON Analytics Use Only

Samples were:
1) Shipped X or Hand Delivered ___ Airbill # 1333430235
2) Ambient or Chilled
3) Received in Good Condition Y or N
4) Labels Indicate Properly Preserved Y or N
5) Received Within Holding Times X or N

COC Tape was:
1) Present on Outer Package Y or N
2) Unbroken on Outer Package Y or N
3) Present on Sample Y or N
4) Unbroken on Sample Y or N
COC Record Present Upon Sample Rec't Y or N

Discrepancies Between Samples Labels and COC Record? Y or N
NOTES: No ID on Bottles or Analyses Requested on COC

Relinquished by	Received by	Date	Time	Relinquished by	Received by	Date	Time
VAN ERIC MCRAE	B. FAIN	11-8-92	2238	Walter Gehman	D.G. Parkes	11-11-92	0747
D.G. Parkes	C. Howell	11/11/92	915	C. Howell	B. Fain	11/12/92	0930 am

RFW 21-21-001/A-7/91 ___ L372 ___ L373 ___ L375 ___ L377 ___ L378 Ref# [illegible] Cooler# [illegible] 381-596a

RECEIVED
DEC 2 1 1992
R. P. KEMMERLIN

ROY F. WESTON, INC.
LIONVILLE ANALYTICAL LABORATORY
ANALYTICAL CASE NARRATIVE

Client: WSRC-TASK 22
RFW #: 9211L637

W.O. #: 00345-031-022-9999-00
Date Received: 11-12-92

SEMIVOLATILE

The set of samples consisted of two (2) leachate samples generated on 11-18-92 from sludge samples collected on 11-08,10-92.

The samples were extracted on 11-23-92 and analyzed according to criteria set forth in SW 846 Method 8270 for TCLP Semivolatile target compounds on 11-30-92.

The following is a summary of the QC results accompanying these sample results and a description of any problems encountered during their analyses:

1. Leachate samples were extracted at ten-fold dilutions due to the leachate matrix; however, all TCLP regulatory limits were achieved.

2. All surrogate recoveries were within EPA QC limits.

3. All matrix spike recoveries were within EPA QC limits.

4. One (1) of twenty-four (24) blank spike recoveries was outside EPA QC limits.

Margaret M. Beatyke
J. Peter Hershey, Ph.D.
Laboratory Manager
Lionville Analytical Laboratory

12/11/92
Date

kls/11-637b.cn

GLOSSARY OF BNA DATA

DATA QUALIFIERS

U = Compound was analyzed for but not detected. The associated numerical value is the estimated sample quantitation limit which is included and corrected for dilution and percent moisture.

J = Indicates an estimated value. This flag is used either when estimating a concentration for tentatively identified compounds where a 1:1 response is assumed or when the mass spectral data indicate the presence of a compound that meets the identification criteria but the result is less than the specified detection limit but greater than zero; for example, if the limit of detection is 10 ug/L and a concentration of 3 ug/L is calculated, it is reported as 3J.

B = This flag is used when the analyte is found in the associated blank as well as in the sample. It indicates possible/probable blank contamination. This flag is also used for a TIC as well as for a positively identified TCL compound.

E = Indicates that the compound was detected beyond the calibration range and was subsequently analyzed at a dilution.

I = Interference.

X = Additional qualifiers used as required are explained in the case narrative.

NQ = Result qualitatively confirmed but not able to quantify.

ABBREVIATIONS

BS = Indicates blank spike in which reagent grade water is spiked with the CLP matrix spike solutions and carried through all the steps in the method. Spike recoveries are reported.

BSD = Indicates blank spike duplicate.

MS = Indicates matrix spike.

MSD = Indicates matrix spike duplicate.

DL = Indicates that surrogate recoveries were not obtained because the extract had to be diluted for analysis.

NA = Not Applicable.

DF = Dilution Factor.

NR = Not Required.

SP = Indicates Spiked Compound.

Roy F. Weston, Inc. - Lionville Laboratory
Semivolatiles by GC/MS, TCLP Leachate
Report Date: 12/01/92 10:23

RFW Batch Number: 9211L637 Client: WSRC-TASK 22 Work Order: 00345-031-022-9999-00 Page: 1a

Sample Information	Cust ID:	FILTERCAKE S LURRY(4)		FILTERCAKE S LURRY(4)		FILTERCAKE S LURRY(4)		FILTERCAKE S LURRY(4)		SBLK		SBLK BS	
	RFW#:	003		003 REP		003 MS		004		92LE1973-MB1		92LE1973-MB1	
	Matrix:	WATER		WATER		WATER		WATER		WATER		WATER	
	D.F.:	1.00		1.00		1.00		1.00		1.00		1.00	
	Units:	ug/L		ug/L		ug/L		ug/L		ug/L		ug/L	
Surrogate Recovery	Nitrobenzene-d5	74	%	79	%	85	%	76	%	75	%	79	%
	2-Fluorobiphenyl	54	%	63	%	68	%	63	%	65	%	62	%
	p-Terphenyl-d14	88	%	89	%	89	%	81	%	85	%	81	%
	Phenol-d5	74	%	73	%	76	%	78	%	81	%	69	%
	2-Fluorophenol	69	%	66	%	69	%	72	%	78	%	64	%
	2,4,6-Tribromophenol	92	%	90	%	91	%	80	%	84	%	82	%
Pyridine		100	U	100	U	79	%	100	U	10	U	74	%
1,4-Dichlorobenzene		100	U	100	U	54	%	100	U	10	U	48	%
2-Methylphenol		100	U	100	U	77	%	100	U	10	U	76	%
3- and/or 4-Methylphenol		100	U	100	U	74	%	100	U	10	U	72	%
Hexachloroethane		100	U	100	U	47	%	100	U	10	U	36	%
Nitrobenzene		100	U	100	U	84	%	100	U	10	U	80	%
Hexachlorobutadiene		100	U	100	U	47	%	100	U	10	U	35	%
2,4,6-Trichlorophenol		100	U	100	U	64	%	100	U	10	U	58	%
2,4,5-Trichlorophenol		500	U	500	U	71	%	500	U	50	U	62	%
2,4-Dinitrotoluene		100	U	100	U	78	%	100	U	10	U	64	%
Hexachlorobenzene		100	U	100	U	103	%	100	U	10	U	103	%
Pentachlorophenol		500	U	500	U	93	%	500	U	50	U	54	%

*= Outside of EPA CLP QC limits.

RFW Batch Number: 9211L637 Client: WSRC-TASK 22 Work Order: 00345-031-022-9999-00 Page: 2a

	Cust ID:	SBLK BSD		LCHBLK		
Sample Information	RFW#:	92LE1973-MB1		92LTO119-LB1		
	Matrix:	WATER		WATER		
	D.F.:	1.00		1.00		
	Units:	ug/L		ug/L		
Surrogate Recovery	Nitrobenzene-d5	77	%	79	%	
	2-Fluorobiphenyl	67	%	68	%	
	p-Terphenyl-d14	85	%	95	%	
	Phenol-d5	75	%	82	%	
	2-Fluorophenol	71	%	78	%	
	2,4,6-Tribromophenol	40	%	93	%	
Pyridine		72	%	100	U	
1,4-Dichlorobenzene		49	%	100	U	
2-Methylphenol		79	%	100	U	
3- and/or 4-Methylphenol		76	%	100	U	
Hexachloroethane		39	%	100	U	
Nitrobenzene		78	%	100	U	
Hexachlorobutadiene		39	%	100	U	
2,4,6-Trichlorophenol		22	%	100	U	
2,4,5-Trichlorophenol		51	%	500	U	
2,4-Dinitrotoluene		70	%	100	U	
Hexachlorobenzene		107	%	100	U	
Pentachlorophenol		0 *	%	500	U	

*= Outside of EPA CLP QC limits.

Roy F. Weston, Inc. - Lionville Laboratory
BNA ANALYTICAL DATA PACKAGE FOR
WSRC-TASK 22

DATE RECEIVED: 11/12/92 RFW LOT # :9211L637

CLIENT ID	RFW #	MTX	PREP #	LEACH DATE	EXTR/PREP	ANALYSIS
FILTERCAKE SLURRY(4)	003	W	92LE1973	11/18/92	11/23/92	11/30/92
FILTERCAKE SLURRY(4)	003 REP	W	92LE1973	11/18/92	11/23/92	11/30/92
FILTERCAKE SLURRY(4)	003 MS	W	92LE1973	11/18/92	11/23/92	11/30/92
FILTERCAKE SLURRY(4)	004	W	92LE1973	11/18/92	11/23/92	11/30/92
LAB QC:						
SBLK	MB1	W	92LE1973	N/A	11/23/92	11/30/92
SBLK	MB1 BS	W	92LE1973	N/A	11/23/92	11/30/92
SBLK	MB1 BSD	W	92LE1973	N/A	11/23/92	11/30/92
LCHBLK	LB1	W	92LE1973	N/A	11/23/92	11/30/92

WESTON Analytics Use Only: 92ILL637

Custody Transfer Record/Lab Work Request

WESTON

Page 1 of 1

Client: WSRC - TASK 22
Est. Final Proj. Sampling Date: NOVEMBER 9, 1992
Work Order #: WSRC - TASK # 22
Project Contact/Phone #: J.B. PICKETT (803) 725-3838
AD Project Manager: DIANE THOMAS
QC: STD Del: STD TAT: 30 DAY
Date Rec'd: 11/12/92 Date Due: 12/12/92
Account #: WERC22STD

Refrigerator #

#/Type Container	Liquid						4	4	4			4											
	Solid																						
Volume	Liquid						1/6L	1/4L	1/6L			1/6L											
	Solid						125ml	500ml	250ml	Ziplock		250ml											
Preservatives							1	1	1														

ANALYSES REQUESTED

ORGANIC							INORG								
VOA	BNA	Pest/PCB	Herb	TCLV	TCLP	metals	Metal	CN	PH TS NO3	SOL RHT	TASH Icorp	TMSC TMSC1			

MATRIX CODES:	Lab ID	Client ID/Description	Matrix QC Chosen (✓) MS	MSD	Matrix	Date Collected	Time Collected	WESTON Analytics Use Only: COA	CBOT	CBOT	OTHBT	TCLV	TCLP	See Below	RCRA (T, V, Ni)		IPH TS INSOL	ISOL IPHT	TASH Icorp Icorc	TMSC Tmsc1			
S - Soil, SE - Sediment, SO - Solid, SL - Sludge, W - Water, O - Oil, A - Air, DS - Drum Solids, DL - Drum Liquids, L - EP/TCLP Leachate, WI - Wipe, X - Other, F - Fish	1	FILTERCAKE/SLURRY (4)	RAD		SL	11/9/92	1800					X	X	X			X	X	X	X			
	2	FILTERCAKE/SLURRY (4)	RAD		SL	11/10/92	1000					X	X	X			X	X	X	X			
	003	FILTERCAKE/SLURRY (4) TRIP OF 001			W	11/18/92			X	X	X				X								
	004	FILTERCAKE/SLURRY (4) TRIP OF 002			W	11/18/92			X	X	X				X								
	005	FILTERCAKE/SLURRY (4) TRIP OF 001			W	11/18/92		X															
	006	FILTERCAKE/SLURRY (4) TRIP OF 002			W	11/18/92		X															
		LEACHATE METAL = RCRA + U-, Ni																					
		Orig Reumtex																					

FIELD PERSONNEL: COMPLETE ONLY SHADED AREAS

Special Instructions:

No ID on Bottles

metals = Al, B-, Ca, Cr, Cu, Fe, Mg, Mn, Ni, Si, Na, U-, Zn

Imsc = Cyanide Spot Test
Imsc1 = Sulfide Spot Test

DATE/REVISIONS:

11/19/92 1. WO# = 00345-031-022-9999-00
1 2. Cancel Icorp and Add Icorc by
3. Cayan Method
11/23/92 4. Leachate data added to COC
12/1/92 5.
6.

WESTON Analytics Use Only

Samples were:
1) Shipped X or Hand Delivered ___
Airbill # 1334302935
2) Ambient or Chilled (Y) or N
3) Received in Good Condition (Y) or N
4) Labels Indicate Properly Preserved (Y) or N
5) Received Within Holding Times (Y) or N

COC Tape was:
1) Present on Outer Package (Y) or N
2) Unbroken on Outer Package (Y) or N
3) Present on Sample (Y) or N
4) Unbroken on Sample (Y) or N

COC Record Present Upon Sample Rec't (Y) or N

Discrepancies Between Samples Labels and COC Record (Y) or N

NOTES: No ID on Bottles or Analyses Requested on COC

Relinquished by	Received by	Date	Time
VAN ERICKSEN	B. FAIN	11-8-92	2238
D.C. Rec	C. Howell	11/11/92	915

Relinquished by	Received by	Date	Time
Walter Johnson	D.C. Rec'd	11-11-92	0747
C. Howell	B Fain	11/12/92	0939

RFW 21-21-001/A-7/91 ___ L372 ___ L373 ___ L375 ___ L377 ___ L378 Ref# N/A Cooler# N/A 381-596a

WESTON Analytics Use Only

Custody Transfer Record/Lab Work Request

WESTON

Page ____ of ____

Client WSRC

Est. Final Proj. Sampling Date 11/10/92

Work Order # R0M22

Project Contact/Phone # J.B. Pickett 803/725-4087

AD Project Manager Diane Thomas

QC ____ Del ____ TAT ____

Date Rec'd ____ Date Due ____

Account # ____

Refrigerator #

#/Type Container	Liquid	
	Solid	
Volume	Liquid	
	Solid	
Preservatives		

ANALYSES REQUESTED →

ORGANIC: VOA | BNA | Pest/PCB | Herb

INORG: Metal | CN

WESTON Analytics Use Only

MATRIX CODES:
S - Soil
SE - Sediment
SO - Solid
SL - Sludge
W - Water
O - Oil
A - Air
DS - Drum Solids
DL - Drum Liquids
L - EP/TCLP Leachate
WI - Wipe
X - Other
F - Fish

Lab ID	Client ID/Description	Matrix QC Chosen (✓) MS	MSD	Matrix	Date Collected	Time Collected
	FILTERCAKES/SLURRY (4)			SL	11/10/92	1000 hrs

FIELD PERSONNEL: COMPLETE ONLY SHADED AREAS

Special Instructions:

DATE/REVISIONS:

1. ____
2. ____
3. ____
4. ____
5. ____
6. ____

WESTON Analytics Use Only

Samples were:
1) Shipped ___ or Hand Delivered ___
Airbill # ____
2) Ambient or Chilled
3) Received in Good Condition Y or N
4) Labels Indicate Properly Preserved Y or N
5) Received Within Holding Times Y or N

COC Tape was:
1) Present on Outer Package Y or N
2) Unbroken on Outer Package Y or N
3) Present on Sample Y or N
4) Unbroken on Sample Y or N

COC Record Present Upon Sample Rec't Y or N

Discrepancies Between Samples Labels and COC Record? Y or N
NOTES:

Relinquished by	Received by	Date	Time
[signature]	[signature] Bridwell	11/10/92	1133
[signature] C. Howell	C. Howell	11/11/92	910

Relinquished by	Received by	Date	Time
Walter Galvez	D.C. Powell	11-11-92	0748
C. Howell			

RFW 21-21-001/A-7/91 ____ L372 L373 L375 L377 L378 Ref# Order # 11-596a

INTER-OFFICE MEMORANDUM
Savannah River Site

Date: 03-Sep-1992 11:39am EDT
From: Dan G. Poulos
POULOS-DG-Y8298
Dept: RME&T
Tel No: x54087

TO: See Below

Subject: SAMPLE FILTERCAKE (U)

Ernie, please obtain a filtercake sample from one (1) DETF filtercake container. This sample is necessary as a precursor to the annual RCRA sampling and analysis for the IT/SF. Label the sample "DETF Filtercake", initials of operator obtaining the sample, time and date of sample, and transport to 320-M Lab. Request 320-M personnel to transport the sample to Mike Polochko at SRTC for the following analysis:

1) Total Uranium (ppm)

2) Dry Weight % Solids at 105 degrees C

The sample should be obtained between 9/8/92 - 9/10/92. Also, please be sure to enter the filtercake sampling into the DETF Operators Logbook. Please be sure to remind 320-M Laboratory that SRTC will perform the above mentioned analysis. Please contact me if you have any questions.

REV/JBP

Environmental File: 1.3.4

Distribution:

TO:	ERNIE M. ALL	(ALL-EM-O6515)
CC:	Jennifer L. Rice	(RICE-JL-O7073)
CC:	George W. Joyner	(JOYNER-GW-W7299)
CC:	J B PICKETT	(PICKETT-JB-O4797)
CC:	H. Lee Martin	(MARTIN-HL-O3230)
CC:	Frank R. Weitz	(WEITZ-FR-B4662)
CC:	Glenn A. Diener	(DIENER-GA-Y9713)
CC:	JoAnne M. Steingard	(STEINGARD-JM-L1807)
CC:	Aprell L. Patterson	(PATTERSON-AL-O9822 @A1@SRXSS2)
CC:	Sherold R. Johnson	(JOHNSON-SR-O5364)

RESULTS REPORT--BY SAMPLE

Date: 12-Oct-1992 08:27 am

Sample Id: 200085120
User SampleId: SPECIAL FILTER CAKE #9201043
Sample Type: MAREA-SOL-DISS/UCHEMCHEK/MOISTURE
Material Name: SOLID
Material Type: SAMPLE
MaterialGroup: MAREA

Supervisor: CHANDLER_L
Submitter: POULOS_D 730-M
Requester: POULOS_D 730-M
Priority: 1

Sample Status: COMPLETE
Condition: APPROVED
Cond Level: SAMPLE
User Stamp: RHINEHART_RH
Time Stamp: 16-Sep-1992 12:00 am

Task Id Number: 300188890
Instrument Class: ANALYZER
Instrument Name: KPA-10 CHEMCHEK
Analyst: GRAY_MW
Supervisor: RHINEHART_RH

Operation: U CHEMCHEK
Method: U CHEMCHEK
Due Date: 30-Sep-1992 09:42 am
Done Date: 18-Sep-1992 10:40 am

Task Repetition: 1
Task Version: 1

Component - Measure - Units	Result Value	Inl	Ind	Ins	Status	Condition
U CHEMCHEK NOTEBOOK - ADP FILE/NOTEBOOK REF - LOCATION	P 126	N/A	N/A	N/A	COMPLETE	APPROVED
URANIUM - URANIUM - PPM	40.0	N/A	N/A	N/A	COMPLETE	APPROVED

— Find out if dry wt. or wet wt.

Task Id Number: 300189113
Instrument Class: BALANCE
Instrument Name: METTLER PB30 WET CHEM
Analyst: RHINEHART_RH
Supervisor: RHINEHART_RH

Operation: MOISTURE
Method: MOISTURE
Due Date: 02-Oct-1992 11:57 am
Done Date: 18-Sep-1992 12:02 pm

wet weight
R Rinehart 10/24/92

Task Repetition: 1
Task Version: 1

Component - Measure - Units	Result Value	Inl	Ind	Ins	Status	Condition
MOISTURE NOTEBOOK - ADP FILE/NOTEBOOK REF - LOCATION	90-197 PG 148	N/A	N/A	N/A	COMPLETE	APPROVED
MOISTURE SAMPLE - MOISTURE - WT PERCENT	46.14	N/A	N/A	N/A	COMPLETE	APPROVED

Analytical Services: Customer Sample RESULTS Report V1.15.9 < < < <

Saturday Sep 19, 1992 5:17 am

Group by Submitter **Ordered** by Sample Type, User Id, Method, Sequence

730-M

Submitter : POULOS_D 730-M
Address : Unknown

UserId: SPECIAL FILTER CAKE #9201043
ADS SampId: ~~20008520~~
Study : MAREA LETF

CustomDG : MAREA
SampleType: MAREA-SOL-DISS/UCHEMCHEK/MOISTURE
LoggedBy : RHINEHART_RH

SubmissionId: 10001720
SubmitDate : 09/16/92
LoggerPhone : X5-2034

---------- Results Section ----------

MOISTURE Method Results.

Operation 1 : MOISTURE — Analyst: RHINEHART_RH — R V 1 1
ADP FILE/NOTEBOOK REF: MOISTURE NOTEBOOK 90-197 PG 148

Operation 1 : MOISTURE — Analyst: RHINEHART_RH — R V 1 1
ADP FILE/NOTEBOOK REF: MOISTURE NOTEBOOK 90-197 PG 148

Component	Value	Units	R V
MOISTURE SAMPLE	46.14	WT PERCENT	1 1

U CHEMCHEK Method Results.

Operation 1 : U CHEMCHEK — Analyst: GRAY_MW — R V 1 1
ADP FILE/NOTEBOOK REF: U CHEMCHEK NOTEBOOK P 126

Component	Value	Units	R V
URANIUM	40.0	PPM	1 1

PAGE: 1 > > Analytical Services: Customer REQUESTED Sample Summary V1.41.9 < < < < Thursday Sep 17, 1992 6:41 am

Group by Submitter, Submission Id Ordered by Sample Type, User Id, Sample Id

Submitter: POULOS_D 730-M Address: Unknown

This report confirms samples logged into the Analytical Data Management System of the SRL Analytical Services Group. IT IS NOT A RESULT REPORT. Results will be sent to you, the submitter, for each sample as results are approved. Please note both the Submission Id numbers and the individual ASG sample numbers for discussions with ASG personnel. If you have not already placed ASG sample numbers on your sample containers, please write the ASG SAMPLE ID, USER ID, YOUR NAME, DATE, and ANY HAZARDS on your SAMPLE LABEL. Deliver the samples to ASG Sample Receiving, 773A B-150, when you are ready for the analyses to begin and contact the sample receiving technician or your PLANNER [noted below] to acknowledge delivery of the samples.

A sample condition of INCOMPLETE indicates that ASG has not received the samples or acknowledged the samples as being received in the ASG sample receiving room. Work will not begin until the samples are brought ONLINE. If you need help or need to REJECT or CANCEL a SAMPLE please CONTACT Bill Kerrigan, x5-3306 or come by 773A-B141. You may monitor partial results and the progress of your samples directly by connecting to the ADSLIMS [computer node SLADMS] through your local area network. For changes in the sample plan please contact the PLANNER for adding methods and changing the work requested. Please discuss sample analyses priorities with your PLANNER.

SubmissId: 100017200 Study : MAREA LETF SubmitDate : 09/16/92
CustomDG: MAREA LoggedBy: RHINEHART_RH LoggerPhone: X5-2034

Required Techniques Section

SampleType: MAREA-SOL-DISS/UCHEMCHEK/MOISTURE Planner : RHINEHART_RH PlannerPhone: X5-2034

Method	Operation	Analyst	Approv	Incomp	Reject	Work	Total
MOISTURE	1 MOISTURE	RHINEHART_RH	0	0	0	1	1
U CHEMCHEK	1 U CHEMCHEK	GRAY_MW	0	0	0	1	1

Sample Submitted Section

UserId	SampleId	Status	Condition	SpecialHandling
SPECIAL FILTER CAKE #9201043	200095120	LOGGED	ONLINE	

WESTINGHOUSE SAVANNAH RIVER COMPANY

INTER-OFFICE MEMORANDUM

RRD-MEP-93-0070

December 10, 1993

TO: S.W. Norford, 730-M
Interim Treatment/Storage Facility (IT/SF) Systems Engineer
Reactor Materials Engineering & Technology (RME&T)

FROM: D.G. Poulos, 730-M DGP
Reactor Materials Engineering & Technology (RME&T)

ANALYTICAL RESULTS ON 1993 ANNUAL RCRA ANALYSES FOR FILTERCAKE TRANSFERRED FROM DETF TO IT/SF TANKS (U)

Ref. R.P. Kemmerlin to D.G. Poulos, "AA01244N - WESTON Analytics Subcontract (U)", SSD-ALW-93-0291, December 7, 1993.

The annual "RCRA" analyses on the filtercake generated by the M-Area Dilute Effluent Treatment Facility from treatment of supernate in the Interim Treatment/ Storage Facility (IT/SF) tanks has been completed. The filtercake was sampled at the Chemical Transfer Facility (CTF) slurry hold tank, prior to transfer to Tank 10 in the IT/SF, on 10/14/93. The samples were transferred to Weston Analytics Laboratory on 10/21/93 for total constituent and Toxicity Characteristic Leaching Procedure (TCLP) analyses. The analyses were conducted under Purchase Requisition AA-01244-N, Task Order 22, for which R. P. Kemmerlin in the Subcontract Technical Representative (STR).

The analytical results are summarized in Table 1. The TCLP results indicate that no Toxic Characteristic constituent exceeds the regulatory threshold. All sample/analyses Quality Assurance/Quality Control (QA/QC) requirements were met. However, silicon was not completely dissolved and subsequently the analytical results reflected only that portion of the silicon which was in suspension.

This memorandum and the associated attachments will be maintained for the lifetime of the permitted facility.

att.

RECORD AUTHENTICATED BY
SIGNATURE Vicki Blanchard

Rev/JBP

cc w/att: Records Administration, 773-52A
Environmental Files: ~~3.4.1.93~~ 1.3.9 F. Filtercake analysis

cc w/o att: E.M. All, 305-1M
J.L. Rice, 305-1M
T.P. Varallo, 730-M
J.C. Musall, 730-M
J.B. Pickett, 730-M
R. P. Kemmerlin, 320-M

Table 1 - Annual RCRA Filtercake Analyses on Samples Collected 10/14/93

RRD-MEP-93-0070
Page 1 of 3

GENERATOR SAMPLE ID			1	2	3
		Units			
Flashpoint			None Obs.	None Obs.	None Obs.
pH			8.2	8.2	8.2
Corrosivity (Coupon Test)		mm/yr	5	5	5
Reactivity	Cyanide (CN)		Negative	Negative	Negative
	Sulfide (S)		Negative	Negative	Negative
Total Solids		Wt. %	26.9	27.2	25.4

TOTAL CONSTITUENT CONCENTRATIONS (dry wt. basis)

Al	mg/Kg	34500	30100	37000
B	mg/Kg	57.8	51.1	57.7
Ca	mg/Kg	<1840	<1820	<1940
Cr	mg/Kg	51.5	44.2	53.6
Cu	mg/Kg	<9.2	<9.1	<9.7
Fe	mg/Kg	1700	1480	1910
Mg	mg/Kg	<1840	<1820	<1940
Mn	mg/Kg	36.2	31.6	40.3
Na	mg/Kg	17500	16300	18400
Ni	mg/Kg	<14.7	<14.6	<15.5
Si	mg/Kg	857	747	895
U	mg/Kg	386	385	410
Zn	mg/Kg	46.5	37.2	49.4
NO3 (as N)	mg/Kg	2100	2600	3070
PO4 (as P)	mg/Kg	3730	14700	14200
SO4	mg/Kg	11700	10900	11900

TCLP METALS

					TCLP LIMITS
Ag	mg/L	<0.01	<0.01	<0.01	5
As	mg/L	<0.1	<0.1	<0.1	5
Ba	mg/L	<0.2	<0.2	<0.2	100
Ca	mg/L	<0.005	<0.005	<0.005	1
Cr	mg/L	<0.01	<0.01	<0.01	5
Hg	mg/L	<0.0002	<0.0002	<0.0002	0.2
Pb	mg/L	<0.090	<0.090	<0.090	5
Se	mg/L	<0.1	<0.1	<0.1	1
Ni	mg/L	<0.1	<0.1	<0.1	N/A
U	mg/L	<0.1	<0.1	0.118	N/A

Table 1 - Annual RCRA Filtercake Analyses on Samples Collected 10/14/93

GENERATOR SAMPLE ID		1	2	3	
TCLP VOLATILES					
					TCLP LIMITS
Benzene	mg/L	<0.05	<0.05	<0.05	0.5
Carbon Tetrachloride	mg/L	<0.05	<0.05	<0.05	0.5
Chlorobenzene	mg/L	<0.05	<0.05	<0.05	100
Chloroform	mg/L	<0.05	<0.05	<0.05	6
1,2-Dichloroethane	mg/L	<0.05	<0.05	<0.05	0.5
1,1-Dichloroethylene	mg/L	<0.05	<0.05	<0.05	0.7
Methyl Ethyl Ketone (2-Butanone	mg/L	<0.1	<0.1	<0.1	200
Tetrachloroethylene	mg/L	<0.05	<0.05	<0.05	0.7
Trichloroethylene	mg/L	<0.05	<0.05	<0.05	0.5
Vinyl Chloride	mg/L	<0.1	<0.1	<0.1	0.2
TCLP SEMIVOLATILES					
					TCLP LIMITS
o-Cresol	mg/L	<0.1	<0.1	<0.1	200
m-Cresol + p-Cresol	mg/L	<0.1	<0.1	<0.1	200
1,4-Dichlorobenzene	mg/L	<0.1	<0.1	<0.1	7.5
2,4-Dinitrotoluene	mg/L	<0.1	<0.1	<0.1	0.13
Hexachlorobenzene	mg/L	<0.1	<0.1	<0.1	0.13
Hexachlorobutadiene	mg/L	<0.1	<0.1	<0.1	0.5
Hexachloroethane	mg/L	<0.1	<0.1	<0.1	3
Nitrobenzene	mg/L	<0.1	<0.1	<0.1	2
Pentachlorophenol	mg/L	<0.5	<0.5	<0.5	100
Pyridine	mg/L	<0.1	<0.1	<0.1	5
2,4,5-Trichlorophenol	mg/L	<0.5	<0.5	<0.5	400
2,4,6-Trichlorophenol	mg/L	<0.1	<0.1	<0.1	2
TCLP HERBICIDES					
					TCLP LIMITS
2,4-D	mg/L	<0.01	<0.01	<0.01	10
2,4,5-TP	mg/L	<0.005	<0.005	<0.005	1
2,4,5-T (Extra - not on TCLP list)	mg/L	<0.005	<0.005	<0.005	N/A

Table 1 - Annual RCRA Filtercake Analyses on Samples Collected 10/14/93

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Page 3 of 3

GENERATOR SAMPLE ID		1	2	3	
TCLP PESTICIDES					
					TCLP LIMITS
Chlordane (Total)	mg/L	<0.0011	<0.001	<0.0011	0.03
Endrin	mg/L	<0.00023	<0.00021	<0.00022	0.02
Heptachlor	mg/L	<0.00011	<0.0001	<0.00011	0.008
Heptachlor Epoxide	mg/L	<0.00011	<0.0001	<0.00011	0.008
Lindane	mg/L	<0.00011	<0.0001	<0.00011	0.4
Methoxychlor	mg/L	<0.0011	<0.001	<0.0011	10
Toxaphene	mg/L	<0.0023	<0.0021	<0.0022	0.5

Samples collected from Chemical Transfer Facility (CTF) hold tank (ID # 200-18), prior to transfer to Interim Treatment/Storage Facility (IT/SF). Filtercake was from supernate batch number 93E79.

WESTINGHOUSE SAVANNAH RIVER COMPANY
INTER-OFFICE MEMORANDUM

SSD-ALW-93-0291

DECEMBER 7, 1993

TO: DAN POULOS, 730-M

FROM: R.P. KEMMERLIN, 320-M Lab, (5-1143) RPK

AA01244N - WESTON ANALYTICS SUBCONTRACT (U)

SUBJECT: WESTON ANALYTICS REPORT TRANSMITTAL

Enclosed are the hardcopy reports and EDD for Release Order # **22**:

Batch Number

9310L360

If you have any questions please call me at 5-1143.

Thank you.

cc: w/o att: S.M. Campbell, 979-W

WESTON®
MANAGERS DESIGNERS/CONSULTANTS
208 WELSH POOL ROAD
PICKERING CREEK INDUSTRIAL PARK
LIONVILLE, PA 19341-1313
PHONE: (215) 524-7360
TELEX: 83-5348

December 02, 199

RECEIVED
DEC 06 1993
R. P. KEMMERLIN

Mr. Robert Kemmerlin
Subcontract Technical Representative
Westinghouse Savannah River Company
320-M Laboratory Room 123
Aiken, SC 29808

Dear Mr. Kemmerlin:

Enclosed is the hard copy data report as well as EDD for the following batch of samples submitted to WESTON/Lionville Laboratory:

RO #	RFW Batch Number	Task Custodian
22	9310L360	Dan Puolos

Please give me a call at (215) 524-7360 if you have any questions.

Very truly yours,

ROY F. WESTON, INC.

Diane C. Thomas
Project Manager

/clk

Enclosure:

RECEIVED
DEC 06 1993
R.P. KEMMERLIN

WESTON®, Analytics Division
Lionville, PA

Data Transfer Record

Page 1 of 1
Disk 1 of 1

LIMS ×
Initial ×
Corrected
Other

Client: WSRC TASK 22

Project Manager: Diane Thomas

W.O. Number: 00345-031-022-9999-00

Electronic ×
Hard Copy

The disk contains the following data:

Item #	Analysis	RFW Batch #	File Name	Task #
1.	Inorganics	9310L360	L9310360.EDD	
	metals			
	GC/MS VOA			
	GC/MS BNA			
	Pest/PCB's			
	Herbicides			

Electronic Transfer By: John Humphreys Transfer Date: 11/29/93

Received By: _____ Receipt Date: _____

RFW 21-21-032/B-05-93

WESTON

ROY F. WESTON, INC.
LIONVILLE ANALYTICAL LABORATORY
ANALYTICAL CASE NARRATIVE

DEC 06 1993

R. P. KE...

Client : WSRC-TASK 22
RFW# : 9310L360

W.O. #: 00345-031-022-9999-00
Date Received: 10-21-93

INORGANIC

The following is a summary of the quality control results and a description of any problems encountered during the analysis of this batch of samples:

1. All sample holding times as required by 40CFR136 were met.

2. All preparation blank results were below the required detection limits.

3. All laboratory control standards (blank spikes) were within the control limits of 80-120%.

4. All calibration verification checks were within the required control limits of 90-110%. Calibration verification is performed using independent standards.

5. Replicate results are summarized on the Inorganic Precision Report contained within this document. All results were within the 20% RPD guidance limit.

6. The Sulfide and Cyanide spot tests were both negative.

7. The samples for Sulfate were analyzed as liquids. A density correction was made to convert mg/L to mg/kg. The final result was also corrected for dry weight.

8. The analytical methods applied by the laboratory, unless otherwise requested, for the analysis of solid samples are derived from Test Methods for Evaluating Solid Waste (USEPA SW846).

Margaret M. Beatyfor

J. Peter Hershey, Ph.D.
Laboratory Manager
Lionville Analytical Laboratory

11/23/93
Date

pas/i10-360

ROY F. WESTON
INORGANICS DATA SUMMARY REPORT
PHYSICAL TESTING OBSERVATIONS

Client : WSRC-TASK 22
RFW# : 9310L360 001, 002, 003

W.O. #: 00345-031-022-9999-00
Date Received: 10-21-93

Analyte:	**Observation:**
Flash point (IFLSH)	No flash point observed. Test flame extinguished at: 180°F for sample 001, 144°F for sample 002 & 146°F for sample 003. Xylene was used to determine the accuracy of the flash point apparatus. The Xylene will flash at 80°F +/- 2°F. For this test, the Xylene flashed at 79/80°F.

pas\5-93\pto360.pg2

ROY F. WESTON, INC.
GLOSSARY OF TERMS - INORGANIC REPORTS

DATA QUALIFIERS

U - Indicates that the parameter was not detected at or above the reported limit. The associated numerical value is the sample detection limit.

* - Indicates that the original sample result is greater than 4x the spike amount added. The USEPA-CLP has determined that spike results on samples where this occurs may be unreliable and therefore, the control limits are not applicable.

ABBREVIATIONS

MB - Method or preparation blank.
MS - Matrix Spike.
MSD - Matrix Spike Duplicate.
REP - Sample Replicate.
LC - Indicates a method LCS or Blank Spike.
NC - Not calculable, result below the detection limit.

A suffix of -R or -S following these codes indicates a replicate or spike analysis respectively.

NOTES

Holding times for soil samples have not been promulgated by the USEPA.

For solid samples, all results are reported on a dry weight basis with the exception of Extractable Organic Halides, which are reported on a wet weight basis.

WESTON Analytics Use Only
93101.360

Custody Transfer Record/Lab Work Request

WSRC - TASK 22

WESTON

Page 1 of 1

Client: Westinghouse Savannah River
Est. Final Proj. Sampling Date: 10/14/93
Work Order #: 00345-031-022-9999-00
Project Contact/Phone #: D. Poulos/803 725-4087
AD Project Manager: Diane Tillmas
QC: SW846 Del: STD TAT: 30 DAY
Date Rec'd: 10-21-93 Date Due: 11/20/93
Account #: WSRC22 TASK STD

	VOA	BNA	Pest/PCB	Herb					Metal	CN	Corr. Flsh NO3 PO4T SO4	PH %SLD IMSC1	VOA	BNA	Pest/Herbs	Leachate metals
Refrigerator #	1	5	5	5					4	4						
#/Type Container – Liquid	3	3	22	3					lab							
#/Type Container – Solid																
Volume – Liquid	250	125	500	250					500							
Volume – Solid																
Preservatives	NA	NA	NA	NA					NA	NA						

ANALYSES REQUESTED → ORGANIC: VOA, BNA, Pest/PCB, Herb; INORG: Metal, CN

WESTON Analytics Use Only: TCLP; SE total; Imsc; ICHR IFLSH NO3 PO4T SO4; IPH I%SLD Imsc1; 0604T; 0620T; 0620T-CH/BT; SE total

Lab ID	Client ID/Description	Matrix QC Chosen (✓) MS	MSD	Matrix	Date Collected	Time Collected	TCLP								SE total	Imsc	ICHR…	IPH…	0604T	0620T	0620T-CH	SE total
001	IT/SF Slurry x (12)	RAD		SL	10/14/93	1200	✓	✓	✓	✓					✓	✓	✓	✓				
002	IT/SF Slurry x (12) Filt of 001			L															✓			
003	IT/SF Slurry x (12) TCLP of 001			L																✓	✓	✓

Imsc = CN Spot Test
Imsc1 = SF Spot Test
Leachate metals = RCRA + U, Ni

MATRIX CODES: S - Soil; SE - Sediment; SO - Solid; SL - Sludge; W - Water; O - Oil; A - Air; DS - Drum Solids; DL - Drum Liquids; L - EP/TCLP Leachate; WI - Wipe; X - Other; F - Fish

FIELD PERSONNEL: COMPLETE ONLY SHADED AREAS

Special Instructions: Target Date: 11/4
Temp = 14.9
* All different collect times on bottles do not match C.O.C.
metals/total: Al, B, Ca, Cr, Cu, Fe, Hg, Mn, Ni, Si, Na, U, Zn

DATE/REVISIONS:
1.
2.
3.
4.
5.
6.

WESTON Analytics Use Only
Samples were:
1) Shipped X or Hand Delivered
Airbill #
2) Ambient or (Chilled)
3) Received in Good Condition (Y) or N
4) Labels Indicate Properly Preserved (Y) or N
5) Received Within Holding Times (Y) or N

COC Tape was:
1) Present on Outer Package Y or (N)
2) Unbroken on Outer Package Y or (N)
3) Present on Sample (Y) or N
4) Unbroken on Sample (Y) or N
COC Record Present Upon Sample Rec't (Y) or N

Relinquished by	Received by	Date	Time	Relinquished by	Received by	Date	Time
D. Poulos	J. Bidwell	10/20/93	1430	D. G. Poulos	[signature]	10/21/93	0425
E. M. Givens	D. Poulos	10-20-93	1253	FEDEX	[signature]	10-21-93	0845

Discrepancies Between Samples Labels and COC Record? (Y) or N
NOTES: NO ID'S ON BOTTLES

RFW 21-21-001/A-7/91 L372 L373 L375 L377 L378 Ref# 360 Cooler# 692 381-596a

ROY F. WESTON INC.

INORGANIC DATA SUMMARY REPORT 11/23/93

CLIENT: WSRC-TASK 22

WESTON BATCH #: 9310L360

WORK ORDER: 00345-031-022-9999-00

SAMPLE	SITE ID	ANALYTE	RESULT		UNITS	REPORTING LIMIT	DILUTION FACTOR
-001	IT/SF SLURRY X(12) 1	% Solids	26.9		%	0.10	1.0
		Corrosivity	5.00	u	MM/YR	5.00	1.0
		Nitrate, as N	2100		MG-N/KG	74.4	200
		pH	8.2		PH UNITS	0.010	1.0
		Phosphate, as P - Total	3730		MG/KG	886	50.0
		Sulfate	11700		MG/KG	9300	100
-002	IT/SF SLURRY X(12) 2	% Solids	27.2		%	0.10	1.0
		Corrosivity	5.00	u	MM/YR	5.00	1.0
		Nitrate, as N	2600		MG-N/KG	73.6	200
		pH	8.2		PH UNITS	0.010	1.0
		Phosphate, as P - Total	14700		MG/KG	1690	100
		Sulfate	10900		MG/KG	9200	100
-003	IT/SF SLURRY X(12) 3	% Solids	25.4		%	0.10	1.0
		Corrosivity	5.00	u	MM/YR	5.00	1.0
		Nitrate, as N	3070		MG-N/KG	78.6	200
		pH	8.2		PH UNITS	0.010	1.0
		Phosphate, as P - Total	14200		MG/KG	1750	100
		Sulfate	11900		MG/KG	9820	100

ROY F. WESTON INC.

INORGANIC METHOD BLANK DATA SUMMARY PAGE 11/23/93

LIENT: WSRC-TASK 22 WESTON BATCH #: 9310L360

ORK ORDER: 00345-031-022-9999-00

AMPLE	SITE ID	ANALYTE	RESULT		UNITS	REPORTING LIMIT	DILUTION FACTOR
LANK10	93LNT202-MB1	Nitrate, as N	0.10	u	MG-N/KG	0.10	1.0
LANK20	93LNT202-MB2	Nitrate, as N	0.10	u	MG-N/KG	0.10	1.0
CSS0	93LTP114-LCS	Phosphate, as P - Total	5.0	u	MG/KG	5.0	1.0
LANK10	93LTP114-MB1	Phosphate, as P - Total	5.0	u	MG/KG	5.0	1.0
LANK20	93LTP114-MB2	Phosphate, as P - Total	5.0	u	MG/KG	5.0	1.0
LANK10	93LS4B51-MB1	Sulfate	25.0	u	MG/KG	25.0	1.0
LANK20	93LS4B51-MB2	Sulfate	25.0	u	MG/KG	25.0	1.0

WESTON Analytics Use Only
C9310L360

Diane QA Data 1/31/00 Metals Includes Phys. Test

Custody Transfer Record/Lab Work Request

WESTON

Client: WSRC - TASK 22
Est. Final Proj. Sampling Date:
Work Order #: 00345-031-022-9999-00
Project Contact/Phone #:
AD Project Manager: Diane C. Thomas
QC: SWOrke Del: STD TAT: 30DAY
Date Rec'd: 10-21-93 Date Due: 11/20/93
Account #: WSRC.22STD

Refrigerator #: Leachate

		001	002	003	004	005	006	007	008	009
#/Type Container	Liquid				4	4	4			
	Solid				1/6c	1/6c	1/6c	1/6c		
Volume	Liquid				125ml	250ml	250ml	250ml		
	Solid				1	1	1			
Preservatives					Leachate			Cold		

ANALYSES REQUESTED

	ORGANIC							INORG			
	VOA	BNA	Pest/PCB	Herb	TCLV	TCLP	TOTAL metals	Metal	CN	Corr Flsh (803 3011	pH (9045)
001					X	X	X		X	X	X
002					X	X	X		X	X	X
003					X	X	X		X	X	X
004	X										
005	X										
006	X										
007		X	X	X				X			
008		X	X	X				X			
009		X	X	X				X			

MATRIX CODES: S - Soil; SE - Sediment; SO - Solid; SL - Sludge; W - Water; O - Oil; A - Air; DS - Drum Solids; DL - Drum Liquids; L - EP/TCLP Leachate; WI - Wipe; X - Other; F - Fish

Lab ID	Client ID/Description	Matrix QC Chosen (✓) MS	MSD	Matrix	Date Collected	Time Collected
001	IT/SF Slurry X(12) 1	PAD		SE	10/14/93	
002	IT/SF Slurry X(12) 2	PAD		SE	10/14/93	
003	IT/SF Slurry X(12) 3	PAD		SE	10/14/93	
004	IT/SF Slurry X(12) 1 TCLV of 001			L	10/20/93	
005	IT/SF Slurry X(12) 2 TCLV of 002			L	"	
006	IT/SF Slurry X(12) 3 TCLV of 003			L	"	
007	IT/SF Slurry X(12) 1 TCLP of 001			L	10/26/93	
008	IT/SF Slurry X(12) 2 TCLP of 002			L	"	
009	IT/SF Slurry X(12) 3 TCLP of 003			L	"	

WESTON Analytics Use Only

	0634T	0635T	0628T	0418T	ITCLV	ITCLP	SEE below	RCRATCLV U, Ni	ICMSC	ICORP (6010) FLSH (200.7) UNCH (200.7)	IPH (6010) SLD (200.7)
001					X	X	X		X	X	X
002					X	X	X		X	X	X
003					X	X	X		X	X	X
004	X										
005	X										
006	X										
007		X	X	X				X			
008		X	X	X				X			
009		X	X	X				X			

FIELD PERSONNEL: COMPLETE ONLY SHADED AREAS

Special Instructions:
Leachate Metals = RCRA + U-, Ni
metals / Total = Al, B-, Ca, Cr, Cu, Fe, Mg, Mn, Ni, Si, Na, U-, Zn.
Mg only 10/27/93
Temp = 14.9°C
Target Date: 11/6
Orig. Rewritten

DATE/REVISIONS:
10/27/93 1. Record Leachate data of 004 To 006
10/28/93 2. Record Leachate data of 007 To 009
11/8/93 3. Change Hg to Mg & ICORP to ICORP per SW 11/8/93
4.
5.
6.

Relinquished by	Received by	Date	Time
Fed Ex	B Shaffer	10/21/93	0945
	BCS	10/21/93	

Relinquished by	Received by	Date	Time
	BCS	10/21/93	

WESTON Analytics Use Only

Samples were:
1) Shipped X or Hand Delivered ___ Airbill # ___
2) Ambient or (Chilled)
3) Received in Good Condition (Y) or N
4) Labels Indicate Properly Preserved (Y) or N
5) Received Within Holding Times (Y) or N

COC Tape was:
1) Present on Outer Package Y or (N)
2) Unbroken on Outer Package Y or (N)
3) Present on Sample (Y) or N
4) Unbroken on Sample (Y) or N

Discrepancies Between Samples Labels and COC Record? (Y) or N
NOTES: No IDs on Bottles

COC Record Present Upon Sample Rec't (Y) or N

RFW 21-21-001/A-7/91

L372 L373 L375

1-596a

ROY F. WESTON INC.

INORGANIC ACCURACY REPORT 11/23/93

LIENT: WSRC-TASK 22 WESTON BATCH #: 9310L360

ORK ORDER: 00345-031-022-9999-00

AMPLE	SITE ID	ANALYTE	SPIKED SAMPLE	INITIAL RESULT	SPIKED AMOUNT	%RECOV	DILUTION FACTOR(SPK)
LANK10	93LNT202-MB1	Nitrate, as N	2.7	0.10u	2.5	108	1.0
		Nitrate, as N MSD	2.4	0.10u	2.5	96.4	1.0
LANK20	93LNT202-MB2	Nitrate, as N	2.7	0.10u	2.5	107	1.0
CSS0	93LTP114-LCS	Phosphate, as P - Tot.	436	5.0 u	423	103	1.0
LANK10	93LTP114-MB1	Phosphate, as P - Tot.	25.3	5.0 u	25.0	101	1.0
		Phosphate, as P - Tot.	25.6	5.0 u	25.0	102	1.0
LANK20	93LTP114-MB2	Phosphate, as P - Tot.	25.4	5.0 u	25.0	102	1.0
LANK10	93LS4B51-MB1	Sulfate	200	25.0 u	200	100	1.0
		Sulfate MSD	201	25.0 u	200	101	1.0
LANK20	93LS4B51-MB2	Sulfate	206	25.0 u	200	103	1.0

ROY F. WESTON INC.

INORGANIC DATA SUMMARY REPORT 11/24/93

CLIENT: WSRC-TASK 22

WESTON BATCH #: 9310L360

WORK ORDER: 00345-031-022-9999-00

SAMPLE	SITE ID	ANALYTE	RESULT		UNITS	REPORTING LIMIT	DILUTION FACTOR
-001	IT/SF SLURRY X(12) 1	Aluminum, Total	34500		MG/KG	73.6	1.0
		Boron, Total	57.8		MG/KG	36.8	1.0
		Calcium, Total	1840	u	MG/KG	1840	1.0
		Chromium, Total	51.5		MG/KG	3.7	1.0
		Copper, Total	9.2	u	MG/KG	9.2	1.0
		Iron, Total	1700		MG/KG	36.8	1.0
		Magnesium, Total	1840	u	MG/KG	1840	1.0
		Manganese, Total	36.2		MG/KG	5.5	1.0
		Sodium, Total	17500		MG/KG	1840	1.0
		Nickel, Total	14.7	u	MG/KG	14.7	1.0
		Silicon, Total	857		MG/KG	36.8	1.0
		Uranium, Total	386		MG/KG	73.6	1.0
		Zinc, Total	46.5		MG/KG	7.4	1.0

ROY F. WESTON INC.

INORGANIC DATA SUMMARY REPORT 11/24/93

CLIENT: WSRC-TASK 22 WESTON BATCH #: 9310L360

WORK ORDER: 00345-031-022-9999-00

SAMPLE	SITE ID	ANALYTE	RESULT		UNITS	REPORTING LIMIT	DILUTION FACTOR
-002	IT/SF SLURRY X(12) 2	Aluminum, Total	30100		MG/KG	72.8	1.0
		Boron, Total	51.1		MG/KG	36.4	1.0
		Calcium, Total	1820	u	MG/KG	1820	1.0
		Chromium, Total	44.2		MG/KG	3.6	1.0
		Copper, Total	9.1	u	MG/KG	9.1	1.0
		Iron, Total	1480		MG/KG	36.4	1.0
		Magnesium, Total	1820	u	MG/KG	1820	1.0
		Manganese, Total	31.6		MG/KG	5.5	1.0
		Sodium, Total	16300		MG/KG	1820	1.0
		Nickel, Total	14.6	u	MG/KG	14.6	1.0
		Silicon, Total	747		MG/KG	36.4	1.0
		Uranium, Total	385		MG/KG	72.8	1.0
		Zinc, Total	37.2		MG/KG	7.3	1.0

ROY F. WESTON, INC.
GLOSSARY OF TERMS - INORGANIC REPORTS

DATA QUALIFIERS

U - Indicates that the parameter was not detected at or above the reported limit. The associated numerical value is the sample detection limit.

* - Indicates that the original sample result is greater than 4x the spike amount added. The USEPA-CLP has determined that spike results on samples where this occurs may be unreliable and therefore, the control limits are not applicable.

ABBREVIATIONS

MB - Method or preparation blank.
MS - Matrix Spike.
MSD - Matrix Spike Duplicate.
REP - Sample Replicate.
LC - Indicates a method LCS or Blank Spike.
NC - Not calculable, result below the detection limit.

A suffix of -R or -S following these codes indicates a replicate or spike analysis respectively.

ANALYTICAL METAL METHODS

METALS SCREEN	SW 3005/SW 6010	:SW 3050/SW 6010
ARSENIC	SW 3005/SW 7060	:SW 3050/SW 7060
SELENIUM	SW 3005/SW 7740	:SW 3050/SW 7740
LEAD	SW 3005/SW 7421	:SW 3050/SW 7421
MERCURY	SW 3005/SW 7470	:SW 3050/SW 7471
THALLIUM	SW 3005/SW 7841	:SW 3050/SW 7841

NOTES

The laboratory prepares a matrix spike at one per 20 frequency for TCLP samples. The Federal Register recommends that all matrix spikes be prepared at greater than 50% of the indigenous analyte concentration.

Holding times for soil samples have not been promulgated by the USEPA.

For solid samples, all results are reported on a dry weight basis.

ROY F. WESTON INC.

INORGANIC DUPLICATE SPIKE REPORT 11/23/93

IENT: WSRC-TASK 22 WESTON BATCH #: 9310L360

RK ORDER: 00345-031-022-9999-00

MPLE	SITE ID	ANALYTE	SPIKE#1 %RECOV	SPIKE#2 %RECOV	%RPD
ANK10	93LNT202-MB1	Nitrate, as N	108	96.4	11.0
ANK10	93LTP114-MB1	Phosphate, as P - Tot.	101	102	1.3
ANK10	93LS4B51-MB1	Sulfate	100	101	0.46

ROY F. WESTON INC.

INORGANIC PRECISION REPORT 11/23/93

CLIENT: WSRC-TASK 22 WESTON BATCH #: 9310L360

WORK ORDER: 00345-031-022-9999-00

SAMPLE	SITE ID	ANALYTE	INITIAL RESULT	REPLICATE	%RPD	DILUTION FACTOR(REP)
-001REP	IT/SF SLURRY X(12) 1	Corrosivity	5.00u	5.00u	NC	1.0
-003REP	IT/SF SLURRY X(12) 3	% Solids	25.4	23.9	6.4	1.0
		pH	8.2	8.3	0.24	1.0

Roy F. Weston, Inc. - Lionville Laboratory
INORGANIC ANALYTICAL DATA PACKAGE FOR
WSRC-TASK 22

DATE RECEIVED: 10/21/93 RFW LOT # :9310L360

CLIENT ID /ANALYSIS	RFW #	MTX	PREP #	COLLECTION	EXTR/PREP	ANALYSIS
IT/SF SLURRY X(12) 1						
% SOLIDS	001	SE	93LRS053	10/14/93	10/26/93	10/27/93
CORROSIVITY	001	SE	93LCC014	10/14/93	11/03/93	11/04/93
CORROSIVITY	001 REP	SE	93LCC014	10/14/93	11/03/93	11/04/93
FLASH POINT	001	SE	93LFP029	10/14/93	10/29/93	10/29/93
SULFIDE SPOT TEST	001	SE	93MSC001	10/14/93	11/18/93	11/18/93
CYANIDE SPOT TEST	001	SE	93MSC001	10/14/93	11/18/93	11/18/93
NITRATE	001	SE	93LNT202	10/14/93	11/09/93	11/09/93
PH	001	SE	93LRP055	10/14/93	10/29/93	10/29/93
TOTAL PHOSPHATE AS P	001	SE	93LTP114	10/14/93	11/10/93	11/10/93
SULFATE	001	SE	93LS4B51	10/14/93	10/27/93	10/27/93
TCLP	001	SE	93LTO100	10/14/93	10/25/93	10/26/93
TCLP LEACHATE	001	SE	93LTV039	10/14/93	10/25/93	10/26/93
IT/SF SLURRY X(12) 2						
% SOLIDS	002	SE	93LRS053	10/14/93	10/26/93	10/27/93
CORROSIVITY	002	SE	93LCC014	10/14/93	11/03/93	11/04/93
FLASH POINT	002	SE	93LFP029	10/14/93	10/29/93	10/29/93
SULFIDE SPOT TEST	002	SE	93MSC001	10/14/93	11/18/93	11/18/93
CYANIDE SPOT TEST	002	SE	93MSC001	10/14/93	11/18/93	11/18/93
NITRATE	002	SE	93LNT202	10/14/93	11/09/93	11/09/93
PH	002	SE	93LRP055	10/14/93	10/29/93	10/29/93
TOTAL PHOSPHATE AS P	002	SE	93LTP114	10/14/93	11/10/93	11/10/93
SULFATE	002	SE	93LS4B51	10/14/93	10/27/93	10/27/93
TCLP	002	SE	93LTO100	10/14/93	10/25/93	10/26/93
TCLP LEACHATE	002	SE	93LTV039	10/14/93	10/25/93	10/26/93
IT/SF SLURRY X(12) 3						
% SOLIDS	003	SE	93LRS053	10/14/93	10/26/93	10/27/93
% SOLIDS	003 REP	SE	93LRS053	10/14/93	10/26/93	10/27/93
CORROSIVITY	003	SE	93LCC014	10/14/93	11/03/93	11/04/93
FLASH POINT	003	SE	93LFP029	10/14/93	10/29/93	10/29/93
SULFIDE SPOT TEST	003	SE	93MSC001	10/14/93	11/18/93	11/18/93
CYANIDE SPOT TEST	003	SE	93MSC001	10/14/93	11/18/93	11/18/93

Roy F. Weston, Inc. - Lionville Laboratory
INORGANIC ANALYTICAL DATA PACKAGE FOR
WSRC-TASK 22

DATE RECEIVED: 10/21/93 RFW LOT # :9310L360

CLIENT ID /ANALYSIS	RFW #	MTX	PREP #	COLLECTION	EXTR/PREP	ANALYSIS
NITRATE	003	SE	93LNT202	10/14/93	11/09/93	11/09/93
PH	003	SE	93LRP055	10/14/93	10/29/93	10/29/93
PH	003 REP	SE	93LRP055	10/14/93	10/29/93	10/29/93
TOTAL PHOSPHATE AS P	003	SE	93LTP114	10/14/93	11/10/93	11/10/93
SULFATE	003	SE	93LS4B51	10/14/93	10/27/93	10/27/93
TCLP	003	SE	93LTO100	10/14/93	10/25/93	10/26/93
TCLP LEACHATE	003	SE	93LTV039	10/14/93	10/25/93	10/26/93

LAB QC:

NITRATE	MB1	S	93LNT202	N/A	11/09/93	11/09/93
NITRATE	MB1 BS	S	93LNT202	N/A	11/09/93	11/09/93
NITRATE	MB1 BSD	S	93LNT202	N/A	11/09/93	11/09/93
NITRATE	MB2	S	93LNT202	N/A	11/09/93	11/09/93
NITRATE	MB2 BS	S	93LNT202	N/A	11/09/93	11/09/93
TOTAL PHOSPHATE AS P	LCS	S	93LTP114	N/A	11/10/93	11/10/93
TOTAL PHOSPHATE AS P	LCS BS	S	93LTP114	N/A	11/10/93	11/10/93
TOTAL PHOSPHATE AS P	MB1	S	93LTP114	N/A	11/10/93	11/10/93
TOTAL PHOSPHATE AS P	MB1 BS	S	93LTP114	N/A	11/10/93	11/10/93
TOTAL PHOSPHATE AS P	MB1 BSD	S	93LTP114	N/A	11/10/93	11/10/93
TOTAL PHOSPHATE AS P	MB2	S	93LTP114	N/A	11/10/93	11/10/93
TOTAL PHOSPHATE AS P	MB2 BS	S	93LTP114	N/A	11/10/93	11/10/93
SULFATE	MB1	S	93LS4B51	N/A	10/27/93	10/27/93
SULFATE	MB1 BS	S	93LS4B51	N/A	10/27/93	10/27/93
SULFATE	MB1 BSD	S	93LS4B51	N/A	10/27/93	10/27/93
SULFATE	MB2	S	93LS4B51	N/A	10/27/93	10/27/93
SULFATE	MB2 BS	S	93LS4B51	N/A	10/27/93	10/27/93

WESTON

10. All Matrix Spike recoveries were within the 75-125% control limits (exception allowed when sample concentration exceeds the spike added concentration by a factor of 4 or more).

11. For analytes where the Matrix Spike is out-of-control, a Post-Digestion Matrix Spike and Serial Dilution are performed.

12. All Matrix Spike Duplicates were within the 20% Relative Percent Difference (RPD) control limits.

13. All Duplicate analyses were within the 20% Relative Percent Difference (RPD) control limits.

14. The TCLP extract from sample 007 was selected for the matrix spike for this analytical batch.

15. The matrix spike for Silver and Barium were below 50% recovery at 45.3 and 29.2 ug/L. The Silver and Barium recoveries in the TCLP Leachate were below 80-100% of the action level, so standard addition was not required per Federal Register, Vol.57, No.227, Nov. 24, 1992, page 55117. Nickel and Uranium are not analytes regulated by the method.

Margaret M. Beaty for

Raymond A. Siery
Inorganic Section Manager
Lionville Analytical Laboratory

11/23/93
Date

pas/m10-360

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DEC 06 1993
R. P. KENNEDY

WESTON

ROY F. WESTON, INC.
LIONVILLE ANALYTICAL LABORATORY
:ANALYTICAL CASE NARRATIVE

Client : WSRC-TASK 22
RFW# : 9310L360

W.O. #: 00345-031-022-9999-00
Date Received: 10-21-93

METALS

1. This narrative covers the analysis of 3 soil samples and 3 TCLP leachates.

2. The samples were prepared and analyzed based on the SW846 methods listed in the attached glossary.

3. All analyses were performed within the required holding times.

4. All Initial and Continuing Calibration Verifications (ICV/CCV's) were within control limits.

5. All Initial and Continuing Calibration Blanks (ICB/CCB's) were within control limits.

6. All preparation/method blank results were below or equal to the reporting limits except for:

Method Blank Name	Element	Concentration
93L7114-MB1	Silicon	12.6 ug/L

All samples in this preparation batch were found to contain Silicon at concentrations greater than 10X the preparation blank. Therefore, redigestion and reanalysis were not performed.

7. All ICP Interference Check Samples (ICSA and ICSAB) were within control limits.

8. All Laboratory Control Samples (LCS) were within the 80-120% control limits.

9. All duplicate laboratory control samples were within the 20% Relative Percent Difference (RPD) control limits.

ROY F. WESTON INC.

INORGANIC DATA SUMMARY REPORT 11/24/93

CLIENT: WSRC-TASK 22

WESTON BATCH #: 9310L360

WORK ORDER: 00345-031-022-9999-00

SAMPLE	SITE ID	ANALYTE	RESULT		UNITS	REPORTING LIMIT	DILUTION FACTOR
-003	IT/SF SLURRY X(12) 3	Aluminum, Total	37000		MG/KG	77.7	1.0
		Boron, Total	57.7		MG/KG	38.8	1.0
		Calcium, Total	1940	u	MG/KG	1940	1.0
		Chromium, Total	53.6		MG/KG	3.9	1.0
		Copper, Total	9.7	u	MG/KG	9.7	1.0
		Iron, Total	1910		MG/KG	38.8	1.0
		Magnesium, Total	1940	u	MG/KG	1940	1.0
		Manganese, Total	40.3		MG/KG	5.8	1.0
		Sodium, Total	18400		MG/KG	1940	1.0
		Nickel, Total	15.5	u	MG/KG	15.5	1.0
		Silicon, Total	895		MG/KG	38.8	1.0
		Uranium, Total	410		MG/KG	38.8	1.0
		Zinc, Total	49.4		MG/KG	7.8	1.0

ROY F. WESTON INC.

INORGANIC DATA SUMMARY REPORT 11/24/93

CLIENT: WSRC-TASK 22 WESTON BATCH #: 9310L360

WORK ORDER: 00345-031-022-9999-00

SAMPLE	SITE ID	ANALYTE	RESULT		UNITS	REPORTING LIMIT	DILUTION FACTOR
-007	IT/SF SLURRY X(12) 1	Silver, TCLP Leachate	10.0	u	UG/L	10.0	1.0
		Arsenic, TCLP Leachate	100	u	UG/L	100	1.0
		Barium, TCLP Leachate	200	u	UG/L	200	1.0
		Cadmium, TCLP Leachate	5.0	u	UG/L	5.0	1.0
		Chromium, TCLP Leachate	10.0	u	UG/L	10.0	1.0
		Mercury, TCLP Leachate	0.20	u	UG/L	0.20	1.0
		Nickel, TCLP Leachate	100	u	UG/L	100	1.0
		Lead, TCLP Leachate	90.0	u	UG/L	90.0	1.0
		Selenium, TCLP Leachate	100	u	UG/L	100	1.0
		Uranium, TCLP Leachate	100	u	UG/L	100	1.0

ROY F. WESTON INC.

INORGANIC DATA SUMMARY REPORT 11/24/93

CLIENT: WSRC-TASK 22 WESTON BATCH #: 9310L360

WORK ORDER: 00345-031-022-9999-00

SAMPLE	SITE ID	ANALYTE	RESULT		UNITS	REPORTING LIMIT	DILUTION FACTOR
-008	IT/SF SLURRY X(12) 2	Silver, TCLP Leachate	10.0	u	UG/L	10.0	1.0
		Arsenic, TCLP Leachate	100	u	UG/L	100	1.0
		Barium, TCLP Leachate	200	u	UG/L	200	1.0
		Cadmium, TCLP Leachate	5.0	u	UG/L	5.0	1.0
		Chromium, TCLP Leachate	10.0	u	UG/L	10.0	1.0
		Mercury, TCLP Leachate	0.20	u	UG/L	0.20	1.0
		Nickel, TCLP Leachate	100	u	UG/L	100	1.0
		Lead, TCLP Leachate	90.0	u	UG/L	90.0	1.0
		Selenium, TCLP Leachate	100	u	UG/L	100	1.0
		Uranium, TCLP Leachate	100	u	UG/L	100	1.0

ROY F. WESTON INC.

INORGANIC DATA SUMMARY REPORT 11/24/93

CLIENT: WSRC-TASK 22

WESTON BATCH #: 9310L360

WORK ORDER: 00345-031-022-9999-00

SAMPLE	SITE ID	ANALYTE	RESULT		UNITS	REPORTING LIMIT	DILUTION FACTOR
-009	IT/SF SLURRY X(12) 3	Silver, TCLP Leachate	10.0	u	UG/L	10.0	1.0
		Arsenic, TCLP Leachate	100	u	UG/L	100	1.0
		Barium, TCLP Leachate	200	u	UG/L	200	1.0
		Cadmium, TCLP Leachate	5.0	u	UG/L	5.0	1.0
		Chromium, TCLP Leachate	10.0	u	UG/L	10.0	1.0
		Mercury, TCLP Leachate	0.20	u	UG/L	0.20	1.0
		Nickel, TCLP Leachate	100	u	UG/L	100	1.0
		Lead, TCLP Leachate	90.0	u	UG/L	90.0	1.0
		Selenium, TCLP Leachate	100	u	UG/L	100	1.0
		Uranium, TCLP Leachate	118		UG/L	100	1.0

ROY F. WESTON INC.

INORGANIC METHOD BLANK DATA SUMMARY PAGE 11/24/93

CLIENT: WSRC-TASK 22
WORK ORDER: 00345-031-022-9999-00

WESTON BATCH #: 9310L360

SAMPLE	SITE ID	ANALYTE	RESULT		UNITS	REPORTING LIMIT	DILUTION FACTOR
BLANK1	93L7114-MB1	Aluminum, Total	20.0	u	MG/KG	20.0	1.0
		Boron, Total	10.0	u	MG/KG	10.0	1.0
		Calcium, Total	500	u	MG/KG	500	1.0
		Chromium, Total	1.0	u	MG/KG	1.0	1.0
		Copper, Total	2.5	u	MG/KG	2.5	1.0
		Iron, Total	10.0	u	MG/KG	10.0	1.0
		Magnesium, Total	500	u	MG/KG	500	1.0
		Manganese, Total	1.5	u	MG/KG	1.5	1.0
		Sodium, Total	500	u	MG/KG	500	1.0
		Nickel, Total	4.0	u	MG/KG	4.0	1.0
		Silicon, Total	12.6		MG/KG	10.0	1.0
		Uranium, Total	20.0	u	MG/KG	20.0	1.0
		Zinc, Total	2.0	u	MG/KG	2.0	1.0
BLANK1	93L7115-MB1	Silver, TCLP Leachate	10.0	u	UG/L	10.0	1.0
		Arsenic, TCLP Leachate	100	u	UG/L	100	1.0
		Barium, TCLP Leachate	200	u	UG/L	200	1.0
		Cadmium, TCLP Leachate	5.0	u	UG/L	5.0	1.0
		Chromium, TCLP Leachate	10.0	u	UG/L	10.0	1.0
		Nickel, TCLP Leachate	100	u	UG/L	100	1.0
		Lead, TCLP Leachate	90.0	u	UG/L	90.0	1.0
		Selenium, TCLP Leachate	100	u	UG/L	100	1.0
		Uranium, TCLP Leachate	100	u	UG/L	100	1.0
BLANK2	93L7115-MB2	Silver, TCLP Leachate	10.0	u	UG/L	10.0	1.0
		Arsenic, TCLP Leachate	100	u	UG/L	100	1.0
		Barium, TCLP Leachate	200	u	UG/L	200	1.0
		Cadmium, TCLP Leachate	5.0	u	UG/L	5.0	1.0
		Chromium, TCLP Leachate	10.0	u	UG/L	10.0	1.0
		Nickel, TCLP Leachate	100	u	UG/L	100	1.0
		Lead, TCLP Leachate	90.0	u	UG/L	90.0	1.0
		Selenium, TCLP Leachate	100	u	UG/L	100	1.0
		Uranium, TCLP Leachate	100	u	UG/L	100	1.0
BLANK1	93C0327-MB1	Mercury, Total	0.10	u	UG/L	0.10	1.0

ROY F. WESTON INC.

INORGANIC ACCURACY REPORT 11/24/93

CLIENT: WSRC-TASK 22 WESTON BATCH #: 9310L360

WORK ORDER: 00345-031-022-9999-00

SAMPLE	SITE ID	ANALYTE	SPIKED SAMPLE	INITIAL RESULT		SPIKED AMOUNT	%RECOV		DILUTION FACTOR(SPK)
-001	IT/SF SLURRY X(12) 1	Aluminum, Total	36200	34500		736	224	*	1.0
		Aluminum, Total MSD	35200	34500		736	96.6	*	1.0
		Boron, Total	380	57.8		368	87.6		1.0
		Boron, Total MSD	376	57.8		368	86.4		1.0
		Calcium, Total	8720	1840	u	9200	94.8		1.0
		Calcium, Total MSD	8730	1840	u	9200	94.9		1.0
		Chromium, Total	123	51.5		73.6	97.7		1.0
		Chromium, Total MSD	119	51.5		73.6	92.3		1.0
		Copper, Total	98.5	9.2	u	92.0	107		1.0
		Copper, Total MSD	96.4	9.2	u	92.0	105		1.0
		Iron, Total	2100	1700		368	108	*	1.0
		Iron, Total MSD	2120	1700		368	115	*	1.0
		Magnesium, Total	8500	1840	u	9200	92.4		1.0
		Magnesium, Total MSD	8450	1840	u	9200	91.8		1.0
		Manganese, Total	216	36.2		184	97.6		1.0
		Manganese, Total MSD	218	36.2		184	98.7		1.0
		Sodium, Total	26700	17500		9200	99.8		1.0
		Sodium, Total MSD	25800	17500		9200	90.3		1.0
		Nickel, Total	184	14.7	u	184	100		1.0
		Nickel, Total MSD	186	14.7	u	184	101		1.0
		Silicon, Total	1210	857		368	96.0		1.0
		Silicon, Total MSD	1210	857		368	96.1		1.0
		Uranium, Total	701	386		368	85.5		1.0
		Uranium, Total MSD	701	386		368	85.6		1.0
		Zinc, Total	218	46.5		184	93.0		1.0
		Zinc, Total MSD	219	46.5		184	93.6		1.0

ROY F. WESTON INC.

INORGANIC ACCURACY REPORT 11/24/93

LIENT: WSRC-TASK 22

)RK ORDER: 00345-031-022-9999-00

WESTON BATCH #: 9310L360

AMPLE	SITE ID	ANALYTE	SPIKED SAMPLE	INITIAL RESULT	SPIKED AMOUNT	%RECOV	DILUTION FACTOR(SPK)
007	IT/SF SLURRY X(12) 1	Silver, TCLP Leachate	2270	10.0 u	5000	45.3	1.0
		Arsenic, TCLP Leachate	7120	100 u	5000	142	1.0
		Barium, TCLP Leachate	29200	200 u	100000	29.2	1.0
		Cadmium, TCLP Leachate	1020	5.0 u	1000	102	1.0
		Chromium, TCLP Leachat	5270	10.0 u	5000	105	1.0
		Mercury, TCLP Leachate	254	0.20u	200	127	100
		Nickel, TCLP Leachate	556	100 u	1000	55.6	1.0
		Lead, TCLP Leachate	4660	90.0 u	5000	93.2	1.0
		Selenium, TCLP Leachat	3640	100 u	1000	364	1.0
		Uranium, TCLP Leachate	1250	100 u	1000	125	1.0

ROY F. WESTON INC.

INORGANIC DUPLICATE SPIKE REPORT 11/24/93

CLIENT: WSRC-TASK 22 WESTON BATCH #: 9310L360

WORK ORDER: 00345-031-022-9999-00

SAMPLE	SITE ID	ANALYTE	SPIKE#1 %RECOV	SPIKE#2 %RECOV	%RPD
-001	IT/SP SLURRY X(12) 1	Aluminum, Total	224	96.6 *	NC
		Boron, Total	87.6	86.4	1.4
		Calcium, Total	94.8	94.9	0.14
		Chromium, Total	97.7	92.3	5.7
		Copper, Total	107	105	2.2
		Iron, Total	108	115 *	NC
		Magnesium, Total	92.4	91.8	0.61
		Manganese, Total	97.6	98.7	1.2
		Sodium, Total	99.8	90.3	10
		Nickel, Total	100	101	0.70
		Silicon, Total	96.0	96.1	0.085
		Uranium, Total	85.5	85.6	0.070
		Zinc, Total	93.0	93.6	0.58
LCS2	93L7114-LC2	Aluminum, LCS	99.4	98.2	1.2
		Boron, LCS	92.7	92.8	0.15
		Calcium, LCS	94.2	94.6	0.42
		Chromium, LCS	97.2	95.8	1.5
		Copper, LCS	95.3	94.2	1.1
		Iron, LCS	96.3	95.8	0.46
		Magnesium, LCS	98.3	97.6	0.64
		Manganese, LCS	93.7	93.2	0.57
		Sodium, LCS	98.8	97.1	1.7
		Nickel, LCS	93.2	92.9	0.27
		Silicon, LCS	98.5	98.3	0.22
		Uranium, LCS	97.5	97.6	0.12
		Zinc, LCS	92.2	92.0	0.22
LCS2	93L7115-LC2	Silver, LCS	102	102	0.31
		Arsenic, LCS	102	104	2.1
		Barium, LCS	102	103	0.59
		Cadmium, LCS	87.6	89.2	1.8
		Chromium, LCS	99.4	101	1.9
		Nickel, LCS	104	104	0.14
		Lead, LCS	102	103	0.93
		Selenium, LCS	103	103	0.52
		Uranium, LCS	98.2	98.4	0.20
LCS2	93C0327-LC2	Mercury, LCS	104	101	3.1

ROY F. WESTON INC.

INORGANIC PRECISION REPORT 11/24/93

IENT: WSRC-TASK 22 WESTON BATCH #: 9310L360

ORK ORDER: 00345-031-022-9999-00

AMPLE	SITE ID	ANALYTE	INITIAL RESULT	REPLICATE	%RPD	DILUTION FACTOR(REP)
001REP	IT/SF SLURRY X(12) 1	Aluminum, Total	34500	35900	3.9	1.0
		Boron, Total	57.8	56.2	2.8	1.0
		Calcium, Total	1840 u	1840 u	NC	1.0
		Chromium, Total	51.5	52.3	1.5	1.0
		Copper, Total	9.2 u	9.2 u	NC	1.0
		Iron, Total	1700	1800	5.8	1.0
		Magnesium, Total	1840 u	1840 u	NC	1.0
		Manganese, Total	36.2	38.9	7.2	1.0
		Sodium, Total	17500	18000	2.7	1.0
		Nickel, Total	14.7 u	14.7 u	NC	1.0
		Silicon, Total	857	857	0.070	1.0
		Uranium, Total	386	390	0.98	1.0
		Zinc, Total	46.5	44.2	5.1	1.0

ROY F. WESTON INC.

INORGANIC LABORATORY CONTROL STANDARDS REPORT 11/24/93

SAMPLE	SITE ID	ANALYTE	SPIKED SAMPLE	SPIKED AMOUNT	UNITS	%RECOV
LCS1	93L7114-LC1	Aluminum, LCS	497	500	MG/KG	99.4
		Boron, LCS	463	500	MG/KG	92.7
		Calcium, LCS	2350	2500	MG/KG	94.2
		Chromium, LCS	48.6	50.0	MG/KG	97.2
		Copper, LCS	119	125	MG/KG	95.3
		Iron, LCS	481	500	MG/KG	96.3
		Magnesium, LCS	2460	2500	MG/KG	98.3
		Manganese, LCS	70.3	75.0	MG/KG	93.7
		Sodium, LCS	2470	2500	MG/KG	98.8
		Nickel, LCS	186	200	MG/KG	93.2
		Silicon, LCS	493	500	MG/KG	98.5
		Uranium, LCS	487	500	MG/KG	97.5
		Zinc, LCS	92.2	100	MG/KG	92.2
LCS2	93L7114-LC2	Aluminum, LCS	491	500	MG/KG	98.2
		Boron, LCS	464	500	MG/KG	92.8
		Calcium, LCS	2360	2500	MG/KG	94.6
		Chromium, LCS	47.9	50.0	MG/KG	95.8
		Copper, LCS	118	125	MG/KG	94.2
		Iron, LCS	479	500	MG/KG	95.8
		Magnesium, LCS	2440	2500	MG/KG	97.6
		Manganese, LCS	69.9	75.0	MG/KG	93.2
		Sodium, LCS	2430	2500	MG/KG	97.1
		Nickel, LCS	186	200	MG/KG	92.9
		Silicon, LCS	492	500	MG/KG	98.3
		Uranium, LCS	488	500	MG/KG	97.6
		Zinc, LCS	92.0	100	MG/KG	92.0
LCS1	93L7115-LC1	Silver, LCS	511	500	UG/L	102
		Arsenic, LCS	10200	10000	UG/L	102
		Barium, LCS	5100	5000	UG/L	102
		Cadmium, LCS	219	250	UG/L	87.6
		Chromium, LCS	497	500	UG/L	99.4
		Nickel, LCS	2070	2000	UG/L	104
		Lead, LCS	2550	2500	UG/L	102
		Selenium, LCS	10300	10000	UG/L	103
		Uranium, LCS	9820	10000	UG/L	98.2
LCS2	93L7115-LC2	Silver, LCS	510	500	UG/L	102
		Arsenic, LCS	10400	10000	UG/L	104

ROY F. WESTON INC.

INORGANIC LABORATORY CONTROL STANDARDS REPORT 11/24/93

AMPLE	SITE ID	ANALYTE	SPIKED SAMPLE	SPIKED AMOUNT	UNITS	%RECOV
CS2	93L7115-LC2	Barium, LCS	5130	5000	UG/L	103
		Cadmium, LCS	223	250	UG/L	89.2
		Chromium, LCS	507	500	UG/L	101
		Nickel, LCS	2080	2000	UG/L	104
		Lead, LCS	2580	2500	UG/L	103
		Selenium, LCS	10300	10000	UG/L	103
		Uranium, LCS	9840	10000	UG/L	98.4
CS1	93C0327-LC1	Mercury, LCS	5.2	5.0	UG/L	104
CS2	93C0327-LC2	Mercury, LCS	5.0	5.0	UG/L	101

Roy F. Weston, Inc. - Lionville Laboratory
INORGANIC ANALYTICAL DATA PACKAGE FOR
WSRC TASK22

DATE RECEIVED: 10/21/93 RFW LOT # :9310L360

CLIENT ID /ANALYSIS	RFW #	MTX	PREP #	COLLECTION	EXTR/PREP	ANALYSIS
IT/SF SLURRY X(12) 1						
TCLP	001	SE	93LTO100	10/14/93	10/25/93	10/26/93
ALUMINUM, TOTAL	001	SE	93L7114	10/14/93	11/19/93	11/22/93
ALUMINUM, TOTAL	001 REP	SE	93L7114	10/14/93	11/19/93	11/22/93
ALUMINUM, TOTAL	001 MS	SE	93L7114	10/14/93	11/19/93	11/22/93
ALUMINUM, TOTAL	001 MSD	SE	93L7114	10/14/93	11/19/93	11/22/93
BORON, TOTAL	001	SE	93L7114	10/14/93	11/19/93	11/22/93
BORON, TOTAL	001 REP	SE	93L7114	10/14/93	11/19/93	11/22/93
BORON, TOTAL	001 MS	SE	93L7114	10/14/93	11/19/93	11/22/93
BORON, TOTAL	001 MSD	SE	93L7114	10/14/93	11/19/93	11/22/93
CALCIUM, TOTAL	001	SE	93L7114	10/14/93	11/19/93	11/22/93
CALCIUM, TOTAL	001 REP	SE	93L7114	10/14/93	11/19/93	11/22/93
CALCIUM, TOTAL	001 MS	SE	93L7114	10/14/93	11/19/93	11/22/93
CALCIUM, TOTAL	001 MSD	SE	93L7114	10/14/93	11/19/93	11/22/93
CHROMIUM, TOTAL	001	SE	93L7114	10/14/93	11/19/93	11/22/93
CHROMIUM, TOTAL	001 REP	SE	93L7114	10/14/93	11/19/93	11/22/93
CHROMIUM, TOTAL	001 MS	SE	93L7114	10/14/93	11/19/93	11/22/93
CHROMIUM, TOTAL	001 MSD	SE	93L7114	10/14/93	11/19/93	11/22/93
COPPER, TOTAL	001	SE	93L7114	10/14/93	11/19/93	11/22/93
COPPER, TOTAL	001 REP	SE	93L7114	10/14/93	11/19/93	11/22/93
COPPER, TOTAL	001 MS	SE	93L7114	10/14/93	11/19/93	11/22/93
COPPER, TOTAL	001 MSD	SE	93L7114	10/14/93	11/19/93	11/22/93
IRON, TOTAL	001	SE	93L7114	10/14/93	11/19/93	11/22/93
IRON, TOTAL	001 REP	SE	93L7114	10/14/93	11/19/93	11/22/93
IRON, TOTAL	001 MS	SE	93L7114	10/14/93	11/19/93	11/22/93
IRON, TOTAL	001 MSD	SE	93L7114	10/14/93	11/19/93	11/22/93
MAGNESIUM, TOTAL	001	SE	93L7114	10/14/93	11/19/93	11/22/93
MAGNESIUM, TOTAL	001 REP	SE	93L7114	10/14/93	11/19/93	11/22/93
MAGNESIUM, TOTAL	001 MS	SE	93L7114	10/14/93	11/19/93	11/22/93
MAGNESIUM, TOTAL	001 MSD	SE	93L7114	10/14/93	11/19/93	11/22/93
MANGANESE, TOTAL	001	SE	93L7114	10/14/93	11/19/93	11/22/93
MANGANESE, TOTAL	001 REP	SE	93L7114	10/14/93	11/19/93	11/22/93
MANGANESE, TOTAL	001 MS	SE	93L7114	10/14/93	11/19/93	11/22/93
MANGANESE, TOTAL	001 MSD	SE	93L7114	10/14/93	11/19/93	11/22/93
SODIUM, TOTAL	001	SE	93L7114	10/14/93	11/19/93	11/22/93
SODIUM, TOTAL	001 REP	SE	93L7114	10/14/93	11/19/93	11/22/93

Roy F. Weston, Inc. - Lionville Laboratory
INORGANIC ANALYTICAL DATA PACKAGE FOR
WSRC TASK22

DATE RECEIVED: 10/21/93 RFW LOT # :9310L360

CLIENT ID /ANALYSIS	RFW #	MTX	PREP #	COLLECTION	EXTR/PREP	ANALYSIS
SODIUM, TOTAL	001 MS	SE	93L7114	10/14/93	11/19/93	11/22/93
SODIUM, TOTAL	001 MSD	SE	93L7114	10/14/93	11/19/93	11/22/93
NICKEL, TOTAL	001	SE	93L7114	10/14/93	11/19/93	11/22/93
NICKEL, TOTAL	001 REP	SE	93L7114	10/14/93	11/19/93	11/22/93
NICKEL, TOTAL	001 MS	SE	93L7114	10/14/93	11/19/93	11/22/93
NICKEL, TOTAL	001 MSD	SE	93L7114	10/14/93	11/19/93	11/22/93
SILICON, TOTAL	001	SE	93L7114	10/14/93	11/19/93	11/22/93
SILICON, TOTAL	001 REP	SE	93L7114	10/14/93	11/19/93	11/22/93
SILICON, TOTAL	001 MS	SE	93L7114	10/14/93	11/19/93	11/22/93
SILICON, TOTAL	001 MSD	SE	93L7114	10/14/93	11/19/93	11/22/93
JRANIUM, TOTAL	001	SE	93L7114	10/14/93	11/19/93	11/22/93
JRANIUM, TOTAL	001 REP	SE	93L7114	10/14/93	11/19/93	11/22/93
JRANIUM, TOTAL	001 MS	SE	93L7114	10/14/93	11/19/93	11/22/93
JRANIUM, TOTAL	001 MSD	SE	93L7114	10/14/93	11/19/93	11/22/93
ZINC, TOTAL	001	SE	93L7114	10/14/93	11/19/93	11/22/93
ZINC, TOTAL	001 REP	SE	93L7114	10/14/93	11/19/93	11/22/93
ZINC, TOTAL	001 MS	SE	93L7114	10/14/93	11/19/93	11/22/93
ZINC, TOTAL	001 MSD	SE	93L7114	10/14/93	11/19/93	11/22/93
T/SF SLURRY X(12) 2						
CLP	002	SE	93LTO100	10/14/93	10/25/93	10/26/93
LUMINUM, TOTAL	002	SE	93L7114	10/14/93	11/19/93	11/22/93
ORON, TOTAL	002	SE	93L7114	10/14/93	11/19/93	11/22/93
ALCIUM, TOTAL	002	SE	93L7114	10/14/93	11/19/93	11/22/93
HROMIUM, TOTAL	002	SE	93L7114	10/14/93	11/19/93	11/22/93
OPPER, TOTAL	002	SE	93L7114	10/14/93	11/19/93	11/22/93
RON, TOTAL	002	SE	93L7114	10/14/93	11/19/93	11/22/93
AGNESIUM, TOTAL	002	SE	93L7114	10/14/93	11/19/93	11/22/93
ANGANESE, TOTAL	002	SE	93L7114	10/14/93	11/19/93	11/22/93
ODIUM, TOTAL	002	SE	93L7114	10/14/93	11/19/93	11/22/93
ICKEL, TOTAL	002	SE	93L7114	10/14/93	11/19/93	11/22/93
ILICON, TOTAL	002	SE	93L7114	10/14/93	11/19/93	11/22/93
RANIUM, TOTAL	002	SE	93L7114	10/14/93	11/19/93	11/22/93
INC, TOTAL	002	SE	93L7114	10/14/93	11/19/93	11/22/93
T/SF SLURRY X(12) 3						
CLP	003	SE	93LTO100	10/14/93	10/25/93	10/26/93

Roy F. Weston, Inc. - Lionville Laboratory
INORGANIC ANALYTICAL DATA PACKAGE FOR
WSRC TASK22

DATE RECEIVED: 10/21/93 RFW LOT # :9310L360

CLIENT ID /ANALYSIS	RFW #	MTX	PREP #	COLLECTION	EXTR/PREP	ANALYSIS
ALUMINUM, TOTAL	003	SE	93L7114	10/14/93	11/19/93	11/22/93
BORON, TOTAL	003	SE	93L7114	10/14/93	11/19/93	11/22/93
CALCIUM, TOTAL	003	SE	93L7114	10/14/93	11/19/93	11/22/93
CHROMIUM, TOTAL	003	SE	93L7114	10/14/93	11/19/93	11/22/93
COPPER, TOTAL	003	SE	93L7114	10/14/93	11/19/93	11/22/93
IRON, TOTAL	003	SE	93L7114	10/14/93	11/19/93	11/22/93
MAGNESIUM, TOTAL	003	SE	93L7114	10/14/93	11/19/93	11/22/93
MANGANESE, TOTAL	003	SE	93L7114	10/14/93	11/19/93	11/22/93
SODIUM, TOTAL	003	SE	93L7114	10/14/93	11/19/93	11/22/93
NICKEL, TOTAL	003	SE	93L7114	10/14/93	11/19/93	11/22/93
SILICON, TOTAL	003	SE	93L7114	10/14/93	11/19/93	11/22/93
URANIUM, TOTAL	003	SE	93L7114	10/14/93	11/19/93	11/22/93
ZINC, TOTAL	003	SE	93L7114	10/14/93	11/19/93	11/22/93
IT/SF SLURRY X(12) 1						
SILVER, TCLP LEACHAT	007	W	93L7115	10/26/93	11/18/93	11/23/93
SILVER, TCLP LEACHAT	007 MS	W	93L7115	10/26/93	11/18/93	11/23/93
ARSENIC, TCLP LEACHA	007	W	93L7115	10/26/93	11/18/93	11/23/93
ARSENIC, TCLP LEACHA	007 MS	W	93L7115	10/26/93	11/18/93	11/23/93
BARIUM, TCLP LEACHAT	007	W	93L7115	10/26/93	11/18/93	11/23/93
BARIUM, TCLP LEACHAT	007 MS	W	93L7115	10/26/93	11/18/93	11/23/93
CADMIUM, TCLP LEACHA	007	W	93L7115	10/26/93	11/18/93	11/23/93
CADMIUM, TCLP LEACHA	007 MS	W	93L7115	10/26/93	11/18/93	11/23/93
CHROMIUM, TCLP LEACH	007	W	93L7115	10/26/93	11/18/93	11/23/93
CHROMIUM, TCLP LEACH	007 MS	W	93L7115	10/26/93	11/18/93	11/23/93
MERCURY, TCLP LEACHA	007	W	93C0327	10/26/93	11/02/93	11/02/93
MERCURY, TCLP LEACHA	007 MS	W	93C0327	10/26/93	11/02/93	11/02/93
NICKEL, TCLP LEACHAT	007	W	93L7115	10/26/93	11/18/93	11/23/93
NICKEL, TCLP LEACHAT	007 MS	W	93L7115	10/26/93	11/18/93	11/23/93
LEAD, TCLP LEACHATE	007	W	93L7115	10/26/93	11/18/93	11/23/93
LEAD, TCLP LEACHATE	007 MS	W	93L7115	10/26/93	11/18/93	11/23/93
SELENIUM, TCLP LEACH	007	W	93L7115	10/26/93	11/18/93	11/23/93
SELENIUM, TCLP LEACH	007 MS	W	93L7115	10/26/93	11/18/93	11/23/93
URANIUM, LEACHATE	007	W	93L7115	10/26/93	11/18/93	11/23/93
URANIUM, LEACHATE	007 MS	W	93L7115	10/26/93	11/18/93	11/23/93
IT/SF SLURRY X(12) 2						
SILVER, TCLP LEACHAT	008	W	93L7115	10/26/93	11/18/93	11/23/93

Roy F. Weston, Inc. - Lionville Laboratory
INORGANIC ANALYTICAL DATA PACKAGE FOR
WSRC TASK22

DATE RECEIVED: 10/21/93 RFW LOT # :9310L360

CLIENT ID /ANALYSIS	RFW #	MTX	PREP #	COLLECTION	EXTR/PREP	ANALYSIS
ARSENIC, TCLP LEACHA	008	W	93L7115	10/26/93	11/18/93	11/23/93
BARIUM, TCLP LEACHAT	008	W	93L7115	10/26/93	11/18/93	11/23/93
CADMIUM, TCLP LEACHA	008	W	93L7115	10/26/93	11/18/93	11/23/93
CHROMIUM, TCLP LEACH	008	W	93L7115	10/26/93	11/18/93	11/23/93
MERCURY, TCLP LEACHA	008	W	93C0327	10/26/93	11/02/93	11/02/93
NICKEL, TCLP LEACHAT	008	W	93L7115	10/26/93	11/18/93	11/23/93
LEAD, TCLP LEACHATE	008	W	93L7115	10/26/93	11/18/93	11/23/93
SELENIUM, TCLP LEACH	008	W	93L7115	10/26/93	11/18/93	11/23/93
URANIUM, LEACHATE	008	W	93L7115	10/26/93	11/18/93	11/23/93
IT/SF SLURRY X(12) 3						
SILVER, TCLP LEACHAT	009	W	93L7115	10/26/93	11/18/93	11/23/93
ARSENIC, TCLP LEACHA	009	W	93L7115	10/26/93	11/18/93	11/23/93
BARIUM, TCLP LEACHAT	009	W	93L7115	10/26/93	11/18/93	11/23/93
CADMIUM, TCLP LEACHA	009	W	93L7115	10/26/93	11/18/93	11/23/93
CHROMIUM, TCLP LEACH	009	W	93L7115	10/26/93	11/18/93	11/23/93
MERCURY, TCLP LEACHA	009	W	93C0327	10/26/93	11/02/93	11/02/93
NICKEL, TCLP LEACHAT	009	W	93L7115	10/26/93	11/18/93	11/23/93
LEAD, TCLP LEACHATE	009	W	93L7115	10/26/93	11/18/93	11/23/93
SELENIUM, TCLP LEACH	009	W	93L7115	10/26/93	11/18/93	11/23/93
URANIUM, LEACHATE	009	W	93L7115	10/26/93	11/18/93	11/23/93
LB QC:						
ALUMINUM LABORTORY	LC1 BS	S	93L7114	N/A	11/19/93	11/22/93
ALUMINUM LABORTORY	LC2 BS	S	93L7114	N/A	11/19/93	11/22/93
ALUMINUM, TOTAL	MB1	S	93L7114	N/A	11/19/93	11/22/93
BORON LABORATORY	LC1 BS	S	93L7114	N/A	11/19/93	11/22/93
BORON LABORATORY	LC2 BS	S	93L7114	N/A	11/19/93	11/22/93
BORON, TOTAL	MB1	S	93L7114	N/A	11/19/93	11/22/93
CALCIUM LABORATORY	LC1 BS	S	93L7114	N/A	11/19/93	11/22/93
CALCIUM LABORATORY	LC2 BS	S	93L7114	N/A	11/19/93	11/22/93
CALCIUM, TOTAL	MB1	S	93L7114	N/A	11/19/93	11/22/93
CHROMIUM LABORATORY	LC1 BS	S	93L7114	N/A	11/19/93	11/22/93
CHROMIUM LABORATORY	LC2 BS	S	93L7114	N/A	11/19/93	11/22/93
CHROMIUM, TOTAL	MB1	S	93L7114	N/A	11/19/93	11/22/93
COPPER LABORATORY	LC1 BS	S	93L7114	N/A	11/19/93	11/22/93

Roy F. Weston, Inc. - Lionville Laboratory
INORGANIC ANALYTICAL DATA PACKAGE FOR
WSRC TASK22

DATE RECEIVED: 10/21/93 : RFW LOT # :9310L360

CLIENT ID /ANALYSIS	RFW #	MTX	PREP #	COLLECTION	EXTR/PREP	ANALYSIS
COPPER LABORATORY	LC2 BS	S	93L7114	N/A	11/19/93	11/22/93
COPPER, TOTAL	MB1	S	93L7114	N/A	11/19/93	11/22/93
IRON LABORATORY	LC1 BS	S	93L7114	N/A	11/19/93	11/22/93
IRON LABORATORY	LC2 BS	S	93L7114	N/A	11/19/93	11/22/93
IRON, TOTAL	MB1	S	93L7114	N/A	11/19/93	11/22/93
MAGNESIUM LABORATORY	LC1 BS	S	93L7114	N/A	11/19/93	11/22/93
MAGNESIUM LABORATORY	LC2 BS	S	93L7114	N/A	11/19/93	11/22/93
MAGNESIUM, TOTAL	MB1	S	93L7114	N/A	11/19/93	11/22/93
MANGANESE LABORATORY	LC1 BS	S	93L7114	N/A	11/19/93	11/22/93
MANGANESE LABORATORY	LC2 BS	S	93L7114	N/A	11/19/93	11/22/93
MANGANESE, TOTAL	MB1	S	93L7114	N/A	11/19/93	11/22/93
SODIUM LABORATORY	LC1 BS	S	93L7114	N/A	11/19/93	11/22/93
SODIUM LABORATORY	LC2 BS	S	93L7114	N/A	11/19/93	11/22/93
SODIUM, TOTAL	MB1	S	93L7114	N/A	11/19/93	11/22/93
NICKEL LABORATORY	LC1 BS	S	93L7114	N/A	11/19/93	11/22/93
NICKEL LABORATORY	LC2 BS	S	93L7114	N/A	11/19/93	11/22/93
NICKEL, TOTAL	MB1	S	93L7114	N/A	11/19/93	11/22/93
SILICON LABORATORY	LC1 BS	S	93L7114	N/A	11/19/93	11/22/93
SILICON LABORATORY	LC2 BS	S	93L7114	N/A	11/19/93	11/22/93
SILICON, TOTAL	MB1	S	93L7114	N/A	11/19/93	11/22/93
URANIUM LABORATORY	LC1 BS	S	93L7114	N/A	11/19/93	11/22/93
URANIUM LABORATORY	LC2 BS	S	93L7114	N/A	11/19/93	11/22/93
URANIUM, TOTAL	MB1	S	93L7114	N/A	11/19/93	11/22/93
ZINC LABORATORY	LC1 BS	S	93L7114	N/A	11/19/93	11/22/93
ZINC LABORATORY	LC2 BS	S	93L7114	N/A	11/19/93	11/22/93
ZINC, TOTAL	MB1	S	93L7114	N/A	11/19/93	11/22/93
SILVER LABORATORY	LC1 BS	W	93L7115	N/A	11/18/93	11/23/93
SILVER LABORATORY	LC2 BS	W	93L7115	N/A	11/18/93	11/23/93
SILVER, TCLP LEACHAT	MB1	W	93L7115	N/A	11/18/93	11/23/93
SILVER, TCLP LEACHAT	MB2	W	93L7115	N/A	11/18/93	11/23/93
ARSENIC LABORATORY	LC1 BS	W	93L7115	N/A	11/18/93	11/23/93
ARSENIC LABORATORY	LC2 BS	W	93L7115	N/A	11/18/93	11/23/93
ARSENIC, TCLP LEACHA	MB1	W	93L7115	N/A	11/18/93	11/23/93
ARSENIC, TCLP LEACHA	MB2	W	93L7115	N/A	11/18/93	11/23/93
BARIUM LABORATORY	LC1 BS	W	93L7115	N/A	11/18/93	11/23/93
BARIUM LABORATORY	LC2 BS	W	93L7115	N/A	11/18/93	11/23/93
BARIUM, TCLP LEACHAT	MB1	W	93L7115	N/A	11/18/93	11/23/93
BARIUM, TCLP LEACHAT	MB2	W	93L7115	N/A	11/18/93	11/23/93

Roy F. Weston, Inc. - Lionville Laboratory
INORGANIC ANALYTICAL DATA PACKAGE FOR
WSRC TASK22

DATE RECEIVED: 10/21/93 RFW LOT # :9310L360

CLIENT ID /ANALYSIS	RFW #	MTX	PREP #	COLLECTION	EXTR/PREP	ANALYSIS
CADMIUM LABORATORY	LC1 BS	W	93L7115	N/A	11/18/93	11/23/93
CADMIUM LABORATORY	LC2 BS	W	93L7115	N/A	11/18/93	11/23/93
CADMIUM, TCLP LEACHA	MB1	W	93L7115	N/A	11/18/93	11/23/93
CADMIUM, TCLP LEACHA	MB2	W	93L7115	N/A	11/18/93	11/23/93
CHROMIUM LABORATORY	LC1 BS	W	93L7115	N/A	11/18/93	11/23/93
CHROMIUM LABORATORY	LC2 BS	W	93L7115	N/A	11/18/93	11/23/93
CHROMIUM, TCLP LEACH	MB1	W	93L7115	N/A	11/18/93	11/23/93
CHROMIUM, TCLP LEACH	MB2	W	93L7115	N/A	11/18/93	11/23/93
MERCURY LABORATORY	LC1 BS	W	93C0327	N/A	11/02/93	11/02/93
MERCURY LABORATORY	LC2 BS	W	93C0327	N/A	11/02/93	11/02/93
MERCURY, TOTAL	MB1	W	93C0327	N/A	11/02/93	11/02/93
NICKEL LABORATORY	LC1 BS	W	93L7115	N/A	11/18/93	11/23/93
NICKEL LABORATORY	LC2 BS	W	93L7115	N/A	11/18/93	11/23/93
NICKEL, TCLP LEACHAT	MB1	W	93L7115	N/A	11/18/93	11/23/93
NICKEL, TCLP LEACHAT	MB2	W	93L7115	N/A	11/18/93	11/23/93
LEAD LABORATORY	LC1 BS	W	93L7115	N/A	11/18/93	11/23/93
LEAD LABORATORY	LC2 BS	W	93L7115	N/A	11/18/93	11/23/93
LEAD, TCLP LEACHATE	MB1	W	93L7115	N/A	11/18/93	11/23/93
LEAD, TCLP LEACHATE	MB2	W	93L7115	N/A	11/18/93	11/23/93
SELENIUM LABORATORY	LC1 BS	W	93L7115	N/A	11/18/93	11/23/93
SELENIUM LABORATORY	LC2 BS	W	93L7115	N/A	11/18/93	11/23/93
SELENIUM, TCLP LEACH	MB1	W	93L7115	N/A	11/18/93	11/23/93
SELENIUM, TCLP LEACH	MB2	W	93L7115	N/A	11/18/93	11/23/93
URANIUM LABORATORY	LC1 BS	W	93L7115	N/A	11/18/93	11/23/93
URANIUM LABORATORY	LC2 BS	W	93L7115	N/A	11/18/93	11/23/93
URANIUM, LEACHATE	MB1	W	93L7115	N/A	11/18/93	11/23/93
URANIUM, LEACHATE	MB2	W	93L7115	N/A	11/18/93	11/23/93

Dianne QA Data - Yellow metals Metal Physical Test

WESTON Analytics Use Only: 9310L360

Custody Transfer Record/Lab Work Request

WESTON

Page 1 of 1

Client: WSRC - TASK 22
Est. Final Proj. Sampling Date:
Work Order #: 00045-031-022-9999-00
Project Contact/Phone #:
AD Project Manager: Diane C. Thomas
QC: SWSTE Del: STD TAT: 30 DAY
Date Rec'd: 10-21-93 Date Due: 11/20/93
Account #: WSRC22STD

	VOA	BNA	Pest/PCB	Herb	TCLV	TCLP	TOTAL metals	Metal	CN	CORR FLSH NO3 PAINT	PH 4.5LD [illegible]
Refrigerator #					4	4	4		4		
#/Type Container (Liquid / Solid)	Leachate				1/6L	1/6L	1/6L	Leachate	1/6L		
Volume (Liquid / Solid)					125ml	250ml	250ml		250ml		
Preservatives											
WESTON Analytics Use Only	0624T	0625T	0608T	0418ST	ITCLV	ITCLP	see below	RCRATCLU + Ni	IMSC	TCORR IFLSH IMCON IPOINT ISCN	IPH IC5LD IMSC1

MATRIX CODES:
S - Soil
SE - Sediment
SO - Solid
SL - Sludge
W - Water
O - Oil
A - Air
DS - Drum Solids
DL - Drum Liquids
L - EP/TCLP Leachate
WI - Wipe
X - Other
F - Fish

Lab ID	Client ID/Description	Matrix QC Chosen (✓) MS / MSD	Matrix	Date Collected	Time Collected	VOA	BNA	Pest/PCB	Herb	TCLV	TCLP	Total metals	Metal	CN	Corr/Flsh	pH
001	IT/SF Slurry X(12) 1	RAD	SE	10/14/93						X	X	X		X	X	X
002	IT/SF Slurry X(12) 2	RAD	SE	10/14/93						X	X	X		X	X	X
003	IT/SF Slurry X(12) 3	RAD	SE	10/14/93						X	X	X		X	X	X
004	IT/SF Slurry X(12) 1 TCLV of 001		L	10/26/93		X										
005	IT/SF Slurry X(12) 2 TCLV of 002		L			X										
006	IT/SF Slurry X(12) 3 TCLV of 003		L			X										
007	IT/SF Slurry X(12) 1 TCLP of 001		L	10/26/93			X	X	X				X			
008	IT/SF Slurry X(12) 2 TCLP of 002		L				X	X	X				X			
009	IT/SF Slurry X(12) 3 TCLP of 003		L				X	X	X				X			

FIELD PERSONNEL: COMPLETE ONLY SHADED AREAS

Special Instructions:
Leachate Metals = RCRA + U-, Ni
metals / Total = Al, B-, Ca, Cr, Cu, Fe, Mg, Mn, Ni, Si, Na, U-, Zn.
Temp = 14.9°C
Target Date: 16
Orig. Rewritten
MDH 11/2/93

DATE/REVISIONS:
10/27/93 1. Record Leachate date of 004 To 006
10/28/93 2. Record Leachate date of 007 To 009
11/2/93 3. Change Hg to Mg & ICORP to ICORC per SNC3M1289.
4.
5.
6.

Relinquished by	Received by	Date	Time	Relinquished by	Received by	Date	Time
Fed Ex	B Shaffer	10/21/93	0945		BES 10/21/93		
	BES	10/21/93					

WESTON Analytics Use Only

Samples were:
1) Shipped X or Hand Delivered ___ Airbill # ___
2) Ambient or (Chilled)
3) Received in Good Condition (Y) or N
4) Labels Indicate Properly Preserved (Y) or N
5) Received Within Holding Times (Y) or N

COC Tape was:
1) Present on Outer Package Y or (N)
2) Unbroken on Outer Package Y or (N)
3) Present on Sample (Y) or N
4) Unbroken on Sample (Y) or N
COC Record Present Upon Sample Rec't (Y) or N

Discrepancies Between Samples Labels and COC Record? (Y) or N
NOTES: No ID's on Bottles.

RFW 21-21-001/A-7/91

11-596a

WESTON

ROY F. WESTON, INC.
LIONVILLE ANALYTICAL LABORATORY
ANALYTICAL CASE NARRATIVE

DEC 06 1993
R. P. KEMMERLIN

Client: WSRC-TASK 22
RFW #: 9310L360

W.O. #: 00345-031-022-9999-00
Date Received: 10-21-93

GC/MS VOLATILE

The set of samples consisted of three (3) leachate samples generated on 10-26-93 from sediment samples collected on 10-14-93.

The samples were analyzed according to criteria set forth in SW 846 Method 8240 for TCLP Volatile target compounds on 10-28-93 and 11-02-93.

The following is a summary of the QC results accompanying these sample results and a description of any problems encountered during their analyses:

1. Leachate samples were analyzed at ten-fold dilutions due to the leachate matrix; however, all TCLP regulatory limits were achieved.

2. All surrogate recoveries were within EPA QC limits.

3. All matrix spike recoveries were within EPA QC limits.

4. All blank spike recoveries were within EPA QC limits.

5. These sediment slurries were approximately 50% water and required filtration prior to the leaching procedure. The filtrate and leachate fractions were composited prior to the volatile analysis.

Sourneath Boonthmond

J. Peter Hershey, Ph.D.
Laboratory Manager
Lionville Analytical Laboratory

11.11.93
Date

sma/voa/10-360v.cn

DATA QUALIFIERS

U = Compound was analyzed for but not detected. The associated numerical value is the estimated sample quantitation limit which is included and corrected for dilution and percent moisture.

J = Indicates an estimated value. This flag is used either when estimating a concentration for tentatively identified compounds where a 1:1 response is assumed or when the mass spectral data indicate the presence of a compound that meets the identification criteria but the result is less than the specified detection limit but greater than zero; for example, if the limit of detection is 10 ug/L and a concentration of 3 ug/L is calculated, it is reported as 3J.

B = This flag is used when the analyte is found in the associated blank as well as in the sample. It indicates possible/probable blank contamination. This flag is also used for a TIC as well as for a positively identified TCL compound.

E = Indicates that the compound was detected beyond the calibration range and was subsequently analyzed at a dilution.

I = Interference.

X = Additional qualifiers used as required are explained in the case narrative.

NQ = Result qualitatively confirmed but not able to quantify.

ABBREVIATIONS

BS = Indicates blank spike in which reagent grade water is spiked with the CLP matrix spike solutions and carried through all the steps in the method. Spike recoveries are reported.

BSD = Indicates blank spike duplicate.

MS = Indicates matrix spike.

MSD = Indicates matrix spike duplicate.

DL = Indicates that surrogate recoveries were not obtained because the extract had to be diluted for analysis.

NA = Not Applicable.

DF = Dilution Factor.

NR = Not Required.

SP = Indicates Spiked Compound.

pas\6-93\gloss.voa

Sample Information	Cust ID:	IT/SF SLURRY X(12) 1	IT/SF SLURRY X(12) 1	IT/SF SLURRY X(12) 1	IT/SF SLURRY X(12) 2	IT/SF SLURRY X(12) 3	VBLK
	RFW#:	004	004 MS	004 MSD	005	006	93LVX244-MB1
	Matrix:	WATER	WATER	WATER	WATER	WATER	WATER
	D.F.:	10.0	10.0	10.0	10.0	10.0	1.00
	Units:	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
Surrogate Recovery	Toluene-d8	99 %	99 %	97 %	99 %	101 %	98 %
	Bromofluorobenzene	100 %	100 %	98 %	99 %	102 %	96 %
	1,2-Dichloroethane-d4	100 %	107 %	109 %	107 %	107 %	94 %
Vinyl Chloride		100 U	106 %	100 %	100 U	100 U	10 U
1,1-Dichloroethene		50 U	110 %	104 %	50 U	50 U	5 U
Chloroform		50 U	114 %	107 %	50 U	50 U	5 U
1,2-Dichloroethane		50 U	120 %	115 %	50 U	50 U	5 U
2-Butanone		100 U	83 %	77 %	100 U	100 U	10 U
Carbon Tetrachloride		50 U	113 %	108 %	50 U	50 U	5 U
Trichloroethene		50 U	105 %	103 %	50 U	50 U	5 U
Benzene		50 U	109 %	103 %	50 U	50 U	5 U
Tetrachloroethene		50 U	108 %	102 %	50 U	50 U	5 U
Chlorobenzene		50 U	111 %	104 %	50 U	50 U	5 U

*= Outside of EPA CLP QC limits.

Roy F. Weston, Inc. - Lionville Laboratory
Volatiles by GC/MS, TCLP Leachate

RFW Batch Number: 9310L360 Client: WSRC-TASK 22 Report Date: 11/08/93 14:52
Work Order: 00345031022 Page: 2a

Sample Information	Cust ID:	VBLK BS		LCHBLK		VBLK	
	RFW#:	93LVX244-MB1		93LTV039-LB1		93LVK190-MB1	
	Matrix:	WATER		WATER		WATER	
	D.F.:	1.00		10.0		1.00	
	Units:	ug/L		ug/L		ug/L	
Surrogate Recovery	Toluene-d8	104	%	103	%	107	%
	Bromofluorobenzene	104	%	105	%	99	%
	1,2-Dichloroethane-d4	110	%	101	%	85	%
Vinyl Chloride		114	%	100	U	10	U
1,1-Dichloroethene		118	%	50	U	5	U
Chloroform		115	%	50	U	5	U
1,2-Dichloroethane		118	%	50	U	5	U
2-Butanone		81	%	100	U	10	U
Carbon Tetrachloride		117	%	50	U	5	U
Trichloroethene		110	%	50	U	5	U
Benzene		112	%	50	U	5	U
Tetrachloroethene		109	%	50	U	5	U
Chlorobenzene		114	%	50	U	5	U

*= Outside of EPA CLP QC limits.

Roy F. Weston, Inc. - Lionville Laboratory
VOA ANALYTICAL DATA PACKAGE FOR
WSRC-TASK 22

DATE RECEIVED: 10/21/93 RFW LOT # :9310L360

CLIENT ID	RFW #	MTX	PREP #	LEACH DATE	EXTR/PREP	ANALYSIS
IT/SF SLURRY X(12) 1	004	W	93LVX244	10/26/93	N/A	11/02/93
IT/SF SLURRY X(12) 1	004 MS	W	93LVX244	10/26/93	N/A	11/02/93
IT/SF SLURRY X(12) 1	004 MSD	W	93LVX244	10/26/93	N/A	11/02/93
IT/SF SLURRY X(12) 2	005	W	93LVX244	10/26/93	N/A	11/02/93
IT/SF SLURRY X(12) 3	006	W	93LVX244	10/26/93	N/A	11/02/93
LAB QC:						
VBLK	MB1	W	93LVX244	N/A	N/A	11/02/93
VBLK	MB1 BS	W	93LVX244	N/A	N/A	11/02/93
VBLK	MB1	W	93LVK190	N/A	N/A	10/28/93
LCHBLK	LB1	W	93LVK190	N/A	N/A	10/28/93

WESTON

This report provides Toxicity Characteristics Leaching Procedure (TCLP) information. Listed below each client identification on the ITCL labchron, "TCLP" represents the non-volatile leachate fraction and "TCLP LEACHATE" represents the Zero Headspace Extraction (ZHE) volatile leachate fraction. The "EXTR/PREP DATE" is the date the leachate preparation was initiated; the "ANALYSIS DATE" is the date the leachates were completed.

Roy F. Weston, Inc. - Lionville Laboratory
INORGANIC ANALYTICAL DATA PACKAGE FOR
WSRC-TASK 22

ATE RECEIVED: 10/21/93 RFW LOT # :9310L360

IENT ID /ANALYSIS	RFW #	MTX	PREP #	COLLECTION	EXTR/PREP	ANALYSIS
/SF SLURRY X(12) 1						
LP	001	SE	93LTO100	10/14/93	10/25/93	10/26/93
LP LEACHATE	001	SE	93LTV039	10/14/93	10/25/93	10/26/93
/SF SLURRY X(12) 2						
LP	002	SE	93LTO100	10/14/93	10/25/93	10/26/93
LP LEACHATE	002	SE	93LTV039	10/14/93	10/25/93	10/26/93
/SF SLURRY X(12) 3						
LP	003	SE	93LTO100	10/14/93	10/25/93	10/26/93
LP LEACHATE	003	SE	93LTV039	10/14/93	10/25/93	10/26/93

Diane QA Date 10/21/93 Metals must be 2 5ml. Test 5ml.

WESTON Analytics Use Only: 9310L360

Custody Transfer Record/Lab Work Request

WESTON

Client: WSRC - TASK 22
Est. Final Proj. Sampling Date:
Work Order #: 00345 - 031 - 022 - 9999 - 00
Project Contact/Phone #:
AD Project Manager: Diane C. Thomas
QC: SW846 Del: STD TAT: 30 DAY
Date Rec'd: 10-21-93 Date Due: 11/20/93
Account #: WSRC22STD

Refrigerator #

#/Type Container	Liquid				4	4	4		4							
	Solid															
Volume	Liquid				1 1/6c	1 1/6c	1 1/6c	Lab Hold	1 1/6c							
	Solid				125ml	250ml	250ml		250ml							
Preservatives		Leachate			1	1	1	Lab Hold								

ANALYSES REQUESTED →

ORGANIC				INORG											
VOA	BNA	Pest/PCB	Herb	TCLV	TCLP	TOTAL metals	Metal	CN	CORP FLSH 203 RCRA TCLP	pH TCLP ONLY					

MATRIX CODES: S - Soil; SE - Sediment; SO - Solid; SL - Sludge; W - Water; O - Oil; A - Air; DS - Drum Solids; DL - Drum Liquids; L - EP/TCLP Leachate; WI - Wipe; X - Other; F - Fish

Lab ID	Client ID/Description	Matrix QC Chosen (✓) MS	MSD	Matrix	Date Collected	Time Collected	WESTON Analytics Use Only: 0634T	0635T	0608T	0418ST	ITCLV	ITCLP	8240 Leach	RCRAT(M) U- Ni	TMSC	TCLP FLSH TMSC RCRA TCLP TMSC	pH TCLP TMSC
001	IT/SF Slurry X(12) 1	RMD		SE	10/14/93						X	X	X		X	X	X
002	IT/SF Slurry X(12) 2	RMD		SE	10/14/93						X	X	X		X	X	X
003	IT/SF Slurry X(12) 3	RMD		SE	10/14/93						X	X	X		X	X	X
004	IT/SF Slurry X(12) 1 TCLV of 001			L	10/21/93		X										
005	IT/SF Slurry X(12) 2 TCLV of 002			L			X										
006	IT/SF Slurry X(12) 3 TCLV of 003			L			X										
007	IT/SF Slurry X(12) 1 TCLP of 001			L	10/26/93			X	X	X				X			
008	IT/SF Slurry X(12) 2 TCLP of 002			L				X	X	X				X			
009	IT/SF Slurry X(12) 3 TCLP of 003			L				X	X	X				X			

FIELD PERSONNEL: COMPLETE ONLY SHADED AREAS

Special Instructions:
Leachate Metals = RCRA + U-, Ni
metals / Total = Al, B-, Ca, Cr, Co, Fe, Mg, Mn, Ni, Si, Na, U-, Zn.
Mg only 10/25/93
Temp = 14.9°C
Target Date: 16
Orig. Rewritten

DATE/REVISIONS:
10/27/93 1. Record Leachate data of 004 To 006
10/28/93 2. Record Leachate data of 007 To 009
11/2/93 3. Change Hg to Mg & ICORP to ICORC per SW846M 1289
4.
5.
6.

Relinquished by	Received by	Date	Time
Tod Exo	B Shaffer BBS	10/21/93 10/21/93	0945

Relinquished by	Received by	Date	Time
	BBS	10/21/93	

WESTON Analytics Use Only

Samples were:
1) Shipped ✓ or Hand Delivered ___ Airbill # ___
2) Ambient or Chilled
3) Received in Good Condition (Y) or N
4) Labels Indicate Properly Preserved (Y) or N
5) Received Within Holding Times (Y) or N

COC Tape was:
1) Present on Outer Package Y or (N)
2) Unbroken on Outer Package Y or (N)
3) Present on Sample (Y) or N
4) Unbroken on Sample (Y) or N

COC Record Present Upon Sample Rec't (Y) or N

Discrepancies Between Samples Labels and COC Record? (Y) or N
NOTES: No ID's on Bottles

RFW 21-21-001/A-7/91

16a

ROY F. WESTON, INC.
LIONVILLE ANALYTICAL LABORATORY
ANALYTICAL CASE NARRATIVE

DEC 06 1993

R. P. KEMMERLIN

Client: WSRC-TASK 22
RFW #: 9310L360

W.O. #: 00345-031-022-9999-00
Date Received: 10-21-93

SEMIVOLATILE

The set of samples consisted of three (3) leachate samples generated on 10-26-93 from sediment samples collected on 10-14-93.

The samples were extracted on 11-02-93 and analyzed according to criteria set forth in SW 846 Method 8270 for the TCLP Semivolatile target compounds on 11-08,09-93.

The following is a summary of the QC results accompanying these sample results and a description of any problems encountered during their analyses:

1. Leachate samples were extracted at ten-fold dilutions due to the leachate matrix; however, all TCLP regulatory limits were achieved.

2. One (1) of fifty-four (54) surrogate recoveries was outside method QC limits; however, surrogate recovery criteria were met (i.e., no more than one outlier per fraction {acid and base neutral} and no recoveries less than 10%).

3. All blank spike recoveries were within method QC limits.

4. All matrix spike recoveries were within method QC limits.

Stuart Broomthorpe

J. Peter Hershey, Ph.D.
Laboratory Manager
Lionville Analytical Laboratory

11.22.93
Date

sma/bna/10-360b.cn

DATA QUALIFIERS

U = Compound was analyzed for but not detected. The associated numerical value is the estimated sample quantitation limit which is included and corrected for dilution and percent moisture.

J = Indicates an estimated value. This flag is used either when estimating a concentration for tentatively identified compounds where a 1:1 response is assumed or when the mass spectral data indicate the presence of a compound that meets the identification criteria but the result is less than the specified detection limit but greater than zero; for example, if the limit of detection is 10 ug/L and a concentration of 3 ug/L is calculated, it is reported as 3J.

B = This flag is used when the analyte is found in the associated blank as well as in the sample. It indicates possible/probable blank contamination. This flag is also used for a TIC as well as for a positively identified TCL compound.

E = Indicates that the compound was detected beyond the calibration range and was subsequently analyzed at a dilution.

I = Interference.

X = Additional qualifiers used as required are explained in the case narrative.

NQ = Result qualitatively confirmed but not able to quantify.

ABBREVIATIONS

BS = Indicates blank spike in which reagent grade water is spiked with the CLP matrix spike solutions and carried through all the steps in the method. Spike recoveries are reported.

BSD = Indicates blank spike duplicate.

MS = Indicates matrix spike.

MSD = Indicates matrix spike duplicate.

DL = Indicates that surrogate recoveries were not obtained because the extract had to be diluted for analysis.

NA = Not Applicable.

DF = Dilution Factor.

NR = Not Required.

SP = Indicates Spiked Compound.

Semivolatiles by GC/MS, TCLP Leachate Report Date: 11/10/93 15:06

RFW Batch Number: 9310L360 Client: WSRC-TASK 22 Work Order: 00345031022 Page: 1a

Sample Information	Cust ID:	IT/SF SLURRY X(12) 1	IT/SF SLURRY X(12) 1	IT/SF SLURRY X(12) 1	IT/SF SLURRY X(12) 2	IT/SF SLURRY X(12) 3	SBLK
	RFW#:	007	007 REP	007 MS	008	009	93LE1954-MB1
	Matrix:	WATER	WATER	WATER	WATER	WATER	WATER
	D.F.:	1.00	1.00	1.00	1.00	1.00	1.00
	Units:	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
Surrogate Recovery	Nitrobenzene-d5	97 %	102 %	75 %	96 %	98 %	97 %
	2-Fluorobiphenyl	102 %	111 %	79 %	114 %	100 %	109 %
	p-Terphenyl-d14	121 %	140 %	98 %	119 %	119 %	127 %
	Phenol-d5	85 %	92 %	66 %	90 %	90 %	105 * %
	2-Fluorophenol	90 %	98 %	71 %	82 %	96 %	96 %
	2,4,6-Tribromophenol	79 %	87 %	62 %	82 %	80 %	86 %
Pyridine		100 U	100 U	40 %	100 U	100 U	10 U
1,4-Dichlorobenzene		100 U	100 U	49 %	100 U	100 U	10 U
2-Methylphenol	o-cresol	100 U	100 U	45 %	100 U	100 U	10 U
3- and/or 4-Methylphenol	m + p-cresol	100 U	100 U	47 %	100 U	100 U	10 U
Hexachloroethane		100 U	100 U	54 %	100 U	100 U	10 U
Nitrobenzene		100 U	100 U	49 %	100 U	100 U	10 U
Hexachlorobutadiene		100 U	100 U	59 %	100 U	100 U	10 U
2,4,6-Trichlorophenol		100 U	100 U	43 %	100 U	100 U	10 U
2,4,5-Trichlorophenol		500 U	500 U	44 %	500 U	500 U	50 U
2,4-Dinitrotoluene		100 U	100 U	40 %	100 U	100 U	10 U
Hexachlorobenzene		100 U	100 U	73 %	100 U	100 U	10 U
Pentachlorophenol		500 U	500 U	51 %	500 U	500 U	50 U

*= Outside of EPA CLP QC limits.

Roy F. Weston, Inc. - Lionville Laboratory
Semivolatiles by GC/MS, TCLP Leachate

RFW Batch Number: 9310L360 Client: WSRC-TASK 22 Report Date: 11/10/93 15:06
Work Order: 00345031022 Page: 2a

		Cust ID:	SBLK BS		SBLK BSD		LCHBLK	
Sample Information		RFW#:	93LE1954-MB1		93LE1954-MB1		93LTO100-LB1	
		Matrix:	WATER		WATER		WATER	
		D.F.:	1.00		1.00		1.00	
		Units:	ug/L		ug/L		ug/L	
Surrogate Recovery	Nitrobenzene-d5		87	%	85	%	74	%
	2-Fluorobiphenyl		102	%	103	%	102	%
	p-Terphenyl-d14		124	%	121	%	112	%
	Phenol-d5		80	%	80	%	83	%
	2-Fluorophenol		81	%	81	%	71	%
	2,4,6-Tribromophenol		93	%	90	%	84	%
Pyridine			57	%	56	%	100	U
1,4-Dichlorobenzene			74	%	69	%	100	U
2-Methylphenol			73	%	70	%	100	U
3- and/or 4-Methylphenol			82	%	77	%	100	U
Hexachloroethane			73	%	73	%	100	U
Nitrobenzene			65	%	63	%	100	U
Hexachlorobutadiene			84	%	84	%	100	U
2,4,6-Trichlorophenol			65	%	63	%	100	U
2,4,5-Trichlorophenol			74	%	70	%	500	U
2,4-Dinitrotoluene			64	%	58	%	100	U
Hexachlorobenzene			125	%	118	%	100	U
Pentachlorophenol			83	%	39	%	500	U

*= Outside of EPA CLP QC limits.

Roy F. Weston, Inc. - Lionville Laboratory
BNA ANALYTICAL DATA PACKAGE FOR
WSRC-TASK 22

DATE RECEIVED: 10/21/93 RFW LOT # :9310L360

CLIENT ID	RFW #	MTX	PREP #	LEACH DATE	EXTR/PREP	ANALYSIS
IT/SF SLURRY X(12) 1	007	W	93LE1954	10/26/93	11/02/93	11/09/93
IT/SF SLURRY X(12) 1	007 REP	W	93LE1954	10/26/93	11/02/93	11/09/93
IT/SF SLURRY X(12) 1	007 MS	W	93LE1954	10/26/93	11/02/93	11/09/93
IT/SF SLURRY X(12) 2	008	W	93LE1954	10/26/93	11/02/93	11/08/93
IT/SF SLURRY X(12) 3	009	W	93LE1954	10/26/93	11/02/93	11/09/93
LAB QC:						
SBLK	MB1	W	93LE1954	N/A	11/02/93	11/08/93
SBLK	MB1 BS	W	93LE1954	N/A	11/02/93	11/08/93
SBLK	MB1 BSD	W	93LE1954	N/A	11/02/93	11/08/93
LCHBLK	LB1	W	93LE1954	N/A	11/02/93	11/08/93

WESTON

This report provides Toxicity Characteristics Leaching Procedure (TCLP) information. Listed below each client identification on the ITCL labchron, "TCLP" represents the non-volatile leachate fraction and "TCLP LEACHATE" represents the Zero Headspace Extraction (ZHE) volatile leachate fraction. The "EXTR/PREP DATE" is the date the leachate preparation was initiated; the "ANALYSIS DATE" is the date the leachates were completed.

Roy F. Weston, Inc. - Lionville Laboratory
INORGANIC ANALYTICAL DATA PACKAGE FOR
WSRC-TASK 22

DATE RECEIVED: 10/21/93 RFW LOT # :9310L360

CLIENT ID /ANALYSIS	RFW #	MTX	PREP #	COLLECTION	EXTR/PREP	ANALYSIS
IT/SF SLURRY X(12) 1						
TCLP	001	SE	93LTO100	10/14/93	10/25/93	10/26/93
TCLP LEACHATE	001	SE	93LTV039	10/14/93	10/25/93	10/26/93
IT/SF SLURRY X(12) 2						
TCLP	002	SE	93LTO100	10/14/93	10/25/93	10/26/93
TCLP LEACHATE	002	SE	93LTV039	10/14/93	10/25/93	10/26/93
IT/SF SLURRY X(12) 3						
TCLP	003	SE	93LTO100	10/14/93	10/25/93	10/26/93
TCLP LEACHATE	003	SE	93LTV039	10/14/93	10/25/93	10/26/93

WESTON Analytics Use Only: 9310L360

Diane QA Data - 15 11 04 Metals Metal Phys. Test

Custody Transfer Record/Lab Work Request

WESTON

Page 1 of 1

Client: WSRC - TASK 22
Est. Final Proj. Sampling Date:
Work Order #: 00345-031-022-9999-00
Project Contact/Phone #:
AD Project Manager: Diane C. Thomas
QC: 3WORK Del: STD TAT: 30DAY
Date Rec'd: 10-21-93 Date Due: 11/20/93
Account #: WSRC22STD

Refrigerator #:

	Liquid	Solid
#/Type Container	Cubitainer	
Volume	1L	
Preservatives		

ANALYSES REQUESTED

ORGANIC: VOA; BNA; Pest/PCB; Herb

TCLV; TCLP; TOTAL metals

INORG: Metal; CN

Corp PLGN IGNS PCHT

pH TCLP ICP

MATRIX CODES: S - Soil; SE - Sediment; SO - Solid; SL - Sludge; W - Water; O - Oil; A - Air; DS - Drum Solids; DL - Drum Liquids; L - EP/TCLP Leachate; WI - Wipe; X - Other; F - Fish

Lab ID	Client ID/Description	Matrix QC Chosen (✓) MS	MSD	Matrix	Date Collected	Time Collected	WESTON Analytics Use Only: 0604T	0605T	0608T	0418ST	TCLV	TCLP	See below	RCRA U-, Ni	TMSC	RCRA IGNS PCHT	TPH TCLP ICP TMSC1
001	IT/SF Slurry X(12) 1	RAD		SE	10/14/93						X	X	X		X	X	X
002	IT/SF Slurry X(12) 2	RAD		SE	10/14/93						X	X	X		X	X	X
003	IT/SF Slurry X(12) 3	RAD		SE	10/14/93						X	X	X		X	X	X
004	IT/SF Slurry X(12) 1 TCLV of 001			L	10/21/93		X										
005	IT/SF Slurry X(12) 2 TCLV of 002			L			X										
006	IT/SF Slurry X(12) 3 TCLV of 003			L			X										
007	IT/SF Slurry X(12) 1 TCLP of 001			L	10/26/93			X	X	X				X			
008	IT/SF Slurry X(12) 2 TCLP of 002			L				X	X	X				X			
009	IT/SF Slurry X(12) 3 TCLP of 003			L				X	X	X				X			

FIELD PERSONNEL: COMPLETE ONLY SHADED AREAS

Special Instructions:
Leachate Metals = RCRA + U-, Ni
metals / Total = Al, B-, Ca, Cr, Cu, Fe, Hg, Mg, Mn, Ni, Si, Na, U-, Zn.
Mg only 11/2/93
Temp = 14.9°C
Target Date: 16
Orig. Rev. Hen

DATE/REVISIONS:
10/27/93 1. Record Leachate data of 004 To 006
10/29/93 2. Record Leachate data of 007 To 009
11/2/93 3. Change Hg to Mg & ICORP to ICORE per SME 11/2/93
4.
5.
6.

Relinquished by	Received by	Date	Time
Fed Ex	B Shaffer	10/21/93	0945
	BRS	10/21/93	

Relinquished by	Received by	Date	Time
	BRS	10/21/93	

WESTON Analytics Use Only

Samples were: 1) Shipped X or Hand Delivered ___ Airbill # ___
2) Ambient or Chilled
3) Received in Good Condition (Y) or N
4) Labels Indicate Properly Preserved (Y) or N
5) Received Within Holding Times (Y) or N

COC Tape was: 1) Present on Outer Package Y or (N)
2) Unbroken on Outer Package Y or (N)
3) Present on Sample (Y) or N
4) Unbroken on Sample (Y) or N
COC Record Present Upon Sample Rec't (Y) or N

Discrepancies Between Samples Labels and COC Record? (Y) or N
NOTES: No ID's on Bottles

RFW 21-21-00

5a

WESTON

ROY F. WESTON, INC.
LIONVILLE ANALYTICAL LABORATORY
ANALYTICAL CASE NARRATIVE

DEC 06 1993

R. P. KEMMERLIN

Client: WSRC-TASK 22
RFW #: 9310L360

W.O. #: 00345-031-022-9999-00
Date Received: 10-21-93

HERBICIDE

1. The set of samples consisted of three (3) leachate samples generated on 10-26-93 from sediment samples collected on 10-14-93.

2. The samples were analyzed based on SW-846, 3rd Edition, procedures. The extraction procedure used was based on Method 3500.1 and the extracts were analyzed based on Method 8150.

3. All required holding times for extraction and analysis were met.

4. The method blank was below the reporting limits for all target compounds.

5. All surrogate recoveries were within acceptance criteria.

6. All blank spike recoveries were within acceptance criteria.

7. All matrix spike recoveries were within acceptance criteria.

8. All initial and continuing standard calibrations associated with this data set were within acceptance criteria on both the primary and confirmation columns.

Sharon Ott Brownthwood

J. Peter Hershey, Ph.D.
Laboratory Manager
Lionville Analytical Laboratory

11.18.93
Date

sma/her/10-360ch.cn

GLOSSARY OF HERBICIDE DATA

DATA QUALIFIERS

U = Indicates that the compound was analyzed for but not detected. The minimum detection limit for the sample (not the method detection limit) is reported with the U (e.g., 10U).

J = Indicates an estimated value. This flag is used in cases where a target analyte is detected at a level less than the lower quantification level. If the limit of quantification is 10 ug/L and a concentration of 3 ug/L is calculated, it is reported as 3J.

B = This flag is used when the analyte is found in the associated blank as well as in the sample. It indicates possible/probable blank contamination. This flag is also used for a TIC as well as for a positively identified TCL compound.

E = Indicates that the compound was detected beyond the calibration range and was subsequently analyzed at a dilution.

I = Interference.

ABBREVIATIONS

BS = Indicates blank spike in which reagent grade water is spiked with the CLP matrix spiking solutions and carried through all the steps in the method. Spike recoveries are reported.

BSD = Indicates blank spike duplicate.

MS = Indicates matrix spike.

MSD = Indicates matrix spike duplicate.

DL = Indicates that recoveries were not obtained because the extract had to be diluted for analysis.

NA = Not Applicable.

DF = Dilution Factor.

NR = Not Required.

SP = Indicates spiked compound.

RFW Batch Number: 9310L360 Client: WSRC-TASK 22 Work Order: 00345031022 Page: 1

	Cust ID:	IT/SF SLURRY X(12) 1		IT/SF SLURRY X(12) 1		IT/SF SLURRY X(12) 2		IT/SF SLURRY X(12) 3		PBLK		PBLK BS	
Sample Information	RFW#:	007		007 MS		008		009		93LE1931-MB1		93LE1931-MB1	
	Matrix:	WATER		WATER		WATER		WATER		WATER		WATER	
	D.F.:	1.00		1.00		1.00		1.00		1.00		1.00	
	Units:	ug/L		ug/L		ug/L		ug/L		ug/L		ug/L	
Surrogate:	DCAA	96	%	81	%	100	%	95	%	105	%	92	%
2,4-D		10	U	103	%	10	U	10	U	10	U	92	%
2,4,5-TP (Silvex)		5.0	U	79	%	5.0	U	5.0	U	5.0	U	88	%
2,4,5-T		5.0	U	84	%	5.0	U	5.0	U	5.0	U	89	%

	Cust ID:	LCHBLK	
Sample Information	RFW#:	93LTO100-LB1	
	Matrix:	WATER	
	D.F.:	1.00	
	Units:	ug/L	
Surrogate:	DCAA	93	%
2,4-D		10	U
2,4,5-TP (Silvex)		5.0	U
2,4,5-T		5.0	U

U= Analyzed, not detected. J= Present below detection limit. B= Present in blank. NR= Not requested. NS= Not spiked.
%= Percent recovery. D= Diluted out. I= Interference. NA= Not Applicable. *= Outside of EPA CLP QC

DR 11-15-93

Roy F. Weston, Inc. - Lionville Laboratory
HBGT ANALYTICAL DATA PACKAGE FOR
WSRC-TASK 22

DATE RECEIVED: 10/21/93 RFW LOT # :9310L360

CLIENT ID	RFW #	MTX	PREP #	LEACH DATE	EXTR/PREP	ANALYSIS
IT/SF SLURRY X(12) 1	007	W	93LE1931	10/26/93	10/29/93	11/05/93
IT/SF SLURRY X(12) 1	007 MS	W	93LE1931	10/26/93	10/29/93	11/05/93
IT/SF SLURRY X(12) 2	008	W	93LE1931	10/26/93	10/29/93	11/05/93
IT/SF SLURRY X(12) 3	009	W	93LE1931	10/26/93	10/29/93	11/05/93
LAB QC:						
PBLK	MB1	W	93LE1931	N/A	10/29/93	11/05/93
PBLK	MB1 BS	W	93LE1931	N/A	10/29/93	11/05/93
LCHBLK	LB1	W	93LE1931	N/A	10/29/93	11/05/93

DR 11-15-93

WESTON

This report provides Toxicity Characteristics Leaching Procedure (TCLP) information. Listed below each client identification on the ITCL labchron, "TCLP" represents the non-volatile leachate fraction and "TCLP LEACHATE" represents the Zero Headspace Extraction (ZHE) volatile leachate fraction. The "EXTR/PREP DATE" is the date the leachate preparation was initiated; the "ANALYSIS DATE" is the date the leachates were completed.

Roy F. Weston, Inc. - Lionville Laboratory
INORGANIC ANALYTICAL DATA PACKAGE FOR
WSRC-TASK 22

DATE RECEIVED: 10/21/93

RFW LOT # :9310L360

CLIENT ID /ANALYSIS	RFW #	MTX	PREP #	COLLECTION	EXTR/PREP	ANALYSIS
IT/SF SLURRY X(12) 1						
TCLP	001	SE	93LTO100	10/14/93	10/25/93	10/26/93
TCLP LEACHATE	001	SE	93LTV039	10/14/93	10/25/93	10/26/93
IT/SF SLURRY X(12) 2						
TCLP	002	SE	93LTO100	10/14/93	10/25/93	10/26/93
TCLP LEACHATE	002	SE	93LTV039	10/14/93	10/25/93	10/26/93
IT/SF SLURRY X(12) 3						
TCLP	003	SE	93LTO100	10/14/93	10/25/93	10/26/93
TCLP LEACHATE	003	SE	93LTV039	10/14/93	10/25/93	10/26/93

WESTON Analytics Use Only

C9310L360

Custody Transfer Record/Lab Work Request

WESTON

Page 1 of 1

Client: WSRC - TASK 22

Est. Final Proj. Sampling Date:

Work Order #: 00845-031-022-9999-00

Project Contact/Phone #:

AD Project Manager: Diane C. Thomas

QC: SW846 Del: STD TAT: 30 DAY

Date Rec'd: 10-21-93 Date Due: 11/20/93

Account #: WSRC22STD

Refrigerator #:

#/Type Container: Liquid / Solid

Volume: Liquid / Solid

Preservatives:

ANALYSES REQUESTED →

ORGANIC: VOA | BNA | Pest/PCB | Herb

TCLV | TCLP | TOTAL metals

INORG: Metal | CN

Corp Plan 203 Part 264 | IH 40 SLD Insc 1

MATRIX CODES:
S - Soil
SE - Sediment
SO - Solid
SL - Sludge
W - Water
O - Oil
A - Air
DS - Drum Solids
DL - Drum Liquids
L - EP/TCLP Leachate
WI - Wipe
X - Other
F - Fish

Lab ID	Client ID/Description	Matrix QC Chosen (✓) MS	MSD	Matrix	Date Collected	Time Collected	WESTON Analytics Use Only: 0604T	0605T	0608T	0708T	TCLV	TCLP	SEP below	RCRA TCLP Ni, Mn	TMSC	RCRA IDLSH IDNON IDPHT HSOL	IH 40 SLD Insc 1
001	IT/SF Slurry X(12) 1	RAD		SE	10/14/93						X	X	X		X	X	X
002	IT/SF Slurry X(12) 2	RAD		SE	10/14/93						X	X	X		X	X	X
003	IT/SF Slurry X(12) 3	RAD		SE	10/14/93						X	X	X		X	X	X
004	IT/SF Slurry X(12) 1 TCLV of 001			L	10/26/93		X										
005	IT/SF Slurry X(12) 2 TCLV of 002			L	"		X										
006	IT/SF Slurry X(12) 3 TCLV of 003			L	"		X										
007	IT/SF Slurry X(12) 1 TCLP of 001			L	10/26/93			X	X	X				X			
008	IT/SF Slurry X(12) 2 TCLP of 002			L	"			X	X	X				X			
009	IT/SF Slurry X(12) 3 TCLP of 003			L	"			X	X	X				X			

FIELD PERSONNEL: COMPLETE ONLY SHADED AREAS

Special Instructions:
Leachate metals = RCRA + U-, Ni
metals / Total = Al, B-, Ca, Cr, Cu, Fe, Mg, Mn, Ni, Si, Na, U-, Zn.
Mg only 10/28/93
Temp = 14.9°C
Target Date: 16
Orig Rewritten

DATE/REVISIONS:
10/27/93 1. Record Leachate data of 004 To 006
10/28/93 2. Record Leachate data of 007 To 009
11/8/93 3. Change Hg to Mg & ICorCP
4. ICorCP per SE 12/1/93
5.
6.

Relinquished by	Received by	Date	Time
FedEx	B Shaffer	10/21/93	0945
	BPS	10/21/93	

Relinquished by	Received by	Date	Time
	BPS	10/21/93	

WESTON Analytics Use Only

Samples were:
1) Shipped X or Hand Delivered ___ Airbill # ___
2) Ambient or (Chilled)
3) Received in Good Condition (Y) or N
4) Labels Indicate Properly Preserved (Y) or N
5) Received Within Holding Times (Y) or N

COC Tape was:
1) Present on Outer Package Y or (N)
2) Unbroken on Outer Package Y or (N)
3) Present on Sample (Y) or N
4) Unbroken on Sample (Y) or N

COC Record Present Upon Sample Rec't (Y) or N

Discrepancies Between Samples Labels and COC Record? (Y) or N

NOTES: No ID's on Bottles

RFW 21-21-001/A-7/91

___ L372 ___ L373 ___ L375 ___ L377 ___ L378 Ref# ___ Cooler# ___

381-596a

WESTON

ROY F. WESTON, INC.
LIONVILLE ANALYTICAL LABORATORY
ANALYTICAL CASE NARRATIVE

DEC 06 1993

R. P. KEMMERL

Client: WSRC-TASK 22
RFW #: 9310L360

W.O. #: 00345-031-022-9999-00
Date Received: 10-21-93

PESTICIDE

1. The set of samples consisted of three (3) leachate samples generated on 10-26-93 from three (3) sediment samples collected on 10-14-93.

2. The samples were analyzed based on SW-846, 3rd Edition, procedures. The extraction procedure used was based on Method 3520 and the extracts were analyzed based on Method 8080.

3. These samples received a sulfur cleanup.

4. All required holding times for extraction and analysis were met.

5. The method blank was below the reporting limits for all target compounds.

6. All blank spike recoveries were within acceptance criteria.

7. All matrix spike recoveries were within acceptance criteria.

8. All surrogate recoveries were within acceptance criteria.

9. All initial and continuing standard calibrations associated with this data set were within acceptance criteria.

Sonia Ott Brownthorn

J. Peter Hershey, Ph.D.
Laboratory Manager
Lionville Analytical Laboratory

11. 18. 93
Date

sma/pcb/10-360p.cn

WESTON.

GLOSSARY OF PESTICIDE/PCB DATA

DATA QUALIFIERS

U = Indicates that the compound was analyzed for but not detected. The minimum detection limit for the sample (not the method detection limit) is reported with the U (e.g., 10U).

J = Indicates an estimated value. This flag is used in cases where a target analyte is detected at a level less than the lower quantification level. If the limit of quantification is 10 ug/L and a concentration of 3 ug/L is calculated, it is reported as 3J.

B = This flag is used when the analyte is found in the associated blank as well as in the sample. It indicates possible/probable blank contamination. This flag is also used for a TIC as well as for a positively identified TCL compound.

E = Indicates that the compound was detected beyond the calibration range and was subsequently analyzed at a dilution.

I = Interference.

ABBREVIATIONS

BS = Indicates blank spike in which reagent grade water is spiked with the CLP matrix spiking solutions and carried through all the steps in the method. Spike recoveries are reported.

BSD = Indicates blank spike duplicate.

MS = Indicates matrix spike.

MSD = Indicates matrix spike duplicate.

DL = Indicates that recoveries were not obtained because the extract had to be diluted for analysis.

NA = Not Applicable.

DF = Dilution Factor.

NR = Not Required.

SP = Indicates spiked compound.

Roy F. Weston, Inc. - Lionville Laboratory

Pesticide by GC, TCLP Leachate

Report Date: 11/12/93 14:05

RFW Batch Number: **9310L360** Client: **WSRC-TASK 22** Work Order: 00345031022 Page: 1

Sample Information	Cust ID:	IT/SF SLURRY X(12) 1		IT/SF SLURRY X(12) 1		IT/SF SLURRY X(12) 2		IT/SF SLURRY X(12) 3		PBLK		PBLK BS	
	RFW#:	007		007 MS		008		009		93LE1948-MB1		93LE1948-MB1	
	Matrix:	WATER		WATER		WATER		WATER		WATER		WATER	
	D.F.:	1.00		1.00		1.00		1.00		1.00		1.00	
	Units:	ug/L		ug/L		ug/L		ug/L		ug/L		ug/L	
Surrogate: Decachlorobiphenyl		86	%	71	%	92	%	98	%	58	%	48	%
Tetrachloro-m-xylene		72	%	72	%	78	%	72	%	85	%	98	%
Heptachlor		0.11	U	95	%	0.10	U	0.11	U	0.10	U	105	%
alpha-Chlordane		1.1	U	85	%	1.0	U	1.1	U	1.0	U	100	%
gamma-Chlordane		1.1	U	95	%	1.0	U	1.1	U	1.0	U	110	%
gamma-BHC (Lindane)		0.11	U	70	%	0.10	U	0.11	U	0.10	U	100	%
Endrin		0.23	U	110	%	0.21	U	0.22	U	0.20	U	110	%
Methoxychlor		1.1	U	106	%	1.0	U	1.1	U	1.0	U	124	%
Toxaphene		2.3	U	2.0	U	2.1	U	2.2	U	2.0	U	2.0	U
Heptachlor Epoxide		0.11	U	110	%	0.10	U	0.11	U	0.10	U	120	%

Sample Information	Cust ID:	LCHBLK
	RFW#:	93LTO100-LB1
	Matrix:	WATER
	D.F.:	1.00
	Units:	ug/L
Surrogate: Decachlorobiphenyl		72 %
Tetrachloro-m-xylene		78 %
Heptachlor		0.10 U
alpha-Chlordane		1.0 U
gamma-Chlordane		1.0 U
gamma-BHC (Lindane)		0.10 U
Endrin		0.20 U
Methoxychlor		1.0 U
Toxaphene		2.0 U
Heptachlor Epoxide		0.10 U

U= Analyzed, not detected. J= Present below detection limit. B= Present in blank. NR= Not requested. NS= Not spiked.
%= Percent recovery. D= Diluted out. I= Interference. NA= Not Applicable. *= Outside of EPA CLP QC

This report provides Toxicity Characteristics Leaching Procedure (TCLP) information. Listed below each client identification on the ITCL labchron, "TCLP" represents the non-volatile leachate fraction and "TCLP LEACHATE" represents the Zero Headspace Extraction (ZHE) volatile leachate fraction. The "EXTR/PREP DATE" is the date the leachate preparation was initiated; the "ANALYSIS DATE" is the date the leachates were completed.

Roy F. Weston, Inc. - Lionville Laboratory
: PEST/PCB ANALYTICAL DATA PACKAGE FOR
WSRC-TASK 22

DATE RECEIVED: 10/21/93 RFW LOT # :9310L360

CLIENT ID	RFW #	MTX	PREP #	LEACH DATE	EXTR/PREP	ANALYSIS
IT/SF SLURRY X(12) 1	007	W	93LE1948	10/26/93	11/02/93	11/07/93
IT/SF SLURRY X(12) 1	007 MS	W	93LE1948	10/26/93	11/02/93	11/07/93
IT/SF SLURRY X(12) 2	008	W	93LE1948	10/26/93	11/02/93	11/07/93
IT/SF SLURRY X(12) 3	009	W	93LE1948	10/26/93	11/02/93	11/07/93
LAB QC:						
PBLK	MB1	W	93LE1948	N/A	11/02/93	11/07/93
PBLK	MB1 BS	W	93LE1948	N/A	11/02/93	11/07/93
LCHBLK	LB1	W	93LE1948	N/A	11/02/93	11/07/93

9408 11/13/93

DATE RECEIVED: 10/21/93 RFW LOT # :9310L360

CLIENT ID /ANALYSIS	RFW #	MTX	PREP #	COLLECTION	EXTR/PREP	ANALYSIS
IT/SF SLURRY X(12) 1						
TCLP	001	SE	93LTO100	10/14/93	10/25/93	10/26/93
TCLP LEACHATE	001	SE	93LTV039	10/14/93	10/25/93	10/26/93
IT/SF SLURRY X(12) 2						
TCLP	002	SE	93LTO100	10/14/93	10/25/93	10/26/93
TCLP LEACHATE	002	SE	93LTV039	10/14/93	10/25/93	10/26/93
IT/SF SLURRY X(12) 3						
TCLP	003	SE	93LTO100	10/14/93	10/25/93	10/26/93
TCLP LEACHATE	003	SE	93LTV039	10/14/93	10/25/93	10/26/93

WESTON Analytics Use Only
9310L360

Diane QA Data - Yellow metals to Metal Test Phys.

Custody Transfer Record/Lab Work Request

WESTON

Page 1 of 1

Client: WSRC - TASK 22
Est. Final Proj. Sampling Date:
Work Order #: 00345-031-022-9999-00
Project Contact/Phone #:
AD Project Manager: Diane C. Thomas
QC: SWOrk Del: STD TAT: 30 DAY
Date Rec'd: 10-21-93 Date Due: 11/20/93
Account #: WSRC22STD

Refrigerator #

#/Type Container	Liquid	Leachate			4	4	4		4								
	Solid																
Volume	Liquid				1/6L	1/6L	1/6L	Leachate	1/6L								
	Solid				125ml	250ml	8oz		250ml								
Preservatives																	

ANALYSES REQUESTED →

ORGANIC							INORG										
VOA	BNA	Pest/PCB	Herb	TCLV	TCLP	TOTAL metals	Metal	CN	Corr FLSH 1203 PCNT SOL	pH 1:5 SLD mod 1							

WESTON Analytics Use Only

Lab ID	Client ID/Description	Matrix QC Chosen (✓) MS	MSD	Matrix	Date Collected	Time Collected	0634T	0685T	0608T	0418T	ITLV	ITLP	See below	RCRAT(U+Ni)	ICMSC	Corr FLSH 1203 PCNT SOL	pH 1:5 SLD mod 1
001	IT/SF Slurry X(12) 1	RAD		SE	10/14/93						X	X	X		X	X	X
002	IT/SF Slurry X(12) 2	RAD		SE	10/14/93						X	X	X		X	X	X
003	IT/SF Slurry X(12) 3	RAD		SE	10/14/93						X	X	X		X	X	X
004	IT/SF Slurry X(12) 1 TCLV of 001			L	10/21/93		X										
005	IT/SF Slurry X(12) 2 TCLV of 002			L	"		X										
006	IT/SF Slurry X(12) 3 TCLV of 003			L	"		X										
007	IT/SF Slurry X(12) 1 TCLP of 001			L	10/26/93			X	X	X				X			
008	IT/SF Slurry X(12) 2 TCLP of 002			L	"			X	X	X				X			
009	IT/SF Slurry X(12) 3 TCLP of 003			L	"			X	X	X				X			

FIELD PERSONNEL: COMPLETE ONLY SHADED AREAS

Special Instructions:
Leachate Metals = RCRA + U-, Ni
metals / Total = Al, B-, Ca, Cr, Cu, Fe, Mg, Mn, Ni, Si, Na, U-, Zn.
Mg moved 10/27/93
Temp = 14.9°C
Target Date: 10
Orig Rewritten

DATE/REVISIONS:
10/27/93 1. Record Leachate data of 004 To 006
10/28/93 2. Record Leachate data of 007 To 009
11/2/93 3. Change Hg to Mg & ICorCP
4. ICorCP per SW-846M 1280,
5.
6.

Relinquished by	Received by	Date	Time
Fed Ex	B Hoffer	10/21/93	0945
	BRS	10/21/93	

Relinquished by	Received by	Date	Time
	BRS	10/21/93	

WESTON Analytics Use Only

Samples were:
1) Shipped X or Hand Delivered ___
Airbill # ___
2) Ambient or (Chilled)
3) Received in Good Condition (Y) or N
4) Labels Indicate Properly Preserved (Y) or N
5) Received Within Holding Times (Y) or N

COC Tape was:
1) Present on Outer Package Y or (N)
2) Unbroken on Outer Package Y or (N)
3) Present on Sample (Y) or N
4) Unbroken on Sample (Y) or N
COC Record Present Upon Sample Rec't (Y) or N

Discrepancies Between Samples Labels and COC Record? (Y) or N
NOTES: No TD's on Rollon

RFW 21-21 001/A 7/91

APPENDIX D

WATTS PLATING BATH INFORMATION

Pickett to Lawrence, "Regulatory Status of Stored Watts Plating Bath Solution", WSRC, 11/2/1990.

Blank Page

SAVANNAH RIVER SITE
REACTOR MATERIALS
TOTAL QUALITY

WESTINGHOUSE SAVANNAH RIVER COMPANY
INTER-OFFICE MEMORANDUM

November 2, 1990

TO: B. M. LAWRENCE, 742-A*
ENVIRONMENTAL PROTECTION DEPARTMENT

FROM: J. B. PICKETT, 730-M(5-3838)
REACTOR MATERIALS ENGINEERING & TECHNOLOGY DEPT.

REGULATORY STATUS OF STORED WATTS PLATING BATH SOLUTION

A meeting was held on 10/31/90 with the DOE, RMET, RMP, EPD, and NUS representatives to discuss the regulatory status of the stored Watts plating bath solution. The solution (twenty four 55 gal. drums) has been stored since mid-1988 for use in the 313-M plating line. The plating solution was removed from the plating line tanks in order to conduct maintenance on the plating line.

The DOE/WSRC is under a consent order agreement to define and report all RCRA storage violations by November 30, 1990. The DOE was concerned that the storage of this solution might be considered by SCDHEC to be in violation of the speculative accumulation regulation, as defined in the SC Hazardous Regulations, R.61-79.261.2(e)(2)(iii). Therefore, the DOE recommended that SCDHEC be contacted to confirm that the plating solution may continue to be stored for return to the plating bath. If SCDHEC indicates that they would consider the stored plating solution a violation of the speculative accumulation regulation, then DOE/WSRC would add the material to the survey required by the consent order prior to November 30, 1990 deadline.

RMET concured with the DOE recommendation that SCDHEC be contacted to reconfirm the status of this material, unless the DOE can determine from conference call logs that confirmation had previously occurred.

Programmatic Impacts

If and when Building 313-M is formally "shut down" the stored solution will automatically become a waste material. It will have to be classified as a "California List" waste due to its chemical composition. Since the plating solution contains ~30 ppm depleted uranium, it is not conducive to recycling or reclamation. A program is currently in progress to define if the plating solution could simply be added to the contents of the IS/TF tank No. 7. However, RMET is concerned that the addition of the

extra nickel to Tank No 7 might impact the eventual stabilization process, such that the leaching standard for nickel could not be met.

As a separate program, a number of plating line solution recovery vendors will be contacted to determine if they could treat a uranium contaminated material, and at what uranium concentration levels. It may be possible to utilize the 313-M dummy plating bath to selectively remove the uranium such that the nickel solution could be reclaimed.

The RCRA permit for either the M-Area IT/SF or the SRS permitted storage facilities will have to modified to allow the storage of this material (a liquid, low pH, "California List", and D008 characteristic waste) until it can be treated or reclaimed. The FFCA would also have to be modified to change the status of this material from a potential Land Ban restricted waste to a current restricted waste.

If it is determined that the stored solution should immediately be declared a "hazardous waste", then these programs will have to have a much higher priority and emphasis.

Information with regard to the chemical composition and the EP toxicity test results on the Watts plating solution are given in the attachments.

Attachments:

- S. L. Strommen to L. Quarles, "Plating Solution Stored on 313-M South Side Pad", 7/11/89
- S. L. Strommen to H. L. Martin, "Uranium Results from SRL", 9/8/89.
- General Engineering Laboratories, "Certificate of Analysis", 10/13/89
- Electroplating Handbook, "Nickel Baths", page 250.

JBP

cc: W. A. Richardson, DOE, 730-M
L. Quarles, 322-M
J. V. Cioffi, 730-M
A. E. Hadden, WSRC, 730-M
N. E. Barnett, 730-M
C. W. Mettlen, 704-M
J. W. Runnels, 704-M
L. Smith, 313-M
S. O. Stallings, 313-M
C. P. Thompson,730-M
W. J. Maloney, 703-A
H. L. Martin, 730-M
S. L. Rykaczewski, 730-M
C. R. Johnson, 730-M
F. R. Weitz, 730-M
J. C. Musall, 730-M
J. C. Medlin, 730-M *(RMET Environmental Files, 7.3.1 313-M Restart)

* With Attachments Separate copy 6.8 (California List)

Key words
California List
settlement Agreement
313-M
staging Area

Don't Say It. Mac-Write It.

July 11, 1989

TO: L. Quarles, 703-A

FROM: S. L. Strommen, 730-M

PLATING SOLUTION STORED ON 313-M SOUTH-SIDE PAD

The plating solution on the 313-M south-side pad is stored in twenty-four drums. The drums are store's catalog item Caption 4, Item 31505.00 LSY and are described as a 55-gallon, zinc galvanized drum with liner.

The approximate plating solution composition is:

pH	1.3 - 2.1
Nickel Sulfate	30-40 oz/gal
Nickel Chloride	4-4.5 oz/gal
Boric Acid	4-6 oz/gal

Sampling for EP Toxicity testing was completed July 11, 1989. It will be several months before results are available.

Attached is a copy of the letter you requested.

cc: W. Maloney, 703-A
A. E. Hadden, 730-M
R. A. Lee, 730-M
C. P. Thompson, 730-M
L. Smith, 313-M

September 8, 1989

TO: H. L. Martin, 730-M

FROM: S. L. Strommen

URANIUM LAB RESULTS FROM SRL

The lab results from SRL are summarized below.

SAMPLE (Sample ID)	Alpha	Beta/Gamma	Uranium
Methylene Chloride (200032240)	<50	<50	<1 ppb
Plating Line Solution (200032241)	<50	<50	32 ppm
Plating Line Solution (2000322624)	<50	<50	28 ppm
Tank 7 sludge (200032242)	<50	<50	250 ppm
Tank 7 Sludge-2 (200032625)	<50	<50	140 ppm
Tank 7 Sludge-3 (200032626)	<50	<50	230 ppm
Tank 7 Sludge -4 (200032627)	<50	<50	2300 ppm
Slurry Line Sample (200032243)	<50	<50	1.8 ppm
Slurry Line Sample-2 (2000322628)	<50	<50	140 ppm

cc: F. Weitz, 730-M
C. R. Johnson, 730-M

GENERAL ENGINEERING LABORATORIES
Environmental Engineering and Analytical Services

M. J. Greene
President

George C. Greene, P.E., Ph.D.
Vice President
SC Registration No 9103

Laboratory Certifications

VA
NACIP

CERTIFICATE OF ANALYSIS

Client: SAVANNAH RIVER LAB
BLDG. 773-A
AIKEN , SC 29808

Date: 10/13/89

Contact: B. M. DEWEESE

Released by: [signature]
QA/QC Officer

cc/fc: SRED/EPTM4 Project Manager: Edie M. Kent

Page No.: 1

Parameter				
	Sample ID :	200032241	200032624	
		[illegible]	[illegible]	
	Lab ID :	89100185	89100186	
	Sample Type :	10	10	
	Date Received:	10/04/89	10/04/89	
	Collected by :	SRED	SRED	
ARSENIC		<1.00 ppm	<1.00 ppm	5.0
BARIUM		<1.00 ppm	<1.00 ppm	100.0
CADMIUM		<0.50 ppm	<0.50 ppm	1.0
CHROMIUM		<1.00 ppm	<1.00 ppm	5.0
LEAD		18.1 ppm	19.0 ppm	5.0
MERCURY		<0.20 ppm	<0.20 ppm	0.2
SELENIUM		<0.50 ppm	<0.50 ppm	1.0
SILVER		<1.00 ppm	<1.00 ppm	5.0
EP TOX EXTRACTION-LIQUID		YES	YES	
MERCURY DIGESTION (EP TOX)		YES	YES	

plating line solution

EP TOX mg/L

P. O. Box 30712 • Charleston, SC 29417
Phone (803) 556-8171 • FAX (803) 766-1178

TABLE 19. NICKEL BATHS

Composition	1 Watts Type g/L	1 Watts Type oz/gal	2 High Chloride g/L	2 High Chloride oz/gal	3 All Chloride g/L	3 All Chloride oz/gal	4 Fluoborate[c] g/L	4 Fluoborate[c] oz/gal
Nickel sulfate, $NiSO_4 \cdot 6H_2O$	300	40	240	32				
Nickel chloride, $NiCl_2 \cdot 6H_2O$	45	6	90	12	240	32		
Nickel fluoborate, $Ni(BF_4)_2$							220	29.3
Boric acid	30-37.5	4-5	30-37.5	4-5	30	4	30	4
By analysis:								
Nickel	77.0	10.3	75	10	75	10	55	7.3
pH range (electrometric)								
Low	2.0-2.5		2.0-2.5		0.9-1.1			
Medium	3.5-4.0						3.0-4.5	
High	4.8-5.2							
Non-pitter: I or II								
I. Approved wetting agent[a] to give dynes/cm at 21 C (70 F)	35-45		34-45		35-45		35-45	
II. Hydrogen peroxide[b] to give free oxygen, ppm	5-10		5-10		5-10		5-10	
For engineering applications as required								
Conditions:								
Temperature, C (F) av.	55	(130)	55	(130)	55	(130)	5	(130)
(practical range)	32-71	(90-160)	38-71	(100-160)	38-63	(100-145)	32-71	(90-160)
Current density, A/dm^2 (asf)	1-6	(10-60)	1-6	(10-60)	5-10	(50-100)	5-10	(50-100)
(possible range)					<50	(500)	<50	(500)
Agitation: Cathode and (mild) solution preferred. Air effective in absence of wetting agents.								
Cathode efficiency, %	95-100		95-100		90-100		95-100	
Ratio anode to cathode area (for high current density)	1:1		1:1		1:1-(3:1)		1:1-(3:1)	
Anodes: Nickel, bagged, cast or rolled, depolarized or carbon type.								
Filtration: Continuous, turn over once every 1 to 4 hr. Filter aid and activated carbon commonly used.								
Volts:	6-12		6-12		6-12		6-12	
Suitable materials of construction:	3, 4, 5, 8, 13, 14		3, 4, 8, 13, 14, 15		8, 9, 12, 13, 14, 15		3, 8, 12, 13, 14	
Use: Baths 1 and 2 (dull nickel, 0.1-2.0 mil and higher. For semi- and full-bright nickel, 0.1-2.0 mil, using proprietary addition agents[d]). Bath 3 (hard dull nickel, any thickness). Bath 4 (dull nickel, any thickness).								
Applications: For decorative and protective coating, copper and/or nickel-chromium, on most basis metals use baths 1 or 2. For corrosion resistant coating on steel for chemical equipment use baths 1 or 2. For building up worn parts or electroforming use baths 1 or 4. For a nickel strike, especially over steel, copper and copper alloys prior to silver plating, use baths 1 or 3 (less concentrated frequently).								
References	1, 2, 50, 55, 56, 57		1, 2, 50, 57		1, 2, 50, 51		8, 52, 53, 54, 56	

[a]Sodium lauryl alcohol sulfate, one of few acceptable.
[b]Cannot be used in bath containing organic addition agents or wetting agent.
[c]Sold as liquid concentrate to be diluted with water as required. Specific gravity 1.58, 13.2 lb/gal, nickel, 23.6 oz/gal, boric acid 6.3 oz/gal, fluoboric acid nil (Refs. 8 and 9).
[d]See suppliers for patented proprietary processes.

ELECTROPLATING ENGINEERING Handbook

Fourth Edition

EDITED BY

Lawrence J. Durney

VAN NOSTRAND REINHOLD COMPANY
New York

APPENDIX E

PLATING LINE SUMP SOLUTION ANALYSIS

General Engineering Laboratory Analysis, 9/14/88

CERTIFICATE OF ANALYSIS

NACIP

Client: SAVANNAH RIVER LAB
BLDG. 773-A
AIKEN
Contact: B. M. DEWEESE , SC 29808

Date: 09/14/88

cc/fc: SRED/EPTM6

Released by: ALLAN M. CRANE

Page No.: 1

Parameter	Sample ID	#200015933	#200015933 DUPLICATE	#200015934	#200015934 DUPLICATE
	Lab ID	88090191	88090192	88090194	88090195
	Sample Type	16	16	16	16
	Date Received:	09/07/88	09/07/88	09/07/88	09/07/88
	Collected by :	SRED	SRED	SRED	SRED
ARSENIC		<1.00 ppm	<1.00 ppm	<1.00 ppm	<1.00 ppm
BARIUM		<1.00 ppm	<1.00 ppm	<1.00 ppm	<1.00 ppm
CADMIUM		<0.50 ppm	<0.50 ppm	<0.50 ppm	<0.50 ppm
CHROMIUM		6.29 ppm	7.14 ppm	7.54 ppm	7.80 ppm
LEAD		3.83 ppm	4.51 ppm	4.50 ppm	4.96 ppm
MERCURY		<0.20 ppm	<0.20 ppm	<0.20 ppm	<0.20 ppm
SELENIUM		<0.50 ppm	<0.50 ppm	<0.50 ppm	<0.50 ppm
SILVER		<1.00 ppm	<1.00 ppm	<1.00 ppm	<1.00 ppm
EP TOX EXTRACTION-LIQUID		YES	YES	YES	YES
DIGESTION FOR MERCURY ANALYSIS		YES	YES	YES	YES

Note "200015933 = "Drum 56"

"200015934 = "Drum 57"

Max 5.0

Serum

GENERAL ENGINEERING LABORATORIES

2040 Savage Road • Charleston, SC 29414 / P. O. Box 30712 • Charleston, SC 29417
Phone (803) 556-8171 • FAX (803) 766-1178

APPENDIX F-1

MSDS's for PREVIOUSLY USED CHEMICALS
M-AREA MANUFACTURING PROCESS CHEMICALS

PREVIOUSLY USED PROCESS CHEMICALS
1-PRIMARY PROCESS CHEMICALS

Aluminum	
Aluminux R	
Boric Acid	
Chlorothene VG Solvent	1,1,1-Trichloroethane
Diatomaceous Earth	Silica
Fiske Lubricant	Aluminum and graphite in mineral oil
Freon TF R	Trichlorotrifluoroethane
GRAFO R	Graphite in mineral oil
Hydrochloric Acid	
Lead	
Lithium	
Nickel slugs	
Nickel carbonate hydrate	
Nickel chloride hexahydrate	
Nickel (II) sulfate hexahydrate	
Nitric acid	
Phosphoric acid	
Rando oil HD 68	Hydraulic oil
Sodium hydroxide	
Sodium nitrate	
Solka-Floc R	Cellulose; filter aid
Tin	
1,1,1-Trichloroethane	(inhibited 1,1,1-Trichloroethane)
Uranium	

MOHAWK ALUMINUM CORP.

MATERIAL SAFETY DATA SHEET

Company	Issue Date	Identification Number
MOHAWK ALUMINUM CORP. 34 Barnes Industrial Road Wallingford, Ct. 06492	November 25, 1985	1
Trade Name (Common Name or Synonym) Aluminum Alloys Series	**Emergency Phone Number**	
1XXX, 2XXX, 3XXX, 4XXX, 5XXX, 6XXX, 7XXX	203-265-1567	
Chemical Name	**Formula**	**DOT Identification Number**
Aluminum	AL	NA

I. INGREDIENTS

Material or Component	CAS Number	% Weight	Exposure Limits	
			1984-85 ACGIH TLV (mg/m^3)	OSHA 1910.1000 PEL (mg/m^3)
Base Metal				
Aluminum (Al)	7429-90-5	90-99.7	10.0 as metal dust and oxide 5.0 as welding fume	Not established Not established
Alloying Elements				
Cobalt (Co)	7440-48-4	< 1.0 - 10.00	0.1	0.1
Copper (Cu)	7440-50-8	< 1.0 - 10.00	0.2 as fume	0.1 as fume
Iron (Fe)	1309-37-1	< 1.0 - 10.00	5.0 as fume	10.0 as fume
Lead (Pb)	7439-92-1	< 0.2 - 0.7	0.15 as dust and fume	0.05 as dust and fume
Magnesium (Mg)	1309-48-4	< 1.0 - 10.00	10.0 as fume	15.0 as fume
Manganese (Mn)	7439-96-5	< 1.0 - 10.00	1.0 as fume	5.0 ceiling
Silicon (Si)	7440-21-3	< 1.0 - 10.00	10.0 as total dust	Not established
Tin (Sn)	7440-31-5	< 1.0 - 10.00	2.0 as oxide and metal	2.0 as inorganic compounds
Zinc (Zn)	1314-13-2	< 1.0 - 10.00	5.0 as fume	5.0 as fume

Note: Aluminum alloys will be comprised of various combinations of the elements shown here. In addition, other alloying may be present in minute quantities.

II. PHYSICAL DATA

Material is (At Normal Conditions):	Appearance and Odor		
☐ Liquid ☒ Solid ☐ Other	Silver Metallic - No Odor		
Acidity/Alkalinity			**Vapor Pressure (mm Hg at 20°C)**
pH = NA	Melting Point 900 - 1215 °F Boiling Point NA °F	Specific Gravity (H_2O = 1) 2.5 - 2.9 Solubility in water (% by weight) NIL	NA

III. PERSONAL PROTECTIVE EQUIPMENT

Appropriate personal protective equipment is required when melting, casting, drawing, stamping, machining, forging, or otherwise processing. The nature of the processing activity will determine what form of equipment is necessary, i.e., glasses, NIOSH/MSHA approved respirator, protective clothing and ear protection.

IV. EMERGENCY MEDICAL PROCEDURES

For skin contact, remove particles by thoroughly washing with soap and water.

For eye contact, flush with water for at least 15 minutes. Get medical attention if irritation persists.

331 (11-85)

NA = Not Applicable

V.

Health

For standard operations (e.g., melting, cutting, grinding), aluminum alloys present a low health risk by inhalation and are usually considered a nuisance dust. Toxicity by ingestion - none expected. Ski and eyes - not an irritant. Welding and plasma cutting of alloys high in copper (2000 and 7000 series may present the potential for overexposure to copper fume which can result in upper respirator tract irritation, nausea, and metal fume fever. Nickel and chromium are other alloying element considered hazardous as fume; however, they do not present a carcinogenic or other health concern due to their low concentrations of the chemical form in which they are present. Overexposure t lead fumes over an extended period of time can result in such toxic effects as central nervous syste disturbances, renal changes, peripheral neuropathy, gastrointestinal disturbances, anemia, and chron osomal changes.

Threshold Limit Value: See Ingredients Section.

Fire and Explosion

Flash Point	Auto Ignition Temperature	Flammable Limits in Air	Extinguishing Media
NA °F	NA °F	Lower % Upper NA %	Dry powder or sand.

Unusual Fire and Explosion Hazards: Damp aluminum dust may spontaneously heat with liberation of hydrogen to form explosive air mistures. SEE ADDITIONAL INFORMATION.

Extinguishing Media Not to be Used: Do not use water or halogen on dust fires.

Reactivity

Stability: ☒ Stable ☐ Unstable

Incompatibility (Materials to Avoid): Anhydrous bromine, strong acids and/or alkaline material.

Conditions to Avoid: See Fire and Explosion Section. SEE ADDITIONAL INFORMATION.

Hazardous Decomposition Products: See Fire and Explosion Section. SEE ADDITIONAL INFORMATION.

VI. ENVIRONMENTAL

Spill or leak procedures

NA

Waste Disposal Methods*

Used or unused product should be tested to determine hazard status and disposal requirements unde federal, state, or local laws and regulations. Recycling of aluminum scrap is encouraged by the Aluminu Industry.

*Disposer must comply with Federal, State and Local disposal or discharge laws.

VII. ADDITIONAL INFORMATION

1. Halogen acids and sodium hydroxide in contact with aluminum may generate explosive mixtures of hydrogen.
2. Finely divided aluminum will form explosive mixtures in air. It will also form explosive mixtures in air in the presenc bromates, iodates, or ammonium nitrate.
3. When remelting aluminum scrap, entrapped moisture or the presence of strong oxidizers such as ammonium nitrate cc cause an explosion. This applies to the collection of moisture in sow cavities as well. Moisture must be driven off prio remelting.
4. Do not touch cast aluminum metal or heated aluminum product without knowing metal temperature. Alumin experiences no color change during heating. If metal is hot and touched, burns can result.
5. Aluminum powder must be packaged and shipped as a Flammable Solid, UN1396.
6. Hard alloy ingots in the 2000 and 7000 series must be stress-relieved to prevent explosion when sawed.
7. The welding of aluminum alloys may generate carbon monoxide, carbon dioxide, ozone, nitrogen oxides, infra-red radia and ultra-violet radiation.

The information in this MSDS was obtained from sources which we believe are reliable. However, the information is provided without any representation or warranty, express or implied regarding the accuracy or corrections.

...e and disposal of the product are beyond our control and may be beyond our knowledge. For ... arising out of or in any m...

Diversey Wyandotte Corporation
1532 Biddle Avenue
Wyandotte, Michigan 48192

Emergency Telephone (313) 281-0930

SECTION I — PRODUCT IDENTIFICATION

		Product [redacted] ALUMINUX®
C 2226/2754F	R 10/81	Description Chemical Mixture — Alkaline Etchant for Aluminum

SECTION II — HAZARDOUS INGREDIENTS

CAS Number	Chemical Component	%	TLV (Units)	Hazard Data
1310-73-2	Sodium hydroxide	>95	2 mg/m^3	Corrosive to eyes, skin and mucous membranes.

SECTION III — PHYSICAL DATA

XX Solid Liquid	Appearance and Odor White, granular beads with no odor
Specific Gravity Bulk density 62 lbs/ft^3	pH at 25°C N.A.
Solubility in Water Complete	Freezing Point N.A.
Percent Volatiles (by weight) None	Phosphorus None

SECTION IV — FIRE AND EXPLOSIVE HAZARD DATA

Flash Point (method)	Flammable Limits	LFL	UFL
Not combustible	N/A		

Extinguishing Media Not a fire hazard. Water fog.

Special Fire Hazards and Equipment Required Forms corrosive caustic soda solutions. Avoid contact with skin. Although this product is not combustible, good fire-fighting practice dictates the use of self-contained breathing apparatus and turn-out gear for fires in area where product is stored.

SECTION V — REACTIVE HAZARDS

Product Stable Yes	Unstable at — °F — °C	Hazardous Polymerization None	Will Not Occur ~~May Occur~~

Conditions to Avoid Use caution when mixing with acids as violent reaction will occur. Add slowly to water to prevent generation of localized heating and splattering. Use plastic scoop for removal from drum.

Incompatibility (Materials to Avoid) Do not mix with acids, flammable liquids, organic halogens or soft metals. Hydrogen gas and severe corrosion will occur if solutions of concentrated product contacts aluminum.

Hazardous Decomposition Products None known.

Eyes Corrosive. Causes severe burns, possible irreversible eye damage, or irritation.

Corrosive. Causes severe burns or irritation.

ngestion POISON. CORROSIVE. May be fatal if swallowed. May cause esophogic or gastric perforation. Causes severe burns to mouth, throat and mucous membranes.

nhalation May cause moderate to severe pulmonary irritation if mist or dust is inhaled.

Threshold Limit Value
2 mg/m^3 for NaOH

Principal Routes of Absorption
Direct contact with skin or eyes. Ingestion or inhalation of liquid or

Acute Effects of Overexposure
Corrosive. Causes severe irritation or burns.

Chronic Effects of Overexposure
None known.

FIRST AID PROCEDURE—*NEVER GIVE FLUIDS* OR INDUCE VOMITING IF PATIENT UNCONSCIOUS OR HAVING CONVULSIONS. CALL A PHYSICIAN.

Flush immediately with plenty of water for at least 15 minutes. Upper a
Eyes lower eyelids should be raised to insure complete removal of caustic so Get prompt medical attention.

Skin Flush immediately with water while removing contaminated clothing and shoes. Get prompt medical attention. Launder clothing before reuse.

Ingestion If swallowed, rinse mouth with water. Drink large amounts of water milk. DO NOT induce vomiting. If patient vomits, rinse mouth and repe drinking water. Get medical attention.

Inhalation Remove to fresh air. If not breathing, give artificial respiration, preferably mouth-to-mouth. If breathing is difficult, give oxygen. Get medical attention.

SECTION VII — NORMAL HANDLING PROCEDURES

Precautions to be taken in Handling and Storage. Store in a dry area away from acids. Keep container closed when moving or not in use. KEEP OUT OF REACH OF CHILDREN. Wash thoroughly after handling or using product. Add slowly to water wi mixing to avoid spattering. Do not store with food.

Protective Equipment
Eyes Goggles, face shield or side-shield safety glasses.
Gloves Rubber or caustic resistant.
Other Clothing to prevent skin contact. Eye wash in area of use.

Ventilation Requirements Mechanical to ma tain 2 mg/m^3 TLV. Wear NIOSH approved alkaline cartridge respi in areas where mist or dust exceed TLV.

Corrosive Action on Materials Corrosive to aluminum, copper, brass, tin and other soft metals. May remove paint and organic coatings.

SECTION VIII — SPILL OR LEAK CONTROL PROCEDURES

Steps to be taken in case of Spills. Forms corrosive liquid in water. Sweep up and store in a meta container. Dissolve in water and neutralize with dilute acids or carbon dioxide. Discharge neutralized solution to sanitary sewer or bu in chemical landfill. Consult local environmental regulations. Wash sp area thoroughly. Liquid waste solution is strongly alkaline.

Waste Disposal Methods Neutralize to a specific pH with dilute acid before disposal to sewer. Consult local regulations. Alkaline solutions are toxic to fish and wildlife. Do not discharge to lakes, streams or ponds.

The above information is believed to be accurate and discloses the known hazards for this product as of this date. No additional warranties are made.

JAN 31 1986

Date

Ronald

MATERIAL SAFETY DATA SHEET

CORPORATE RESEARCH & DEVELOPMENT
120 ERIE BOULEVARD
SCHENECTADY, N.Y. 12305

MATERIALS INFORMATION SERVICES

NO. 4

BORIC ACID

Revision B

DATE March 1983

SECTION I. MATERIAL IDENTIFICATION

MATERIAL NAME: **BORIC ACID**

OTHER DESIGNAITONS: Orthoboric Acid, Boracic Acid, Hydrogen Borate, H_3BO_3, GE Material D4A6, CAS #010 043 353

MANUFACTURER: Available from several suppliers, including:

Kerr-McGee Chem. Corp.	Ashland Chem. Co.	U.S. Borax & Chem. Co.
Kerr-McGee Center	P.O. Box 2219	3075 Wilshire Blvd.
Oklahoma City, OK 73125	Columbus, OH 43216	Los Angeles, CA 90010

SECTION II. INGREDIENTS AND HAZARDS

	%	HAZARD DATA
Boric Acid *Control as a Nuisance Particulate has been recommended: 10 mg/m^3 total dust, or 5 mg/m^3 respirable dust. Animal studies (dog and rat) have shown infertility and damage to testes can result from acute or chronic ingestion of boric acid. Evidence on reproductive toxic effects in humans is inadequate.	ca 100	No TLV Established* Infant, Oral LDLo 934 mg/kg Man, Inhalation TCLo 22 mg/m^3 (10-yr intermittent) Toxic glandular effects Rat, Oral LD_{50} 2660 mg/kg

SECTION III. PHYSICAL DATA

Vapor pressure, 21C, mm Hg --- 15 (due to water)

Solubility in water, g/100g @ 0C ---------- 2.6
@ 20C ---------- 4.9
@ 100C --------- 28

Melting point, deg C ---------- 170-180

Specific gravity, 20/4C ------ 1.435

pH @ 20C, 1% aqueous soln --- ca 5.2
4% aqueous soln ---- ca 3.9

Molecular weight ---------- 61.84

Appearance & Odor: Colorless crystals or a fine or granular white powder. No odor.

SECTION IV. FIRE AND EXPLOSION DATA

Flash Point and Method	Autoignition Temp.	Flammability Limits in Air	Lower	Upper
Non-combustible				

Extinguishing media: Use that which is most appropriate for the surrounding fire. Boric acid does not support combustion and is non-combustible. Material decomposes on heating, giving off water (see Sect V); used as fire retardant.

SECTION V. REACTIVITY DATA

This is a stable material in closed containers at room temperature under normal storage and handling conditions. It does not polymerize.

A weak acid. Loses chemically combined water upon heating, forming metaboric acid (HBO_2) at 100-105C, then pyroboric acid ($H_2B_4O_7$) at 140-160C, and at higher temperatures, boric anyhydride (B_2O_3).

Reacts with basic materials such as alkali carbonates and hydroxides to form borate salts.

A mixture of potassium and boric acid may explode on impact. Mixture with acetic anhydride can react violently when heated to 58-60C.

If moisture is present boric acid can be corrosive to iron.

GENERAL ELECTRIC

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NO. 4

SECTION VI. HEALTH HAZARD INFORMATION

TLV None established (See Sect II)

Excessive inhalation of dust can cause irritation to mucous membranes of the respiratory tract. Not significantly absorbed through intact skin. Readily absorbed through damaged, abraded and burned skin, or open wounds and areas of active dermatitis when exposed to dry materials or aqueous solutions. Ingestion or absorption may cause nausea, vomiting, anuria, erythematous lesions on skin and mucous membranes, abdominal cramps, circulatory failure, and coma. Chronic exposures may cause dry skin, eruptions, and gastric disturbances. Poisoning can be acute or chronic. Adult acute fatal dose reported at 5 to >30g (moderate to slightly toxic)

FIRST AID:

Eye Contact: Flush thoroughly with running water for 15 min. including under eyelids.

Skin Contact: Remove grossly contaminated clothing under safety shower. Flush affected area well with water.

Inhalation: Remove to fresh air. Restore and/or support breathing as required.

Ingestion: If conscious, rinse mouth with water. Give several glasses of water to drink to dilute. Induce vomiting.

Seek medical assistance for further treatment, observation and support after first aid.

SECTION VII. SPILL, LEAK, AND DISPOSAL PROCEDURES

Provide adequate ventilation. Clean-up personnel need protection to avoid inhalation of dust. Keep airborne particulate at a minimum when sweeping up. Collect solid spills and place in appropriate containers for reclaim or disposal. Liquid spills can be absorbed with inert solid. Residue and traces can be flushed to sewer with high dilution.

DISPOSAL: Reclaim dry material for salvage or reuse. Unsalvageable waste may be buried in approved landfill. (Note that this material can have herbicidal properties.)

Follow Federal, State, and Local regulations.

SECTION VIII. SPECIAL PROTECTION INFORMATION

Provide sufficient ventilation in the workplace to keep airborne particulate at a low level. Dust respirators should be available for dusty conditions.

Use protection (rubber gloves, aprons, etc) appropriate for work situation to minimize skin contact. Avoid eye contact by use of chemical safety goggles where dusty conditions occur or solution splashing is possible.

Provide periodic medical examinations to those regularly exposed to boric acid with emphasis on liver and kidney function.

Eyewash stations and safety showers should be accessible to areas of large quantity use or handling especially if splashing is possible.

SECTION IX. SPECIAL PRECAUTIONS AND COMMENTS

Store in closed containers in a cool, dry, area. Storage bins should have a 60° sloping cone bottom with provision to prevent ingress of water. Carbon steel or aluminum containers are suitable for this dry storage. (Stainless steel needed for moist conditions.)

Use good housekeeping practices to prevent accumulation of dust and follow sound cleaning techniques that will keep airborne particulate at a low level.

Avoid breathing dust. Do not ingest. Avoid contact, especially when skin is cut or abraded or active dermatitis is present. Wash hands and face before eating, drinking or smoking after handling this material.

DATA SOURCE(S) CODE: 1,4-11,14,25,26,34,37,48,49

Judgments as to the suitability of information herein for purchaser's purposes are necessarily purchaser's responsibility. Therefore, although reasonable care has been taken in the preparation of such information, General Electric Company extends no warranties, makes no representations and assumes no responsibility as to the accuracy or suitability of such information for application to purchaser's intended purposes or for consequences of its use.

APPROVALS: MIS/CRD J. M. Nicholson

INDUST. HYGIENE/SAFETY [illegible] 3-9-83

MEDICAL REVIEW: 21 March 1983

GENERAL ELECTRIC

WSRC-TR-96-0244, Rev. 2; APPENDIX F-1, Page 9 of 94

MATERIAL SAFETY DATA
(APPROVED BY THE U.S. DEPARTMENT OF LABC

Information on this form is furnished solely for the purpose of compliance with the Occupational Safety and Health Act of 1970 and shall not be used for any other purpose. Use or dissemination of all or any part of this information for any other purpose may result in a violation of law or constitute grounds for legal action.

Section 1 NAME & PRODUCT

MANUFACTURER'S NAME	CITY, STATE, ZIP CODE	EMERGENCY PHONE NO. - 24 HOU
DOW CHEMICAL U.S.A.	MIDLAND, MICHIGAN 48640	517 - 636 - 4400

DATE THIS FORM WRITTEN: January 3, 1974

PREPARED BY (Signature): [signature]

TRADE NAME: CHLOROTHENE® VG Solvent

SYNONYMS

Section 2 INGREDIENTS

	%	TLV (units
1,1,1-Trichloroethane (Minimum)	94.5	350

3/10/78 Contains 2% Dioxane [signature]

CAS 000-071-556 (Not a specification value)

Section 3 PHYSICAL DATA

BOILING POINT (°F.)	165 (74°C)	SOLUBILITY IN WATER	0.7 gm/100gm @25
VAPOR PRESSURE (mmHgat 20°c)	100	SPECIFIC GRAVITY (H_2O = 1)	1.321 @ 25/25°C
VAPOR DENSITY (air = 1)	4.55	% VOLATILE BY VOLUME	100 (essentially

APPEARANCE: Colorless liquid

Section 4 FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (AND METHOD USED): None °F T.O.C., T.C.C., C.O.C.

FLAMMABLE LIMITS (STP IN AIR) @ 25°C: L.F.L. 8.0 U.F.L. 10.5

EXTINGUISHING MEDIA: [X] WATER FOG [ ] FOAM [ ] ALCOHOL FOAM [ ] CO_2 [ ] DRY CHEMICAL [ ] OTHER

SPECIAL FIRE FIGHTING PROTECTION EQUIPMENT AND HAZARDS

Self-contained respiratory equipment. Not considered a flammable liquid hazard under normal industrial use conditions.

Section 5 REACTIVITY DATA

STABILITY (NORMAL CONDITIONS): [X] STABLE [ ] UNSTABLE

CONDITIONS TO AVOID: Open flames, welding arcs or other high temperature sourc which induce thermal decomposition.

INCOMPATIBILITY — MATERIALS TO AVOID: [X*] WATER [ ] ACID [ ] BASE [ ] CORROSIVE [ ] OXIDIZING MATERIAL

OTHER: [ ] *Slow hydrolysis produces corrosive acid.

HAZARDOUS DECOMPOSITION PRODUCTS

Open flames and welding arcs can cause thermal degradation with the evoluti of hydrogen chloride and very small amounts of phosgene and chlorine.

HAZARDOUS POLYMERIZATION: [ ] MAY OCCUR [X] WILL NOT OCCUR

CONDITIONS TO AVOID

Section 6 SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

Use proper protective equipment. Small leaks: Mop up, wipe up, or soak up immediately. Remove to out of doors. Large spills: Evacuate area. Contain liquid; transfer to closed metal containers. Keep out of water supply

DISPOSAL METHOD

Send solvent to a reclaimer. In some cases it can be transported to an are where it can be placed on the ground and allowed to evaporate safely. Refe to Chemical Safety Data Sheet SD-90, Manufacturing Chemists Association, 1825 Connecticut Avenue, Washington, D.C. 20009.

CHLOROTHENE VG Solvent

MATERIAL SAFETY DATA SHEET (CONT.)

DOW CHEMICAL U.S.A.
MIDLAND, MICHIGAN 48640

Section 7 HEALTH HAZARD DATA

INGESTION

Very low toxicity. LD_{50} (laboratory animals) ranges from 8.6 to 14.0 g/kg. Based on these data it is estimated that the lethal dose for a 150 pound person is estimated between ½ to one pint.

EYE CONTACT

Mild irritation, but essentially no corneal injury.

SKIN CONTACT

Short contact - no irritation. Prolonged or frequent exposure - minor irritations. If confined to the skin - up to moderate irritation, even a burn.

SKIN ABSORPTION

Very low. LD_{50} (rabbits) - 24 hour exposure - greater than 1.5 g/kg.

INHALATION

TLV: 350 ppm (1972)

EFFECTS OF OVEREXPOSURE

Anesthetic effects - may occur in the range of 500 to 1000 ppm.

FIRST AID PROCEDURES		
EYE FLUSH WITH FLOWING WATER	EYES AND SKIN: Flush eyes with plenty of water. For both eyes and skin get medical attention if irritation or injury develops. INHALATION: If breathing stops, give artificial respiration. Get medical help. Remove to fresh air; keep warm and quiet until recovered. INGESTION: Induce vomiting. Call a physician immediately. No specific antidote known. Treat symptomatically.* CAUTION: with some solvents, drinking alcohol shortly before, during or after exposure may cause undesirable effects.	NEVER GIVE FLUIDS OR INDUCE VOMITING IF PATIENT IS UNCONSCIOUS OR HAVING CONVULSIO

Section 8 SPECIAL PROTECTION INFORMATION

VENTILATION

Limit concentration in air to TLV.

RESPIRATORY PROTECTION (Specify type) Below 350 ppm - none. Respiratory protection required in the absence of environmental control. For levels up to 2% for ½ hour or less, a suitable full face mask with organic canister should be used. Above 2% and for emergencies, use a self-contained breathing apparatus.

PROTECTIVE CLOTHING

No special protective clothing needed.

EYE PROTECTION

☐ NOT NORMALLY NECESSARY ☒ SAFETY GLASSES WITHOUT SIDE SHIELDS ☐ SAFETY GLASSES WITH SIDE SHIELDS ☐ CHEMICAL WORKERS GOGGLES

☐ GAS TIGHT GOGGLES OR EQUIVALENT OTHER ☒ Eye wash stations and safety showers should b readily available.

Section 9 SPECIAL PRECAUTIONS OR OTHER COMMENTS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING

Handle with reasonable care. Avoid breathing vapors. Store in a cool dry place.

*NOTE TO PHYSICIAN: Overexposure to many of the chlorinated solvents especia[lly] accompanied by anoxia, may temporarily increase cardiac irritability. Ma[in]tain adequate oxygenation until recovery. Avoid sympatomimetic amines, such as epinephrine, which may precipitate arrhythmias.

HEALTH HAZARD REP

☒ N. WOLFE — 773A
SAFETY ENGINEER — AREA

TO
1. T. S. McMILLAN
2. J. H. CRAWFORD
3.

DATE
3/6/76

REF
☒ PURCHASE REQUISITION NO. K-78876
OR
☐ STORES STOCK REQUEST NO.

FROM
INDUSTRIAL HYGIENIST
Bldg 735-A, Ext 2652

4/27/76 DATED — Mc MILLAN ORIGINATOR

As required by SRP Safety Manual Item 31, the material referred to in the referenced requisition/request has been reviewed for potential health hazards with the following conclusions:

☒ No special precautions are needed other than those usually required for this type of material. See comments.

☐ Special precautions are required for use of this material. Appropriate references and/or Data Sheets containing recommended practices are furnished with this form.

☐ This material presents an extreme hazard. Cancellation of the order is advised. Alternatively, if use of this material is essential, a meeting of all interested groups must be held to develop safe handling procedures. See comments.

COMMENTS
DEGREASING AGENT = 1, 1, 1- TRICHLOROETHANE.
(METHYL CHLOROFORM) (~~CHLOROthene~~) CH_3CCl_3

HAZARD
POTENTIAL SOLVENT EXPOSURE to METHYL CHLOROFORM.
TLV = ~~100~~ 350 PPM (~~540~~ mg/m^3). NON-FLAMMABLE, TOXIC SOLVENT

RECOMMENDATIONS
LOCATE DEGREASER AND MANOLE ACCORDING to STANDARD DEGREASING PROCEDURES. USE TRICHLOROETHYLENE AS A GUIDE.

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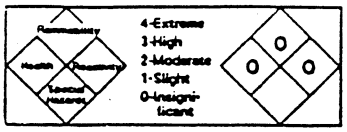

NFPA FIRE HAZARD SYMBOL†
See NFPA 704 for detailed explanation.

No.: 2415 Rev. No.: 2
Date Prepared: 03/27/85

Manville

I. PRODUCT IDENTIFICATION

Trade Name(s): CELITE 500
Generic Name: NATURAL DIATOMACEOUS EARTH
Chemical Name: SILICA
CAS #: 7631-86-9
Formula: SiO_2

Manufacturer: MANVILLE INTERNATIONAL CORP.
Address: P.O. BOX 5108
City: DENVER State: CO Zip: 80217
Telephone: (303)978-3120
Emergency:

II. PRODUCT INGREDIENTS

INGREDIENT NAME	CAS NUMBER	%	PEL and TLV (except as noted)
NATURAL DIATOMACEOUS EARTH-AMORPHOUS SILICA	7631-86-9	>97	2.00 mg/m³
CRYSTALLINE SILICA-QUARTZ	14808-60-7	<3	RESPIRABLE QUARTZ (OSHA)

III. PHYSICAL DATA

Appearance and Odor: FINE GRAY POWDER, NO ODOR.

Boiling Point: NA
Vapor Pressure: NA
Water Solubility (%): NEGLIGIBLE
Vapor Density (Air=1): NA
Evaporation Rate (= 1): NA
Specific Gravity (water = 1): 2.3
Melting Point: ND
% Volatile by Volume: NIL

IV. FIRE AND EXPLOSION DATA

Flash Point (Method): NONFLAMMABLE
Flammable Limits: LEL: % UEL: NA %
Extinguishing Media: NA
Unusual Fire or Explosion Hazards: NONE
NFPA Flammable/Combustible Liquid Classification: NA
Auto-Ignition Temperature: NA

Special Fire-Fighting Procedures: NONE

V. HEALTH HAZARDS A. Summary/Risks

Summary: RESPIRABLE DUST FROM THIS PRODUCT WILL TYPICALLY CONTAIN UP TO 3% FREE CRYSTALLINE SILICA (QUARTZ). AS SUCH IT REPRESENTS A RISK TO THE RESPIRATORY SYSTEM.

THIS PRODUCT IS NOT CONSIDERED A CARCINOGEN.

Medical conditions which may be aggravated: PRE-EXISTING UPPER RESPIRATORY AND LUNG DISEASE SUCH AS, BUT NOT LIMITED TO BRONCHITIS, EMPHYSEMA AND ASTHMA.
Target Organ(s): LUNGS
Acute Health Effects: TRANSITORY UPPER RESPIRATORY IRRITANT.

Chronic Health Effects: LONG TERM, UNPROTECTED EXPOSURE TO DUST LEVELS IN EXCESS OF THE PEL MAY CAUSE LUNG DISEASE (SILICOSIS). FOLLOW THE SAFE HANDLING PRACTICES SHOWN ON THE LABEL.

Primary Entry Route(s): INHALATION.

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V. HEALTH HAZARDS B. Signs/Symptoms of Overexposure

Inhalation: CONGESTION AND IRRITATION OF THE THROAT, NASAL PASSAGES AND UPPER RESPIRATORY SYSTEM

Skin Contact: NA

Skin Absorption: NA

Ingestion: NOT HAZARDOUS WHEN INGESTED. GENERALLY REGARDED AS SAFE BY THE FDA.

Eyes: TEMPORARY IRRITATION AND INFLAMMATION.

V. HEALTH HAZARDS C. First Aid/Emergency Procedures

Inhalation: REMOVE TO FRESH AIR. DRINK WATER TO CLEAR THROAT AND BLOW NOSE.

Skin Contact: NA

Skin Absorption: NA

Ingestion: NA

Eyes: FLUSH WITH COPIOUS QUANTITIES OF WATER FOR A MINIMUM OF 15 MINUTES.

VI. REACTIVITY DATA

MATERIAL IS STABLE. HAZARDOUS POLYMERIZATION CANNOT OCCUR.
Chemical Incompatibilities: HYDROFLUORIC ACID
Conditions to Avoid: NONE IN DESIGNED USE.

Hazardous Decomposition Products: NONE DETERMINED.

VII. SPILL OR LEAK PROCEDURES

Procedures for Spill/Leak: VACUUM CLEAN SPILLAGE. IF SWEEPING IS NECESSARY USE A DUST SUPPRESSANT.

Waste Management: WASTES GENERATED DURING APPLICATION, DEMOLITION, BREAKAGE OR SPILLAGE ARE NOT HAZARDOUS WASTES AS DEFINED BY RCRA (40 CFR PART 261). COMPLY WITH FEDERAL, STATE AND LOCAL REGULATIONS. METHOD OF DISPOSAL-LANDFILL. RQ-N/A.

VIII. SPECIAL PROTECTION INFORMATION

Goggles: NOT NORMALLY REQUIRED.
Gloves: NOT NORMALLY REQUIRED.
Respirator: USE A RESPIRATOR SUCH AS 3M 9900 OR EQUIVALENT FOR PROTECTION AGAINST PNEUMOCONIOSIS PRODUCING DUSTS.
[illegible] EXHAUST VENTILLATION OR DUST COLLECTION.

Other: NA

Special Considerations for repair/maintenance of contaminated equipment: INSURE PROPER RESPIRATORY PROTECT

IX. SPECIAL PRECAUTIONS

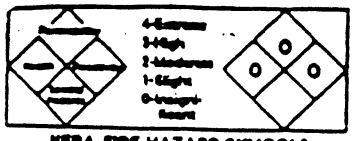
Storage Segregation Hazard Classes: NA
*** ALWAYS SEGREGATE MATERIALS BY MAJOR HAZARD CLASS ***
Special Handling/Storage: REPAIR ALL BROKEN BAGS IMMEDIATELY.

Special Workplace Engineering Controls: NOT NORMALLY REQUIRED.

Other: NA

Prepared/Revised by: KENNETH A. ROBERTS **Title:** MGR., ENVIRONMENTAL SERVICES

As of the date of preparation of this document, the foregoing information is believed to be accurate and is provided in good faith to comply with applicable federal and state law(s). However, no warranty or representation with respect to such information is intended or given.



NFPA FIRE HAZARD SYMBOL†
See NFPA 704 for detailed explanation.

No.: 2420 Rev. No.: 2
Date Prepared: 03/27/85

Manville

I. PRODUCT IDENTIFICATION

Trade Name(s) : CELITE 505, 512, 577, 587, 589 STANDARD SUPER-CEL
Generic Name: CALCINED DIATOMACEOUS EARTH
Chemical Name: SILICA

CAS #: 61790-53-2
Formula: SiO_2

Manufacturer: MANVILLE INTERNATIONAL CORP.
Address: P.O. BOX 5108
City: DENVER State: CO Zip: 80217

Telephone: (303)978-3120
Emergency:

II. PRODUCT INGREDIENTS

INGREDIENT NAME	CAS NUMBER	%	PERMISSIBLE EXPOSURE LIMIT
CALCINED DIATOMACEOUS EARTH CRYSTALLINE SILICA-CRISTOBALITE PEL IS CALCULATED ON THE BASIS THAT THIS PRODUCT MAY CONTAIN UP TO 10% CRYSTALLINE SILICA (CRISTOBALITE, CAS.14464-46-1)	61790-53-2	100	0.45 mg/m³ RESPIRABLE CRISTOBALITE (OSHA)

III. PHYSICAL DATA

Appearance and Odor: FINE PINK POWDER, NO ODOR.

Boiling Point: NA
Vapor Pressure: NA
Water Solubility (%) : NEGLIGIBLE
Vapor Density (Air=1) : NA

Evaporation Rate (= 1) : NA
Specific Gravity (water = 1) : 2.3
Melting Point: ND
% Volatile by Volume: NIL

IV. FIRE AND EXPLOSION DATA

Flash Point (Method) : NONFLAMMABLE
Flammable Limits: LEL: % UEL: NA %
Extinguishing Media: NA
Unusual Fire or Explosion Hazards: NONE

NFPA Flammable/Combustible Liquid Classification: NA
Auto-Ignition Temperature: NA

Special Fire-Fighting Procedures: NONE

V. HEALTH HAZARDS A. Summary/Risks

Summary: RESPIRABLE DUST FROM THIS PRODUCT WILL TYPICALLY CONTAIN UP TO 10% FREE CRYSTALLINE SILICA (CRISTOBALITE). AS SUCH IT REPRESENTS A RISK TO THE REPIRATORY SYSTEM.

THIS PRODUCT IS NOT CONSIDERED A CARCINOGEN.

Medical conditions which may be aggravated: PRE-EXISTING UPPER RESPIRATORY AND LUNG DISEASE SUCH AS, BUT NOT LIMITED TO BRONCHITIS, EMPHYSEMA AND ASTHMA.
Target Organs) : LUNGS
Acute Health Effects: TRANSITORY UPPER RESPIRATORY IRRITANT.

Chronic Health Effects: LONG TERM, UNPROTECTED EXPOSURE TO DUST LEVELS IN EXCESS OF THE PEL MAY CAUSE LUNG DISEASE (SILICOSIS). FOLLOW THE SAFE HANDLING PRACTICES SHOWN ON THE LABEL.

Primary Entry Route(s) : INHALATION.

V. HEALTH H

Inhalation: CONGESTION AND IRRITATION

Skin Contact: NA

Skin Absorption: NA

Ingestion: NOT HAZARDOUS WHEN INGESTED. GENERALLY REGARDED AS SAFE BY THE FDA.

Eyes: TEMPORARY IRRITATION AND INFLAMMATION.

V. HEALTH HAZARDS C. First Aid/Emergency Procedures

Inhalation: REMOVE TO FRESH AIR. DRINK WATER TO CLEAR THROAT AND BLOW NOSE.

Skin Contact: NA

Skin Absorption: NA

Ingestion: NA

Eyes: FLUSH WITH COPIOUS QUANTITIES OF WATER FOR A MINIMUM OF 15 MINUTES.

VI. REACTIVITY DATA

MATERIAL IS STABLE. HAZARDOUS POLYMERIZATION CANNOT OCCUR.
Chemical Incompatibilities: HYDROFLUORIC ACID
Conditions to Avoid: NONE IN DESIGNED USE.

Hazardous Decomposition Products: NONE DETERMINED.

VII. SPILL OR LEAK PROCEDURES

Procedures for Spill/Leak: VACUUM CLEAN SPILLAGE. IF SWEEPING IS NECESSARY USE A DUST SUPPRESSANT.

Waste Management: WASTES GENERATED DURING APPLICATION, DEMOLITION, BREAKAGE OR SPILLAGE ARE NOT HAZARDOUS WASTES AS DEFINED BY RCRA (40 CFR PART 261). COMPLY WITH FEDERAL, STATE AND LOCAL REGULATIONS. METHOD OF DISPOSAL-LANDFILL. RQ-N/A.

VIII. SPECIAL PROTECTION INFORMATION

Goggles: NOT NORMALLY REQUIRED.
Gloves: NOT NORMALLY REQUIRED.
Respirator: USE A RESPIRATOR SUCH AS 3M 9900 OR EQUIVALENT FOR PROTECTION AGAINST PNEUMOCONIOSIS PRODUCING DUSTS.
Ventilation: USE ADEQUATE EXHAUST VENTILLATION OR DUST COLLECTION.

Other: NA

Special Considerations for repair/maintenance of contaminated equipment: INSURE PROPER RESPIRATORY PROTECTI

IX. SPECIAL PRECAUTIONS

Storage Segregation Hazard Classes: NA
*** ALWAYS SEGREGATE MATERIALS BY MAJOR HAZARD CLASS ***
Special Handling/Storage: REPAIR ALL BROKEN BAGS IMMEDIATELY.

Special Workplace Engineering Controls: NOT NORMALLY REQUIRED.

Other: NA

Prepared/Revised by: KENNETH A. ROBERTS **Title:** MGR., ENVIRONMENTAL SERVICES

As of the date of preparation of this document, the foregoing information is believed to be accurate and is provide good faith to comply with applicable federal and state law(s). However, no warranty or representation with respect to information is intended or given.

MSDS

MATERIAL SAFETY DATA SHEET

GENIUM PUBLISHING CORPORATION
1145 CATALYN STREET
SCHENECTADY, NY 12303-1836 USA
(518) 377-8855

GENIUM PUBLISHING CORP.

NATURAL DIATOMACEOUS EARTH

Date September 1980

SECTION I. MATERIAL IDENTIFICATION

Reviewed: February 1982

MATERIAL NAME: NATURAL DIATOMACEOUS EARTH
DESCRIPTION: Submicroscopic siliceous skeletons of prehistoric diatoms.
OTHER DESIGNATIONS: Diatomite, Amorphous Silica, Kieselguhr, Silicon Dioxide, SiO_2, GE Materials D4E13 and D4E16 (natural grades), CAS #061 790 532
MANUFACTURER: Available from several suppliers, including:
Johns-Manville Sales Corp., Ken Caryl Ranch, Denver, CO 80202 Phone: (303) 979-1000 — CELITE (Natural Grades)
Grefco, Inc., 3450 Wilshire Blvd. Los Angeles, CA Phone: (213) 381-5081 — DICALITE (Natural Grades)

SECTION II. INGREDIENTS AND HAZARDS

	%	HAZARD DATA
Diatomaceous Earth (Natural) with ca 4% free moisture*	ca 100	8-hr TWA 1.5 mg/m³** (Respirable Mass)

Composition (SiO_2)	%	8-hr TWA** Resp. Mass	Total Mass
Amorphous Silica	>95	3 mg/m³	6 mg/m³
Quartz	< 5	0.1	0.3
Cristobalite	Trace	0.05	0.15
Tridymite	Trace	0.05	0.15

*May contain small amounts of oxides of potassium, calcium, aluminum and iron, depending on ore source; 3-4% combined H_2O

**ACGIH 1981 TLV. The current OSHA standard for amorphous silica and natural diatomaceous earth is 20 mppcf or 80/% quartz content mg/m³.

Rat, Oral
LD_{50} 3160 mg/kg

SECTION III. PHYSICAL DATA

Boiling point, at 760 mm Hg, deg C	2230	Softening point, deg C	1427
Solubility in water	insoluble	Melting point, deg C	1710
Density	2.2	Molecular weight	60.09
Particle size, microns	<10		

Appearance & Odor: Light gray or buff colored powder (also supplied in the form of blocks or bricks); odorless.

SECTION IV. FIRE AND EXPLOSION DATA

Flash Point and Method	Autoignition Temp.	Flammability Limits In Air	LOWER	UPPER
N/A				

Extinguishing Media: Use media appropriate to surrounding fire.
This material is noncombustible, but avoid generating airborne dust.
When heated to extreme temperatures, it can crystallize or melt into a glass.

Firefighters may need respiratory protection under dusty conditions.

SECTION V. REACTIVITY DATA

Material is stable under ordinary circumstances. Does not polymerize.
Reacts with hydrofluoric acid to produce toxic silicon tetrafluoride gas and with xenon hexafluoride to produce explosive xenon trioxide. Heating with alkali carbonates can produce a vigorous reaction; when wet and heated with Mg, it can explode. It can react exothermally with oxygen difluoride and explosively with chlorine trifluoride.
It can absorb up to 4 times its weight in water, and when finely divided, is soluble in strong or molten alkalis.
When heated to high temperature, as in calcining (especially in the presence of alkaline flux), this material forms crystalline silicas, cristobalite and tridymite, both of which are very active in causing silicosis when inhaled.

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MATERIAL SAFETY DATA SHEET

FEBRUARY 1, 1985

ILLINOIS MINERALS CO
2035 WASHINGTON, CAIRO, ILL. 6291

SECTION I — IDENTIFICATION OF MATERIAL

CHEMICAL NAME OR COMPOSITION

Amorphous Silica

SILICON DIOXIDE — MICROCRYSTALLINE

HMIS NPCA RATING

Health
Flammability
Reactivity
Personal Protection

TRADE NAME & SYNONYMS		
IMSIL A-108®	0	AIR FLOATED
IMSIL A-10®	1240	AIR FLOATED
IMSIL A-15®	1160	AIR FLOATED
IMSIL A-25®	54	AIR FLOATED
	250	AIR FLOATED
	200	AIR FLOATED

CHEMICAL FAMILY	MOLECULAR FORMULA
OXIDE	SiO_2

SECTION II — SIGNIFICANT COMPONENTS AND CONTAMINANTS

CAS NO.	COMPONENT	PERCENT	PERMISSIBLE EXPOSURE LIMIT	SHORT TERM EXPOSURE LIMIT	DOT HAZARI
14808-60-7	SILICON DIOXIDE	99.5+	0.1mg/m3	-------	Non-Hazardou

SECTION III — PHYSICAL DATA

PHYSICAL CHARACTERISTICS: WHITE, ODORLESS POWDER

BOILING POINT	FREEZING POINT	SPECIFIC GRAVITY (WATER=1.0)
NA	NA	2.65

VAPOR PRESSURE (mm OF MERCURY)	pH
NA	6.5 - 7.0
VAPOR DENSITY (AIR =1)	**SOLUBILITY IN WATER**
NA	INSOLUBLE

SECTION IV — FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (SPECIFY METHOD)	FLAMMABLE (EXPLOSIVE) LIMITS (PERCENTAGE BY VOLUME	
	LOWER EXPLOSIVE LIMIT	UPPER EXPLOSIVE LIMIT
NA	NA	NA

FIRE EXTINGUISHING MEDIA: NA

SPECIAL FIRE FIGHTING PROCEDURES: NA

UNUSUAL FIRE AND EXPLOSION HAZARDS: NA

*Warning - Chronic Health effect possible - Inhalation of silica dust may cause delayed lung injury/disease (Silicosis). Take appropriate measures to avoid breathing dust. For further information please refer to "Guidelines for handling of Silica Dust" provided upon request.

SECTION V

TOXICITY NON—TOXIC

EFFECTS OF OVEREXPOSURE	**ACUTE**	NOT APPLICABLE
	CHRONIC	PROLONGED OVEREXPOSURE BY INHALATION MAY CAUSE DELAYED LUNG INJURY.

EMERGENCY AND FIRST AID PROCEDURES
EYES: FLUSH WITH WATER OR OTHER SUITABLE LIQUID

SECTION VI — REACTIVITY DATA

GENERAL REACTIVITY STABLE — INERT

INCOMPATABILITY (MATERIALS TO AVOID) HYDROFLUORIC ACID

HAZARDOUS DECOMPOSITION PRODUCTS NONE

HAZARDOUS POLYMERIZATION NONE | **CONDITIONS TO AVOID** NONE KNOWN

SECTION VII — SPILL/DISPOSAL REQUIREMENTS

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

NOT CONSIDERED A HAZARDOUS WASTE UNDER FEDERAL RCRA REGULATIONS

WASTE DISPOSAL METHOD VACUUM, SWEEP OR FLUSH FOR NORMAL DISPOSAL

CONTAINER DISPOSAL NORMAL METHOD FOR NON—HAZARDOUS WASTE

SECTION VIII — SPECIAL PROTECTION INFORMATION (SPECIFY IN DETAIL)

EYE PROTECTION	NOT NECESSARY BUT RECOMMENDED	**GLOVES**	NOT NECESSARY
RESPIRATORY	APPROVED RESPIRATOR FOR DUSTS RECOMMENDED FOR CONCENTRATION ABOVE TLV		
VENTILATION	ADEQUATE FOR DUSTY ENVIRONMENTS	**OTHER**	NPCA — HMIS CODE E

SECTION IX - SPECIAL PRECAUTIONS

NONE

SECTION X — SHIPPING REGULATIONS (D.O.T. NOMENCLATURE)

PROPER SHIPPING NAME ILLINOIS MINERALS COMPANY MICROCRYSTALLINE SILICA

HAZARD CLASS	NA	**TYPE OF PACKAGING**	NA	**LABEL**	NA
PLACARD	NA	**MARKING**	NA	**EXEMPT**	NA

(618) 734-4172

GUIDELINES FOR SAFE HANDLING OF SILICA DUST

ILLINOIS MINERALS CO
2035 WASHINGTON, CAIRO, ILL 62

INTRODUCTION

These guidelines are provided to inform our customers of the potentially harmful health effects and the increase of risk of disease caused by the inhalation of any crystalline silica dust. The medical and scientific evidence suggested that as the amount and/or duration of silica dust inhalation increases, the risk of serious respiratory disease also increases. While Illinois Minerals is not in a position to agree or disagree with the various scientific and medical studies, we do believe that various precautions will minimize the risk associated with silica dust inhalation. These guidelines also provide information which may assist you in the implementing, monitoring and evaluating of your own industrial hygiene and dust control programs to minimize potentially harmful exposures. While Illinois Minerals cannot assure that these procedures will eliminate risk, they should tend to reduce the risk.

HEALTH EFFECTS

The prolonged inhalation of dusts containing crystalline silica may result in the development of a disabling lung disease known as silicosis. This is a chronic condition brought on by the entrapment of very fine silica particles in the aveoli of the lung causing scaring tissue or nodules to form over time. The accumulation of nodules will eventually cause the lungs to lose a portion of their ability to transfer and absorb oxygen, thus, resulting in lessened physical abilities. Chronic silicosis, generally is produced 5-20 years after the chronic silica inhalation. In addition to causing silicosis, the inhalation of silica dust can otherwise weaken the lungs and their natural cleansing process. As a result, the inhalation of silica dust may be a contributing factor leading to other respiratory diseases. Also, it has been generally stated that the duration of dust inhalation is of extreme importance. Persons who for many years have continuously inhaled silica dust have a greater likelihood of contracting a silica related disease. Those who only intermittently inhale the dust have less risk of injury. In addition, those persons who smoke will increase the risk which otherwise exists.

THRESHOLD LIMIT VALUE (TLV)

TLV's or Threshold Limit Value of mineral dusts are time weighted average concentrations considered permissible for exposures of eight hours per day, five days per week that are published by the American Conference of Governmental Industrial Hygienists (ACGIH). Most of these values have been promulgated as Permissible Exposure Limits (PEL) in the OSHA Standards.

These values have been obtained from laboratory studies on animals. They are reviewed annually and changed as necessary on the basis of experience. Copies of TLV's may be obtained by writing to:

American Conference of Industrial Governmental Hygienists
U.S. Public Health Service
P.O. Box 1937
Cincinnati, OH 45201

The current OSHA Permissible Exposure Limit (PEL) for respirable crystalline silica dust is 10mg/m^3 divided by the percent free silica plus two, averaged over an 8 hour work shift.

VENTILATION

The primary means of controlling airborne dust is through use of proper ventilation. For detailed information, refer to the ACGIH publication, "Industrial Ventilation, a Manual of Recommended Practices."

PROTECTIVE EQUIPMENT

Respiratory protection should be used by personnel working in dust environments. A combination of both proper ventilation and respiratory protection would tend to eliminate most risks.

For details on use of respirators, refer to the ANSI standard, z88.2-1969 "Practices for Respiratory Protection."

At locations where dust levels may exceed PEL's, a NIOSH approved half face piece respirator can be used for exposures up to 10X PEL. For exposures up to 100X PEL, use full face piece respirator with replaceable dust filter. Higher exposures need an approved air supply respirator.

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MATERIAL SAFETY DATA SHEET

SECTION I

MANUFACTURER'S NAME: FISKE BROTHERS REFINING CO.	EMERGENCY TELEPHONE NO.: (419) 691-2491
ADDRESS (Number, Street, City, State, and ZIP Code): P. O. BOX 8038, STATION A, 1500 OAKDALE, TOLEDO, OHIO 43605	
CHEMICAL NAME AND SYNONYMS	TRADE NAME AND SYNONYMS: FISKE'S 604 HOT DIE LUBRICANT
CHEMICAL FAMILY: ORGANIC HYDROCARBON	FORMULA: Lubricating oil thickened with inorganic thickener plus graphite, aluminum powder

SECTION II HAZARDOUS INGREDIENTS

PAINTS, PRESERVATIVES, & SOLVENTS	%	TLV (Units)	ALLOYS AND METALLIC COATINGS	%	TLV (Units)
PIGMENTS			BASE METAL		
CATALYST			ALLOYS		
VEHICLE			METALLIC COATINGS		
SOLVENTS			FILLER METAL PLUS COATING OR CORE FLUX		
ADDITIVES			OTHERS		
OTHERS					

HAZARDOUS MIXTURES OF OTHER LIQUIDS, SOLIDS, OR GASES	%	TLV (Units)
NON-HAZARDOUS		

SECTION III PHYSICAL DATA

BOILING POINT (°F.)	NON-MELT	SPECIFIC GRAVITY (H_2O=1)	
VAPOR PRESSURE (mm Hg.)		PERCENT VOLATILE BY VOLUME (%)	
VAPOR DENSITY (AIR=1)		EVAPORATION RATE (_____=1)	
SOLUBILITY IN WATER	NIL		
APPEARANCE AND ODOR	SILVER COLOR - BLAND ODOR		

SECTION IV FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (Method used)	600°F. COC	FLAMMABLE LIMITS	Lel	Uel
EXTINGUISHING MEDIA	CO_2 WATER MIST FOAM			
SPECIAL FIRE FIGHTING PROCEDURES	AS WITH OIL PRODUCTS			
UNUSUAL FIRE AND EXPLOSION HAZARDS	NONE			

SECTION V HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE

EFFECTS OF OVEREXPOSURE

EMERGENCY AND FIRST AID PROCEDURES

EXTERNAL - NORMAL GOOD HYGIENE

INTERNAL - CONSULT A PHYSICIAN

SECTION VI REACTIVITY DATA

STABILITY	UNSTABLE		CONDITIONS TO AVOID
	STABLE	X	

INCOMPATABILITY (Materials to avoid) --

HAZARDOUS DECOMPOSITION PRODUCTS --

HAZARDOUS POLYMERIZATION	MAY OCCUR		CONDITIONS TO AVOID
	WILL NOT OCCUR	X	

SECTION VII SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

NORMAL CLEAN UP PROCEDURE PLUS OIL ABSORBING MATERIAL

WASTE DISPOSAL METHOD

INCINERATE OR APPROVED LAND FILL

SECTION VIII SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION (Specify type)

VENTILATION	LOCAL EXHAUST	X	SPECIAL
	MECHANICAL (General)		OTHER

PROTECTIVE GLOVES	NOT NORMALLY REQUIRED	EYE PROTECTION	SAME AS AGAINST ANY FOREIGN OBJECT

OTHER PROTECTIVE EQUIPMENT NONE NORMALLY REQUIRED

SECTION IX SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING

NO SPECIAL REQUIREMENTS

OTHER PRECAUTIONS NONE

COMPANY NAME FISKE BROTHERS REFINING CO.

DATE PREPARED 6/18/86

PREPARED BY: O. F. Kuhlman

Technical Advisor

MATERIAL SAFETY DATA SHEET

CORPORATE RESEARCH & DEVELOPMENT

SCHENECTADY, N. Y. 12305

MATERIALS INFORMATION SERVICES

NO. 314

TRICHLOROTRIFLUOROETHAN

Revision B

Date July 1979

SECTION I. MATERIAL IDENTIFICATION

MATERIAL NAME: TRICHLOROTRIFLUOROETHANE
OTHER DESIGNATIONS: 1,1,2-Trichloro-1,2,2-trifluoroethane, FCl_2CCClF_2, GE Materials D5B77 and D5B81A, CAS# 000 076 131
MANUFACTURER: Available from many suppliers
TRADE NAMES: ARKLONE P-113, BLACO-TRON TF, FREON TF, FREON 113, FRIGEN 113TR-T, GENETRON 113, GENESOLV D, ISOTRON 113, REFRIGERANT 113, UCON 113

SECTION II. INGREDIENTS AND HAZARDS	%	HAZARD DATA
Trichlorotrifluoroethane *Material is commercially available in refrigerant and high purity solvent grades. Stabilizers are not normally used.	ca 100*	8-hr TWA 1000 ppm or 7600 mg/m3 Human, inhalation TCLo 4500 ppm (central nervous system) Rat, oral LDLo 45 mg/kg

SECTION III. PHYSICAL DATA

Boiling point, 1 atm, deg F (C) --	117.6 (47.6)	Specific gravity (20/4C) --	1.57
Vapor pressure at 70 F, mm Hg ----	285	Volatiles, % ----------	ca 100
Vapor density (Air=1) ----------	ca 6	Evaporation rate (Acetone=1)	0.45
Solubility in H_2O at 70 F, % -----	0.028	Melting point, deg C ------	-35 to -36
		Molecular weight ----------	187.39

Appearance & odor: Clear, colorless liquid with a slight ethereal odor whose recognition threshold (100% of test panel for UCON-113) is 135 ppm in air. (Vapor may be detected below 50 ppm, unfatigued.)

SECTION IV. FIRE AND EXPLOSION DATA

Flash Point and Method	Autoignition Temp.	Flammability Limits In Air	LOWER	UPPER
None	None	None	-	-

Extinguishing media: Use that which is appropriate for the surrounding fire. This is a nonflammable material; however, when it is involved in a fire, the firefighters should use self-contained breathing apparatus for protection against suffocating vapors and toxic and corrosive decomposition products.

SECTION V. REACTIVITY DATA

Trichlorotrifluoroethane is a stable material under normal use and storage conditions. It does not undergo or cause hazardous polymerization. Thermal-oxidative decomposition begins at about 250 C to give halogen acids, halogens, and carbonyl halides which are toxic and corrosive.

It can react violently with active metals such as sodium, potassium, and barium; and finely divided aluminum, zinc, magnesium and beryllium can also react, especially at high temperature.

NO. 314

SECTION VI. HEALTH HAZARD INFORMATION

TLV 1000 ppm or 7600 mg/m^3

This material is low in toxicity. It is an anesthetic and inhalation of high concentrations can produce asphyxiation. At levels of about 2500 ppm in air there begins to be interference with psychological and psychomotor functions, expressed as excitement and incoordination. Possible cardiac arrhythmias at high concentration. Repeated or prolonged skin contact will cause defatting and possible dermatitis. Eye contact with liquid produces irritation and mild conjunctivitis.

FIRST AID:

Inhalation: Remove to fresh air and apply artificial respiration, if required. Contact physician; advise against use of epinephrin-type drugs.

Skin contact: Prevent repeated exposure. Apply lanolin-type cream.

Eye contact: Flush eyes with copious amounts of water for 15 minutes. Get prompt medical attention.

Ingestion: Induce vomiting. Contact a physician; advise against use of epinephrin-type drugs.

SECTION VII. SPILL, LEAK, AND DISPOSAL PROCEDURES

When spills of significant size occur, evacuate the area. Remove ignition sources. Provide ventilation. Those involved in clean-up should use self-contained respirators. Recover as much liquid as feasible and place in covered metal container. Residues or small spills can be picked up with an absorbent, such as vermiculite, and held in a covered metal container for disposal as solid waste or for evaporation in an area remote from buildings and people.

Waste solvent should be recovered when possible by filtration and distillation processes or disposed of via a licensed solvent waste disposal company.

SECTION VIII. SPECIAL PROTECTION INFORMATION

Provide adequate exhaust ventilation to keep below the TLV level. Self-contained breathing apparatus should be available for emergency use. Approved cannister respirators can be used for short periods up to 2-3 times the TLV level for nonroutine requirements.

Supply ventilation for sumps and low lying areas where the dense vapors of this material might collect.

Skin contact should be prevented by use of proper procedures and equipment and by protective gloves, aprons, etc. (Polyvinyl alcohol gloves offer the greatest protection against trichlorotrifluoroethane but are attacked by water.)

Face shields or safety goggles should be used where splashing of solvent is possible. Provide eyewash stations where splashing is probable.

SECTION IX. SPECIAL PRECAUTIONS AND COMMENTS

Store sealed containers in a cool (below 125 F), well-ventilated place. Keep vapors of this material away from flames, arc welding, high temperature surfaces, etc to avoid toxic and corrosive decomposition products. Space heaters in an atmosphere containing halocarbon vapors well below the TLV can suffer extensive corrosion damage in the combustion and chimney areas. No smoking in areas of use.

DATA SOURCE(S) CODE: 1,2,4,7,8,12,21,26

APPROVALS: MIS, CRD

Industrial Hygiene and Safety

MEDICAL REVIEW: 12/79

Judgments as to the suitability of information herein for purchaser's purposes are necessarily purchaser's responsibility. Therefore, although reasonable care has been taken in the preparation of such information, General Electric Company extends no warranties, makes no representations and assumes no responsibility as to the accuracy or suitability of such information for application to purchaser's

Required under USDL Safety and Health Regulations for Ship Repairing, Shipbuilding, and Shipbreaking (29 CFR 1915, 1916, 1917)

SECTION I

MANUFACTURER'S NAME	EMERGENCY TELEPHONE NO.
Grafo Colloids Corporation	412/981-1773
ADDRESS (Number, Street, City, State, and ZIP Code) P.O. Box 725, Sharon, PA 16146	
CHEMICAL NAME AND SYNONYMS Aquadag	TRADE NAME AND SYNONYMS Grafo Hydrograf
CHEMICAL FAMILY	FORMULA

SECTION II - HAZARDOUS INGREDIENTS

PAINTS, PRESERVATIVES, & SOLVENTS	%	TLV (Units)	ALLOYS AND METALLIC COATINGS	%	TLV (Units)
PIGMENTS			BASE METAL		
CATALYST			ALLOYS		
VEHICLE			METALLIC COATINGS		
SOLVENTS			FILLER METAL PLUS COATING OR CORE FLUX		
ADDITIVES			OTHERS		
OTHERS					

HAZARDOUS MIXTURES OF OTHER LIQUIDS, SOLIDS, OR GASES		%	TLV (Units)
Ammonium Hydroxide	Max.	0.6	25 ppm
Dowcide A (Sodium Ortho-phenyl phenol)	Max.	0.08	5 mg/
Graphite	Max.	20	15 mpp

SECTION III - PHYSICAL DATA

BOILING POINT (°F.)	212	SPECIFIC GRAVITY (H_2O=1) Approx.	1.1
VAPOR PRESSURE (mm Hg.) 20° C	17.5	PERCENT, VOLATILE BY VOLUME (%) Approx.	78
VAPOR DENSITY (AIR=1)		EVAPORATION RATE (_____ =1)	
SOLUBILITY IN WATER	Appreciable		
APPEARANCE AND ODOR	Black, heavy liquid or paste; slight ammonia odor		

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (Method used)	FLAMMABLE LIMITS	Lel	Uel
none			
EXTINGUISHING MEDIA not flammable			
SPECIAL FIRE FIGHTING PROCEDURES			
UNUSUAL FIRE AND EXPLOSION HAZARDS Avoid contact with strong oxidizing agents			

(Continued on reverse side)

S

THRESHOLD LIMIT VALUE Not de

EFFECTS OF OVEREXPOSURE
Repeated and prolonged exposure to ammonia fumes in concentrations may result in temporary respiratory discomfort.

EMERGENCY AND FIRST AID PROCEDURES
Inhalation: provide fresh air. Skin: wash with soap and water. Eye: Flush with copius amounts of warm water; seek medical aid if irritation persists.

SECTION VI - REACTIVITY DATA

STABILITY			CONDITIONS TO AVOID
	UNSTABLE		
	STABLE	X	

INCOMPATABILITY *(Materials to avoid)* Avoid contact with strong oxidizing agents.

HAZARDOUS DECOMPOSITION PRODUCTS

HAZARDOUS POLYMERIZATION			CONDITIONS TO AVOID
	MAY OCCUR		
	WILL NOT OCCUR	X	

SECTION VII - SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED Wash area with soap and water

WASTE DISPOSAL METHOD Soak up excess with absorbent material, dispose of in approved landfill area.

SECTION VIII - SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION *(Specify type)* Use of inhalator is advisable.

VENTILATION	LOCAL EXHAUST	SPECIAL
	to remove local airborne particles	
	MECHANICAL *(General)*	OTHER

PROTECTIVE GLOVES Waterproof if needed to avoid skin stains

EYE PROTECTION Goggles if splashing likely.

OTHER PROTECTIVE EQUIPMENT Waterproof apron if needed to protect personal clothing from stains.

SECTION IX - SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING Keep container closed when not in use to prevent drying out. Protect from freezing during storage.

OTHER PRECAUTIONS Produces black stains on fabrics which are difficult to remove.

 The information on this form is furnished solely for the pur Form OS
pose of compliance with OSHA Act, and shall not be used for any other purpose. Rev May
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the results to be obtained from the use thereof.

H3880 -01
Effective: 10/08/85

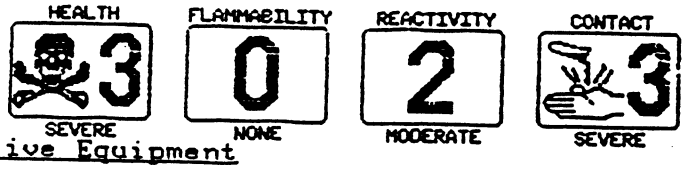
Hydrochloric Acid

SECTION I - PRODUCT IDENTIFICATION

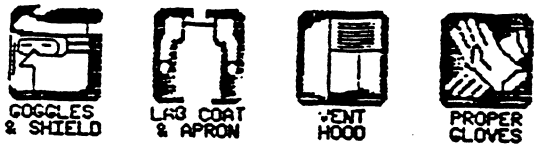
Product Name:	Hydrochloric Acid
Formula:	HCl
Formula Wt:	36.46
CAS No.:	07647-01-0
NIOSH/RTECS No.:	MW4025000
Common Synonyms:	Muriatic Acid; Chlorohydric Acid; Hydrochloride
Product Codes:	9543,9539,9535,5367,9534,9544,9529,9542,4800,9549,9530,9548 9540,9547,9546,9537

PRECAUTIONARY LABELLING

BAKER SAF-T-DATA™ System



Laboratory Protective Equipment



Precautionary Label Statements

POISON! DANGER!
CAUSES SEVERE BURNS
MAY BE FATAL IF SWALLOWED
Do not get in eyes, on skin, on clothing.
Avoid breathing vapor. Keep in tightly closed container. Use with adequate ventilation. Wash thoroughly after handling.

SECTION II - HAZARDOUS COMPONENTS

Component	%	CAS No.
Hydrochloric Acid	35-40	7647-01-0

SECTION III - PHYSICAL DATA

Boiling Point:	110°C (230°F)	Vapor Pressure(mmHg):	212
Melting Point:	N/A	Vapor Density(air=1):	1.3

Continued on Page: 2

H3880 -01 Hydrochloric Acid Page: 2
Effective: 10/08/85 Issued: 10/09/85

SECTION III - PHYSICAL DATA (Continued)

Specific Gravity: 1.19 (H_2O=1)

Evaporation Rate: N/A (Butyl Acetate=1)

Solubility(H_2O): Complete (in all proportions)

% Volatiles by Volume: 100

Appearance & Odor: Clear, colorless or slightly yellow fuming liquid.

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

Flash Point: N/A

NFPA 704M Rating: 3-0-0

Fire Extinguishing Media

Use extinguishing media appropriate for surrounding fire.

Special Fire-Fighting Procedures

Firefighters should wear proper protective equipment and self-contained (positive pressure if available) breathing apparatus with full facepiece.
Move exposed containers from fire area, if it can be done without risk.
Use water to keep fire exposed containers cool; do not get water inside containers.

Toxic Gases Produced

hydrogen chloride

SECTION V - HEALTH HAZARD DATA

Toxicity:

LC_{50} (inhl-rat-1H) (ppm)	- 3124
LD_{50} (ipr-mouse)(mg/kg)	- 40
LD_{50} (oral-rabbit)(mg/kg)	- 900

Effects of Overexposure

Liquid may cause severe burns to skin and eyes.
Inhalation of vapors may cause severe irritation of the respiratory system.
Inhalation of vapors may cause coughing and difficult breathing.

Emergency and First Aid Procedures

If swallowed, do NOT induce vomiting. Give water, milk, or milk of magnesia.
In case of contact, immediately flush eyes or skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes.
Wash clothing before re-use.

Continued on Page: 3

SECTION VI - REACTIVITY DATA

Stability: Stable

Hazardous Polymerization: Will not occur

Conditions to Avoid: heat, moisture

Incompatibles: most common metals, water, strong bases, amines, carbonates, metal oxide

Decomposition Products: hydrogen chloride

SECTION VII - SPILL AND DISPOSAL PROCEDURES

Steps to be taken in the event of a spill or discharge

Wear self-contained breathing apparatus and full protective clothing. Stop leak if you can do so without risk. Ventilate area. Neutralize spill with soda ash or lime. With clean shovel, carefully place material into clean, dry container and cover; remove from area. Flush spill area with water.

J. T. Baker Neutrasorb^{R} or Neutrasol^{R} "Low Na+" acid neutralizers are recommended for spills of this product.

Disposal Procedure

Dispose in accordance with all applicable federal, state, and local environmental regulations.

EPA Hazardous Waste Number: D002 (Corrosive Waste)

SECTION VIII - INDUSTRIAL PROTECTIVE EQUIPMENT

Ventilation: Use adequate general or local exhaust ventilation to keep vapor and mist levels as low as possible.

Respiratory Protection: None required where adequate ventilation conditions exist. If airborne concentration is high, a chemical cartridge respirator with acid cartridge is recommended. If concentration exceeds capacity of cartridge respirator, a self-contained breathing apparatus is advised.

Eye/Skin Protection: Safety goggles and face shield, uniform, protective suit, acid-resistant gloves are recommended.

SECTION IX - STORAGE AND HANDLING PRECAUTIONS

SAF-T-DATA^{TM} Storage Color Code: White

Special Precautions

Keep container tightly closed. Store in corrosion-proof area.

Continued on Page: 4

SECTION IX - STORAGE AND HANDLING PRECAUTIONS (Continued)

Do not store near oxidizing materials.

SECTION X - TRANSPORTATION DATA AND ADDITIONAL INFORMATION

DOMESTIC (D.O.T.)

Proper Shipping Name	Hydrochloric acid
Hazard Class	Corrosive material (liquid)
UN/NA	UN1789
Labels	CORROSIVE
Reportable Quantity	5000 LBS.

INTERNATIONAL (I.M.O.)

Proper Shipping Name	Hydrochloric acid, solution
Hazard Class	8
UN/NA	UN1789
Labels	CORROSIVE

N/A = Not Applicable or Not Available

The information published in this Material Safety Data Sheet has been compiled from our experience and data presented in various technical publications. It is ıe user's responsibility to determine the suitability of this information for ıe adoption of necessary safety precautions. We reserve the right to revise Material Safety Data Sheets periodically as new information becomes available.

-- LAST PAGE --

MATERIAL SAFETY DATA SHEET

Required under USDL Safety and Health Regulations for Ship Repairing, Shipbuilding, and Shipbreaking (29 CFR 1915, 1916, 1917)

SECTION I

MANUFACTURER'S NAME: O. G. KELLEY & CO., INC.	EMERGENCY TELEPHONE NO.: 615/926-7166
ADDRESS (Number, Street, City, State, and ZIP Code): 724 W. Walnut Street, Johnson City, TN 37601	
CHEMICAL NAME AND SYNONYMS: Lead	TRADE NAME AND SYNONYMS: Lead Pipe, Lead Pig, Lead Sheet, Ingot Lead
CHEMICAL FAMILY	FORMULA: Pb

SECTION II - HAZARDOUS INGREDIENTS

PAINTS, PRESERVATIVES, & SOLVENTS	%	TLV (Units)	ALLOYS AND METALLIC COATINGS	%	TLV (Units)
PIGMENTS			BASE METAL		
CATALYST			ALLOYS		
VEHICLE			METALLIC COATINGS		
SOLVENTS			FILLER METAL PLUS COATING OR CORE FLUX		
ADDITIVES			OTHERS LEAD		0.05 mg/M3
OTHERS			LEAD		0.15 mg/M3

HAZARDOUS MIXTURES OF OTHER LIQUIDS, SOLIDS, OR GASES	%	TLV (Units)

SECTION III - PHYSICAL DATA

BOILING POINT (°F.) 1525 (C)	2777 (F)	SPECIFIC GRAVITY (H_2O=1)	11.35
VAPOR PRESSURE (mm Hg.)		PERCENT, VOLATILE BY VOLUME (%)	N/A
VAPOR DENSITY (AIR=1)		EVAPORATION RATE (_____=1)	
SOLUBILITY IN WATER	Insoluble	melting point 621 (F)	327.5(C)
APPEARANCE AND ODOR	Gray odorless solid		

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (Method used) N/A	FLAMMABLE LIMITS N/A	Lel	Uel
EXTINGUISHING MEDIA N/A			
SPECIAL FIRE FIGHTING PROCEDURES N/A			
UNUSUAL FIRE AND EXPLOSION HAZARDS N/A			

(Continued on reverse side)

SECTION V - HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE

EFFECTS OF OVEREXPOSURE
Gastrointestinal disturbances and anemia with prolonged absorption of Lead. Wi
more serious intoxication there is neuromuscular dysfunction,while the most sev
lead exposure may result in encephalopathy.

EMERGENCY AND FIRST AID PROCEDURES
Eyes-N/A Skin-wash with soap & water
inhalation-remove from exposure and get medical attention ingestion-get medica
attention

SECTION VI - REACTIVITY DATA

STABILITY			CONDITIONS TO AVOID
Stable	UNSTABLE		NONE
	STABLE		

INCOMPATABILITY *(Materials to avoid)*
NONE

HAZARDOUS DECOMPOSITION PRODUCTS
Temperatures above the melting point may produce fume

HAZARDOUS POLYMERIZATION			CONDITIONS TO AVOID
NONE	MAY OCCUR		NONE
	WILL NOT OCCUR		

SECTION VII - SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED
N/A

WASTE DISPOSAL METHOD

SECTION VIII - SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION *(Specify type)*
Respirators required NIOSH/MSHA-approved for Lead dust/fume

VENTILATION		
General is adequate	LOCAL EXHAUST	SPECIAL
	use exhaust ventilation when working with molten lead.	
	MECHANICAL *(General)*	OTHER

PROTECTIVE GLOVES	EYE PROTECTION
Gloves required Impervious	

OTHER PROTECTIVE EQUIPMENT
Full body clothing should be utilized to prevent skin contact Change rooms, wash up procedures and shower facilities recommended

SECTION IX - SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING

OTHER PRECAUTIONS

LITHIUM

LITHIUM
LITHIUM
LITHIUM

MATERIAL SAFETY DATA SHEET

FISHER SCIENTIFIC
CHEMICAL DIVISION
1 REAGENT LANE
FAIR LAWN NJ 07410
(201) 796-7100

EMERGENCY CONTACTS
GASTON L. PILLORI
(201) 796-7100

DATE: 06/13/86
PO NBR: N/A
ACCT: 220066-01
INDEX: N/A
CAT NO: L11125

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SUBSTANCE IDENTIFICATION

SUBSTANCE: **LITHIUM**

CAS-NUMBER 7439-93-2

TRADE NAMES/SYNONYMS: LITHIUM METAL; L-111

CHEMICAL FAMILY:
INORGANIC METAL

MOLECULAR FORMULA: LI MOL WT: 6.941

CERCLA RATINGS (SCALE 0-3): HEALTH=2 FIRE=3 REACTIVITY=3 PERSISTENCE=3

COMPONENTS AND CONTAMINANTS

PERCENT: 100 COMPONENT: LITHIUM

OTHER CONTAMINANTS: NONE.

EXPOSURE LIMITS:
NONE ESTABLISHED.

PHYSICAL DATA

DESCRIPTION: SOFT, SILVER-WHITE METAL. BOILING POINT: 2448 F (1342 C)

MELTING POINT: 357 F (181 C) SPECIFIC GRAVITY: 0.5

VAPOR PRESSURE: 1 MMHG @ 1333 F SOLUBILITY IN WATER: REACTS

SOLVENT SOLUBILITY: LIQUID AMMONIA.

CHRONIC EXPOSURE- HAS NOT BEEN OBSERVED IN HUMANS.

FIRST AID- (WATER REACTIVE!) WIPE MATERIAL FROM SKIN IMMEDIATELY, THEN FLUSH AFFECTED AREA WITH LARGE AMOUNTS OF WATER UNTIL NO EVIDENCE OF CHEMICAL REMAINS.

EYE CONTACT:
CORROSIVE.
ACUTE EXPOSURE- DIRECT CONTACT MAY CAUSE SERIOUS CORNEAL BURNS.

CHRONIC EXPOSURE- HAS NOT BEEN REPORTED IN HUMANS.

FIRST AID- WIPE MATERIAL AWAY FROM AROUND THE EYES, THEN WASH EYES WITH LARGE AMOUNTS OF WATER UNTIL NO EVIDENCE OF CHEMICAL REMAINS. IN THE PRESENCE OF BURNS, APPLY STERILE DRESSING.

INGESTION:

ACUTE EXPOSURE- CONTACT WITH TISSUE WILL CAUSE IGNITION WITH BURNS OF THE GASTROINTESTINAL TRACT.

FIRST AID- IF VICTIM IS CONSCIOUS, GIVE HIM LARGE QUANTITIES OF WATER IMMEDIATELY TO DILUTE. DO NOT INDUCE VOMITING. GET MEDICAL ATTENTION IMMEDIATELY.

REACTIVITY

REACTIVITY:
BURNS VIOLENTLY IN AIR. DANGEROUS WHEN WET!

INCOMPATIBILITIES:
AIR: IGNITION.
ARSENIC: VIOLENT REACTION WITH STRONGLY HEATED ARSENIC.
BERYLLIUM: MOLTEN LITHIUM @ 180 C ATTACKS BERYLLIUM SEVERELY.
BROMINE: POSSIBLE EXPLOSION.
BROMINE PENTAFLUORIDE: IGNITION.
BROMOFORM: LITHIUM MIXED WITH BROMOFORM CAN EXPLODE ON IMPACT.
CARBIDES: MOLTEN LITHIUM ATTACKS CARBIDES.
CARBON OXIDES: IGNITION OR EXPLOSION.
CARBON MONOXIDE AND WATER: THE PRODUCT OF THE REACTION BETWEEN LI AND CO, LITHIUM CARBONYL, DETONATES VIOLENTLY WITH WATER, IGNITING GASEOUS PRODUCTS.
CARBON TETRABROMIDE: POSSIBLE EXPLOSION BY IMPACT.
CARBON TETRACHLORIDE: POSSIBLE EXPLOSION.
CHLORINE: REACTS WITH LUMINOUS FLAME.
CHLOROFORM: POSSIBLE EXPLOSION.
CHROMIC OXIDE: REACTION OCCURS AROUND 180 C WITH TEMPERATURE RISE TO 965 C.
CHROMIUM TRIOXIDE AND NITROGEN: VIOLENT COMBUSTION.
CHROMIUM: MOLTEN LITHIUM @ 180 C ATTACKS CHROMIUM SEVERELY.
CHROMIUM TRICHLORIDE: ON DUSTING A LITHIUM STRIP WITH CHROMIUM, THEN WAVING IN A NITROGEN ATMOSPHERE, THE LITHIUM BURNS VIGOROUSLY.
COBALT ALLOYS: MOLTEN LITHIUM ATTACKS COBALT ALLOYS.
DIAZOMETHANE: POSSIBLE EXPLOSION.
DIBORANE: IGNITION.
FERROUS SULFIDE: REACTION OCCURS @ 180 C WITH CONSEQUENT TEMP. RISE TO 945 C.
HALOCARBONS: POSSIBLE IGNITION BY IMPACT.

FIRE AND EXPLOSION DATA

FIRE AND EXPLOSION HAZARD:
FINELY DIVIDED METAL MAY IGNITE IN AIR AT AMBIENT TEMPERATURE, AND MASSIVE METAL AT TEMPERATURES ABOVE THE MELTING POINT, ESPECIALLY IF OXIDE OR NITRIDE IS PRESENT. SINCE LITHIUM WILL BURN IN OXYGEN, NITROGEN, OR CARBON DIOXIDE, AND MAY REACTS WITH SAND, SODIUM CARBONATE, ETC., IT IS DIFFICULT TO EXTINGUISH ONCE ALIGHT.

FLASH POINT: FLAMMABLE SOLID UPPER EXPLOSION LIMIT: NOT AVAILABLE

LOWER EXPLOSION LIMIT: NOT AVAILABLE

FIREFIGHTING MEDIA:
DRY CHEMICAL, SODA ASH OR LIME
(1984 EMERGENCY RESPONSE GUIDEBOOK, DOT P 5800.3).

FOR LARGE FIRES: WITHDRAW FROM AREA AND LET FIRE BURN
(1984 EMERGENCY RESPONSE GUIDEBOOK, DOT P 5800.3).

FIREFIGHTING:
MOVE CONTAINER FROM FIRE AREA IF POSSIBLE. COOL CONTAINERS EXPOSED TO FLAME WITH WATER FROM SIDE UNTIL WELL AFTER FIRE IS OUT. FOR MASSIVE FIRE IN CARGO AREA, USE UNMANNED HOSE HOLDER OR MONITOR NOZZLES; ELSE WITHDRAW AND LET FIRE BURN (1984 EMERGENCY RESPONSE GUIDEBOOK, DOT P 5800.3).

DO NOT USE WATER, USE GRAPHITE, SODA ASH, POWDERED SODIUM CHLORIDE, OR SUITABLE DRY POWDER. AVOID BREATHING FUMES FROM BURNING MATERIAL (BUREAU OF EXPLOSIVES, EMERGENCY HANDLING OF HAZARDOUS MATERIALS IN SURFACE TRANSPORTATION, 1981).

TOXICITY

CARCINOGEN STATUS: NONE. TERATOGENIC DATA: RTEC.
LITHIUM IS AN ALKALI METAL WHOSE TOXICITY IS NOT WELL CHARACTERIZED BECAUSE THE SAFETY HAZARD IS EXTREMELY ACUTE. EYE OR SKIN CONTACT WILL CAUSE BURNS.

HEALTH EFFECTS AND FIRST AID

INHALATION:

ACUTE EXPOSURE- IGNITES IN PRESENCE OF MOISTURE, RELEASING CORROSIVE LITHIUM HYDROXIDE AND FLAMMABLE HYDROGEN GAS.

CHRONIC EXPOSURE- NOT REPORTED IN HUMANS.

FIRST AID- REMOVE PERSON FROM EXPOSURE AREA TO FRESH AIR IMMEDIALTEY. GIVE ARTIFICIAL RESPIRATION IF BREATHING HAS STOPPED OR IS DEPRESSED. MAINTAIN AIRWAY AND BLOOD PRESSURE. KEEP VICTIM WARM AND AT REST. GET MEDICAL ATTENTION.

SKIN CONTACT:
CORROSIVE.
ACUTE EXPOSURE- REACTION WITH MOISTURE ON SKIN MAY RESULT IN SERIOUS BURNS. THERE MAY BE IRRITATION. SMALL SEPTIC BLISTERS MAY FORM.

11

HALOGENS: VIOLENT EXOTHERMIC REACTIONS OR POSSIBLE EXPLOSION.
HYDROGEN: LITHIUM BURNS IN GASEOUS HYDROGEN.
IODINE: A HIGHLY LUMINOUS REACTION OCCURS.
IODOFORM: THE MIXTURE CAN EXPLODE ON IMPACT.
IRON ALLOYS: MOLTEN LITHIUM ATTACKS IRON ALLOYS.
MALEIC ANHYDRIDE: EXPLOSIVE DECOMPOSITION.
MANGANESE ALLOYS: MOLTEN LITHIUM ATTACKS MANGANESE ALLOYS.
MERCURY: VIOLENT EXOTHERMIC REACTION OR POSSIBLE EXPLOSION.
METAL OXIDES: INTENSE EXOTHERMIC REACTION.
METHYL DICHLORIDE: THE MIXTURE CAN EXPLODE ON IMPACT.
METHYL DIIODIDE: THE MIXTURE CAN EXPLODE ON IMPACT.
MOLYBDENUM TRIOXIDE: THE REACTION OCCURS @ 180 C WITH CONSEQUENT TEMPERATURE RISE TO 1400 C.
MONOFLUOROTRICHLOROMETHANE: POSSIBLE EXPLOSION.
NICKEL ALLOYS: MOLTEN LITHIUM ATTACKS NICKEL ALLOYS.
NIOBIUM PENTAOXIDE: THE REACTION OCCURS @ 320 C WITH CONSEQUENT TEMPERATURE RISE TO 490 C.
NITRIC ACID: IGNITION.
NITROGEN: IGNITION.
ORGANIC MATTER: MOLTEN LITHIUM ATTACKS PLASTICS AND RUBBER.
OXYGEN: IGNITION.
PHOSPHORUS: VIOLENT REACTION WITH STRONGLY HEATED PHOSPHORUS.
PLATINUM: INTENSE REACTION @ 550 C.
POLY-1,1-DIFLUOROETHYLENE-HEXAFLUOROPYLENE: IGNITION BY HEATING.
SILICATES: MOLTEN LITHIUM ATTACKS SILICATES.
SODIUM CARBONATE: VIOLENT REACTION.
SODIUM CHLORIDE: VIOLENT REACTION.
SODIUM NITRITE: FORMATION OF LITHIUM SODIUM HYPONITRITE WHICH DECOMPOSES VIOLENTLY AROUND 100-130 C.
SULFUR: EXPLOSIVE REACTION.
TANTALUM PENTOXIDE: THE REACTION OCCURS AROUND 410 C WITH CONSEQUENT TEMPERATURE RISE TO 595 C.
TETRACHLOROETHYLENE: FORMATION OF EXPLOSIVE MIXTURE.
TITANIUM DIOXIDE: REACTS @ 200 C WITH A FLASH OF LIGHT; TEMP CAN REACH 900 C.
TRICHLOROETHYLENE: FORMATION OF EXPLOSIVE MIXTURE.
TRICHLOROTRIFLUOROETHANE: FORMATION OF EXPLOSIVE MIXTURE.
TRIFLUOROMETHYL HYPOFLUORITE: VIOLENT EXOTHERMIC REACTION.
TUNGSTEN TRIOXIDE: THE REACTION OCCURS @ 200 C WITH SUBSEQUENT TEMPERATURE RISE TO 1030 C.
VANADIUM: MOLTEN LITHIUM ATTACKS VANADIUM SEVERELY.
VANADIUM PENTOXIDE: THE REACTION OCCURS @ 400 C WITH SUBSEQUENT RISE IN TEMP. TO 768 C.
WATER (HOT): INTENSE REACTION.
ZIRCONIUM TETRACHLORIDE AND NITROGEN: VIOLENT COMBUSTION BY HEATING.

DECOMPOSITION:
DECOMPOSES ON CONTACT WITH WATER TO FORM CORROSIVE LITHIUM HYDROXIDE AND FLAMMABLE HYDROGEN GAS.

POLYMERIZATION:
NOT KNOWN TO OCCUR.

****

CONDITIONS TO AVOID

MAY IGNITE ITSELF IF EXPOSED TO AIR OR IN PRESENCE OF MOISTURE. MAY RE-IGNITE AFTER FIRE IS EXTINGUISHED. VIOLENT REACTION WITH WATER PRODUCES FLAMMABLE

GAS. RUNOFF TO SEWER MAY CREATE FIRE OR EXPLOSION HAZARD.

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SPILL AND LEAK PROCEDURES

OCCUPATIONAL SPILL:
SHUT OFF IGNITION SOURCES. DO NOT TOUCH SPILLED MATERIAL. STOP LEAK IF YOU CAN DO IT WITHOUT RISK. DO NOT GET WATER ON SPILLED MATERIAL OR INSIDE THE CONTAINER. FOR SMALL DRY SPILLS, WITH CLEAN SHOVEL PLACE MATERIAL INTO CLEAN, DRY CONTAINER AND COVER; MOVE CONTAINERS FROM SPILL AREA. FOR SMALL LIQUID SPILLS, TAKE UP WITH SAND OR OTHER ABSORBENT MATERIAL AND PLACE INTO CONTAINERS FOR LATER DISPOSAL. FOR LARGER SPILLS, DIKE SPILL FOR LATER DISPOSAL. COVER POWDER SPILLS WITH PLASTIC SHEET OR TARP TO MINIMIZE SPREADING. KEEP UNNECESSARY PEOPLE AWAY. ISOLATE HAZARD AREA AND DENY ENTRY.

PROTECTIVE EQUIPMENT

VENTILATION:
PROVIDE LOCAL EXHAUST OR GENERAL DILUTION VENTILATION SYSTEM.

RESPIRATOR:
HIGH LEVELS- SUPPLIED-AIR RESPIRATOR WITH A FULL FACEPIECE, HELMET, OR HOOD. SELF-CONTAINED BREATHING APPARATUS WITH A FULL FACEPIECE.

FIREFIGHTING- SELF-CONTAINED BREATHING APPARATUS WITH A FULL FACEPIECE OPERATED IN PRESSURE-DEMAND OR OTHER POSITIVE-PRESSURE MODE.

CLOTHING:
EMPLOYEE MUST WEAR APPROPRIATE PROTECTIVE CLOTHING AND EQUIPMENT TO PREVENT REPEATED OR PROLONGED SKIN CONTACT WITH THIS SUBSTANCE.

GLOVES:
EMPLOYEE MUST WEAR APPROPRIATE PROTECTIVE GLOVES TO PREVENT CONTACT WITH THIS SUBSTANCE.

EYE PROTECTION:
EMPLOYEE MUST WEAR SPLASH-PROOF OR DUST-RESISTANT SAFETY GOGGLES AND A FACESHIELD TO PREVENT CONTACT WITH THIS SUBSTANCE.

WHERE THERE IS ANY POSSIBILITY THAT AN EMPLOYEE'S EYES MAY BE EXPOSED TO THIS SUBSTANCE, THE EMPLOYER SHALL PROVIDE AN EYE-WASH FOUNTAIN WITHIN THE IMMEDIATE WORK AREA FOR EMERGENCY USE.

AUTHORIZED - ALLIED FISHER SCIENTIFIC
CREATION DATE: 01/18/85 REVISION DATE: 09/04/85

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INCO S-ROUNDS® Electrolytic Nickel

INCO®
MATERIAL SAFETY DATA SHEET

September 13, 1985

TYPICAL COMPOSITION %

Ni	C	Cu	Co	Fe	S
99.9	0.003	0.002	0.065	0.0005	0.025

HAZARDOUS INGREDIENTS

Hazardous Ingredients	Calculated Composition %	C.A.S. No.	PEL[1]-mg/m^3	TLV[2]-mg/m^3
Nickel metal (Ni)	99.9	7740-02-0	1	1

PHYSICAL and CHEMICAL DATA

Silver-gray, odorless metal discs of approximately 1 in. (25 mm) diameter and ¼ in. (6 mm) thickness.

Ingredient	Mol. wt.	Density g/cm^3	m.p. °C	b.p. °C	Sol. in H_2O g/100 ml	Magnetic properties
Ni	58.71	8.9	1453	2732	0	ferromagnetic

PHYSICAL HAZARDS

None

HEALTH HAZARDS[3]

Inhalation: The National Toxicology Program has listed nickel as a possible cancer hazard. The International Agency for Research on Cancer concluded there was sufficient evidence that nickel refining was carcinogenic to humans and limited evidence that nickel and certain nickel compounds were carcinogenic to humans. IARC could not state with certainty which forms of nickel are human carcinogens but said "....metallic nickel seems less likely to be so than nickel subsulphide or nickel oxides.". The inhalation of nickel powder has not resulted in an increased incidence of malignant tumors in rodents. Studies of workers exposed to nickel powder and to dust and fume generated in the production of nickel alloys and of stainless steel have not indicated a respiratory cancer hazard.

Inhalation of airborne nickel powder at concentrations fifteen times the PEL irritated the respiratory tract in rodents.

Skin Contact: Repeated contact with metallic nickel can cause nickel sensitivity resulting in allergic skin rashes.

Wounds: Nickel powder and nickel oxide have caused tumors at the site of injection in rodents. However, studies of nickel-containing prostheses do not suggest a significant risk for humans.

Ingestion: Nickel metal has a low oral toxicity (oral rat LD_{50} > 9000 mg/kg). The U.S. Food and Drug Administration concluded that nickel and its inorganic compounds are not carcinogenic when ingested.

Preexisting Conditions: Sensitized individuals may experience an allergic skin rash.

INCO S-ROUNDS® Electrolytic Nickel (Continued)

PRECAUTIONS FOR SAFE STORAGE, HANDLING AND USE

If user operations generate dust, fume or mist, use ventilation to keep exposure to airborne nickel below the PEL.[1] If ventilation alone cannot so control exposure, use NIOSH-approved respirators selected according to OSHA 29 CFR 1910.134. Maintain airborne nickel levels as low as possible.

Avoid repeated skin contact. Wear suitable gloves. Wash skin thoroughly after handling. Launder clothing and gloves as needed.

Do not store near acids. Like other metals, nickel can react with acids to liberate hydrogen gas which can form explosive mixtures in air.

Under special conditions nickel can react with carbon monoxide in reducing atmospheres to form nickel carbonyl, $Ni(CO)_4$, an extremely toxic gas.

SPILL, LEAK AND DISPOSAL PROCEDURE

Pick up and replace in original container.

Nickel-containing waste is normally collected to recover nickel values. Should waste disposal be deemed necessary follow EPA and local regulations.

EMERGENCY AND FIRST AID PROCEDURES

or skin rashes seek medical attention.

Cleanse wounds thoroughly to remove any nickel particles.

If exposure to nickel carbonyl is suspected, seek medical attention immediately.

INTERNATIONAL NICKEL INC.
Park 80 West, Plaza Two
Saddle Brook, NJ 07662

Tel: (201) 843-8600

Trademark of the INCO family of companies.

[1] OSHA Permissible Exposure Limit

[2] Threshold Limit Value of the American Conference of Governmental Industrial Hygienists.

[3] Describes possible health hazards of the nickel product supplied. If user operations change it to other chemical forms, whether as end products, intermediates or fugitive emissions, the possible health hazards of such forms must be determined by the user.

chemists helping chemist

aldrich chemical co.

P.O. Box 355, Milwaukee, Wisconsin 53201 USA • (414) 273-3850

ATTN: SAFETY DIRECTOR
ECHNISERV
I DUPONT
BLDG 723/9A
SAVANNAH RIVER PLANT
AIKEN SC 29801
RUSTY REED

DATE: 06/09/86
CUST # 923392 P.O. #

MATERIAL SAFETY DATA SHEET

IDENTIFICATION

PRODUCT # 24408-2 NAME: NICKEL(III) CARBONATE HYDRATE

TOXICITY HAZARDS

RTECS # QR6200000
NICKEL(III) CARBONATE (1:1)
REVIEWS, STANDARDS, AND REGULATIONS
CARCINOGENIC REVIEW:ANIMAL POSITIVE IARC** 11,75,76
OSHA STANDARD-AIR:TWA 1 MG(NI)/M3 FEREAC 39,23540,74
MSHA STANDARD-AIR:TWA 1 MG(NI)/M3 DTLVS* 3,178,71
NIOSH REL TO INORGANIC NICKEL-AIR:TWA 0.015 MG(NI)/M3 MMWR** 34(1S), 23S,85
NTP FOURTH ANNUAL REPORT ON CARCINOGENS, 1984
REPORTED IN EPA TSCA INVENTORY, 1983
MEETS CRITERIA FOR PROPOSED OSHA MEDICAL RECORDS RULE FEREAC 47,30420, 82

HEALTH HAZARD DATA

ACUTE EFFECTS
HARMFUL IF SWALLOWED, INHALED, OR ABSORBED THROUGH SKIN.
MAY CAUSE IRRITATION.
EXPOSURE CAN CAUSE:
GASTROINTESTINAL DISTURBANCES
CHRONIC EFFECTS
CARCINOGEN.
LUNG IRRITATION
DERMATITIS
TO THE BEST OF OUR KNOWLEDGE, THE CHEMICAL, PHYSICAL, AND TOXICOLOGICAL PROPERTIES HAVE NOT BEEN THOROUGHLY INVESTIGATED.
FIRST AID
IN CASE OF CONTACT, IMMEDIATELY FLUSH EYES OR SKIN WITH COPIOUS AMOUNTS OF WATER FOR AT LEAST 15 MINUTES WHILE REMOVING CONTAMINATED CLOTHING AND SHOES.
IF INHALED, REMOVE TO FRESH AIR. IF NOT BREATHING GIVE ARTIFICIAL RESPIRATION, PREFERABLY MOUTH-TO-MOUTH. IF BREATHING IS DIFFICULT, GIVE OXYGEN.
CALL A PHYSICIAN.
DISCARD CONTAMINATED CLOTHING AND SHOES.

PHYSICAL DATA

NO PHYSICAL DATA AVAILABLE

FIRE AND EXPLOSION HAZARD DATA

EXTINGUISHING MEDIA
WATER SPRAY.
CARBON DIOXIDE, DRY CHEMICAL POWDER, ALCOHOL OR POLYMER FOAM.
SPECIAL FIRE FIGHTING PROCEDURES
WEAR SELF-CONTAINED BREATHING APPARATUS AND PROTECTIVE CLOTHING TO PREVENT CONTACT WITH SKIN AND EYES.
UNUSUAL FIRE AND EXPLOSION HAZARDS
EMITS TOXIC FUMES UNDER FIRE CONDITIONS.

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MATERIAL SAFETY DATA SHEET PAGE: 2

CATALOG # 24408-2 NAME: NICKEL(II) CARBONATE HYDRATE

REACTIVITY DATA

INCOMPATIBILITIES
STRONG OXIDIZING AGENTS
STRONG ACIDS
HAZARDOUS COMBUSTION OR DECOMPOSITION PRODUCTS
TOXIC FUMES OF:
CARBON MONOXIDE, CARBON DIOXIDE
LEAD, LEAD OXIDES

SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IF MATERIAL IS RELEASED OR SPILLED
EVACUATE AREA.
WEAR SELF-CONTAINED BREATHING APPARATUS, RUBBER BOOTS AND HEAVY RUBBER GLOVES.
WEAR DISPOSABLE COVERALLS AND DISCARD THEM AFTER USE.
SWEEP UP, PLACE IN A BAG AND HOLD FOR WASTE DISPOSAL.
VENTILATE AREA AND WASH SPILL SITE AFTER MATERIAL PICKUP IS COMPLETE.
WASTE DISPOSAL METHOD
BURY IN A LANDFILL SITE APPROVED FOR THE DISPOSAL OF CHEMICAL AND HAZARDOUS WASTES.

OBSERVE ALL FEDERAL, STATE & LOCAL LAWS.

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE

WEAR APPROPRIATE OSHA/MSHA-APPROVED RESPIRATOR, CHEMICAL-RESISTANT GLOVES, SAFETY GOGGLES, OTHER PROTECTIVE CLOTHING.
SAFETY SHOWER AND EYE BATH.
USE ONLY IN A CHEMICAL FUME HOOD.
DO NOT BREATHE DUST.
AVOID ALL CONTACT.
WASH THOROUGHLY AFTER HANDLING.
CARCINOGEN.
HARMFUL SOLID.
KEEP TIGHTLY CLOSED.
STORE IN A COOL DRY PLACE.

ADDITIONAL PRECAUTIONS AND COMMENTS

NOT APPLICABLE

THE ABOVE INFORMATION IS BELIEVED TO BE CORRECT BUT DOES NOT PURPORT TO BE ALL INCLUSIVE AND SHALL BE USED ONLY AS A GUIDE. ALDRICH SHALL NOT BE HELD LIABLE FOR ANY DAMAGE RESULTING FROM HANDLING OR FROM CONTACT WITH THE ABOVE PRODUCT. SEE REVERSE SIDE OF INVOICE OR PACKI SLIP FOR ADDITIONAL TERMS AND CONDITIONS OF SALE.

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NICKELOUS CARBONATE
NICKELOUS CARBONATE
NICKELOUS CARBONATE

MATERIAL SAFETY DATA SHEET

FISHER SCIENTIFIC
CHEMICAL DIVISION
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FAIR LAWN NJ 07410
(201) 796-7100

EMERGENCY CONTACTS
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(201) 796-7100

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SUBSTANCE IDENTIFICATION

CAS-NUMBER 3333-67-3

SUBSTANCE: **NICKELOUS CARBONATE**

TRADE NAMES/SYNONYMS: CARBONIC ACID, NICKEL SALT (1:1); C.I.77779; NICKEL (II) CARBONATE; N-51

CHEMICAL FAMILY:
INORGANIC SALT

MOLECULAR FORMULA: C-NI-03 MOL. WT: 118.72

CERCLA RATINGS (SCALE 0-3): HEALTH=3 FIRE=0 REACTIVITY=0 PERSISTENCE=3

COMPONENTS AND CONTAMINANTS

PERCENT: 100 COMPONENT: NICKELOUS CARBONATE

OTHER CONTAMINANTS: NONE

EXPOSURE LIMITS:
1 MG(NI)/M3 ACGIH TWA;
15 UG(NI)/M3 NIOSH RECOMMENDED TWA

PHYSICAL DATA

DESCRIPTION: RHOMBIC, LIGHT GREEN CRYSTAL OR BROWN POWDER

MELTING POINT: DECOMPOSES SPECIFIC GRAVITY: 2.6

SOLUBILITY IN WATER: INSOLUBLE SOLVENT SOLUBILITY: AMMONIA, DILUTE ACIDS

FIRE AND EXPLOSION DATA

FIRE AND EXPLOSION HAZARD:
NEGLIGIBLE FIRE AND EXPLOSION HAZARD WHEN EXPOSED TO HEAT OR FLAME.

FLASH POINT: NON-COMBUSTIBLE

FIREFIGHTING MEDIA:
DRY CHEMICAL, CARBON DIOXIDE, WATER SPRAY OR FOAM
(1984 EMERGENCY RESPONSE GUIDEBOOK, DOT P 5800.3).

FOR LARGER FIRES, USE WATER SPRAY, FOG OR ALCOHOL FOAM
(1984 EMERGENCY RESPONSE GUIDEBOOK, DOT P 5800.3).

FIREFIGHTING:
MOVE CONTAINERS FROM FIRE AREA IF POSSIBLE (1984 EMERGENCY RESPONSE GUIDEBOOK, DOT P 5800.3).

EXTINGUISH USING AGENT INDICATED. USE FLOODING AMOUNTS OF WATER AS A FOG. AVOID BREATHING DUSTS AND FUMES FROM BURNING MATERIAL; KEEP UPWIND. (BUREAU OF EXPLOSIVE, EMERGENCY HANDLING OF HAZARDOUS MATERIALS IN SURFACE TRANSPORTATION, 1981).

TOXICITY

32 MG/KG SUBCUTANEOUS-GUINEA PIG; LDLO; MUTAGENIC DATA (RTECS); POSITIVE ANIMAL CARCINOGEN (IARC). EPIDEMIOLOGICAL STUDIES CONCLUSIVELY DEMONSTRATE AN INCREASED RISK OF NASAL CAVITY AND PULMONARY CANCER IN WORKERS IN NICKEL REFINERIES. IT IS LIKELY THAT NICKEL IN SOME FORM(S) IS CARCINOGENIC TO MAN. NICKEL COMPOUNDS ARE EYE, MUCOUS MEMBRANE, AND SKIN IRRITANTS AND PULMONARY AND SKIN SENSITIZERS.

HEALTH EFFECTS AND FIRST AID

INHALATION:
IRRITANT/SENSITIZER.

ACUTE EXPOSURE- INHALATION OF NICKEL DUST AND FUME MAY CAUSE RESPIRATORY IRRITATION, COUGH, ASTHMA, PULMONARY FIBROSIS, AND PNEUMONITIS WITH FEVER. PULMONARY SENSITIZATION MAY OCCUR IN PREVIOUSLY EXPOSED WORKERS.

CHRONIC EXPOSURE- REPEATED OR PROLONGED EXPOSURE MAY CAUSE MUCOUS MEMBRANE IRRITATON AND PULMONARY SENSITIZATION. AN INCREASE INCIDENCE OF LUNG AND NASAL CAVITY CANCERS HAS BEEN NOTED AMONG WORKMEN IN NICKEL SMELTERS AND REFINERIES. SEE ANIMAL CARCINOGENIC, MUTAGENIC AND TUMORIGENIC REFERENCES IN TOXICITY SECTION.

FIRST AID- REMOVE FROM EXPOSURE AREA TO FRESH AIR IMMEDIATELY. IF BREATHING HAS STOPPED, PERFORM ARTIFICIAL RESPIRATION. KEEP AFFECTED PERSON WARM AND AT REST. GET MEDICAL ATTENTION.

SKIN CONTACT:
IRRITANT/SENSITIZER.

ACUTE EXPOSURE- DUST MAY CAUSE IRRITATION AND CONTACT OR SENSITIZATION DERMATITIS.

CHRONIC EXPOSURE- MAY CAUSE DERMATITIS.

FIRST AID- REMOVE CONTAMINATED CLOTHING AND SHOES IMMEDIATELY. WASH AFFECTED AREA WITH SOAP OR MILD DETERGENT AND LARGE AMOUNTS OF WATER UNTIL NO EVIDENCE OF CHEMICAL REMAINS (APPROXIMATELY 15-20 MINUTES). GET MEDICAL ATTENTION IMMEDIATELY.

EYE CONTACT:
IRRITANT.
ACUTE EXPOSURE- MAY CAUSE REDNESS AND IRRITATION.

CHRONIC EXPOSURE- REPEATED OR PROLONGED CONTACT MAY CAUSE IRRITATION AND CONJUNCTIVITIS.

FIRST AID- WASH EYES IMMEDIATELY WITH LARGE AMOUNTS OF WATER, OCCASIONALLY LIFTING UPPER AND LOWER LIDS, UNTIL NO EVIDENCE OF CHEMICAL REMAINS (APPROXIMATELY 15-20 MINUTES). GET MEDICAL ATTENTION.

INGESTION:

ACUTE EXPOSURE- NO EFFECTS HAVE BEEN REPORTED IN HUMANS.

FIRST AID- IF VICTIM IS CONCIOUS, IMMEDIATELY GIVE 2 TO 4 GLASSES OF WATER. INDUCE VOMITING BY TOUCHING FINGER TO BACK OF THROAT. GET MEDICAL ATTENTION IMMEDIATELY.

FIRST AID- IF VICTIM IS CONSCIOUS, IMMEDIATELY GIVE 2 TO 4 GLASSES OF WATER, AND INDUCE VOMITING BY TOUCHING FINGER TO BACK OF THROAT. GET MEDICAL ATTENTION IMMEDIATELY.

REACTIVITY

REACTIVITY:
STABLE UNDER NORMAL TEMPERATURES AND PRESSURES, UP TO THE MELTING POINT, WHERE DECOMPOSITION OCCURS.

INCOMPATIBILITIES:
NONE KNOWN.

DECOMPOSITION:
THERMAL DECOMPOSITION MAY RELEASE TOXIC FUMES OF CARBON MONOXIDE AND OXIDES OF NICKEL.

POLYMERIZATION:
NOT KNOWN TO OCCUR.

****

CONDITIONS TO AVOID

****

SPILL AND LEAK PROCEDURES

OCCUPATIONAL SPILL:
NO SPECIAL PRECAUTIONS INDICATED.

PROTECTIVE EQUIPMENT

VENTILATION:
PROVIDE LOCAL EXHAUST VENTILATION OR GENERAL DILUTION VENTILATION TO MEET PERMISSIBLE EXPOSURE LIMITS.

RESPIRATOR:
1000 MG(NI)/M3- SUPPLIED-AIR RESPIRATOR WITH FULL FACEPIECE, HELMET, OR HOOD.

>1000 MG(NI)/M3- SELF-CONTAINED BREATHING APPARATUS WITH A FULL FACEPIECE.

FIREFIGHTING- SELF-CONTAINED BREATHING APPARATUS WITH A FULL FACEPIECE OPERATED IN PRESSURE-DEMAND OR OTHER POSITIVE PRESSURE MODE.

CLOTHING:
EMPLOYEE MUST WEAR APPROPRIATE PROTECTIVE CLOTHING AND EQUIPMENT TO PREVENT REPEATED OR PROLONGED SKIN CONTACT WITH THIS SUBSTANCE.

GLOVES:
EMPLOYEE MUST WEAR APPROPRIATE PROTECTIVE GLOVES TO PREVENT CONTACT WITH THIS SUBSTANCE.

EYE PROTECTION:
EMPLOYEE MUST WEAR SPLASH-PROOF OR DUST-RESISTANT SAFETY GOGGLES AND A FACESHIELD TO PREVENT CONTACT WITH THIS SUBSTANCE.

WHERE THERE IS ANY POSSIBILITY THAT AN EMPLOYEE'S EYES MAY BE EXPOSED TO THIS SUBSTANCE, THE EMPLOYER SHALL PROVIDE AN EYE-WASH FOUNTAIN WITHIN THE IMMEDIATE WORK AREA FOR EMERGENCY USE.

AUTHORIZED - ALLIED FISHER SCIENTIFIC
CREATION DATE: 03/15/85 REVISION DATE: 04/26/85

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MATERIAL SAFETY DATA

CORPORATE RESEARCH & DEVELOPMENT

SCHENECTADY, N. Y. 12305

MATERIALS INFORMATION SERVICE

NICKEL CHLORIDE

Date September 1978

SECTION I. MATERIAL IDENTIFICATION

MATERIAL NAME: **NICKEL CHLORIDE**

OTHER DESIGNATIONS: Nickelous Chloride Hexahydrate, $NiCl_2 \cdot 6H_2O$, GE Material D4G8, CAS# 007 791 200

MANUFACTURER: Allied Chemical Corporation
Specialty Chemicals Div.
Columbia Rd., Morristown, NJ 07960
Phone: (201) 455-2000

McGean Chemical Co., Inc.
1250 Terminal Tower
Cleveland, OH 44113
Phone: (216) 621-6425

SECTION II. INGREDIENTS AND HAZARDS

	%	HAZARD DATA
Nickel(II)Chloride Hexahydrate	ca 99	8-hr TWA 0.1 mg/m^3* (as Ni)
*Current OSHA regulation is 1 mg/m^3; ACGIH (1977) 8-hr TWA is 0.1 mg/m^3 (as Ni) with STEL of 0.3 mg/m^3. NIOSH has proposed TWA of 0.015 mg/m^3 (as Ni) for all inorganic nickel compounds and considers all inorganic nickel compounds to be carcinogenic when airborne (under dispute).		Mouse, intraperitoneal LD_{50} 48 mg/kg Dog, intraveneous LD 40-80 mg/kg

SECTION III. PHYSICAL DATA

Solubility in water, g/100 cc at 20 C — 254
at 100 C - 599

pH of aqueous solution ———————— ca 4

Vapor pressure of this material is water vapor only at room temperature

Molecular weight ———— 237.70

Appearance & Odor: Green, deliquescent crystals or crystalline powder.

SECTION IV. FIRE AND EXPLOSION DATA

Flash Point and Method	Autoignition Temp.	Flammability Limits In Air	LOWER	UPPER
N/A	N/A	N/A		

This material is non-flammable. Use extinguishing media which is appropriate for the flammables involved in the fire.

No unusual fire or explosion hazards are associated with this material.

Firefighters should use an approved self-contained respirator if this material is involved in a fire situation.

SECTION V. REACTIVITY DATA

This material is stable in closed containers at room temperature. (It will pick up moisture from the air and go into solution if exposed in open containers.)

A water solution of this material is acidic.

SECTION VI. HEALTH HAZARD INFORMATION

TLV 0.1 mg/kg (See Sect. II)

Irritating and harmful when swallowed. Irritating and damaging to the eyes on contact. Irritating to the skin; may produce allergic sensitization. "Nickel itch" is a form of dermatitis that can occur in those handling nickel compounds or metallic nickel plate. Inhalation of dust or mist is irritating to the upper respiratory tract.

NIOSH has proposed that all "airborne nickel" be considered carcinogenic; this is under dispute, but any inhalation of dusts or mists containing nickel should be avoided. (Evidence is good that inhalation exposure to certain nickel refining processes has produced cancer in the respiratory passages and lungs.) Inorganic nickel compounds are not considered carcinogenic by ingestion.

FIRST AID:

Eye contact: Flush well, including under eyelids, with running water for 10-15 minutes; then get medical attention promptly.

Skin contact: Flush exposed areas with water, then wash with soap and water. Get medical attention if irritation persists.

Inhalation: Remove to fresh air. If discomfort persists, get medical attention.

Ingestion: Contact physician immediately for instructions!

SECTION VII. SPILL, LEAK, AND DISPOSAL PROCEDURES

Those involved in clean up must have protection against skin or eye contact and inhalation of dust or mist. Pick up promptly for recovery or disposal by a method that does not generate dust. Notify safety and health personnel if large spills occur.

DISPOSAL: All disposal must be done in accordance with Federal, State, and local regulations. Nickel content of effluent must be properly regulated for discharge. Disposal may require precipitating nickel under alkaline conditions, filtering, neutralizing the filtrate for discharge and, placing nickel-containing sludge in an approved landfill.

SECTION VIII. SPECIAL PROTECTION INFORMATION

Provide adequate general ventilation and local exhaust ventilation to meet the TLV requirements. (General ventilation may be adequate where no dust or misting occur.) Whenever dust or mist problems occur, local exhaust ventilation should have a face velocity greater than 100 lfm at the inlet at the working station and workers should be equipped with approved respiratory protection.

Protective rubber gloves and safety glasses are required. Protective clothing and a chemical apron should be worn where gross contact is probable. An eye wash station should be near the work area.

SECTION IX. SPECIAL PRECAUTIONS AND COMMENTS

Store this material in closed containers that are well protected from physical damage. Handle in a manner that avoid dusting or misting conditions.

Avoid breathing of dust or of mists containing this material. Avoid contact with the skin, eyes or clothing. Wash thoroughly after handling. Follow good hygienic practice.

Preclude from exposure those individuals who have become sensitized to nickel compounds and those who have problems with skin, sinus and pulmonary diseases. Because of possible carcinogenic risk, medical surveillance as presented in NIOSH recommended inorganic nickel standard should be conducted.

ATA SOURCE(S) CODE: 1-6, 10, 12, 20

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NICKEL(OUS) SULFATE, HEXAHYDRATE
NICKEL(OUS) SULFATE, HEXAHYDRATE
NICKEL(OUS) SULFATE, HEXAHYDRATE

MATERIAL SAFETY DATA SHEET

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SUBSTANCE IDENTIFICATION

SUBSTANCE: **NICKEL(OUS) SULFATE, HEXAHYDRATE** CAS-NUMBER 10101-97-0

TRADE NAMES/SYNONYMS: NICKEL(II) SULFATE, HEXAHYDRATE (1:1:6); BLUE SALT; SINGLE NICKEL SALT; SULFURIC ACID, NICKEL(2+) SALT, HEXAHYDRATE; N-72; N-73

CHEMICAL FAMILY:
INORGANIC SALT

MOLECULAR FORMULA: NI-O4-S.6 H2-O MOL WT: 262.86

CERCLA RATINGS (SCALE 0-3): HEALTH=3 FIRE=0 REACTIVITY=0 PERSISTENCE=3

COMPONENTS AND CONTAMINANTS

PERCENT: 100 COMPONENT: NICKEL SULFATE, HEXAHYDRATE

OTHER CONTAMINANTS: NONE

EXPOSURE LIMITS:
1.0 MG(NI)/M3 OSHA TWA; 0.1 MG(NI)/M3 ACGIH TWA;
25 UG(NI)/M3 NIOSH RECOMMENDED TWA

PHYSICAL DATA

DESCRIPTION: ODORLESS, BLUE OR EMERALD GREEN, EFFLORESCENT CRYSTALS

WITH A SWEET ASTRINGENT TASTE BOILING POINT: 217 F (103 C) DEHYD.

MELTING POINT: 128 F (53 C) SPECIFIC GRAVITY: 2.1 PH: ABOUT 4.5 IN SOL.

SOLUBILITY IN WATER: 62.5%

SOLVENT SOLUBILITY: METHANOL; SLIGHT SOL ALCOHOL, AMMONIUM HYDROXIDE

FIRE AND EXPLOSION DATA

FIRE AND EXPLOSION HAZARD:
NEGLIGIBLE FIRE AND EXPLOSION HAZARD WHEN EXPOSED TO HEAT OR FLAME.

FLASH POINT: NON-COMBUSTIBLE

FIREFIGHTING MEDIA:
DRY CHEMICAL, CARBON DIOXIDE, WATER SPRAY OR FOAM
(1984 EMERGENCY RESPONSE GUIDEBOOK, DOT P 5800.3).

FOR LARGER FIRES, USE WATER SPRAY, FOG OR ALCOHOL FOAM
(1984 EMERGENCY RESPONSE GUIDEBOOK, DOT P 5800.3).

FIREFIGHTING:
MOVE CONTAINER FROM FIRE AREA IF POSSIBLE. DO NOT SCATTER SPILLED MATERIAL WITH MORE WATER THAN NEEDED FOR FIRE CONTROL. DIKE FIRE CONTROL WATER FOR LATER DISPOSAL (1984 EMERGENCY RESPONSE GUIDEBOOK, DOT P 5800.3).

USE AGENTS SUITABLE FOR TYPE OF SURROUNDING FIRE. AVOID BREATHING HAZARDOUS VAPORS OR DUSTS, KEEP UPWIND (BUREAU OF EXPLOSIVES, EMERGENCY HANDLING OF HAZARDOUS MATERIALS IN SURFACE TRANSPORTATION, 1981).

TOXICITY

500 MG/KG SUBCUTANEOUS-DOG LDLO; 500 MG/KG SUBCUTANEOUS-CAT LDLO; 500 MG/KG SUBCUTANEOUS-RABBIT LDLO; 62 MG/KG SUBCUTANEOUS-GUINEA PIG LDLO; 89 MG/KG INTRAVENOUS-DOG LDLO; 72 MG/KG INTRAVENOUS-CAT LDLO; 36 MG/KG INTRAVENOUS-RABBIT LDLO; MUTAGENIC DATA (RTECS); CARCINOGEN STATUS: NONE.
NICKEL SULFATE, HEXAHYDRATE IS AN EYE, MUCOUS MEMBRANE, RESPIRATORY TRACT, AND SKIN IRRITANT, AND A SKIN AND PULMONARY SENSITIZER. IT IS MODERATELY TOXIC BY INGESTION AND MAY EFFECT THE CENTRAL NERVOUS SYSTEM.

HEALTH EFFECTS AND FIRST AID

INHALATION:
IRRITANT/SENSITIZER.

ACUTE EXPOSURE- INHALATION OF NICKEL DUST AND FUME MAY CAUSE RESPIRATORY IRRITATION, COUGH, ASTHMA, PULMONARY FIBROSIS, AND PNEUMONITIS WITH FEVER. PULMONARY SENSITIZATION MAY OCCUR IN PREVIOUSLY EXPOSED WORKERS.

CHRONIC EXPOSURE- REPEATED OR PROLONGED EXPOSURE MAY CAUSE MUCOUS MEMBRANE IRRITATON AND PULMONARY SENSITIZATION. AN INCREASE INCIDENCE OF LUNG AND NASAL CAVITY CANCERS HAS BEEN NOTED AMONG WORKMEN IN NICKEL SMELTERS AND REFINERIES. SEE ANIMAL MUTAGENIC REFERENCE IN TOXICITY SECTION.

FIRST AID- REMOVE FROM EXPOSURE AREA TO FRESH AIR IMMEDIATELY. IF BREATHING HAS STOPPED, PERFORM ARTIFICIAL RESPIRATION. KEEP AFFECTED PERSON WARM AND AT REST. GET MEDICAL ATTENTION.

SKIN CONTACT:
IRRITANT/SENSITIZER.
ACUTE EXPOSURE- CONTACT MAY CAUSE IRRITATION AND SENSITIVITY DERMATITIS. "NICKEL ITCH" IS A DERMATITIS WITH PURITIS, ERYTHEMATOUS OR FOLICULAR ERUPTION, FOLLOWED, POSSIBLY, BY ECZEMA OR ULCERS.

CHRONIC EXPOSURE- MAY CAUSE SENSITIZATION DERMATITIS WITH SYMPTOMS AS WITH ACUTE EXPOSURE.

FIRST AID- REMOVE CONTAMINATED CLOTHING AND SHOES IMMEDIATELY. WASH AFFECTED AREA WITH SOAP OR MILD DETERGENT AND LARGE AMOUNTS OF WATER UNTIL NO EVIDENCE OF CHEMICAL REMAINS (APPROXIMATELY 15-20 MINUTES). GET MEDICAL ATTENTION IMMEDIATELY.

EYE CONTACT:
IRRITANT.
ACUTE EXPOSURE- MAY CAUSE REDNESS AND IRRITATION.

CHRONIC EXPOSURE- REPEATED OR PROLONGED CONTACT MAY CAUSE IRRITATION AND CONJUNCTIVITIS.

FIRST AID- WASH EYES IMMEDIATELY WITH LARGE AMOUNTS OF WATER, OCCASIONALLY LIFTING UPPER AND LOWER LIDS, UNTIL NO EVIDENCE OF CHEMICAL REMAINS (APPROXIMATELY 15-20 MINUTES). GET MEDICAL ATTENTION.

INGESTION:

ACUTE EXPOSURE- NICKEL AND SALTS MAY CAUSE NAUSEA, VOMITING, STOMATITIS, AND COLLAPSE, WITH WATERY OR BLOODY DIARRHEA, HEMOLYSIS, ANURIA, HEMATURIA, JAUNDICE, CYANOSIS, HYPOTENSION, CONVULSIONS, AND COMA. MAY ALSO CAUSE WEAKNESS, DIZZINESS, AND LASSITUDE.

FIRST AID- IF VICTIM IS CONSCIOUS, IMMEDIATELY GIVE 2 TO 4 GLASSES OF WATER, AND INDUCE VOMITING BY TOUCHING FINGER TO BACK OF THROAT. GET MEDICAL ATTENTION IMMEDIATELY.

REACTIVITY

REACTIVITY:
STABLE UNDER NORMAL TEMPERATURES AND PRESSURES.

INCOMPATIBILITIES:
NONE KNOWN.

DECOMPOSITION:
THERMAL DECOMPOSITION PRODUCTS INCLUDE HIGHLY TOXIC FUMES OF SULFUR OXIDES.

POLYMERIZATION:
NONE KNOWN.

****

CONDITIONS TO AVOID

NO REPORTS FOUND.

****

SPILL AND LEAK PROCEDURES

SOIL SPILL:
DIG A HOLDING AREA SUCH AS PIT, POND OR LAGOON TO CONTAIN SPILLED MATERIAL. USE PROTECTIVE COVER SUCH AS A PLASTIC SHEET TO PREVENT DISSOLVING IN FIRE-FIGHTING WATER OR RAIN.

WATER SPILL:
NEUTRALIZE WITH CAUSTIC SODA.

ADD SUITABLE AGENT TO NEUTRALIZE SPILLED MATERIAL TO PH-7.

USE DREDGES OR LIFTS TO EXTRACT IMMOBILIZED MASSES OF POLLUTION AND PRECIPITATES.

OCCUPATIONAL SPILL:
STOP LEAK IF YOU CAN DO IT WITHOUT RISK. FOR SMALL SPILLS, TAKE UP WITH SAND OR OTHER ABSORBENT MATERIAL AND PLACE INTO CLEAN, DRY CONTAINERS FOR LATER DISPOSAL. KEEP UNNECESSARY PEOPLE AWAY. ISOLATE HAZARD AREA AND DENY ENTRY.

PROTECTIVE EQUIPMENT

VENTILATION:
PROVIDE LOCAL EXHAUST VENTILATION OR GENERAL DILUTION VENTILATION TO MEET PERMISSIBLE EXPOSURE LIMITS.

RESPIRATOR:

10 MG(NI)/M3- SUPPLIED-AIR RESPIRATOR.
SELF-CONTAINED BREATHING APPARATUS.

50 MG(NI)/M3- SUPPLIED-AIR RESPIRATOR WITH A FULL FACE-PIECE, HELMET, OR HOOD.
SELF-CONTAINED BREATHING APPARATUS WITH A FULL FACEPIECE.

1000 MG(NI)/M3- POWERED AIR-PURIFYING RESPIRATOR WITH A HIGH-EFFICIENCY PARTICULATE FILTER.
TYPE 'C' SUPPLIED-AOR RESPIRATOR OPERATED IN PRESSURE-DEMAND OR OTHER POSITIVE-PRESSURE OR CONTINUOUS-FLOW MODE.

2000 MG(NI)/M3- TYPE 'C' SUPPLIED-AIR RESPIRATOR WITH A FULL FACEPIECE OPERATED IN PRESSURE-DEMAND OR OTHER POSITIVE PRESSURE-MODE OR WITH A FULL FACEPIECE, HELMET OR HOOD OPERATED IN CONTINUOUS FLOW-MODE.

FIREFIGHTING- SELF-CONTAINED BREATHING APPARATUS WITH A FULL FACEPIECE OPERATED IN PRESSURE-DEMAND OR OTHER POSITIVE-PRESSURE MODE.

CLOTHING:
EMPLOYEE MUST WEAR APPROPRIATE PROTECTIVE CLOTHING AND EQUIPMENT TO PREVENT REPEATED OR PROLONGED SKIN CONTACT WITH THIS SUBSTANCE.

GLOVES:
EMPLOYEE MUST WEAR APPROPRIATE PROTECTIVE GLOVES TO PREVENT CONTACT WITH THIS SUBSTANCE.

EYE PROTECTION:
EMPLOYEE MUST WEAR SPLASH-PROOF OR DUST-RESISTANT SAFETY GOGGLES AND A FACESHIELD TO PREVENT CONTACT WITH THIS SUBSTANCE.

WHERE THERE IS ANY POSSIBILITY THAT AN EMPLOYEE'S EYES MAY BE EXPOSED TO THIS SUBSTANCE, THE EMPLOYER SHALL PROVIDE AN EYE-WASH FOUNTAIN WITHIN THE IMMEDIATE WORK AREA FOR EMERGENCY USE.

AUTHORIZED - ALLIED FISHER SCIENTIFIC
CREATION DATE: 03/20/85 REVISION DATE: 04/26/85

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NITRIC ACID
NITRIC ACID
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SUBSTANCE IDENTIFICATION

SUBSTANCE: **NITRIC ACID** CAS-NUMBER 7697-37-2

TRADE NAMES/SYNONYMS: AQUA FORTIS; HYDROGEN NITRATE; AZOTIC ACID; NITRYL HYDROXIDE; A-200; A-200C; A-200S; A-198; A-202; A-206-C

CHEMICAL FAMILY:
INORGANIC ACID

MOLECULAR FORMULA: H-N-O3 MOL WT 63.02

CERCLA RATINGS (SCALE 0-3): HEALTH=3 FIRE=0 REACTIVITY=0 PERSISTENCE=0

COMPONENTS AND CONTAMINANTS

PERCENT: 70 COMPONENT: HYDROGEN NITRATE

PERCENT: 30 COMPONENT: WATER

OTHER CONTAMINANTS: NONE

EXPOSURE LIMITS:
2 PPM (5 MG/M3) OSHA TWA; 2 PPM NIOSH RECOMMENDED TWA; 2 PPM ACGIH TWA; 4 PPM ACGIH STEL

PHYSICAL DATA

DESCRIPTION: COLORLESS FUMING LIQUID WITH AN ACRID ODOR; SUFFOCATING FUMES. THE ODOR IS NOT CONSIDERED AN ADEQUATE WARNING PROPERTY.

BOILING POINT: 181 F (83 C) MELTING POINT: -44 F (-42 C)

SPECIFIC GRAVITY: 1.5 VAPOR PRESSURE: 62 MMHG @ 25 C

4 (14) 7 5 12

EVAPORATION RATE: NOT AVAILABLE SOLUBILITY IN WATER: MISCIBLE

SOLVENT SOLUBILITY: ETHER ODOR THRESHOLD: <5.0 PPM VAPOR DENSITY: 2.2

FIRE AND EXPLOSION DATA

FIRE AND EXPLOSION HAZARD:
INCREASES THE FLAMMABILITY OF COMBUSTIBLES, ORGANIC MATERIAL, AND READILY OXIDIZABLE MATERIALS, CAUSING IGNITION OF SOME. SEVERE EXPLOSION HAZARD BY REACTION WITH MANY INCOMPATIBLES, INCLUDING METALLIC POWDERS, CARBIDES, HYDROGEN SULFIDE, AND TURPENTINE. IN OR NEAR FIRE, MATERIAL EMITS TOXIC AND REACTIVE NITROGEN OXIDES AS GASES.

FLASH POINT: NONCOMBUSTIBLE

FIREFIGHTING MEDIA:
WATER SPRAY

FIREFIGHTING:
MOVE CONTAINER FROM FIRE AREA IF POSSIBLE. COOL CONTAINERS EXPOSED TO FLAMES WITH WATER FROM SIDE UNTIL WELL AFTER FIRE IS OUT. FOR MASSIVE FIRE IN STORAGE AREA, USE UNMANNED HOSE HOLDER OR MONITOR NOZZLES; ELSE WITHDRAW FROM AREA AND LET FIRE BURN (1984 EMERGENCY RESPONSE GUIDEBOOK, DOT P 5800.3).

EXTINGUISH USING AGENTS INDICATED. IF LARGE AMOUNTS OF COMBUSTIBLE MATERIALS ARE INVOLVED, USE WATER SPRAY OR FOG IN FLOODING AMOUNTS. USE WATER SPRAY TO ABSORB CORROSIVE VAPORS. COOL CONTAINERS WITH FLOODING AMOUNTS OF WATER FROM AS FAR A DISTANCE AS POSSIBLE. AVOID BREATHING CORROSIVE VAPORS; KEEP UPWIND

TOXICITY

430 MG/KG ORAL-HUMAN LDLO; 110 MG/KG UNKNOWN-MAN LDLO;
CARCINOGEN STATUS: NONE.
NITRIC ACID IS A SEVERE EYE, MUCOUS MEMBRANE, AND SKIN IRRITANT.

HEALTH EFFECTS AND FIRST AID

INHALATION:
CORROSIVE. 100 PPM IS IMMEDIATELY DANGEROUS TO LIFE AND HEALTH.
ACUTE EXPOSURE- MAY CAUSE COUGHING, HEADACHE, DIZZINESS, AND WEAKNESS. DELAYED SYMPTOMS MAY INCLUDE DRYNESS OF THE THROAT AND NOSE, CHEST PAIN OR TIGHTNESS, DYSPNEA, FROTHY SPUTUM, HYPOTENSTION AND CYANOSIS FOLLOWED BY PNEUMONITIS AND PULMONARY EDEMA, WHICH MAY BE FATAL. IF PATIENT RECOVERS, SCAR TISSUE MAY CAUSE STRICTURE OF THE PYLORUS OR ESOPHAGUS.

CHRONIC EXPOSURE- REPEATED OR PROLONGED EXPOSURE CAUSES DENTAL EROSION FOLLOWED BY JAW NECROSIS, CHRONIC COUGH AND BRONCHITIS OR CHEMICAL PNEUMONITIS AND GASTROINTESTINAL DISTURBANCES.

FIRST AID- REMOVE FROM EXPOSURE AREA TO FRESH AIR IMMEDIATELY. IF BREATHING HAS STOPPED, GIVE ARTIFICIAL RESPIRATION. MAINTAIN AIRWAY AND ADMINISTER OXYGEN IF AVAILABLE. KEEP AFFECTED PERSON WARM AND AT REST.

CORROSIVE:
ACUTE EXPOSURE- DIRECT CONTACT WITH LIQUID OR CONCENTRATED VAPOR CAUSES IMMEDIATE SEVERE AND PENETRATING BURNS, STAINING THE SKIN YELLOW OR YELLOWISH-BROWN.

CHRONIC EXPOSURE- PROLONGED OR REPEATED EXPOSURE MAY CAUSE DERMATITIS.

FIRST AID- REMOVE CONTAMINATED CLOTHING AND SHOES IMMEDIATELY. WASH AFFECTED AREA WITH SOAP OR MILD DETERGENT AND LARGE AMOUNTS OF WATER UNTIL NO EVIDENCE OF CHEMICAL REMAINS (APPROXIMATELY 15-20 MINUTES). IN CASE OF CHEMICAL BURNS, COVER AREA WITH STERILE, DRY DRESSING. BANDAGE SECURELY, BUT NOT TOO TIGHTLY. GET MEDICAL ATTENTION.

EYE CONTACT:
CORROSIVE.
ACUTE EXPOSURE- DIRECT CONTACT WITH THE LIQUID MAY CAUSE PAIN, PHOTOPHOBIA, TEARING, EDEMA, CORNEAL ULCERATION, SEVERE BURNS, AND NECROSIS OF THE DEEPER TISSUES WITH PERMANENT DAMAGE AND BLINDNESS IS POSSIBLE.

CHRONIC EXPOSURE- REPEATED OR PROLONGED EXPOSURE MAY CAUSE CONJUNCTIVITIS.

FIRST AID- WASH EYES IMMEDIATELY WITH LARGE AMOUNTS OF WATER, OCCASIONALLY LIFTING UPPER AND LOWER LIDS, UNTIL NO EVIDENCE OF CHEMICAL REMAINS (APPROXIMATELY 15-20 MINUTES). IN PRESENCE OF BURNS, APPLY STERILE BANDAGES LOOSELY WITHOUT MEDICATION. GET MEDICAL ATTENTION.

INGESTION:
CORROSIVE.
ACUTE EXPOSURE- IMMEDIATE PAIN IN THE MOUTH, THROAT, AND STOMACH MAY BE FOLLOWED BY VOMITING, AND DIARRHEA OF DARK PRECIPATED BLOOD. HYPOTENSION, OLIGURIA, ANURIA, SEVERE, POSSIBLY FATAL, CIRCULATORY COLLAPSE, AND ASPHYXIA FROM EDEMA OF THE GLOTTIS ARE POSSIBLE. BURNS OF THE GASTROINTESTINAL TRACT MAY BE SEVERE ENOUGH TO CAUSE PERFORATION OF THE ESOPHAGUS AND STOMACH WHICH MAY BE FOLLOWED BY MEDIASTINITUS OR PERITONITIS, INDICATED BY FEVER.

FIRST AID- IF VICTIM IS CONSCIOUS, GIVE HIM LARGE QUANTITIES OF WATER IMMEDIATELY TO DILUTE THE ACID. DO NOT INDUCE VOMITING. GIVE PATIENT 1 OUNCE (30 ML) OF MILK OF MAGNESIA. GET MEDICAL ATTENTION IMMEDIATELY.

REACTIVITY

REACTIVITY:
STABLE UNDER NORMAL TEMPERATURES AND PRESSURES. HOWEVER NITRIC VAPOR AND/OR NITRIC OXIDES ARE QUIETLY EVOLVED. ALSO SUNLIGHT CATLAYSES THE FORMATION OF THE OXIDES AND THIS GIVES A YELLOW COLOR TO THE CONCENTRATED ACID.

INCOMPATIBILITIES:
EASILY OXIDIZED SUBSTANCES, EXAMPLES FOLLOW:

EXPLOSION: ACETONITRILE, CESIUM CARBIDE, CUPRIC NITRIDE, CYANIDES, 1,2-DIAMINOETHANE BISTRIMETHYL GOLD, DINITROTOLUENE, EPICHLOROHYDRIN, 5-ETHYL-2-METHYL PYRIDINE, CYCLOPENTADIENE, BENZENE, TOLUENE, METALS, METAL CARBIDES, 4-METHYLCYCLOHEXANONE, NITROBENZENE AND WATER, NITROMETHANE, POLYDIBROMOSILANES, PHOSPHORUS TRICHLORIDE, POTASSIUM HYPOPHOSPHITE (ON EVAPORATION), RUBIDIUM CARBIDE, SELENIUM IODOPHOSPHIDE, SULFUR DIOXIDES, THIOCYANATES,

THIOCYANIC ACID METAL SALTS, THIOPHENES, TETRABORANE, TRICADMIUM DIPHOSPHIDE, TRITHIOACETONE.
PROBABLE EXPLOSION: ACETONE AND ACETIC ACID, SULFURIC ACID AND GLYCERIDES, TRIAZINE AND TRIFLUOROACETIC ANHYDRIDE @ 36 C.
POSSIBLE EXPLOSION: ACETIC ACID, I-AMINOTHIAZOLE AND SULFURIC ACID, CYANATES, 1,3-CYCLOPENTADIENE, FLURORINE, LACTIC ACID AND HYDROGEN FLUORIDE, MESITYLENE, ORGANIC SUBSTANCES AND SULFURIC ACID, ORGANIC SUBSTANCES AND PERCHLORATES, PHTHALIC ACID OR PHTHALIC ANHYDRIDE AND SULFURIC ACID, REDUCING AGENTS, SULFURIC ACID, TITANIUM ALLOY.
EXPLOSION BY FRICTION OR IMPACT: ACETIC ANHYDRIDE.
EXPLOSIVE OXIDATION: NON-METAL OXIDES- ARSINE, PHOSPHINE, OR TETRABORANE, DIPHENYLDISTIBENE.
POSSIBLE EXPLOSION BY IMPACT : TITANIUM-MAGNESIUM ALLOY.
VIOLENT REACTION: ACRYLONITRILE, ALCOHOLS, ARSINE, CARBON (PULVERIZED), CHLORINE TRIFLUORIDE, CUPROUS NITRIDE, CYCLIC KETONES, CYCLOHEXANOL, ETHANOL, GERMANIUM, HYDRAZINE, SULFUR HALIDES, SULFURIC ACID AND TEREPHTHALIC ACID, THIOALDEHYDES OR THIOKETONES, URANIUM, URANIUN ALLOYS.
VIOLENT OXIDATION: ACETONE AND SULFURIC ACID, SULFAMIC ACID.
VIOLENT DECOMPOSITION: BUTANETHIOL, PHOSPHINE.
VIOLENT DECOMPOSITION RESULTING IN IGNITION: CROTONALDEHYDE, TETRAPHOSPHORUS TRIIODIDE.
POSSIBLE VIOLENT REACTION: ANTIMONY.
POSSIBLE VIOLENT EXOTHERMIC REACTION: ANION EXCHANGE RESIN.
INTENSE EXOTHERMIC REACTION: ACROLEIN, ALLYL ALCOHOL, ALLYL CHLORIDE, 2-AMINOETHANOL, AMMONIUM HYDROXIDE, BISMUTH, N-BUTYRALDEHYDE, CHLOROSULFONIC ACID, CRESOL, CUMENE, DIISOPROPYL ETHER, ETHYLENEDIAMINE, POLYALKENES, GLYOXAL, ISOPRENE, MESITYL OXIDE, 2-METHYL-5-ETHYLPYRIDINE, OLEUM, PROPYLENE OXIDE, PROPIOLACTONE (BETA-), PYRIDENE, SODIUM HYDROXIDE, VINYL ACETATE, VINYLDENE CHLORIDE,.
INTENSE REACTION: DIETHYLETHER, HYDRAZOIC ACID, P-XYLENE IN THE PRESENCE OF SULFURIC ACID, SELENIUM, SODIUM AZIDE, TOLUENE, TRIMETHYLTRIOXANE.
IGNITION WITH POSSIBLE EXPLOSION: HYDROGEN TELLURIDE.
IGNITION: ANILINE, BORON PHOSPHIDE, BROMINE PENTAFLUORIDE, N-BUTYLMERCAPTAN, CALCIUM HYPOPHOSPHITE, DIBORANE, DIPHENYL TIN, M-ETHYL ANILINE, ETHYL PHOSPHINE, FURFURYL ALCOHOL, HALOGEN PHOSPHIDES, HYDROGEN IODIDES, LITHIUM, METALS, PHOSPHONIUM IODIDE, PHOPHORUS, SELENIUM HYDRIDE, SODIUM, TERPENES, TOLUIDINE, TRIETHYLGALLIUM MONOETHYL ETHER COMPLEX, UNS-DIMETHYLHYDRAZINE.
POSSIBLE IGNITION: AMMONIA, ANION EXCHANGE RESIN AND CHROMITES OR DICHROMATE, AROMATIC AMINES, DIVINYL ETHER, DIENE OR ACETYLENE DERIVATIVES, LITHIUM, REDUCING AGENTS.
INCANDESCENT REACTION: BORON, FERROUS OXIDE (POWDER), HYDROGEN SULFIDE, LITHIUM SILICIDE, SELENIUM HYDRIDE, MAGNESIUM PHOSPHIDE, MANGANESE, ZINC.
FORMATION OF HIGHLY EXPLOSIVE PRODUCTS: NITROAROMATIC HYDROCARBONS.
FORMATION OF EXPLOSIVE PRODUCTS: ACETYLENE, 4-CHLORO-2-NITROANILINE, CYCLOHEXANE, CYCLOHEXYLAMINE, 2,6-DI-T-BUTYL PHENOL, DICHLOROMETHANE, ETHANOL AND SILVER, 5-ETHYL-2-PICOLINE, HYDROGEN PEROXIDE AND KETONES, HYDROGEN PEROXIDE AND MERCURIC OXIDE, HYDROGEN PEROXIDE AND THIOUREA, INDANE AND SULFURIC ACID, METAL SALICYLATES, PHENYLORTHOPHOSPHORIC ACID DISODIUM SALT, TITANIUM.
FORMATION OF POSSIBLY EXPLOSIVE PRODUCTS: BENZOTHIOPHENE DERIVATIVES.
FORMATION OF EASILY COMBUSTIBLE ESTER: CELLULOSE.
DETONATABLE MIXTURE (DEPENDING ON AMOUNT OF WATER PRESENT): NITROBENZENE.

DECOMPOSITION:
DECOMPOSES ON EXPOSURE TO AIR OR ORGANIC MATTER, OR WITH HEAT, TO RELEASE HIGHLY TOXIC FUMES OR OXIDES OF NITROGEN, INCLUDING NITRIC OXIDE AND NITROGEN DIOXIDE, AND HYDROGEN NITRATE. REACTS WITH THE FOLLOWING TO RELEASE TOXIC GASES: SULFIDES, CARBONATES, CYANIDES. VIOLENT REACTION WITH ALL CARBIDES, GAS MIXTURE EVOLVED (N2O4) REACTS STRONGLY WITH HYDROCARBONS, FLUORINE, OR

POLYMERIZATION:
WILL NOT OCCUR.

****
CONDITIONS TO AVOID

MAY IGNITE COMBUSTIBLE MATERIALS (WOOD, PAPER, OIL, ETC.). REACTS VIOLENTLY WITH WATER AND FUELS. FLAMMABLE, POISONOUS GASES MAY ACCUMULATE IN TANKS AND HOPPER CARS. RUNOFF TO SEWER MAY CREATE FIRE OR EXPLOSION HAZARD. AVOID CONTACT WITH OR STORAGE WITH INCOMPATIBLE MATERIALS, INCLUDING THOSE MATERIALS AND CLASSES OF MATERIALS LISTED IN THE REACTIVITY SECTION. HEATING MAY INCREASE THE EVOLUTION OF NITRIC ACID VAPOR AND/OR NITROGEN OXIDES (GASES) BEYOND AN ACCEPTABLE LEVEL.

****
SPILL AND LEAK PROCEDURES

OCCUPATIONAL SPILL:
KEEP COMBUSTIBLES (WOOD, PAPER, OIL AND OTHER EASILY OXIDIZABLE MATERIALS) AWAY FROM SPILLED MATERIAL. WEAR PERSONAL PROTECTIVE EQUIPMENT. DO NOT TOUCH SPILLED MATERIAL. STOP LEAK IF YOU CAN DO IT WITHOUT RISK. USE WATER SPRAY TO REDUCE VAPORS. DILUTE SPILLS OR LEAKS WITH PLENTY OF WATER. NEUTRALIZE RESIDUE WITH (A) ALKALI, SUCH AS SOLDA ASH, LIME, LIMESTONE; OR (B) OTHER SUITABLE NEUTRALIZATION MATERIALS. ADEQUATE VENTILATION IS REQUIRED TO ELIMINATE ANY NITROGEN OXIDES RELEASED AND, IF SODA ASH OR LIMESTONE IS USED, CO2. ABSORB WITH EXCESS SODA ASH, SCOOP UP AND PLACE IN A SUITABLE E.G. GLASS OR PLASTIC CONTAINER AND CLOSE. LABEL 'OXIDIZER'. KEEP OUT OF SEWERS AND WATER SOURCES. KEEP UNNECESSARY PEOPLE AWAY. ISOLATE HAZARD AREA AND DENY ENTRY. VENTILATE CLOSED SPACES BEFORE ENTERING.

PROTECTIVE EQUIPMENT

VENTILATION:
PROVIDE LOCAL EXHAUST VENTILATION, PROCESS ENCLOSURE OR GENERAL DILUTION VENTILATION TO MEET PERMISSABLE EXPOSURE LIMITS REQUIREMENTS. EQUIPMENT MUST BE CORROSION-RESISTANT.

RESPIRATOR:
EXPOSURE LIMIT TO 100 MG/M3-
SELF-CONTAINED BREATHING APPARATUS WITH A FULL FACEPIECE OPERATED IN PRESSURE-DEMAND OR OTHER POSITIVE-PRESSURE MODE.
TYPE 'C' SUPPLIED-AIR RESPIRATOR OPERATED IN PRESSURE-DEMAND OR OTHER POSITIVE-PRESSURE OR CONTINUOUS FLOW MODE.

> 100 MG/M3, INCLUDING THE IDLH LEVEL, 250 MG/M3-
SELF-CONTAINED BREATHING APPARATUS WITH A FULL FACEPIECE OPERATED IN PRESSURE-DEMAND OR OTHER POSITIVE-PRESSURE MODE, OR USE EQUIVALENT RESPIRATOR.

FIREFIGHTING- SELF-CONTAINED BREATHING APPARATUS WITH A FULL FACEPIECE OPERATED IN PRESSURE-DEMAND OR OTHER POSITIVE PRESSURE MODE.

CLOTHING:
EMPLOYEE MUST WEAR IMPERVIOUS CLOTHING AS NECESSARY TO AVOID ANY POSSIBILITY

OF CONT. WITH CHEMICAL.

GLOVES:
WEAR IMPERVIOUS GLOVES AS NECESSARY TO AVOID ANY POSSIBLILITY OF CONTACT WITH SUBSTANCE. PREFERRED MATERIALS: VITON OR SARANEX.

EYE PROTECTION:
WEAR FACESHIELD (8 INCH MINIMUM) AND VENTED SAFETY GOGGLES. DO NOT WEAR CONTACT LENSES WHEN WORKING WITH CHEMICALS.

AUTHORIZED - ALLIED FISHER SCIENTIFIC
CREATION DATE: 02/10/85 REVISION DATE: 10/21/85

-ADDITIONAL INFORMATION-

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MONSANTO PRODUCT NAME

PHOSPHORIC ACID

MONSANTO COMPANY
800 N. LINDBERGH BLVD.
ST. LOUIS, MO 63167

Emergency Phone No.
(Call Collect)
314-694-1000

PRODUCT IDENTIFICATION

Synonym(s):	Phos acid; Orthophosphoric acid
Chemical Name:	Phosphoric acid
Chemical Formula:	H_3PO_4
Chemical Family:	Mineral acid
CAS No.:	7664-38-2
TSCA Inventory:	Phosphoric acid appears on the Inventory of Chemical Substances published by the U. S. Environmental Protection Agency (EPA) under authority of the Toxic Substances Control Act (TSCA).
Dot Proper Shipping Name:	Phosphoric Acid
Dot Hazard Class/ I.D. No.:	Corrosive material/UN1805
DOT Label(s):	Corrosive
U.S. Surface Freight Classification:	Phosphoric Acid
Reportable Quantity (RQ) Under U.S. EPA CERCLA Regulations:	5,000 lbs.
Hazardous Chemical(s) Under OSHA Hazard Communication Standard:	The substance listed below is identified as a hazardous chemical under the criteria of the OSHA Hazard Communication Standard (29 CFR 1910.1200): Phosphoric acid, CAS Reg. No. 7664-38-2

ARNING STATEMENTS

NGER!

JSES BURNS TO EYES AND SKIN

ECAUTIONARY MEASURES

not get in eyes, on skin, on clothing.
d breathing mist.
) container closed.
with adequate ventilation.
n, thoroughly after handling.

ied container retains vapor and product residue. Observe all labeled safeguards until container is ed, reconditioned or destroyed.

ROSIVE TO MILD STEEL

RECEIVED
1985 NOV 15
UNEO. SYST. DEPT.

MATERIAL SAFETY DATA

Phosphoric Acid

EMERGENCY AND FIRST AID PROCEDURES

FIRST AID: IF IN EYES OR ON SKIN, immediately flush with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Call a physician. Wash clothing before reuse.

IN CASE OF: SPILL OR LEAK, contain spills and leaks to prevent discharge to the environment.

OCCUPATIONAL CONTROL PROCEDURES

Eye Protection: Wear chemical safety goggles to prevent eye contact. Have eye baths immediately available where eye contact can occur.

Skin Protection: Wear appropriate impervious gloves and protective clothing to prevent skin contact. Wear face shields and impervious aprons when splashing is likely. Remove contaminated clothing promptly and launder before reuse. Provide safety shower at any location where skin contact can occur. Wash contaminated skin promptly.

Respiratory Protection: Use NIOSH approved equipment with full facepiece when airborne exposure limits are exceeded. Consult respirator manufacturer to determine appropriate type equipment for given application.

Ventilation: Provide ventilation to minimize exposure. Local exhaust ventilation preferred.

Airborne Exposure Limits:

Typical Product Composition: Phosphoric acid in water

OSHA PEL/TWA: 1 mg/m³
ACGIH TLV®/TWA: 1 mg/m³
TLV®/STEL: 3 mg/m³

FIRE PROTECTION INFORMATION

Extinguishing Media: Although phosphoric acid is not combustible, it can react with metals to liberate hydrogen, a flammable gas.

REACTIVITY DATA

Materials To Avoid: Avoid contact with materials such as sulfides and sulfites which could release toxic gases, and be cautious in mixing with strong bases because high heat of reaction can generate steam.

Hazardous Decomposition Products: None.

Hazardous Polymerization: Does not occur.

The following information presents both qualified experts to assess the effects of phosphoric acid on the health of industrially exposed individuals and to support the Precautionary Statements and Occupational Control Procedures recommended in this document. To avoid misunderstanding, the data provided in this section should be interpreted by individuals trained in evaluation of this type of information.

Human Experience

Dermal contact is expected to be the primary route of occupational exposure to phosphoric acid. Phosphoric acid is considered to be corrosive to the eyes and skin. Phosphoric acid may not produce an immediate burning sensation upon skin contact, delaying the awareness of the worker that contact has occurred. Occupational exposure to this material has not been reported to cause significant adverse health effects when recommended safety precautions are followed.

Toxicological Data

Data from Monsanto studies indicate the following:

	Acute Oral LD_{50} (Rat)	Acute Dermal LD_{50} (Rabbit)	Eye Irritation FHSA 24-hr Rabbit	Skin Irritation FHSA 24-hr Rabbit	Skin Irritation 4-hr DOT Rabbit
Phosphoric acid 75%	4,400 mg/kg, Slightly Toxic	Greater than 3,160 mg/kg, Slightly Toxic	Corrosive	Corrosive	Noncorrosive
Phosphoric acid 80%	4,200 mg/kg, Slightly Toxic	Greater than 3,160 mg/kg, Slightly Toxic	Corrosive	Corrosive	Noncorrosive
Phosphoric acid 85%	3,500 mg/kg, Slightly Toxic	Greater than 1,260 mg/kg, Slightly Toxic	Corrosive	Corrosive	Corrosive

The results of the acute oral and dermal tests indicate that these concentrations of phosphoric acid are slightly toxic by ingestion in single oral doses and by single dermal applications. Following a 24-hour exposure, irreversible eye and skin damage occurred at all tested concentrations of phosphoric acid.

Additional Information

Phosphoric acid has a low vapor pressure at room temperature and is not expected to present a significant inhalation hazard under ambient conditions. Phosphoric acid, however, can be irritating to the respiratory tract if inhaled as a mist or if the material is vaporized.

PHYSICAL DATA

Appearance and Odor:	Clear, colorless, syrupy liquid; no foreign odor
Vapor Pressure @ 20°C (mm Hg):	0.0285 (100% acid)
Solubility in Water:	Complete

	75%	80%	85%
Boiling Point (760 mm Hg):	135°C	144°C	154°C
Freezing Point:	−17.5°C	+4.6°C	+21.1°C
Viscosity @ 25°C (centistokes):	12	17	23
Specific Gravity @ 25°C/15.5°C:	1.575	1.633	1.692
% Equivalent H_3PO_4:	75.1	80.35	85.5
Lbs./gallon @ 25°C:	13.17	13.66	14.15

Note: These physical data are typical values based on material tested but may vary from sample to sample. Typical values should not be construed as a guaranteed analysis of any specific lot or as specification items.

SPILL, LEAK & DISPOSAL INFORMATION

Emergency Spill and Leak Information: Contain spills and leaks to prevent discharge to the environment. Neutralize cautiously with a base such as soda ash.

Phosphoric acid, as currently defined, is a *hazardous substance* under the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA). If 5,000 pounds or more are released into the environment, it must be reported to the National Response Center (800-424-8802 or 202-426-2675). Since local, state and federal laws may vary, consult your attorney or appropriate regulatory officials for information relating to spill reporting.

Keep product out of sewers, watersheds and water systems.

Disposal Information: Dispose of in accordance with all applicable federal, state and local regulations.

As currently defined in the federal Resource Conservation and Recovery Act (RCRA), unneutralized phosphoric acid, when discarded, is a *hazardous waste* exhibiting the characteristics of corrosivity (D-002). See 40 CFR 261.22. Its disposal, therefore, is regulated by federal RCRA regulations. Consult your attorney or appropriate regulatory officials for information regarding additional state and local waste disposal requirements.

ADDITIONAL COMMENTS

Store in rubber-lined or 316 stainless steel tanks designed for H_3PO_4. Store drums away from heat and out of direct sunlight.

DATE: 10/1/85
MSDS NO.: 007664382

FOR ADDITIONAL NON-EMERGENCY INFORMATION, CONTACT:

Product Acceptability Coordinator
Detergent Materials
Monsanto Industrial Chemicals Co.
314-694-2096
(A Unit of Monsanto Company)

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INDUSTRIAL H SAFETY DATA SHEET

NOTE: NO REPRESENTATION IS MADE AS TO THE ACCURACY OF THE INFORMATION HEREIN. SEE PAGE 7 FOR CONDITIONS UNDER WHICH DATA ARE FURNISHED.

Trade Name and Synonyms
01659 RANDO OIL HD 68

Manufacturer's Name
Texaco Inc.

Emergency Telephone No.
(914) 831-3400 ext. 204

Address
P.O. Box 509 Beacon, NY 12508

Chemical Name and/or Family or Description
Hydraulic Oils

THIS PRODUCT IS CLASSIFIED AS: X NOT HAZARDOUS:

_____ HAZARDOUS BY DEFINITION NO.(S) _____ ON ATTACHED EXPLANATION SHEETS

WARNING STATEMENT:
NONE CONSIDERED NECESSARY

OCCUPATIONAL CONTROL PROCEDURES

Protective Equipment (Type)

Eyes: Chemical type goggles or face shield optional.

Skin: Exposed employes should exercise reasonable personal cleanliness; this includes cleansing exposed skin areas several times daily with soap and water, and laundering or dry cleaning soiled work clothing at least weekly.

Inhalation: None required if exposures are within permissible concentrations; see below.

Ventilation: Normal

Permissible Concentrations:

Air: 5 mg/cubic meter of air for mineral oil mist averaged over an 8 hour daily exposure (ACGIH, 1984-85).

EMERGENCY AND FIRST AID PROCEDURES

First Aid

Eyes: As with most foreign materials, should eye contact occur, flush eyes with plenty of water.

Skin: Wash exposed areas with soap and water.

Ingestion: None considered necessary.

Inhalation: None considered necessary.

Other Instructions: None.

N.D. = Not Determined N.A. = Not Applicable

PHYSIOLOGICAL EFFECTS:

Code No. 01659

Effects of Exposure

Acute:

Eyes: Believed to be minimally irritating.

Skin: Believed to be slightly irritating with possible redness, edema, or drying of the skin.

Respiratory System: Believed to be minimally irritating if not in excess of permissible concentrations; see page 1.

Chronic: N.D.

Other: -

Sensitization Properties:

Skin: Yes ___ No ___ Unknown X Respiratory: Yes ___ No ___ Unknown X

Median Lethal Dose (LD_{50} LC_{50})(Species)

Oral: Similar product >22.4 g/kg (rat); practically nontoxic

Inhalation: N.D.

Dermal: Similar product >3.0 g/kg (rabbit); practically nontoxic

Other: N. D.

Irritation Index, Estimation of Irritation (Species)

Skin: Similar product 2.08/8.0 (rabbit); slightly irritating

Eyes: Similar product 9.83/110 (rabbit); no appreciable effect

Symptoms of Exposure: See above.

FIRE PROTECTION INFORMATION

Ignition Temp. °F. N.D. Flash Point °F. (Method) 425 °F (COC)

Flammable Limits (%) Lower N.D. Upper N.D.

Products Evolved When Subjected to Heat or Combustion:

Carbon monoxide, carbon dioxide, aldehydes and ketones, combustion products of nitrogen and sulfur.

Recommended Fire Extinguishing Agents And Special Procedures:

According to the National Fire Protection Association Guide, use water spray, dry chemical, foam, or carbon dioxide.
Water or foam may cause frothing. Use water to cool fire-exposed containers. If a leak or spill has not ignited, use water spray to disperse the vapors and to provide protection for persons attempting to stop the leak.

Unusual or Explosive Hazards:

None.

N.D. - Not Determined N.A. - Not Applicable

ENVIRONMENTAL PROTECTION

Code No. 01659

Waste Disposal Method:
Under RCRA, it is the responsibility of the user of products to determine, at the time of disposal, whether product meets RCRA criteria for hazardous waste. This is because product uses, transformations, mixture, processes, etc. may render the resulting material hazardous. (See Remarks for Waste Classification.)

Procedures in Case of Breakage or Leakage: (Transportation Spills Call CHEMTREC (800) 424-9300)
Contain spill if possible. Wipe up or absorb on suitable material and shovel up.

Remarks:
Waste Classification: Product (as presently constituted) has the RCRA characteristics of barium toxicity and if discarded in its purchased form would have the hazardous waste number D005.

PRECAUTIONS

NONE CONSIDERED NECESSARY

Requirements for Transportation, Handling and Storage:
Minimum feasible handling temperatures should be maintained. Periods of exposure to high temperatures should be minimized. Water contamination should be avoided.

DOT Proper Shipping Name: N.A.
DOT Hazard Class (if applicable): N.A.

CHEMICAL AND PHYSICAL PROPERTIES

Boiling Point (°F) N.D. Vapor Pressure N.D. (mmHg)

Specific Gravity .8816 (H_2O=1) Vapor Density N.D. (Air=1)

Appearance and Odor pale liquid

pH of undiluted product: N.A. Solubility N.D.

Percent Volatile by Volume N.D. Evaporation N.D. ( )=1

Viscosity 64.5 cSt @ 40 °C Other -

Hazardous Polymerizations _____ Occur X Do not occur

The Material Reacts Violently With: (If others is checked below, see additional comments on page 6 for futher details)

Air	Water	Heat	Strong Oxidizers	Others	None of These
					X

N.D. - Not Determined N.A. - Not Applicable
< - Less Than > - Greater Than

COMPOSITION

Code No. 01659

Chemical/Common Name	CAS No.	Exposure Limit	Range in
Solvent-dewaxed heavy paraffinic petroleum distillates	64742650	5.0 mg/m3 TWA	95.00 - 9

To the best of our knowledge, none of the above listed components is hazardous according to OSHA (1910.1200) or one or more state Right-To-Know lists.

DUCT SHIPPING LABEL | Code No. 01659

01659 RANDO OIL HD 68

NONE CONSIDERED NECESSARY

hemical/Common Name	CAS No.	Exposure Limit	Range in %
olvent-dewaxed heavy paraffinic petroleum distillates	64742650	5.0 mg/m3 TWA	95.00 - 99.99

o the best of our knowledge, none of the above listed components is hazardous ccording to OSHA (1910.1200) or one or more state Right-To-Know lists.

HMIS

Health : 1 Reactivity : 0
Flammability: 1 Special : -

JTION: Misuse of empty containers can be hazardous. Empty containers can be hazardous if used to store toxic, flammable, or reactive materials. Cutting or welding of empty containers might cause fire, explosion or toxic fumes from residues. Do not pressurize or expose to open flame or heat. Keep container closed and drum bungs in place.

HEALTH EMERGENCY TELEPHONE: (914) 831-3400 (EXT. 204)

Texaco Inc.
2000 Westchester Avenue
White Plains, New York 10650

For Additional Information Concerning:

Fuels/Lubricants/Antifreezes
call (914) 831-3400 (EXT.204)
Chemicals/Additives
call (409) 722-8381
Transportation Spills
call CHEMTREC (800) 424-9300

ADDITIONAL COMMENTS

Code No. 01659

TEXACO INTENDS TO COMPLY FULLY WITH PPOVISIONS OF THE TOXIC SUBSTANCES CONTROL ACT
STATE OF MICHIGAN CRITICAL MATERIALS ACT (REVISED 1985)
0.038% zinc; conversion factor 7.3 pounds per gallon

To determine applicability or effect of any law or regulation with respect to the product, users should consult his legal advisor or the appropriate government agency. Texaco does not undertake to furnish advice on such matters.

By R. T. Richards Title Mgr. Env. Conservation & Toxicology

Date 11-20-85 ☐ New ☒ Revised. Supersedes 10-16-85

N.D. - Not Determined N.A. - Not Applicable

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EXPLANATION OF THE INDUSTRIAL HYGIENE, TOXICOLOGY, AND MATERIAL SAFETY DATA SHEET

PRODUCT INFORMATION

Trade Name and Synonyms

Refer to the code number and name under which the product is marketed and the common commercial name of the product.

Manufacturer's Name and Address Self explanatory.

Chemical Name and/or Family or Description

Refer to chemical, generic, or descriptive name of single elements and compounds.

For purposes of this form, a product is defined as hazardous if it possesses one or more of the following charateristics: (1) has a flash-point below 200 degrees Farenheit, closed cup or subject to spontaneous heating; (2) has a threshold limit value below 500 ppm gases and vapor below 5 mg/m^3 for dust, fumes and mist, and below 25 MPPCF for mineral dust; (3) a single dose oral LD50 below 500 mg/kg; (4) causes burns to the skin in the short-term exposure or is systemically toxic by skin contact; (5) has been demonstrated to be a skin or eye irritant or causes respiratory irritation; (6) may cause skin or respiratory sensitization; (7) has teratogenic, mutagenic or other toxic effects; (8) may cause asphyxia or pneumoconiosis; (9) in the course of normal operations may produce dusts, gases, fumes, vapor, mist, or smoke which have one or more of the above characteristics; (10) contains a component which may be carcinogenic according to NTP (National Toxicology Program), IARC (International Agency for Research on Cancer), OSHA (Occupational Safety and Health Administration), EPA (Environmental Protection Agency) and/or NCI (National Cancer Institute.); (11) has a median LC50 in air of 200 ppm or less by volume of gas or vapor, or 20 mg/l or less of mist, fume or dust when administered by inhalation.

OCCUPATIONAL CONTROL PROCEDURES

(Consult your Industrial Hygienist or Occupational Health Specialist.)

Protective Equipment

Type of protective equiment that is necessary for the safe handling and use of this product.

Ventilation

Normal means adequate to maintain permissible concentrations.
Ventilation type, i.e. local exhaust, mechanical, etc.

Permissible Concentrations

Indicates Threshold Limit Value (TLV) and/or Time Weighted Average (TWA) as established by the American Conference of Governmental Industrial Hygienists and/or standards promulgated by the Occupational Safety and Health Administration.

EMERGENCY AND FIRST AID PROCEDURES

Administer first aid and emergency procedures in case of eye and/or skin contact, ingestion and inhalation.

PHYSIOLOGICAL EFFECTS

Acute Exposures (Eye, Skin, Respiratory System)

Refers to the most common effects that would be expected to occur from direct contact with the product.

Chronic

Refers to the effects that are most likely to occur from repeated or prolonged exposure.

Sensitizer

Means a substance which will cause on or in normal living tissue, through an allergic or photodynamic process, a hypersensitivity which becomes evident on reapplication of, or exposure to, the same substance.

Median Lethal Dose or Concentration (LD50,LC50)

Refers to that dose or concentration of the material which will produce death in 50 per cent of the animals. For inhalation, exposure time is indicated.

Irritation Index

Refers to an empirical score (Draize Method) for eye and skin irritation which tested by the method described. if numbers are not available, a yes or no answer indicates whether or not the material is an irritant.

FIRE PROTECTION INFORMATION

Ignition Temperature

Refers to the temperature in degrees Farenheit, at which a liquid will give off enough flammable vapor to ignite and burn continuously for 5 seconds.

Flash Point (State Method used)

Refers to the temperature in degrees Farenheit, at which a liquid will give off enough flammable

Flammable Limits

Refers to the range of gas or vapor concentration (percent by volume in air) which will burn or explode if an ignition source is present. Lower means the the lower flammable limit and upper means the upper flammable limit given in percent.

Products Evolved When Subjected to Heat or Combustion.

The products evolved when this material is subjected to heat or combustion. Includes temperature at which oxidation or other forms of degradation occurs.

Recommended Fire Extinguishing Agents and Special Procedures

Specifies the fire fighting agents that should be used to extinguish fires. If unusual fire hazards are involved or special procedures indicated, this is specified.

Unsusual Fire or Explosive Hazards

Specifies hazards to personnel in case of fire, explosive danger.

ENVIRONMENTAL PROTECTION

Specifies how this product can be successfully disposed of.

Indicates precautions necessary in the event that leakage or breakage occurs. Included are (a) clean-up procedures, (b) personal protective equipment if necessary, (c) hazards that may be created, i.e. fire, explosion, etc.

PRECAUTIONARY LABEL

Label that is required or recommended.

Requirements for Transportation, Handling and Storage

Specifies handling and storage procedures. Gives ICC, DOT, or other regulations related to safety and health for transportation.

CHEMICAL AND PHYSICAL PROPERTIES

Boiling Point (or Range)

In degrees Farenheit or Celsius Boiling Point at 760 mmHg.

Vapor Pressure

Pressure exerted when a solid or liquid is in equilibrium with its own vapor.

Specific Gravity

The ratio of the density of the product to the density of water.

Vapor Density

The ratio of the density of the vapor at saturation concentration (20 degrees Celsius or 68 degrees Farenheit) to the density of air at 760 mmHg.

Appearance and Odor

Refers to the general characterization of the material, e.g. powder, colorless liquid, aromatic odor, etc.

pH

Refers to the degree of acidity or basicity of the material in a specific concentration.

pH1-5 - STRONGLY ACIDIC
pH5-7 - WEAKLY ACIDIC
pH7-9 - WEAKLY BASIC
pH9-14 - STRONGLY BASIC

Solubility

Refers to the solubility of a material by weight in water at room temperature. The term negligible, less than 0.1 %; slight, 0.1 to 1%; moderate, 1 to 10%; appreciable, 10% or greater. Gives solubility in organic solvents where appropriate.

Percent Volatile By Volume

Refers to the amount volatized at 20 degrees Celsius or 68 degrees Farenheit when allowed to evaporate.

Evaporation

Gives the rate of evaporation compared to a standard

Viscosity

Measure of flow characteristics in Kinematic viscosity in Centistokes.

Hazardous Polymerization

Hazardous polymerization is that reaction which takes place at a rate which produces large amounts of energy. Indicates whether it may or may not occur and under what storage conditions.

Does the Material React Violently

Indicates whether the material will react violently, releasing large amounts of energy when exposed under conditions listed.

Composition

Components of the product as manufactured.

Texaco Inc.
2000 Westchester Avenue
White Plains, New York 10650
Phone (914) 831-3400 (Beacon)

1, 2, 3, 4, 6, 7, 6, (13), (12), 5, (14), 1,

SODIUM HYDROXIDE
SODIUM HYDROXIDE
SODIUM HYDROXIDE

MATERIAL SAFETY DATA SHEET

FISHER SCIENTIFIC
CHEMICAL DIVISION
1 REAGENT LANE
FAIR LAWN NJ 07410
(201) 796-7100

EMERGENCY CONTACTS
GASTON L. PILLORI
(201) 796-7100

DATE: 02/18/86
PO NBR: N/A
ACCT: 220066-03
INDEX: N/A
CAT NO: S318100

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SUBSTANCE IDENTIFICATION

SUBSTANCE: **SODIUM HYDROXIDE**

CAS-NUMBER 1310-73-2

TRADE NAMES/SYNONYMS: CAUSTIC SODA; SODA LYE; LYE; WHITE CAUSTIC; CAUSTIC ALKALI; CAUSTIC SODA, BEAD; CAUSTIC SODA, DRY; CAUSTIC SODA, FLAKE; CAUSTIC SODA, GRANULAR; CAUSTIC SODA, SOLID; SODIUM HYDRATE; SODIUM HYDROXIDE, BEAD; SODIUM HYDROXIDE, FLAKE; SODIUM HYDROXIDE, DRY; SODIUM HYDROXIDE, SOLID; S-613 ASCARITE; S-318; S-320; S-612

CHEMICAL FAMILY:
INORGANIC BASE

MOLECULAR FORMULA: NA-O-H MOL WT: 40.00

CERCLA RATINGS (SCALE 0-3): HEALTH=3 FIRE=0 REACTIVITY=1 PERSISTENCE=0

COMPONENTS AND CONTAMINANTS

PERCENT: 97	COMPONENT: SODIUM HYDROXIDE
PERCENT: 0.50	COMPONENT: SODIUM CARBONATE
PERCENT: .008	COMPONENT: SODIUM CHLORIDE
PERCENT: <0.1	COMPONENT: SODIUM SULFATE
PERCENT: 0.1	COMPONENT: POTASSIUM, CALCIUM, AND MAGNESIUM

OTHER CONTAMINANTS: SILICON DIOXIDE (0.03%) AND OTHER METALS (0.01%).

EXPOSURE LIMITS:
2 MG/M3 OSHA TWA; 2 MG/M3 ACGIH CEILING; 2 MG/M3 NIOSH RECOMMENDED 15 MINUTE CEILING.

PHYSICAL DATA

DESCRIPTION: ODORLESS, WHITE OR OFF-WHITE HYGROSCOPIC SOLID.

BOILING POINT: 2534 F (1390 C) MELTING POINT: 605 F (318 C)

SPECIFIC GRAVITY: 2.1 VAPOR PRESSURE: 42 MMHG @ 1000 C

PH: 14 FOR A 5% AQ SOLN SOLUBILITY IN WATER: 42%

SOLVENT SOLUBILITY: ALCOHOL, GLYCEROL.

FIRE AND EXPLOSION DATA

FIRE AND EXPLOSION HAZARD:
NEGLIGIBLE FIRE AND EXPLOSION HAZARD WHEN EXPOSED TO HEAT OR FLAME.

FLASH POINT: NON-FLAMMABLE

FIREFIGHTING MEDIA:
DRY CHEMICAL, CARBON DIOXIDE, WATER SPRAY OR FOAM
(1984 EMERGENCY RESPONSE GUIDEBOOK, DOT P 5800.3).

FOR LARGER FIRES, USE FLOODING QUANTITIES OF WATER.

FIREFIGHTING:
MOVE CONTAINERS FROM FIRE AREA IF POSSIBLE. COOL CONTAINERS EXPOSED TO FLAMES WITH WATER FROM SIDE UNTIL WELL AFTER FIRE IS OUT (1984 EMERGENCY RESPONSE GUIDEBOOK, DOT P 5800.3).

TOXICITY

1%/24 HOURS EYE-MONKEY SEVERE IRRITATION; 50 MG/24 HOURS SKIN-RABBIT SEVERE IRRITATION; 1% EYE-RABBIT SEVERE IRRITATION; 50 UG/24 HOURS EYE-RABBIT SEVERE IRRITATION; 1 MG/24 HOURS EYE-RABBIT SEVERE IRRITATION;
CARCINOGEN STATUS: NONE.
SODIUM HYDROXIDE IS AN EYE AND MUCOUS MEMBRANE IRRITANT AND SEVERE SKIN IRRITANT.

HEALTH EFFECTS AND FIRST AID

INHALATION:
-CORROSIVE. 200 MG/M3 IS IMMEDIATELY DANGEROUS TO LIFE AND HEALTH.
ACUTE EXPOSURE- THE EFFECTS OF THE DUST OR MIST WILL VARY FROM MILD IRRITATION OF THE NOSE @ 2 MG/M3 TO SEVERE PNEUMONITIS DEPENDING ON THE SEVERITY OF EXPOSURE. LOW CONCENTRATIONS MAY CAUSE SORE THROAT, COUGHING, AND LABORED BREATHING. INTENSE EXPOSURES MAY RESULT IN DELAYED PULMONARY EDEMA.

CHRONIC EXPOSURE- PROLONGED EXPOSURE MAY CAUSE BRONCHIAL IRRITATION, COUGHING, BRONCHIAL PNEUMONIA, AND GASTROINTESTINAL DISTURBANCES.

FIRST AID- REMOVE FROM EXPOSURE AREA TO FRESH AIR IMMEDIATELY.

HAS STOPPED, GIVE ARTIFICIAL RESPIRATION. KEEP AFFECTED PERSON WARM AND AT REST. GET MEDICAL ATTENTION AS SOON AS POSSIBLE.

SKIN CONTACT:
CORROSIVE.

ACUTE EXPOSURE- ON THE SKIN, SOLUTIONS OF 25 TO 50% MAY CAUSE THE SENSATION OF IRRITATION WITHIN ABOUT 3 MINUTES. WITH SOLUTIONS OF 4% THIS DOES NOT OCCUR UNTIL AFTER SEVERAL HOURS. IF NOT REMOVED FROM THE SKIN, SEVERE BURNS WITH DEEP ULCERATION MAY OCCUR. EXPOSURE TO THE DUST OR MIST MAY CAUSE MULTIPLE SMALL BURNS AND TEMPORARY LOSS OF HAIR.

CHRONIC EXPOSURE- REPEATED EXPOSURE MAY RESULT IN DERMATITIS.

FIRST AID- REMOVE CONTAMINATED CLOTHING WHILE RUNNING STREAMS OF WATER UNDER CLOTHING. WASH AFFECTED AREA WITH SOAP OR MILD DETERGENT AND LARGE AMOUNTS OF WATER (APPROXIMATELY 15-20 MINUTES) UNTIL NO EVIDENCE OF CHEMICAL REMAINS. FOR CHEMICAL BURNS, APPLY STERILE BANDAGE SECURELY, BUT NOT TOO TIGHTLY. GET MEDICAL ATTENTION.

EYE CONTACT:
CORROSIVE.

ACUTE EXPOSURE- CONTACT MAY CAUSE DISINTEGRATION AND SLOUGHING OF CONJUNCTIVAL AND CORNEAL EPITHELIUM, CORNEAL OPACIFICATION, MARKED EDEMA AND ULCERATION; AFTER 7 TO 13 DAYS EITHER GRADUAL RECOVERY BEGINS OR THERE IS PROGRESSION OF ULCERATION AND CORNEAL OPACIFICATION. COMPLICATIONS OF SEVERE EYE BURNS ARE SYMBLEPHARON WITH OVERGROWTH OF THE CORNEA BY A VASCULARIZED MEMBRANE, PROGRESSIVE OR RECURRENT CORNEAL ULCERATION AND PERMANENT CORNEAL OPACIFICATION.

CHRONIC EXPOSURE- REPEATED OR PROLONGED VAPOR CONTACT AT LOW LEVELS OF EXPOSURE MAY CAUSE CONJUNCTIVITIS.

FIRST AID- WASH EYES IMMEDIATELY WITH LARGE AMOUNTS OF WATER, OCCASIONALLY LIFTING THE UPPER AND LOWER LIDS, UNTIL NO EVIDENCE OF CHEMICAL REMAINS (APPROXIMATELY 15-20 MINUTES). GET MEDICAL ATTENTION.

INGESTION:
CORROSIVE.

ACUTE EXPOSURE- SEVERE ABDOMINAL PAIN, CORROSION OF THE LIPS, MOUTH, TONGUE, AND PHARYNX, AND VOMITING OF LARGE PIECES OF MUCOSA. ASPHYXIA CAN OCCUR FROM SWELLING OF THE THROAT. PERFORATION OF THE ESOPHAGUS AND STOMACH CAN OCCUR. CASES OF SQUAMOUS CELL CARCINOMA OF THE ESOPHAGUS HAVE OCCURRED WITH LATENT PERIODS OF 12 TO 42 YEARS AFTER INGESTION; A RESULT TISSUE DESTRUCTION AND POSSIBLY SCAR FORMATION RATHER THAN THE RESULT OF DIRECT CARCINOGENIC ACTION.

FIRST AID- IF VICTIM IS CONSCIOUS, GIVE HIM LARGE QUANTITIES OF WATER IMMEDIATELY TO DILUTE THE ALKALI. DO NOT INDUCE VOMITING. GET MEDICAL ATTENTION IMMEDIATELY.

REACTIVITY

REACTIVITY:
THE SUBSTANCE IS A STRONG BASE. IT REACTS EXOTHERMICALLY WITH WATER RELEASING CORROSIVE FUMES OF SODIUM HYDROXIDE.

INCOMPATIBILITIES:

ACETALDEHYDE: RESULTS IN VIOLENT POLYMERIZATION OF ACETALDEHYDE.
ACETIC ACID: MIXING IN A CLOSED CONTAINER INCREASES TEMPERATURE AND PRESSURE
ACETIC ANHYDRIDE: MIXING IN A CLOSED CONTAINER INCREASES TEMPERATURE AND PRESSURE.
ACROLEIN: RESULTS IN AN EXTREMELY VIOLENT POLYMERIZATION OF ACROLEIN.
ACRYLONITRILE: VIOLENT POLYMERIZATION.
ALLYL ALCOHOL: AS A BENZENE EXTRACT OF ALLYL BENZENESULFONATE WAS PREPARED FROM ALLYL ALCOHOL AND BENZENE SULFONYL CHLORIDE IN THE PRESENCE OF AQUEOUS SODIUM HYDROXIDE, UNDER VACUM DISTILLATION TWO FRACTIONS CAME OFF, THEN THE TEMPERATURE ROSE TO 135 C, WHEN THE RESIDUE DARKENED AND EXPLODED.
ALLYL CHLORIDE: IN CONTACT WITH DRY CAUSTIC SODA BEADS, HYDROLYSIS MAY TAKE PLACE PRODUCING ALLYL ALCOHOL.
ALUMINUM: VIGOROUS REACTION WITH THE EVOLUTION OF FLAMMABLE HYDROGEN GAS.
CHLORINE TRIFLUORIDE: VIOLENT REACTION.
CHLOROFORM AND METHYL ALCOHOL: EXOTHERMIC REACTION.
CHLOROHYDRIN: MIXING IN A CLOSED CONTAINER CAUSES AN INCREASE IN TEMPERATURE AND PRESSURE.
CHLORONITROTOLUENES: POSSIBLE EXPLOSION.
CHLOROSULFONIC ACID: MIXING IN A CLOSED CONTAINER CAUSES AN INCREASE IN TEMPERATURE AND PRESSURE.
1,2-DICHLOROETHYLENE: MAY FORM SPONTANEOUSLY FLAMMABLE MONOCHLOROACETYLENE.
ETHYLENE CYANOHYDRIN: MIXING IN A CLOSED CONTAINER CAUSES AN INCREASE IN TEMPERATURE AND PRESSURE.
GLYOXAL: MIXING IN A CLOSED CONTAINER INCREASES TEMPERATURE AND PRESSURE.
HALOGENATED HYDROCARBONS: VIOLENT REACTION.
HYDROCHLORIC ACID: MIXING IN A CLOSED CONTAINER CAUSES AN INCREASE IN TEMPERATURE AND PRESSURE.
HYDROFLUORIC ACID: MIXING IN A CLOSED CONTAINER CAUSES AN INCREASE IN TEMPERATURE AND PRESSURE.
HYDROQUINONE: RAPID DECOMPOSITION OF HYDROQUINONE WITH EVOLUTION OF HEAT.
MALEIC ANHYDRIDE: EXPLOSIVE DECOMPOSITION.
METALS: CORRODES METALS, REACTING TO FORM FLAMMABLE HYDROGEN GAS.
NITRIC ACID: MIXING IN A CLOSED CONTAINER INCREASES TEMPERATURE AND PRESSURE
NITROETHANE: FORMS AN EXPLOSIVE SALT.
NITROMETHANE: FORMS AN EXPLOSIVE SALT.
NITROPARAFFINS: THE NITROPARAFFINS, IN THE PRESENCE OF WATER, FORM DRY SALTS WITH ORGANIC BASES. THE DRY SALTS ARE EXPLOSIVE.
NITROPROPANE: FORMS AN EXPLOSIVE SALT.
OLEUM: MIXING IN A CLOSED CONTAINER CAUSES AN INCREASE IN TEMPERATURE AND PRESSURE.
PENTOL (3-METHYL-2-PENTEN-4-YN-1-OL): POSSIBLE EXPLOSION.
PHOSPHORUS: PHOSPHORUS BOILED WITH ALKALINE HYDROXIDES YIELDS MIXED PHOSPHINES WHICH MAY IGNITE SPONTANEOUSLY IN AIR.
PHOSPHORUS PENTOXIDE: EXTREMELY VIOLENT REACTION WHEN INITIATED BY LOCAL HEATING.
B-PROPIOLACTONE: MIXING IN A CLOSED CONTAINER CAUSES AN INCREASE IN TEMPERATURE AND PRESSURE.
SULFURIC ACID: MIXING IN A CLOSED CONTAINER CAUSES AN INCREASE IN TEMPERAURE AND PRESSURE.
TETRACHLOROBENZENE AND METHYL ALCOHOL: POSSIBLE EXPLOSION.
TETRAHYDROFURAN: SERIOUS EXPLOSIONS CAN OCCUR.
TRICHLOROETHYLENE: FORMATION OF EXPLOSIVE MIXTURES OF DICHLOROACETYLENE.
WATER: CAUSTIC SODA BEADS IN CONTACT WITH WATER MAY GENERATE ENOUGH HEAT TO IGNITE ADJACENT COMBUSTIBLES.

DECOMPOSITION:
MAY RELEASE TOXIC FUMES OF SODIUM OXIDE, WHICH CAN REACT WITH WATER OR STEAM TO PRODUCE HEAT AND FLAMMABLE HYDROGEN VAPORS.

POLYMERIZATION:
NOT KNOWN TO OCCUR.

****
CONDITIONS TO AVOID

MAY BURN BUT DOES NOT IGNITE READILY. FLAMMABLE, POISONOUS GASES MAY ACCUMULATE IN TANKS AND HOPPER CARS. MAY IGNITE COMBUSTIBLES (WOOD, PAPER, OIL, ETC.).

****
SPILL AND LEAK PROCEDURES

SOIL SPILL:
DIG HOLDING AREA SUCH AS LAGOON, POND OR PIT FOR CONTAINMENT.

USE PROTECTIVE COVER SUCH AS A PLASTIC SHEET TO PREVENT MATERIAL FROM DISSOLVING IN FIRE EXTINGUISHING WATER OR RAIN.

WATER SPILL:
ADD SUITABLE AGENT TO NEUTRALIZE SPILLED MATERIAL TO PH-7.

OCCUPATIONAL SPILL:
DO NOT TOUCH SPILLED MATERIAL. STOP LEAK IF YOU CAN DO IT WITHOUT RISK. FOR SMALL SPILLS, TAKE UP WITH SAND OR OTHER ABSORBENT MATERIAL AND PLACE INTO CONTAINERS FOR LATER DISPOSAL. FOR SMALL DRY SPILLS, WITH CLEAN SHOVEL PLACE MATERIAL INTO CLEAN, DRY CONTAINER AND COVER. MOVE CONTAINERS FROM SPILL AREA. FOR LARGER SPILLS, DIKE FAR AHEAD OF SPILL FOR LATER DISPOSAL. KEEP UNNECESSARY PEOPLE AWAY. ISOLATE HAZARD AREA AND DENY ENTRY.

PROTECTIVE EQUIPMENT

VENTILATION:
PROVIDE LOCAL EXHAUST VENTILATION SYSTEM TO MEET PERMISSIBLE EXPOSURE LIMITS.

RESPIRATOR:

100 MG/M3- HIGH-EFFICIENCY PARTICULATE RESPIRATOR WITH A FULL FACEPIECE.
SUPPLIED-AIR RESPIRATOR WITH A FULL FACEPIECE, HELMET, OR HOOD.
SELF-CONTAINED BREATHING APPARATUS WITH A FULL FACEPIECE.

200 MG/M3- POWERED AIR-PURIFYING RESPIRATOR WITH A HIGH-EFFICIENCY PARTICULATE FILTER AND A FULL FACEPIECE.
TYPE C SUPPLIED-AIR RESPIRATOR WITH A FULL FACEPIECE OPERATED IN PRESSURE-DEMAND OR OTHER POSITIVE PRESSURE MODE OR WITH A FULL FACEPIECE, HELMET, OR HOOD OPERATED IN CONTINUOUS-FLOW MODE.

ESCAPE- DUST MASK, EXCEPT SINGLE-USE AND QUARTER-MASK RESPIRATORS.
SELF-CONTAINED BREATHING APPARATUS.

FIREFIGHTING- SELF-CONTAINED BREATHING APPARATUS WITH A FULL FACEPIECE OPERATED IN PRESSURE-DEMAND OR OTHER POSITIVE PRESSURE MODE.

CLOTHING:
EMPLOYEE MUST WEAR APPROPRIATE PROTECTIVE CLOTHING AND EQUIPMENT TO PREVENT ANY POSSIBILITY OF SKIN CONTACT WITH THIS SUBSTANCE.

GLOVES:
EMPLOYEE MUST WEAR APPROPRIATE PROTECTIVE GLOVES TO PREVENT CONTACT WITH THIS SUBSTANCE.

EYE PROTECTION:
EMPLOYEE MUST WEAR SPLASH-PROOF OR DUST-RESISTANT SAFETY GOGGLES AND A FACESHIELD TO PREVENT CONTACT WITH THIS SUBSTANCE.

WHERE THERE IS ANY POSSIBILITY THAT AN EMPLOYEE'S EYES MAY BE EXPOSED TO THIS SUBSTANCE, THE EMPLOYER SHALL PROVIDE AN EYE-WASH FOUNTAIN WITHIN THE IMMEDIATE WORK AREA FOR EMERGENCY USE.

AUTHORIZED - ALLIED FISHER SCIENTIFIC
CREATION DATE: 01/21/85 REVISION DATE: 05/01/85

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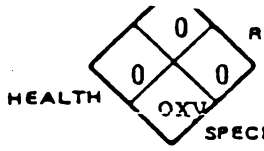
Olin

EMERGENCY PHONE (203) 356-2345
Olin Corporation, 120 Long Ridge Road
Stamford, Conn. 06904



SAFETY DATA

SECTION I — IDENTIFICATION

CHEMICAL NAME & SYNONYMS		
Sodium Nitrate		
CHEMICAL FAMILY	FORMULA $NaNO_3$	TRADE NAME Sodium Nitrate
DESCRIPTION White-yellow solid		CAS NO. 7631-99-4

SECTION II — NORMAL HANDLING PROCEDURES

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE

Do not get in eyes, on skin or on clothing. Do not take internally. Avoid breathing dust. Use only with adequate ventilation. Protect against physical damage. Store in a cool, dry place. Separate from combustibles, organic or other readily oxidizable materials. Avoid storage on wood floors. Immediately remove and dispose of any spilled material.

CORROSIVE ACTION ON MATERIALS (Metals, Plastic, Rubber, Etc.)

PROTECTIVE EQUIPMENT		VENTILATION REQUIREMENTS
Eyes	Goggles	Local exhaust or general ventilation required as dictated by airborne concentrations.
Gloves	Impervious	
Other	Coveralls and impervious boots	

SECTION III — HAZARDOUS INGREDIENTS

BASIC MATERIAL	APPROX. %	OSHA PEL	LD 50	LC 50	SIGNIFICANT EFFECTS

SECTION IV — FIRE AND EXPLOSION HAZARD DATA

FLASH POINT METHOD	OSHA CLASSIFICATION	FLAMMABLE EXPLOSIVE LIMITS	*LOWER	UPPER
	Class 1 Oxidizer			

EXTINGUISHING MEDIA Flood with water in early stages. Nitrate may fuse or melt in large fires and water may result in scattering of molten material. Water should not be applied to molten salt baths.

SPECIAL FIRE HAZARD & FIRE FIGHTING PROCEDURES Use NIOSH/MSHA approved self-contained breathing apparatus where this material is involved in a fire.

SECTION V — HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE
None established.

SYMPTOMS OF OVER EXPOSURE Dizziness, abdominal cramps, vomiting, headache, mental impairment, cyanosis. May cause eye, skin and mucous membrane irritation.

EMERGENCY FIRST-AID PROCEDURES

SKIN	Flush thoroughly with water.
EYES	Flush with water for 15 minutes, call a physician.
INGESTION	Drink water, induce vomiting by sticking finger down throat, call a physician.

SECTION ..

ACUTE ORAL LD 50	4.3 g/kg (rats)	CARCINOGENIC	Not known to be carcinogenic.
		MUTAGENIC	Mutagenic in laboratory studie
ACUTE DERMAL LD 50	Not determined	EYE IRRITATION	May be an irritant
		PRIMARY SKIN IRRITATION	May be an irritant
ACUTE INHALATION LC 50	Not determined		

PRINCIPAL ROUTES OF ABSORPTION
Oral, inhalation

EFFECTS OF ACUTE EXPOSURE Dizziness, abdominal cramps, vomiting, headache, mental impairment, cyanosis. May cause eye, skin and mucous membrane irritation.

EFFECTS OF CHRONIC EXPOSURE
None expected at industrial use levels.

SECTION VII – SPILL OR LEAKAGE PROCEDURES (Control Procedures)

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED
Remove all sources of ignition. Wear NIOSH/MSHA approved dust respirator. Follow OSHA regulations for respirator use. (See 29 CFR 1910.134). Wear goggles, coveralls, impervious gloves and boots. Clean up in a manner to minimize contamination with organic material. Do not return material to original container. Place in a fresh container and isolate outside in a well ventilated area. Do not seal the container. Flush any residual material with water Wash all contaminated clothing before reuse. In the event of a large spill use the emergenc telephone number shown on the front of this sheet.

WASTE DISPOSAL METHOD

Dispose of contaminated product and materials used in cleaning up spills or leaks in a manne approved for this material. Consult appropriate federal, state and local regulatory agencies to ascertain proper disposal procedures.

SECTION VIII – REACTIVITY DATA

STABLE UNSTABLE AT ___ °C ___ °F		HAZARDOUS POLYMERIZATION	MAY OCCUR
			WILL NOT OCCUR

CONDITIONS TO AVOID

INCOMPATABILITY (Materials To Avoid) Organic materials, cyanides, reducing materials.

HAZARDOUS DECOMPOSITION PRODUCTS Oxides of Nitrogen

SECTION IX – PHYSICAL DATA

MELTING POINT	306 °C	VAPOR PRESSURE	VOLATILES
BOILING POINT		SOLUBILITY IN WATER Soluble	EVAPORATION RATE
SPECIFIC GRAVITY(H_2O =1)	2.26	pH	VAPOR DENSITY(Air = 1)

INFORMATION FURNISHED BY: A. L. Gaudreau DATE August 1, 1980 (Revision 2, May 30,-1984)

Occupational Safety and Health Administration

MATERIAL SAFETY DATA SHEET

W

November 6, 1985

Required under USDL Safety and Health Regulations for Ship Repairing, Shipbuilding, and Shipbreaking (29 CFR 1915, 1916, 1917)

SECTION I

MANUFACTURER'S NAME: James River Corporation - Berlin-Gorham Group	EMERGENCY TELEPHONE NO.: (603) 752-4600
ADDRESS (Number, Street, City, State, and ZIP Code): 650 Main Street, Berlin, NH 03570	(213) 517-0765
CHEMICAL NAME AND SYNONYMS: Cellulose	TRADE NAME AND SYNONYMS: Solka-Floc BW-40
CHEMICAL FAMILY: Carbohydrate	FORMULA: $C_6H_{10}O_5$ n

SECTION II - HAZARDOUS INGREDIENTS

PAINTS, PRESERVATIVES, & SOLVENTS	%	TLV (Units)	ALLOYS AND METALLIC COATINGS	%	TLV (Units)
PIGMENTS NONE			BASE METAL NONE		
CATALYST NONE			ALLOYS NONE		
VEHICLE NONE			METALLIC COATINGS NONE		
SOLVENTS NONE			FILLER METAL PLUS COATING OR CORE FLUX NONE		
ADDITIVES NONE			OTHERS NONE		
OTHERS NONE					

HAZARDOUS MIXTURES OF OTHER LIQUIDS, SOLIDS, OR GASES	%	TLV (Units)
Do not mix with powerful oxidizing agents such as perchloric acid.		
Cellulose - CAS No. 9004-34-6		

SECTION III - PHYSICAL DATA

BOILING POINT (°F.)	Chars	SPECIFIC GRAVITY (H_2O=1)	1.55
VAPOR PRESSURE (mm Hg.)	Non-Vol.	PERCENT, VOLATILE BY VOLUME (%)	5 - 7
VAPOR DENSITY (AIR=1)	Non-Vol.	EVAPORATION RATE (Water = 1)	1
SOLUBILITY IN WATER	Ca. 1%		

APPEARANCE AND ODOR: White fibrous powder; slight, characteristic odor

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (Method used)	FLAMMABLE LIMITS	Lel	Uel
Non-volatile	non-explosive		

EXTINGUISHING MEDIA: Water, carbon dioxide

SPECIAL FIRE FIGHTING PROCEDURES: None. Burning properties similar to those of paper.

UNUSUAL FIRE AND EXPLOSION HAZARDS: Dust explosions are possible if material and air are mixed in definite proportions and ignited.

(Continued on reverse side)

SECTION V - HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE TLV - 5 Mg/M^3 and pharmaceuticals, No health hazard, only white grades accepted for use in human foods as an inert, bulking agent or filteraid.

EFFECTS OF OVEREXPOSURE

EMERGENCY AND FIRST AID PROCEDURES

SECTION VI - REACTIVITY DATA

STABILITY			CONDITIONS TO AVOID
	UNSTABLE		
	STABLE	X	

INCOMPATABILITY *(Materials to avoid)*
Powerful oxidizing agents such as perchloric acid.

HAZARDOUS DECOMPOSITION PRODUCTS

HAZARDOUS POLYMERIZATION			CONDITIONS TO AVOID
	MAY OCCUR		
	WILL NOT OCCUR	X	

SECTION VII - SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED
Sweep us bulk of material and vacuum the remainder.

WASTE DISPOSAL METHOD
Land-fill; materila is bio-degradable.

SECTION VIII - SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION *(Specify type)*
Dust mask (simple) for non-hazardous substances.

VENTILATION		
	LOCAL EXHAUST: Exhaust Fan	SPECIAL
	MECHANICAL *(General)*	OTHER

PROTECTIVE GLOVES
Not required

EYE PROTECTION
Normally not needed

OTHER PROTECTIVE EQUIPMENT
Not required.

SECTION IX - SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING
Store in dry location where temperature is moderate (not over 150°F)

OTHER PRECAUTIONS
None

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MATERIAL SAFETY DATA SHEET

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EMERGENCY CONTACTS
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CAT NO: T127500

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SUBSTANCE IDENTIFICATION

CAS-NUMBER 7440-31-5

SUBSTANCE: **TIN**

TRADE NAMES/SYNONYMS: TIN, METALLIC; SILVER MATT POWDER; TIN FLAKE; TIN POWDER; WANG; METALLIC TIN; STANNUM; C.I. 77860; PIGMENT METAL 5; T-121; T-122; T-123; T-124; T-127; T-128; T-129; T-131

CHEMICAL FAMILY:
INORGANIC METAL

MOLECULAR FORMULA: SN MOL WT 118.69

CERCLA RATINGS (SCALE 0-3): HEALTH=1 FIRE=1 REACTIVITY=0 PERSISTENCE=3

COMPONENTS AND CONTAMINANTS

PERCENT: >99 COMPONENT: TIN

OTHER CONTAMINANTS: SILICATES

EXPOSURE LIMITS:
2 MG/M3 OSHA TWA; 2 MG/M3 ACGIH TWA

PHYSICAL DATA

DESCRIPTION: ODORLESS, ALMOST SILVER-WHITE, LUSTROUS, SOFT METAL

BOILING POINT: 4100 F (2260 C) MELTING POINT: 449 F (232 C)

SPECIFIC GRAVITY: 7.3 VAPOR PRESSURE: 1 MMHG @ 1610 C

SOLUBILITY IN WATER: INSOLUBLE

SOLVENT SOLUBILITY: HCL, SULFURIC ACID, AQUA REGIA, ALKALI

FIRE AND EXPLOSION DATA

FIRE AND EXPLOSION HAZARD:
SLIGHT FIRE, NEGLIGIBLE EXPLOSION HAZARD, IN THE FORM OF DUST, WHEN EXPOSED TO HEAT OR FLAME.

FLASH POINT: COMBUSTIBLE AUTOIGNITION TEMP.: 806 F (430 C)

FIREFIGHTING MEDIA:
SPECIAL POWDER, DRY SAND, NO HYDROUS EXTINGUISHING AGENTS.

FIREFIGHTING:
USE EXTINGUISHING AGENT AS INDICATED.

TOXICITY

CARGINOGEN STATUS: NONE.
METALLIC TIN IS RELATIVELY NON-TOXIC. INORGANIC TIN COMPOUNDS ARE EYE, MUCOUS MEMBRANE, RESPIRATORY TRACT, AND SKIN IRRITANTS.

HEALTH EFFECTS AND FIRST AID

INHALATION:
400 MG(SN)/M3 IMMEDIATELY DANGEROUS TO LIFE AND HEALTH.
ACUTE EXPOSURE- TIN COMPOUNDS MAY CAUSE RESPIRATORY IRRITATION.
CHRONIC EXPOSURE- THE DUST OR FUME MAY CAUSE BENIGN PNEUMOCONIOSIS WITHOUT
CHRONIC EXPOSURE- THE DUST OF FUME MAY CAUSE BENIGN PNEUMOCONIOSIS WITHOUT FIBROSIS.

FIRST AID- REMOVE FROM EXPOSURE AREA TO FRESH AIR IMMEDIATELY. IF BRATHING HAS STOPPED, GIVE ARTIFICIAL RESPIRATION. KEEP AFFECTED PERSON WARM AND AT REST. GET MEDICAL ATTENTION.

SKIN CONTACT:
ACUTE EXPOSURE- NO REPORTED EFFECTS IN HUMANS FROM TIN DUST. INORGANIC TIN COMPOUNDS MAY CAUSE IRRITATION.

CHRONIC EXPOSURE- REPEATED OR PROLONGED CONTACT WITH INORGANIC TIN COMPOUNDS MAY CAUSE DERMATITIS.

FIRST AID- REMOVE CONTAMINATED CLOTHING AND SHOES IMMEDIATELY. WASH AFFECTED AREA WITH SOAP OR MILD DETERGENT AND LARGE AMOUNTS OF WATER UNTIL NO EVIDENCE OF CHEMICAL REMAINS (APPROXIMATELY 15-20 MINUTES). GET MEDICAL ATTENTION.

EYE CONTACT:
ACUTE EXPOSURE- NO REPORTED EFFECTS IN HUMANS FROM TIN DUST. DIRECT CONTACT WITH INORGANIC TIN COMPOUNDS MAY CAUSE IRRITATION.

CHRONIC EXPOSURE- REPEATED OR PROLONGED EXPOSURE TO INORGANIC TIN COMPOUNDS MAY CAUSE CONJUCTIVITIS.

FIRST AID- WASH EYES WITH LARGE AMOUNTS OF WATER, OCCASIONALLY LIFTING UPPER AND LOWER LIDS, UNTIL NO EVIDENCE OF CHEMICAL REMAINS (APPROX-

IMATELY 15-20 MINUTES). GET MEDICAL ATTENTION.

INGESTION:

ACUTE EXPOSURE- RELATIVELY NON-TOXIC BEACUSE OF POOR ABSORPTION. AT VERY HIGH LEVELS, ABDOMINAL PAIN, NAUSEA, VOMITING, GASTRIC IRRITATION, AND DIARRHEA MAY OCCUR.

FIRST AID- DO NOT INDUCE VOMITING. GET IMMEDIATE MEDICAL ATTENTION.

REACTIVITY

REACTIVITY:
STABLE UNDER NORMAL TEMPERATURES AND PRESSURES.

INCOMPATIBILITIES:
VIOLENT REACTION MAY OCCUR WITH BROMINE TRIFLUORIDE, CARBON DIOXIDE AND BICARBONATE POWDER, OR AMMONIUM NITRATE. VILOENT REACTION MAY OCCUR WITH BROMINE EXCEPT IN HALOCARBON SOLUTION. VIOLENT REACTION WITH CHLORINE TRIFLUORIDE IN PRESENCE OF CARBON. PRODUCES INCANDESCENT AND EXOTHERMIC REACTION WHEN HEATED WITH IODINE HEPTAFLUORIDE OR TELLIRIUM OR IN CHLORINE. FLAMES AND SPARKING MAY OCCUR WHEN CUPRIC NITRATE IS IN PROLONGED, CLOSE CONTACT WITH TIN FOIL WITH WATER. IGNITION MAY OCCUR WITH FLUORINE AT 100 C. VIGOROUS, INCANDESCENT REACTION MAY OCCUR WITH POWDERED SULFUR. OXIDATION WITH INCANDESCENCE MAY OCCUR WITH POTASSIUM OXIDE OR PEROXIDE, OR SODIUM PEROXIDE.

DECOMPOSITION:
THERMAL DECOMPOSITION MAY GIVE OFF STANNIC OXIDE.

POLYMERIZATION:
NONE KNOWN.

****

CONDITIONS TO AVOID

****

SPILL AND LEAK PROCEDURES

OCCUPATIONAL SPILL:
NO SPECIFIC PRECAUTIONS OR PROCEDURES NECESSARY.

PROTECTIVE EQUIPMENT

VENTILATION:
PROVIDE LOCAL EXHAUST VENTILATION OR GENERAL DILUTION VENTILATION TO MEET PERMISSIBLE EXPOSURE LIMITS.

RESPIRATOR:
200 MG/M3- HIGH-EFFICIENCY PARTICULATE RESPIRATOR.

400 MG/M3- SELF-CONTAINED BREATHING APPARATUS WITH A FULL FACEPIECE OPERATED IN PRESSURE-DEMAND OR OTHER POSITIVE-PRESSURE MODE.

FIREFIGHTING- SELF-CONTAINED BREATHING APPARATUS WITH A FULL FACEPIECE OPERATED IN PRESSURE-DEMAND OR OTHER POSITIVE-PRESSURE MODE.

CLOTHING:
PROTECTIVE CLOTHING NOT REQUIRED. AVOID REPEATED OR PROLONGED CONTACT WITH THIS SUBSTANCE.

GLOVES:
PROTECTIVE GLOVES ARE NOT REQUIRED BUT RECOMMENDED.

EYE PROTECTION:
EMPLOYEE MUST WEAR SPLASH-PROOF OR DUST-RESISTANT SAFETY GOGGLES TO PREVENT EYE CONTACT WITH THIS SUBSTANCE.

AUTHORIZED - ALLIED FISHER SCIENTIFIC
CREATION DATE: 02/08/85 REVISION DATE: 04/23/85

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MATERIAL SAFETY DATA SHEET

CORPORATE RESEARCH & DEVELOPMENT
120 ERIE BOULEVARD
SCHENECTADY, N.Y. 12305

MATERIALS INFORMATION SERVICES

NO 311
INHIBITED
1,1,1-TRICHLOROETHANE
REVISION D
DATE August 1983

SECTION I. MATERIAL IDENTIFICATION

MATERIAL NAME: **INHIBITED 1,1,1-TRICHLOROETHANE**
OTHER DESIGNATIONS: Methyl Chloroform, MC, CCl_3CH_3, GE Material D5B79, CAS# 000 071 556, α-Trichloroethane
TRADENAMES & MANUFACTURER: BLACO-THANE (Baron-Blakeslee), CHLOROTHENE NU & VG (Dow), INHIBISOL (Penetone Corp.), TRI-ETHANE (PPG Ind. Inc), TRITHENE (SRS, Inc.)

SECTION II. INGREDIENTS AND HAZARDS

	%	HAZARD DATA
1,1,1-Trichloroethane	>95	8-hr TWA 350 ppm**
Inhibitor, typical*	< 5	Unknown
		Human, Inhalation
		LCLo 27 gm/m³/10 min
		TCLo 920 ppm/70 min (CNS effects)
		Human, Oral
		TDLo 670 mg/kg (GI effects)

*Inhibitors used are proprietary. Commercial materials contain up to about 5% inhibitor and are designed for cold cleaning or vapor degreasing use or both.

**Current OSHA PEL and ACGIH (1983) TLV. ACGIH STEL 450 ppm.

NIOSH (1976) proposed a 10-hr TWA of 200 ppm with a 350 ppm ceiling (15 minute sample) and has recommended caution in use

SECTION III. PHYSICAL DATA

Boiling point, 1 atm, deg F ----- ca 165*	Specific gravity, 25/25C --- 1.3-1.336*
Vapor pressure, 20 C, mm Hg ----- 100	Volatiles, % ---------- ca 100
Vapor density (Air=1) ---------- 4.55	Melting point, deg C ------- -32
Water solubility, g/100ml H_2O @20C - 0.09	Evaporation rate (CCl_4=1) -- 1
	Molecular weight ---------- 133.41

Appearance & Odor: Colorless liquid with a mild, sweetish, pleasant, ether-like odor which may be just perceptible (unfatigued) at about 100 ppm in air.
*Properties depend on the inhibitor and inhibitor level.

SECTION IV. FIRE AND EXPLOSION DATA

Flash Point and Method	Autoignition Temp	Flammability Limits in Air (High energy ignition source at 25C), Vol. % Lower	Upper
None	537 C (998 F)	8.0%	10.5%

This material is nearly nonflammable. High energy, such as electric arc, is needed for ignition, and the flame tends to go out when the ignition source is removed. Material involved in a fire can emit toxic and irritating fumes. Water fog, carbon dioxide, dry chemical, or foam may be used to fight fires.
Use self-contained or air-supplied breathing apparatus for protection against suffocating vapors and toxic and corrosive decomposition products.

SECTION V. REACTIVITY DATA

This material can be hydrolyzed by water to form hydrochloric acid and acetic acid. It will react with strong caustic, such as caustic soda or caustic potash to form flammable or explosive material. Attacks natural rubber.
It requires inhibitor content to prevent corrosion of metals; and when inhibitor is depleted, it can decompose rapidly by reaction with finely divided white metals, such as aluminum, magnesium, zinc, etc. Do not use these metals for storage containers or in pressurized spraying equipment where MC is involved.
It will decompose at high temperature upon contact with hot metal, or under ultra-violet radiation to produce toxic and corrosive gases (hydrogen chloride, dichloroacetylene, chlorine and some phosgene).

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GENERAL ELECTRIC

NO. 311

SECTION VI. HEALTH HAZARD INFORMATION

TLV 350 ppm or 1900 mg/m3

Brief exposure at 900-1000 ppm causes mild eye irritation and loss of coordination due to the early effects of MC on the CNS. Excessive exposure gives headache, drowsiness, impaired judgement, unconsciousness. Defats skin on contact, can produce irritation and dermatitis; can be absorbed through the skin. Eye contact gives pain and irritation. Considered low in toxicity among the chlorinated hydrocarbons.

FIRST AID:

Eye contact: Flush eyes well with plenty of running water for 15 min, including under eyelids.

Skin contact: Remove solvent-wet clothing promptly. Wash contact area with warm water and soap. Get medical attention for irritation.

Inhalation: Remove to fresh air. Restore and/or support breathing as needed. Get medical assistance. (Note: Advise physician not to use adrenalin.)

Ingestion: Contact physician.Aspiration a hazard! Possible spontaneous vomiting. (If medical help not readily available and amount swallowed was appreciable, give milk or water to drink and induce vomiting. Repeat. Estimated lethal dose for 150 lb man is 0.5 to 1 pint.)

PHYSICIAN: Avoid using sympathomimetic amines in treatment.

SECTION VII. SPILL, LEAK, AND DISPOSAL PROCEDURES

For small spills in ventilated area, mop, wipe or soak up with absorbent material avoiding inhalation and contact. Evaporate outdoors or in an exhaust hood.

For large spills, inform safety personnel and evacuate area. Use protective equipment during clean-up (see Sect. VIII). Ventilate area. Contain liquid, pick up and place in closed metal containers. Do not allow to enter drains and water ways.

DISPOSAL: Dispose of via a licensed waste solvent disposal company, or reclaim by filtration and distillation procedures. Follow Federal, State and Local regulations.

Aquatic toxicity TLm 96: 100-10 ppm.

EPA hazardous waste number under RCRA is U226 (40CFR261).

SECTION VIII. SPECIAL PROTECTION INFORMATION

Provide general and local exhaust ventilation to meet TLV requirements. Air-supplied or self-contained respirator should be available for non-routine or emergency use. A chemical cartridge-type respirator can be used for a limited time below 1000 ppm. A full facepiece is needed above 500 ppm.

Chemical goggles or a face shield should be worn if splashing is possible. Gloves and apron (of neoprene, polyethylene or polyvinyl alcohol) should be worn when needed to avoid skin contact. Remove solvent-wet clothing promptly. A safety shower and eyewash station should be available to use area if splashing is probable.

Preplacement and periodic medical examinations should consider cardiovascular, liver, CNS functions, and skin.

SECTION IX. SPECIAL PRECAUTIONS AND COMMENTS

Store in closed containers in a cool, well-ventilated area. Keep water-free. Monitor inhibitor level for vapor degreasing use. Use caution in cleaning operations involving white metal fines (see Sect. V). Trichloroethylene contamination may cause decomposition when aluminum is degreased.

Provide medical monitoring of those regularly exposed to MC in the workplace. Preclude those with CNS, liver, or heart disease from exposure. Personnel using this solvent should avoid drinking alcoholic beverages shortly before,during,or soon after exposure. NIOSH(1976 Crit. Doc.) expressed concern because of possible birth defects from high level pregnant rat exposures. Since 1976, directed studies have been negative. At occupational physicians' seminar on "Reproductive Hazards in the Workplace," Washington,DC (4/25/83), no physician was aware of data to substantiate the NIOSH concern.

DOT Classification: ORM-A I.D. No. UN2831

DATA SOURCE(S) CODE: 1-12,14,20,23,25,26,30,31,34,37,38,45-49,53

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APPROVALS: MIS/CRD J. M. Nielsen

INDUST. HYGIENE/SAFETY 7.21.83

MEDICAL REVIEW: 1 August 1983

GENERAL ELECTRIC

CHEM ID CHEM NAME
***
* 007440-61-1 URANIUM

ENTRY INFORMATION
05/23/1986

PREPARER	REVIEWER	ENTRY DATE	REVISED
D. AVERILL	J. BROWER	02/13/1985	05/16/1986

DOE CHEMICAL HAZARDS EMERGENCY MANAGEMENT SYSTEM
05/23/1986

HEALTH AND SAFETY INFORMATION AUTHORITY

CHEMICAL NAME OR SYNONYM
***
* URANIUM
* URANIUM METAL
* U238
* URANIUM METAL PYROPHORIC DOT
* 7440-61-1

DISPOSAL

RECOVERY FOR REPROCESSING IS THE PREFERRED METHOD FOR HANDLING WASTE URANIUM. SHIP TO LISCENCED RECOVERY FACILITY. SCRAP URANIUM SHOULD BE COVERED WITH OIL.

DECOMPOSITION PRODUCTS

THERMAL DECOMPOSITION - URANIUM OXIDES.

ENVIRONMENTAL EFFECTS

NO CRITERIA SET, BUT EPA HAS SUGGESTED A PERMISSIBLE CONCENTRATION IN WATER OF 3 UG/L BASED ON HEALTH EFFECTS.

EMERGENCY PROCEDURES

PERSONS NOT WEARING PROTECTIVE EQUIPMENT AND CLOTHING SHOULD BE RESTRICTED FROM AREAS OF SPILLS UNTIL CLEANUP HAS BEEN COMPLETED. IF URANIUM MATERIALS ARE SPILLED, 1. VENTILATE AREA OF SPILL. 2. COLLECT SPILLED MATERIAL IN MOST CONVENIENT AND SAFE MANNER AND DEPOSIT IN SEALED CONTAINERS FOR RECLAMATION. LIQUID CONTAINING URANIUM OR INSOLUBLE COMPOUNDS SHOULD BE ABSORBED IN VERMICULITE, DRY SAND, EARTH, OR A SIMILAR MATERIAL. URANIUM CHIPS OR TURNINGS WHICH ARE SPILLED SHOULD BE COVERED WITH OIL.

FIRST AID

WASH EYES IMMEDIATELY WITH LARGE AMOUNTS OF WATER. GET MEDICAL ATTENTION. CONTACT LENSES SHOULD NOT BE WORN WHEN WORKING WITH THIS CHEMICAL. SKIN EXPOSURE - PROMPTLY WASH CONTAMINATED SKIN USING SOAP OR MILD DETERGENT AND WATER. IF IRRITATION IS PRESENT AFTER WASHING, GET MEDICAL ATTENTION. INHALATION - IF A PERSON BREATHES IN LARGE AMOUNTS OF URANIUM MOVE THE EXPOSED PERSON TO FRESH AIR AT ONCE. IF BREATHING HAS STOPPED, PERFORM ARTIFICIAL RESPIRATION. KEEP THE AFFECTED PERSON WARM AND AT REST. GET MEDICAL ATTENTION IMMEDIATELY . SWALLOWING - GIVE THE PERSON LARGE QUANTITIES OF WATER IMMEDIATELY. AFTER THE WATER HAS BEEN SWALLOWED, TRY TO GET THE PERSON TO VOMIT BY TOUCHING THE BACK OF THE THROAT WITH A FINGER. DO NOT MAKE AN UNCONSCIOUS PERSON VOMIT. GET MEDICAL ATTENTION IMMEDIATELY.

FIRE HAZARD

URANIUM IS A DANGEROUS FIRE HAZARD IN THE FORM OF A SOLID OR DUST WHEN EXPOSED TO HEAT OR FLAME. IT IS A MODERATE EXPLOSION HAZARD IN THE FORM OF DUST WITH A MINIMUN EXPLOSIVE CONCENTRATION OF 60 GRAMS/CU.M. EXTINGUISH WITH DRY POWDER, DRY SAND, OR GRAPHITE. DONOT USE

HEALTH HAZARD

HIGHLY TOXIC AND RADIOACTIVE.
URANIUM AND/OR IT INSOLUBLE COMPOUNDS ARE TOXIC IF THEY ARE INHALED, SWALLOWED, OR IF THEY COME IN CONTACT WITH THE EYES OR SKIN. URANIUM METAL AND ITS INSOLUBLE COMPOUNDS ARE LESS TOXIC THAN THE SOLUBLE COMPOUNDS. IT IS WEAKLY RADIOACTIVE AND IS PRINCIPALLY AND ALPHA PARTICLE EMITER. IT IS NOT A SIGNIFICANT EXTERNAL RADIATION HAZARD. IT POSES AN INTERNAL RADIATION AND CHEMICAL HAZARD. EXPOSURE MAY CAUSE AN INCREASE IN CANCER OF THE LYMPHATIC AND BLOOD-FORMING TISSUES IN MAN. PROLONGED CONTACT WITH THE SKIN MIGHT CAUSE RADIATION DAMAGE TO THE SKIN AND/OR SKIN RASH (DERMATITIS). PROLONGED INHALATION HAS CAUSED DAMAGE TO THE LUNGS OF ANIMALS. URANIUM IS HIGHLY TOXIC TO THE KIDNEYS AND LIVER.

CHEMICAL INCOMPATIBILITIES

CONTACT WITH CO2 MAY CAUSE FIRE.
URANIUM METAL IS INCOMPATIBLE WITH HALOGENS. U POWDER IGNITES IN FLORINE AT ROOM TEMPERATURE, IN CHLORINE AT 150-180 DEGREES C, AND IN IODINE VAPOR AT 260 DEGREE C. MAY EXPLODE OR IGNITE IN BRF3 AND CCL4. URANIUM REACTS EXPLOSIVELY WITH NITRIC ACID, AND DINITROGEN TETRAOXIDE. U METAL GLOWS AND PRODUCES HEAT IN AMMONIA, SULFUR VAPOR, AND IN CONTACT WITH SELENIUM.

MEDICAL RECCOMMENDATIONS

SPECIAL ATTENTION SHOULD BE GIVEN TO THE BLOOD, LUNGS, KIDNEY, AND LIVER IN PREEMPLOYMENT MEDICAL EXAMS. PERIODIC MEDICAL EXAM SHOULD INCLUDE A CHEST X-RAY, URINALYSIS, COMPLETE BLOOD COUNT AND CHEMISTRY.

PHYSICAL DESCRIPTION

A HARD, SILVERY WHITE RADIOACTIVE METAL

PROTECTION MEASURES

GOOD ENGINEERING CONTROLS SHOULD BE USED TO REDUCE ENVIRONMENTAL CONCENTRATIONS TO THE PERMISSIBLE EXPOSURE LEVEL (PEL). ABOVE THE PEL RESPIRATORY PROTECTION MUST BE WORN. AT A CONCENTRATION OF 2.5 MG/M3 OR LESS WEAR FUME RESPIRATOR OR HIGH EFFICENCY PARTICULATE RESPIRATOR APPROVED FOR RADIONUCLIDES, A SUPPLIED-AIR RESPIRATOR, OR A SCBA. EMPLOYEES SHOULD WEAR IMPERVIOUS CLOTHING, GLOVES, AND GOGGLES TO PREVENT SKIN CONTACT WITH URANIUM. EATING AND SMOKING SHOULD NOT BE PERMITTED IN AREAS WHERE SOLIDS OR LIQUIDS CONTAINING URANIUM OR INSOLUBLE COMPOUNDS ARE HANDLED, PROCESSED, OR STORED. EMPLOYEES WHO HANDLE URANIUM SHOULD WASH THEIR HANDS THOROUGHLY WITH SOAP OR MILD DETERGENT AND WATER BEFORE EATING, SMOKING OR USING TOILET FACILITIES.

SAMPLING METHODS

NO STANDARD MEASUREMENT METHODS FOR URANIUM OR INSOLUBLE COMPOUNDS HAVE BEEN PUBLISHED BY NIOSH. MAY BE SAMPLED AND USING A CELLULOSE ESTER FILTER AND ANALYZED BY ATOMIC ABSORPTION.

SHIPPING INFORMATION

SHIP AS URANIUM METAL, PYROPHORIC. LABEL AS RADIOACTIVE AND FLAMMABLE SOLID.

STORAGE RECOMMENDATIONS

STORE AS RADIOACTIVE MATERIAL. KEEP FROM EXPOSURE TO AIR, MOISTURE, CO2 HALOGENS, ACIDS, AMMONIA, SULFUR. SCRAP URANIUM SHOULD BE COVERED WITH

USE

URANIUM METAL HAS LIMITED USES IN ALLOYS AND PHOTOELECTRIC TUBES. URANI COMPOUNDS ARE USED AS FUEL IN NUCLEAR REACTORS, IN PLUTONIUM PRODUCTIO IN THE ARE PRODUCTION OF OTHER RADIOACTIVE ISOTOPES, AND AS FEEDS FOR GASEOUS DIFFUSION PLANTS.

CHEMICAL CATEGORIES
05/23/1986

CATEGORY	CLASS NAME	CLASS CODE

APPENDIX F-2

MSDS's for PREVIOUSLY USED CHEMICALS
AUXILIARY M-AREA MANUFACTURING PROCESS CHEMICALS

PREVIOUSLY USED PROCESS CHEMICALS
2-AUXILIARY PROCESS CHEMICALS**

Common Name	Description
Charcoal	Activated carbon
CINDOL R	Aqueous detergent
Doubleteam R	Synthetic coolant
Filterbestos R	Cellulose; filter aid
Hydrogen peroxide	Oxidizing agent
Isopropyl alcohol	Alcohol
Monolec Industrial Lubricant	Petroleum hydrocarbon
W & B Coolant	Fatty acid soap

**Chemicals used in low volumes; i.e., approximate volumes consumed less than 100 gallons/year.

MATERIAL SAFETY DATA SHEET

C

PRODUCT NAME: Charcoal, activated CAS# 1333-86-4

CHEMICAL NATURE: Nonmetallic element

% ACTIVITY: 97+%

I. PHYSICAL DATA

BOILING POINT, 760 mm. Hg	4000°C	Melting POINT	3500°C
SPECIFIC GRAVITY	3.51	VAPOR PRESSURE AT 20°C.	No Data
VAPOR DENSITY	<1	SOLUBILITY IN H_2O	Insoluble
PER CENT VOLATILES BY WEIGHT	Not applicable	IONIC NATURE	NO
APPEARANCE AND ODOR	Black amorphous mass.		

II. HAZARDOUS INGREDIENTS

MATERIAL	%	TLV (Units)
Charcoal, activated	97+%	3.5 mg/m^3
(ACGIH-1980)		

III. FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (test method)	No Data	AUTOIGNITION TEMPERATURE		No Data	
FLAMMABLE LIMITS IN AIR, % by volume	No Data	LOWER		UPPER	
EXTINGUISHING MEDIA	Flammable solid Use water, carbon dioxide dry chemical extinguishing agents, dry extinguishing agents, dry sand, or dry ground dolomite.				
SPECIAL FIRE FIGHTING PROCEDURES	No special firefighting procedures needed, use normal procedures which include wearing NIOSH/MSHA approved self-contained breathin apparatus, flame and chemical resistant clothing; hats, boots and gloves. If without risk, remove material from fire area. Cool containers with water from maximum distance.				
UNUSUAL FIRE AND EXPLOSION HAZARDS	Slight explosion hazard when exposed to flame/				

THE BURDEN OF SAFE USE OF OUR MATERIALS MUST REST ENTIRELY WITH THE USER. WE CANNOT ASSUME RESPONSIBILITY FOR THE COMPLETENESS OR ACCURACY OF ANY INFORMATION SUPPLIED BY US CONCERNING THE HAZARDS OR RECOMMENDED USE OF THE CHEMICALS.

IV. HEA

THRESHOLD LIMIT VALUE	3.5 mg/m^3 (ACGIH-1980)
EFFECTS OF OVEREXPOSURE	Associated with small amounts of irritation and possible toxic impurities.
EMERGENCY AND FIRST AID PROCEDURES	Remove from exposure. Eyes: Flush with copious amounts of wate at least 15 minutes. Skin: Remove any contaminated clothing. skin with large volumes of water for 15 minutes. Ingestion/Inha tion: Seek prompt, competent medical attention.

V. REACTIVITY DATA

STABILITY			
UNSTABLE	STABLE	CONDITIONS TO AVOID	Heat, sparks, open flame or other sources of ignit
	X		
INCOMPATIBILITY (materials to avoid)		Halogen containing compounds, sodium compounds, potassium compc	
HAZARDOUS DECOMPOSITION PRODUCTS			
HAZARDOUS POLYMERIZATION			
May Occur	Will not Occur	CONDITIONS TO AVOID	
	X		

VI. SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IF MATERIAL IS RELEASED OR SPILLED	Wearing full protective clothing and respiratory protection (See Sect. VII), eliminate all sources of ignition. Cover spill with sand or dry vermiculite, mix well and carefully transfer to a we marked container. Close container tightly. Submit or retain fo posal.
WASTE DISPOSAL METHOD	Consult state, local, and federal regulations for proper disposal of Charcoal, activated

VII. SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION (specify type)		NIOSH/MSHA approved high efficiency particulate respirator or s contained breathing apparatus for emergency use.		
VENTILATION	LOCAL EXHAUST	Fume Hood	SPECIAL	
	MECHANICAL	Not acceptable	OTHER	
PROTECTIVE GLOVES		Rubber	EYE PROTECTION	OSHA approved safety goggles
OTHER PROTECTIVE EQUIPMENT		Lab coat and apron, flame & chemical resistant coveralls, eyewas capable of sustained flushing, safety drench shower and hygienic		

VIII. SPECIAL PRECAUTIONS

PRECAUTIONARY LABELING	Warning. Flammable solid. Liberates toxic fumes upon decomposition.
OTHER HANDLING AND STORAGE CONDITIONS	Keep container tightly closed. Store in a cool, dry, well-ventilated area. Wash thoroughly after use. Keep away from incompatible materials and flammable materials.

MATERIAL SAFETY DATA SHEET REV DATE: 08128

423202 CINDOL 3202

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SECTION I-PRODUCT IDENTIFICATION

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PRODUCT NAME: CINDOL 3202
PROPER SHIPPING NAME: METAL CUTTING DRAWING COMPOUND

HAZARD CLASS: NON-HAZARDOUS
HAZARD ID NO: N/A

COMPLETED BY: DAVID H EADLINE
PHONE NUMBER: 215-666-4105
MFG. DUNS # : 00-226-1535

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SECTION II-COMPONENTS

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**** CONFIDENTIAL ****

MATERIAL	CAS NO	PERCENT	HAZARD
MINERAL OIL	8012-95-1	44	TLV:5 MG/CU.M. AS OIL MIST
SODIUM PETROLEUM SULFONATE	68608-26-4	10-30	
FATTY ACID-AMINE CONDENSATE	61790-66-7	10-30	
FATTY ACID ESTER	68989-57-1	1-10	
C15-C20 ALPHA OLEFINS	64743-02-8	10-30	
TRIDECYL ALCOHOL	112-70-9	1-10	
BUTYL CARBITOL	112-34-5	1-10	
PRESERVATIVE	3811-73-2	1-10	
FORMALDEHYDE	50-00-0	0.6	TLV:C-2 PPM
DYE	2321-07-5	<1	
PERFUME	68917-09-9	<1	
(PRODUCT USE DILUTION; 5%)			

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SECTION III-PHYSICAL DATA

==========

BOIL. PT.(DEG F): ABOVE 300
VAPOR PRESSURE (MM HG) NEGLIGIBLE
VAPOR DENSITY (AIR = 1) 10+
PERCENT VOLATILE: NIL
PH NEAT: N/A PH AT 5 %:9.5

SPECIFIC GRAVITY: 0.934
EVAP RATE: NEGLIGIBLE

SOL IN WATER: EMULSIFIES

==========

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

==========

FLASH POINT, DEG. F (METHOD USED): 305 C.O.C.
NFPA CLASSIFICATION HEALTH: 0 FIRE: 1 REACTIVITY: 0
EXTINGUISHING MEDIA:
CARBON DIOXIDE, FOAM, DRY CHEMICAL

LEL: N/D UEL: N/D

CONTINUED ON PAGE 2

SPECIAL FIRE FIGHTING INSTRUCTIONS:
NOT REQUIRED
UNUSUAL FIRE AND EXPLOSION HAZARDS:
NONE

SECTION V - HEALTH HAZARD INFORMATION

ROUTES OF EXPOSURE AND EFFECTS

INHALATION:
N/A
SKIN:
MILD IRRITANT; MAY HAVE DEFATTING ACTION
EYE:
MILD IRRITANT
INGESTION:
NO SIGNIFICANT EFFECTS EXPECTED

********** FIRST AID **********

INHALATION:
N/A
SKIN:
WASH WITH SOAP AND WATER
EYE:
FLUSH WITH WATER 15 MINUTES. CONSULT PHYSICIAN IF IRRITATION PERSISTS
INGESTION:
IF INGESTED, DO NOT INDUCE VOMITING, CONSULT PHYSICIAN. PRODUCT CONTAINS MINERAL OIL, PETROL, SULFONATE, ALPHA OLEFIN

SECTION VI - REACTIVITY DATA

STABILITY: STABLE: [X] UNSTABLE: [ ]
INCOMPATABILITY (MATERIALS TO AVOID):
STRONG OXIDIZERS
HAZARDOUS DECOMPOSITION PRODUCTS:
THERMAL; OXIDES OF CARBON AND NITROGEN
HAZARDOUS POLYMERIZATION: MAY OCCUR: [ ] WILL NOT OCCUR: [X]

SECTION VII - SPILL OR LEAK PROCEDURES

POTENTIAL AS A POLLUTANT:
PRODUCT NOT EXTREMELY BIODEGRADABLE AS SUCH. KEEP SPILLS AWAY FROM SEWERS AND SLOW MOVING STREAMS. MATERIAL NOT CONSIDERED A POLLUTANT IF EFFECTIVE WASTE DISPOSAL IS UTILIZED.
BIOCHEMICAL OXYGEN DEMAND (BOD-5): N/D
SPILL, LEAK OR RELEASE:

CONTINUED ON PAGE 3

FLUSH AREA WITH C(

WASTE DISPOSAL:
TREAT NEAT MATERIAL ACCORDING TO REGULATIONS FOR DISPOSAL OF WASTE PETROLEUM OIL. FOR EMULSIONS, USE DEEMULSIFICATION PROCESS TO SPLIT PRODUCT. TREAT OILY LAYER AS WASTE OIL. NEUTRALIZE AQUEOUS LAYER AND RELEASE TO TREATMENT PLANT IN ACCORDANCE WITH PERTINENT REGULATIONS.

SECTION VIII - SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION:
NOT NORMALLY REQUIRED
VENTILATION:
LOCAL EXHAUST REQUIRED
PROTECTIVE GLOVES:
RUBBER IF SKIN IS SENSITIVE
EYE PROTECTION:
SAFETY GOGGLES IF SPLASHING
OTHER PROTECTIVE EQUIPMENT:
NOT REQUIRED

SECTION IX - SPECIAL PRECAUTIONS

STORAGE AND HANDLING CONDITIONS:
AVOID CONTACT WITH STRONG OXIDIZERS

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(000000-9999 -30111111) | DATE OF ISSUE 06/13/86 | 06/23/85

THE INFORMATION CONTAINED HEREIN IS BASED ON DATA CONSIDERED ACCURATE IN LIGHT OF CURRENT FORMULATION. HOWEVER, NO WARRANTY IS EXPRESSED OR IMPLIED REGARDING THE ACCURACY OF THIS DATA OR THE RESULTS TO BE OBTAINED FROM THE USE THEREOF.

SECTION I - GENERAL INFORMATION

CHEMICAL NAME & SYNONYMS
N/A

TRADE NAME & SYNONYMS
DOUBLETEAM

CHEMICAL FAMILY
SYNTHETIC COOLANT

FORMULA
X<--MIXTURE

MANUFACTURERS NAME:
MANTEK, DIVISION OF NCH CORP.

ADDRESS (NUMBER, STREET, CITY, STATE & ZIP CODE)
BOX 152170
IRVING, TEXAS 75015

PREPARED BY:
RICHARD STOLLEY/T:S.CHEM

PRODUCT CODE NUMBER
0002

EMERGENCY TELEPHONE NUMBER
214-438-4144
EXT. 013

SECTION II- HAZARDOUS INGREDIENTS

CHEMICAL NAME (INGREDIENTS)	HZD D TYPE	TLV*	PEL*	CAS#
NO HAZADOUS INGREDIENTS				
PER 29 CFR 1910.1200(D)				

SECTION III - PHYSICAL DATA

BOILING PT.(FAHRENHEIT)	210	SPEC GRAVITY (H20=1)	:1.090
VAPOR PRESSURE (MM HG).	18	COLOR	LIGHT YELLOW

DOUBLETEAM

(CONTINUED) SECTION III - PHYSICAL DATA PAGE : 02

VAPOR DENSITY (AIR=1)	0.6	ODOR	OCOTEA CYMBARIUM
PH @ 100%	9.6	CLARITY	TRANSPARENT
PERCENT, VOLATILE BY VOLUME (%)	65	EVAPORATION RATE (BU AC = 1)	0.10
SOLUBILITY IN WATER	COMPLETE		
VISCOSITY	NON-VISCOUS		

SECTION IV - FIRE AND EXPLOSION HAZARD

FLASH POINT (METHOD USED)	FLAMMABLE LIMITS	LEL	UEL
NON-FLAM	N/A	N/A	N/A

EXTINGUISHING MEDIA "ALCOHOL"
<--FOAM <--FOAM <--CO2 DRY <--CHEMICAL <--WATER <--SPRAY <--OTHER

SPECIAL FIRE FIGHTING PROCEDURES

N/A

UNUSUAL FIRE & EXPLOSION HAZARDS

N/A

SECTION V - HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE :

NOT ESTABLISHED FOR MIXTURE. SEE SECTION II.

EFFECTS OF OVEREXPOSURE

- ACUTE - (SHORT TERM EXPOSURE)

DIRECT CONTACT WITH THE EYES MAY CAUSE IRRITATION. UNDILUTED SKIN CONTACT MAY CAUSE REDDENING OF SKIN IRRITATION AND POSSIBLE DISCOMFORT TO SENSITIVE SKIN.

- CHRONIC - (LONG TERM EXPOSURE)

DIRECT CONTACT WITH EYES FOR A PROLONGED PERIOD OF TIME CAN CAUSE CORNEAL DAMAGE. PROLONGED UNDILUTED SKIN CONTACT AMY CAUSE REDDENING OF SKIN, IRRITATION LEADING POTENTIALLY TO DERMATITIS.
***NOTE - THIS COOLANT DILUTED AS RECOMMENDED SHOULD NOT CAUSE SKIN IRRITATION.

(CONTINUED)

PRIMARY ROUTE OF ENTRY: X<-- INHALATION <-- INGESTION X<-- ABSORPTION

EMERGENCY & FIRST AID PROCEDURES

INHALATION :
REMOVE TO FRESH AIR. SEEK MEDICAL ATTENTION IF IRRITATION PERSISTS.

EYE CONTACT:
FLUSH WITH PLENTY OF WATER FOR 15 MINUTES HOLDING EYELIDS APART TO ENSURE FLUSHING OF ENTIRE SURFACE AREA. SEEK MEDICAL ATTENTION IF IRRITATION PERSISTS.

SKIN CONTACT:
BARRIER CREAM ADVISABLE: WASH WITH SOAP AND WATER.

INGESTION :
GIVE TWO GLASSES OF WATER TO DILUTE CONTENTS OF STOMACH. SEE A PHYSICIAN IF DISCOMFORT OCCURS.

NOTES TO PHYSICIAN :
N/A

SECTION VI - TOXICITY INFORMATION

N/A

SECTION VII - REACTIVITY DATA

	X<--STABLE	<--UNSTABL	CONDIDTIONS TO AVOID
STABILITY			

N/A

INCOMPATIBILITY (MATERIALS TO AVOID)
DO NOT ADD ANY ADDITIONAL MATERIALS SUCH AS SODIUM NITRITE OR POTASSIUM NITRITE. CANCER CAUSING MATERIAL CAN BE FORMED.

HAZARDOUS DECOMPOSITION PRODUCTS

N/A

	WILL NOT	MAY	CONDITIONS TO AVOID
HAZARDOUS	X <--OCCUR	<--OCCUR	
POLYMERIZATION	N/A		

DOUBLETEAM

SECTION VIII - SPILL OR LEAK PROCEDURES PAGE : 04

STEPS TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED
SMALL SPILL - FLUSH SURFACE WITH LARGE VOLUME OF WATER AND FLUSH DOWN DRAIN. LARGE SPILL - STOP LEAK. CONTAIN SPILL. REMOVE BY WET VACUUM OR ABSORBANT. REUSE SPILLED MATERIAL IF POSSIBLE. OTHERWISE, PLACE IN CLOSED LABELED CONTAINER AND STORE IN SAFE PLACE.

WASTE DISPOSAL METHOD
THE INGREDIENTS IN THIS PRODUCT ARE NOT REGULATED AS HAZARDOUS MATERIALS BY THE EPA. THIS PRODUCT MAY BE FLUSHED INTO A SANITARY SEWER. HOWEVER, AFTER USE IT WILL BE NECESSARY TO SKIM TRAMP OIL AND ELIMINATE SOLIDS BEFORE FLUSHING. CHECK WITH STATE AND LOCAL AUTHORITIES PRIOR TO DISPOSAL OF TRAMP OIL, SOLIDS OR DISCHARGE INTO SANITARY SEWER.

NEUTRALIZING AGENT

FLUSH WITH LARGE AMOUNTS OF WATER.

SECTION IX - SPECIAL PROTECTION INFORMATION

REQUIRED VENTILATION
GOOD INDUSTRIAL HYGIENE PRACTICE DICTATES THAT THE WORK AREAS SHOULD PROVIDE ADEQUATE VENTILATION OR CONTROLS TO MAINTAIN AND MEET OSHA REQUIREMENTS.

RESPIRATORY PROTECTION
GENERAL EXHAUST IS ADEQUATE UNDER NORMAL CIRCUMSTANCES.

PROTECTIVE GLOVES
GLOVES SHOULD BE WORN DEPENDING UPON SEVERITY OF CONTACT.

EYE PROTECTION
CHEMICAL GOGGLES DEPENDING UPON SEVERITY OF CONTACT.

OTHER PROTECTION
N/A

SECTION X - STORAGE AND HANDLING INFORMATION

STORAGE TEMPERATURE 120 F.<--MAX 32 F.<--MIN	INDOOR	HEATED	REFRIGERATED	OUTDOOR
	X			

PRECAUTIONS TO BE TAKEN IN HANDLING & STORING
STORE IN MODERATE TEMPERATURES.

DOUBLETEAM

(CONTINUED) SECTION X - STORAGE AND HANDLING INFORMATIPAGE : 05

OTHER PRECAUTIONS
KEEP OUT OF REACH OF CHILDREN.
READ ENTIRE LABEL BEFORE USING.

:

SECTION XI - TRANSPORTATION * (FOR FUTURE USE)

APPLICABLE REGULATIONS
<--49 CFR <--IMCO <--TARIFF 6 D <--IATA <--MILITARY AIR (AFR 71-4)

SHIPPING NAME

HAZARD CLASS | ID NUMBER | REPORT QTY

LABELS | LIMITED QTY

UNIT CONTAINER

DOT SPS CONTAINER | NET EXPLOSIVE WT.

AEROSOL PROPELLANT(S)

SECTION XII - REFERENCES

---

1. THRESHOLD LIMIT VALUE FOR CHEMICAL SUBSTANCES IN THE WORK ENVIRONMENT. 2ND EDITION. ACGIH. 1985.
2. NIOSH REGISTRY OF TOXIC EFFECTS OF CHEMICAL SUBSTANCES. 1982.

MANTEK, DIVISION OF NCH CORP. ASSUMES NO RESPONSIBILITY FOR PERSONAL INJURY OR PROPERTY DAMAGE TO VENDEES, USER OR THIRD PARTIES CAUSED BY THE MATERIAL. SUCH VENDEES OR USERS ASSUME ALL RISKS ASSOCIATED WITH THE USE OF THE MATERIAL.

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Oc...

MATERIAL SAFETY DATA SHEET

Required under USDL Safety and Health Regulations for Ship Repairing, Shipbuilding, and Shipbreaking (29 CFR 1915, 1916, 1917)

SECTION I

MANUFACTURER'S NAME	EMERGENCY TELEPHONE NO.
INDUSTRIAL FILTER & PUMP MFG. CO.	(312) 656-7800

ADDRESS (Number, Street, City, State, and ZIP Code): 5900 West Cgden Ave, Cicero, Illinois 60650

CHEMICAL NAME AND SYNONYMS	TRADE NAME AND SYNONYMS
NONE	FILTERBESTOS
CHEMICAL FAMILY: NONE	FORMULA: PROPRIETARY

SECTION II - HAZARDOUS INGREDIENTS

PAINTS, PRESERVATIVES, & SOLVENTS	%	TLV (Units)	ALLOYS AND METALLIC COATINGS	%	TLV (Units)
PIGMENTS			BASE METAL		
CATALYST			ALLOYS		
VEHICLE			METALLIC COATINGS		
SOLVENTS			FILLER METAL PLUS COATING OR CORE FLUX		
ADDITIVES			OTHERS		
OTHERS					

HAZARDOUS MIXTURES OF OTHER LIQUIDS, SOLIDS, OR GASES	%	TLV (Units)
No asbestos 4-28-78 RLS		
NOT AVAILABLE		

SECTION III - PHYSICAL DATA

BOILING POINT (°F.)		SPECIFIC GRAVITY (H_2O=1)	
VAPOR PRESSURE (mm Hg.)		PERCENT, VOLATILE BY VOLUME (%)	
VAPOR DENSITY (AIR=1)		EVAPORATION RATE (_____ =1)	
SOLUBILITY IN WATER	NOT AVAILABLE		
APPEARANCE AND ODOR			

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (Method used)	FLAMMABLE LIMITS	Lel	Uel

EXTINGUISHING MEDIA

SPECIAL FIRE FIGHTING PROCEDURES

NOT AVAILABLE

UNUSUAL FIRE AND EXPLOSION HAZARDS

(Continued on reverse side)

SECTION V - HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE

EFFECTS OF OVEREXPOSURE

N O T REGULATED

EMERGENCY AND FIRST AID PROCEDURES

SECTION VI - REACTIVITY DATA

STABILITY	UNSTABLE		CONDITIONS TO AVOID
	STABLE		

INCOMPATABILITY *(Materials to avoid)*

N O T A V A I L A B L E

HAZARDOUS DECOMPOSITION PRODUCTS

HAZARDOUS POLYMERIZATION	MAY OCCUR		CONDITIONS TO AVOID
	WILL NOT OCCUR		

SECTION VII - SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

N O T A V A I L A B L E

WASTE DISPOSAL METHOD

SECTION VIII - SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION *(Specify type)*

DUST RESPIRATOR

VENTILATION	LOCAL EXHAUST	SPECIAL
	MECHANICAL *(General)*	OTHER

PROTECTIVE GLOVES	EYE PROTECTION

OTHER PROTECTIVE EQUIPMENT

SECTION IX - SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING

N O N E

OTHER PRECAUTIONS

U.S. DEPARTMENT OF LABOR
Occupational Safety and Health Administration

Form Approved
OMB No. 44-R1387

MATERIAL SAFETY DATA SHEET

Required under USDL Safety and Health Regulations for Ship Repairing, Shipbuilding, and Shipbreaking (29 CFR 1915, 1916, 1917)

SECTION I

MANUFACTURER'S NAME	EMERGENCY TELEPHONE NO.
INDUSTRIAL FILTER & PUMP MFG. CO.	312-656-7800

ADDRESS (Number, Street, City, State, and ZIP Code)
5900 W. Ogden Avenue, Cicero, Illinois 60650

CHEMICAL NAME AND SYNONYMS	TRADE NAME AND SYNONYMS
CELLULOSE	C-95 FILTERBEST
CHEMICAL FAMILY: WOOD	FORMULA: GROUND WOOD PULP

SECTION II - HAZARDOUS INGREDIENTS

PAINTS, PRESERVATIVES, & SOLVENTS	%	TLV (Units)	ALLOYS AND METALLIC COATINGS	%	TLV (Units)
PIGMENTS	NONE		BASE METAL	NONE	
CATALYST	"		ALLOYS	"	
VEHICLE	"		METALLIC COATINGS	"	
SOLVENTS	"		FILLER METAL PLUS COATING OR CORE FLUX	"	
ADDITIVES	"		OTHERS	"	
OTHERS	"				

HAZARDOUS MIXTURES OF OTHER LIQUIDS, SOLIDS, OR GASES	%	TLV (Units)
NONE		

SECTION III - PHYSICAL DATA

BOILING POINT (°F.)	NONE	SPECIFIC GRAVITY (H_2O=1)	1.58
VAPOR PRESSURE (mm Hg.)	"	PERCENT, VOLATILE BY VOLUME (%)	NONE
VAPOR DENSITY (AIR=1)	"	EVAPORATION RATE (_____ =1)	NONE
SOLUBILITY IN WATER	"		

APPEARANCE AND ODOR: FIBROUS SOLID FLOC - PRACTICALLY ODORLESS

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (Method used)	FLAMMABLE LIMITS	Lel	Uel
NONE			

EXTINGUISHING MEDIA: WATER

SPECIAL FIRE FIGHTING PROCEDURES: NONE

UNUSUAL FIRE AND EXPLOSION HAZARDS
DUST EXPLOSIBILITY INDEX 2.8 MIN. EXPLOSION CONC. 0.055 OZ/FT^3

(Continued on reverse side)

SECTION V - HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE	NONE
EFFECTS OF OVEREXPOSURE	NO EFFECTS
EMERGENCY AND FIRST AID PROCEDURES	NONE

SECTION VI - REACTIVITY DATA

STABILITY	UNSTABLE		CONDITIONS TO AVOID
	STABLE	X	NONE

INCOMPATABILITY *(Materials to avoid)*: STRONG OXIDANTS

HAZARDOUS DECOMPOSITION PRODUCTS:

HAZARDOUS POLYMERIZATION	MAY OCCUR		CONDITIONS TO AVOID
	WILL NOT OCCUR	X	NONE

SECTION VII - SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED: SWEEP UP

WASTE DISPOSAL METHOD: DUMP - NO SPECIAL METHOD NECESSARY

SECTION VIII - SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION *(Specify type)*: DUST MASK

VENTILATION	LOCAL EXHAUST	SPECIAL
NORMAL	MECHANICAL *(General)* FORCE VENTILATION RECOMMENDED	OTHER

PROTECTIVE GLOVES: UNNECESSARY	EYE PROTECTION: DUST GOGGLES

OTHER PROTECTIVE EQUIPMENT:

SECTION IX - SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING: NONE

OTHER PRECAUTIONS: NONE

GPO 934-190

MATERIAL SAFETY

CORPORATE RESEARCH & DEVELOPMENT

SCHENECTADY, N. Y. 12305

MATERIALS INFORMATION SERVICE

HYDROGEN PEROXIDE (>60%)

Date December 1978

SECTION I. MATERIAL IDENTIFICATION

MATERIAL NAME: [redacted] PEROXIDE (>60%)

OTHER DESIGNATIONS: H_2O_2 Concentrated Solution, CAS# 007 722 841

MANUFACTURER: Material is available from several suppliers, including FMC Corporation and Pennwalt Corporation.

SECTION II. INGREDIENTS AND HAZARDS	%	HAZARD DATA
Hydrogen Peroxide (H_2O_2)	> 60	8-hr TWA 1 ppm*
Water	< 40	--
Proprietary Stabilizer (such as acetanilide, sodium stannate or other)	Small amount	
*Current OSHA and ACGIH (1978) TLV. Material increases in hazards as H_2O_2 concentration increases. Obtain detailed supplier recommendations, especially for 90% H_2O_2 grade and higher concentrations.		Rat, inhalation LCLo 100 ppm (pulmonary edema)

SECTION III. PHYSICAL DATA	70%	90%	98%	100%
Boiling point at 1 atm, deg C	126	141	148	152.2
Vapor pressure at 30 C, mm Hg	10.1	4.7	3.1	ca 3
Partial pressure of H_2O_2 at 30 C, mm Hg	1.17	2.25	2.67	--
Specific gravity (20/4 C)	1.29	1.39	1.44	1.45
Approx. freezing point, deg C	-40	-11	-2	-0.4
Volumes oxygen produced/1 volume H_2O_2 soln.	300	418	470	--
Water solubility	MISCIBLE			

Appearance & Odor: A clear, colorless to light blue, water-like liquid without odor (or with a characteristic slightly acidic odor).

SECTION IV. FIRE AND EXPLOSION DATA			LOWER	UPPER
Flash Point and Method	Autoignition Temp.	Flammability Limits In Air		
None	None	None		

Extinguishing Media: Use water in large amounts to fight fire in which this material is involved; other extinguishing agents are expected to be ineffective. Hydrogen peroxide is non-flammable, but it provides oxygen to facilitate or initiate burning of surrounding combustibles. It is a dangerous fire and explosion hazard in a fire situation. When highly concentrated material is heated, shocked by impact, or contaminated it can rupture containers, start fires (with combustibles), or explode. Use large amounts of water to dilute spilled material and flush it away from combustibles. Firefighters must use self-contained breathing equipment and have eye protection.

SECTION V. REACTIVITY DATA

When handled properly and kept cool and pure, this material is stable. It does not polymerize but can decompose releasing heat and oxygen. Above 65% H_2O_2 more heat is released by decomposition than can be absorbed by evaporation of the water present. Unchecked, the decomposition temperature of 70% H_2O_2 can reach to about 500 F, and 90% to 1364 F. Combustibles in contact with this material can be expected to undergo spontaneous ignition, often delayed. A homogeneous mixture with organic materials such as alcohols or glycerine is a sensitive and powerful explosive. Pure H_2O_2 at 90% in water not readily detonated at room temperature, but higher concentrations and/or heat can facilatate detonation. Contamination with certain materials such as iron, chromium, brass bronze, lead, silver manganese or their salts or with alkalis or ordinary dirt or rust can give violent decomposition.

GENERAL ELECTRIC

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SECTION VI. HEALTH HAZAR

The health hazard associated with normal usage is acute local damage by oxidation effects on tissue in contact with liquid or vapor, especially of the eyes, skin, and upper respiratory systems. Concentrations in air above 75 ppm are too irritating to be tolerated Short exposure to very high airborne concentration can be lethal from damage to the piratory system. The effects of contact with tissues can range from irritation or b tering to necrosis, depending on conditions. Do not ingest! FIRST AID:

Eye contact: Immediately flush with plenty of running water for 15 minutes, including under eyelids; then get prompt medical attention.

Skin contact: Remove contaminated clothing under a safety shower. Wash affected skin thoroughly with water. Contact a physician if redness or skin burn is apparent. (I contaminated clothing in water; launder before allowing to dry out.)

Inhalation: Remove to fresh air. Contact a physician immediately.

Ingestion: Immediately give much water to drink to dilute; encourage vomiting. Give lukewarm water freely and encourage belching if there is evidence of distention. Contact physician.

SECTION VII. SPILL, LEAK, AND DISPOSAL PROCEDURES

Prepare in advance for emergency situations! A source plenty of water for dilution and flushing of spills must be readily available as well as drainage and a holding area free from incompatible chemicals.

Safety personnel should be given prompt notification of significant spills.

Immediately flush spills with copious amounts of water, flush away from combustible materials. Provide maximum ventilation; eliminate sources of ignition· evacuate area e cept for clean-up personnel, who must use full protective equipment (see Sect. VIII). Flush to holding area for dilution with more water and/or the decomposition of H_2O_2.

DISPOSAL: Follow Federal, State and local regulations for disposal. Small spills can b highly diluted with water and flushed to the drain.

SECTION VIII. SPECIAL PROTECTION INFORMATION

Provide general ventilation and local exhaust ventilation to meet TLV requirements. Lo exhaust ventilation and/or hoods should be used where mist or vapors may be generated Self-contained breathing apparatus must be available for emergency use.

Prevent contact with the skin by the use (as required) of boots, protective clothing, an gloves which are impermeable to, and insoluble in H_2O_2 (polyesters which are antistati treated, chloroprene, PVC or polyethylene have been recommended).

Chemical safety goggles and/or face shield must be used for eye protection. An eyewash station and safety shower must be readily available near use or storage area.

Provide special training to employees working with H_2O_2 on body protection, emergency procedures and first aid.

SECTION IX. SPECIAL PRECAUTIONS AND COMMENTS

Store in original containers (or in an approved container of compatible material) in a cool, clean, fire resistant area away from combustible materials, catalytic metals and compounds, direct sunlight, and sources of heat. A source of ample water must be avai able for handling spills. Protect containers from physical damage and from contaminat Do not return material to storage container after removal! Ventilation must be good. Containers must be covered and vented. Workers handling H_2O_2 must be specially traine for the assignment. Procedures must maintain the high purity of stored material. Pre vent contact with combustible materials. All equipment used to handle hydrogen peroxi must be of approved composition and properly cleaned and passivated before use.

DOT Classification - OXIDIZER (yellow label)
DATA SOURCE(S) CODE: 1,2,4-9, 12,16,20

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APPROVALS: MIS, CRD	J. M. Nielsen
Industrial Hygiene and Safety	
Corporate Medical Staff	George F. Mantello MD

GENERAL ELECTRIC

MATERIAL SAFETY DATA SHEET

EFFECTI

Union Carbide Corporation urges the customer receiving this Material Safety Data Sheet to study it carefully to become aware of hazards, if any, of the product involved. In the interest of safety you should (1) notify your employees, agents, and contractors of the information on this sheet, (2) furnish a copy to each of your customers for the product, and (3) request your customers to inform their employees and customers as well.

I. IDENTIFICATION

PRODUCT NAME:	ISOPROPANOL, ANHYDROUS		
CHEMICAL NAME:	Isopropyl Alcohol	CHEMICAL FAMILY:	Alcohols
FORMULA:	$(CH_3)_2CHOH$	MOLECULAR WEIGHT:	60.10
SYNONYMS:	Isopropyl alcohol; 2-propanol; dimethyl carbinol		
DEPARTMENT OF TRANSPORTATION	Hazard Classification Shipping Name	Flammable Liquid Isopropanol	
CAS # 67-63-0	CAS NAME	2-Propanol	

II. PHYSICAL DATA

BOILING POINT, 760 mm Hg	82.26°C (180.07°F)	FREEZING POINT	-88.5°C (-127.3°F)
SPECIFIC GRAVITY (H_2O = 1)	0.7864 at 20/20°C	VAPOR PRESSURE at 20°C	33 mm Hg
VAPOR DENSITY (air = 1)	2.07	SOLUBILITY IN WATER, % by wt.	Complete at 20°C
PERCENT VOLATILES BY VOLUME	100	EVAPORATION RATE (Butyl Acetate = 1)	2.88
APPEARANCE AND ODOR	Colorless liquid; characteristic odor		

III. INGREDIENTS

MATERIAL	%	TLV	HAZARD
Isopropanol	~100	400 ppm	Eye irritant; Flammable

IV. FIRE AND EXPLOSION HAZARD DATA

FLASH POINT	53°C, Tag Closed Cup, ASTM D 56; 63°F, Tag Open Cup, ASTM D 1310			
FLAMMABLE LIMITS IN AIR, % by volume	LOWER	2.0	UPPER	12.7 at 200°F
EXTINGUISHING MEDIA	Use water spray, carbon dioxide, dry chemical, alcohol-type, or universal-type foams applied by manufacturers' recommended techniques.			
SPECIAL FIRE FIGHTING PROCEDURES	Use self-contained breathing apparatus and protective clothing.			
UNUSUAL FIRE AND EXPLOSION HAZARDS	Vapors form from this product and may travel or be moved by air currents and ignited by pilot lights, other flames, smoking, sparks, heaters, electrical equip., static discharges, or other ignition sources at locations distant from handling point.			

EMERGENCY PHONE NUMBER • 304/744-3487 • This number is available days, nights, weekends, and holidays.

TLV AND SOURCE

400 ppm, ACGIH 1984-5; OSHA 29 CFR, para. 1910.1000, Table Z-1

EFFECTS OF ACUTE OVEREXPOSURE

SWALLOWING	Slightly toxic. Ingestion of a large quantity may cause drowsiness and loss of consciousness. Stomach cramps, pain, nausea, vomiting, and diarrhea may also occur.
SKIN ABSORPTION	No evidence of adverse effects from available informatio
INHALATION	Low concentrations may cause mild irritation of eyes, no and throat. Concentrations above the TLV may result in headache and drowsiness.
SKIN CONTACT	Prolonged contact may cause drying and cracking of skin.
EYE CONTACT	Causes slight to moderate irritation, with possible corneal injury.

EFFECTS OF REPEATED OVEREXPOSURE

No evidence of adverse effects from available information.

OTHER HEALTH HAZARDS

None currently known.

EMERGENCY AND FIRST AID PROCEDURES

SWALLOWING	Give two glasses of water and induce vomiting. If a significant quantity has been swallowed, get medical attention promptly.
SKIN	Remove contaminated clothing and flush skin with water.
INHALATION	Remove to fresh air. If breathing stops, give artificia respiration and get medical attention as soon as possibl
EYES	Flush eyes immediately with large quantities of water. medical attention.

NOTES TO PHYSICIAN
There is no specific antidote. Treatment of overexposure should be directed at the control of symptoms and the clinical condition.

X. STABILITY

UNSTABLE	STABLE	CONDITIONS TO AVOID	Heat; sparks; flame
	X		

INCOMPATIBILITY (materials to avoid)	Avoid concentrated nitric and sulfuric acids, strong oxidizers, aldehydes, halogens, and halogen compounds.
HAZARDOUS COMBUSTION OR DECOMPOSITION PRODUCTS	Burning may produce carbon monoxide and/or carbon dioxide.

HAZARDOUS POLYMERIZATION

May Occur	Will Not Occur	CONDITIONS TO AVOID	None
	X		

XI. SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IF MATERIAL IS RELEASED OR SPILLED	Extinguish and do not turn on any ignition source until area is determined to be free from explosion or fire hazards. Collect large spills for disposal. Flush small spills with water.
WASTE DISPOSAL METHOD	Incinerate in a furnace where permitted under appropriate Federal, State, and local regulations. See Section IX.

XII. SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION	Self-contained breathing apparatus in high concentrations.
VENTILATION	This product should be confined within closed equipment, in which case general (mechanical) room ventilation should be satisfactory. Special, local ventilation is needed at points where vapors can be expected to escape to the workplace air.

PROTECTIVE GLOVES	Butyl	EYE PROTECTION	Monogoggles
OTHER PROTECTIVE EQUIPMENT	Eye bath; safety shower		

XIII. SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING
Keep away from heat, sparks, and flame. Avoid contact with eyes. Keep container closed. Use with adequate ventilation. Wash thoroughly after handling.

FOR INDUSTRY USE ONLY

OTHER PRECAUTIONS
At very low concentrations in water (~10 ppm), isopropanol is readily biodegradable in a wastewater treatment plant.

The opinions expressed herein are those of qualified experts within Union Carbide Corporation. We believe that the information contained herein is current as of the date of this Material Safety Data Sheet. Since the use of this information and these opinions and the conditions of use of the product are not within the control of Union Carbide Corporation, it is the user's obligation to determine the conditions of safe use of the product.

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MATERIAL SAFETY DATA SHEET

SECTION I
PRODUCT IDENTIFICATION

Supplier:
Lubrication Engineers, Inc.
3351 Airport Freeway
Fort Worth, TX 76111

Emergency Telephone No.:
(817) 834-6321

Chemical Name and Synonyms:
Not Applicable

MONOLBC
Trade Name and Synonyms:
4701 Monolec Industrial
[redacted]

Chemical Family:
Petroleum Hydrocarbon

Formula:
Not Applicable

SECTION II
TYPICAL CHEMICAL AND PHYSICAL PROPERTIES

Appearance:
Red/orange lubricant

Odor:
Lube oil odor

Relative Density: (Air=1)
>1

Melting Point:
450 F

Boiling Point: F
>500

Vapor Pressure: (MM HG 60F)
<5

Viscosity: At 210 F, SUS
Not applicable

At 100 C, CS
Not applicable

Viscosity: At 100 F, SUS
Not applicable

At 40 C, CS
Not applicable

Solubility in Water:
Negligible

PH: 6-8

Pour Point:
Not applicable

Flash Point: F (Method)
475 F C.O.C.

Specific Gravity: (H2O=1)
Approx. .85

INGREDIENTS

	PCT (Approx)	TLV	Oral LD50	Dermal LD50
Hazardous Ingredients:				
Barium compounds	<1.0	Unknown	Unknown	Unkr
Antimony compounds	4.0-7.0	Unknown	Unknown	Unkr
Barium dinonlynaphthalene sulfonate (rust inhibitor)	<1.0	Unknown	3.5ml/kg Rat	2ml/ Rabt
Antimony dialkyldithiocarbamate (multi-functional additive)	4.0-7.0	0.5 mg/m3 as Sb	>16,000 mg/kg Rat	1600(kg Ra
Oil Mist (Mineral)	>80.0	5mg/m3 TWA	Unknown	Unkr

Non-Hazardous Ingredients:

Additives and/or Other Ingreds.

The precise ingredients, their C.A.S. Numbers, and percent of composit are proprietary to Lubrication Engineers, Inc. This material is an automotive/industrial lubricant with a low order of toxicity and irritancy

SECTION IV
FIRE AND EXPLOSION HAZARD DATA

Flash Point: F (Method Used)
475 F (C.O.C.)

Flammable Limits: LEL UEL
Unknown

Extinguishing Media:
Foam, dry chemical, water fog, or carbon dioxide.

Special Fire Fighting Procedures:
Do not direct a solid stream of water into fire. Treat as a petroleu oil fire. Respiratory protection required for fire fighting personne

Unusual Fire and Explosion Hazards:
None

SECTION V
HEALTH HAZARD DATA

Threshold Limit Value: (If Established)
Not established. Oil mist = 5 mg/m3.

Effects of Overexposure:
May cause mild dermatitis upon prolonged contact. Expected to be an e and lung irritant. No components are listed on OSHA, I.A.R.C., or N.T lists for carcinogens.

SECTION VI
EMERGENCY AND FIRST AID PROCEDURES

Eye Contact:
Flush immediately with water until irritation subsides.

Skin Contact:
Wash affected skin area with mild soap and water.

Ingestion:
Do not induce vomiting. Contact a physician.

Inhalation:
Remove to fresh air. If not breathing, give artificial respiration. Contact a physician.

Stability: (Thermal, Light, Etc.)
Stable

Conditions to Avoid:
Contact with nuclear radiation and strong oxidizing materials.

Incompatibility: (Materials to Avoid)
Strong oxidizing materials.

Hazardous Decomposition Products:
Dense smoke; oxides of C, S, N, Sb; Ba compounds; hydrogen sulfide.

Hazardous Polymerization:
Will not occur.

SECTION VIII
SPILL OR LEAK PROCEDURES

Steps To Be Taken In Case Material Is Released Or Spilled:
Remove all sources of ignition. Treat as a petroleum oil spill.

Waste Disposal Method:
Incinerate where permitted under Federal, State and local laws. Used petroleum products may be recycled through re-refining processes.

SECTION IX
SPECIAL PROTECTION INFORMATION

Eye Protection:
Sufficient to avoid direct contact.

Skin Protection:
Protective neoprene or plastic gloves may be desired.

Respiratory Protection:
Usually not needed.

Ventilation:
Usually not needed in open, unconfined areas.

Other:
Not needed.

SECTION X
SPECIAL PRECAUTIONS

Close containers when not in use. Keep away from heat, open flames and strong oxidants. Avoid eye contact and prolonged skin contact. Avoid breathing oil mists. Wash thoroughly after handling.

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Form Approved
Budget Bureau No. 44-R1387
Approval Expires

Form No. LS8-OOS-4
May 1969

U.S. DEPARTMENT OF LABOR

WAGE AND LABOR STANDARDS ADMINISTRATION
Bureau of Labor Standards

MATERIAL SAFETY DATA SHEET

SECTION I

MANUFACTURER'S NAME: White & Bagley of Michigan, Inc.	EMERGENCY TELEPHONE NO.: 617-791-3201
ADDRESS (Number, Street, City, State, and ZIP Code): 7131 Westfield, Detroit, Michigan 48204	617-987-2217 E.F.Ahern (nights
CHEMICAL NAME AND SYNONYMS: NA (Not Applicable)	TRADE NAME AND SYNONYMS: W&B Grinding Concentrate 1500
CHEMICAL FAMILY: NA	FORMULA: NA

SECTION II HAZARDOUS INGREDIENTS

PAINTS, PRESERVATIVES, & SOLVENTS	%	TLV (Units)	ALLOYS AND METALLIC COATINGS	%	TLV (Units)
PIGMENTS			BASE METAL		
CATALYST			ALLOYS		
VEHICLE			METALLIC COATINGS		
SOLVENTS			FILLER METAL PLUS COATING OR CORE FLUX		
ADDITIVES			OTHERS		
OTHERS					

HAZARDOUS MIXTURES OF OTHER LIQUIDS, SOLIDS, OR GASES	%	TLV (Units)
None		

SECTION III PHYSICAL DATA

BOILING POINT (°F.)	equiv. to water	SPECIFIC GRAVITY (H_2O=1)	1.3
VAPOR PRESSURE (mm Hg.)	equiv. to water	PERCENT VOLATILE BY VOLUME (%)	57
VAPOR DENSITY (AIR=1)	approx. 2	EVAPORATION RATE (water =1)	1
SOLUBILITY IN WATER			
APPEARANCE AND ODOR	concentrate: yellow-orange liquid - odor cinnamon diluted: green colored solution. No characteristic odor		

SECTION IV FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (Method used)	NA	FLAMMABLE LIMITS	Lel	Uel
		NA		
EXTINGUISHING MEDIA	NA			
SPECIAL FIRE FIGHTING PROCEDURES	NA			
UNUSUAL FIRE AND EXPLOSION HAZARDS	Residue-laden cloths should be discarded in proper manner. Residues increase combustibility.			

THRESHOLD LIMIT VALUE (diluted form) Not listed by ACGIH*. Suggest using 5 mg/cu. meter set by ACGIH for mineral oil mists -- which is a visible concentration

EFFECTS OF OVEREXPOSURE

None known

EMERGENCY AND FIRST AID PROCEDURES

Skin: Wash off with soap and water

Eye: Flush with water for 15 minutes

*American Conference of Governmental Industrial Hygienists

SECTION VI: REACTIVITY DATA

STABILITY	UNSTABLE		CONDITIONS TO AVOID
	STABLE	X	

INCOMPATABILITY *(Materials to avoid)* Oil; Mineral Acids

HAZARDOUS DECOMPOSITION PRODUCTS Oxides of nitrogen if mineral acids are added

HAZARDOUS POLYMERIZATION	MAY OCCUR		CONDITIONS TO AVOID
	WILL NOT OCCUR	X	

SECTION VII: SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

Flush with water and absorb

WASTE DISPOSAL METHOD Dilute with large amounts of water and dispose in accordance with local, state and federal regulations.

SECTION VIII: SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION *(Specify type)* None

VENTILATION	LOCAL EXHAUST		SPECIAL
	MECHANICAL *(General)*	Yes	OTHER

PROTECTIVE GLOVES No

EYE PROTECTION Goggles when dispensing concentrate

OTHER PROTECTIVE EQUIPMENT No

SECTION IX: SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING

Store away from area where mineral acids are stored

OTHER PRECAUTIONS None

Occupational Safety and Health Administration

MATERIAL SAFETY DATA SHEET

Required under USDL Safety and Health Regulations for Ship Repairing, Shipbuilding, and Shipbreaking (29 CFR 1915, 1916, 1917)

SECTION I

MANUFACTURER'S NAME: The White & Bagley Company	EMERGENCY TELEPHONE NO.: 617-791-3201
ADDRESS (Number, Street, City, State, and ZIP Code): 150 Worcester Center Blvd., Worcester, MA 01608	617-987-2217 E. F. Ahern (nights)
CHEMICAL NAME AND SYNONYMS: NA (Not Applicable)	TRADE NAME AND SYNONYMS: W&B Grinding Concentrate 1500-3226
CHEMICAL FAMILY: NA	FORMULA: NA

SECTION II - HAZARDOUS INGREDIENTS

PAINTS, PRESERVATIVES, & SOLVENTS	%	TLV (Units)	ALLOYS AND METALLIC COATINGS	%	TLV (Units)
PIGMENTS			BASE METAL		
CATALYST			ALLOYS		
VEHICLE			METALLIC COATINGS		
SOLVENTS			FILLER METAL PLUS COATING OR CORE FLUX		
ADDITIVES			OTHERS		
OTHERS					

HAZARDOUS MIXTURES OF OTHER LIQUIDS, SOLIDS, OR GASES	%	TLV (Units)
none		
Contains No Nitrites		
Contains Triethanolamine soaps of fatty acids Triethanolamine Borate		

SECTION III - PHYSICAL DATA

BOILING POINT (°F.) equiv. to water		SPECIFIC GRAVITY (H2O=1)	1.09
VAPOR PRESSURE (mm Hg.) equiv. to water		PERCENT, VOLATILE BY VOLUME (%)	58
VAPOR DENSITY (AIR=1) approx. 2		EVAPORATION RATE (Water = 1)	1
SOLUBILITY IN WATER	complete		

APPEARANCE AND ODOR: Concentrate: yellow orange liquid - sweet odor
Diluted: green colored solution - no characteric odor

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (Method used) NA	FLAMMABLE LIMITS NA	LEL	UEL

EXTINGUISHING MEDIA: NA

SPECIAL FIRE FIGHTING PROCEDURES: NA

UNUSUAL FIRE AND EXPLOSION HAZARDS: None

SECTION V - HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE (diluted form) Not listed by ACGIH* Suggest using 5 mg/cu. meter set by ACGH for mineral oil mists--which is a visible concentration.

EFFECTS OF OVEREXPOSURE

None known

EMERGENCY AND FIRST AID PROCEDURES

Skin: Wash off with soap and water

Eye: Flush with water for 15 minutes

*American Conference of Governmental Industrial Hygienists

SECTION VI - REACTIVITY DATA

STABILITY	UNSTABLE		CONDITIONS TO AVOID
	STABLE	X	-

INCOMPATABILITY (Materials to avoid) Oil, mineral acids

HAZARDOUS DECOMPOSITION PRODUCTS CO_2 if combustion takes place

HAZARDOUS POLYMERIZATION	MAY OCCUR		CONDITIONS TO AVOID
	WILL NOT OCCUR	X	

SECTION VII - SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

Flush with water and absorb

WASTE DISPOSAL METHOD

Dilute with large amounts of water and dispose of in accordance with local, state and federal regulations.

SECTION VIII - SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION (Specify type) None

VENTILATION	LOCAL EXHAUST	SPECIAL
	MECHANICAL (General) Yes	OTHER

PROTECTIVE GLOVES No	EYE PROTECTION goggles when dispensing concentrate

OTHER PROTECTIVE EQUIPMENT No

SECTION IX - SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING

Store away from area where mineral acids are stored

OTHER PRECAUTIONS

None

GPO 934-110

APPENDIX G

MSDS's for CHEMICALS USED in the DETF

PROCESS CHEMICALS USED IN THE DETF

Common Name	Chemical Name or Description
Aluminum Sulfate	Aluminum alum, aluminum sulfate solid, aluminum salt (3:2), octadecahydrate
PerFLO 30®	Perlite; fused sodium potassium aluminum silicate, aluminum silicate
Praestol F290®	Organic polymer
Sodium Hydroxide	Caustic
Sodium Phosphate	Inorganic acid; disodium hydrogen phosphate
Sulfuric acid	Inorganic acid, dihydrogen sulfate

Mallinckrodt®

ALUMINUM SULFATE

Material Safety Data Sheet

Mallinckrodt Inc.
Science Products Division
P.O. Box M
Paris, Kentucky 40361

Emergency Telephone Number
314-982-5000

Effective Date: 08-13-85

PRODUCT IDENTIFICATION:

Synonyms: Aluminum alum, aluminum sulfate solid, sulfuric acid, aluminum salt (3:2), octadeca hydrate

Formula CAS No.: 7784-31-8 (Hydrated)
TSCA CAS No.: 10043-01-3 (Anhydrous)

Molecular Weight: 666.44 (approx.)

Hazardous Ingredients:

Chemical Formula: $Al_2(SO_4)_3$ $18H_2O$ (approx.)

Not applicable.

PRECAUTIONARY MEASURES

WARNING! HARMFUL IF SWALLOWED OR INHALED. CAUSES IRRITATION.

Avoid breathing dust.
Keep container closed.
Use with adequate ventilation.
Wash thoroughly after handling.
Avoid contact with eyes, skin and clothing.

EMERGENCY/FIRST AID

If swallowed, induce vomiting immediately by giving two glasses of water, or milk if available and sticking finger down throat. Never give anything by mouth to an unconscious person. If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. In case of contact, immediately flush skin or eyes with plenty of water for at least 15 minutes.
In all cases call a physician.
SEE SECTION 5.

DOT Hazard Class: ORM-E

Physical Data — SECTION 1

Appearance: White, granular powder.

Odor: Odorless.

Solubility: 50% @ 0°C (32°F).

Boiling Point: Loses water at about 250°C (482°F).

Vapor Density (Air=1): No information found.

Melting Point: Liquifies on gradual heating.

Vapor Pressure (mm Hg): No information found.

Specific Gravity: 1.61

Evaporation Rate: No information found.

Fire and Explosion Information — SECTION 2

Fire: Not considered to be a fire hazard.

Explosion: Not considered to be an explosion hazard.

Fire Extinguishing Media: Use any means suitable for extinguishing surround fire.

Special Information: In the event of a fire, wear full protective clothing and NIOSH-approved self-contained breathi apparatus with full facepiece operated in the pressure demand or other positive pressure mode.

Reactivity Data — SECTION 3

Stability: Stable under ordinary conditions of use and storag

Hazardous Decomposition Products: Hydrolyzes to form dilute sulfuric acid. Toxic and corrosive oxides of sulfur at temperatures above 760°C (1400°F).

Hazardous Polymerization: This substance does not polymerize.

Incompatibilities: Alkalies, water reactive materials such as oleum.

Leak/Spill Disposal Information — SECTION 4

Ventilate the area of the leak or spill.

Spills: Sweep up or vacuum spilled material and place in a suitable container for disposal. Neutralize residue with soda ash. The area may then be flushed with plenty of water. Adequate ventilation is required.
Disposal: Large quantities may be sent to an approved waste facility or recovered. Smaller amounts may be dissolved in water, treated with soda ash to neutralize and sent to the sewer with ample water.

Reportable Quantity (RQ)(CWA/CERCLA) : 5000 lbs.

Ensure compliance with local, state and federal regulations.

Health Hazard Information SECTION 5

A. Exposure/Health Effects

Inhalation:	Dust may act as an irritant to the respiratory system, mainly due to the formation of acidic sulfur compounds via hydrolysis. Coughing or sneezing, sore throat and breathing difficulty may be noted.
Ingestion:	May cause abdominal pain, stricture, gastrointestinal upset due principally to acid formed by hydrolysis. May produce nausea and vomiting. Large amounts have caused gastrointestinal inflammation.
Skin Contact:	May cause irritation, especially under repeated or prolonged contact, or when moisture is present.
Eye Contact:	May cause irritation. Crystals may be abrasive. Splashes from solutions may cause severe irritation or burns.
Chronic Exposure:	Not expected to be a health hazard.
Aggravation of Pre-existing Conditions:	No adverse effects expected.

B. FIRST AID

Inhalation:	Remove to fresh air. Get medical attention for any breathing difficulty.
Ingestion:	If swallowed, induce vomiting immediately by giving two glasses of water, or milk if available and sticking finger down throat. Call a physician immediately. Never give anything by mouth to an unconscious person.
Skin Exposure:	Remove any contaminated clothing. Wash skin with soap or mild detergent and water for at least 15 minutes. Get medical attention if irritation develops or persists.
Eye Exposure:	Wash eyes with plenty of water for at least 15 minutes, lifting lower and upper eyelids occasionally. Get medical attention immediately.

C. TOXICITY DATA (RTECS, 1982)

Oral mouse LD50: 6027 mg/kg (Anhydrous)
Reproductive effects cited (Anhydrous)

Occupational Control Measures — SECTION 6

Airborne Exposure Limits:

-ACGIH Threshold Limit Value (TLV): 2 mg (Al)/m^3 (TWA)

Ventilation System:

A system of local exhaust is recommended to kee employee exposures below the Airborne Exposure Local exhaust ventilation is generally preferre because it can control the emissions of the dus vapor at its source, preventing dispersion of i the general work area. Please refer to the ACG document, "Industrial Ventilation, A Manual of Recommended Practices", most recent edition, for details.

Personal Respirators (NIOSH Approved)

If the TLV is exceeded, a dust/mist respirator w chemical goggles may be worn, in general, up to times the TLV. Consult respirator supplier for limitations. Alternatively, a supplied air full facepiece respirator or airlined hood may be wor

Skin Protection:

Wear protective gloves and clean body-covering clothing.

Eye Protection:

Use chemical safety goggles. Contact lenses sho be worn when working with this material.

Maintain eye wash fountain and quick-drench faci in work area.

Storage and Special Information — SECTION 7

Keep in a tightly closed container, stored in a cool, dry, ventilated area. Protect against physical damage. Aluminum sulfate absorbs moisture and becomes a safety hazard when spilled because it absorbs moisture and becomes slippery.

****
The information contained herein is provided in good faith and is believed to be correct as of the date hereof. However, Mallinckrodt, Inc. makes no representation as to the comprehensiveness or accuracy of the information. It is expected that individuals receiving the information will exercise their independent judgment in determining its appropriateness for a particular purpose. Accordingly, Mallinckrodt, Inc. will not be responsible for damages of any kind resulting from the use of or reliance upon such information. NO REPRESENTATIONS, OR WARRANTIES, EITHER EXPRESS OR IMPLIED, OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE OR OF ANY OTHER NATURE ARE MADE HEREUNDER WITH RESPECT TO THE INFORMATION SET FORTH HEREIN OR TO THE PRODUCT TO WHICH THE INFORMATION REFERS.
****

Material Safety Data Sheet

May be used to comply with OSHA's Hazard Communication Standard, 29 CFR 1910.1200. Standard must be consulted for specific requirements.

(Non Mandatory Form)
Form Approved
OMB No. 1218-0072

IDENTITY (As Used on Label and List) :

Note: Blank spaces are not permitted. If any item is not applicable, or no information is available, the space must be marked to indicate that.

Section I

Manufacturer's Name MID-ATLANTIC PERLITE PRODUCTS CO.	Emergency Telephone Number (717) 236-4004
Address (Number, Street, City, State, and ZIP Code) 1500 N. Cameron Street	Telephone Number for Information (717) 236-4004
Harrisburg, PA 17103	Date Prepared 5-15-86
	Signature of Preparer (optional)

Section II — Hazardous Ingredients/Identity Information

Hazardous Components (Specific Chemical Identity; Common Name(s))	OSHA PEL	ACGIH TLV	Other Limits Recommended	% (optional)
N/A				

This material is the expanded form of Perlite; it is chemically inert and is approved by the Food-Chemical Codex for filtering liquid food.

Sodium Potassium Aluminum Silicate.

Trade names - MAPPCO PerFIL and PerFLO.

Section III — Physical/Chemical Characteristics

Boiling Point	Specific Gravity (H_2O = 1)
Vapor Pressure (mm Hg.)	Melting Point
Vapor Density (AIR = 1)	Evaporation Rate (Butyl Acetate = 1)
Solubility in Water Insoluble	
Appearance and Odor Off white, no odor	

Section IV — Fire and Explosion Hazard Data

Flash Point (Method Used) None (non-flammable)	Flammable Limits	LEL	UEL

Extinguishing Media
Inert mineral, does not burn, CO^2 compatable

Special Fire Fighting Procedures
Will not support combustion

Unusual Fire and Explosion Hazards
None

(Reproduce locally)

Stability			
	Unstable		Conditions: None -
	Stable	X	

Incompatibility (*Materials to Avoid*)
None - incompatable with concentrate hydro fluoric acid (will partiall dissolve).

Hazardous Decomposition or Byproducts
None

Hazardous Polymerization			
	May Occur		Conditions to Avoid
	Will Not Occur	X	

Section VI — Health Hazard Data

Route(s) of Entry: Inhalation? Yes Skin? Ingestion?

Health Hazards (*Acute and Chronic*)

Carcinogenicity: NTP? IARC Monographs? OSHA Regulated?

Signs and Symptoms of Exposure
Nuisance dust - chemically inert

Medical Conditions
Generally Aggravated by Exposure

Emergency and First Aid Procedures
Eye discomfort - treat by eyewash, no emergency procedure required

Section VII — Precautions for Safe Handling and Use

Steps to Be Taken in Case Material Is Released or Spilled
Sweep into container and discard. This is an innocuous white mineral powder, not harmful to touch or to handle. It is easily suspended in air in windy locations, suggest using respirator such as MSA-77 and possible use of goggles.

Waste Disposal Method
Landfill acceptable, no special procedures

Precautions to Be Taken in Handling and Storing
None required

Other Precautions
None

Section VIII — Control Measures

Respiratory Protection (*Specify Type*)
none.

Ventilation			
	Local Exhaust X		Special
	Mechanical (*General*) At bag dumping stations		Other

Protective Gloves
None required

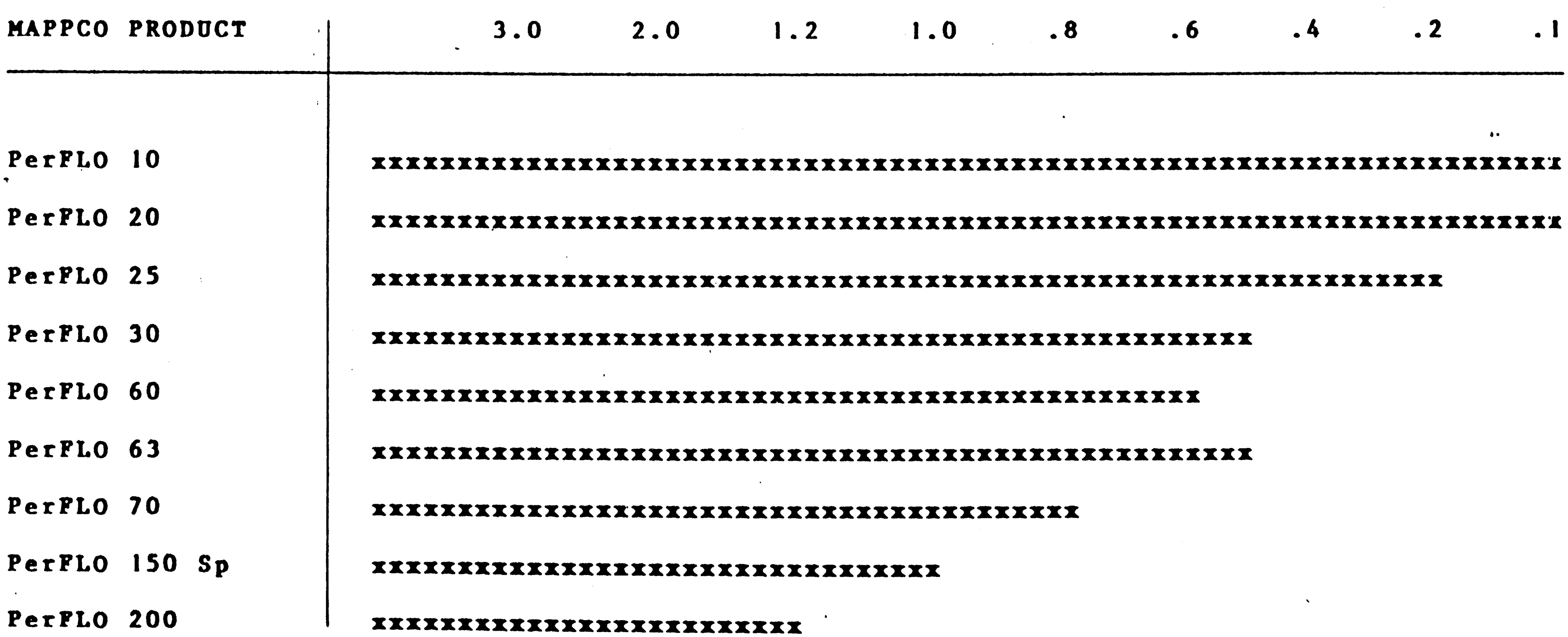
Eye Protection
Goggles in windy dump area

Other Protective Clothing or Equipment
Dump material in slurry tranks under negative pressure to reduce dusting

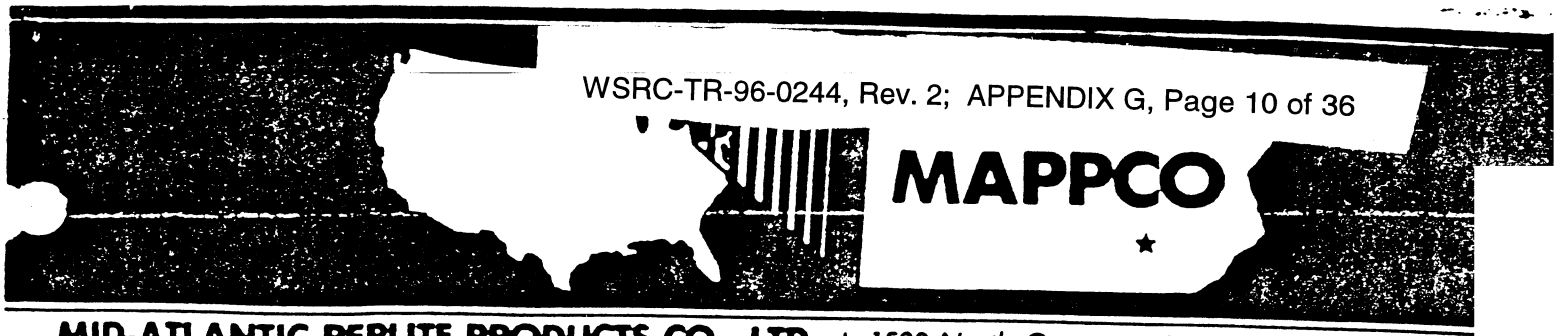
Work/Hygienic Practices

* U.S.G.P.O.: 1986-491-529/4577

SIZE OF SOLID PARTICLES REMOVED (MICRONS)



Represent average removal percentages.



MID-ATLANTIC PERLITE PRODUCTS CO., LTD. ★ 1500 North Cameron Street ★ Harrisburg, P

MAPPCO PERLITE FILTERAID DATA
GENERAL CHARACTERISTICS
(TYPICAL VALUE OR RANGE)

TRADE NAME:	PerFLO 20
PRODUCER:	Mid-Atlantic Perlite Products Co.
SHIPPING POINT:	Harrisburg, PA.
MINERALOGICAL:	Amorphous mineral of volcanic orig geologically known as Perlite, a fused sodium potassium aluminum silicate.
TYPE:	Expanded, milled, particle classif
COLOR:	White
SPECIFIC GRAVITY:	2.34
REFRACTIVE INDEX:	1.45
WET APPARENT DENSITY (Lbs/Cu.Ft.):	14 - 16
FLUFFED LOOSE WEIGHT: (Lbs/Cu.Ft.):	5.5 - 6.5
pH (10% slurry)	6.5 - 8.5
FREE MOISTURE (Max.):	0.5%
RETAINED ON U.S. STD. SIEVE N° 325:	5%
GE BRIGHTNESS:	82 - 85

Ismael Mendoza
Revised September 1986

MAPPCO

MID-ATLANTIC PERLITE PRODUCTS CO., LTD. ★ 1500 North Cameron Street ★ Harrisburg, PA 17103

MAPPCO PERFLO PERLITE FILTERAID DATA
PHYSICAL AND CHEMICAL CHARACTERISTICS

TRADE NAME:	PerFLO 10
PRODUCER:	Mid-Atlantic Perlite Products Co.
SHIPPING POINT:	Harrisburg, PA.
MINERALOGICAL:	Amorphous mineral of volcanic origin, geologically known as Perlite, a fused sodium potassium aluminum silicate.
TYPE:	Expanded, milled, particle classified.
COLOR:	White
SPECIFIC GRAVITY:	2.3
WET APPARENT DENSITY:	18 - 20 Lbs/Cu.Ft.
SCREEN RETENTION:	U.S. STD. 325M 1% (Wet Screening)
pH (10% suspension):	6.5 - 7.5
Ignition Loss*	1 Hr. @ 1200°F 1.27 - 2.20
Ignition Loss*	4 Hr. @ 1700°F 2.10 - 3.25
Median Particle Diameter:	Typical Range 3.4 - 4.4μ

* Combined Water

Ismael Mendoza
Revised September 1986

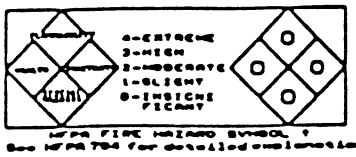
MID-ATLANTIC PERLITE PRODUCTS CO., LTD. ★ 1500 North Cameron Street ★ Harrisburg, PA

MAPPCO PERLITE FILTERAID DATA
GENERAL CHARACTERISTICS
(TYPICAL VALUE OR RANGE)

TRADE NAME:	PerFLO 30
PRODUCER:	Mid-Atlantic Perlite Products Co.
SHIPPING POINT:	Harrisburg, PA.
MINERALOGICAL:	Amorphous mineral of volcanic origin, geologically known as Perlite, a fused sodium potassium aluminum silicate.
TYPE:	Expanded , milled, particle classified
COLOR:	White
GE BRIGHTNESS (Typical):	82 - 85
SPECIFIC GRAVITY:	2.34
WET APPARENT DENSITY:	13 - 14 Lbs/Cu.Ft.
FLUFFED LOOSE WEIGHT:	4 - 5 Lbs/Cu.Ft.
FREE MOISTURE, % :	1.0
IGNITION LOSS, % COMBINED WATER:	1.5
RETAINED ON U.S. STD. SIEVE N° 325 (WET SCREENING):	1 - 7%
pH (10% slurry):	7 - 8.5
MEAN PARTICLE DIAMETER IN MICRONS:	5 - 5.5
ODOR:	Imparts no odor, absorbs no odor.

Ismael Mendoza
Revised September 1986

MATERIAL SAFETY DATA SHEET



No.: 1 Rev. 1
Date Prepared: 9/88

NORD PERLITE

I. PRODUCT IDENTIFICATION

Trade Name(s): 734, 634, 443, 332, 272, GS1400, 190, 909, EC216, UC216, UCA350, PF10, PF20, PF30, 30SP, PF60, PF70, 70LF, PF150, 150SP, 150LF, PF200, 200SP, PF300, 101F, 102F
Generic Name: PERLITE
Chemical Name: SODIUM POTASSIUM ALUMINUM SILICATE.
CAS #: 93763-70-3
Formula: Na_2O, K_2O, Al_2O_3, SiO_2

Manufacturer: NORD PERLITE COMPANY
Address: 8150 WASHINGTON VILLAGE DRIVE
City: DAYTON State: OHIO Zip: 45458
Telephone: (513) 433-5782
Emergency: (513) 433-5782

II. PRODUCT INGREDIENTS

INGREDIENT NAME	CAS NUMBER	%	PERMISSIBLE EXPOSURE LIMIT
EXPANDED PERLITE	93763-70-3	100	TLV: 10mg/m^3 Total Dust PEL: 10mg/m^3 Total Dust
This Product Contains Greater Than 0.1% but less than 1.0% Crystalline Silica			*This level is based upon current ACGIH recommendations and proposed OSHA regulations, and is the same for their recommendation for nuisance dust.

III. PHYSICAL DATA

Appearance and Odor: FINE WHITE POWDER, NO ODOR

Boiling Point: NA
Vapor Pressure: NA
Water Solubility (%): NEGLIGIBLE
Vapor Density (air = 1): NA
Evaporation Rate: NA
Specific Gravity (water = 1): 2.3
Melting Point: NA
% Volatile by Volume: NIL

IV. FIRE AND EXPLOSION DATA

Flash Point (method): NONFLAMMABLE
Flammable Limits: NA
NFPA Flammable/Conbustable Liquid Classification: NA
Auto-Ignition Temperature: NA

Extinguishing Media: NA

Unusual Fire or Explosion Hazards: NONE

Special Fire-Fighting Procedures: NONE

V. HEALTH HAZARDS A. Summary Risks

Summary: THIS PRODUCT CONTAINS TRACE LEVELS OF CRYSTALLINE SILICA. IARC HAS CONCLUDED THAT THERE IS "LIMITED CARCINOGENICITY OF CRYSTALLINE SILICA TO HUMANS". HOWEVER, TO NORD'S KNOWLEDGE THERE IS NO CREDIBLE EVIDENCE TO INDICATE THAT THE TRACE AMOUNTS OF CRYSTALLINE SILICA PRESENT IN THIS PRODUCT HAVE A CARCINOGENIC EFFECT. THIS PRODUCT IS CONSIDERED A NUISANCE DUST BY THE ACGIH AND OSHA.

Medical conditions which may be aggravated: PRE-EXISTING UPPER RESPIRATORY AND LUNG DISEASE SUCH AS, BUT NOT LIMITED TO BRONCHITIS, EMPHYSEMA AND ASTHMA.

Target Organ(s): LUNGS

Acute Health Effects: TRANSITORY UPPER RESPIRATORY IRRITANT.

Chronic Health Effects: INHALATION OF HIGH LEVELS OF ANY NUISANCE DUST OVER LONG PERIODS OF TIME MAY AFFECT LUNG CAPACITY.

Primary Entry Route(s): INHALATION.

V. HEALTH HAZARDS B. Signs/Symptoms of Overexposure

Inhalation: RESPIRATORY IRRITATION. IN EXTREME EXPOSURES SOME CONGESTION MAY OCCUR.

Skin Contact: NA

Skin Absorption: NA

Ingestion: NOT HAZARDOUS WHEN INGESTED.

Eyes: TEMPORARY IRRITATION AND INFLAMMATION.

V. HEALTH HAZARDS C. First Aid/Emergency Procedures

Inhalation: REMOVE TO FRESH AIR. DRINK WATER TO CLEAR THROAT AND BLOW NOSE TO EVACUATE DUST.

Skin Contact: NA

Skin Absorption: NA

Ingestion: NA

Eyes: FLUSH EYES WITH COPIOUS AMOUNT OF WATER. IF IRRITATION PERSISTS CONSULT A PHYSICIAN.

VI. REACTIVITY DATA

MATERIAL IS STABLE. HAZARDOUS POLYMERIZATION CANNOT OCCUR.

Chemical Incompatibilities: HYDROFLUORIC ACID.

Conditions to Avoid: NONE IN DESIGNED USE.

Hazardous Decomposition Products: MAY REACT WITH HYDROFLUORIC ACID TO FORM TOXIC SILICON TETRAFLOURIDE GAS.

VII. SPILL OR LEAK PROCEDURES

Procedures for Spill/Leak: VACUUM CLEAN SPILLAGE. IF SWEEPING IS NECESSARY USE A DUST SUPPRESSANT.

Waste Management: DISPOSE OF IN ACCORDANCE WITH ALL APPLICABLE FEDERAL, STATE, AND LOCAL REGULATIONS.

VIII. SPECIAL PROTECTION INFORMATION

Goggles: CHEMICAL SAFETY GOGGLES,

Gloves: NOT NORMALLY REQUIRED.

Respirator: OSHA/NIOSH APPROVED RESPIRATOR FOR PROTECTION AGAINST NUISANCE DUST.

Ventilation: LOCAL IF NECESSARY TO MAINTAIN ALLOWABLE PEL OR TLV LEVELS.

Other: NA

Special Considerations for Repair/Maintenance of Contaminated Equipment: INSURE PROPER RESPIRATORY PROTECTION.

IX. SPECIAL PRECAUTIONS

Storage Segregation Hazard Classes: NA

Special Handling/Storage: REPAIR ALL BROKEN BAGS IMMEDIATELY. MAINTAIN GOOD HOUSEKEEPING PRACTICES.

Special Workplace Engineering Controls: NOT NORMALLY REQUIRED.

Other: NA

AS OF THE DATE OF PREPARATION OF THIS DOCUMENT, THE INFORMATION PROVIDED IS BELIEVED TO BE ACCURATE AND IS PROVIDED IN GOOD FAITH TO COMPLY WITH APPLICABLE FEDERAL AND STATE LAW(S). HOWEVER, NO WARRANTY OR REPRESENTATION WITH RESPECT TO SUCH INFORMATION IS INTENDED OR GIVEN.

TECHNICAL * BULLETIN

CALCINED DIATOMACEOUS EARTH FILTER AIDS

vs NORD PERLITE FILTER AIDS

CRYSTALLINE SILICA COMPARISON

The level of crystalline silica found in commercially available filter aids varies greatly with respect to the raw materials used in the manufacturing process, as well as processing methods. To illustrate the dramatic variation in crystalline silica levels found in commercial filter aids, ranges of crystalline silica found in typical Diatomaceous Earth products and in Nord Perlite products are shown below.

Comparative levels of Crystalline Silica Found in Calcined Diatomaceous Earth and Nord Perlite Filteraids:

Typical Filter Aid Type	Crystalline Silica Content
"Straight" Calcined Diatomaceous Earth	10 - 25%
"Flux" Calcined Diatomaceous Earth	25 - 60%
Nord Perlite	Less Than 1.0%

Nord Perlite Company has recently learned the International Agency for Research on Cancer (IARC) has concluded that there is sufficient evidence in animals and limited evidence in humans that crystalline silica is a carcinogen. Specifically, IARC's recently published Supplement 7 classifies crystalline silica as a category 2A material - "limited evidence for the carcinogenicity of crystalline silica to humans". The Occupational Safety and Health Administration (OSHA) considers crystalline silica to be a pneumoconiosis producing dust.

General Health Considerations

Calcined Diatomaceous Earth Filter Aids:

For use as filter aid material, Diatomaceous earth is heat treated, or calcined, a process which converts up to 25% of the amorphous silica to cristobalite - a form of crystalline silica. If an alkaline fluxing agent such as soda ash is used in calcining, the cristobalite level may reach as high as 60% or more.

Exposure to Diatomaceous Earth can cause pneumoconiosis. Nearly all cases of disabling pneumoconiosis from exposure to Diatomaceous Earth have been associated with cristobalite exposure, and the extent and severity of Diatomaceous Earth pneumoconiosis correlates with the cristobalite content as well as the duration of the exposure. In addition to the large cristobalite crystalline silica fraction, Diatomaceous Earth can contain from 3% to 5% quartz crystalline silica.

The current Permissible Exposure Limits (PELs) and Threshold Limit Values (TLVs) for Diatomaceous Earth are determined by the percentage of the total crystalline silica species present in the material. As a result, the PEL for Diatomaceous Earth can range from 1.0mg/m^3 for the straight calcined grades, to less than 0.1mg/m^3 for the flux calcined grades. A flux calcined Diatomaceous Earth product for example, containing 60% cristobalite crystalline silica and 3% quartz crystalline silica would require dust control to maintain the Time Weighted Average (TWA) below 0.08mg of respirable dust per cubic meter of air.

Nord Perlite Filter Aids:

Nord Perlite filter aids are produced from natural perlite from Nord Perlite's mines in Arizona, which are considered among the world's richest and purest deposits. No Chemicals or fluxing additives are used in the manufacturing process. Nord Perlite is essentially an amorphous mineral consisting of fused sodium potassium aluminum silicate. Nord Perlite contains greater than 0.1% but less than 1.0% crystalline silica.

There are no published medical reports to indicate that exposure to perlite dust, either to ore or to the expanded form, has resulted in adverse physiological effects. To Nord's knowledge there is no credible evidence to indicate that the trace amounts of crystalline silica present in Nord Perlite Products have a carcinogenic effect.

Since Nord Perlite products contain less than 1.0% crystalline silica, OSHA currently regulates Nord Perlite as a nuisance dust, and proposes a PEL of 10 mg/m^3 TWA for total dust. The ACGIH also considers Nord Perlite to be a nuisance dust and recommends a TLV of 10mg/m^3 total dust.

Technical information and data described here is believed to be reliable. However, no guarantee is implied or expressed as to the accuracy of these data or the use of the product. Nord Perlite Company cannot assume liability that may arise from the use of any product in a process, manner, or

BLANK

Stockhausen

Material Safety Data Sheet

May be used to comply with OSHA's Hazard Communication Standard, 29 CFR 1910.1200. Standard must be consulted for specific requirements.

U.S. Department of Labor
Occupational Safety and Health Administration
(Non-Mandatory Form)
Form Approved
OMB No. 1218-0072

IDENTITY (As Used on Label and List): Praestol K290FL

Note: Blank spaces are not permitted. If any item is not applicable, or no information is available, the space must be marked to indicate that.

Section I

Manufacturer's Name: STOCKHAUSEN, INC.	Emergency Telephone Number: (919) 378-9393
Address (Number, Street, City, State, and ZIP Code): 2408 Doyle St. Greensboro, N.C. 27406	Telephone Number for Information: (919) 333-3500
	Date Prepared: May 16, 1991
	Signature of Preparer (optional): Walter K. Fier

NA = Not Applicable
NE = Not Established

Section II — Hazardous Ingredients/Identity Information

Serial No. 0343

Hazardous Components (Specific Chemical Identity; Common Name(s))	OSHA PEL	ACGIH TLV	Other Limits Recommended	% (optional)
Polymer (acrylamide co-polymer).	N/E	N/E	Irritant (eye)	Major
Hydrocarbon				
CAS. No. 64742-47-8	N/E	N/E	200 ppm TLV*	ca.25%
Surfactant				
CAS. No. 26027-38-3	N/E	N/E	Irritant (eye & Skin)	ca. 2%

SARA 313 Reportable Toxic Chemical(s) - NONE.

Section III — Physical/Chemical Characteristics

Boiling Point: ca.98°C		Specific Gravity (H_2O = 1) @ 20°C: 1.02	
Vapor Pressure (mm Hg.): ca.37		Melting Point: Less than 0°C	
Vapor Density (AIR = 1): Greater than 1		Evaporation Rate (Butyl Acetate = 1): Less than 1	

Solubility in Water: Soluble - 0.5% to 1.0% maximum due to viscous nature of polymer solutions.

Appearance and Odor: Viscous, milky white emulsion: mild odor of hydrocarbon and acrylate.

Section IV — Fire and Explosion Hazard Data

Flash Point (Method Used): Greater than 100°C (PMCC)	Flammable Limits: N/E	LEL: N/E	UEL: N/E	

Extinguishing Media: Water fog, dry chemical, CO_2 and Halon type extinguishants.

Special Fire Fighting Procedures: Spilled product creates extremely slippery conditions.

Product in contact with water is even more slippery. Exercise Caution.

Unusual Fire and Explosion Hazards: Hydrocarbon component is combustible if separated from the mixture (i.e. evaporation - stratification)

K290FL

Section V — Reactivity Data

Stability			Conditions to Avoid
	Unstable		None known.
	Stable	X	

Incompatibility (Materials to Avoid): None known

Hazardous Decomposition or Byproducts: None known

Hazardous Polymerization			Conditions to Avoid
	May Occur		None known
	Will Not Occur	X	

Section VI — Health Hazard Data

Routes of Entry: Inhalation? Yes Skin? Yes Ingestion? No

Health Hazards (Acute and Chronic): Components, hydrocarbon and surfactant are considered irritants. Prolonged inhalation of vapors may cause irritation of the respiratory tract. Aspirat of mist into lungs may cause pulmonary disorder.

Carcinogenicity: NTP? No IARC Monographs? No OSHA Regulated? No

Signs and Symptoms of Exposure: Not confirmed: reddening, swelling of the area affected with itching, burning or other discomfort.

Medical Conditions Generally Aggravated by Exposure: Not confirmed: existing rashes, cuts, allergies or other sensiti areas.

Emergency and First Aid Procedures: Eyes and skin are to be flushed thoroughly with water. Inhalation: move to source of fresh air. Consult physician regarding any continued disc

Section VII — Precautions for Safe Handling and Use

Steps to Be Taken in Case Material is Released or Spilled: Contain and collect using a suitable absorbent if nec Flush residuals to the drain. Place collected material into suitable container for disposal or use if practical.

Waste Disposal Method: Dispose of in accordance with federal, state and local laws. Consult WWTI for controlled release of diluted material.

Precautions to Be Taken in Handling and Storing: Handle as an irritant. Do not get into eyes. Avoid prolonged contact with the skin. Do not inhale or ingest.

Other Precautions: Spilled product creates extremely slippery conditions, especially in contact with water.

Section VIII — Control Measures

Respiratory Protection (Specify Type): None required for normal enduse processes. Observe Section II limits.

Ventilation			
	Local Exhaust: Insure Section II is observed	Special: None required	
	Mechanical (General): Recommended	Other: None required	

Protective Gloves: Impervious type: Rubber or Neoprene

Eye Protection: Safety glasses

Other Protective Clothing or Equipment: Apron, shoes and other clothing as needed to prevent prolonged skin contact.

Work/Hygienic Practices: Wash thoroughly after handling.

1, 2, 5, 6, (9), (12)
5, (14), 1

SODIUM HYDROXIDE
SODIUM HYDROXIDE
SODIUM HYDROXIDE

MATERIAL SAFETY DATA SHEET

FISHER SCIENTIFIC
CHEMICAL DIVISION
1 REAGENT LANE
FAIR LAWN NJ 07410
(201) 796-7100

EMERGENCY CONTACTS
GASTON L. PILLORI
(201) 796-7100

DATE: 02/18/86
PO NBR: N/A
ACCT: 220066-03
INDEX: N/A
CAT NO: S318100

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SUBSTANCE IDENTIFICATION

SUBSTANCE: **SODIUM HYDROXIDE** CAS-NUMBER 1310-73-2

TRADE NAMES/SYNONYMS: CAUSTIC SODA; SODA LYE; LYE; WHITE CAUSTIC; CAUSTIC ALKALI; CAUSTIC SODA, BEAD; CAUSTIC SODA, DRY; CAUSTIC SODA, FLAKE; CAUSTIC SODA, GRANULAR; CAUSTIC SODA, SOLID; SODIUM HYDRATE; SODIUM HYDROXIDE, BEAD; SODIUM HYDROXIDE, FLAKE; SODIUM HYDROXIDE, DRY; SODIUM HYDROXIDE, SOLID; S-613 ASCARITE; S-318; S-320; S-612

CHEMICAL FAMILY:
INORGANIC BASE

MOLECULAR FORMULA: NA-O-H MOL WT: 40.00

CERCLA RATINGS (SCALE 0-3): HEALTH=3 FIRE=0 REACTIVITY=1 PERSISTENCE=0

COMPONENTS AND CONTAMINANTS

PERCENT: 97	COMPONENT: SODIUM HYDROXIDE
PERCENT: 0.50	COMPONENT: SODIUM CARBONATE
PERCENT: .008	COMPONENT: SODIUM CHLORIDE
PERCENT: <0.1	COMPONENT: SODIUM SULFATE
PERCENT: 0.1	COMPONENT: POTASSIUM, CALCIUM, AND MAGNESIUM

OTHER CONTAMINANTS: SILICON DIOXIDE (0.03%) AND OTHER METALS (0.01%).

EXPOSURE LIMITS:
2 MG/M3 OSHA TWA; 2 MG/M3 ACGIH CEILING; 2 MG/M3 NIOSH RECOMMENDED 15 MINUTE CEILING.

PHYSICAL DATA

DESCRIPTION: ODORLESS, WHITE OR OFF-WHITE HYGROSCOPIC SOLID.

BOILING POINT: 2534 F (1390 C) MELTING POINT: 605 F (318 C)

SPECIFIC GRAVITY: 2.1 VAPOR PRESSURE: 42 MMHG @ 1000 C

PH: 14 FOR A 5% AQ SOLN SOLUBILITY IN WATER: 42%

SOLVENT SOLUBILITY: ALCOHOL, GLYCEROL.

FIRE AND EXPLOSION DATA

FIRE AND EXPLOSION HAZARD:
NEGLIGIBLE FIRE AND EXPLOSION HAZARD WHEN EXPOSED TO HEAT OR FLAME.

FLASH POINT: NON-FLAMMABLE

FIREFIGHTING MEDIA:
DRY CHEMICAL, CARBON DIOXIDE, WATER SPRAY OR FOAM
(1984 EMERGENCY RESPONSE GUIDEBOOK, DOT P 5800.3).

FOR LARGER FIRES, USE FLOODING QUANTITIES OF WATER.

FIREFIGHTING:
MOVE CONTAINERS FROM FIRE AREA IF POSSIBLE. COOL CONTAINERS EXPOSED TO FLAMES WITH WATER FROM SIDE UNTIL WELL AFTER FIRE IS OUT (1984 EMERGENCY RESPONSE GUIDEBOOK, DOT P 5800.3).

TOXICITY

1%/24 HOURS EYE-MONKEY SEVERE IRRITATION; 50 MG/24 HOURS SKIN-RABBIT SEVERE IRRITATION; 1% EYE-RABBIT SEVERE IRRITATION; 50 UG/24 HOURS EYE-RABBIT SEVERE IRRITATION; 1 MG/24 HOURS EYE-RABBIT SEVERE IRRITATION;
CARCINOGEN STATUS: NONE.
SODIUM HYDROXIDE IS AN EYE AND MUCOUS MEMBRANE IRRITANT AND SEVERE SKIN IRRITANT.

HEALTH EFFECTS AND FIRST AID

INHALATION:
CORROSIVE. 200 MG/M3 IS IMMEDIATELY DANGEROUS TO LIFE AND HEALTH.
ACUTE EXPOSURE- THE EFFECTS OF THE DUST OR MIST WILL VARY FROM MILD IRRITATION OF THE NOSE @ 2 MG/M3 TO SEVERE PNEUMONITIS DEPENDING ON THE SEVERITY OF EXPOSURE. LOW CONCENTRATIONS MAY CAUSE SORE THROAT, COUGHING, AND LABORED BREATHING. INTENSE EXPOSURES MAY RESULT IN DELAYED PULMONARY EDEMA.

CHRONIC EXPOSURE- PROLONGED EXPOSURE MAY CAUSE BRONCHIAL IRRITATION, COUGHING, BRONCHIAL PNEUMONIA, AND GASTROINTESTINAL DISTURBANCES.

FIRST AID- REMOVE FROM EXPOSURE AREA TO FRESH AIR IMMEDIATELY. IF BREATHING

HAS STOPPED, GIVE ARTIFICIAL RESPIRATION. KEEP AFFECTED PERSON WARM AND AT REST. GET MEDICAL ATTENTION AS SOON AS POSSIBLE.

KIN CONTACT:
ORROSIVE.
ACUTE EXPOSURE- ON THE SKIN, SOLUTIONS OF 25 TO 50% MAY CAUSE THE SENSATION OF IRRITATION WITHIN ABOUT 3 MINUTES. WITH SOLUTIONS OF 4% THIS DOES NOT OCCUR UNTIL AFTER SEVERAL HOURS. IF NOT REMOVED FROM THE SKIN, SEVERE BURNS WITH DEEP ULCERATION MAY OCCUR. EXPOSURE TO THE DUST OR MIST MAY CAUSE MULTIPLE SMALL BURNS AND TEMPORARY LOSS OF HAIR.

CHRONIC EXPOSURE- REPEATED EXPOSURE MAY RESULT IN DERMATITIS.

FIRST AID- REMOVE CONTAMINATED CLOTHING WHILE RUNNING STREAMS OF WATER UNDER CLOTHING. WASH AFFECTED AREA WITH SOAP OR MILD DETERGENT AND LARGE AMOUNTS OF WATER (APPROXIMATELY 15-20 MINUTES) UNTIL NO EVIDENCE OF CHEMICAL REMAINS. FOR CHEMICAL BURNS, APPLY STERILE BANDAGE SECURELY, BUT NOT TOO TIGHTLY. GET MEDICAL ATTENTION.

YE CONTACT:
ORROSIVE.
ACUTE EXPOSURE- CONTACT MAY CAUSE DISINTEGRATION AND SLOUGHING OF CONJUNCTIVAL AND CORNEAL EPITHELIUM, CORNEAL OPACIFICATION, MARKED EDEMA AND ULCERATION; AFTER 7 TO 13 DAYS EITHER GRADUAL RECOVERY BEGINS OR THERE IS PROGRESSION OF ULCERATION AND CORNEAL OPACIFICATION. COMPLICATIONS OF SEVERE EYE BURNS ARE SYMBLEPHARON WITH OVERGROWTH OF THE CORNEA BY A VASCULARIZED MEMBRANE, PROGRESSIVE OR RECURRENT CORNEAL ULCERATION AND PERMANENT CORNEAL OPACIFICATION.

CHRONIC EXPOSURE- REPEATED OR PROLONGED VAPOR CONTACT AT LOW LEVELS OF EXPOSURE MAY CAUSE CONJUNCTIVITIS.

FIRST AID- WASH EYES IMMEDIATELY WITH LARGE AMOUNTS OF WATER, OCCASIONALLY LIFTING THE UPPER AND LOWER LIDS, UNTIL NO EVIDENCE OF CHEMICAL REMAINS (APPROXIMATELY 15-20 MINUTES). GET MEDICAL ATTENTION.

NGESTION:
ORROSIVE.
ACUTE EXPOSURE- SEVERE ABDOMINAL PAIN, CORROSION OF THE LIPS, MOUTH, TONGUE, AND PHARYNX, AND VOMITING OF LARGE PIECES OF MUCOSA. ASPHYXIA CAN OCCUR FROM SWELLING OF THE THROAT. PERFORATION OF THE ESOPHAGUS AND STOMACH CAN OCCUR. CASES OF SQUAMOUS CELL CARCINOMA OF THE ESOPHAGUS HAVE OCCURRED WITH LATENT PERIODS OF 12 TO 42 YEARS AFTER INGESTION; A RESULT TISSUE DESTRUCTION AND POSSIBLY SCAR FORMATION RATHER THAN THE RESULT OF DIRECT CARCINOGENIC ACTION.

FIRST AID- IF VICTIM IS CONSCIOUS, GIVE HIM LARGE QUANTITIES OF WATER IMMEDIATELY TO DILUTE THE ALKALI. DO NOT INDUCE VOMITING. GET MEDICAL ATTENTION IMMEDIATELY.

REACTIVITY

EACTIVITY:
HE SUBSTANCE IS A STRONG BASE. IT REACTS EXOTHERMICALLY WITH WATER RELEASING CORROSIVE FUMES OF SODIUM HYDROXIDE.

NCOMPATIBILITIES:

ACETALDEHYDE: RESULTS IN VIOLENT POLYMERIZATION OF ACETALDEHYDE.
ACETIC ACID: MIXING IN A CLOSED CONTAINER INCREASES TEMPERATURE AND PRESSURE
ACETIC ANHYDRIDE: MIXING IN A CLOSED CONTAINER INCREASES TEMPERATURE AND PRESSURE.
ACROLEIN: RESULTS IN AN EXTREMELY VIOLENT POLYMERIZATION OF ACROLEIN.
ACRYLONITRILE: VIOLENT POLYMERIZATION.
ALLYL ALCOHOL: AS A BENZENE EXTRACT OF ALLYL BENZENESULFONATE WAS PREPARED FROM ALLYL ALCOHOL AND BENZENE SULFONYL CHLORIDE IN THE PRESENCE OF AQUEOUS SODIUM HYDROXIDE, UNDER VACUM DISTILLATION TWO FRACTIONS CAME OFF, THEN THE TEMPERATURE ROSE TO 135 C, WHEN THE RESIDUE DARKENED AND EXPLODED.
ALLYL CHLORIDE: IN CONTACT WITH DRY CAUSTIC SODA BEADS, HYDROLYSIS MAY TAKE PLACE PRODUCING ALLYL ALCOHOL.
ALUMINUM: VIGOROUS REACTION WITH THE EVOLUTION OF FLAMMABLE HYDROGEN GAS.
CHLORINE TRIFLUORIDE: VIOLENT REACTION.
CHLOROFORM AND METHYL ALCOHOL: EXOTHERMIC REACTION.
CHLOROHYDRIN: MIXING IN A CLOSED CONTAINER CAUSES AN INCREASE IN TEMPERATURE AND PRESSURE.
CHLORONITROTOLUENES: POSSIBLE EXPLOSION.
CHLOROSULFONIC ACID: MIXING IN A CLOSED CONTAINER CAUSES AN INCREASE IN TEMPERATURE AND PRESSURE.
1,2-DICHLOROETHYLENE: MAY FORM SPONTANEOUSLY FLAMMABLE MONOCHLOROACETYLENE.
ETHYLENE CYANOHYDRIN: MIXING IN A CLOSED CONTAINER CAUSES AN INCREASE IN TEMPERATURE AND PRESSURE.
GLYOXAL: MIXING IN A CLOSED CONTAINER INCREASES TEMPERATURE AND PRESSURE.
HALOGENATED HYDROCARBONS: VIOLENT REACTION.
HYDROCHLORIC ACID: MIXING IN A CLOSED CONTAINER CAUSES AN INCREASE IN TEMPERATURE AND PRESSURE.
HYDROFLUORIC ACID: MIXING IN A CLOSED CONTAINER CAUSES AN INCREASE IN TEMPERATURE AND PRESSURE.
HYDROQUINONE: RAPID DECOMPOSITION OF HYDROQUINONE WITH EVOLUTION OF HEAT.
MALEIC ANHYDRIDE: EXPLOSIVE DECOMPOSITION.
METALS: CORRODES METALS, REACTING TO FORM FLAMMABLE HYDROGEN GAS.
NITRIC ACID: MIXING IN A CLOSED CONTAINER INCREASES TEMPERATURE AND PRESSURE
NITROETHANE: FORMS AN EXPLOSIVE SALT.
NITROMETHANE: FORMS AN EXPLOSIVE SALT.
NITROPARAFFINS: THE NITROPARAFFINS, IN THE PRESENCE OF WATER, FORM DRY SALTS WITH ORGANIC BASES. THE DRY SALTS ARE EXPLOSIVE.
NITROPROPANE: FORMS AN EXPLOSIVE SALT.
OLEUM: MIXING IN A CLOSED CONTAINER CAUSES AN INCREASE IN TEMPERATURE AND PRESSURE.
PENTOL (3-METHYL-2-PENTEN-4-YN-1-OL): POSSIBLE EXPLOSION.
PHOSPHORUS: PHOSPHORUS BOILED WITH ALKALINE HYDROXIDES YIELDS MIXED PHOSPHINES WHICH MAY IGNITE SPONTANEOUSLY IN AIR.
PHOSPHORUS PENTOXIDE: EXTREMELY VIOLENT REACTION WHEN INITIATED BY LOCAL HEATING.
B-PROPIOLACTONE: MIXING IN A CLOSED CONTAINER CAUSES AN INCREASE IN TEMPERATURE AND PRESSURE.
SULFURIC ACID: MIXING IN A CLOSED CONTAINER CAUSES AN INCREASE IN TEMPERAURE AND PRESSURE.
TETRACHLOROBENZENE AND METHYL ALCOHOL: POSSIBLE EXPLOSION.
TETRAHYDROFURAN: SERIOUS EXPLOSIONS CAN OCCUR.
TRICHLOROETHYLENE: FORMATION OF EXPLOSIVE MIXTURES OF DICHLOROACETYLENE.
WATER: CAUSTIC SODA BEADS IN CONTACT WITH WATER MAY GENERATE ENOUGH HEAT TO IGNITE ADJACENT COMBUSTIBLES.

DECOMPOSITION:
MAY RELEASE TOXIC FUMES OF SODIUM OXIDE, WHICH CAN REACT WITH WATER OR STEAM TO PRODUCE HEAT AND FLAMMABLE HYDROGEN VAPORS.

POLYMERIZATION:
NOT KNOWN TO OCCUR.

****
CONDITIONS TO AVOID

MAY BURN BUT DOES NOT IGNITE READILY. FLAMMABLE, POISONOUS GASES MAY ACCUMULATE IN TANKS AND HOPPER CARS. MAY IGNITE COMBUSTIBLES (WOOD, PAPER, OIL, ETC.).

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SPILL AND LEAK PROCEDURES

SOIL SPILL:
DIG HOLDING AREA SUCH AS LAGOON, POND OR PIT FOR CONTAINMENT.

USE PROTECTIVE COVER SUCH AS A PLASTIC SHEET TO PREVENT MATERIAL FROM DISSOLVING IN FIRE EXTINGUISHING WATER OR RAIN.

WATER SPILL:
ADD SUITABLE AGENT TO NEUTRALIZE SPILLED MATERIAL TO PH-7.

OCCUPATIONAL SPILL:
DO NOT TOUCH SPILLED MATERIAL. STOP LEAK IF YOU CAN DO IT WITHOUT RISK. FOR SMALL SPILLS, TAKE UP WITH SAND OR OTHER ABSORBENT MATERIAL AND PLACE INTO CONTAINERS FOR LATER DISPOSAL. FOR SMALL DRY SPILLS, WITH CLEAN SHOVEL PLACE MATERIAL INTO CLEAN, DRY CONTAINER AND COVER. MOVE CONTAINERS FROM SPILL AREA. FOR LARGER SPILLS, DIKE FAR AHEAD OF SPILL FOR LATER DISPOSAL. KEEP UNNECESSARY PEOPLE AWAY. ISOLATE HAZARD AREA AND DENY ENTRY.

PROTECTIVE EQUIPMENT

VENTILATION:
PROVIDE LOCAL EXHAUST VENTILATION SYSTEM TO MEET PERMISSIBLE EXPOSURE LIMITS.

RESPIRATOR:
100 MG/M3- HIGH-EFFICIENCY PARTICULATE RESPIRATOR WITH A FULL FACEPIECE.
SUPPLIED-AIR RESPIRATOR WITH A FULL FACEPIECE, HELMET, OR HOOD.
SELF-CONTAINED BREATHING APPARATUS WITH A FULL FACEPIECE.

200 MG/M3- POWERED AIR-PURIFYING RESPIRATOR WITH A HIGH-EFFICIENCY PARTICULATE FILTER AND A FULL FACEPIECE.
TYPE C SUPPLIED-AIR RESPIRATOR WITH A FULL FACEPIECE OPERATED IN PRESSURE-DEMAND OR OTHER POSITIVE PRESSURE MODE OR WITH A FULL FACEPIECE, HELMET, OR HOOD OPERATED IN CONTINUOUS-FLOW MODE.

ESCAPE- DUST MASK, EXCEPT SINGLE-USE AND QUARTER-MASK RESPIRATORS.
SELF-CONTAINED BREATHING APPARATUS.

FIREFIGHTING- SELF-CONTAINED BREATHING APPARATUS WITH A FULL FACEPIECE OPERATED IN PRESSURE-DEMAND OR OTHER POSITIVE PRESSURE MODE.

CLOTHING:
EMPLOYEE MUST WEAR APPROPRIATE PROTECTIVE CLOTHING AND EQUIPMENT TO PREVENT ANY POSSIBILITY OF SKIN CONTACT WITH THIS SUBSTANCE.

GLOVES:
EMPLOYEE MUST WEAR APPROPRIATE PROTECTIVE GLOVES TO PREVENT CONTACT WITH THIS SUBSTANCE.

EYE PROTECTION:
EMPLOYEE MUST WEAR SPLASH-PROOF OR DUST-RESISTANT SAFETY GOGGLES AND A FACESHIELD TO PREVENT CONTACT WITH THIS SUBSTANCE.

WHERE THERE IS ANY POSSIBILITY THAT AN EMPLOYEE'S EYES MAY BE EXPOSED TO THIS SUBSTANCE, THE EMPLOYER SHALL PROVIDE AN EYE-WASH FOUNTAIN WITHIN THE IMMEDIATE WORK AREA FOR EMERGENCY USE.

AUTHORIZED - ALLIED FISHER SCIENTIFIC
CREATION DATE: 01/21/85 REVISION DATE: 05/01/85

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SODIUM PHOSPHATE, MONOBASIC *
SODIUM PHOSPHATE, MONOBASIC
SODIUM PHOSPHATE, MONOBASIC

MATERIAL SAFETY DATA SHEET

ISHER SCIENTIFIC *
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SUBSTANCE IDENTIFICATION

CAS-NUMBER 7558-80-7

UBSTANCE: **SODIUM PHOSPHATE, MONOBASIC**

RADE NAMES/SYNONYMS:
MONOSODIUM PHOSPHATE, SODIUM DIHYDROGEN PHOSPHATE,
MONOSODIUM DIHYDROGEN PHOSPHATE, SODIUM ACID PHOSPHATE, SODIUM BIPHOSPHATE,
ACID SODIUM PHOSPHATE, MONOSODIUM ORTHOPHOSPHATE, MSP,
PHOSPHORIC ACID, MONOSODIUM SALT, DIHYDROGEN SODIUM PHOSPHATE,
MONOBASIC SODIUM PHOSPHATE, MONOSODIUM HYDROGEN PHOSPHATE,
SODIUM DIPHOSPHATE ANHYDROUS, SODIUM DIHYDROGEN, MONOPHOSPHATE,
SODIUM DIHYDROGEN ORTHOPHOSPHATE, SODIUM PHOSPHATE (NA(H2PO4)),
SODIUM PRIMARY PHOSPHATE, NAH2PO4, S-369, S-381, S-468, ACC15190

HEMICAL FAMILY:
NORGANIC SALT

OLECULAR FORMULA: NA-H2-P-O4

OLECULAR WEIGHT: 119.98

ERCLA RATINGS (SCALE 0-3): HEALTH=3 FIRE=1 REACTIVITY=0 PERSISTENCE=0
PA RATINGS (SCALE 0-4): HEALTH=3 FIRE=1 REACTIVITY=0

COMPONENTS AND CONTAMINANTS

OMPONENT: SODIUM PHOSPHATE, MONOBASIC PERCENT: 100

THER CONTAMINANTS: NONE

XPOSURE LIMITS:
NO OCCUPATIONAL EXPOSURE LIMITS ESTABLISHED BY OSHA, ACGIH, OR NIOSH.

PHYSICAL DATA

ESCRIPTION: ODORLESS, DELIQUESCENT CRYSTALS OR POWDER

OILING POINT: 399 F (204 C) MELTING POINT: 212 F (100 C)

PECIFIC GRAVITY: 2.040 VAPOR PRESSURE: NEGLIGIBLE PH: 4.5 @ 0.1 M

OLUBILITY IN WATER: 59.9 % @ 0 C

OLVENT SOLUBILITY: VERY SLIGHTLY SOLUBLE IN ETHER, CHLOROFORM, TOLUENE, NSOLUBLE IN ALCOHOL.

FIRE AND EXPLOSION DATA

RE AND EXPLOSION HAZARD:
IGHT FIRE HAZARD WHEN EXPOSED TO HEAT OR FLAME.

REFIGHTING MEDIA:
Y CHEMICAL, CARBON DIOXIDE, HALON, WATER SPRAY OR STANDARD FOAM
987 EMERGENCY RESPONSE GUIDEBOOK, DOT P 5800.4).

R LARGER FIRES, USE WATER SPRAY, FOG OR STANDARD FOAM
987 EMERGENCY RESPONSE GUIDEBOOK, DOT P 5800.4).

REFIGHTING:
VE CONTAINER FROM FIRE AREA IF POSSIBLE. DO NOT SCATTER SPILLED MATERIAL
TH HIGH PRESSURE WATER STREAMS. DIKE FIRE CONTROL WATER FOR LATER DISPOSAL
987 EMERGENCY RESPONSE GUIDEBOOK, DOT P 5800.4, GUIDE PAGE 31).

E AGENTS SUITABLE FOR TYPE OF SURROUNDING FIRE. AVOID BREATHING HAZARDOUS

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VAPORS. KEEP UPWIND.

TOXICITY

SODIUM PHOSPHATE, MONOBASIC:
IRRITATION DATA: 50 MG EYE-HUMAN MILD; 150 MG EYE-RABBIT MILD.
TOXICITY DATA: 8290 MG/KG ORAL-RAT LD50; 250 MG/KG INTRAMUSCULAR-RAT LD50.
CARCINOGEN STATUS: NONE.
ACUTE TOXICITY LEVEL: SLIGHTLY TOXIC BY INGESTION.
TARGET EFFECTS: POISONING MAY AFFECT THE CALCIUM METABOLISM.

HEALTH EFFECTS AND FIRST AID:

INHALATION:
SODIUM PHOSPHATE, MONOBASIC:
ACUTE EXPOSURE- INHALATION OF DUST MAY CAUSE IRRITATION.
CHRONIC EXPOSURE- NO DATA AVAILABLE.

FIRST AID- REMOVE FROM EXPOSURE AREA TO FRESH AIR IMMEDIATELY. IF BREATHING HAS STOPPED, PERFORM ARTIFICIAL RESPIRATION. KEEP PERSON WARM AND AT REST. TREAT SYMPTOMATICALLY AND SUPPORTIVELY. GET MEDICAL ATTENTION IMMEDIATELY.

SKIN CONTACT:
SODIUM PHOSPHATE, MONOBASIC:
ACUTE EXPOSURE- MAY CAUSE IRRITATION.
CHRONIC EXPOSURE- REPEATED AND PROLONGED CONTACT MAY CAUSE DERMATITIS.

FIRST AID- REMOVE CONTAMINATED CLOTHING AND SHOES IMMEDIATELY. WASH AFFECTED AREA WITH SOAP OR MILD DETERGENT AND LARGE AMOUNTS OF WATER UNTIL NO EVIDENCE OF CHEMICAL REMAINS (APPROXIMATELY 15-20 MINUTES). GET MEDICAL ATTENTION IMMEDIATELY.

EYE CONTACT:
SODIUM PHOSPHATE, MONOBASIC:
ACUTE EXPOSURE- MAY CAUSE TRANSIENT IRRITATION. TESTED ON RABBIT EYES BY CONTINUOUS EXPOSURE FOR THREE HOURS AT 0.1 M SOLUTION AT PH 7.0 TO 7.5 MADE UP TO 0.46 OSMOLAR WITH SODIUM CHLORIDE OR SUCROSE, CAUSED NO DISTURBANCE OF THE CORNEA.
CHRONIC EXPOSURE- NO DATA AVAILABLE.

FIRST AID- WASH EYES IMMEDIATELY WITH LARGE AMOUNTS OF WATER OR NORMAL SALINE, OCCASIONALLY LIFTING UPPER AND LOWER LIDS, UNTIL NO EVIDENCE OF CHEMICAL REMAINS (APPROXIMATELY 15-20 MINUTES). GET MEDICAL ATTENTION IMMEDIATELY.

INGESTION:
SODIUM PHOSPHATE, MONOBASIC:
ACUTE EXPOSURE- INGESTION MAY RESULT IN ABDOMINAL PAIN, NAUSEA, VOMITING, DIARRHEA, CRAMPS, PAIN AND BURNING IN THE MOUTH. DOSES OF 250 GM/KG GIVEN ORALLY TO GUINEA PIGS, RATS AND RABBITS PRODUCED DIARRHEA. GENERALLY, PHOSPHATES ARE SLOWLY AND INCOMPLETELY ABSORBED, THEREFORE SYSTEMIC REACTIONS ARE UNLIKELY WHEN THESE SALTS ARE GIVEN ORALLY. SODIUM PHOSPHATES ARE CAPABLE OF SERIOUSLY REDUCING THE IONIC SERUM CALCIUM.
CHRONIC EXPOSURE- SODIUM PHOSPHATE, MONOBASIC IS USED AS A FOOD ADDITIVE. NO ADVERSE EFFECTS HAVE BEEN REPORTED.

FIRST AID- TREAT SYMPTOMATICALLY AND SUPPORTIVELY. GET MEDICAL ATTENTION IMMEDIATELY. IF VOMITING OCCURS, KEEP HEAD LOWER THAN HIPS TO PREVENT ASPIRATION.

ANTIDOTE:
THE FOLLOWING ANTIDOTE HAS BEEN RECOMMENDED. HOWEVER, THE DECISION AS TO WHETHER THE SEVERITY OF POISONING REQUIRES ADMINISTRATION OF ANY ANTIDOTE AND ACTUAL DOSE REQUIRED SHOULD BE MADE BY QUALIFIED MEDICAL PERSONNEL.

PHOSPHATES:
FOR HYPOCALCEMIA, AFTER PHOSPHATE INGESTION, GIVE CALCIUM GLUCONATE, 5 ML OF 10% SOLUTION SLOWLY INTRAVENOUSLY, TO RESTORE IONIC CALCIUM TO NORMAL LEVEL (DREISBACH, HANDBOOK OF POISONING, 12TH ED.). ANTIDOTE SHOULD BE ADMINISTERED BY QUALIFIED MEDICAL PERSONNEL.

REACTIVITY

REACTIVITY:
STABLE UNDER NORMAL TEMPERATURES AND PRESSURES.

INCOMPATIBILITIES:
SODIUM PHOSPHATE, MONOBASIC:
BRASS: MAY BE CORROSIVE IN THE PRESENCE OF MOISTURE.
METALS: SOLUTIONS MAY BE CORROSIVE.
STEEL: MAY BE CORROSIVE IN THE PRESENCE OF MOISTURE.

DECOMPOSITION:
THERMAL DECOMPOSITION PRODUCTS MAY INCLUDE TOXIC AND HAZARDOUS OXIDES OF PHOSPHORUS AND SODIUM.

OLYMERIZATION:

U.S. (O.S.) U.S.

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IZARDOUS POLYMERIZATION HAS NOT BEEN REPORTED TO OCCUR UNDER NORMAL
EMPERATURES AND PRESSURES.

STORAGE AND DISPOSAL

SERVE ALL FEDERAL, STATE AND LOCAL REGULATIONS WHEN STORING OR DISPOSING
THIS SUBSTANCE. FOR ASSISTANCE, CONTACT THE DISTRICT DIRECTOR OF THE
VIRONMENTAL PROTECTION AGENCY.

CONDITIONS TO AVOID

Y BURN BUT DOES NOT IGNITE READILY. AVOID CONTACT WITH STRONG OXIDIZERS,
CESSIVE HEAT, SPARKS, OR OPEN FLAME.

SPILL AND LEAK PROCEDURES

CUPATIONAL SPILL:
OP LEAK IF YOU CAN DO IT WITHOUT RISK. FOR SMALL SPILLS, TAKE UP WITH SAND
OTHER ABSORBENT MATERIAL AND PLACE INTO CLEAN, DRY CONTAINERS FOR LATER
SPOSAL. KEEP UNNECESSARY PEOPLE AWAY. ISOLATE HAZARD AREA AND DENY ENTRY.

PROTECTIVE EQUIPMENT

NTILATION:
OVIDE LOCAL EXHAUST OR PROCESS ENCLOSURE VENTILATION SYSTEM.

SPIRATOR:
E FOLLOWING RESPIRATORS ARE RECOMMENDED BASED ON INFORMATION FOUND IN THE
PHYSICAL DATA, TOXICITY AND HEALTH EFFECTS SECTIONS. THEY ARE RANKED IN
ORDER FROM MINIMUM TO MAXIMUM RESPIRATORY PROTECTION.
E SPECIFIC RESPIRATOR SELECTED MUST BE BASED ON CONTAMINATION LEVELS FOUND
IN THE WORK PLACE, MUST NOT EXCEED THE WORKING LIMITS OF THE RESPIRATOR AND
BE JOINTLY APPROVED BY THE NATIONAL INSTITUTE FOR OCCUPATIONAL SAFETY AND
HEALTH AND THE MINE SAFETY AND HEALTH ADMINISTRATION (NIOSH-MSHA).

DUST AND MIST RESPIRATOR WITH A FULL FACEPIECE.

AIR-PURIFYING FULL FACEPIECE RESPIRATOR WITH A HIGH-EFFICIENCY PARTICULATE FILTER.

POWERED AIR-PURIFYING RESPIRATOR WITH A TIGHT-FITTING FACEPIECE AND HIGH-EFFICIENCY PARTICULATE FILTER.

TYPE 'C' SUPPLIED-AIR RESPIRATOR WITH A FULL FACEPIECE OPERATED IN PRESSURE-DEMAND OR OTHER POSITIVE PRESSURE MODE OR WITH A FULL FACEPIECE, HELMET OR HOOD OPERATED IN CONTINUOUS-FLOW MODE.

SELF-CONTAINED BREATHING APPARATUS WITH A FULL FACEPIECE OPERATED IN PRESSURE-DEMAND OR OTHER POSITIVE PRESSURE MODE.

R FIREFIGHTING AND OTHER IMMEDIATELY DANGEROUS TO LIFE OR HEALTH CONDITIONS:

SELF-CONTAINED BREATHING APPARATUS WITH FULL FACEPIECE OPERATED IN PRESSURE DEMAND OR OTHER POSITIVE PRESSURE MODE.

SUPPLIED-AIR RESPIRATOR WITH FULL FACEPIECE AND OPERATED IN PRESSURE-DEMAND OR OTHER POSITIVE PRESSURE MODE IN COMBINATION WITH AN AUXILIARY SELF-CONTAINED BREATHING APPARATUS OPERATED IN PRESSURE-DEMAND OR OTHER POSITIVE PRESSURE MODE.

OTHING:
PLOYEE MUST WEAR APPROPRIATE PROTECTIVE (IMPERVIOUS) CLOTHING AND EQUIPMENT
PREVENT REPEATED OR PROLONGED SKIN CONTACT WITH THIS SUBSTANCE.

OVES:
PLOYEE MUST WEAR APPROPRIATE PROTECTIVE GLOVES TO PREVENT CONTACT WITH THIS
BSTANCE.

E PROTECTION:
PLOYEE MUST WEAR SPLASH-PROOF OR DUST-RESISTANT SAFETY GOGGLES TO PREVENT
E CONTACT WITH THIS SUBSTANCE.

RGENCY EYE WASH: WHERE THERE IS ANY POSSIBILITY THAT AN EMPLOYEE'S EYES MAY
EXPOSED TO THIS SUBSTANCE, THE EMPLOYER SHOULD PROVIDE AN EYE WASH
INTAIN WITHIN THE IMMEDIATE WORK AREA FOR EMERGENCY USE.

AUTHORIZED - FISHER SCIENTIFIC, INC.
CREATION DATE: 11/20/84 REVISION DATE: 10/13/89

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SULFURIC ACID
SULFURIC ACID
SULFURIC ACID

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SUBSTANCE IDENTIFICATION

SUBSTANCE: **SULFURIC ACID** CAS-NUMBER 7664-93-9

TRADE NAMES/SYNONYMS: OIL OF VITRIOL; BOV; DIPPING ACID; VITRIOL BROWN OIL; HYDROGEN SULFATE; NORDHAUSEN ACID; A-300; A-300C; A-300-SI; A-300S; A-298; SO-A-172; SO-A-174

CHEMICAL FAMILY:
INORGANIC ACID

MOLECULAR FORMULA: H2-S-04 MOL WT: 98.07

CERCLA RATINGS (SCALE 0-3): HEALTH=3 FIRE=0 REACTIVITY=2 PERSISTENCE=0

COMPONENTS AND CONTAMINANTS

PERCENT: 98 COMPONENT: SULFURIC ACID

PERCENT: 2 COMPONENT: WATER

OTHER CONTAMINANTS: NONE.

EXPOSURE LIMITS:
1 MG/M3 OSHA TWA; 1 MG/M3 ACGIH TWA;
1 MG/M3 NIOSH RECOMMENDED TWA

PHYSICAL DATA

DESCRIPTION: COLORLESS TO DARK BROWN OILY LIQUID

BOILING POINT: 536 F (280 C) MELTING POINT: 37 F (3 C)

SPECIFIC GRAVITY: 1.8 VAPOR PRESSURE: 0.001 @ 20 C

SOLUBILITY IN WATER: SOLUBLE SOLVENT SOLUBILITY: DECOMPOSES IN ALCOHOL

ODOR THRESHOLD: 1 MG/M3 VAPOR DENSITY: 3.4

FIRE AND EXPLOSION DATA

FIRE AND EXPLOSION HAZARD:
NEGLIGIBLE FIRE AND EXPLOSION HAZARD WHEN EXPOSED TO HEAT OR FLAME.

FLASH POINT: NON-FLAMMABLE

FIREFIGHTING MEDIA:
DRY CHEMICAL OR CARBON DIOXIDE
(1984 EMERGENCY RESPONSE GUIDEBOOK, DOT P 5800.3).

FOR LARGER FIRES, FLOOD AREA WITH WATER FROM A DISTANCE
(1984 EMERGENCY RESPONSE GUIDEBOOK, DOT P 5800.3).

FIREFIGHTING:
MOVE CONTAINERS FROM FIRE AREA IF POSSIBLE. COOL CONTAINERS EXPOSED TO FLAMES WITH WATER FROM SIDE UNTIL WELL AFTER FIRE IS OUT (1984 EMERGENCY RESPONSE GUIDEBOOK, DOT P 5800.3).

EXTINGUISH USING AGENTS INDICATED; DO NOT USE WATER DIRECTLY ON MATERIAL. IF LARGE AMOUNTS OF COMBUSTIBLE MATERIALS ARE INVOLVED, USE WATER SPRAY OR FOG IN FLOODING AMOUNTS. USE WATER SPRAY TO ABSORB CORROSIVE VAPORS. COOL CONTAINERS WITH FLOODING AMOUNTS OF WATER FROM AS FAR A DISTANCE AS POSSIBLE. AVOID BREATHING CORROSIVE VAPORS; KEEP UPWIND (BUREAU OF EXPLOSIVES, EMERGENCY HANDLING OF HAZARDOUS MATERIALS IN SURFACE TRANSPORTATION, 1981).

TOXICITY

135 MG/KG UNKNOWN-MAN LDLO; 2140 MG/KG ORAL-RAT LD50; 18 MG/M3/8 HOURS INHALATION-GUINEA PIG LC50; CARCINOGEN STATUS: NONE.
SULFURIC ACID IS A SEVERE EYE, PULMONARY, AND SKIN IRRITANT.

HEALTH EFFECTS AND FIRST AID

INHALATION:
CORROSIVE/TOXIC. 80 MG/M3 IS IMMEDIATELY DANGEROUS TO LIFE AND HEALTH.
ACUTE EXPOSURE- EXPOSURE TO CONCENTRATIONS CONTAINING 5 MG/M3 MAY CAUSE NOSE AND THROAT IRRITATION, HEADACHE, COUGH, AN INCREASE IN RESPIRATORY RATE OR IMPAIRMENT OF VENTILATORY CAPACITY. DELAYED SYMPTOMS MAY INCLUDE INCLUDE PULMONARY EDEMA, TIGHTNESS IN THE CHEST, CYANOSIS, HYPOTENSION, BRONCHITIS, OR EMPHYSEMA.

CHRONIC EXPOSURE- REPEATED EXPOSURE TO THE MIST CAUSES CHRONIC TRACHEO-BRONCHITIS, EROSION AND DISCOLORATION OF THE TEETH, BRONCHIAL PNEUMONIA, OR GASTROINTESTINAL DISTURBANCES.

SKIN CONTACT:
CORROSIVE.
ACUTE EXPOSURE- CONTACT MAY CAUSE SEVERE IRRITATION AND PAIN, BURNS, AND VESICULATION.

CHRONIC EXPOSURE- REPEATED OR PROLONGED EXPOSURE TO THE LIQUID OR MIST MAY CAUSE IRRITATION AND DERMATITIS.

FIRST AID- REMOVE CONTAMINATED CLOTHING AND SHOES IMMEDIATELY. WASH AFFECTED AREA WITH SOAP OR MILD DETERGENT AND LARGE AMOUNTS OF WATER UNTIL NO EVIDENCE OF CHEMICAL REMAINS, (APPROXIMATELY 15-20 MINUTES). IN CASE OF CHEMICAL BURNS, COVER THE AREAS WITH STERILE, DRY DRESSING. BANDAGE SECURELY, BUT NOT TOO TIGHTLY. GET MEDICAL ATTENTION.

EYE CONTACT:
CORROSIVE.
ACUTE EXPOSURE- DIRECT CONTACT WITH THE CONCENTRATED ACID SOLUTION MAY CAUSE SEVERE DAMAGE, OFTEN LEADING TO BLINDNESS. DILUTE SOLUTIONS PRODUCE MORE TRANSIENT EFFECTS FROM WHICH RECOVERY MAY BE COMPLETE. EXPOSURE TO THE MIST CAUSES EYE IRRITATION AND LACRIMATION.

CHRONIC EXPOSURE- REPEATED OR PROLONGED EXPOSURE MAY CAUSE CONJUNCTIVITIS, AND LACRIMATION.

FIRST AID- WASH EYES IMMEDIATELY WITH LARGE AMOUNTS OF WATER, OCCASIONALLY LIFTING THE UPPER AND LOWER LIDS, UNTIL NO EVIDENCE OF CHEMICAL REMAINS (APPROXIMATELY 15-20 MINUTES). IN CASE OF BURNS, APPLY STERILE BANDAGES LOOSELY WITHOUT MEDICATION. GET MEDICAL ATTENTION.

INGESTION:
CORROSIVE.
ACUTE EXPOSURE- SEVERE BURNING PAIN IN THE MOUTH, THROAT, AND ABDOMEN FOLLOWED BY VOMITING AND DIARRHEA OF DARK, PRECIPITAED BLOOD. ASPHYXIA MAY OCCUR FROM SWELLING OF THE THROAT. PERFORATION OF THE ESOPHAGUS AND STOMACH MAY OCCUR.

FIRST AID- IF VICTIM IS CONSCIOUS, GIVE LARGE QUANTITIES OF WATER IMMEDIATELY TO DILUTE THE ACID. DO NOT INDUCE VOMITING. GET MEDICAL ATTENTION IMMEDIATELY.

REACTIVITY

REACTIVITY:
VIOLENT EXOTHERMIC REACTION WITH WATER AND ORGANIC MATERIALS. MAY IGNITE FINELY DIVIDED COMBUSTIBLE MATERIALS ON CONTACT.

INCOMPATIBILITIES:
ACETIC ANHYDRIDE: MIXING IN A CLOSED CONTAINER CAUSED AN INCREASE IN TEMPERATURE AND PRESSURE.
ACETONE CYANHYDRIN: POSSIBLE EXPLOSION.
ACETONE AND NITRIC ACID: ACETONE WILL DECOMPOSE VIOLENTLY WHEN BROUGHT IN CONTACT WITH MIXED SULFURIC-NITRIC ACIDS.
ACETONE AND POTASSIUM DICHROMATE: IGNITION.
ACETONITRILE: MIXING IN A CLOSED CONTAINER CAUSED AN INCREASE IN TEMPERATURE AND PRESSURE.
ACROLEIN: MIXING IN A CLOSED CONTAINER CAUSED AN INCREASE IN TEMPERATURE AND PRESSURE.
ACRYLONITRILE: VIGOROUS EXOTHERMIC REACTION.
ALCOHOLS AND HYDROGEN PEROXIDE: POSSIBLE EXPLOSION.
ALLYL ALCOHOL: MIXING IN A CLOSED CONTAINER CAUSED AN INCREASE IN TEMPERATURE AND PRESSURE.

ALLYL CHLORIDE: ALLYL CHLORIDE MAY VIOLENTLY POLYMERIZE.
2-AMINOETHANOL: MIXING IN A CLOSED CONTAINER CAUSED AN INCREASE IN TEMPERATURE AND PRESSURE.
AMMONIUM HYDROXIDE: MIXING IN A CLOSED CONTAINER CAUSED AN INCREASE IN TEMPERATURE AND PRESSURE.
AMMONIUM TRIPERCHROMATE: MIXING IN A CLOSED CONTAINER CAUSED AN INCREASE IN TEMPERATURE AND PRESSURE.
ANILINE: MIXING IN A CLOSED CONTAINER CAUSED AN INCREASE IN TEMPERATURE AND PRESSURE.
BROMATES AND METALS: POSSIBLE IGNITION AND FIRE.
BROMINE PENTAFLUORIDE: VIOLENT REACTION.
N-BUTYRALDEHYDE: MIXING IN A CLOSED CONTAINER CAUSED AN INCREASE IN TEMPERATURE AND PRESSURE.
CARBIDES: CONCENTRATED SULFURIC ACID IS EXTREMELY HAZARDOUS IN CONTACT WITH CARBIDES.
CESIUM ACETYLENE CARBIDE: IGNITION.
CHLORATES: ALL CHLORATES, WHEN BROUGHT IN CONTACT WITH SULFURIC ACID MAY GIVE OFF EXPLOSIVE CHLORINE DIOXIDE GAS. A VIOLENT EXPLOSION IS USUAL.
CHLORATES AND METALS: IGNITION LIKELY.
CHLORINE TRIFLUORIDE: VIOLENT EXPLOSION.
CHLOROSULFONIC ACID: MIXING IN A CLOSED CONTAINER CAUSED AN INCREASE IN TEMPERATURE AND PRESSURE.
CUPROUS NITRIDE: VIOLENT REACTION.
DIISOBUTYLENE: MIXING IN A CLOSED CONTAINER CAUSED AN INCREASE IN TEMPERATURE AND PRESSURE.
DIMETHYLBENZYLCARBINOL AND HYDROGEN PEROXIDE: EXPLOSION.
EPICHLOROHYDRIN: MIXING IN A CLOSED CONTAINER CAUSED AN INCREASE IN TEMPERATURE AND PRESSURE.
ETHANOL AND HYDROGEN PEROXIDE: POSSIBLE EXPLOSION.
ETHYLENE CYANOHYDRIN: VIOLENT REACTION.
ETHYLENE DIAMINE: MIXING IN A CLOSED CONTAINER CAUSED AN INCREASE IN TEMPERATURE AND PRESSURE.
ETHYLENE GLYCOL: MIXING IN A CLOSED CONTAINER CAUSED AN INCREASE IN TEMPERATURE AND PRESSURE.
ETHYLENIMINE: MIXING IN A CLOSED CONTAINER CAUSED AN INCREASE IN TEMPERATURE AND PRESSURE.
FULMINATES: SULFURIC ACID IS EXTREMELY HAZARDOUS IN CONTACT WITH FULMINATES.
HYDROCHLORIC ACID: MIXING IN A CLOSED CONTAINER CAUSED AN INCREASE IN TEMPERATURE AND PRESSURE.
HYDROFLUORIC ACID: MIXING IN A CLOSED CONTAINER CAUSED AN INCREASE IN TEMPERATURE AND PRESSURE.
IODINE HEPTAFLUORIDE: THE ACID BECOMES EFFERVESCENT.
INDANE AND NITRIC ACID: POSSIBLE EXPLOSION.
IRON: POSSIBLE EXPLOSION DUE TO HYDROGEN GAS FROM THE ACID-METAL REACTION.
ISOPRENE: MIXING IN A CLOSED CONTAINER CAUSED AN INCREASE IN TEMP. & PRESSURE.
LITHIUM SILICIDE: INCANDESCENT REACTION.
MERCURIC NITRIDE: EXPLOSION.
MESITYL OXIDE: MIXING IN A CLOSED CONTAINER CAUSED AN INCREASE IN TEMPERATURE AND PRESSURE.
METALS (POWDERED): CONTACT WITH SULFURIC ACID IS EXTREMELY HAZARDOUS.
NITRIC ACID AND GLYCERIDES: EXPLOSION.
P-NITROTOLUENE: EXPLOSION.
PENTASILVER TRIHYDROXYDIAMINOPHOSPHATE: EXPLOSION.
PERCHLORATES: POSSIBLE EXPLOSION.
PERCHLORIC ACID: FORMATION OF DANGEROUS ANHYDROUS PERCHLORIC ACID.
PERMANGANATES AND BENZENE: POSSIBLE EXPLOSION.
1-PHENYL-2-METHYL-PROPYL ALCOHOL AND HYDROGEN PEROXIDE: POSSIBLE EXPLOSION.
PHOSPHORUS: YELLOW PHOSPHORUS IGNITES WHEN PLACED IN BOILING CONCENTRATED

SULFURIC ACID.
PHOSPHORUS ISOCYANATE: VIOLENT REACTION.
PICRATES: CONTACT WITH CONCENTRATED SULFURIC ACID IS EXTREMELY HAZARDOUS.
POTASSIUM TERT-BUTOXIDE: IGNITION.
POTASSIUM CHLORATE: POSSIBLE FIRE AND EXPLOSION.
POTASSIUM PERMANGANATE: POSSIBLE EXPLOSION IN THE PRESENCE OF MOISTURE.
POTASSIUM PERMANGANATE AND POTASSIUM CHLORIDE: VIOLENT EXPLOSION.
BETA-PROPIOLACTONE: MIXTURES IN CLOSED CONTAINERS CAUSED AN INCREASE IN TEMPERATURE AND PRESSURE.
PROPYLENE OXIDE: MIXING IN A CLOSED CONTAINER CAUSED AN INCREASE IN TEMPERATURE AND PRESSURE.
PYRIDINE: MIXING IN A CLOSED CONTAINER CAUSED AN INCREASE IN TEMPERATURE AND PRESSURE.
RUBIDIUM ACETYLENE CARBIDE: BURNS WITH SULFURIC ACID.
SILVER PERMANGANATE: EXPLOSION.
SODIUM: REACTS WITH EXPLOSIVE VIOLENCE.
SODIUM CARBONATE: VIOLENT REACTION.
SODIUM CHLORATE: POSSIBLE FIRE OR EXPLOSION.
SODIUM HYDROXIDE: MIXING IN A CLOSED CONTAINER CAUSED AN INCREASE IN TEMPERATURE AND PRESSURE.
STEEL: POSSIBLE EXPLOSION DUE TO HYDROGEN GAS FROM THE ACID-METAL REACTION.
STYRENE MONOMER: MIXING IN A CLOSED CONTAINER CAUSED AN INCREASE IN TEMPERATURE AND PRESSURE.
TOLUENE AND NITRIC ACID: VIOLENT REACTION.
VINYL ACETATE: MIXING IN A CLOSED CONTAINER CAUSED AN INCREASE IN TEMPERATURE AND PRESSURE.
ZINC CHLORATE: LIKELY TO CAUSE FIRES AND EXPLOSIONS.

DECOMPOSITION:
THERMAL DECOMPOSITION PRODUCTS INCLUDE HIGHLY TOXIC FUMES OF SULFUR OXIDES.

POLYMERIZATION:
NOT KNOWN TO OCCUR.

****
CONDITIONS TO AVOID

MAY IGNITE OTHER COMBUSTIBLE MATERIALS (WOOD, PAPER, OIL, ETC.). VIOLENT REACTION WITH WATER. FLAMMABLE, POISONOUS GASES MAY ACCUMULATE IN CONFINED SPACES. RUNOFF TO SEWER MAY CREATE FIRE OR EXPLOSION HAZARD.

****
SPILL AND LEAK PROCEDURES

SOIL SPILL:
DIG HOLDING AREA SUCH AS LAGOON, POND OR PIT FOR CONTAINMENT.

DIKE FLOW OF SPILLED MATERIAL USING SOIL OR SANDBAGS OR FOAMED BARRIERS SUCH AS POLYURETHANE OR CONCRETE.

USE CEMENT POWDER OR FLY ASH TO ABSORB LIQUID MASS.

NEUTRALIZE SPILL WITH SLAKED LIME, SODIUM BICARBONATE OR CRUSHED LIMESTONE.

AIR SPILL:
KNOCK DOWN VAPORS WITH WATER SPRAY. KEEP UPWIND.

WATER SPILL:
NEUTRALIZE WITH AGRICULTURAL LIME, SLAKED LIME, CRUSHED LIMESTONE, OR SODIUM BICARBONATE.

ADD SUITABLE AGENT TO NEUTRALIZE SPILLED MATERIAL TO PH-7.

OCCUPATIONAL SPILL:
KEEP COMBUSTIBLES (WOOD, PAPER, OIL, ETC.) AWAY FROM SPILLED MATERIAL. DO NOT TOUCH SPILLED MATERIAL. DO NOT GET WATER INSIDE CONTAINER. STOP LEAK IF YOU CAN DO IT WITHOUT RISK. USE WATER SPRAY TO REDUCE VAPORS. DO NOT PUT WATER ON LEAK OR SPILL AREA. CLEAN UP ONLY UNDER THE SUPERVISION OF AN EXPERT. DIKE SPILL FOR LATER DISPOSAL. DO NOT APPLY WATER UNLESS DIRECTED TO DO SO. KEEP UNNECESSARY PEOPLE AWAY. ISOLATE HAZARD AREA AND DENY ENTRY. VENTILATE CLOSED SPACES BEFORE ENTERING.

PROTECTIVE EQUIPMENT

VENTILATION:
PROVIDE LOCAL EXHAUST VENTILATION SYSTEM TO MEET PERMISSIBLE EXPOSURE LIMITS.

RESPIRATOR:

50 MG/M3- GAS MASK WITH A CHIN-STYLE, FRONT, OR BACK-MOUNTED ACID GAS CANISTER AND A HIGH-EFFICIENCY PARTICULATE FILTER.
HIGH-EFFICIENCY PARTICULATE RESPIRATOR WITH A FULL FACEPIECE.
SUPPLIED-AIR RESPIRATOR WITH A FULL FACEPIECE, HELMET, OR HOOD.
SELF-CONTAINED BREATHING APPARATUS WITH A FULL FACEPIECE.

100 MG/M3- TYPE C SUPPLIED-AIR RESPIRATOR WITH A FULL FACEPIECE OPERATED IN PRESSURE-DEMAND OR OTHER POSITIVE PRESSURE MODE OR WITH A FULL FACEPIECE, HELMET, OR HOOD OPERATED IN CONTINUOUS-FLOW MODE.

ESCAPE- GAS MASK WITH A CHIN-STYLE, FRONT, OR BACK-MOUNTED ACID GAS CANISTER AND A HIGH-EFFICIENCY PARTICULATE FILTER.
SELF-CONTAINED BREATHING APPARATUS.

FIREFIGHTING- SELF-CONTAINED BREATHING APPARATUS WITH A FULL FACEPIECE OPERATED IN PRESSURE-DEMAND OR OTHER POSITIVE PRESSURE MODE.

CLOTHING:
WEAR APPROPRIATE PROTECTIVE CLOTHING TO AVOID ANY POSSIBILITY OF SKIN CONTACT WITH LIQUIDS CONTAINING MORE THAN 1% SULFURIC ACID. AVOID REPEATED OR PROLONGED SKIN CONTACT WITH LIQUIDS CONTAINING 1% OR LESS SULFURIC ACID.

GLOVES:
EMPLOYEE MUST WEAR APPROPRIATE PROTECTIVE GLOVES TO PREVENT CONTACT WITH THIS SUBSTANCE.

EYE PROTECTION:
EMPLOYEE MUST WEAR SPLASH-PROOF OR DUST-RESISTANT SAFETY GOGGLES AND A FACESHIELD TO PREVENT CONTACT WITH THIS SUBSTANCE.

WHERE THERE IS ANY POSSIBILITY THAT AN EMPLOYEE'S EYES MAY BE EXPOSED TO THIS SUBSTANCE, THE EMPLOYER SHALL PROVIDE AN EYE-WASH FOUNTAIN WITHIN THE IMMEDIATE WORK AREA FOR EMERGENCY USE.

-ADDITIONAL INFORMATION-

THE INFORMATION BELOW IS BELIEVED TO BE ACCURATE AND REPRESENTS THE BEST INFORMATION CURRENTLY AVAILABLE TO US. HOWEVER, WE MAKE NO WARRANTY OF MERCHANTABILITY OR ANY OTHER WARRANTY, EXPRESS OR IMPLIED, WITH RESPECT TO SUCH INFORMATION, AND WE ASSUME NO LIABILITY RESULTING FROM ITS USE. USERS SHOULD MAKE THEIR OWN INVESTIGATIONS TO DETERMINE THE SUITABILITY OF THE INFORMATION FOR THEIR PARTICULAR PURPOSES.

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APPENDIX H

MSDS's for CHEMICALS USED IN THE VTF

CHEMICALS USED IN THE VTF

Common Name	Description
Boric Acid	
Calcium carbonate	Limestone
Calcium sulfate	Gypsum
Chromium oxide	Present in furnace lining brick
Cupric oxide	
Diatomaceous Earth	Diatomite, Celite
Hydrochloric acid	Muratic acid
Hydrogen peroxide	Hydrogen peroxide, 30%
Iron hydroxide	
Ferric oxide	
Lithium carbonate	
Magnesium carbonate	
Manganese dioxide	
Sodium carbonate	Soda ash
Sodium fluoride	
Sodium hydroxide	Caustic soda
Sodium sulfate	
Sugar	Sucrose
Silca gel	Amorphous silicon dioxide
Sulfuric acid	
Titanium dioxide	
Urea	
Zirconium dioxide	
Zirconium silicate	

MSDS for **BORIC ACID**

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1 - PRODUCT IDENTIFICATION

PRODUCT NAME: BORIC ACID
FORMULA: H3BO3
FORMULA WT: 61.83
CAS NO.: 10043-35-3
NIOSH/RTECS NO.: ED4550000
COMMON SYNONYMS: BORACIC ACID; ORTHOBORIC ACID; BOROFAX
PRODUCT CODES: 0084,5168,0090,0091,9820
EFFECTIVE: 10/03/86
REVISION #02

PRECAUTIONARY LABELLING

BAKER SAF-T-DATA(TM) SYSTEM

HEALTH	-	2	MODERATE
FLAMMABILITY	-	0	NONE
REACTIVITY	-	0	NONE
CONTACT	-	2	MODERATE

HAZARD RATINGS ARE 0 TO 4 (0 = NO HAZARD; 4 = EXTREME HAZARD).

LABORATORY PROTECTIVE EQUIPMENT

SAFETY GLASSES; LAB COAT; VENT HOOD; PROPER GLOVES

PRECAUTIONARY LABEL STATEMENTS

WARNING
CAUSES IRRITATION
HARMFUL IF SWALLOWED OR ABSORBED THROUGH SKIN
AVOID CONTACT WITH EYES, SKIN, CLOTHING.
AVOID BREATHING DUST. KEEP IN TIGHTLY CLOSED CONTAINER. USE WITH ADEQUATE VENTILATION. WASH THOROUGHLY AFTER HANDLING.

SAF-T-DATA(TM) STORAGE COLOR CODE: ORANGE (GENERAL STORAGE)

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2 - HAZARDOUS COMPONENTS

COMPONENT	%	CAS NO.
BORIC ACID	90-100	10043-35-3

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3 - PHYSICAL DATA

BOILING POINT: N/A
MELTING POINT: 171 C (340 F)
SPECIFIC GRAVITY: 1.44
(H2O=1)
SOLUBILITY(H2O): MODERATE (1 TO 10 %)
APPEARANCE & ODOR: COLORLESS, ODORLESS SOLID.

VAPOR PRESSURE(MM HG): 15
VAPOR DENSITY(AIR=1): N/A
EVAPORATION RATE: N/A
(BUTYL ACETATE=1)
% VOLATILES BY VOLUME: 0

MSDS for **BORIC ACID**

4 - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (CLOSED CUP: N/A

FLAMMABLE LIMITS: UPPER - N/A % LOWER - N/A %

FIRE EXTINGUISHING MEDIA
USE EXTINGUISHING MEDIA APPROPRIATE FOR SURROUNDING FIRE.

SPECIAL FIRE-FIGHTING PROCEDURES
FIREFIGHTERS SHOULD WEAR PROPER PROTECTIVE EQUIPMENT AND SELF-CONTAINED BREATHING APPARATUS WITH FULL FACEPIECE OPERATED IN POSITIVE PRESSURE MODE.

TOXIC GASES PRODUCED
OXIDES

5 - HEALTH HAZARD DATA

TOXICITY:

LD50 (ORAL-RAT) (MG/KG)	- 2660
LD50 (SCU-RAT) (MG/KG)	- 1400
LD50 (IV-RAT) (MG/KG)	- 1330

CARCINOGENICITY: NTP: NO IARC: NO Z LIST: NO OSHA REG: NO

EFFECTS OF OVEREXPOSURE
INGESTION IS HARMFUL AND MAY BE FATAL.
DUST INHALATION MAY CAUSE TIGHTNESS AND PAIN IN CHEST, COUGHING, AND DIFFICULTY IN BREATHING.
CONTACT WITH SKIN OR EYES MAY CAUSE IRRITATION.
PROLONGED EXPOSURE MAY CAUSE DERMATITIS.
INGESTION MAY CAUSE NAUSEA, VOMITING, HEADACHES, DIZZINESS, GASTROINTESTINAL IRRITATION.
CHRONIC EFFECTS OF OVEREXPOSURE MAY INCLUDE KIDNEY AND/OR LIVER DAMAGE.

TARGET ORGANS
NONE IDENTIFIED

MEDICAL CONDITIONS GENERALLY AGGRAVATED BY EXPOSURE
DAMAGED SKIN

ROUTES OF ENTRY
INGESTION, INHALATION, SKIN CONTACT, EYE CONTACT

EMERGENCY AND FIRST AID PROCEDURES
CALL A PHYSICIAN.

IF SWALLOWED, IF CONSCIOUS, GIVE LARGE AMOUNTS OF WATER. INDUCE VOMITING.
IF INHALED, REMOVE TO FRESH AIR. IF NOT BREATHING, GIVE ARTIFICIAL RESPIRATION. IF BREATHING IS DIFFICULT, GIVE OXYGEN.
IN CASE OF CONTACT, IMMEDIATELY FLUSH EYES OR SKIN WITH PLENTY OF WATER FOR AT LEAST 15 MINUTES.

6 - REACTIVITY DATA

MSDS for **BORIC ACID**

STABILITY: STABLE

HAZARDOUS POLYMERIZATION: WILL NOT OCCUR

CONDITIONS TO AVOID: MOISTURE, HEAT

INCOMPATIBLES: POTASSIUM METAL, WATER, STRONG BASES

DECOMPOSITION PRODUCTS: OXIDES

---

7 - SPILL AND DISPOSAL PROCEDURES

STEPS TO BE TAKEN IN THE EVENT OF A SPILL OR DISCHARGE
WEAR SELF-CONTAINED BREATHING APPARATUS AND FULL PROTECTIVE CLOTHING. WITH CLEAN SHOVEL, CAREFULLY PLACE MATERIAL INTO CLEAN, DRY CONTAINER AND COVER; REMOVE FROM AREA. FLUSH SPILL AREA WITH WATER.

DISPOSAL PROCEDURE
DISPOSE IN ACCORDANCE WITH ALL APPLICABLE FEDERAL, STATE, AND LOCAL ENVIRONMENTAL REGULATIONS.

---

8 - PROTECTIVE EQUIPMENT

VENTILATION: USE ADEQUATE GENERAL OR LOCAL EXHAUST VENTILATION TO KEEP FUME OR DUST LEVELS AS LOW AS POSSIBLE.

RESPIRATORY PROTECTION: NONE REQUIRED WHERE ADEQUATE VENTILATION CONDITIONS EXIST. IF AIRBORNE CONCENTRATION IS HIGH, USE AN APPROPRIATE RESPIRATOR OR DUST MASK.

EYE/SKIN PROTECTION: SAFETY GLASSES WITH SIDESHIELDS, UNIFORM, RUBBER GLOVES ARE RECOMMENDED.

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9 - STORAGE AND HANDLING PRECAUTIONS

SAF-T-DATA(TM) STORAGE COLOR CODE: ORANGE (GENERAL STORAGE)

SPECIAL PRECAUTIONS
KEEP CONTAINER TIGHTLY CLOSED. SUITABLE FOR ANY GENERAL CHEMICAL STORAGE AREA.

---

10 - TRANSPORTATION DATA AND ADDITIONAL INFORMATION

DOMESTIC (D.O.T.)

PROPER SHIPPING NAME CHEMICALS, N.O.S. (NON-REGULATED)

INTERNATIONAL (I.M.O.)

PROPER SHIPPING NAME CHEMICALS, N.O.S. (NON-REGULATED)

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MSDS for **CALCIUM CARBONATE**

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1 - PRODUCT IDENTIFICATION

PRODUCT NAME: CALCIUM CARBONATE
FORMULA: CACO3
FORMULA WT: 100.09
CAS NO.: 471-34-1
NIOSH/RTECS NO.: EV9580000
COMMON SYNONYMS: LIMESTONE; MARBLE; CALCITE; CHALK; CARBONIC ACID, CALCIUM SALT
PRODUCT CODES: 5178,4485,5152,1294,1301,1300,4918,1288
EFFECTIVE: 10/22/86
REVISION #02

PRECAUTIONARY LABELLING

BAKER SAF-T-DATA(TM) SYSTEM

HEALTH	-	0	NONE
FLAMMABILITY	-	0	NONE
REACTIVITY	-	0	NONE
CONTACT	-	1	SLIGHT

HAZARD RATINGS ARE 0 TO 4 (0 = NO HAZARD; 4 = EXTREME HAZARD).

LABORATORY PROTECTIVE EQUIPMENT

SAFETY GLASSES; LAB COAT

PRECAUTIONARY LABEL STATEMENTS

CAUTION
MAY CAUSE IRRITATION
MAY BE HARMFUL IF SWALLOWED
DURING USE AVOID CONTACT WITH EYES, SKIN, CLOTHING. WASH THOROUGHLY AFTER HANDLING. WHEN NOT IN USE KEEP IN TIGHTLY CLOSED CONTAINER.

SAF-T-DATA(TM) STORAGE COLOR CODE: ORANGE (GENERAL STORAGE)

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2 - HAZARDOUS COMPONENTS

COMPONENT	%	CAS NO.
CALCIUM CARBONATE	90-100	471-34-1

---

3 - PHYSICAL DATA

BOILING POINT: N/A
MELTING POINT: 825 C (1517 F)
SPECIFIC GRAVITY: 2.83
(H2O=1)

VAPOR PRESSURE(MM HG): N/A
VAPOR DENSITY(AIR=1): N/A
EVAPORATION RATE: N/A
(BUTYL ACETATE=1)

SOLUBILITY(H2O): NEGLIGIBLE (LESS THAN 0.1 %) % VOLATILES BY VOLUME: 0

APPEARANCE & ODOR: GRAY GRANULAR STONES.

---

4 - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (CLOSED CUP: N/A

FLAMMABLE LIMITS: UPPER - N/A % LOWER - N/A %

FIRE EXTINGUISHING MEDIA
USE EXTINGUISHING MEDIA APPROPRIATE FOR SURROUNDING FIRE.

SPECIAL FIRE-FIGHTING PROCEDURES
FIREFIGHTERS SHOULD WEAR PROPER PROTECTIVE EQUIPMENT AND SELF-CONTAINED BREATHING APPARATUS WITH FULL FACEPIECE OPERATED IN POSITIVE PRESSURE MODE.

TOXIC GASES PRODUCED
OXIDES, CARBON MONOXIDE, CARBON DIOXIDE

---

5 - HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE (TLV/TWA): 10 MG/M3 (PPM)

CARCINOGENICITY: NTP: NO IARC: NO Z LIST: NO OSHA REG: NO

EFFECTS OF OVEREXPOSURE
DUST MAY IRRITATE NOSE AND THROAT.
INHALATION OF DUST MAY CAUSE IRRITATION TO UPPER RESPIRATORY TRACT.
CONTACT CAN CAUSE EYE IRRITATION.
INGESTION MAY CAUSE GASTROINTESTINAL PAIN.

TARGET ORGANS
EYES, SKIN

MEDICAL CONDITIONS GENERALLY AGGRAVATED BY EXPOSURE
NONE IDENTIFIED

ROUTES OF ENTRY
INHALATION, INGESTION, EYE CONTACT, SKIN CONTACT

EMERGENCY AND FIRST AID PROCEDURES

INGESTION:	IF SWALLOWED AND THE PERSON IS CONSCIOUS, IMMEDIATELY GIVE LARGE AMOUNTS OF WATER. GET MEDICAL ATTENTION.
INHALATION:	IF A PERSON BREATHES IN LARGE AMOUNTS, MOVE THE EXPOSED PERSON TO FRESH AIR. GET MEDICAL ATTENTION.
EYE CONTACT:	IMMEDIATELY FLUSH WITH PLENTY OF WATER FOR AT LEAST 15 MINUTES. GET MEDICAL ATTENTION.
SKIN CONTACT:	IMMEDIATELY WASH WITH PLENTY OF SOAP AND WATER FOR AT LEAST 15 MINUTES.

---

6 - REACTIVITY DATA

STABILITY: STABLE : HAZARDOUS POLYMERIZATION: WILL NOT OCCUR

CONDITIONS TO AVOID: HEAT

INCOMPATIBLES: STRONG ACIDS, FLUORINE, ALUM, AMMONIUM SALTS

DECOMPOSITION PRODUCTS: OXIDES, CARBON MONOXIDE, CARBON DIOXIDE

---

7 - SPILL AND DISPOSAL PROCEDURES

STEPS TO BE TAKEN IN THE EVENT OF A SPILL OR DISCHARGE
WEAR SUITABLE PROTECTIVE CLOTHING. CAREFULLY SWEEP UP AND REMOVE.

DISPOSAL PROCEDURE
DISPOSE IN ACCORDANCE WITH ALL APPLICABLE FEDERAL, STATE, AND LOCAL ENVIRONMENTAL REGULATIONS.

---

8 - PROTECTIVE EQUIPMENT

VENTILATION: USE ADEQUATE GENERAL OR LOCAL EXHAUST VENTILATION TO KEEP FUME OR DUST LEVELS AS LOW AS POSSIBLE.

RESPIRATORY PROTECTION: A RESPIRATOR WITH DUST/MIST FILTER IS RECOMMENDED. IF AIRBORNE CONCENTRATION EXCEEDS TLV, A SELF-CONTAINED BREATHING APPARATUS IS ADVISED.

EYE/SKIN PROTECTION: SAFETY GLASSES WITH SIDESHIELDS, PROPER GLOVES ARE RECOMMENDED.

---

9 - STORAGE AND HANDLING PRECAUTIONS

SAF-T-DATA(TM) STORAGE COLOR CODE: ORANGE (GENERAL STORAGE)

SPECIAL PRECAUTIONS
KEEP CONTAINER TIGHTLY CLOSED. SUITABLE FOR ANY GENERAL CHEMICAL STORAGE AREA.

---

10 - TRANSPORTATION DATA AND ADDITIONAL INFORMATION

DOMESTIC (D.O.T.)

PROPER SHIPPING NAME CHEMICALS, N.O.S. (NON-REGULATED)

INTERNATIONAL (I.M.O.)

PROPER SHIPPING NAME CHEMICALS, N.O.S. (NON-REGULATED)

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MSDS for **CALCIUM SULFATE, ANHYDROUS, POWDER** Page 1

---

1 - PRODUCT IDENTIFICATION

PRODUCT NAME: CALCIUM SULFATE, ANHYDROUS, POWDER
FORMULA: CASO4
FORMULA WT: 136.14
CAS NO.: 07778-18-9
COMMON SYNONYMS: ANHYDRITE; ANHYDROUS GYPSUM
PRODUCT CODES: 1458
EFFECTIVE: 05/22/86
REVISION #01

PRECAUTIONARY LABELLING

BAKER SAF-T-DATA(TM) SYSTEM

HEALTH	-	1	SLIGHT
FLAMMABILITY	-	0	NONE
REACTIVITY	-	0	NONE
CONTACT	-	1	SLIGHT

HAZARD RATINGS ARE 0 TO 4 (0 = NO HAZARD; 4 = EXTREME HAZARD).

LABORATORY PROTECTIVE EQUIPMENT

SAFETY GLASSES; LAB COAT

PRECAUTIONARY LABEL STATEMENTS

CAUTION
MAY CAUSE IRRITATION
DURING USE AVOID CONTACT WITH EYES, SKIN, CLOTHING. WASH THOROUGHLY AFTER HANDLING. WHEN NOT IN USE KEEP IN TIGHTLY CLOSED CONTAINER.

SAF-T-DATA(TM) STORAGE COLOR CODE: ORANGE (GENERAL STORAGE)

---

2 - HAZARDOUS COMPONENTS

COMPONENT	%	CAS NO.
NOT APPLICABLE		

---

3 - PHYSICAL DATA

BOILING POINT: N/A
MELTING POINT: 1450 C (2642 F)
SPECIFIC GRAVITY: 2.96 (H2O=1)
SOLUBILITY(H2O): SLIGHT (0.1 TO 1 %)
APPEARANCE & ODOR: WHITE ODORLESS GRANULES.

VAPOR PRESSURE(MM HG): N/A
VAPOR DENSITY(AIR=1): N/A
EVAPORATION RATE: (BUTYL ACETATE=1) N/A
% VOLATILES BY VOLUME: 0

4 - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (CLOSED CUP: N/A

FLAMMABLE LIMITS: UPPER - N/A % LOWER - N/A %

FIRE EXTINGUISHING MEDIA
USE EXTINGUISHING MEDIA APPROPRIATE FOR SURROUNDING FIRE.

SPECIAL FIRE-FIGHTING PROCEDURES
FIREFIGHTERS SHOULD WEAR PROPER PROTECTIVE EQUIPMENT AND SELF-CONTAINED BREATHING APPARATUS WITH FULL FACEPIECE OPERATED IN POSITIVE PRESSURE MODE.

TOXIC GASES PRODUCED
SULFUR DIOXIDE

5 - HEALTH HAZARD DATA

CARCINOGENICITY: NTP: NO IARC: NO Z LIST: NO OSHA REG: NO

EFFECTS OF OVEREXPOSURE
DUST MAY IRRITATE SKIN OR EYES.

TARGET ORGANS
NONE IDENTIFIED

MEDICAL CONDITIONS GENERALLY AGGRAVATED BY EXPOSURE
NONE IDENTIFIED

ROUTES OF ENTRY
NONE INDICATED

EMERGENCY AND FIRST AID PROCEDURES

INGESTION:	IF SWALLOWED AND THE PERSON IS CONSCIOUS, IMMEDIATELY GIVE LARGE AMOUNTS OF WATER. GET MEDICAL ATTENTION.
INHALATION:	IF A PERSON BREATHES IN LARGE AMOUNTS, MOVE THE EXPOSED PERSON TO FRESH AIR. GET MEDICAL ATTENTION.
EYE CONTACT:	IMMEDIATELY FLUSH WITH PLENTY OF WATER FOR AT LEAST 15 MINUTES. GET MEDICAL ATTENTION.
SKIN CONTACT:	IMMEDIATELY WASH WITH PLENTY OF SOAP AND WATER FOR AT LEAST 15 MINUTES.

6 - REACTIVITY DATA

STABILITY: STABLE HAZARDOUS POLYMERIZATION: WILL NOT OCCUR

CONDITIONS TO AVOID: NONE DOCUMENTED

INCOMPATIBLES: STRONG ACIDS, ALUMINUM
DECOMPOSITION PRODUCTS: OXIDES OF SULFUR

---

7 - SPILL AND DISPOSAL PROCEDURES

STEPS TO BE TAKEN IN THE EVENT OF A SPILL OR DISCHARGE
WEAR SUITABLE PROTECTIVE CLOTHING. CAREFULLY SWEEP UP AND REMOVE.

DISPOSAL PROCEDURE
DISPOSE IN ACCORDANCE WITH ALL APPLICABLE FEDERAL, STATE, AND LOCAL ENVIRONMENTAL REGULATIONS.

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8 - PROTECTIVE EQUIPMENT

VENTILATION:	USE ADEQUATE GENERAL OR LOCAL EXHAUST VENTILATION TO KEEP FUME OR DUST LEVELS AS LOW AS POSSIBLE.
RESPIRATORY PROTECTION:	NONE REQUIRED WHERE ADEQUATE VENTILATION CONDITIONS EXIST. IF AIRBORNE CONCENTRATION IS HIGH, USE AN APPROPRIATE RESPIRATOR OR DUST MASK.
EYE/SKIN PROTECTION:	SAFETY GLASSES WITH SIDESHIELDS, PROPER GLOVES ARE RECOMMENDED.

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9 - STORAGE AND HANDLING PRECAUTIONS

SAF-T-DATA(TM) STORAGE COLOR CODE: ORANGE (GENERAL STORAGE)

SPECIAL PRECAUTIONS
KEEP CONTAINER TIGHTLY CLOSED. SUITABLE FOR ANY GENERAL CHEMICAL STORAGE AREA.

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10 - TRANSPORTATION DATA AND ADDITIONAL INFORMATION

DOMESTIC (D.O.T.)

PROPER SHIPPING NAME CHEMICALS, N.O.S. (NON-REGULATED)

INTERNATIONAL (I.M.O.)

PROPER SHIPPING NAME CHEMICALS, N.O.S. (NON-REGULATED)

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MSDS for **CHROMIUM OXIDE** Page 1

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1 - PRODUCT IDENTIFICATION

PRODUCT NAME: CHROMIUM OXIDE
FORMULA: CR2O3
FORMULA WT: 151.99
CAS NO.: 01308-38-9
NIOSH/RTECS NO.: GB6475000
COMMON SYNONYMS: CHROMIUM(III)OXIDE; CHROMIC OXIDE; CHROME OXIDE GREEN
PRODUCT CODES: 5306,1617,1616
EFFECTIVE: 09/10/86
REVISION #02

PRECAUTIONARY LABELLING

BAKER SAF-T-DATA(TM) SYSTEM

HEALTH	-	2	MODERATE
FLAMMABILITY	-	0	NONE
REACTIVITY	-	1	SLIGHT
CONTACT	-	2	MODERATE

HAZARD RATINGS ARE 0 TO 4 (0 = NO HAZARD; 4 = EXTREME HAZARD).

LABORATORY PROTECTIVE EQUIPMENT

SAFETY GLASSES; LAB COAT; VENT HOOD; PROPER GLOVES

PRECAUTIONARY LABEL STATEMENTS

WARNING
CAUSES IRRITATION
HARMFUL IF SWALLOWED

AVOID CONTACT WITH EYES, SKIN, CLOTHING.
KEEP IN TIGHTLY CLOSED CONTAINER. WASH THOROUGHLY AFTER HANDLING.

SAF-T-DATA(TM) STORAGE COLOR CODE: ORANGE (GENERAL STORAGE)

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2 - HAZARDOUS COMPONENTS

COMPONENT	%	CAS NO.
CHROMIUM OXIDE	90-100	1308-38-9

---

3 - PHYSICAL DATA

BOILING POINT: 3000 C (5432 F)
MELTING POINT: 2435 C (4415 F)
SPECIFIC GRAVITY: 5.22 (H2O=1)
VAPOR PRESSURE(MM HG): N/A
VAPOR DENSITY(AIR=1): N/A
EVAPORATION RATE: N/A (BUTYL ACETATE=1)

SOLUBILITY(H2O): NEGLIGIBLE (LESS THAN 0.1 %) % VOLATILES BY VOLUME: 0

APPEARANCE & ODOR: LIGHT TO DARK GREEN, ODORLESS CRYSTALS.

---

4 - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (CLOSED CUP N/A

FLAMMABLE LIMITS: UPPER - N/A % LOWER - N/A %

FIRE EXTINGUISHING MEDIA
USE EXTINGUISHING MEDIA APPROPRIATE FOR SURROUNDING FIRE.

SPECIAL FIRE-FIGHTING PROCEDURES
FIREFIGHTERS SHOULD WEAR PROPER PROTECTIVE EQUIPMENT AND SELF-CONTAINED BREATHING APPARATUS WITH FULL FACEPIECE OPERATED IN POSITIVE PRESSURE MODE. MOVE CONTAINERS FROM FIRE AREA IF IT CAN BE DONE WITHOUT RISK. USE WATER TO KEEP FIRE-EXPOSED CONTAINERS COOL.

---

5 - HEALTH HAZARD DATA

NOTE: WHILE THE SPECIFIC COMPOUNDS CANNOT BE IDENTIFIED, THERE IS EVIDENCE THAT CERTAIN CHROMIUM COMPOUNDS CAUSE CANCER IN HUMANS AND EXPERIMENTAL ANIMALS. CHROMIUM IS WIDELY DISTRIBUTED IN AIR, WATER, SOIL AND FOOD. TRIVALENT CHROMIUM MAY BE AN ESSENTIAL TRACE INGREDIENT IN THE HUMAN DIET. ALL CHROMIUM COMPOUNDS ARE REGULATED BY THE EPA, BUT NO SPECIFIC DATA IS AVAILABLE TO LINK TRIVALENT CHROMIUM TO CANCER. PRUDENT JUDGEMENT DICTATES THAT EXPOSURE SHOULD BE MINIMIZED AS MUCH AS POSSIBLE. (SEE IARC MONOGRAPH ON EVALUATION OF CARCINOGENIC RISK OF CHEMICALS TO HUMANS, VOLUME 23 LYON, FRANCE IARC, 1980, PP. 205-323).

THRESHOLD LIMIT VALUE (TLV/TWA): 0.5 MG/M3 (PPM)

PERMISSIBLE EXPOSURE LIMIT (PEL): 1 MG/M3 (PPM)

CARCINOGENICITY: NTP: YES IARC: YES Z LIST: NO OSHA REG: NO

EFFECTS OF OVEREXPOSURE
CONTACT WITH SKIN OR EYES MAY CAUSE SEVERE IRRITATION OR BURNS.
DUST MAY ULCERATE MUCOUS MEMBRANES.
EXCESSIVE INHALATION OF DUST IS IRRITATING AND MAY BE SEVERELY DAMAGING TO RESPIRATORY PASSAGES AND/OR LUNGS.
INGESTION MAY RESULT IN SEVERE INTESTINAL IRRITATION WITH BURNS TO MOUTH.

TARGET ORGANS
RESPIRATORY SYSTEM

MEDICAL CONDITIONS GENERALLY AGGRAVATED BY EXPOSURE
NONE IDENTIFIED

ROUTES OF ENTRY
INHALATION, INGESTION

EMERGENCY AND FIRST AID PROCEDURES
CALL A PHYSICIAN.
IF SWALLOWED, IF CONSCIOUS, IMMEDIATELY INDUCE VOMITING.
IF INHALED, REMOVE TO FRESH AIR. IF NOT BREATHING, GIVE ARTIFICIAL RESPIRATION. IF BREATHING IS DIFFICULT, GIVE OXYGEN.
IN CASE OF CONTACT, IMMEDIATELY FLUSH EYES WITH PLENTY OF WATER FOR AT LEAST 15 MINUTES. FLUSH SKIN WITH WATER.

---

6 - REACTIVITY DATA

STABILITY: STABLE HAZARDOUS POLYMERIZATION: WILL NOT OCCUR

CONDITIONS TO AVOID: NONE DOCUMENTED

---

7 - SPILL AND DISPOSAL PROCEDURES

STEPS TO BE TAKEN IN THE EVENT OF A SPILL OR DISCHARGE
WEAR SELF-CONTAINED BREATHING APPARATUS AND FULL PROTECTIVE CLOTHING. WITH CLEAN SHOVEL, CAREFULLY PLACE MATERIAL INTO CLEAN, DRY CONTAINER AND COVER; REMOVE FROM AREA. FLUSH SPILL AREA WITH WATER.

DISPOSAL PROCEDURE
DISPOSE IN ACCORDANCE WITH ALL APPLICABLE FEDERAL, STATE, AND LOCAL ENVIRONMENTAL REGULATIONS.

EPA HAZARDOUS WASTE NUMBER: D007 (EP TOXIC WASTE)

---

8 - PROTECTIVE EQUIPMENT

VENTILATION: USE GENERAL OR LOCAL EXHAUST VENTILATION TO MEET TLV REQUIREMENTS.

RESPIRATORY PROTECTION: RESPIRATORY PROTECTION REQUIRED IF AIRBORNE CONCENTRATION EXCEEDS TLV. AT CONCENTRATIONS UP TO 1 PPM, A DUST/MIST RESPIRATOR IS RECOMMENDED. ABOVE THIS LEVEL, A SELF-CONTAINED BREATHING APPARATUS IS ADVISED.

EYE/SKIN PROTECTION: SAFETY GLASSES WITH SIDESHIELDS, UNIFORM, RUBBER GLOVES ARE RECOMMENDED.

---

9 - STORAGE AND HANDLING PRECAUTIONS

SAF-T-DATA(TM) STORAGE COLOR CODE: ORANGE (GENERAL STORAGE)

SPECIAL PRECAUTIONS
KEEP CONTAINER TIGHTLY CLOSED. SUITABLE FOR ANY GENERAL CHEMICAL STORAGE AREA.

---

10 - TRANSPORTATION DATA AND ADDITIONAL INFORMATION

DOMESTIC (D.O.T.)

PROPER SHIPPING NAME	CHROMIUM OXIDE, POWDER
HAZARD CLASS	ORM-E
LABELS	NONE
REPORTABLE QUANTITY	1 LBS.

INTERNATIONAL (I.M.O.)
PROPER SHIPPING NAME CHEMICALS, N.O.S. (NON-REGULATED)

BLANK

MSDS for **CUPRIC OXIDE** Page 1

---

1 - PRODUCT IDENTIFICATION

PRODUCT NAME: CUPRIC OXIDE
FORMULA: CUO
FORMULA WT: 79.55
CAS NO.: 01317-38-0
COMMON SYNONYMS: COPPER(II)OXIDE; BLACK COPPER OXIDE
PRODUCT CODES: 1814,1820,5256,5255
EFFECTIVE: 10/08/85
REVISION #01

PRECAUTIONARY LABELLING

BAKER SAF-T-DATA(TM) SYSTEM

HEALTH	-	2	MODERATE
FLAMMABILITY	-	0	NONE
REACTIVITY	-	0	NONE
CONTACT	-	1	SLIGHT

HAZARD RATINGS ARE 0 TO 4 (0 = NO HAZARD; 4 = EXTREME HAZARD).

LABORATORY PROTECTIVE EQUIPMENT

SAFETY GLASSES; LAB COAT

PRECAUTIONARY LABEL STATEMENTS

WARNING
HARMFUL IF SWALLOWED
AVOID CONTACT WITH EYES, SKIN, CLOTHING.
KEEP IN TIGHTLY CLOSED CONTAINER. WASH THOROUGHLY AFTER HANDLING.

SAF-T-DATA(TM) STORAGE COLOR CODE: ORANGE (GENERAL STORAGE)

2 - HAZARDOUS COMPONENTS

COMPONENT	%	CAS NO.
CUPRIC OXIDE	90-100	1317-38-0

3 - PHYSICAL DATA

BOILING POINT: N/A
VAPOR PRESSURE(MM HG): N/A

MELTING POINT: 1326 C (2419 F)
VAPOR DENSITY(AIR=1): N/A

SPECIFIC GRAVITY: 6.40 (H2O=1)
EVAPORATION RATE: N/A (BUTYL ACETATE=1)

SOLUBILITY(H2O): NEGLIGIBLE (LESS THAN 0.1 %) % VOLATILES BY VOLUME: 0

APPEARANCE & ODOR: BLACK CRYSTALLINE POWDER OR GRANULES.

---

4 - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (CLOSED CUP N/A

FLAMMABLE LIMITS: UPPER - N/A % LOWER - N/A %

FIRE EXTINGUISHING MEDIA
USE EXTINGUISHING MEDIA APPROPRIATE FOR SURROUNDING FIRE.

---

5 - HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE (TLV/TWA): 1 MG/M3 (PPM)

CARCINOGENICITY: NTP: NO IARC: NO Z LIST: NO OSHA REG: NO

EFFECTS OF OVEREXPOSURE
INHALATION OF DUST MAY CAUSE IRRITATION TO UPPER RESPIRATORY TRACT.

TARGET ORGANS
NONE IDENTIFIED

MEDICAL CONDITIONS GENERALLY AGGRAVATED BY EXPOSURE
NONE IDENTIFIED

ROUTES OF ENTRY
NONE INDICATED

EMERGENCY AND FIRST AID PROCEDURES
CALL A PHYSICIAN.
IF SWALLOWED, IF CONSCIOUS, IMMEDIATELY INDUCE VOMITING.

---

6 - REACTIVITY DATA

STABILITY: STABLE HAZARDOUS POLYMERIZATION: WILL NOT OCCUR

CONDITIONS TO AVOID: NONE DOCUMENTED

---

7 - SPILL AND DISPOSAL PROCEDURES

STEPS TO BE TAKEN IN THE EVENT OF A SPILL OR DISCHARGE
WEAR SELF-CONTAINED BREATHING APPARATUS AND FULL PROTECTIVE CLOTHING.
WITH CLEAN SHOVEL, CAREFULLY PLACE MATERIAL INTO CLEAN, DRY CONTAINER AND COVER; REMOVE FROM AREA. FLUSH SPILL AREA WITH WATER.

DISPOSAL PROCEDURE
DISPOSE IN ACCORDANCE WITH ALL APPLICABLE FEDERAL, STATE, AND LOCAL ENVIRONMENTAL REGULATIONS.

---

8 - PROTECTIVE EQUIPMENT

VENTILATION: USE GENERAL OR LOCAL EXHAUST VENTILATION TO MEET TLV REQUIREMENTS.

RESPIRATORY PROTECTION: RESPIRATORY PROTECTION REQUIRED IF AIRBORNE CONCENTRATION EXCEEDS TLV. AT CONCENTRATIONS UP TO 15 PPM, A HIGH-EFFICIENCY PARTICULATE RESPIRATOR IS RECOMMENDED. ABOVE THIS LEVEL, A SELF-CONTAINED BREATHING APPARATUS IS ADVISED.

EYE/SKIN PROTECTION: SAFETY GLASSES WITH SIDESHIELDS, RUBBER GLOVES ARE RECOMMENDED.

---

9 - STORAGE AND HANDLING PRECAUTIONS

SAF-T-DATA(TM) STORAGE COLOR CODE: ORANGE (GENERAL STORAGE)

SPECIAL PRECAUTIONS
KEEP CONTAINER TIGHTLY CLOSED. SUITABLE FOR ANY GENERAL CHEMICAL STORAGE AREA.

---

10 - TRANSPORTATION DATA AND ADDITIONAL INFORMATION

DOMESTIC (D.O.T.)

PROPER SHIPPING NAME CHEMICALS, N.O.S. (NON-REGULATED)

INTERNATIONAL (I.M.O.)

PROPER SHIPPING NAME CHEMICALS, N.O.S. (NON-REGULATED)

BLANK

72-62-7925-01

MATERIAL SAFETY DATA SHEET

Ashland

ASHLAND, KENTUCKY 41114
(606) 329-3333

1 (800) 274-5263 or
1-800-ASHLAND

000001

DIESEL FUEL #2, LOW SULFUR

THIS MSDS COMPLIES WITH 29 CFR 1910.1200 (THE HAZARD COMMUNICATION STANDARD)

****

Product Name: DIESEL FUEL #2, LOW SULFUR

GTS DURATEK
REGINA MOWAD
8955 GUILFORD RD.
COLUMBIA, MD 21046

02 95 020 2114519-351

PRODUCT:
INVOICE: REQST
INVOICE DATE: 02/02/95
TO:

Data Sheet No: 0285418-001.005
Prepared: 01/17/95
Supersedes: (N/A)
Print Date: 02/02/95

SECTION I-PRODUCT IDENTIFICATION

General or Generic ID: HYDROCARBON

DOT Hazard Classification: COMBUSTIBLE

SECTION II-COMPONENTS

IF PRESENT, IARC, NTP AND OSHA CARCINOGENS AND CHEMICALS SUBJECT TO THE REPORTING REQUIREMENTS OF SARA TITLE III SECTION 313 ARE IDENTIFIED IN THIS SECTION. SEE DEFINITION PAGE FOR CLARIFICATION

INGREDIENT	Percent	PEL	TLV	Note
DIESEL FUEL #2, LOW SULFUR CAS #: 68476-34-6	100			(1)

Notes:

(1) PEL/TLV NOT ESTABLISHED FOR THIS MATERIAL

SECTION III-PHYSICAL DATA

Boiling Point	for PRODUCT	320.00 - 400.00 Deg F (160.00 - 204.44 Deg C) @ 760.00 mm Hg
Vapor Pressure	for PRODUCT	< 1.00 mm Hg @ 68.00 Deg F (20.00 Deg C)
Specific Vapor Density	AIR = 1	> 5.00
Specific Gravity		.870 @ 60.00 Deg F (15.55 Deg C)
Percent Volatiles	UNAVAILABLE	
Evaporation Rate		SLOWER THAN ETHER
Appearance		CLEAR TO FLUORESCENT GREEN
State		LIQUID
Form		HOMOG SOLN

SECTION IV-FIRE AND EXPLOSION INFORMATION

FLASH POINT > 135.0 Deg F (57.2 Deg C)

EXPLOSIVE LIMIT UNAVAILABLE

EXTINGUISHING MEDIA: REGULAR FOAM OR CARBON DIOXIDE OR DRY CHEMICAL

HAZARDOUS DECOMPOSITION PRODUCTS: MAY FORM:, CARBON DIOXIDE AND CARBON MONOXIDE, VARIOUS HYDROCARBONS, ETC.

FIREFIGHTING PROCEDURES: WEAR A SELF-CONTAINED BREATHING APPARATUS WITH A FULL FACEPIECE OPERATED IN THE POSITIVE PRESSURE DEMAND MODE WITH APPROPRIATE TURN-OUT GEAR AND CHEMICAL RESISTANT PERSONAL PROTECTIVE EQUIPMENT. REFER TO THE PERSONAL PROTECTIVE EQUIPMENT SECTION OF THIS MSDS.

WATER OR FOAM MAY CAUSE FROTHING WHICH CAN BE VIOLENT AND POSSIBLY ENDANGER THE LIFE OF THE FIREFIGHTER.

SPECIAL FIRE & EXPLOSION HAZARDS: VAPORS ARE HEAVIER THAN AIR AND MAY TRAVEL ALONG THE GROUND OR BE MOVED BY VENTILATION AND IGNITED BY HEAT, PILOT LIGHTS, OTHER FLAMES AND IGNITION SOURCES AT LOCATIONS DISTANT FROM MATERIAL HANDLING POINT.

NEVER USE WELDING OR CUTTING TORCH ON OR NEAR DRUM (EVEN EMPTY) BECAUSE PRODUCT (EVEN JUST RESIDUE) CAN IGNITE EXPLOSIVELY.

ALL FIVE GALLON PAILS AND LARGER METAL CONTAINERS INCLUDING TANK CARS AND TANK TRUCKS SHOULD BE GROUNDED AND/OR BONDED WHEN MATERIAL IS TRANSFERRED.

NFPA CODES: HEALTH- 1 FLAMMABILITY- 2 REACTIVITY- 0

CONTINUED ON PAGE: 2

000001 **DIESEL FUEL #2, LOW SULFUR** **Page: 2**

SECTION V-HEALTH HAZARD DATA

EFFECTS OF ACUTE OVEREXPOSURE:

EYES - EXPOSURE CAUSES EYE IRRITATION. SYMPTOMS MAY INCLUDE STINGING, TEARING, REDNESS, AND SWELLING. ADDITIONAL SYMPTOMS OF EYE EXPOSURE MAY INCLUDE:
-BLURRED VISION-
SKIN - EXPOSURE MAY CAUSE MILD SKIN IRRITATION. PROLONGED OR REPEATED EXPOSURE MAY DRY THE SKIN. SYMPTOMS MAY INCLUDE REDNESS, BURNING, DRYING AND CRACKING, AND SKIN BURNS. PRE-EXISTING SKIN DISORDERS MAY BE AGGRAVATED BY EXPOSURE TO THIS MATERIAL.
BREATHING - EXPOSURE TO VAPOR OR MIST IS POSSIBLE.
SYMPTOMS MAY INCLUDE:
-IRRITATION (NOSE, THROAT, RESPIRATORY TRACT)- PRE-EXISTING LUNG DISORDERS, E.G. ASTHMA-LIKE CONDITIONS, MAY BE AGGRAVATED BY EXPOSURE TO THIS MATERIAL.
-CENTRAL NERVOUS SYSTEM DEPRESSION (DIZZINESS, DROWSINESS, WEAKNESS, FATIGUE, NAUSEA, HEADACHE, UNCONSCIOUSNESS)-
-AND DEATH
SWALLOWING - SINGLE DOSE ORAL TOXICITY IS LOW. SWALLOWING SMALL AMOUNTS DURING NORMAL HANDLING IS NOT LIKELY TO CAUSE HARMFUL EFFECTS; SWALLOWING LARGE AMOUNTS MAY BE HARMFUL.
SYMPTOMS MAY INCLUDE:
-GASTROINTESTINAL IRRITATION (NAUSEA, VOMITING, DIARRHEA)-
THIS MATERIAL CAN ENTER THE LUNGS DURING SWALLOWING OR VOMITING AND CAUSE LUNG INFLAMMATION AND/OR DAMAGE.

FIRST AID:

IF ON SKIN: REMOVE CONTAMINATED CLOTHING. WASH EXPOSED AREA WITH SOAP AND WATER. IF SYMPTOMS PERSIST, SEEK MEDICAL ATTENTION. LAUNDER CLOTHING BEFORE REUSE.

IF IN EYES: IF SYMPTOMS DEVELOP, IMMEDIATELY MOVE INDIVIDUAL AWAY FROM EXPOSURE AND INTO FRESH AIR. FLUSH EYES GENTLY WITH WATER FOR AT LEAST 15 MINUTES WHILE HOLDING EYELIDS APART; SEEK IMMEDIATE MEDICAL ATTENTION.

IF SWALLOWED: DO NOT INDUCE VOMITING. CALL A PHYSICIAN OR POISON CONTROL CENTER IMMEDIATELY. ASPIRATION HAZARD IF SWALLOWED. CAN ENTER LUNGS AND CAUSE DAMAGE. NEVER GIVE ANYTHING BY MOUTH TO AN UNCONSCIOUS PERSON.

IF BREATHED: IF SYMPTOMS DEVELOP, IMMEDIATELY MOVE INDIVIDUAL AWAY FROM EXPOSURE AND INTO FRESH AIR. SEEK IMMEDIATE MEDICAL ATTENTION; KEEP PERSON WARM AND QUIET. IF PERSON IS NOT BREATHING, BEGIN ARTIFICIAL RESPIRATION. IF BREATHING IS DIFFICULT, ADMINISTER OXYGEN.

PRIMARY ROUTE(S) OF ENTRY:

INHALATION, SKIN CONTACT

EFFECTS OF CHRONIC OVEREXPOSURE:

THIS PRODUCT CONTAINS FUEL OIL #2. MATERIALS SIMILAR TO FUEL OIL #2 HAVE BEEN SHOWN TO PRODUCE SKIN CANCER IN LABORATORY ANIMALS FOLLOWING REPEATED SKIN EXPOSURE WITHOUT WASHING OR REMOVAL.

THE FOLLOWING WARNING APPLIES IF THIS FUEL IS BURNED IN DIESEL ENGINES:IARC CLASSIFIES WHOLE DIESEL EXHAUST AS PROBABLY CARCINOGENIC (GROUP 2A) AND NIOSH REGARDS DIESEL EXHAUST AS A "POTENTIAL OCCUPATIONAL CARCINOGEN". WHILE EXCESS CANCER RISK FOR WORKERS EXPOSED TO DIESEL EXHAUST IS CURRENTLY UNKNOWN, EXPOSURE SHOULD BE MINIMIZED TO REDUCE POTENTIAL RISK.

SECTION VI-REACTIVITY DATA

HAZARDOUS POLYMERIZATION: CAN OCCUR

STABILITY: STABLE

INCOMPATIBILITY: AVOID CONTACT WITH:, STRONG OXIDIZING AGENTS

SECTION VII-SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED:

SMALL SPILL: ELIMINATE ALL SOURCES OF IGNITION SUCH AS FLARES, FLAMES (INCLUDING PILOT LIGHTS), AND ELECTRICAL SPARKS.

ABSORB LIQUID ON VERMICULITE, FLOOR ABSORBENT OR OTHER ABSORBENT MATERIAL.

LARGE SPILL: ELIMINATE ALL IGNITION SOURCES(FLARES, FLAMES, INCLUDING PILOT LIGHTS, ELECTRICAL SPARKS). PERSONS NOT WEARING PROTECTIVVE EQUIPMENT SHOULD BE EXCLUDED FROM THE AREA OF THE SPILL UNTIL CLEAN-UP HAS BEEN COMPLETED. CONTAIN SPILL TO THE SMALLEST AREA POSSIBLE. DIKE AREA TO PREVENT SPREADING. PREVENT FROM ENTERING DRAINS, SEWERS, STREAMS OR OTHER BODIES OF WATER. RECOVER AS MUCH OF THE PRODUCT AS POSSIBLE BY METHODS SUCH AS VACUUMING AND USE OF ABSORBANT. TRANSFER CONTAMINATED ABSORBENT, SOIL AND OTHER MATERIALS IN PROPER CONTAINERSFOR ULTIMATE DISPOSAL.

WASTE DISPOSAL METHOD:

SMALL SPILL: DISPOSE OF IN ACCORDANCE WITH ALL APPLICABLE FEDERAL, STATE, AND LOCAL REGULATIONS.

LARGE SPILL: DISPOSE OF IN ACCORDANCE WITH ALL APPLICABLE LOCAL, STATE AND FEDERAL REGULATIONS.

SECTION VIII-PROTECTIVE EQUIPMENT TO BE USED

RESPIRATORY PROTECTION: IF WORKPLACE EXPOSURE LIMIT(S) OF PRODUCT OR ANY COMPONENT IS EXCEEDED (SEE SECTION II), A NIOSH/MSHA APPROVED AIR SUPPLIED RESPIRATOR IS ADVISED IN ABSENCE OF PROPER ENVIRONMENTAL CONTROL. OSHA REGULATIONS ALSO PERMIT OTHER NIOSH/MSHA RESPIRATORS (NEGATIVE PRESSURE TYPE) UNDER SPECIFIED CONDITIONS (SEE YOUR INDUSTRIAL HYGIENIST). ENGINEERING OR ADMINISTRATIVE CONTROLS SHOULD BE IMPLEMENTED TO REDUCE EXPOSURE.

VENTILATION: PROVIDE SUFFICIENT MECHANICAL (GENERAL AND/OR LOCAL EXHAUST) VENTILATION TO MAINTAIN EXPOSURE BELOW TLV(S).

PROTECTIVE GLOVES: WEAR RESISTANT GLOVES SUCH AS:, NEOPRENE, NITRILE RUBBER

CONTINUED ON PAGE: 3

Ashland

ASHLAND, KENTUCKY 41114
(606) 329-3333

Telephone
1 (800) 274-5263 or
1-800-ASHLAND

SECTION VIII-PROTECTIVE EQUIPMENT TO BE USED (Continued)

EYE PROTECTION: CHEMICAL SPLASH GOGGLES IN COMPLIANCE WITH OSHA REGULATIONS ARE ADVISED; HOWEVER, OSHA REGULATIONS ALSO PERMIT OTHER TYPE SAFETY GLASSES. CONSULT YOUR SAFETY REPRESENTATIVE.

OTHER PROTECTIVE EQUIPMENT: TO PREVENT REPEATED OR PROLONGED SKIN CONTACT, WEAR IMPERVIOUS CLOTHING AND BOOTS.

SECTION IX-SPECIAL PRECAUTIONS OR OTHER COMMENTS

CONTAINERS OF THIS MATERIAL MAY BE HAZARDOUS WHEN EMPTIED. SINCE EMPTIED CONTAINERS RETAIN PRODUCT RESIDUES (VAPOR, LIQUID, AND/OR SOLID), ALL HAZARD PRECAUTIONS GIVEN IN THIS DATASHEET MUST BE OBSERVED.

THE INFORMATION ACCUMULATED HEREIN IS BELIEVED TO BE ACCURATE BUT IS NOT WARRANTED TO BE WHETHER ORIGINATING WITH THE COMPANY OR NOT. RECIPIENTS ARE ADVISED TO CONFIRM IN ADVANCE OF NEED THAT THE INFORMATION IS CURRENT, APPLICABLE, AND SUITABLE TO THEIR CIRCUMSTANCES.

SECTION X-LABEL INFORMATION

WARNING!

COMBUSTIBLE LIQUID AND VAPOR

MAY CAUSE EYE AND SKIN IRRITATION.

INHALATION OF VAPOR MAY CAUSE IRRITATION OF NASAL AND RESPIRATORY PASSAGES.

SWALLOWING MAY CAUSE IRRITATION OF MOUTH, ESOPHAGUS, AND GASTROINTESTINAL SYSTEM AND MAY BE FATAL.

HANDLING & STORAGE:

KEEP AWAY FROM HEAT AND OPEN FLAME. USE OR STORE ONLY WITH ADEQUATE VENTILATION. MAINTAIN AMBIENT AIR CONCENTRATION(S) OF VOLATILE COMPONENT(S) BELOW PERMISSIBLE EXPOSURE LIMITS. AVOID CONTACT WITH EYES AND PROLONGED OR REPEATED CONTACT WITH SKIN. WEAR SAFETY GLASSES OR GOGGLES, RESISTANT GLOVES, AND OTHER APPROPRIATE PROTECTIVE EQUIPMENT ESSENTIAL FOR YOUR OPERATION. MINIMIZE EXPOSURE THROUGH GOOD HYGIENIC PRACTICES. DO NOT TRANSFER TO UNLABELED CONTAINER. DO NOT USE CUTTING OR WELDING TORCH ON THIS CONTAINER (EVEN EMPTY). FOR INDUSTRIAL USE ONLY. BEFORE USE, REVIEW MATERIAL SAFETY DATA SHEET FOR MORE DETAILED INFORMATION, INCLUDING CHRONIC HEALTH EFFECTS. 24-HOUR EMERGENCY NUMBER 1-800-ASHLAND.

FIRST AID:

EYES: FLUSH THOROUGHLY WITH WATER. GET MEDICAL ATTENTION IMMEDIATELY.

SKIN: WASH THOROUGHLY WITH SOAP AND WATER.

INHALATION: IF AFFECTED, REMOVE TO FRESH AIR. IF BREATHING IS DIFFICULT, GET MEDICAL ATTENTION.

INGESTION: DO NOT INDUCE VOMITING. CALL A PHYSICIAN OR POISON CONTROL CENTER IMMEDIATELY. ASPIRATION HAZARD IF SWALLOWED. CAN ENTER LUNGS AND CAUSE DAMAGE. NEVER GIVE ANYTHING BY MOUTH TO AN UNCONSCIOUS PERSON.

CHRONIC INFORMATION:

CONTAINS: PETROLEUM DISTILLATES.

*** COMPONENTS APPEAR IN SECTION II ***

(606) 329-3333

1 (800) 274-5263 or
1-800-ASHLAND

DEFINITIONS

This definition page is intended for use with Material Safety Data Sheets supplied by the Ashland Petroleum Company. Recipients of these data sheets should consult the OSHA Safety and Health Standards (29 CFR 1910), particularly subpart G - Occupational Health and Environmental Control, and subpart I - Personal Protective Equipment, for general guidance on control of potential Occupational Health and Safety Hazards.

SECTION I
PRODUCT IDENTIFICATION

GENERAL OR GENERIC ID: Chemical family or product description.

DOT HAZARD CLASSIFICATION: Product meets DOT criteria for hazards listed.

SECTION II
COMPONENTS

Components are listed in this section if they present a physical or health hazard and are present at or above 1% in the mixture. If a component is identified as a CARCINOGEN by NTP, IARC or OSHA as of the date on the MSDS, it will be listed and footnoted in this section when present at or above 0.1% in the product. Negative conclusions concerning carcinogenicity are not reported. Additional health information may be found in Section V. Components subject to the reporting requirements of Section 313 of SARA Title III are identified in the footnotes in this section, along with typical percentages. Other components may be listed if deemed appropriate.

Exposure recommendations are for components. OSHA Permissible Exposure Limits (PELs) and American Conference of Governmental Industrial Hygienists (ACGIH) Threshold Limit Values (TLVs) appear on the line with the component identification. Other recommendations appear as footnotes.

SECTION III
PHYSICAL DATA

BOILING POINT: Of product if known. The lowest value of the components is listed for mixtures.

VAPOR PRESSURE: Of product if known. The highest value of the components is listed for mixtures.

SPECIFIC VAPOR DENSITY: Compared to AIR = 1. If Specific Vapor Density of product is not known, the value is expressed as lighter or heavier than air.

SPECIFIC GRAVITY: Compared to WATER = 1. If Specific Gravity of product is not known, the value is expressed as less than or greater than water.

pH: If applicable.

PERCENT VOLATILES: Percentage of material with initial boiling point below 425 degrees Fahrenheit and vapor pressure above 0.1mm Hg at 68 F.

EVAPORATION RATE: Indicated as faster or slower than ETHYL ETHER, unless otherwise stated.

SECTION IV
FIRE AND EXPLOSION DATA

FLASH POINT: Method identified.

EXPLOSION LIMITS: For product if known. The lowest value of the components is listed for mixtures.

HAZARDOUS DECOMPOSITION PRODUCTS: Known or expected hazardous products resulting from heating, burning or other reactions.

EXTINGUISHING MEDIA: Following National Fire Protection Association criteria.

SECTION IV (cont.)

FIREFIGHTING PROCEDURES: Minimum equipment to protect firefighters from toxic products of vaporization, combustion or decomposition in fire situations. Other firefighting hazards may also be indicated.

SPECIAL FIRE AND EXPLOSION HAZARDS: States hazards not covered by other sections.

NFPA CODES: Hazard ratings assigned by the National Fire Protection Association.

SECTION V
HEALTH HAZARD DATA

PERMISSIBLE EXPOSURE LIMIT: For product.

THRESHOLD LIMIT VALUE: For product.

EFFECTS OF ACUTE OVEREXPOSURE: Potential local and systemic effects due to single or short term overexposure to the eyes and skin or through inhalation or ingestion.

EFFECTS OF CHRONIC OVEREXPOSURE: Potential local and systemic effects due to repeated or long term overexposure to the eyes and skin or through inhalation or ingestion.

FIRST AID: Procedures to be followed when dealing with accidental overexposure.

PRIMARY ROUTE OF ENTRY: Based on properties and expected use.

SECTION VI
REACTIVITY DATA

HAZARDOUS POLYMERIZATION: Conditions to avoid to prevent hazardous polymerization resulting in a large release of energy.

STABILITY: Conditions to avoid to prevent hazardous or violent decomposition.

INCOMPATIBILITY: Materials and conditions to avoid to prevent hazardous reactions.

SECTION VII
SPILL OR LEAK PROCEDURES

Reasonable precautions to be taken and methods of containment, clean-up and disposal. Consult federal, state and local regulations for accepted procedures and any reporting or notification requirements.

SECTION VIII
PROTECTIVE EQUIPMENT TO BE USED

Protective equipment which may be needed when handling the product.

SECTION IX
SPECIAL PRECAUTIONS OR OTHER COMMENTS

Covers any relevant points not previously mentioned.

SECTION X
LABEL INFORMATION

Contains label information including physical and health hazard warnings, handling and first aid instructions appropriate for the product.

ADDITIONAL COMMENTS

Containers should be either reconditioned by CERTIFIED firms or properly disposed of by APPROVED firms. Disposal of containers should be in accordance with applicable laws and regulations. "EMPTY" drums should not be given to individuals. Serious accidents have resulted from the misuse of "EMPTIED" containers (drums, pails, etc.). Refer to Sections IV and IX.

MSDS for **DIATOMACEOUS EARTH**

---

1 - PRODUCT IDENTIFICATION

PRODUCT NAME: DIATOMACEOUS EARTH
FORMULA:
FORMULA WT: .00
CAS NO.: 68855-54-9
COMMON SYNONYMS: DIATOMITE; CELITE; KIESELGUHR SODA ASH FLUX CALCINED
PRODUCT CODES: 1939,1939
EFFECTIVE: 09/26/86
REVISION #02

PRECAUTIONARY LABELLING

BAKER SAF-T-DATA(TM) SYSTEM

HEALTH	-	1	SLIGHT
FLAMMABILITY	-	0	NONE
REACTIVITY	-	0	NONE
CONTACT	-	1	SLIGHT

HAZARD RATINGS ARE 0 TO 4 (0 = NO HAZARD; 4 = EXTREME HAZARD).

LABORATORY PROTECTIVE EQUIPMENT

SAFETY GLASSES; LAB COAT

PRECAUTIONARY LABEL STATEMENTS

CAUTION
MAY CAUSE IRRITATION
DURING USE AVOID CONTACT WITH EYES, SKIN, CLOTHING. WASH THOROUGHLY AFTER HANDLING. WHEN NOT IN USE KEEP IN TIGHTLY CLOSED CONTAINER.

SAF-T-DATA(TM) STORAGE COLOR CODE: ORANGE (GENERAL STORAGE)

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2 - HAZARDOUS COMPONENTS

COMPONENT	%	CAS NO.
DIATOMACEOUS EARTH	90-100	68855-54-9

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3 - PHYSICAL DATA

BOILING POINT: N/A
VAPOR PRESSURE(MM HG): N/A
MELTING POINT: N/A
VAPOR DENSITY(AIR=1): N/A
SPECIFIC GRAVITY: 2.30 (H2O=1)
EVAPORATION RATE: N/A (BUTYL ACETATE=1)
SOLUBILITY(H2O): SLIGHT (0.1 TO 1 %)
% VOLATILES BY VOLUME: 0
APPEARANCE & ODOR: WHITE TO PALE GRAY TO PALE BUFF POWDER WITH NO ODOR.

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4 - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (CLOSED CUP N/A

FLAMMABLE LIMITS: UPPER - N/A % LOWER - N/A %

FIRE EXTINGUISHING MEDIA
USE EXTINGUISHING MEDIA APPROPRIATE FOR SURROUNDING FIRE.

TOXIC GASES PRODUCED
OXIDES OF SILICON

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5 - HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE (TLV/TWA): 10 MG/M3 (PPM)

CARCINOGENICITY: NTP: NO IARC: NO Z LIST: NO OSHA REG: NO

EFFECTS OF OVEREXPOSURE
INHALATION OF DUST MAY CAUSE IRRITATION TO UPPER RESPIRATORY TRACT.
CONTACT WITH SKIN OR EYES MAY CAUSE IRRITATION.
PROLONGED EXPOSURE TO EXCESSIVE CONCENTRATIONS OF DUST MAY CAUSE PULMONARY DISEASE.

TARGET ORGANS
NONE IDENTIFIED

MEDICAL CONDITIONS GENERALLY AGGRAVATED BY EXPOSURE
NONE IDENTIFIED

ROUTES OF ENTRY
INHALATION, SKIN CONTACT, EYE CONTACT

EMERGENCY AND FIRST AID PROCEDURES

INGESTION:	IF SWALLOWED AND THE PERSON IS CONSCIOUS, IMMEDIATELY GIVE LARGE AMOUNTS OF WATER. GET MEDICAL ATTENTION.
INHALATION:	IF A PERSON BREATHES IN LARGE AMOUNTS, MOVE THE EXPOSED PERSON TO FRESH AIR. GET MEDICAL ATTENTION.
EYE CONTACT:	IMMEDIATELY FLUSH WITH PLENTY OF WATER FOR AT LEAST 15 MINUTES. GET MEDICAL ATTENTION.
SKIN CONTACT:	IMMEDIATELY WASH WITH PLENTY OF SOAP AND WATER FOR AT LEAST 15 MINUTES.

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6 - REACTIVITY DATA

STABILITY: STABLE HAZARDOUS POLYMERIZATION: WILL NOT OCCUR

CONDITIONS TO AVOID: NONE DOCUMENTED

INCOMPATIBLES: HYDROGEN FLUORIDE

DECOMPOSITION PRODUCTS: OXIDES OF SILICON

7 - SPILL AND DISPOSAL PROCEDURES

STEPS TO BE TAKEN IN THE EVENT OF A SPILL OR DISCHARGE
WEAR SUITABLE PROTECTIVE CLOTHING. CAREFULLY SWEEP UP AND REMOVE.

DISPOSAL PROCEDURE
DISPOSE IN ACCORDANCE WITH ALL APPLICABLE FEDERAL, STATE, AND LOCAL ENVIRONMENTAL REGULATIONS.

8 - PROTECTIVE EQUIPMENT

VENTILATION:	USE ADEQUATE GENERAL OR LOCAL EXHAUST VENTILATION TO KEEP FUME OR DUST LEVELS AS LOW AS POSSIBLE.
RESPIRATORY PROTECTION:	NONE REQUIRED WHERE ADEQUATE VENTILATION CONDITIONS EXIST. IF AIRBORNE CONCENTRATION IS HIGH, USE AN APPROPRIATE RESPIRATOR OR DUST MASK.
EYE/SKIN PROTECTION:	SAFETY GLASSES WITH SIDESHIELDS, PROPER GLOVES ARE RECOMMENDED.

9 - STORAGE AND HANDLING PRECAUTIONS

SAF-T-DATA(TM) STORAGE COLOR CODE: ORANGE (GENERAL STORAGE)

SPECIAL PRECAUTIONS
KEEP CONTAINER TIGHTLY CLOSED. SUITABLE FOR ANY GENERAL CHEMICAL STORAGE AREA.

10 - TRANSPORTATION DATA AND ADDITIONAL INFORMATION

DOMESTIC (D.O.T.)

PROPER SHIPPING NAME CHEMICALS, N.O.S. (NON-REGULATED)

INTERNATIONAL (I.M.O.)

PROPER SHIPPING NAME CHEMICALS, N.O.S. (NON-REGULATED)

BLANK

MSDS for **HYDROCHLORIC ACID**

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1 - PRODUCT IDENTIFICATION

PRODUCT NAME: HYDROCHLORIC ACID
FORMULA: HCL
FORMULA WT: 36.46
CAS NO.: 7647-01-0
NIOSH/RTECS NO.: MW4025000
COMMON SYNONYMS: MURIATIC ACID; CHLOROHYDRIC ACID; HYDROCHLORIDE
PRODUCT CODES: 9543,9539,9535,5367,9534,9544,9529,9542,4800,9549,9530,9548 9540,9547,9546,9537
EFFECTIVE: 08/07/86
REVISION #02

PRECAUTIONARY LABELLING

BAKER SAF-T-DATA(TM) SYSTEM

HEALTH	-	3	SEVERE (POISON)
FLAMMABILITY	-	0	NONE
REACTIVITY	-	2	MODERATE
CONTACT	-	3	SEVERE (CORROSIVE)

HAZARD RATINGS ARE 0 TO 4 (0 = NO HAZARD; 4 = EXTREME HAZARD).

LABORATORY PROTECTIVE EQUIPMENT

GOGGLES & SHIELD; LAB COAT & APRON; VENT HOOD; PROPER GLOVES

PRECAUTIONARY LABEL STATEMENTS

POISON DANGER
CAUSES SEVERE BURNS
MAY BE FATAL IF SWALLOWED OR INHALED

DO NOT GET IN EYES, ON SKIN, ON CLOTHING. DO NOT BREATHE VAPOR. CAUSES DAMAGE TO RESPIRATORY SYSTEM (LUNGS), EYES AND SKIN. KEEP IN TIGHTLY CLOSED CONTAINER. LOOSEN CLOSURE CAUTIOUSLY. USE WITH ADEQUATE VENTILATION. WASH THOROUGHLY AFTER HANDLING. IN CASE OF SPILL NEUTRALIZE WITH SODA ASH OR LIME AND PLACE IN DRY CONTAINER.

SAF-T-DATA(TM) STORAGE COLOR CODE: WHITE (CORROSIVE)

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2 - HAZARDOUS COMPONENTS

COMPONENT	%	CAS NO.
HYDROCHLORIC ACID (23 BAUME)	35-40	7647-01-0

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3 - PHYSICAL DATA

BOILING POINT: 110 C (230 F)
MELTING POINT: -25 C (-13 F)
SPECIFIC GRAVITY: 1.19 (H2O=1)
VAPOR PRESSURE(MM HG): N/A
VAPOR DENSITY(AIR=1): 1.3
EVAPORATION RATE: N/A (BUTYL ACETATE=1)

SOLUBILITY(H2O): COMPLETE (IN ALL PROPORTIONS) % VOLATILES BY VOLUME: 100

APPEARANCE & ODOR: CLEAR, COLORLESS OR SLIGHTLY YELLOW, PUNGENT, FUMING LIQUID.

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4 - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (CLOSED CUP N/A NFPA 704M RATING: 3-0-0

FLAMMABLE LIMITS: UPPER - N/A % LOWER - N/A %

FIRE EXTINGUISHING MEDIA
USE EXTINGUISHING MEDIA APPROPRIATE FOR SURROUNDING FIRE.

SPECIAL FIRE-FIGHTING PROCEDURES
FIREFIGHTERS SHOULD WEAR PROPER PROTECTIVE EQUIPMENT AND SELF-CONTAINED BREATHING APPARATUS WITH FULL FACEPIECE OPERATED IN POSITIVE PRESSURE MODE. MOVE CONTAINERS FROM FIRE AREA IF IT CAN BE DONE WITHOUT RISK. USE WATER TO KEEP FIRE-EXPOSED CONTAINERS COOL.
DO NOT GET WATER INSIDE CONTAINERS.

UNUSUAL FIRE & EXPLOSION HAZARDS
MAY EMIT HYDROGEN GAS UPON CONTACT WITH METAL.

TOXIC GASES PRODUCED
HYDROGEN CHLORIDE, HYDROGEN GAS

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5 - HEALTH HAZARD DATA

PEL AND TLV LISTED DENOTE CEILING LIMIT.

THRESHOLD LIMIT VALUE (TLV/TWA): 7 MG/M3 (5 PPM)

PERMISSIBLE EXPOSURE LIMIT (PEL): 7 MG/M3 (5 PPM)

TOXICITY:	LD50 (ORAL-RABBIT) (MG/KG)	- 900
	LD50 (IPR-MOUSE) (MG/KG)	- 40
	LC50 (INHL-RAT-1H) (PPM)	- 3124

CARCINOGENICITY: NTP: NO IARC: NO Z LIST: NO OSHA REG: NO

EFFECTS OF OVEREXPOSURE
INHALATION OF VAPORS MAY CAUSE PULMONARY EDEMA, CIRCULATORY SYSTEM COLLAPSE, DAMAGE TO UPPER RESPIRATORY SYSTEM, COLLAPSE.
INHALATION OF VAPORS MAY CAUSE COUGHING AND DIFFICULT BREATHING.
LIQUID MAY CAUSE SEVERE BURNS TO SKIN AND EYES.
INGESTION IS HARMFUL AND MAY BE FATAL.
INGESTION MAY CAUSE SEVERE BURNING OF MOUTH AND STOMACH.
INGESTION MAY CAUSE NAUSEA AND VOMITING.

TARGET ORGANS
RESPIRATORY SYSTEM, EYES, SKIN

MEDICAL CONDITIONS GENERALLY AGGRAVATED BY EXPOSURE
NONE IDENTIFIED

ROUTES OF ENTRY
INGESTION, INHALATION, SKIN CONTACT, EYE CONTACT

EMERGENCY AND FIRST AID PROCEDURES
CALL A PHYSICIAN.
IF SWALLOWED, DO NOT INDUCE VOMITING; IF CONSCIOUS, GIVE WATER, MILK, OR MILK OF MAGNESIA.
IF INHALED, REMOVE TO FRESH AIR. IF NOT BREATHING, GIVE ARTIFICIAL RESPIRATION. IF BREATHING IS DIFFICULT, GIVE OXYGEN.
IN CASE OF CONTACT, IMMEDIATELY FLUSH EYES OR SKIN WITH PLENTY OF WATER FOR AT LEAST 15 MINUTES WHILE REMOVING CONTAMINATED CLOTHING AND SHOES.
WASH CLOTHING BEFORE RE-USE.

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6 - REACTIVITY DATA

STABILITY: STABLE HAZARDOUS POLYMERIZATION: WILL NOT OCCUR

CONDITIONS TO AVOID: HEAT, MOISTURE

INCOMPATIBLES: MOST COMMON METALS, WATER, AMINES, METAL OXIDES, ACETIC ANHYDRIDE, PROPIOLACTONE, VINYL ACETATE, MERCURIC SULFATE, CALCIUM PHOSPHIDE, FORMALDEHYDE, ALKALIES, CARBONATES, STRONG BASES, SULFURIC ACID, CHLOROSULFONIC ACID

DECOMPOSITION PRODUCTS: HYDROGEN CHLORIDE, HYDROGEN, CHLORINE

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7 - SPILL AND DISPOSAL PROCEDURES

STEPS TO BE TAKEN IN THE EVENT OF A SPILL OR DISCHARGE
WEAR SELF-CONTAINED BREATHING APPARATUS AND FULL PROTECTIVE CLOTHING. STOP LEAK IF YOU CAN DO SO WITHOUT RISK. VENTILATE AREA. NEUTRALIZE SPILL WITH SODA ASH OR LIME. WITH CLEAN SHOVEL, CAREFULLY PLACE MATERIAL INTO CLEAN, DRY CONTAINER AND COVER; REMOVE FROM AREA. FLUSH SPILL AREA WITH WATER.

J. T. BAKER NEUTRASORB(R) OR NEUTRASOL(R) "LOW NA+" ACID NEUTRALIZERS ARE RECOMMENDED FOR SPILLS OF THIS PRODUCT.

DISPOSAL PROCEDURE
DISPOSE IN ACCORDANCE WITH ALL APPLICABLE FEDERAL, STATE, AND LOCAL ENVIRONMENTAL REGULATIONS.

EPA HAZARDOUS WASTE NUMBER: D002 (CORROSIVE WASTE)

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8 - PROTECTIVE EQUIPMENT

VENTILATION: USE GENERAL OR LOCAL EXHAUST VENTILATION TO MEET TLV REQUIREMENTS.

RESPIRATORY PROTECTION: RESPIRATORY PROTECTION REQUIRED IF AIRBORNE CONCENTRATION EXCEEDS TLV. AT CONCENTRATIONS UP TO 100 PPM, A CHEMICAL CARTRIDGE RESPIRATOR WITH ACID CARTRIDGE IS RECOMMENDED. ABOVE THIS LEVEL, A SELF-CONTAINED BREATHING APPARATUS IS ADVISED.

EYE/SKIN PROTECTION: SAFETY GOGGLES AND FACE SHIELD, UNIFORM, PROTECTIVE SUIT, ACID-RESISTANT GLOVES ARE RECOMMENDED.

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9 - STORAGE AND HANDLING PRECAUTIONS

SAF-T-DATA(TM) STORAGE COLOR CODE: WHITE (CORROSIVE)

SPECIAL PRECAUTIONS
KEEP CONTAINER TIGHTLY CLOSED. STORE IN CORROSION-PROOF AREA.
ISOLATE FROM INCOMPATIBLE MATERIALS.
DO NOT STORE NEAR OXIDIZING MATERIALS.

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10 - TRANSPORTATION DATA AND ADDITIONAL INFORMATION

DOMESTIC (D.O.T.)

PROPER SHIPPING NAME	HYDROCHLORIC ACID
HAZARD CLASS	CORROSIVE MATERIAL (LIQUID)
UN/NA	UN1789
LABELS	CORROSIVE
REPORTABLE QUANTITY	5000 LBS.

INTERNATIONAL (I.M.O.)

PROPER SHIPPING NAME	HYDROCHLORIC ACID, SOLUTION
HAZARD CLASS	8
UN/NA	UN1789
LABELS	CORROSIVE

MSDS for **HYDROGEN PEROXIDE, 30%** Page 1

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1 - PRODUCT IDENTIFICATION

PRODUCT NAME: HYDROGEN PEROXIDE, 30%
FORMULA: H2O2
FORMULA WT: 34.01
CAS NO.: 7722-84-1
NIOSH/RTECS NO.: MX0899000
COMMON SYNONYMS: HYDROGEN PEROXIDE SOLUTION
PRODUCT CODES: 2186,5369,2189,2192,2190,2191,5170
EFFECTIVE: 11/24/86
REVISION #02

PRECAUTIONARY LABELLING

BAKER SAF-T-DATA(TM) SYSTEM

HEALTH	-	2	MODERATE
FLAMMABILITY	-	0	NONE
REACTIVITY	-	3	SEVERE (OXIDIZER)
CONTACT	-	4	EXTREME (CORROSIVE)

HAZARD RATINGS ARE 0 TO 4 (0 = NO HAZARD; 4 = EXTREME HAZARD).

LABORATORY PROTECTIVE EQUIPMENT

GOGGLES & SHIELD; LAB COAT & APRON; VENT HOOD; PROPER GLOVES

PRECAUTIONARY LABEL STATEMENTS

DANGER
CAUSES BURNS
MAY CAUSE EYE INJURY. EFFECTS MAY BE DELAYED.
STRONG OXIDIZER - CONTACT WITH OTHER MATERIAL MAY CAUSE FIRE

KEEP FROM CONTACT WITH CLOTHING AND OTHER COMBUSTIBLE MATERIALS. DO NOT STORE NEAR COMBUSTIBLE MATERIALS. DO NOT GET IN EYES, ON SKIN, ON CLOTHING. AVOID CONTAMINATION FROM ANY SOURCE, METALS, DUST, AND ORGANIC MATERIALS THAT MAY CAUSE RAPID DECOMPOSITION, GENERATION OF LARGE QUANTITIES OF OXYGEN GAS AND HIGH PRESSURE. DRYING OF PRODUCT ON CLOTHING OR COMBUSTIBLE MATERIALS MAY CAUSE FIRE. IN CASE OF FIRE, USE WATER ONLY. FLUSH SPILLS OR LEAKS AWAY BY FLOODING WITH WATER APPLIED QUICKLY TO ENTIRE SPILL OR LEAK.

SAF-T-DATA(TM) STORAGE COLOR CODE: YELLOW (REACTIVE)

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2 - HAZARDOUS COMPONENTS

COMPONENT	%	CAS NO.
HYDROGEN PEROXIDE	30	7722-84-1

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3 - PHYSICAL DATA

BOILING POINT: 106 C (223 F) VAPOR PRESSURE(MM HG): 23.3

MELTING POINT: -28 C (-18 F) VAPOR DENSITY(AIR=1): N/A

SPECIFIC GRAVITY: 1.11 (H2O=1) EVAPORATION RATE: >1 (BUTYL ACETATE=1)

SOLUBILITY(H2O): COMPLETE (IN ALL PROPORTIONS) % VOLATILES BY VOLUME: 100

APPEARANCE & ODOR: CLEAR, COLORLESS LIQUID.

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4 - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (CLOSED CUP N/A NFPA 704M RATING: 2-0-1 OXY

FLAMMABLE LIMITS: UPPER - N/A % LOWER - N/A %

FIRE EXTINGUISHING MEDIA
USE WATER SPRAY.

SPECIAL FIRE-FIGHTING PROCEDURES
FIREFIGHTERS SHOULD WEAR PROPER PROTECTIVE EQUIPMENT AND SELF-CONTAINED BREATHING APPARATUS WITH FULL FACEPIECE OPERATED IN POSITIVE PRESSURE MODE. MOVE CONTAINERS FROM FIRE AREA IF IT CAN BE DONE WITHOUT RISK. USE WATER TO KEEP FIRE-EXPOSED CONTAINERS COOL.

UNUSUAL FIRE & EXPLOSION HAZARDS
STRONG OXIDIZER. CONTACT WITH OTHER MATERIAL MAY CAUSE FIRE.

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5 - HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE (TLV/TWA): 1.5 MG/M3 (1 PPM)

PERMISSIBLE EXPOSURE LIMIT (PEL): 1.4 MG/M3 (1 PPM)

CARCINOGENICITY: NTP: NO IARC: NO Z LIST: NO OSHA REG: NO

EFFECTS OF OVEREXPOSURE
INHALATION OF VAPORS MAY CAUSE SEVERE IRRITATION OF THE RESPIRATORY SYSTEM.
CONTACT WITH SKIN OR EYES MAY CAUSE SEVERE IRRITATION OR BURNS.
PROLONGED CONTACT MAY CAUSE SEVERE EYE DAMAGE, WHICH CAN BE DELAYED, POSSIBLE BLINDNESS.
INGESTION MAY BE IRRITATING TO ESOPHAGUS AND STOMACH, CAUSING BLEEDING AND SUDDEN DISTENTION.

TARGET ORGANS
EYES, SKIN

MEDICAL CONDITIONS GENERALLY AGGRAVATED BY EXPOSURE
NONE IDENTIFIED

ROUTES OF ENTRY
EYE CONTACT, SKIN CONTACT, INHALATION, INGESTION

EMERGENCY AND FIRST AID PROCEDURES
CALL A PHYSICIAN.
IF SWALLOWED, IF CONSCIOUS, IMMEDIATELY INDUCE VOMITING.
IF INHALED, REMOVE TO FRESH AIR. IF NOT BREATHING, GIVE ARTIFICIAL RESPIRATION. IF BREATHING IS DIFFICULT, GIVE OXYGEN.
IN CASE OF CONTACT, IMMEDIATELY FLUSH EYES OR SKIN WITH PLENTY OF WATER FOR AT LEAST 15 MINUTES WHILE REMOVING CONTAMINATED CLOTHING AND SHOES.
WASH CLOTHING BEFORE RE-USE.

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6 - REACTIVITY DATA

STABILITY: UNSTABLE HAZARDOUS POLYMERIZATION: WILL NOT OCCUR

CONDITIONS TO AVOID: HEAT

INCOMPATIBLES: COMBUSTIBLE MATERIALS, STRONG REDUCING AGENTS, MOST COMMON METALS, ORGANIC MATERIALS, METALLIC SALTS, ALKALIES, POROUS MATERIALS; ESP. WOOD, ASBESTOS, SOIL, RUST, STRONG OXIDIZING AGENTS

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7 - SPILL AND DISPOSAL PROCEDURES

STEPS TO BE TAKEN IN THE EVENT OF A SPILL OR DISCHARGE
WEAR SELF-CONTAINED BREATHING APPARATUS AND FULL PROTECTIVE CLOTHING.
STOP LEAK IF YOU CAN DO SO WITHOUT RISK. KEEP COMBUSTIBLES (WOOD, PAPER, OIL, ETC.) AWAY FROM SPILLED MATERIAL. FLUSH AREA WITH FLOODING AMOUNTS OF WATER. (USE CAUTION.)

DISPOSAL PROCEDURE
DISPOSE IN ACCORDANCE WITH ALL APPLICABLE FEDERAL, STATE, AND LOCAL ENVIRONMENTAL REGULATIONS.

EPA HAZARDOUS WASTE NUMBER: D002, D003 (CORROSIVE, REACTIVE WASTE)

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8 - PROTECTIVE EQUIPMENT

VENTILATION: USE GENERAL OR LOCAL EXHAUST VENTILATION TO MEET TLV REQUIREMENTS.

RESPIRATORY PROTECTION: RESPIRATORY PROTECTION REQUIRED IF AIRBORNE CONCENTRATION EXCEEDS TLV. AT CONCENTRATIONS ABOVE 1 PPM, A SELF-CONTAINED BREATHING APPARATUS IS ADVISED.

EYE/SKIN PROTECTION: SAFETY GOGGLES AND FACE SHIELD, UNIFORM, PROTECTIVE SUIT, ACID-RESISTANT GLOVES ARE RECOMMENDED.

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9 - STORAGE AND HANDLING PRECAUTIONS

SAF-T-DATA(TM) STORAGE COLOR CODE: YELLOW (REACTIVE)

SPECIAL PRECAUTIONS
KEEP CONTAINER TIGHTLY CLOSED. STORE SEPARATELY AND AWAY FROM FLAMMABLE AND COMBUSTIBLE MATERIALS.
KEEP CONTAINERS OUT OF SUN AND AWAY FROM HEAT.
CONTAINERS SHOULD BE COVERED AND VENTED.

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10 - TRANSPORTATION DATA AND ADDITIONAL INFORMATION

DOMESTIC (D.O.T.)

PROPER SHIPPING NAME	HYDROGEN PEROXIDE SOLUTION
HAZARD CLASS	OXIDIZER
UN/NA	UN2014
LABELS	OXIDIZER

INTERNATIONAL (I.M.O.)

PROPER SHIPPING NAME	HYDROGEN PEROXIDE, 20% UP TO 60% PEROXIDE
HAZARD CLASS	5.1
UN/NA	UN2014
LABELS	OXIDIZING AGENT, CORROSIVE

MATERIAL SAFETY DATA SHEET

NOAH TECHNOLOGIES 7001 Fairgrounds Pkwy, San Antonio, TX 78238
TELEPHONE 512-680-9000 EMERGENCY CALL CHEMTREC 800-424-9300

The following information is accurate to the best of our knowledge. However, since data, safety standards and government regulations are subject to change and the conditions of handling and use, or misuse are beyond our control. NOAH MAKES NO WARRANTY, EITHER EXPRESSED OR IMPLIED, WITH RESPECT TO THE COMPLETENESS OR CONTINUING ACCURACY OF THE INFORMATION CONTAINED HEREIN AND DISCLAIMS ALL LIABILITY FOR RELIANCE THEREON. User should satisfy himself that he has all current data relevant to his particular use.

PRODUCT IDENTIFICATION

PRODUCT NAME: IRON (III) HYDROXIDE SLURRY
Chemical name: Iron (III) Hydroxide Slurry
Formula: $Fe(OH)_3.xH_2O$
Synonyms: Ferric Hydroxide
CAS #: 51247-00-1 Chemical Family: Iron Salt

HAZARDOUS INGREDIENTS

Materials or Components	%	Hazard data
Ferric Hydroxide	10-30	No Tox. Data Available

PHYSICAL PROPERTIES

Boiling Point/Range: decomposes Melting Point: N/A
Freezing Point: N/A Molecular Weight(Calc.): 106.87
Specific Gravity(H_2O=1): 3.7
Vapor Density (Air=1): N/A % Volatiles by Volume: N/A
Solubility in H_2O: insoluble
Evaporation Rate: N/A
Vapor Pressure (mm Hg): N/A
Appearance & odor: Red brown pasty liquid, odorless
Other: N/A

FIRE and EXPLOSION DATA

Flash Point/Test Method: Non-flammable
Flammable Limits - Lower: N/A Upper: N/A
Autoignition Temperature: N/A
EXTINGUISHING MEDIA: Water-spray
SPECIAL FIRE FIGHTING PROCEDURES: N/A
UNUSUAL FIRE and EXPLOSION HAZARDS: N/A

REACTIVITY DATA

STABILITY: Stable
CONDITIONS CONTRIBUTING TO UNSTABILITY: N/A
INCOMPATABILITY (Avoid contact with): N/A
HAZARDOUS DECOMPOSITION PRODUCTS (Thermal and Other):
Iron Oxide Fumes
CONDITIONS TO AVOID:
Heat

MSDS for **FERRIC OXIDE**

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1 - PRODUCT IDENTIFICATION

PRODUCT NAME: FERRIC OXIDE
FORMULA: FE2O3
FORMULA WT: 159.69
CAS NO.: 1309-37-1
NIOSH/RTECS NO.: NO7400000
COMMON SYNONYMS: IRON(III)OXIDE; RED IRON OXIDE; C.I. 77491
PRODUCT CODES: 2024
EFFECTIVE: 05/05/86
REVISION #01

PRECAUTIONARY LABELLING

BAKER SAF-T-DATA(TM) SYSTEM

HEALTH	-	1	SLIGHT
FLAMMABILITY	-	0	NONE
REACTIVITY	-	1	SLIGHT
CONTACT	-	1	SLIGHT

HAZARD RATINGS ARE 0 TO 4 (0 = NO HAZARD; 4 = EXTREME HAZARD).

LABORATORY PROTECTIVE EQUIPMENT

SAFETY GLASSES; LAB COAT

PRECAUTIONARY LABEL STATEMENTS

CAUTION
MAY CAUSE IRRITATION
DURING USE AVOID CONTACT WITH EYES, SKIN, CLOTHING. WASH THOROUGHLY AFTER HANDLING. WHEN NOT IN USE KEEP IN TIGHTLY CLOSED CONTAINER.

SAF-T-DATA(TM) STORAGE COLOR CODE: ORANGE (GENERAL STORAGE)

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2 - HAZARDOUS COMPONENTS

COMPONENT	%	CAS NO.
FERRIC OXIDE	90-100	1309-37-1

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3 - PHYSICAL DATA

BOILING POINT: N/A
VAPOR PRESSURE(MM HG): N/A

MELTING POINT: 1565 C (2849 F)
VAPOR DENSITY(AIR=1): N/A

SPECIFIC GRAVITY: 5.24 (H2O=1)
EVAPORATION RATE: N/A (BUTYL ACETATE=1)

SOLUBILITY(H2O): NEGLIGIBLE (LESS THAN 0.1 %) % VOLATILES BY VOLUME: 0

APPEARANCE & ODOR: RED TO REDDISH-BROWN, ODORLESS POWDER.

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4 - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (CLOSED CUP N/A

FLAMMABLE LIMITS: UPPER - N/A % LOWER - N/A %

FIRE EXTINGUISHING MEDIA
USE EXTINGUISHING MEDIA APPROPRIATE FOR SURROUNDING FIRE.

SPECIAL FIRE-FIGHTING PROCEDURES
FIREFIGHTERS SHOULD WEAR PROPER PROTECTIVE EQUIPMENT AND SELF-CONTAINED BREATHING APPARATUS WITH FULL FACEPIECE OPERATED IN POSITIVE PRESSURE MODE.

---

5 - HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE (TLV/TWA): 5 MG/M3 (PPM)

CARCINOGENICITY: NTP: NO IARC: NO Z LIST: NO OSHA REG: NO

EFFECTS OF OVEREXPOSURE
DUST MAY IRRITATE EYES.
INHALATION OF DUST MAY CAUSE IRRITATION TO UPPER RESPIRATORY TRACT.

TARGET ORGANS
NONE IDENTIFIED

MEDICAL CONDITIONS GENERALLY AGGRAVATED BY EXPOSURE
NONE IDENTIFIED

ROUTES OF ENTRY
NONE INDICATED

EMERGENCY AND FIRST AID PROCEDURES

INGESTION:	IF SWALLOWED AND THE PERSON IS CONSCIOUS, IMMEDIATELY GIVE LARGE AMOUNTS OF WATER. GET MEDICAL ATTENTION.
INHALATION:	IF A PERSON BREATHES IN LARGE AMOUNTS, MOVE THE EXPOSED PERSON TO FRESH AIR. GET MEDICAL ATTENTION.
EYE CONTACT:	IMMEDIATELY FLUSH WITH PLENTY OF WATER FOR AT LEAST 15 MINUTES. GET MEDICAL ATTENTION.
SKIN CONTACT:	IMMEDIATELY WASH WITH PLENTY OF SOAP AND WATER FOR AT LEAST 15 MINUTES.

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6 - REACTIVITY DATA

STABILITY: STABLE HAZARDOUS POLYMERIZATION: WILL NOT OCCUR

CONDITIONS TO AVOID: NONE DOCUMENTED

7 - SPILL AND DISPOSAL PROCEDURES

STEPS TO BE TAKEN IN THE EVENT OF A SPILL OR DISCHARGE
WEAR SUITABLE PROTECTIVE CLOTHING. CAREFULLY SWEEP UP AND REMOVE.

DISPOSAL PROCEDURE
DISPOSE IN ACCORDANCE WITH ALL APPLICABLE FEDERAL, STATE, AND LOCAL ENVIRONMENTAL REGULATIONS.

8 - PROTECTIVE EQUIPMENT

VENTILATION:	USE GENERAL OR LOCAL EXHAUST VENTILATION TO MEET TLV REQUIREMENTS.
RESPIRATORY PROTECTION:	NONE REQUIRED WHERE ADEQUATE VENTILATION CONDITIONS EXIST. IF AIRBORNE CONCENTRATION EXCEEDS TLV, A SELF-CONTAINED BREATHING APPARATUS IS ADVISED.
EYE/SKIN PROTECTION:	SAFETY GLASSES WITH SIDESHIELDS, PROPER GLOVES ARE RECOMMENDED.

9 - STORAGE AND HANDLING PRECAUTIONS

SAF-T-DATA(TM) STORAGE COLOR CODE: ORANGE (GENERAL STORAGE)

SPECIAL PRECAUTIONS
KEEP CONTAINER TIGHTLY CLOSED. SUITABLE FOR ANY GENERAL CHEMICAL STORAGE AREA.

10 - TRANSPORTATION DATA AND ADDITIONAL INFORMATION

DOMESTIC (D.O.T.)

PROPER SHIPPING NAME CHEMICALS, N.O.S. (NON-REGULATED)

INTERNATIONAL (I.M.O.)

PROPER SHIPPING NAME CHEMICALS, N.O.S. (NON-REGULATED)

MSDS for **LITHIUM CARBONATE** Page 1

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1 - PRODUCT IDENTIFICATION

PRODUCT NAME: LITHIUM CARBONATE
FORMULA: LI2CO3
FORMULA WT: 73.89
CAS NO.: 00554-13-2
NIOSH/RTECS NO.: OJ5800000
COMMON SYNONYMS: CARBONIC ACID, DILITHIUM SALT; CARBONIC ACID LITHIUM SALT; DILITHIUM CARBONATE
PRODUCT CODES: 4919,2362
EFFECTIVE: 09/26/85
REVISION #01

PRECAUTIONARY LABELLING

BAKER SAF-T-DATA(TM) SYSTEM

HEALTH	-	2	MODERATE
FLAMMABILITY	-	0	NONE
REACTIVITY	-	0	NONE
CONTACT	-	1	SLIGHT

HAZARD RATINGS ARE 0 TO 4 (0 = NO HAZARD; 4 = EXTREME HAZARD).

LABORATORY PROTECTIVE EQUIPMENT

SAFETY GLASSES; LAB COAT

PRECAUTIONARY LABEL STATEMENTS

WARNING
HARMFUL IF SWALLOWED
AVOID CONTACT WITH EYES, SKIN, CLOTHING. KEEP IN TIGHTLY CLOSED CONTAINER. WASH THOROUGHLY AFTER HANDLING.

SAF-T-DATA(TM) STORAGE COLOR CODE: ORANGE (GENERAL STORAGE)

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2 - HAZARDOUS COMPONENTS

COMPONENT	%	CAS NO.
LITHIUM CARBONATE	90-100	554-13-2

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3 - PHYSICAL DATA

BOILING POINT: N/A
VAPOR PRESSURE(MM HG): N/A
MELTING POINT: 720 C (1328 F)
VAPOR DENSITY(AIR=1): N/A
SPECIFIC GRAVITY: 2.11 (H2O=1)
EVAPORATION RATE: N/A (BUTYL ACETATE=1)
SOLUBILITY(H2O): MODERATE (1 TO 10 %)
% VOLATILES BY VOLUME: N/A
APPEARANCE & ODOR: WHITE ODORLESS POWDER.

---

4 - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (CLOSED CUP N/A

FLAMMABLE LIMITS: UPPER - N/A % LOWER - N/A %

FIRE EXTINGUISHING MEDIA
USE EXTINGUISHING MEDIA APPROPRIATE FOR SURROUNDING FIRE.

---

5 - HEALTH HAZARD DATA

TOXICITY:	LD50 (ORAL-RAT) (MG/KG)	- 525
	LD50 (IPR-RAT) (MG/KG)	- 156
	LD50 (SCU-RAT) (MG/KG)	- 434
	LD50 (IV-RAT) (MG/KG)	- 241

CARCINOGENICITY: NTP: NO IARC: NO Z LIST: NO OSHA REG: NO

EFFECTS OF OVEREXPOSURE
CONTACT WITH SKIN OR EYES MAY CAUSE IRRITATION.
INGESTION MAY CAUSE ACUTE LOCAL TISSUE DAMAGE, WITH OTHER EFFECTS RANGING FROM NAUSEA AND DIZZINESS TO UNCONSCIOUSNESS.
INGESTION MAY CAUSE CENTRAL NERVOUS SYSTEM DEPRESSION.
CHRONIC EFFECTS OF OVEREXPOSURE MAY INCLUDE KIDNEY AND/OR LIVER DAMAGE.

TARGET ORGANS
NONE IDENTIFIED

MEDICAL CONDITIONS GENERALLY AGGRAVATED BY EXPOSURE
NONE IDENTIFIED

ROUTES OF ENTRY
NONE INDICATED

EMERGENCY AND FIRST AID PROCEDURES
CALL A PHYSICIAN.
IF SWALLOWED, IF CONSCIOUS, IMMEDIATELY INDUCE VOMITING.

---

6 - REACTIVITY DATA

STABILITY: STABLE HAZARDOUS POLYMERIZATION: WILL NOT OCCUR

CONDITIONS TO AVOID: MOISTURE

INCOMPATIBLES: FLUORINE, WATER, STRONG ACIDS

---

7 - SPILL AND DISPOSAL PROCEDURES

STEPS TO BE TAKEN IN THE EVENT OF A SPILL OR DISCHARGE
WEAR SELF-CONTAINED BREATHING APPARATUS AND FULL PROTECTIVE CLOTHING. WITH CLEAN SHOVEL, CAREFULLY PLACE MATERIAL INTO CLEAN, DRY CONTAINER AND COVER; REMOVE FROM AREA. FLUSH SPILL AREA WITH WATER.

J. T. BAKER NEUTRACIT-2(R) CAUSTIC NEUTRALIZER IS RECOMMENDED FOR SPILLS OF THIS PRODUCT.

DISPOSAL PROCEDURE
DISPOSE IN ACCORDANCE WITH ALL APPLICABLE FEDERAL, STATE, AND LOCAL ENVIRONMENTAL REGULATIONS.

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8 - PROTECTIVE EQUIPMENT

VENTILATION:	USE ADEQUATE GENERAL OR LOCAL EXHAUST VENTILATION TO KEEP FUME OR DUST LEVELS AS LOW AS POSSIBLE.
RESPIRATORY PROTECTION:	NONE REQUIRED WHERE ADEQUATE VENTILATION CONDITIONS EXIST. IF AIRBORNE CONCENTRATION IS HIGH, USE AN APPROPRIATE RESPIRATOR OR DUST MASK.
EYE/SKIN PROTECTION:	SAFETY GLASSES WITH SIDESHIELDS, PROPER GLOVES ARE RECOMMENDED.

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9 - STORAGE AND HANDLING PRECAUTIONS

SAF-T-DATA(TM) STORAGE COLOR CODE: ORANGE (GENERAL STORAGE)

SPECIAL PRECAUTIONS
KEEP CONTAINER TIGHTLY CLOSED. SUITABLE FOR ANY GENERAL CHEMICAL STORAGE AREA.

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10 - TRANSPORTATION DATA AND ADDITIONAL INFORMATION

DOMESTIC (D.O.T.)

PROPER SHIPPING NAME CHEMICALS, N.O.S. (NON-REGULATED)

INTERNATIONAL (I.M.O.)

PROPER SHIPPING NAME CHEMICALS, N.O.S. (NON-REGULATED)

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MSDS for **MAGNESIUM CARBONATE, N-HYDRATE** Page 1

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1 - PRODUCT IDENTIFICATION

PRODUCT NAME: MAGNESIUM CARBONATE, N-HYDRATE
FORMULA: 4MGCO3 NH2O
FORMULA WT: .00
CAS NO.: 23389-33-5
NIOSH/RTECS NO.: OM2470000
COMMON SYNONYMS: MAGNESIUM(II)CARBONATE, HYDRATE
PRODUCT CODES: 2436,2439,2432
EFFECTIVE: 05/05/86
REVISION #02

PRECAUTIONARY LABELLING

BAKER SAF-T-DATA(TM) SYSTEM

HEALTH	-	1	SLIGHT
FLAMMABILITY	-	0	NONE
REACTIVITY	-	1	SLIGHT
CONTACT	-	0	NONE

HAZARD RATINGS ARE 0 TO 4 (0 = NO HAZARD; 4 = EXTREME HAZARD).

LABORATORY PROTECTIVE EQUIPMENT

SAFETY GLASSES; LAB COAT

PRECAUTIONARY LABEL STATEMENTS

CAUTION
MAY CAUSE IRRITATION
DURING USE AVOID CONTACT WITH EYES, SKIN, CLOTHING. WASH THOROUGHLY AFTER HANDLING. WHEN NOT IN USE KEEP IN TIGHTLY CLOSED CONTAINER.

SAF-T-DATA(TM) STORAGE COLOR CODE: ORANGE (GENERAL STORAGE)

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2 - HAZARDOUS COMPONENTS

COMPONENT	%	CAS NO.
NOT APPLICABLE		

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3 - PHYSICAL DATA

BOILING POINT: N/A
VAPOR PRESSURE(MM HG): N/A
MELTING POINT: N/A
VAPOR DENSITY(AIR=1): N/A
SPECIFIC GRAVITY: 2.95 (H2O=1)
EVAPORATION RATE: N/A (BUTYL ACETATE=1)
SOLUBILITY(H2O): NEGLIGIBLE (LESS THAN 0.1 %) % VOLATILES BY VOLUME: 0
APPEARANCE & ODOR: ODORLESS WHITE POWDER.

---

4 - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (CLOSED CUP N/A

FLAMMABLE LIMITS: UPPER - N/A % LOWER - N/A %

FIRE EXTINGUISHING MEDIA
USE EXTINGUISHING MEDIA APPROPRIATE FOR SURROUNDING FIRE.

---

5 - HEALTH HAZARD DATA

CARCINOGENICITY: NTP: NO IARC: NO Z LIST: NO OSHA REG: NO

EFFECTS OF OVEREXPOSURE
EXCESSIVE INHALATION OF DUST IS IRRITATING.

TARGET ORGANS
NONE IDENTIFIED

MEDICAL CONDITIONS GENERALLY AGGRAVATED BY EXPOSURE
NONE IDENTIFIED

ROUTES OF ENTRY
NONE INDICATED

EMERGENCY AND FIRST AID PROCEDURES

INGESTION:	IF SWALLOWED AND THE PERSON IS CONSCIOUS, IMMEDIATELY GIVE LARGE AMOUNTS OF WATER. GET MEDICAL ATTENTION.
INHALATION:	IF A PERSON BREATHES IN LARGE AMOUNTS, MOVE THE EXPOSED PERSON TO FRESH AIR. GET MEDICAL ATTENTION.
EYE CONTACT:	IMMEDIATELY FLUSH WITH PLENTY OF WATER FOR AT LEAST 15 MINUTES. GET MEDICAL ATTENTION.
SKIN CONTACT:	IMMEDIATELY WASH WITH PLENTY OF SOAP AND WATER FOR AT LEAST 15 MINUTES.

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6 - REACTIVITY DATA

STABILITY: STABLE HAZARDOUS POLYMERIZATION: WILL NOT OCCUR

INCOMPATIBLES: STRONG ACIDS

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7 - SPILL AND DISPOSAL PROCEDURES

STEPS TO BE TAKEN IN THE EVENT OF A SPILL OR DISCHARGE
WEAR SUITABLE PROTECTIVE CLOTHING. CAREFULLY SWEEP UP AND REMOVE.

DISPOSAL PROCEDURE
DISPOSE IN ACCORDANCE WITH ALL APPLICABLE FEDERAL, STATE, AND LOCAL ENVIRONMENTAL REGULATIONS.

---

8 - PROTECTIVE EQUIPMENT

VENTILATION: USE ADEQUATE GENERAL OR LOCAL EXHAUST VENTILATION TO KEEP FUME OR DUST LEVELS AS LOW AS POSSIBLE.

RESPIRATORY PROTECTION: NONE REQUIRED WHERE ADEQUATE VENTILATION CONDITIONS EXIST. IF AIRBORNE CONCENTRATION IS HIGH, USE AN APPROPRIATE RESPIRATOR OR DUST MASK.

EYE/SKIN PROTECTION: SAFETY GLASSES WITH SIDESHIELDS, RUBBER GLOVES ARE RECOMMENDED.

---

9 - STORAGE AND HANDLING PRECAUTIONS

SAF-T-DATA(TM) STORAGE COLOR CODE: ORANGE (GENERAL STORAGE)

SPECIAL PRECAUTIONS
KEEP CONTAINER TIGHTLY CLOSED. SUITABLE FOR ANY GENERAL CHEMICAL STORAGE AREA.

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10 - TRANSPORTATION DATA AND ADDITIONAL INFORMATION

DOMESTIC (D.O.T.)

PROPER SHIPPING NAME CHEMICALS, N.O.S. (NON-REGULATED)

INTERNATIONAL (I.M.O.)

PROPER SHIPPING NAME CHEMICALS, N.O.S. (NON-REGULATED)

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MSDS for **MANGANESE DIOXIDE**

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1 - PRODUCT IDENTIFICATION

PRODUCT NAME: MANGANESE DIOXIDE
FORMULA: MNO2
FORMULA WT: 86.94
CAS NO.: 1313-13-9
NIOSH/RTECS NO.: OP0350000
COMMON SYNONYMS: BLACK MANGANESE OXIDE; CEMENT BLACK; MANGANESE (IV) OXIDE
PRODUCT CODES: Z134,2526,8392,5308,2527,5298
EFFECTIVE: 09/08/86
REVISION #02

PRECAUTIONARY LABELLING

BAKER SAF-T-DATA(TM) SYSTEM

HEALTH	-	1	SLIGHT
FLAMMABILITY	-	0	NONE
REACTIVITY	-	1	SLIGHT
CONTACT	-	1	SLIGHT

HAZARD RATINGS ARE 0 TO 4 (0 = NO HAZARD; 4 = EXTREME HAZARD).

LABORATORY PROTECTIVE EQUIPMENT

SAFETY GLASSES; LAB COAT

PRECAUTIONARY LABEL STATEMENTS

WARNING
CAUSES IRRITATION
HARMFUL IF INHALED

DURING USE AVOID CONTACT WITH EYES, SKIN, CLOTHING. WASH THOROUGHLY AFTER HANDLING. WHEN NOT IN USE KEEP IN TIGHTLY CLOSED CONTAINER.

SAF-T-DATA(TM) STORAGE COLOR CODE: ORANGE (GENERAL STORAGE)

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2 - HAZARDOUS COMPONENTS

COMPONENT	%	CAS NO.
MANGANESE DIOXIDE	90-100	1313-13-9

---

3 - PHYSICAL DATA

BOILING POINT: N/A
VAPOR PRESSURE(MM HG): N/A

MELTING POINT: 535 C (995 F)
VAPOR DENSITY(AIR=1): N/A

SPECIFIC GRAVITY: 5.02 (H2O=1)
EVAPORATION RATE: N/A (BUTYL ACETATE=1)

SOLUBILITY(H2O): NEGLIGIBLE (LESS THAN 0.1 %) % VOLATILES BY VOLUME: N/A

APPEARANCE & ODOR: ODORLESS BLACK CRYSTALLINE POWDER.

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MSDS for **SODIUM SULFATE** Page 1

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1 - PRODUCT IDENTIFICATION

PRODUCT NAME: SODIUM SULFATE
FORMULA: NA2SO4
FORMULA WT: 142.04
CAS NO.: 7757-82-6
NIOSH/RTECS NO.: WE1650000
PRODUCT CODES: 3375,3887,3902,3891,3898,5059
EFFECTIVE: 05/02/86
REVISION #01

PRECAUTIONARY LABELLING

BAKER SAF-T-DATA(TM) SYSTEM

HEALTH	-	0	NONE
FLAMMABILITY	-	0	NONE
REACTIVITY	-	0	NONE
CONTACT	-	1	SLIGHT

HAZARD RATINGS ARE 0 TO 4 (0 = NO HAZARD; 4 = EXTREME HAZARD).

LABORATORY PROTECTIVE EQUIPMENT

SAFETY GLASSES; LAB COAT

PRECAUTIONARY LABEL STATEMENTS

CAUTION
MAY BE HARMFUL IF SWALLOWED
MAY CAUSE IRRITATION

DURING USE AVOID CONTACT WITH EYES, SKIN, CLOTHING. WASH THOROUGHLY AFTER HANDLING. WHEN NOT IN USE KEEP IN TIGHTLY CLOSED CONTAINER.

SAF-T-DATA(TM) STORAGE COLOR CODE: ORANGE (GENERAL STORAGE)

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2 - HAZARDOUS COMPONENTS

COMPONENT	%	CAS NO.
NOT APPLICABLE		

---

3 - PHYSICAL DATA

BOILING POINT: N/A
VAPOR PRESSURE(MM HG): N/A

MELTING POINT: 884 C (1623 F)
VAPOR DENSITY(AIR=1): N/A

SPECIFIC GRAVITY: 2.68 (H2O=1)
EVAPORATION RATE: N/A (BUTYL ACETATE=1)

SOLUBILITY(H2O): APPRECIABLE (MORE THAN 10 %) % VOLATILES BY VOLUME: 0

APPEARANCE & ODOR: ODORLESS, WHITE POWDER OR CRYSTALS.

---

4 - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (CLOSED CUP N/A

FLAMMABLE LIMITS: UPPER - N/A % LOWER - N/A %

FIRE EXTINGUISHING MEDIA
USE EXTINGUISHING MEDIA APPROPRIATE FOR SURROUNDING FIRE.

SPECIAL FIRE-FIGHTING PROCEDURES
FIREFIGHTERS SHOULD WEAR PROPER PROTECTIVE EQUIPMENT AND SELF-CONTAINED (POSITIVE PRESSURE IF AVAILABLE) BREATHING APPARATUS WITH FULL FACEPIECE.
MOVE EXPOSED CONTAINERS FROM FIRE AREA IF IT CAN BE DONE WITHOUT RISK.
USE WATER TO KEEP FIRE-EXPOSED CONTAINERS COOL.

UNUSUAL FIRE & EXPLOSION HAZARDS
STRONG OXIDIZER. CONTACT WITH OTHER MATERIAL MAY CAUSE FIRE.

---

5 - HEALTH HAZARD DATA

TLV LISTED DENOTES CEILING LIMIT.

THRESHOLD LIMIT VALUE (TLV/TWA): 5 MG/M3 (PPM)

CARCINOGENICITY: NTP: NO IARC: NO Z LIST: NO OSHA REG: NO

EFFECTS OF OVEREXPOSURE
DUST MAY IRRITATE SKIN OR EYES.
INHALATION OF EXCESSIVE AMOUNTS OF DUST MAY CAUSE NAUSEA, WEAKNESS, CHILLS, AND LOSS OF APPETITE.
INHALATION OF DUST MAY CAUSE IRRITATION TO UPPER RESPIRATORY TRACT.
INGESTION MAY CAUSE CENTRAL NERVOUS SYSTEM DEPRESSION.
PROLONGED INHALATION OF MANGANESE IN THE FORM OF ITS INORGANIC COMPOUNDS MAY CAUSE MANGANISM.

TARGET ORGANS
RESPIRATORY SYSTEM, CENTRAL NERVOUS SYSTEM, BLOOD, KIDNEYS

MEDICAL CONDITIONS GENERALLY AGGRAVATED BY EXPOSURE
NONE IDENTIFIED

ROUTES OF ENTRY
INGESTION, INHALATION

EMERGENCY AND FIRST AID PROCEDURES

INGESTION:	IF SWALLOWED AND THE PERSON IS CONSCIOUS, IMMEDIATELY GIVE LARGE AMOUNTS OF WATER. GET MEDICAL ATTENTION.
INHALATION:	IF A PERSON BREATHES IN LARGE AMOUNTS, MOVE THE EXPOSED PERSON TO FRESH AIR. GET MEDICAL ATTENTION.
EYE CONTACT:	IMMEDIATELY FLUSH WITH PLENTY OF WATER FOR AT LEAST 15 MINUTES. GET MEDICAL ATTENTION.
SKIN CONTACT:	IMMEDIATELY WASH WITH PLENTY OF SOAP AND WATER FOR AT LEAST 15 MINUTES.

---

6 - REACTIVITY DATA

STABILITY: STABLE HAZARDOUS POLYMERIZATION: WILL NOT OCCUR

CONDITIONS TO AVOID: HEAT, FLAME, OTHER SOURCES OF IGNITION

INCOMPATIBLES: STRONG OXIDIZING AGENTS, STRONG ACIDS, STRONG REDUCING AGENTS, NITRATES, COMBUSTIBLE MATERIALS, HYDROGEN PEROXIDE, AZIDES, CHLORINE, CHLORATES, CHLORINE TRIFLUORIDE

---

7 - SPILL AND DISPOSAL PROCEDURES

STEPS TO BE TAKEN IN THE EVENT OF A SPILL OR DISCHARGE
WEAR SUITABLE PROTECTIVE CLOTHING. KEEP COMBUSTIBLES (WOOD, PAPER, OIL, ETC.) AWAY FROM SPILLED MATERIAL. WITH CLEAN SHOVEL, CAREFULLY PLACE MATERIAL INTO CLEAN, DRY CONTAINER AND COVER; REMOVE FROM AREA. FLUSH SPILL AREA WITH WATER.

DISPOSAL PROCEDURE
DISPOSE IN ACCORDANCE WITH ALL APPLICABLE FEDERAL, STATE, AND LOCAL ENVIRONMENTAL REGULATIONS.

---

8 - PROTECTIVE EQUIPMENT

VENTILATION: USE GENERAL OR LOCAL EXHAUST VENTILATION TO MEET TLV REQUIREMENTS.

RESPIRATORY PROTECTION: NONE REQUIRED WHERE ADEQUATE VENTILATION CONDITIONS EXIST. IF AIRBORNE CONCENTRATION EXCEEDS TLV, A SELF-CONTAINED BREATHING APPARATUS IS ADVISED.

EYE/SKIN PROTECTION: SAFETY GOGGLES, UNIFORM, APRON, PROPER GLOVES ARE RECOMMENDED.

---

9 - STORAGE AND HANDLING PRECAUTIONS

SAF-T-DATA(TM) STORAGE COLOR CODE: ORANGE (GENERAL STORAGE)

SPECIAL PRECAUTIONS
KEEP CONTAINER TIGHTLY CLOSED. STORE SEPARATELY AND AWAY FROM FLAMMABLE AND COMBUSTIBLE MATERIALS.

---

10 - TRANSPORTATION DATA AND ADDITIONAL INFORMATION

DOMESTIC (D.O.T.)
PROPER SHIPPING NAME CHEMICALS, N.O.S. (NON-REGULATED)

INTERNATIONAL (I.M.O.)
PROPER SHIPPING NAME CHEMICALS, N.O.S. (NON-REGULATED)

4 - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (CLOSED CUP N/A

FLAMMABLE LIMITS: UPPER - N/A % LOWER - N/A %

FIRE EXTINGUISHING MEDIA
USE EXTINGUISHING MEDIA APPROPRIATE FOR SURROUNDING FIRE.

SPECIAL FIRE-FIGHTING PROCEDURES
FIREFIGHTERS SHOULD WEAR PROPER PROTECTIVE EQUIPMENT AND SELF-CONTAINED BREATHING APPARATUS WITH FULL FACEPIECE OPERATED IN POSITIVE PRESSURE MODE.

TOXIC GASES PRODUCED
SULFUR DIOXIDE

5 - HEALTH HAZARD DATA

TOXICITY: LD50 (ORAL-MOUSE) (MG/KG) - 5989

CARCINOGENICITY: NTP: NO IARC: NO Z LIST: NO OSHA REG: NO

EFFECTS OF OVEREXPOSURE
DUST MAY BE IRRITATING TO EYES, NOSE, THROAT, OR LUNGS.
CONTACT WITH SKIN OR EYES MAY CAUSE IRRITATION.
INGESTION MAY CAUSE GASTROINTESTINAL IRRITATION.

TARGET ORGANS: NONE IDENTIFIED

MEDICAL CONDITIONS GENERALLY AGGRAVATED BY EXPOSURE
NONE IDENTIFIED

ROUTES OF ENTRY: NONE INDICATED

EMERGENCY AND FIRST AID PROCEDURES

INGESTION:	IF SWALLOWED AND THE PERSON IS CONSCIOUS, IMMEDIATELY GIVE LARGE AMOUNTS OF WATER. GET MEDICAL ATTENTION.
INHALATION:	IF A PERSON BREATHES IN LARGE AMOUNTS, MOVE THE EXPOSED PERSON TO FRESH AIR. GET MEDICAL ATTENTION.
EYE CONTACT:	IMMEDIATELY FLUSH WITH PLENTY OF WATER FOR AT LEAST 15 MINUTES. GET MEDICAL ATTENTION.
SKIN CONTACT:	IMMEDIATELY WASH WITH PLENTY OF SOAP AND WATER FOR AT LEAST 15 MINUTES.

6 - REACTIVITY DATA

STABILITY: STABLE HAZARDOUS POLYMERIZATION: WILL NOT OCCUR

CONDITIONS TO AVOID: NONE DOCUMENTED

INCOMPATIBLES: ALUMINUM, MAGNESIUM, MINERAL ACIDS, STRONG ACIDS, STRONG BASES

DECOMPOSITION PRODUCTS: OXIDES OF SULFUR

7 - SPILL AND DISPOSAL PROCEDURES

STEPS TO BE TAKEN IN THE EVENT OF A SPILL OR DISCHARGE
WEAR SUITABLE PROTECTIVE CLOTHING. CAREFULLY SWEEP UP AND REMOVE.

DISPOSAL PROCEDURE
DISPOSE IN ACCORDANCE WITH ALL APPLICABLE FEDERAL, STATE, AND LOCAL ENVIRONMENTAL REGULATIONS.

8 - PROTECTIVE EQUIPMENT

VENTILATION:	USE ADEQUATE GENERAL OR LOCAL EXHAUST VENTILATION TO KEEP FUME OR DUST LEVELS AS LOW AS POSSIBLE.
RESPIRATORY PROTECTION:	NONE REQUIRED WHERE ADEQUATE VENTILATION CONDITIONS EXIST. IF AIRBORNE CONCENTRATION IS HIGH, USE AN APPROPRIATE RESPIRATOR OR DUST MASK.
EYE/SKIN PROTECTION:	SAFETY GLASSES WITH SIDESHIELDS, PROPER GLOVES ARE RECOMMENDED.

9 - STORAGE AND HANDLING PRECAUTIONS

SAF-T-DATA(TM) STORAGE COLOR CODE: ORANGE (GENERAL STORAGE)

SPECIAL PRECAUTIONS
KEEP CONTAINER TIGHTLY CLOSED. SUITABLE FOR ANY GENERAL CHEMICAL STORAGE AREA.

10 - TRANSPORTATION DATA AND ADDITIONAL INFORMATION

DOMESTIC (D.O.T.)

PROPER SHIPPING NAME CHEMICALS, N.O.S. (NON-REGULATED)

INTERNATIONAL (I.M.O.)

PROPER SHIPPING NAME CHEMICALS, N.O.S. (NON-REGULATED)

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MSDS for **SILICA GEL** Page 1

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1 - PRODUCT IDENTIFICATION

PRODUCT NAME: SILICA GEL
FORMULA:
FORMULA WT: .00
CAS NO.: 1343-98-2
NIOSH/RTECS NO.: VV8850000
COMMON SYNONYMS: AMORPHOUS SILICON DIOXIDE; SILICIC ACID
PRODUCT CODES: 7290,3406,3404,3405,5111
EFFECTIVE: 06/09/86
REVISION #02

PRECAUTIONARY LABELLING

BAKER SAF-T-DATA(TM) SYSTEM

HEALTH	-	1	SLIGHT
FLAMMABILITY	-	0	NONE
REACTIVITY	-	0	NONE
CONTACT	-	1	SLIGHT

HAZARD RATINGS ARE 0 TO 4 (0 = NO HAZARD; 4 = EXTREME HAZARD).

LABORATORY PROTECTIVE EQUIPMENT

SAFETY GLASSES; LAB COAT

PRECAUTIONARY LABEL STATEMENTS

CAUTION
MAY CAUSE IRRITATION
MAY BE HARMFUL IF INHALED

DURING USE AVOID CONTACT WITH EYES, SKIN, CLOTHING. WASH THOROUGHLY AFTER HANDLING. WHEN NOT IN USE KEEP IN TIGHTLY CLOSED CONTAINER.

SAF-T-DATA(TM) STORAGE COLOR CODE: ORANGE (GENERAL STORAGE)

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2 - HAZARDOUS COMPONENTS

COMPONENT	%	CAS NO.
SILICA GEL	90-100	01343-98-2

---

3 - PHYSICAL DATA

BOILING POINT: 2230 C (4046 F)
VAPOR PRESSURE(MM HG): N/A

MELTING POINT: N/A
VAPOR DENSITY(AIR=1): N/A

SPECIFIC GRAVITY: 2.10 (H2O=1)
EVAPORATION RATE: N/A (BUTYL ACETATE=1)

SOLUBILITY(H2O): NEGLIGIBLE (LESS THAN 0.1 %) % VOLATILES BY VOLUME: N/A

APPEARANCE & ODOR: ODORLESS, WHITE, GRANULAR POWDER (AMORPHOUS).

---

4 - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (CLOSED CUP N/A

FLAMMABLE LIMITS: UPPER - N/A % LOWER - N/A %

FIRE EXTINGUISHING MEDIA
USE EXTINGUISHING MEDIA APPROPRIATE FOR SURROUNDING FIRE.

SPECIAL FIRE-FIGHTING PROCEDURES
FIREFIGHTERS SHOULD WEAR PROPER PROTECTIVE EQUIPMENT AND SELF-CONTAINED BREATHING APPARATUS WITH FULL FACEPIECE OPERATED IN POSITIVE PRESSURE MODE.

---

5 - HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE (TLV/TWA): 10 MG/M3 (PPM)

CARCINOGENICITY: NTP: NO IARC: NO Z LIST: NO OSHA REG: NO

EFFECTS OF OVEREXPOSURE
PROLONGED CONTACT MAY CAUSE SKIN IRRITATION.
DUST MAY IRRITATE OR BURN MUCOUS MEMBRANES.

TARGET ORGANS
NONE IDENTIFIED

MEDICAL CONDITIONS GENERALLY AGGRAVATED BY EXPOSURE
NONE IDENTIFIED

ROUTES OF ENTRY
NONE INDICATED

EMERGENCY AND FIRST AID PROCEDURES

INGESTION:	IF SWALLOWED AND THE PERSON IS CONSCIOUS, IMMEDIATELY GIVE LARGE AMOUNTS OF WATER. GET MEDICAL ATTENTION.
INHALATION:	IF A PERSON BREATHES IN LARGE AMOUNTS, MOVE THE EXPOSED PERSON TO FRESH AIR. GET MEDICAL ATTENTION.
EYE CONTACT:	IMMEDIATELY FLUSH WITH PLENTY OF WATER FOR AT LEAST 15 MINUTES. GET MEDICAL ATTENTION.
SKIN CONTACT:	IMMEDIATELY WASH WITH PLENTY OF SOAP AND WATER FOR AT LEAST 15 MINUTES.

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6 - REACTIVITY DATA

STABILITY: STABLE HAZARDOUS POLYMERIZATION: WILL NOT OCCUR

CONDITIONS TO AVOID: MOISTURE

INCOMPATIBLES: HYDROGEN FLUORIDE

7 - SPILL AND DISPOSAL PROCEDURES

STEPS TO BE TAKEN IN THE EVENT OF A SPILL OR DISCHARGE
WEAR SUITABLE PROTECTIVE CLOTHING. CAREFULLY SWEEP UP AND REMOVE.

DISPOSAL PROCEDURE
DISPOSE IN ACCORDANCE WITH ALL APPLICABLE FEDERAL, STATE, AND LOCAL ENVIRONMENTAL REGULATIONS.

8 - PROTECTIVE EQUIPMENT

VENTILATION:	USE GENERAL OR LOCAL EXHAUST VENTILATION TO MEET TLV REQUIREMENTS.
RESPIRATORY PROTECTION:	RESPIRATORY PROTECTION REQUIRED IF AIRBORNE CONCENTRATION EXCEEDS TLV. AT CONCENTRATIONS ABOVE 10 MG/M3, A DUST/MIST RESPIRATOR IS RECOMMENDED.
EYE/SKIN PROTECTION:	SAFETY GLASSES WITH SIDESHIELDS, PROPER GLOVES ARE RECOMMENDED.

9 - STORAGE AND HANDLING PRECAUTIONS

SAF-T-DATA(TM) STORAGE COLOR CODE: ORANGE (GENERAL STORAGE)

SPECIAL PRECAUTIONS
KEEP CONTAINER TIGHTLY CLOSED. SUITABLE FOR ANY GENERAL CHEMICAL STORAGE AREA.

10 - TRANSPORTATION DATA AND ADDITIONAL INFORMATION

DOMESTIC (D.O.T.)

PROPER SHIPPING NAME CHEMICALS, N.O.S. (NON-REGULATED)

INTERNATIONAL (I.M.O.)

PROPER SHIPPING NAME CHEMICALS, N.O.S. (NON-REGULATED)

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MSDS for **SODIUM CARBONATE, ANHYDROUS** Page 1

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1 - PRODUCT IDENTIFICATION

PRODUCT NAME: SODIUM CARBONATE, ANHYDROUS
FORMULA: NA2CO3
FORMULA WT: 105.99
CAS NO.: 497-19-8
NIOSH/RTECS NO.: VZ4050000
COMMON SYNONYMS: SODA ASH; DISODIUM CARBONATE
PRODUCT CODES: 5151,4502,5134,4923,5605,5198,3605,5154,3604,5179,3602
EFFECTIVE: 11/24/86
REVISION #02

PRECAUTIONARY LABELLING

BAKER SAF-T-DATA(TM) SYSTEM

HEALTH	-	1	SLIGHT
FLAMMABILITY	-	0	NONE
REACTIVITY	-	1	SLIGHT
CONTACT	-	1	SLIGHT

HAZARD RATINGS ARE 0 TO 4 (0 = NO HAZARD; 4 = EXTREME HAZARD).

LABORATORY PROTECTIVE EQUIPMENT

SAFETY GLASSES; LAB COAT

PRECAUTIONARY LABEL STATEMENTS

CAUTION
MAY CAUSE IRRITATION
MAY BE HARMFUL IF SWALLOWED
DURING USE AVOID CONTACT WITH EYES, SKIN, CLOTHING. WASH THOROUGHLY AFTER HANDLING. WHEN NOT IN USE KEEP IN TIGHTLY CLOSED CONTAINER.

SAF-T-DATA(TM) STORAGE COLOR CODE: ORANGE (GENERAL STORAGE)

---

2 - HAZARDOUS COMPONENTS

COMPONENT	%	CAS NO.
SODIUM CARBONATE, ANHYDROUS		00497-19-8

---

3 - PHYSICAL DATA

BOILING POINT: N/A
VAPOR PRESSURE(MM HG): N/A
MELTING POINT: 851 C (1564 F)
VAPOR DENSITY(AIR=1): N/A
SPECIFIC GRAVITY: 2.53 (H2O=1)
EVAPORATION RATE: N/A (BUTYL ACETATE=1)
SOLUBILITY(H2O): APPRECIABLE (MORE THAN 10 %) % VOLATILES BY VOLUME: 0
APPEARANCE & ODOR: ODORLESS GRAYISH WHITE POWDER.

---

4 - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (CLOSED CUP N/A

FLAMMABLE LIMITS: UPPER - N/A % LOWER - N/A %

FIRE EXTINGUISHING MEDIA
USE EXTINGUISHING MEDIA APPROPRIATE FOR SURROUNDING FIRE.

SPECIAL FIRE-FIGHTING PROCEDURES
FIREFIGHTERS SHOULD WEAR PROPER PROTECTIVE EQUIPMENT AND SELF-CONTAINED BREATHING APPARATUS WITH FULL FACEPIECE OPERATED IN POSITIVE PRESSURE MODE.

TOXIC GASES PRODUCED
CARBON MONOXIDE, CARBON DIOXIDE, OXIDES

---

5 - HEALTH HAZARD DATA

TOXICITY: LD50 (IPR-MOUSE) (MG/KG) - 117

CARCINOGENICITY: NTP: NO IARC: NO Z LIST: NO OSHA REG: NO

EFFECTS OF OVEREXPOSURE
INHALATION OF DUST MAY CAUSE IRRITATION TO UPPER RESPIRATORY TRACT.
CONTACT MAY CAUSE IRRITATION OF SKIN, EYES, AND MUCOUS MEMBRANES.
INGESTION OF LARGE QUANTITIES MAY CAUSE GASTROINTESTINAL IRRITATION.
INGESTION OF LARGE QUANTITIES MAY CAUSE VOMITING, DIARRHEA AND NAUSEA.

TARGET ORGANS
NONE IDENTIFIED

MEDICAL CONDITIONS GENERALLY AGGRAVATED BY EXPOSURE
NONE IDENTIFIED

ROUTES OF ENTRY
INHALATION, INGESTION, SKIN CONTACT, EYE CONTACT

EMERGENCY AND FIRST AID PROCEDURES
INGESTION: IF SWALLOWED AND THE PERSON IS CONSCIOUS, IMMEDIATELY GIVE LARGE AMOUNTS OF WATER. GET MEDICAL ATTENTION.
INHALATION: IF A PERSON BREATHES IN LARGE AMOUNTS, MOVE THE EXPOSED PERSON TO FRESH AIR. GET MEDICAL ATTENTION.
EYE CONTACT: IMMEDIATELY FLUSH WITH PLENTY OF WATER FOR AT LEAST 15 MINUTES. GET MEDICAL ATTENTION.
SKIN CONTACT: IMMEDIATELY WASH WITH PLENTY OF SOAP AND WATER FOR AT LEAST 15 MINUTES.

---

6 - REACTIVITY DATA

STABILITY: STABLE HAZARDOUS POLYMERIZATION: WILL NOT OCCUR

CONDITIONS TO AVOID: HUMIDITY

INCOMPATIBLES: STRONG ACIDS, ALUMINUM, FLUORINE, OXIDES OF PHOSPHORUS, LITHIUM

DECOMPOSITION PRODUCTS: CARBON MONOXIDE, CARBON DIOXIDE

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7 - SPILL AND DISPOSAL PROCEDURES

STEPS TO BE TAKEN IN THE EVENT OF A SPILL OR DISCHARGE
WEAR SUITABLE PROTECTIVE CLOTHING. CAREFULLY SWEEP UP AND REMOVE.

DISPOSAL PROCEDURE
DISPOSE IN ACCORDANCE WITH ALL APPLICABLE FEDERAL, STATE, AND LOCAL ENVIRONMENTAL REGULATIONS.

---

8 - PROTECTIVE EQUIPMENT

VENTILATION: USE ADEQUATE GENERAL OR LOCAL EXHAUST VENTILATION TO KEEP FUME OR DUST LEVELS AS LOW AS POSSIBLE.

RESPIRATORY PROTECTION: NONE REQUIRED WHERE ADEQUATE VENTILATION CONDITIONS EXIST. IF AIRBORNE CONCENTRATION IS HIGH, USE AN APPROPRIATE RESPIRATOR OR DUST MASK.

EYE/SKIN PROTECTION: SAFETY GLASSES WITH SIDESHIELDS, RUBBER GLOVES ARE RECOMMENDED.

---

9 - STORAGE AND HANDLING PRECAUTIONS

SAF-T-DATA(TM) STORAGE COLOR CODE: ORANGE (GENERAL STORAGE)

SPECIAL PRECAUTIONS
KEEP CONTAINER TIGHTLY CLOSED. SUITABLE FOR ANY GENERAL CHEMICAL STORAGE AREA.

---

10 - TRANSPORTATION DATA AND ADDITIONAL INFORMATION

DOMESTIC (D.O.T.)

PROPER SHIPPING NAME CHEMICALS, N.O.S. (NON-REGULATED)

INTERNATIONAL (I.M.O.)

PROPER SHIPPING NAME CHEMICALS, N.O.S. (NON-REGULATED)

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MSDS for **SODIUM FLUORIDE** Page 1

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1 - PRODUCT IDENTIFICATION

PRODUCT NAME: SODIUM FLUORIDE
FORMULA: NAF
FORMULA WT: 41.99
CAS NO.: 07681-49-4
NIOSH/RTECS NO.: WB0350000
COMMON SYNONYMS: DISODIUM DIFLUORIDE; NATRIUM FLUORIDE; FLORIDINE; FLOROCID
PRODUCT CODES: 5245,3688,3689
EFFECTIVE: 08/29/86
REVISION #03

PRECAUTIONARY LABELLING

BAKER SAF-T-DATA(TM) SYSTEM

HEALTH	-	3	SEVERE (POISON)
FLAMMABILITY	-	0	NONE
REACTIVITY	-	1	SLIGHT
CONTACT	-	1	SLIGHT

HAZARD RATINGS ARE 0 TO 4 (0 = NO HAZARD; 4 = EXTREME HAZARD).

LABORATORY PROTECTIVE EQUIPMENT

GOGGLES; LAB COAT; VENT HOOD; PROPER GLOVES

PRECAUTIONARY LABEL STATEMENTS

POISON DANGER
KEEP AWAY FROM STRONG ACIDS.
CAUSES IRRITATION AND MAY CAUSE BURNS.
MAY BE FATAL IF SWALLOWED OR INHALED

DO NOT GET IN EYES, ON SKIN, ON CLOTHING. DO NOT BREATHE DUST. KEEP IN TIGHTLY CLOSED CONTAINER. USE WITH ADEQUATE VENTILATION. WASH THOROUGHLY AFTER HANDLING.

SAF-T-DATA(TM) STORAGE COLOR CODE: BLUE (HEALTH)

---

2 - HAZARDOUS COMPONENTS

COMPONENT	%	CAS NO.
SODIUM FLUORIDE	90-100	7681-49-4

---

3 - PHYSICAL DATA

BOILING POINT: 1704 C (3099 F)
MELTING POINT: 993 C (1819 F)
SPECIFIC GRAVITY: 2.78 (H2O=1)
VAPOR PRESSURE(MM HG): N/A
VAPOR DENSITY(AIR=1): 1.4
EVAPORATION RATE: N/A (BUTYL ACETATE=1)

SOLUBILITY(H2O): APPRECIABLE (MORE THAN 10 %) % VOLATILES BY VOLUME: 0

APPEARANCE & ODOR: WHITE ODORLESS POWDER OR CRYSTAL.

---

4 - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (CLOSED CUP N/A NFPA 704M RATING: 2-0-0

FLAMMABLE LIMITS: UPPER - N/A % LOWER - N/A %

FIRE EXTINGUISHING MEDIA
USE EXTINGUISHING MEDIA APPROPRIATE FOR SURROUNDING FIRE.

SPECIAL FIRE-FIGHTING PROCEDURES
FIREFIGHTERS SHOULD WEAR PROPER PROTECTIVE EQUIPMENT AND SELF-CONTAINED BREATHING APPARATUS WITH FULL FACEPIECE OPERATED IN POSITIVE PRESSURE MODE.

UNUSUAL FIRE & EXPLOSION HAZARDS
CLOSED CONTAINERS EXPOSED TO HEAT MAY EXPLODE.

TOXIC GASES PRODUCED
HYDROGEN FLUORIDE

---

5 - HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE (TLV/TWA): 2.5 MG/M3 (PPM)

PERMISSIBLE EXPOSURE LIMIT (PEL): 2.5 MG/M3 (PPM)

TOXICITY: LD50 (ORAL-RAT) (MG/KG) - 80
LD50 (IPR-RAT) (MG/KG) - 2

CARCINOGENICITY: NTP: NO IARC: NO Z LIST: NO OSHA REG: NO

EFFECTS OF OVEREXPOSURE
CONTACT WITH SKIN OR EYES MAY CAUSE SEVERE IRRITATION OR BURNS.
EXCESSIVE INHALATION OF DUST IS IRRITATING AND MAY BE SEVERELY DAMAGING TO RESPIRATORY PASSAGES AND/OR LUNGS.
INHALATION MAY CAUSE NAUSEA, VOMITING AND DIFFICULT BREATHING.
INGESTION MAY CAUSE NAUSEA, VOMITING, HEADACHES, DIZZINESS, GASTROINTESTINAL IRRITATION.
INGESTION MAY CAUSE IRRITATION AND BURNING TO MOUTH AND STOMACH.
PROLONGED EXPOSURE MAY INCREASE BONE DENSITY, STIMULATE NEW BONE GROWTH OR CAUSE CALCIUM DEPOSITS IN LIGAMENTS. MOTTLING OF TOOTH ENAMEL MAY OCCUR.

TARGET ORGANS
EYES, SKIN, RESPIRATORY SYSTEM, CENTRAL NERVOUS SYSTEM, KIDNEYS

MEDICAL CONDITIONS GENERALLY AGGRAVATED BY EXPOSURE
NONE IDENTIFIED

ROUTES OF ENTRY
INHALATION, INGESTION, EYE CONTACT, SKIN CONTACT

EMERGENCY AND FIRST AID PROCEDURES
CALL A PHYSICIAN.
IF SWALLOWED, IF CONSCIOUS, IMMEDIATELY INDUCE VOMITING.
IF INHALED, REMOVE TO FRESH AIR. IF NOT BREATHING, GIVE ARTIFICIAL RESPIRATION. IF BREATHING IS DIFFICULT, GIVE OXYGEN.
IN CASE OF CONTACT, IMMEDIATELY FLUSH EYES OR SKIN WITH PLENTY OF WATER FOR AT LEAST 15 MINUTES WHILE REMOVING CONTAMINATED CLOTHING AND SHOES.
WASH CLOTHING BEFORE RE-USE.

NOTE TO PHYSICIAN: URINARY FLUORIDE EXCRETION LEVELS HAVE BEEN USEFUL IN EVALUATING INDUSTRIAL EXPOSURES TO FLUORIDE DUSTS.

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6 - REACTIVITY DATA

STABILITY: STABLE HAZARDOUS POLYMERIZATION: WILL NOT OCCUR

CONDITIONS TO AVOID: HEAT

INCOMPATIBLES: STRONG ACIDS, GLASS

DECOMPOSITION PRODUCTS: HYDROGEN FLUORIDE

---

7 - SPILL AND DISPOSAL PROCEDURES

STEPS TO BE TAKEN IN THE EVENT OF A SPILL OR DISCHARGE
WEAR SELF-CONTAINED BREATHING APPARATUS AND FULL PROTECTIVE CLOTHING. STOP LEAK IF YOU CAN DO SO WITHOUT RISK. VENTILATE AREA. CAREFULLY NEUTRALIZE SPILL WITH DILUTE HCL. FLUSH AREA WITH FLOODING AMOUNTS OF WATER. (USE CAUTION.)

DISPOSAL PROCEDURE
DISPOSE IN ACCORDANCE WITH ALL APPLICABLE FEDERAL, STATE, AND LOCAL ENVIRONMENTAL REGULATIONS.

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8 - PROTECTIVE EQUIPMENT

VENTILATION:	USE ADEQUATE GENERAL OR LOCAL EXHAUST VENTILATION TO KEEP FUME OR DUST LEVELS AS LOW AS POSSIBLE.
RESPIRATORY PROTECTION:	NONE REQUIRED WHERE ADEQUATE VENTILATION CONDITIONS EXIST. IF AIRBORNE CONCENTRATION EXCEEDS TLV, A DUST/MIST RESPIRATOR IS RECOMMENDED. IF CONCENTRATION EXCEEDS CAPACITY OF RESPIRATOR, A SELF-CONTAINED BREATHING APPARATUS IS ADVISED.
EYE/SKIN PROTECTION:	SAFETY GOGGLES, UNIFORM, APRON, PROPER GLOVES ARE RECOMMENDED.

---

9 - STORAGE AND HANDLING PRECAUTIONS

SAF-T-DATA(TM) STORAGE COLOR CODE: BLUE (HEALTH)

SPECIAL PRECAUTIONS
KEEP CONTAINER TIGHTLY CLOSED. STORE IN SECURE POISON AREA.
DO NOT STORE IN GLASS.
SODIUM FLUORIDE REACTS WITH ACIDS TO FORM HYDROGEN FLUORIDE, WHICH IS HIGHLY CORROSIVE AND POISONOUS - KEEP AWAY FROM STRONG ACIDS.

---

10 - TRANSPORTATION DATA AND ADDITIONAL INFORMATION

DOMESTIC (D.O.T.)

PROPER SHIPPING NAME	SODIUM FLUORIDE, SOLID (AIR ONLY)
HAZARD CLASS	ORM-B
UN/NA	UN1690
LABELS	NONE
REPORTABLE QUANTITY	1000 LBS.

INTERNATIONAL (I.M.O.)

PROPER SHIPPING NAME	SODIUM FLUORIDE, SOLID
HAZARD CLASS	6.1
UN/NA	UN1690
LABELS	HARMFUL - STOW AWAY FROM FOOD STUFFS

MSDS for **SODIUM HYDROXIDE** Page 1

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1 - PRODUCT IDENTIFICATION

PRODUCT NAME: SODIUM HYDROXIDE
FORMULA: NAOH
FORMULA WT: 40.00
CAS NO.: 01310-73-2
NIOSH/RTECS NO.: WB4900000
COMMON SYNONYMS: CAUSTIC SODA; SODIUM HYDRATE; LYE
PRODUCT CODES: 3730,3722,5312,5104,3729,3734,3726,5045,3728,3723,5022,3736
EFFECTIVE: 08/28/86
REVISION #02

PRECAUTIONARY LABELLING

BAKER SAF-T-DATA(TM) SYSTEM

HEALTH	-	3	SEVERE (POISON)
FLAMMABILITY	-	0	NONE
REACTIVITY	-	2	MODERATE
CONTACT	-	4	EXTREME (CORROSIVE)

HAZARD RATINGS ARE 0 TO 4 (0 = NO HAZARD; 4 = EXTREME HAZARD).

LABORATORY PROTECTIVE EQUIPMENT

GOGGLES; LAB COAT; VENT HOOD; PROPER GLOVES

PRECAUTIONARY LABEL STATEMENTS

POISON DANGER
CAUSES SEVERE BURNS
MAY BE FATAL IF SWALLOWED

DO NOT GET IN EYES, ON SKIN, ON CLOTHING. AVOID SPATTERING BY SLOWLY ADDING TO SOLUTION. AVOID BREATHING DUST. KEEP IN TIGHTLY CLOSED CONTAINER. USE WITH ADEQUATE VENTILATION. WASH THOROUGHLY AFTER HANDLING.

SAF-T-DATA(TM) STORAGE COLOR CODE: WHITE STRIPE (STORE SEPARATELY)

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2 - HAZARDOUS COMPONENTS

COMPONENT	%	CAS NO.
SODIUM HYDROXIDE	90-100	1310-73-2

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3 - PHYSICAL DATA

BOILING POINT: 1390 C (2534 F)
MELTING POINT: 318 C (604 F)
SPECIFIC GRAVITY: 2.13 (H2O=1)
VAPOR PRESSURE(MM HG): 0
VAPOR DENSITY(AIR=1): N/A
EVAPORATION RATE: N/A (BUTYL ACETATE=1)
SOLUBILITY(H2O): APPRECIABLE (MORE THAN 10 %)
% VOLATILES BY VOLUME: 0
APPEARANCE & ODOR: WHITE, ODORLESS SOLID.

---

4 - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (CLOSED CUP N/A NFPA 704M RATING: 3-0-1

FLAMMABLE LIMITS: UPPER - N/A % LOWER - N/A %

FIRE EXTINGUISHING MEDIA
USE EXTINGUISHING MEDIA APPROPRIATE FOR SURROUNDING FIRE.

SPECIAL FIRE-FIGHTING PROCEDURES
FLOOD WITH WATER, DO NOT SPLATTER OR SPLASH THIS MATERIAL.

UNUSUAL FIRE & EXPLOSION HAZARDS
CONTACT WITH MOISTURE OR WATER MAY GENERATE SUFFICIENT HEAT TO IGNITE COMBUSTIBLE MATERIALS.
REACTS WITH MOST METALS TO PRODUCE HYDROGEN GAS, WHICH CAN FORM AN EXPLOSIVE MIXTURE WITH AIR.

---

5 - HEALTH HAZARD DATA

TLV LISTED DENOTES CEILING LIMIT.

THRESHOLD LIMIT VALUE (TLV/TWA): 2 MG/M3 (PPM)

PERMISSIBLE EXPOSURE LIMIT (PEL): 2 MG/M3 (PPM)

TOXICITY: LD50 (IPR-MOUSE)(MG/KG) - 40

CARCINOGENICITY: NTP: NO IARC: NO Z LIST: NO OSHA REG: NO

EFFECTS OF OVEREXPOSURE
EXCESSIVE INHALATION OF DUST IS IRRITATING AND MAY BE SEVERELY DAMAGING TO RESPIRATORY PASSAGES AND/OR LUNGS.
CONTACT WITH SKIN OR EYES MAY CAUSE SEVERE IRRITATION OR BURNS.
INGESTION IS HARMFUL AND MAY BE FATAL.
INGESTION MAY CAUSE SEVERE BURNING OF MOUTH AND STOMACH.
INGESTION MAY CAUSE NAUSEA AND VOMITING.

TARGET ORGANS
EYES, SKIN, RESPIRATORY SYSTEM

MEDICAL CONDITIONS GENERALLY AGGRAVATED BY EXPOSURE
NONE IDENTIFIED

ROUTES OF ENTRY
INHALATION, INGESTION, EYE CONTACT, SKIN CONTACT

EMERGENCY AND FIRST AID PROCEDURES
CALL A PHYSICIAN.
IF SWALLOWED, DO NOT INDUCE VOMITING; IF CONSCIOUS, GIVE LARGE AMOUNTS OF WATER. FOLLOW WITH DILUTED VINEGAR, FRUIT JUICE OR WHITES OF EGGS, BEATEN WITH WATER.
IF INHALED, REMOVE TO FRESH AIR. IF NOT BREATHING, GIVE ARTIFICIAL RESPIRATION. IF BREATHING IS DIFFICULT, GIVE OXYGEN.
IN CASE OF CONTACT, IMMEDIATELY FLUSH EYES OR SKIN WITH PLENTY OF WATER FOR AT LEAST 15 MINUTES WHILE REMOVING CONTAMINATED CLOTHING AND SHOES.
WASH CLOTHING BEFORE RE-USE.

6 - REACTIVITY DATA

STABILITY: STABLE HAZARDOUS POLYMERIZATION: WILL NOT OCCUR

CONDITIONS TO AVOID: MOISTURE

INCOMPATIBLES: WATER, STRONG ACIDS, MOST COMMON METALS, COMBUSTIBLE MATERIALS, ORGANIC MATERIALS, ZINC, ALUMINUM, MAGNESIUM, HALOGENATED HYDROCARBONS

7 - SPILL AND DISPOSAL PROCEDURES

STEPS TO BE TAKEN IN THE EVENT OF A SPILL OR DISCHARGE
WEAR SELF-CONTAINED BREATHING APPARATUS AND FULL PROTECTIVE CLOTHING. WITH CLEAN SHOVEL, CAREFULLY PLACE MATERIAL INTO CLEAN, DRY CONTAINER AND COVER; REMOVE FROM AREA. FLUSH SPILL AREA WITH WATER.

J. T. BAKER NEUTRACIT-2(R) CAUSTIC NEUTRALIZER IS RECOMMENDED FOR SPILLS OF THIS PRODUCT.

DISPOSAL PROCEDURE
DISPOSE IN ACCORDANCE WITH ALL APPLICABLE FEDERAL, STATE, AND LOCAL ENVIRONMENTAL REGULATIONS.

EPA HAZARDOUS WASTE NUMBER: D002, D003 (CORROSIVE, REACTIVE WASTE)

8 - PROTECTIVE EQUIPMENT

VENTILATION: USE GENERAL OR LOCAL EXHAUST VENTILATION TO MEET TLV REQUIREMENTS.

RESPIRATORY PROTECTION: RESPIRATORY PROTECTION REQUIRED IF AIRBORNE CONCENTRATION EXCEEDS TLV. AT CONCENTRATIONS UP TO 60 PPM, A HIGH-EFFICIENCY PARTICULATE RESPIRATOR IS RECOMMENDED. ABOVE THIS LEVEL, A SELF-CONTAINED BREATHING APPARATUS IS ADVISED.

EYE/SKIN PROTECTION: SAFETY GOGGLES, UNIFORM, APRON, RUBBER GLOVES ARE RECOMMENDED.

9 - STORAGE AND HANDLING PRECAUTIONS

SAF-T-DATA(TM) STORAGE COLOR CODE: WHITE STRIPE (STORE SEPARATELY)

SPECIAL PRECAUTIONS
KEEP CONTAINER TIGHTLY CLOSED. STORE IN CORROSION-PROOF AREA.
STORE IN A DRY AREA.
ISOLATE FROM INCOMPATIBLE MATERIALS.

10 - TRANSPORTATION DATA AND ADDITIONAL INFORMATION

DOMESTIC (D.O.T.)

PROPER SHIPPING NAME	SODIUM HYDROXIDE, DRY SOLID
HAZARD CLASS	CORROSIVE MATERIAL (SOLID)
UN/NA	UN1823
LABELS	CORROSIVE
REPORTABLE QUANTITY	1000 LBS.

INTERNATIONAL (I.M.O.)

PROPER SHIPPING NAME	SODIUM HYDROXIDE, SOLID
HAZARD CLASS	8
UN/NA	UN1823
LABELS	CORROSIVE

MATERIAL SAFETY DATA SHEET

S-210
31-9203

Material Safety Data Sheet
May be used to comply with OSHA's Hazard Communication Standard, 29 CFR 1910.1200. Standard must be consulted for specific requirements.

U.S. Department of Labor
Occupational Safety and Health Administration
(Non-Mandatory Form)
Form Approved
OMB No. 1218-0072

IDENTITY (As Used on Label and List) Dixie Crystals 'A' Course Granulated Sugar

Note: Blank spaces are not permitted. If any item is not applicable, or no information is available, the space must be marked to indicate that.

Section I

Manufacturer's Name: Savannah Foods and Industries, Inc.	Emergency Telephone Number: (912) 964-1361
Address (Number, Street, City, State, and ZIP Code): P.O. Box 710 Savannah, Ga. 31498-4710	Telephone Number for Information: (912) 964-1361
	Date Prepared: 11/19/91
	Signature of Preparer (optional)

Section II — Hazardous Ingredients/Identity Information

Hazardous Components (Specific Chemical Identity; Common Name(s))	OSHA PEL	ACGIH TLV	Other Limits Recommended	% (optional)
Sucrose CAS# 57-50-8	15mg/m3			

Section III — Physical/Chemical Characteristics

Boiling Point: Not Applicable	Specific Gravity (H_2O = 1): 1.55319 @ 27.5 degrees C
Vapor Pressure (mm Hg.): Not Applicable	Melting Point: 160°-186° C (320°-367°F)
Vapor Density (AIR = 1): Not Applicable	Evaporation Rate (Butyl Acetate = 1): NA

Solubility in Water: 199.4 gms in 100 gms water @ 20 degrees C

Appearance and Odor: White crystal and sweet smell

Section IV — Fire and Explosion Hazard Data

Flash Point (Method Used): NA	Flammable Limits: Class 3 350 degrees F	LEL	UEL

Extinguishing Media: Water(Class A Combustible), Dry Chemical, Carbon Dioxide

Special Fire Fighting Procedures: Water spray in dusty areas

Unusual Fire and Explosion Hazards: Sugar dust is a possible explosion hazard (See Section VII-Precautions on page 2 of this MSDS).

(Reproduce locally)

31:2304

Section V — Reactivity Data

Stability	Unstable		Conditions to Avoid
	Stable	X	NA

Incompatibility (Materials to Avoid)

Hazardous Decomposition or Byproducts

Hazardous Polymerization	May Occur		Conditions to Avoid
	Will Not Occur	X	NA

Section VI — Health Hazard Data

Routes of Entry: Inhalation? Yes Skin? NA Ingestion? Yes

Health Hazards (Acute and Chronic) Little or no evidence of specific health effects

Carcinogenicity: NTP? NA IARC Monographs? NA OSHA Regulated? NA

Signs and Symptoms of Exposure Exposure to excess levels of sucrose dust can cause skin and eye irritation, interference with vision, and distraction from the task at hand.

Medical Conditions Generally Aggravated by Exposure Skin and eye irritation

Emergency and First Aid Procedures Flush or wash with water

Section VII — Precautions for Safe Handling and Use

Steps to Be Taken in Case Material is Released or Spilled No special requirements

Waste Disposal Method Dispose of through regular sewage system, if permitted by regulatory agencies, or waste removal.

Precautions to Be Taken in Handling and Storing Sugar is an NFPA Class 3 combustible material and can be an explosion hazard in confined spaces with high temperatures and dry conditions. Good housekeeping practices should be used to minimize dusty conditions.

Other Precautions

Section VIII — Control Measures

Respiratory Protection (Specify Type) Workers exposed to 15mg/m3 TWA must wear respiratory protection.

Ventilation	Local Exhaust	Natural ventilation	Special
Yes	Mechanical (General)		Other

Protective Gloves NA Eye Protection In dusty areas wear goggles

Other Protective Clothing or Equipment

Work/Hygienic Practices

MSDS for **SULFURIC ACID** Page 1

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1 - PRODUCT IDENTIFICATION

PRODUCT NAME: SULFURIC ACID
FORMULA: H2SO4
FORMULA WT: 98.08
CAS NO.: 7664-93-9
NIOSH/RTECS NO.: WS5600000
COMMON SYNONYMS: OIL OF VITRIOL
PRODUCT CODES: 5030,9691,9675,5340,9679,9687,9674,9686,9694,9681,5374,9688
9673,5432,5137,9685,4802,9684,9683,5643,9680
EFFECTIVE: 09/08/86
REVISION #02

PRECAUTIONARY LABELLING

BAKER SAF-T-DATA(TM) SYSTEM

HEALTH	-	3	SEVERE (POISON)
FLAMMABILITY	-	0	NONE
REACTIVITY	-	3	SEVERE (WATER REACTIVE)
CONTACT	-	4	EXTREME (CORROSIVE)

HAZARD RATINGS ARE 0 TO 4 (0 = NO HAZARD; 4 = EXTREME HAZARD).

LABORATORY PROTECTIVE EQUIPMENT

GOGGLES & SHIELD; LAB COAT & APRON; VENT HOOD; PROPER GLOVES

PRECAUTIONARY LABEL STATEMENTS

POISON DANGER
HARMFUL IF INHALED
CAUSES SEVERE BURNS
MAY BE FATAL IF SWALLOWED
REACTS VIOLENTLY WITH WATER.

DO NOT GET IN EYES, ON SKIN, ON CLOTHING.
DO NOT BREATHE VAPOR. KEEP IN TIGHTLY CLOSED CONTAINER. LOOSEN CLOSURE CAUTIOUSLY. USE WITH ADEQUATE VENTILATION. WASH THOROUGHLY AFTER HANDLING. IN CASE OF SPILL NEUTRALIZE WITH SODA ASH OR LIME AND PLACE IN DRY CONTAINER.

SAF-T-DATA(TM) STORAGE COLOR CODE: WHITE (CORROSIVE)

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2 - HAZARDOUS COMPONENTS

COMPONENT	%	CAS NO.
SULFURIC ACID	90-100	7664-93-9

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3 - PHYSICAL DATA

BOILING POINT: 327 C (621 F) VAPOR PRESSURE(MM HG): <0.3

MELTING POINT: -2 C (28 F) VAPOR DENSITY(AIR=1): 3.4

SPECIFIC GRAVITY: 1.84 (H2O=1) EVAPORATION RATE: <1 (BUTYL ACETATE=1)

SOLUBILITY(H2O): COMPLETE (IN ALL PROPORTIONS) % VOLATILES BY VOLUME: N/A

APPEARANCE & ODOR: CLEAR, COLORLESS TO LIGHT YELLOW, OILY ODORLESS LIQUID.

---

4 - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (CLOSED CUP N/A NFPA 704M RATING: 3-0-2 W

FLAMMABLE LIMITS: UPPER - N/A % LOWER - N/A %

FIRE EXTINGUISHING MEDIA
USE DRY CHEMICAL OR CARBON DIOXIDE. DO NOT USE WATER.

SPECIAL FIRE-FIGHTING PROCEDURES
FIREFIGHTERS SHOULD WEAR PROPER PROTECTIVE EQUIPMENT AND SELF-CONTAINED BREATHING APPARATUS WITH FULL FACEPIECE OPERATED IN POSITIVE PRESSURE MODE. DO NOT GET WATER INSIDE CONTAINERS.

UNUSUAL FIRE & EXPLOSION HAZARDS
REACTS WITH MOST METALS TO PRODUCE HYDROGEN GAS, WHICH CAN FORM AN EXPLOSIVE MIXTURE WITH AIR.
A VIOLENT EXOTHERMIC REACTION OCCURS WITH WATER. SUFFICIENT HEAT MAY BE PRODUCED TO IGNITE COMBUSTIBLE MATERIALS.

TOXIC GASES PRODUCED
SULFUR DIOXIDE

---

5 - HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE (TLV/TWA): 1 MG/M3 (PPM)

PERMISSIBLE EXPOSURE LIMIT (PEL): 1 MG/M3 (PPM)

TOXICITY: LD50 (ORAL-RAT)(MG/KG) - 2140

CARCINOGENICITY: NTP: NO IARC: NO Z LIST: NO OSHA REG: NO

EFFECTS OF OVEREXPOSURE
INHALATION OF VAPORS MAY CAUSE SEVERE IRRITATION OF THE RESPIRATORY SYSTEM.
LIQUID MAY CAUSE SEVERE BURNS TO SKIN AND EYES.
INGESTION IS HARMFUL AND MAY BE FATAL.
INGESTION MAY CAUSE NAUSEA AND VOMITING.
INGESTION MAY CAUSE SEVERE BURNS TO MOUTH, THROAT, AND STOMACH. MAY HAVE ADVERSE EFFECT ON KIDNEY FUNCTION AND MAY BE FATAL.

CHRONIC OVEREXPOSURE MAY RESULT IN LUNG DAMAGE.

TARGET ORGANS
RESPIRATORY SYSTEM, EYES, SKIN, TEETH

MEDICAL CONDITIONS GENERALLY AGGRAVATED BY EXPOSURE
NONE IDENTIFIED

ROUTES OF ENTRY
INHALATION, INGESTION, EYE CONTACT, SKIN CONTACT

EMERGENCY AND FIRST AID PROCEDURES
CALL A PHYSICIAN.
IF SWALLOWED, DO NOT INDUCE VOMITING; IF CONSCIOUS, GIVE WATER, MILK, OR MILK OF MAGNESIA.
IF INHALED, REMOVE TO FRESH AIR. IF NOT BREATHING, GIVE ARTIFICIAL RESPIRATION. IF BREATHING IS DIFFICULT, GIVE OXYGEN.
IN CASE OF CONTACT, IMMEDIATELY FLUSH EYES OR SKIN WITH PLENTY OF WATER FOR AT LEAST 15 MINUTES WHILE REMOVING CONTAMINATED CLOTHING AND SHOES.
WASH CLOTHING BEFORE RE-USE.

---

6 - REACTIVITY DATA

STABILITY: STABLE HAZARDOUS POLYMERIZATION: WILL NOT OCCUR

CONDITIONS TO AVOID: MOISTURE, HEAT

INCOMPATIBLES: WATER, MOST COMMON METALS, ORGANIC MATERIALS, STRONG REDUCING AGENTS, COMBUSTIBLE MATERIALS, STRONG BASES, STRONG OXIDIZING AGENTS

DECOMPOSITION PRODUCTS: OXIDES OF SULFUR

---

7 - SPILL AND DISPOSAL PROCEDURES

STEPS TO BE TAKEN IN THE EVENT OF A SPILL OR DISCHARGE
WEAR SELF-CONTAINED BREATHING APPARATUS AND FULL PROTECTIVE CLOTHING.
STOP LEAK IF YOU CAN DO SO WITHOUT RISK. DO NOT USE WATER.
NEUTRALIZE SPILL AND/OR WASHINGS WITH SODA ASH OR LIME.
WITH CLEAN SHOVEL, PLACE MATERIAL INTO CLEAN, DRY CONTAINER AND COVER.
MOVE CONTAINER(S) FROM SPILL AREA.

J. T. BAKER NEUTRASORB(R) OR NEUTRASOL(R) "LOW NA+" ACID NEUTRALIZERS ARE RECOMMENDED FOR SPILLS OF THIS PRODUCT.

DISPOSAL PROCEDURE
DISPOSE IN ACCORDANCE WITH ALL APPLICABLE FEDERAL, STATE, AND LOCAL ENVIRONMENTAL REGULATIONS.

EPA HAZARDOUS WASTE NUMBER: D002, D003 (CORROSIVE, REACTIVE WASTE)

---

8 - PROTECTIVE EQUIPMENT

VENTILATION: USE GENERAL OR LOCAL EXHAUST VENTILATION TO MEET TLV REQUIREMENTS.

RESPIRATORY PROTECTION: NONE REQUIRED WHERE APPROPRIATE VENTILATION CONDITIONS EXIST. IF THE TLV IS EXCEEDED, A SELF-CONTAINED BREATHING APPARATUS IS ADVISED.

EYE/SKIN PROTECTION: SAFETY GOGGLES AND FACE SHIELD, UNIFORM, PROTECTIVE SUIT, RUBBER GLOVES ARE RECOMMENDED.

---

9 - STORAGE AND HANDLING PRECAUTIONS

SAF-T-DATA(TM) STORAGE COLOR CODE: WHITE (CORROSIVE)

SPECIAL PRECAUTIONS
KEEP CONTAINER TIGHTLY CLOSED. STORE IN CORROSION-PROOF AREA.
KEEP CONTAINERS OUT OF SUN AND AWAY FROM HEAT.

---

10 - TRANSPORTATION DATA AND ADDITIONAL INFORMATION

DOMESTIC (D.O.T.)

PROPER SHIPPING NAME	SULFURIC ACID
HAZARD CLASS	CORROSIVE MATERIAL (LIQUID)
UN/NA	UN1830
LABELS	CORROSIVE
REPORTABLE QUANTITY	1000 LBS.

INTERNATIONAL (I.M.O.)

PROPER SHIPPING NAME	SULPHURIC ACID
HAZARD CLASS	8
UN/NA	UN1830
LABELS	CORROSIVE

MSDS for **TITANIUM DIOXIDE** Page 1

---

1 - PRODUCT IDENTIFICATION

PRODUCT NAME: TITANIUM DIOXIDE
FORMULA: TIO2
FORMULA WT: 79.90
CAS NO.: 13463-67-7
NIOSH/RTECS NO.: XR2275000
COMMON SYNONYMS: TITANIUM(IV)OXIDE
PRODUCT CODES: 4162,4962
EFFECTIVE: 09/05/86
REVISION #02

PRECAUTIONARY LABELLING

BAKER SAF-T-DATA(TM) SYSTEM

HEALTH	-	0	NONE
FLAMMABILITY	-	0	NONE
REACTIVITY	-	0	NONE
CONTACT	-	1	SLIGHT

HAZARD RATINGS ARE 0 TO 4 (0 = NO HAZARD; 4 = EXTREME HAZARD).

LABORATORY PROTECTIVE EQUIPMENT

SAFETY GLASSES; LAB COAT

PRECAUTIONARY LABEL STATEMENTS

DURING USE AVOID CONTACT WITH EYES, SKIN, CLOTHING. WASH THOROUGHLY AFTER HANDLING. WHEN NOT IN USE KEEP IN TIGHTLY CLOSED CONTAINER.

SAF-T-DATA(TM) STORAGE COLOR CODE: ORANGE (GENERAL STORAGE)

---

2 - HAZARDOUS COMPONENTS

COMPONENT	%	CAS NO.
TITANIUM DIOXIDE	90-100	13463-67-7

---

3 - PHYSICAL DATA

BOILING POINT: N/A
VAPOR PRESSURE(MM HG): N/A

MELTING POINT: 1855 C (3371 F)
VAPOR DENSITY(AIR=1): N/A

SPECIFIC GRAVITY: 3.84 (H2O=1)
EVAPORATION RATE: N/A (BUTYL ACETATE=1)

SOLUBILITY(H2O): NEGLIGIBLE (LESS THAN 0.1 %) % VOLATILES BY VOLUME: 0

APPEARANCE & ODOR: WHITE POWDER.

---

4 - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (CLOSED CUP N/A

FLAMMABLE LIMITS: UPPER - N/A % LOWER - N/A %

FIRE EXTINGUISHING MEDIA
USE EXTINGUISHING MEDIA APPROPRIATE FOR SURROUNDING FIRE.

---

5 - HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE (TLV/TWA): 10 MG/M3 (PPM)

PERMISSIBLE EXPOSURE LIMIT (PEL): 15 MG/M3 (PPM)

CARCINOGENICITY: NTP: NO IARC: NO Z LIST: NO OSHA REG: NO

EFFECTS OF OVEREXPOSURE
NO EFFECTS OF OVEREXPOSURE WERE DOCUMENTED.

TARGET ORGANS: LUNGS

MEDICAL CONDITIONS GENERALLY AGGRAVATED BY EXPOSURE
NONE IDENTIFIED

ROUTES OF ENTRY: INHALATION

EMERGENCY AND FIRST AID PROCEDURES

INGESTION:	IF SWALLOWED AND THE PERSON IS CONSCIOUS, IMMEDIATELY GIVE LARGE AMOUNTS OF WATER. GET MEDICAL ATTENTION.
INHALATION:	IF A PERSON BREATHES IN LARGE AMOUNTS, MOVE THE EXPOSED PERSON TO FRESH AIR. GET MEDICAL ATTENTION.
EYE CONTACT:	IMMEDIATELY FLUSH WITH PLENTY OF WATER FOR AT LEAST 15 MINUTES. GET MEDICAL ATTENTION.
SKIN CONTACT:	IMMEDIATELY WASH WITH PLENTY OF SOAP AND WATER FOR AT LEAST 15 MINUTES.

---

6 - REACTIVITY DATA

STABILITY: STABLE HAZARDOUS POLYMERIZATION: WILL NOT OCCUR

CONDITIONS TO AVOID: NONE DOCUMENTED

---

7 - SPILL AND DISPOSAL PROCEDURES

STEPS TO BE TAKEN IN THE EVENT OF A SPILL OR DISCHARGE
WEAR SUITABLE PROTECTIVE CLOTHING. CAREFULLY SWEEP UP AND REMOVE.

DISPOSAL PROCEDURE
DISPOSE IN ACCORDANCE WITH ALL APPLICABLE FEDERAL, STATE, AND LOCAL ENVIRONMENTAL REGULATIONS.

---

8 - PROTECTIVE EQUIPMENT

VENTILATION: USE GENERAL OR LOCAL EXHAUST VENTILATION TO MEET TLV REQUIREMENTS.

RESPIRATORY PROTECTION: NONE REQUIRED WHERE ADEQUATE VENTILATION CONDITIONS EXIST. IF AIRBORNE CONCENTRATION EXCEEDS TLV, A SELF-CONTAINED BREATHING APPARATUS IS ADVISED.

EYE/SKIN PROTECTION: SAFETY GLASSES WITH SIDESHIELDS, PROPER GLOVES ARE RECOMMENDED.

---

9 - STORAGE AND HANDLING PRECAUTIONS

SAF-T-DATA(TM) STORAGE COLOR CODE: ORANGE (GENERAL STORAGE)

SPECIAL PRECAUTIONS
KEEP CONTAINER TIGHTLY CLOSED. SUITABLE FOR ANY GENERAL CHEMICAL STORAGE AREA.

---

10 - TRANSPORTATION DATA AND ADDITIONAL INFORMATION

DOMESTIC (D.O.T.)

PROPER SHIPPING NAME CHEMICALS, N.O.S. (NON-REGULATED)

INTERNATIONAL (I.M.O.)

PROPER SHIPPING NAME CHEMICALS, N.O.S. (NON-REGULATED)

BLANK

MSDS for **UREA** Page 1

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1 - PRODUCT IDENTIFICATION

PRODUCT NAME: UREA
FORMULA: NH2CONH2
FORMULA WT: 60.06
CAS NO.: 57-13-6
NIOSH/RTECS NO.: YR6250000
COMMON SYNONYMS: CARBAMIDE; CARBONYL DIAMIDE
PRODUCT CODES: 4204,4206,X331,4205,4836
EFFECTIVE: 05/08/86
REVISION #02

PRECAUTIONARY LABELLING

BAKER SAF-T-DATA(TM) SYSTEM

HEALTH	-	0	NONE
FLAMMABILITY	-	1	SLIGHT
REACTIVITY	-	0	NONE
CONTACT	-	1	SLIGHT

HAZARD RATINGS ARE 0 TO 4 (0 = NO HAZARD; 4 = EXTREME HAZARD).

LABORATORY PROTECTIVE EQUIPMENT

SAFETY GLASSES; LAB COAT

PRECAUTIONARY LABEL STATEMENTS

CAUTION
MAY CAUSE IRRITATION
MAY BE HARMFUL IF INHALED

DURING USE AVOID CONTACT WITH EYES, SKIN, CLOTHING. WASH THOROUGHLY AFTER HANDLING. WHEN NOT IN USE KEEP IN TIGHTLY CLOSED CONTAINER.

SAF-T-DATA(TM) STORAGE COLOR CODE: ORANGE (GENERAL STORAGE)

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2 - HAZARDOUS COMPONENTS

COMPONENT	%	CAS NO.
NOT APPLICABLE		

---

3 - PHYSICAL DATA

BOILING POINT: N/A
VAPOR PRESSURE(MM HG): N/A

MELTING POINT: 135 C (275 F)
VAPOR DENSITY(AIR=1): N/A

SPECIFIC GRAVITY: 1.32 (H2O=1)
EVAPORATION RATE: N/A (BUTYL ACETATE=1)

SOLUBILITY(H2O): APPRECIABLE (MORE THAN 10 %) % VOLATILES BY VOLUME: 0

APPEARANCE & ODOR: WHITE CRYSTALS WITH ODOR OF AMMONIA.

---

4 - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (CLOSED CUP N/A

FLAMMABLE LIMITS: UPPER - N/A % LOWER - N/A %

FIRE EXTINGUISHING MEDIA
USE EXTINGUISHING MEDIA APPROPRIATE FOR SURROUNDING FIRE.

SPECIAL FIRE-FIGHTING PROCEDURES
FIREFIGHTERS SHOULD WEAR PROPER PROTECTIVE EQUIPMENT AND SELF-CONTAINED BREATHING APPARATUS WITH FULL FACEPIECE OPERATED IN POSITIVE PRESSURE MODE.

UNUSUAL FIRE & EXPLOSION HAZARDS
CAN BE AN EXPLOSION HAZARD, ESPECIALLY WHEN HEATED.

TOXIC GASES PRODUCED
AMMONIA, CARBON MONOXIDE, CARBON DIOXIDE

---

5 - HEALTH HAZARD DATA

TOXICITY:	LD50 (ORAL-RAT) (G/KG)	- 14.3
	LD50 (SCU-RAT) (MG/KG)	- 8200
	LD50 (IV-MOUSE) (MG/KG)	- 4600

CARCINOGENICITY: NTP: NO IARC: NO Z LIST: NO OSHA REG: NO

EFFECTS OF OVEREXPOSURE
DUST MAY IRRITATE NOSE AND THROAT.
DUST MAY CAUSE SNEEZING AND COUGHING.

TARGET ORGANS
NONE IDENTIFIED

MEDICAL CONDITIONS GENERALLY AGGRAVATED BY EXPOSURE
NONE IDENTIFIED

ROUTES OF ENTRY
NONE INDICATED.

EMERGENCY AND FIRST AID PROCEDURES

INGESTION:	IF SWALLOWED AND THE PERSON IS CONSCIOUS, IMMEDIATELY GIVE LARGE AMOUNTS OF WATER. GET MEDICAL ATTENTION.
INHALATION:	IF A PERSON BREATHES IN LARGE AMOUNTS, MOVE THE EXPOSED PERSON TO FRESH AIR. GET MEDICAL ATTENTION.
EYE CONTACT:	IMMEDIATELY FLUSH WITH PLENTY OF WATER FOR AT LEAST 15 MINUTES. GET MEDICAL ATTENTION.
SKIN CONTACT:	IMMEDIATELY WASH WITH PLENTY OF SOAP AND WATER FOR AT LEAST 15 MINUTES.

---

6 - REACTIVITY DATA

STABILITY: STABLE HAZARDOUS POLYMERIZATION: WILL NOT OCCUR

CONDITIONS TO AVOID: HEAT, MOISTURE

INCOMPATIBLES: STRONG OXIDIZING AGENTS, STRONG BASES

DECOMPOSITION PRODUCTS: CYANIDES, AMMONIA, OXIDES OF NITROGEN, CARBON MONOXIDE, CARBON DIOXIDE

---

7 - SPILL AND DISPOSAL PROCEDURES

STEPS TO BE TAKEN IN THE EVENT OF A SPILL OR DISCHARGE
WEAR SUITABLE PROTECTIVE CLOTHING. CAREFULLY SWEEP UP AND REMOVE.

DISPOSAL PROCEDURE
DISPOSE IN ACCORDANCE WITH ALL APPLICABLE FEDERAL, STATE, AND LOCAL ENVIRONMENTAL REGULATIONS.

---

8 - PROTECTIVE EQUIPMENT

VENTILATION: USE ADEQUATE GENERAL OR LOCAL EXHAUST VENTILATION TO KEEP FUME OR DUST LEVELS AS LOW AS POSSIBLE.

RESPIRATORY PROTECTION: NONE REQUIRED WHERE ADEQUATE VENTILATION CONDITIONS EXIST. IF AIRBORNE CONCENTRATION IS HIGH, USE AN APPROPRIATE RESPIRATOR OR DUST MASK.

EYE/SKIN PROTECTION: SAFETY GLASSES WITH SIDESHIELDS, RUBBER GLOVES ARE RECOMMENDED.

---

9 - STORAGE AND HANDLING PRECAUTIONS

SAF-T-DATA(TM) STORAGE COLOR CODE: ORANGE (GENERAL STORAGE)

SPECIAL PRECAUTIONS
KEEP CONTAINER TIGHTLY CLOSED. SUITABLE FOR ANY GENERAL CHEMICAL STORAGE AREA.

---

10 - TRANSPORTATION DATA AND ADDITIONAL INFORMATION

DOMESTIC (D.O.T.)

PROPER SHIPPING NAME CHEMICALS, N.O.S. (NON-REGULATED)

INTERNATIONAL (I.M.O.)

PROPER SHIPPING NAME CHEMICALS, N.O.S. (NON-REGULATED)

BLANK

MSDS: 5499
REV: 1

ZINC CORPORATION OF AMERICA
300 FRANKFORT ROAD MONACA, PA 15061-2295 (724) 774-1020

5499?

MSDS FOR ZINC OXIDE: KADOX 911, 911P, 911H, 911HP, 915, 920, 920P, 920H, 920HP, 920G, 930, 930H, 930HP, 930G

ZC-X006

SECTION I - GENERAL INFORMATION

NAME: ZINC OXIDE

MANUFACTURER:
ZINC CORPORATION OF AMERICA
300 Frankfort Road
Monaca, PA 15061
724-774-1020

TRANSPORTATION EMERGENCY:
CHEMTREC: 800-424-9300

CHEMICAL FAMILY: Nonferrous Metal Oxide

CAS NO.: 1314-13-2

FORMULA: ZnO

DOT HAZARD CLASS: Not listed **UN NO.:** NAIF* **NA NO.:** NAIF*

SARA SECTION 313: This product is subject to the reporting requirements of Section 313 of Title III of the Superfund Amendments and Reauthorization Act and 40 CFR 372. The materials underlined below are present in quantities above the applicable deminimis concentrations and are listed as Toxic Chemicals in 40 CFR 372.65.

ISSUE DATE: 02/12/88 **REVISION DATE:** 7/30/98

* NAIF - No applicable information found

SECTION II - INGREDIENTS

MATERIAL	CAS NO	%
ZINC OXIDE	1314-13-2	99.9
CADMIUM	7440-43-9	.005
LEAD	7439-92-1	.0025

LEAD AND CADMIUM ARE INHERENT IN THE MANUFACTURE OF ZINC AND ARE NOT PHYSICALLY ADDED IN THE MANUFACTURE OF ZINC OXIDE

MSDS: ——
REV: 1

MSDS FOR ZINC OXIDE: KADOX 911, 911P, 911H, 911HP, 915, 920, 920P, 920H, 920HP, 920G, 930, 930H, 930HP, 930G

ZC-X006

SECTION III PHYSICAL DATA

BOILING POINT (760 MM HG): N/A

MELTING POINT: 3587°F

SPECIFIC GRAVITY: 5.61

EVAPORATION RATE (=1): N/A

VAPOR DENSITY (air = 1): N/A

SOLUBILITY IN WATER: Negligible

PERCENT VOLATILE BY VOLUME (%): N/A

VAPOR PRESSURE AT 20° F: N/A

APPEARANCE AND ODOR: White powder with no odor. (G, P and H suffix denote granular, pellets or hardened pellets respectively)

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (METHOD USED): N/A

NFPA FIRE RATING

FLAMMABLE LIMITS: LEL: N/A, UEL: N/A

HEALTH	0
FLAMMABILITY	0
REACTIVITY	0

EXTINGUISHING MEDIA: Zinc oxide does not burn. Water spray, dry chemical, or carbon dioxide extinguishers may be used for fires in storage areas.

SPECIAL FIRE FIGHTING PROCEDURES: Non-Flammable

UNUSUAL FIRE AND EXPLOSION HAZARDS: None

SECTION V - HEALTH HAZARD DATA

MATERIAL	FORM	OSHA - PEL TWA mg/m³	OSHA - PEL STEL mg/m³	ACGIH - TLV TWA mg/m³	ACGIH - TLV STEL mg/m³
ZINC OXIDE	Total Dust	10	--	10	--
	Respirable (Fume)	5	10	5	10

ROUTES OF ENTRY

PRIMARY: Inhalation

SECONDARY: Ingestion

MSDS: [illegible]
REV: 1

MSDS FOR ZINC OXIDE: KADOX 911, 911P, 911H, 911HP, 915, 920, 920P, 920H, 920HP, 920G, 930, 930H, 930HP, 930G

ZC-X006

EFFECTS OF SHORT TERM OVEREXPOSURE:

ZINC OXIDE: Inhalation of high levels of zinc oxide may result in tightness of chest, metallic taste, cough, dizziness, fever, chills, headache, nausea, and dry throat. Overexposure may produce symptoms known as metal fume fever or "zinc shakes"; an acute, self-limiting condition without recognized complications. Symptoms of metal fume fever include: chills, fever, muscular pain, nausea and vomiting. Like any finely divided particulate matter, zinc oxide may cause mechanical irritation to skin and eyes.

MEDICAL CONDITIONS GENERALLY AGGRAVATED BY EXPOSURE: Inhalation of dust may be an irritant to pre-existing respiratory conditions.

EMERGENCY AND FIRST AID PROCEDURES: Symptoms resulting from inhalation overexposure usually disappear within 24 hours. Symptomatic treatment, such as bed rest and possibly aspirin is recommended to provide relief from fever and chills. Skin contact - flush areas with large amounts of water. Eye contact - flush eyes with copious amounts of water. In all cases, consult physician for medical attention.

EFFECTS OF LONG TERM OVEREXPOSURE:

ZINC OXIDE: Chronic exposure to zinc oxide may cause respiratory tract irritation with nasopharyngitis and laryngitis.

CARCINOGENIC ASSESSMENT:

NTP? No IARC MONOGRAPH? No OSHA? No

SECTION VI - REACTIVITY DATA

STABILITY: ( ) Unstable
(X) Stable

CONDITIONS TO AVOID: None

INCOMPATIBILITY (MATERIALS TO AVOID). None known.

HAZARDOUS DECOMPOSITION PRODUCTS. None

HAZARDOUS POLYMERIZATION ( ) May occur
(X) Will not occur

SECTION VII - SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED: As with any nuisance dust, avoid excessive dusting. Material should be contained for recycling.

MSDS: 5499
REV: 1

MSDS FOR ZINC OXIDE: KADOX 911, 911P, 911H, 911HP, 915, 920, 920P, 920H, 920HP, 920G, 930, 930H, 930HP, 930G

ZC-X006

WASTE DISPOSAL METHOD: Dispose in closed container or heavy bag. Material may be recycled or disposed of in accordance with Federal, State, and Local Environmental Regulations. This material may be regulated under CERCLA, TSCA, SARA, and/or RCRA Regulations.

SECTION VIII - SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION (SPECIFY TYPE): Use NIOSH/MSHA approved type respirator for protection against dust.

VENTILATION: Local exhaust or other ventilation that will reduce dust concentrations to less than permissible exposure limits.

PROTECTIVE GLOVES: Recommended to prevent skin irritation in hypersensitive individuals.

EYE PROTECTION: Use safety eyewear for protection against airborne particulate matter.

OTHER PROTECTIVE EQUIPMENT: Barrier creams may help prevent skin irritation in hypersensitive individuals.

SECTION IX - SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING: Store in dry, well ventilated location. Protect from physical damage.

OTHER PRECAUTIONS: Practice good personal hygiene when working in areas where this material is used. Avoid prolonged contact with skin

DISCLAIMER: As the conditions or methods of use are beyond our control, we do not assume any responsibility and expressly disclaim any liability for any use of the material. Information contained herein is believed to be true and accurate, but all statements or suggestions are made without any warranty, express or implied, regarding accuracy of the information, the hazards connected with the use of the material, or the results to be obtained from the use thereof.

C:\WPDOCS\OXIDE\ZCX006.CRR

KENTUCKY-TENNESSEE CLAY COMPANY, MAYFIELD, KENTUCKY
SUBSIDIARY OF HECLA MINING COMPANY

Micronized Zirconium Silicate
RZM 4 Micron

PREMIUM QUALITY

RZM ensures consistent premium quality product, as it mines and concentrates all material from its own operations at Tomago on the East Coast of Australia, where it has produced premium zircon for over 30 years.

RZM now offers all the benefits of direct business possibilities from the original producer of the raw material in Australia, through to the final consumer.

TYPICAL CHEMICAL PROPERTIES		TYPICAL PHYSICAL PROPERTIES	
ZrO_2	66%	Density	4.6×10^3 kg/m^3
Fe_2O_3	0.03%	Sizing	100% minus 4 micron
TiO_2	0.12%	Median particle size under 1 micron	
SiO_2	33%	Moh Hardness	7.5

APPLICATIONS

Used in ceramic glazes and frits, specialized glass products, porcelain and high-performance refractories. The highest degree of purity in all products is demanded by the specifications set by buyers. Constant attention by means of microscopic examination, chemical and physical tests are performed, however users must ensure the product suitability for their particular application.

WARNING
BALL CLAYS CONTAIN FREE SILICA
DO NOT BREATHE DUST
Prolonged Inhalation May Cause Delayed Lung Injury (Silicosis). Follow OSHA Safety & Health Standards for Crystalline Silica (Quartz). Suspect Cancer Hazard - There is Limited Evidence That Crystalline Silica May Cause Cancer in Humans.

Kentucky-Tennessee Clay Company
P. O. Box 6002 -- Mayfield, Kentucky 42066
Telephone: 502-247-3061 -- FAX NO.: 502-247-0293

Date: 4-19-94
From: Tracy Egner

No. of Pages: 5
(Includes Front Page)

Fax No.: (301) 621-8211

Company: GIS Duratek, Columbia, MD

Attention: Matthew Tangeman

Per your request enclosed are technical data and MSDS information on 4 micro[redacted] supplied by KY-TN Clay Company. A customer service representative will contact you soon concerning pricing. If I can be of further service, please contact me at (502) 251-2132.

Sincerely,

KENTUCKY-TENNESSEE CLAY COMPANY

Tracy Egner

Tracy Egner
Technical Service Coordinator

KENTUCKY-TENNESSEE CLAY COMPANY

P.O. BOX 6002 MAYFIELD, KENTUCKY 42066

PHONE (502) 247-3061
TELEX: 204048
FAX: (502) 247-0293

MATERIAL SAFETY DATA SHEET

SECTION I. IDENTITY OF PRODUCT AND PRODUCER

PRODUCT NAME: 4 Micron Zircon	**APPEARANCE:** Cream to white odorless powder
SUPPLIER'S NAME AND ADDRESS: Kentucky-Tennessee Clay Company P.O. Box 6002 Highway 45 South Mayfield, KY 42066 **TELEPHONE NUMBERS:** 502-247-3061 502-247-0293 FAX	**EMERGENCY CONTACT:** CHEMTREC: (800) 424-9300* *To be used only in the event of chemical emergencies involving a spill, leak, fire, exposure, or accident involving chemicals.

SECTION II. COMPOSITION

	CHEMICAL NAMES & SYNONYMS	Exposure Limit (OEL/TLV)	FORMULA	APPROXIMATE PROPORTIONS
INGREDIENTS	ZIRCONIUM SILICATE - "ZIRCON" CAS #7440-67-2	N/A	$ZrSiO_4$	99%

SECTION III. HEALTH HAZARD

IF INHALED	Nuisance dust. ACGIH TLV-TWA = 10mg/m^3 total dust
IF SWALLOWED	NO HAZARD KNOWN
IF ABSORBED THROUGH SKIN	NOT APPLICABLE
ON SKIN	NIL
IN EYE	IRRITATION FROM POWDERED NATURE OF MATERIAL

"NO HAZARD KNOWN" indicates that the substance has been tested and no hazard found. "NO INFORMATION" indicates that the substance has not been tested. It should be treated as hazardous.

SECTION IV. REFERENCES

Please give the detail of written sources on the testing and health hazard information referred to in Section III.

DCM Scientific Laboratory, Inc.
Lakewood, Colorado

SECTION V. EMERGENCY & FIRST AID PROCEDURE

A. OVEREXPOSURE

EYES:	Flush with water.
SKIN:	Wash thoroughly with soap and water.
INHALED:	Extremely unlikely. Consult Doctor.
SWALLOWED:	Extremely unlikely. Consult Doctor.
INFORMATION FOR DOCTOR:	Stable inert mineral.

B. SPILLAGE

CLEAN-UP METHOD: Sweep or Vacuum	**PROTECTIVE MEASURES:** Dust Mask
DISPOSAL METHOD & STATUTORY CONTROLS: Dispose of according to local, state and federal regulations.	**POTENTIAL ENVIRONMENTAL HAZARD:** NIL

C. FIRE

UNUSUAL HAZARDS & SPECIAL PRECAUTIONS: NONE	**COMBUSTION PRODUCTS & HAZARDS:** N/A
FIRE FIGHTING PROCEDURES: INCOMBUSTIBLE	**EXTINGUISHER TYPE:** N/A
FLASH POINT: N/A	**AUTO IGNITION TEMPERATURE:** N/A

SECTION VI. CONTROL MEASURES OTHER THAN PERSONAL PROTECTION (Is local exhaust ventilation required?)

MEASURES: NO

NOTES BY HSE: (1)"The best working practice is to reduce concentrations of all airborne contaminants as far below the OEL as is reasonably practicable. In the case of substances not quoted on the (OEL) list or where there are no known toxic effects exposures should be kept as low as practicable." (2)"Whatever techniques are used, they should be subject to adequate checks on a regular basis to ensure that they are providing effective control." (3)"Where the atmosphere of a work place is likely to be contaminated, analysis of the atmosphere should be carried out on a periodic basis." (HSE Guidance Notes EH40 and EH18)

SECTION VII. PERSONAL PROTECTION (Please specify the personal equipment necessary for each area of the body.)

INHALATION: NIOSH/MSHA approved dust mask	**EYES:** Safety Goggles
HANDS, FACE, BODY: Cotton Overalls	**SPECIAL ITEMS TO BE KEPT IN FIRST-AID BOX:** No Special Item

NOTE BY HSE: "The provision and use of personal protective equipment should normally be regarded as providing back-up for other techniques which aim to control the risk at source, rather than as a first line of defense: in certain circumstances however personal protection is the only reasonably practicable measure."

MSDS for **ZIRCONIUM DIOXIDE, POWDER** Page 1

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1 - PRODUCT IDENTIFICATION

PRODUCT NAME: ZIRCONIUM DIOXIDE, POWDER
FORMULA: ZRO2
FORMULA WT: 123.22
CAS NO.: 1314-23-4
COMMON SYNONYMS: ZIRCONIUM OXIDE; ZIRCONIC ANHYDRIDE
PRODUCT CODES: 4963
EFFECTIVE: 09/05/86
REVISION #02

PRECAUTIONARY LABELLING

BAKER SAF-T-DATA(TM) SYSTEM

HEALTH	-	1	SLIGHT
FLAMMABILITY	-	0	NONE
REACTIVITY	-	0	NONE
CONTACT	-	1	SLIGHT

HAZARD RATINGS ARE 0 TO 4 (0 = NO HAZARD; 4 = EXTREME HAZARD).

LABORATORY PROTECTIVE EQUIPMENT

SAFETY GLASSES; LAB COAT

PRECAUTIONARY LABEL STATEMENTS

DURING USE AVOID CONTACT WITH EYES, SKIN, CLOTHING. WASH THOROUGHLY AFTER HANDLING. WHEN NOT IN USE KEEP IN TIGHTLY CLOSED CONTAINER.

SAF-T-DATA(TM) STORAGE COLOR CODE: ORANGE (GENERAL STORAGE)

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2 - HAZARDOUS COMPONENTS

COMPONENT	%	CAS NO.
ZIRCONIUM DIOXIDE	90-100	1314-23-4

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3 - PHYSICAL DATA

BOILING POINT: 4300 C (7772 F)
MELTING POINT: 2680 C (4856 F)
SPECIFIC GRAVITY: 5.85 (H2O=1)
VAPOR PRESSURE(MM HG): N/A
VAPOR DENSITY(AIR=1): N/A
EVAPORATION RATE: N/A (BUTYL ACETATE=1)
SOLUBILITY(H2O): NEGLIGIBLE (LESS THAN 0.1 %)
% VOLATILES BY VOLUME: 0
APPEARANCE & ODOR: ODORLESS HEAVY WHITE POWDER.

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4 - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (CLOSED CUP N/A

FLAMMABLE LIMITS: UPPER - N/A % LOWER - N/A %

FIRE EXTINGUISHING MEDIA
USE EXTINGUISHING MEDIA APPROPRIATE FOR SURROUNDING FIRE.

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5 - HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE (TLV/TWA): 5 MG/M3 (PPM)

SHORT-TERM EXPOSURE LIMIT (STEL): 10 MG/M3 (PPM)

PERMISSIBLE EXPOSURE LIMIT (PEL): 5 MG/M3 (PPM)

CARCINOGENICITY: NTP: NO IARC: NO Z LIST: NO OSHA REG: NO

EFFECTS OF OVEREXPOSURE
NO EFFECTS OF OVEREXPOSURE WERE DOCUMENTED.

TARGET ORGANS
RESPIRATORY SYSTEM, SKIN

MEDICAL CONDITIONS GENERALLY AGGRAVATED BY EXPOSURE
NONE IDENTIFIED

ROUTES OF ENTRY
INHALATION, EYE CONTACT, SKIN CONTACT

EMERGENCY AND FIRST AID PROCEDURES

INGESTION:	IF SWALLOWED AND THE PERSON IS CONSCIOUS, IMMEDIATELY GIVE LARGE AMOUNTS OF WATER. GET MEDICAL ATTENTION.
INHALATION:	IF A PERSON BREATHES IN LARGE AMOUNTS, MOVE THE EXPOSED PERSON TO FRESH AIR. GET MEDICAL ATTENTION.
EYE CONTACT:	IMMEDIATELY FLUSH WITH PLENTY OF WATER FOR AT LEAST 15 MINUTES. GET MEDICAL ATTENTION.
SKIN CONTACT:	IMMEDIATELY WASH WITH PLENTY OF SOAP AND WATER FOR AT LEAST 15 MINUTES.

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6 - REACTIVITY DATA

STABILITY: STABLE HAZARDOUS POLYMERIZATION: WILL NOT OCCUR

CONDITIONS TO AVOID: NONE DOCUMENTED

7 - SPILL AND DISPOSAL PROCEDURES

STEPS TO BE TAKEN IN THE EVENT OF A SPILL OR DISCHARGE
WEAR SUITABLE PROTECTIVE CLOTHING. CAREFULLY SWEEP UP AND REMOVE.

DISPOSAL PROCEDURE
DISPOSE IN ACCORDANCE WITH ALL APPLICABLE FEDERAL, STATE, AND LOCAL ENVIRONMENTAL REGULATIONS.

8 - PROTECTIVE EQUIPMENT

VENTILATION:	USE ADEQUATE GENERAL OR LOCAL EXHAUST VENTILATION TO KEEP FUME OR DUST LEVELS AS LOW AS POSSIBLE.
RESPIRATORY PROTECTION:	A RESPIRATOR WITH DUST/MIST FILTER IS RECOMMENDED. IF AIRBORNE CONCENTRATION EXCEEDS TLV, A SELF-CONTAINED BREATHING APPARATUS IS ADVISED.
EYE/SKIN PROTECTION:	SAFETY GLASSES WITH SIDESHIELDS, PROPER GLOVES ARE RECOMMENDED.

9 - STORAGE AND HANDLING PRECAUTIONS

SAF-T-DATA(TM) STORAGE COLOR CODE: ORANGE (GENERAL STORAGE)

SPECIAL PRECAUTIONS
KEEP CONTAINER TIGHTLY CLOSED. SUITABLE FOR ANY GENERAL CHEMICAL STORAGE AREA.

10 - TRANSPORTATION DATA AND ADDITIONAL INFORMATION

DOMESTIC (D.O.T.)

PROPER SHIPPING NAME CHEMICALS, N.O.S. (NON-REGULATED)

INTERNATIONAL (I.M.O.)

PROPER SHIPPING NAME CHEMICALS, N.O.S. (NON-REGULATED)

BLANK

APPENDIX I

LIST OF CHEMICALS PREVIOUSLY USED IN THE M-AREA LABORATORIES

BLANK

MATERIAL/PRODUCT NAME	CAS NO.	MSDS NO.	BUILDING
SILICONE MOLD RELEASE	–	10074	322-M
METHYLENE CHLORIDE	75-9-2	8955	322-M
NVIGATED ALUMINUM OXIDE	1344-28-1	9559	322-M
NRESSTIC 100	–	4522	322-M
ETHYL ALCOHOL	64-17-5	8633	322-M
BRILLIANT YELLOW QUICK DRY SPRAY ENAMEL	–	1683	322-M
SILVER SPRAY ENAMEL	–	1688	322-M
BRILLANT RED SPRAY ENAMEL	–	1690	322-M
CLEAR ACRYLIC FINISH	–	1689	322-M
GLOSS BLACK QUICK DRY SPRAY ENAMEL	–	1687	322-M
PERMABOND 910	–	4805	322-M
EPI 100 EPOXY ADHESIVE PART B (8245B)	–	4858	322-M
EPOXIDE HARDENER	–	3527	322-M
IRON POLYURETHANE ENAMEL PRECAUTION BLUE	–	4610	322-M
JUSTMASTER AEROSOL SPRAY ENAMEL FIRE RED	–	8916	322-M
EQUAPON CLEAR PART B	–	1699	322-M
AMYL ACETATE	628-63-7	10367	322-M
IRON	7440-42-8	2234	322-M
BRIGHT BEAUTY AEROSOL ACRYLIC ENAMEL	–	1733	322-M
NITRIC ACID	77-92-9	1021	322-M
EPOXY LACQUER SHOP COAT PRIMER RED	–	1657	322-M
GOLD CURE LIQUID	–	7805	322-M
MAGNESIUM POWDER	7439-95-4	6832	322-M
MERCURY	7439-97-6	6705	322-M
METHYL ALCOHOL	67-56-1	8676	322-M
KODAK FIXER	–	7830	322-M
JUST-O-THANE TOPCOAT BASE COMPONENT - YELLOW	–	5140	322-M
METAL POLISH	–	2799	322-M
NVIROQUAT SPRAY	–	3517	322-M
NVY AEROSOL	–	3518	322-M
CLEAR WOOD & MULTI-PURPOSE POLISH	–	8559	322-M
ISOPROPYL ALCOHOL	67-63-0	11027	322-M
ML PRO AP210 LEMON YELLOW SPRAY PAINT	–	15832	322-M
ML PRO AP260 RICH RED SPRAY PAINT	–	15836	322-M
CALCIUM TURNINGS	7440-70-2	5285	322-M
CALCIUM SULFIDE	20548-54-3	1092	322-M

MATERIAL/PRODUCT NAME	CAS NO.	MSDS NO.	BUILDING
CALCIUM HYDROXIDE	1305-62-0	1079	322-M
ALCIUM FLUORIDE	7789-75-5	5288	322-M
CALCIUM CHLORIDE	10043-52-4	1077	322-M
CADMIUM	7440-43-9	5722	322-M
CADMIUM	7440-43-9	1065	322-M
DIALLYL PHTHALATE GLASS	–	258	322-M
TEFLON DRY LUBRICANT	–	3003	322-M
BAKELITE PHENOLIC THERMOSETTING POWDER	–	2671	322-M
BISMUTH	7440-69-9	739	322-M
AMMONIUM PERSULFATE	7727-54-0	765	322-M
AMMONIUM FLUORIDE	12125-1-8	756	322-M
AMMONIUM CHLORIDE	12125-2-9	1983	322-M
ALUMINUX	1310-73-2	1296	322-M
ALL-4	–	1229	322-M
AEROKROIL	–	1182	322-M
ACETONE	67-64-1	1150	322-M
ACETIC ACID GLACIAL	64-19-7	1142	322-M
ACETIC ACID GLACIAL	64-19-7	1142	322-M
SKD-NF DEVELOPER AEROSOL	–	8935	322-M
SKC-NF CLEANER/REMOVER AEROSOL	–	8936	322-M
LITHIUM FLUORIDE	7789-24-4	6718	322-M
LEAD	7439-92-1	6715	322-M
KOLD CURE POWDER	–	7804	322-M
KOLD WELD RESIN-LIQUID & POWDER	–	7803	322-M
KEROSENE	8008-20-6	5477	322-M
IODINE	7553-56-2	5822	322-M
DOW CORNING HIGH VACUUM GREASE	–	6381	322-M
GLYCERINE	56-81-5	5085	322-M
FERRIC NITRATE NONAHYDRATE	7782-61-8	6635	322-M
FERRIC CHLORIDE	7705-8-0	9945	322-M
ETHYLENE GLYCOL	107-21-1	5472	322-M
BL-15 CELL FLUID	–	2680	322-M
KODAK EKTAMATIC S-30 STABILIZER	–	374	322-M
EEL SKID	–	3487	322-M
DOW CORNING 704 DIFFUSION PUMP FLUID	3982-82-9	937	322-M
CUPRIC SULFATE	7758-98-7	5735	322-M

MATERIAL/PRODUCT NAME	CAS NO.	MSDS NO.	BUILDING
?RIC CHLORIDE DIHYDRATE	10125-13-0	1355	322-M
RKEM 320 CLEANER	–	7960	322-M
PELLA OIL PREMIUM 68	–	163	322-M
TASSIUM FERRICYANIDE	13746-66-2	5917	322-M
TASSIUM CYANIDE	151-50-8	6748	322-M
TASSIUM CHLORIDE	7447-40-7	6745	322-M
TASSIUM DICHROMATE	7778-50-9	6749	322-M
DAK PHOTO-FLO 200 SOLUTION	–	7815	322-M
OSPHORIC ACID	7664-38-2	6805	322-M
ALIC ACID DIHYDRATE	6153-56-6	8951	322-M
RIC ACID	7697-37-2	6885	322-M
RIC ACID	7697-37-2	6885	322-M
RIC ACID	7697-37-2	5481	322-M
LYBDIC ACID MONOHYDRATE	7782-91-4	5757	322-M
TADI FLUID	–	8325	322-M
TADI FLUID	–	8325	322-M
TADI I & II 40-6080 THRU 40-6259	–	8326	322-M
RCURIC NITRATE MONOHYDRATE	7783-34-8	10450	322-M
STERMET	7631-86-9	2795	322-M
GNESIUM OXIDE	1309-48-4	10385	322-M
GNESIUM OXIDE	1309-48-4	10385	322-M
LFURIC ACID 96%	7664-93-9	6548	322-M
LFURIC ACID 96%	7664-93-9	6548	322-M
LFAMIC ACID	5329-14-6	5999	322-M
LFAMIC ACID	5329-14-6	8930	322-M
L-HF/S SPOTCHECK PENETRANT AEROSOL	–	8934	322-M
DIUM SILICATE SOLUTION 37%	6834-92-0	10376	322-M
DIUM NITRATE	7631-99-4	6909	322-M
DIUM LAURYL SULFATE	151-21-3	6683	322-M
DIUM HYDROXIDE DRY SOLID, FLAKE, BEAD OR GRANULAR	1310-73-2	5482	322-M
DIUM CYANIDE	143-33-9	6865	322-M
DIUM CHLORIDE	7647-14-5	6924	322-M
DIUM BICARBONATE	144-55-8	1884	322-M
DIUM ACETATE	127-9-3	5952	322-M
ID RESISTANT ADDITIVE 200	–	7292	322-M
AVY DUTY EPOXY ACTIVATOR 9310	–	7285	322-M

MATERIAL/PRODUCT NAME	CAS NO.	MSDS NO.	BUILDING
RETYPE WHITE, INK AND STOCK COLORS	–	6358	322-M
.APID TAP	–	6354	322-M
SAFETY GREEN SPRAY ENAMEL	–	1693	322-M
PROPANE	74-98-6	8036	322-M
PRO-DOPE	–	8048	322-M
POTASSIUM THIOCYANATE	333-20-0	6732	322-M
POTASSIUM IODIDE	7681-11-0	6712	322-M
POTASSIUM HYDROXIDE SOLID	1310-58-3	6753	322-M
ZINC METAL POWDER	7440-66-6	7147	322-M
VARIAN GP MECHANICAL PUMP FLUID	64742-65-0	8860	322-M
SUPER WEATHERSTRIP ADHESIVE 8001/8002	–	3013	322-M
RP SUPER FILTER COAT 418	–	7312	322-M
COLLODION	9004-70-0	10364	322-M
KODAK DEKTOL DEVELOPER - SINGLE POWDER	–	7835	322-M
DUCO CEMENT	–	6306	322-M
KODAK DEVELOPER D-76	–	7833	322-M
TILE-CLAD II ENAMEL MIDTONE BASE	–	1642	322-M
TRLIFT FLORAL, FRESH & LEMON SCENTS - BULK	–	9029	322-M
LEAK LOCK PIPE JOINT COMPOUND	–	3725	322-M
COCONUT OIL HAND SOAP (20%)	–	1527	322-M
MASTER WINDSHIELD DE-ICER	–	7984	322-M
EPOXIDE RESIN	–	3528	322-M
AJAX DISHWASHING LIQUID WITH LEMON JUICE	–	9030	322-M
PHENOLIC POWDER - RED	–	8813	322-M
SOLUBLE OIL	–	7417	322-M
SODIUM PHOSPHATE TRIBASIC DODECAHYDRATE	10101-89-0	5981	322-M
LENS & MIRROR CLEANER	–	7922	322-M
IRON (III) AMMONIUM SULFATE DODECAHYDRATE	7783-83-7	11948	322-M
SYNTHITE RED	–	918	322-M
NO. 900 GOLDEND PASTE	–	7444	322-M
SPRAY BUFF FLOOR WAX	–	6369	322-M
SPRAYMATIC ULTRA LUBE	–	4952	322-M
BUFFER SOLUTION PH 7	–	2696	322-M
UMINUM NITRATE NONAHYDRATE	7784-27-2	1285	322-M
KRYLON ACRYLIC CRYSTAL CLEAR SPRAY COATING	–	1722	322-M
SC-200	–	7397	322-M

MATERIAL/PRODUCT NAME	CAS NO.	MSDS NO.	BUILDING
)IUM METABISULFITE	7681-57-4	6797	322-M
EP GLOSS	–	1408	322-M
ESTO	–	7802	322-M
THANOL	67-56-1	8978	322-M
CKEL	7440-2-0	6770	322-M
TASSIUM PERMANGANATE	7722-64-7	6725	322-M
EAN & FRESH SCENT AIR FRESHENER	–	10128	322-M
GBEE HEAVY DUTY SPOT & STAIN REMOVER	–	7552	322-M
THYLENE CHLORIDE	75-9-2	3422	322-M
THYL ETHYL KETONE	78-93-3	6882	322-M
TASSIUM FLUORIDE	7789-23-3	10941	322-M
DIUM SULFITE	7757-83-7	10937	322-M
PE 541 BLACK TONER FOR MODEL 6040 & 6040 AGDF	–	9539	322-M
IEZON PRODUCTS	–	805	322-M
)UAPON SAFETY YELLOW PART A	–	12237	322-M
IAL, GAMMA ALUMINA	1344-28-1	5706	322-M
N METAL	7440-31-5	11800	322-M
FFER SOLUTION PH 10	–	6276	322-M
REE-IN-ONE HOUSEHOLD OIL	64742-52-5	7485	322-M
WDERED MOLD RELEASE	8015-86-9	11207	322-M
)W CORNING 732 MULTI-PURPOSE SEALANT CLEAR	–	9447	322-M
STY FURNITURE POLISH	–	2807	322-M
RNITURE POLISH WITH WAX FOR WOOD	–	2846	322-M
Y LIQUID DISHWASHING DETERGENT	–	7172	322-M
OXIDE RESIN	–	3528	322-M
HOL UFG DEVELOPER LIQUID	–	7017	322-M
)LD SHOT REFRIGERANT 12 AEROSOL	75-71-8	1529	322-M
ILLO SOAP PADS	–	1023	322-M
MON GLO	–	10974	322-M
)DAK LENS CLEANER	–	7817	322-M
)AMING INSURANCE	–	6319	322-M
RRIER CREME AEROSOL	–	691	322-M
E DRY SPRAY	–	7431	322-M
) SUPERCLEAR LENS CLEANING FLUID - AEROSOL	–	799	322-M
)T SHOT FLYING INSECT KILLER FORMULA 411	–	7655	322-M
BCO/CHEMTROL HEAVY DUTY GRAY INDUSTRIAL GRADE PVC	–	8840	322-M

MATERIAL/PRODUCT NAME	CAS NO.	MSDS NO.	BUILDING
DAP WELDWOOD PLASTIC RESIN GLUE	–	4147	322-M
ANDO OIL HD 68	64742-65-0	5619	322-M
BH-38	–	731	322-M
NITROGEN	7727-37-9	519	322-M
ENVI-RO-TECH PRECISION DUSTER	75-45-6	7472	322-M
SODIUM SULFITE	7757-83-7	6793	322-M
MERCURIC NITRATE MONOHYDRATE	7783-34-8	11384	322-M
LAPMASTER LAPPING COMPOUND NO. 1800	1344-28-1	7791	322-M
RETYPE WHITE, INK AND STOCK COLORS	–	6358	322-M
PROFESSIONAL LINE CASCADE	–	1410	322-M
COMET CLEANSER REGULAR AND LEMON FRESH	–	1534	322-M
DOW CORNING Q2-3067 OPTICAL COUPLANT	–	940	322-M
DIPHENYLTHIOCARBAZONE	60-10-6	909	322-M
DIALLYL PHTHALATE GLASS	–	258	322-M
SCENE WINDOW, GLASS & MULTI-PURPOSE CLEANER	–	7542	322-M
MAGIC GLASS CLEANING & ANTI FOGGING FLUID W/ ANTI STAT	–	7982	322-M
ONE-STROKE VESPHENE	–	5483	322-M
STAINLESS STEEL CLEANER AEROSOL	–	1094	322-M
TARTARIC ACID	87-69-4	6786	322-M
SODIUM NITRITE	7632-0-0	5973	322-M
HYDROFLUORIC ACID	7664-39-3	11010	322-M
DOW CORNING BR 2 PLUS MULTI-PURPOSE EP GREASE	–	11598	322-M
MYSTIK JT-6 MULTI-PURPOSE GREASE	–	7589	322-M
CONDUIT AEROSOL	–	1100	322-M
ENAMEL LATEX GLOSS DEEP BLUE	–	1799	322-M
ALCONOX	–	1210	322-M
DASH POT OIL	–	2628	322-M
SKIN CARE LOTION	–	7080	322-M
CARTER'S STAMP PAD INKS	–	2710	322-M
WINDOW & HARD SURFACE CLEANER	–	11417	322-M
BOLT WASP & HORNET KILLER	–	983	322-M
ANTIMONY TRICHLORIDE	10025-91-9	13288	322-M
S-90 ADHESIVE	–	1179	322-M
STANNOUS CHLORIDE DIHYRATE	10025-69-1	6386	322-M
RUSTMASTER AEROSOL SPRAY ENAMEL GLOSS BLACK	–	1783	322-M
RUSTMASTER AEROSOL SPRAY ENAMEL FLAT WHITE AEROSOL	–	1786	322-M

MATERIAL/PRODUCT NAME	CAS NO.	MSDS NO.	BUILDING
STMASTER AEROSOL SPRAY ENAMEL CLEAR GLOSS	–	1784	322-M
STICK	–	12547	322-M
RCO NITRADD	–	7023	322-M
UMINUM METAL	7429-90-5	11943	322-M
ENOLIC POWDER - GREEN	–	8813	322-M
ENOLIC POWDER - BLACK	–	8813	322-M
DIUM SULFITE	7757-83-7	6793	322-M
DIUM SULFITE	7757-83-7	10937	322-M
LLOIDAL SILICA	–	13298	322-M
RCURIC NITRATE MONOHYDRATE	7783-34-8	11384	322-M
ROMIUM TRIOXIDE	1333-82-0	13453	322-M
M BULLETIN COLOR NO. 102 FIRE RED	–	1652	322-M
EP BLUE GLASS & WINDOW CLEANER	–	14482	322-M
REST 5 DISINFECTANT CLEANER	–	13355	322-M
ELD STAINLESS STEEL CLEANER	–	15944	322-M
TI-CLEAN NEUTRAL CLEANER	–	14479	322-M
STITUTIONAL BAB-O CLEANSER WITH BLEACH	–	9531	322-M
MON-AID FURNITURE POLISH	–	12151	322-M
UMINA	1344-28-1	5706	322-M
UTRACIT-2 CAUSTIC NEUTRALIZER	–	5871	322-M
W CORNING G-N METAL ASSEMBLY PASTE	–	3716	322-M
UMINUM NITRATE NONAHYDRATE	7784-27-2	5186	322-M
AX RELEASE AGENT	8015-86-9	12579	322-M
TROGEN GAS	7727-37-9	15925	322-M
LD WELD RESIN-LIQUID & POWDER	–	7803	322-M
AMOND PETROLEUM JELLY	8009-3-8	9722	322-M
UMINUM NITRATE NONAHYDRATE	7784-27-2	1286	322-M
UTRASORB ACID NEUTRALIZER	–	2820	322-M
OSPHORIC ACID	7664-38-2	8620	322-M
NTACT CEMENT & CARBON PAINT	–	6591	322-M
RTHENE FIRE ANT KILLER	–	15641	322-M
UMINUM NITRATE NONAHYDRATE	7784-27-2	12253	322-M
EEDHIDE LATEX FLAT-WHITE/PASTEL BASE	–	9009	322-M
ICK DRY ENAMEL REGAL BLUE	–	4788	322-M
NO IV - STANDARD COLORS	–	7333	322-M
DAK EKTAMATIC S-30 STABILIZER	–	374	322-M

MATERIAL/PRODUCT NAME	CAS NO.	MSDS NO.	BUILDING
PROPANE	74-98-6	8036	322-M
ETHYL ALCOHOL	67-56-1	8676	322-M
DOW CORNING HIGH VACUUM GREASE :	-	6381	322-M
DUCO CEMENT	-	6306	322-M
ZP-4B ZYGLO DRY DEVELOPER	-	10034	322-M
ZP-9C ZYGLO DEVELOPER	-	7126	322-M
RAID WASP & HORNET KILLER X	-	8009	322-M
ALUMINUM OXIDE	1344-28-1	1288	322-M
MAGNESIUM OXIDE	1309-48-4	10385	322-M
POTASSIUM CHLORIDE SOLUTIONS FOR ELECTRODES	-	5769	322-M
PHOSPHORIC ACID	7664-38-2	6805	322-M
IRON	7439-89-6	7204	322-M
CHROMIUM TRIOXIDE	1333-82-0	13453	322-M
GLYCERINE	56-81-5	5085	322-M
CUPRIC CHLORIDE DIHYDRATE	10125-13-0	1355	322-M
MERCURY	7439-97-6	6705	322-M
SODIUM HYDROXIDE 50% SOLUTION	1310-73-2	4008	322-M
TEFLON DRY LUBRICANT	-	3003	322-M
KODAK SII ACTIVATOR	-	3310	322-M
KODAK RAPID FIXER PART B	-	7808	322-M
DOW CORNING 44 HIGH TEMPERATURE BEARING GREASE - MEDIUM	-	7606	322-M
WHITE PETROLATUM	8009-3-8	18187	322-M
ALUMINUM OTHER THAN POWDER	7429-90-5	10363	322-M
EMG 900 SERIES COLLOIDAL DISPERSIONS	-	14000	322-M
SILOO WHITE LUBE	-	5612	322-M
MAGNESIUM CHLORIDE HEXAHYDRATE	7791-18-6	5837	322-M
TYPE 541 BLACK TONER FOR MODEL 6040 & 6040 AGDF	-	9539	322-M
RE-PEL	-	18498	322-M
silica standard solution 10.0 mg/l as sio2		14547	322-m

MATERIAL/PRODUCT NAME	CAS NO.	MSDS NO.	BUILDING
:A SUPER PLUS SAE 30	–	284	319-M
-PRO C-100 ANTISEIZE COMPOUND	–	8695	319-M
.K LOCK PIPE JOINT COMPOUND	–	3725	319-M
LTIFAK EP 2	–	2816	319-M
:MATEX AVIATION FORM-A-GASKET SEALANT	–	670	319-M
RM-A-GASKET NO. 2 SEALANT	–	8600	319-M
:MATEX AVIATION FORM-A-GASKET SEALANT	–	670	319-M
E-SEAL GASKET & JOINT SEALING COMPOUND NO. 2	–	8412	319-M
.-PRO C-100 ANTISEIZE COMPOUND	–	8695	319-M
EAN & FRESH SCENT AIR FRESHENER	–	10128	320-5M
)PROPYL ALCOHOL 70%	67-63-0	7181	320-5M
YGEN	7782-44-7	546	320-7M
	–	1541	320-7M
LIUM COMPRESSED	7440-59-7	7282	320-7M
GON GAS	7440-37-1	824	320-7M
:ROGEN GAS	7727-37-9	8218	320-7M
OPANE	74-98-6		320-7M
RBON TETRACHLORIDE STANDARD IN METHANOL, 5000 UG/ML	–	18916	320-F
)LATILE HALOCARBONS	–		320-F
)LATILE HALOCARBONS	–		320-F
LORINATED HYDROCARBONS	–		320-F
NYL CHLORIDE NEED P/N ?????	–		320-F
ELL TELLUS OIL 10	–	8854	320-M
)DAK DEVELOPER D-19 - SINGLE POWDER	–	7834	320-M
C-NF CLEANER/REMOVER AEROSOL	–	8936	320-M
C-NF CLEANER/REMOVER AEROSOL	–	8936	320-M
-S CARTRIDGE BLACK	–	3521	320-M
ENOYLTRIFLUOROACETONE (2-)	326-91-0	4282	320-M
:MATOXYLIN	517-28-2	7277	320-M
/DROXY NAPHTHOL BLUE	63451-35-4	6970	320-M
ASEODYMIUM CHLORIDE HEXAHYDRATE	17272-46-7	612	320-M
2-CYCLOHEXYLENEDINITRILO)-TETRAACETIC ACID	482-54-2	1380	320-M
DMIUM	7440-43-9	10320	320-M
LFURIC ACID	7664-93-9	8929	320-M
2-CYCLOHEXYLENEDINITRILO)-TETRAACETIC ACID	482-54-2	1380	320-M
NTIMONY (IV) OXIDE	1332-81-6	792	320-M

MATERIAL/PRODUCT NAME	CAS NO.	MSDS NO.	BUILDING
RED ENAMEL 1201	–	9179	320-M
ELLOW 77 WIRE PULLING LUBRICANT	–	19041	320-M
DAP WELDWOOD PLASTIC RESIN GLUE	–	4147	320-M
SLIPIT SLIDING COMPOUND	–	7076	320-M
PYRONIN Y	92-32-0	2890	320-M
QUINOLINE YELLOW	8004-92-0	8012	320-M
QUINALIZARIN	81-61-8	8013	320-M
AMMONIUM THIOGLYCOLATE SOLUTION	5421-46-5	1984	320-M
BIS(4-AMINO-1-NAPHTHYLAZO)-2,2'-STILBENEDISULFONIC ACID (4,4'-)	5463-64-9	10598	320-M
HAFNIUM OXIDE	12055-23-1	7353	320-M
BUFFER SOLUTION SB96 PH 2.00	–	5721	320-M
PARAFFIN-NORMAL	–	2618	320-M
HARDNESS INDICATOR	–	7290	320-M
MUREXIDE	–	6664	320-M
AMMONIUM THIOCYANATE	1762-95-4	3873	320-M
AMMONIUM HYDROXIDE	1336-21-6	8910	320-M
KODAK DEVELOPER D-19 - SINGLE POWDER	–	7834	320-M
GRAPHITE	7782-42-5	6993	320-M
THREE-IN-ONE HOUSEHOLD OIL	64742-52-5	7485	320-M
BERYLLIUM OXIDE	1304-56-9	2677	320-M
BISMUTH OXIDE	1304-76-3	741	320-M
SODIUM HYDROXIDE SOLUTIONS, 10N AND CO2 ABSORPTION	1310-73-2	5781	320-M
HARDNESS BUFFER	–	7344	320-M
SODIUM BICARBONATE	144-55-8	5957	320-M
SODIUM BORATE DECAHYDRATE	1303-96-4	6619	320-M
SEPTISOL SOLUTION WITH IRGASAN	–	7123	320-M
ENVIROQUAT SPRAY	–	3517	320-M
PHOSPHORIC ACID 75 TO 85%	7664-38-2	10873	320-M
PLATINUM(IC) POTASSIUM CHLORIDE	16921-30-5	6740	320-M
SEPTISOL SOLUTION WITH IRGASAN	–	7123	320-M
PETROLEUM ETHER, 20-40 C	109-66-0	5891	320-M
CYCLOHEXANE	110-82-7	5736	320-M
BROMINE	7726-95-6	1026	320-M
TIN	7440-31-5	10092	320-M
THIOSEMICARBAZIDE	79-19-6	10588	320-M
TARTARIC ACID	87-69-4	6786	320-M

MATERIAL/PRODUCT NAME	CAS NO.	MSDS NO.	BUILDING
TANNIC ACID	1401-55-4	6787	320-M
LFOSALICYLIC ACID	97-5-2	6470	320-M
ARCH	9005-25-8	6476	320-M
ANNOUS CHLORIDE	7772-99-8	6386	320-M
DIUM TUNGSTATE DIHYDRATE	10213-10-2	6788	320-M
DIUM DIETHYLDITHIOCARBAMATE	148-18-5	6926	320-M
LENOL ORANGE TETRASODIUM SALT	3618-43-7	5791	320-M
PHENANTHROLINE FERROUS SULFATE COMPLEX	14634-91-4	6775	320-M
OCTANE	540-84-1	10374	320-M
ENE CONCENTRATE WINDOW, GLASS & MULTI-PURPOSE CLEANER	–	7543	320-M
RCONIUM OXIDE	1314-23-4	7132	320-M
DIUM FLUORIDE SOLID	7681-49-4	6925	320-M
DIUM NITRATE	7631-99-4	8933	320-M
ETONITRILE	75-5-8	10263	320-M
ORIUM (IV) NITRATE TETRAHYDRATE	13823-29-5	10390	320-M
BALT (II, III) OXIDE	1308-6-1	1521	320-M
SENAZO I	520-10-5	836	320-M
VER (I) OXIDE	20667-12-3	9319	320-M
RONTIUM CARBONATE	1633-5-2	6528	320-M
NGSTEN (VI) OXIDE	1314-35-8	7033	320-M
ANIUM POWDER	7440-32-6	8376	320-M
LLURIUM	13494-80-9	7437	320-M
NADIUM WIRE	7440-62-2	6989	320-M
ANYL NITRATE HEXAHYDRATE	10102-6-4	6037	320-M
EA	57-13-6	6900	320-M
NADIUM PENTOXIDE	1314-62-1	10372	320-M
NADYL SULFATE	27774-13-6	6918	320-M
NC ACETATE DIHYDRATE	5970-45-6	6945	320-M
THIUM CARBONATE	554-13-2	6828	320-M
NTHANUM OXIDE	1312-81-8	6821	320-M
AD	7439-92-1	6715	320-M
RIUM CHLORIDE	10361-37-2	685	320-M
NC OXIDE	1314-13-2	6043	320-M
ROMIUM POWDER	7440-47-3	2017	320-M
AZABICYCLO(2.2.2)OCTANE (1,4-)	–	5661	320-M
XTROSE	50-99-7	10478	320-M

MATERIAL/PRODUCT NAME	CAS NO.	MSDS NO.	BUILDING
COPPER	7440-50-8	1556	320-M
ESIUM NITRATE	7789-18-6	1456	320-M
CALCIUM OXIDE	1305-78-8	1088	320-M
IRON (III) OXIDE	1309-37-1	11361	320-M
LANTHANUM CHLORIDE	10099-58-8	5675	320-M
GERMANIUM OXIDE	1310-53-8	13584	320-M
EUROPIUM (III) CHLORIDE	10025-76-0	8648	320-M
GADOLINIUM OXIDE	12064-62-9	8714	320-M
MANGANESE POWDER	7439-96-5	2386	320-M
PALLADIUM SPONGE	–	5485	320-M
POTASSIUM CHLORIDE	7447-40-7	5913	320-M
SCANDIUM CHLORIDE HEXAHYDRATE	20662-14-0	9318	320-M
FERROUS AMMONIUM SULFATE HEXAHYDRATE	7783-85-9	10322	320-M
POTASSIUM PHOSPHATE DIBASIC	7758-11-4	5924	320-M
BARIUM CHLORIDE	10361-37-2	686	320-M
METHYLENE BLUE	61-73-4	6768	320-M
METHYL VIOLET	8004-87-3	10362	320-M
TRANS-1,2-DICHLOROETHYLENE	156-60-5	10019	320-M
ETHYLENEDIAMINETETRAACETIC ACID	60-0-4	8971	320-M
DODECANE	112-40-3	917	320-M
GLYCERINE	56-81-5	5085	320-M
FERRIC SULFATE	10028-22-5	9563	320-M
DIMETHYL GLYOXIME	95-45-4	3999	320-M
AMMONIUM HYDROXIDE	1336-21-6	8910	320-M
ETHYLENEDIAMINETETRAACETIC ACID	60-0-4	8971	320-M
ETHANOL	64-17-5	5183	320-M
AMMONIUM NITRATE	6484-52-2	2652	320-M
AMMONIUM PHOSPHATE DIBASIC	7783-28-0	767	320-M
CYCLOHEXANE	110-82-7	5328	320-M
AMMONIUM HYDROXIDE	1336-21-6	8910	320-M
CERIC AMMONIUM SULFATE DIHYDRATE	10378-47-8	1441	320-M
POTASSIUM IODIDE	7681-11-0	6712	320-M
AMMONIUM CHLORIDE	12125-2-9	11088	320-M
NAPTHOL GREEN B	19381-50-1	7295	320-M
..OFESSIONAL LINE COMET CLEANER WITH CHLORINAL	–	3971	320-M
AMMONIATED ALL PURPOSE CLEANER - AEROSOL	–	14883	320-M

MATERIAL/PRODUCT NAME	CAS NO.	MSDS NO.	BUILDING
LEMON GLO	–	10974	320-M
RAY BUFF FLOOR WAX	–	6369	320-M
-SURE FLAT BLACK SPRAY PAINT 37038	–	15059	320-M
ENE WINDOW, GLASS & MULTI-PURPOSE CLEANER	–	7542	320-M
MAC ANTI-STATIC SPRAY	–	7222	320-M
AGNESIUM SULFATE	7487-88-9	6836	320-M
M 3114 COPPER SPECTROMETRIC STANDARD	–	12258	320-M
M 3121 GOLD SPECTROMETRIC STANDARD	–	12273	320-M
M 3131 MAGNESIUM SPECTROMETRIC STANDARD	–	12261	320-M
M 3109 CALCIUM SPECTROMETRIC STANDARD	–	12257	320-M
MET CLEANSER REGULAR AND LEMON FRESH	–	1534	320-M
RROUS SULFATE HEPTAHYDRATE	7782-63-0	10289	320-M
AIR WOOD & MULTI-PURPOSE POLISH	–	8559	320-M
DROXYLAMINE SULFATE	10039-54-0	7453	320-M
ERAZINE	110-85-0	10324	320-M
M 3105 BERYLLIUM SPECTROMETRIC STANDARD	–	12441	320-M
M 3108 CADMIUM SPECTROMETRIC STANDARD	–	12269	320-M
M 3112 CHROMIUM SPECTROMETRIC STANDARD	–	12270	320-M
M 3101 ALUMINUM SPECTROMETRIC STANDARD	–	12268	320-M
M 3102 ANTIMONY SPECTROMETRIC STANDARD	–	12438	320-M
M 3103 ARSENIC SPECTROMETRIC STANDARD	–	12439	320-M
DISPERSE A-11	–	13861	320-M
OSPHOMOLYBDIC ACID	11104-88-4	2118	320-M
RIUM CHLORIDE	10361-37-2	685	320-M
LFURIC ACID 96%	7664-93-9	6548	320-M
DROCHLORIC ACID	7647-1-0	6966	320-M
TRIC ACID	7697-37-2	5481	320-M
M 3113 COBALT SPECTROMETRIC STANDARD	–	12271	320-M
M 3114 COPPER SPECTROMETRIC STANDARD	–	12258	320-M
M 3126 IRON SPECTROMETRIC STANDARD	–	12259	320-M
M 3128 LEAD SPECTROMETRIC STANDARD	–	12434	320-M
M 3131 MAGNESIUM SPECTROMETRIC STANDARD	–	12261	320-M
M 3132 MANGANESE SPECTROMETRIC STANDARD	–	12262	320-M
M 3133 MERCURY SPECTROMETRIC STANDARD	–	12274	320-M
M 3134 MOLYBDENUM SPECTROMETRIC STANDARD	–	12433	320-M
M 3136 NICKEL SPECTROMETRIC STANDARD	–	12275	320-M

MATERIAL/PRODUCT NAME	CAS NO.	MSDS NO.	BUILDING
SRM 3149 SELENIUM SPECTROMETRIC STANDARD	–	12427	320-M
RM 3150 SILICON SPECTROMETRIC STANDARD	7440-21-3	12281	320-M
SRM 3158 THALLIUM SPECTROMETRIC STANDARD	–	12423	320-M
SRM 3161 TIN SPECTROMETRIC STANDARD	–	12264	320-M
SRM 3168 ZINC SPECTROMETRIC STANDARD	–	12266	320-M
SRM 3112 CHROMIUM SPECTROMETRIC STANDARD	–	12270	320-M
SAND	14808-60-7	10493	320-M
SODIUM BISULFITE MIXTURE	–	6943	320-M
SILVER NITRATE	7761-88-8	5949	320-M
POTASSIUM SULFATE	7778-80-5	6728	320-M
PHENOL	108-95-2	3434	320-M
GELATIN	9000-70-8	6653	320-M
ACETIC ACID GLACIAL	64-19-7	1142	320-M
ACETONE	67-64-1	10249	320-M
PHENOLPHTHALEIN	77-9-8	6803	320-M
METHYL ORANGE SODIUM SALT	547-58-0	10492	320-M
METHANOL	67-56-1	6880	320-M
ISOPROPYL ALCOHOL	67-63-0	6854	320-M
CUPRIC CHLORIDE DIHYDRATE	10125-13-0	1355	320-M
ENTHOL 75	–	2565	320-M
FWT RED DYE TABLET	–	8570	320-M
TRIBUTYL PHOSPHATE	126-73-8	3023	320-M
SODIUM SULFATE	7757-82-6	8931	320-M
TRIBUTYL PHOSPHATE	126-73-8	6626	320-M
URANYL NITRATE HEXAHYDRATE	13520-83-7	6913	320-M
BARIUM CHLORIDE	10361-37-2	685	320-M
POTASSIUM CHLORIDE	7447-40-7	6745	320-M
AMMONIUM SULFATE	7783-20-2	5196	320-M
CHLOROFORM	67-66-3	10025	320-M
DOW CORNING HIGH VACUUM GREASE	–	6381	320-M
THREE ELEPHANT BORIC ACID	10043-35-3	4747	320-M
BUFFER SOLUTION SB96 PH 2.00	–	5721	320-M
BUFFER SOLUTION PH 4	877-24-7	2239	320-M
XYLENE	1330-20-7	6944	320-M
ZIRCONIUM OXIDE	1314-23-4	7131	320-M
ACETONE	67-64-1	1148	320-M

MATERIAL/PRODUCT NAME	CAS NO.	MSDS NO.	BUILDING
** UMINUM POTASSIUM SULFATE DODECAHYDRATE	7784-24-9	5708	320-M
UMINUM SULFATE	10043-1-3	5710	320-M
MONIUM FLUORIDE	12125-1-8	756	320-M
ETONE	67-64-1	10249	320-M
TRIC ACID	7697-37-2	5481	320-M
Y LIQUID DISHWASHING DETERGENT	–	7172	320-M
THYL ORANGE INDICATOR	140-56-7	8303	320-M
DINE	7553-56-2	5822	320-M
DROCHLORIC ACID CONCENTRATED 36-37%	7647-1-0	3397	320-M
THRONE	90-44-8	5713	320-M
RIUM CARBONATE	513-77-9	5223	320-M
AX INSTITUTIONAL CLEANSER WITH CHLORINE BLEACH	–	449	320-M
DIUM SULFATE	7757-82-6	5010	320-M
DIUM NITRATE	7631-99-4	8933	320-M
DIUM BICARBONATE	144-55-8	1884	320-M
ENE WINDOW, GLASS & MULTI-PURPOSE CLEANER	–	7542	320-M
VER NITRATE	7761-88-8	6934	320-M
CLOHEXANONE	108-94-1	5329	320-M
TASSIUM PERMANGANATE	7722-64-7	6851	320-M
TASSIUM FLUORIDE	7789-23-3	6878	320-M
TASSIUM CHLORIDE	7447-40-7	8691	320-M
OSPHORIC ACID	7664-38-2	6805	320-M
PHENANTHROLINE FERROUS SULFATE COMPLEX	14634-91-4	6775	320-M
TRIC ACID	7697-37-2	6885	320-M
UMINA	1344-28-1	5706	320-M
AGENT ALCOHOL	64-17-5	5773	320-M
SIUM CHLORIDE	7647-17-8	8900	320-M
RIC AMMONIUM SULFATE DIHYDRATE	10378-47-8	1441	320-M
RIC AMMONIUM NITRATE	16774-21-3	1442	320-M
LCIUM OXIDE	1305-78-8	1088	320-M
DMIUM OXIDE	1306-19-0	2312	320-M
DMIUM CHLORIDE ANHYROUS	10108-64-2	5281	320-M
DMIUM ACETATE DIHYDRATE	5743-4-4	1067	320-M
RIC ACID	10043-35-3	139	320-M
RIUM DIPHENYLAMINE SULFONATE	6211-24-1	687	320-M
RIUM DIPHENYLAMINE SULFONATE	6211-24-1	687	320-M

MATERIAL/PRODUCT NAME	CAS NO.	MSDS NO.	BUILDING
BARIUM CHLORIDE	10361-37-2	685	320-M
AMMONIUM HYDROXIDE	1336-21-6	757	320-M
ACETONE	67-64-1	1147	320-M
ACETIC ACID GLACIAL	64-19-7	1142	320-M
MERCURIC OXIDE	21908-53-2	6704	320-M
MERCURIC NITRATE MONOHYDRATE	7783-34-8	10450	320-M
MERCURIC NITRATE MONOHYDRATE	7783-34-8	10450	320-M
MERCURIC CHLORIDE	7487-94-7	6707	320-M
MAGNESIUM OXIDE	1309-48-4	10385	320-M
MANGANESE SULFATE MONOHYDRATE	10034-96-5	10404	320-M
LITHIUM NITRATE	7790-69-4	10366	320-M
LITHIUM HYDROXIDE	1310-65-2	6717	320-M
LITHIUM CARBONATE	554-13-2	10365	320-M
LEAD SUB-ACETATE	1335-32-6	6825	320-M
LEAD OXIDE	1317-36-8	2363	320-M
LEAD NITRATE	10099-74-8	6720	320-M
LEAD NITRATE	10099-74-8	6720	320-M
LEAD METAL	7439-92-1	8688	320-M
LEAD ACETATE TRIHYDRATE	6080-56-4	6714	320-M
LANTHANUM NITRATE HEXAHYDRATE	10277-43-7	6756	320-M
LANTHANUM CHLORIDE HEPTAHYDRATE	10025-84-0	6820	320-M
LANOLIN	8006-54-0	6757	320-M
HYDROXYLAMINE HYDROCHLORIDE	5470-11-1	6955	320-M
HYDROXYLAMINE HYDROCHLORIDE	5470-11-1	6955	320-M
SODIUM CITRATE	68-4-2	7053	320-M
SILVER SULFATE	10294-26-5	6937	320-M
SAND	14808-60-7	10493	320-M
4-(2-PYRIDYLAZO)RESORCINOL DISODIUM SALT	–	2889	320-M
POTASSIUM SULFATE	7778-80-5	6728	320-M
POTASSIUM DICHROMATE	7778-50-9	10386	320-M
PHENOL	108-95-2	567	320-M
METHYLENE CHLORIDE	75-9-2	3422	320-M
METHYL ALCOHOL	67-56-1	8676	320-M
METHANOL	67-56-1	6338	320-M
MERCURIC SULFATE	7783-35-9	6709	320-M
SULFURIC ACID	7664-93-9	6479	320-M

MATERIAL/PRODUCT NAME	CAS NO.	MSDS NO.	BUILDING
?)DIUM HYDROXIDE 50% SOLUTION	1310-73-2	5966	320-M
/LENE	1330-20-7	6944	320-M
)W CORNING HIGH VACUUM GREASE:	–	6381	320-M
)RM-A-GASKET SILICONE BLUE RTV GASKET MAKER	–	8601	320-M
:O-MAR 700 LATEX SEMI-GLOSS INTERIOR FINISH WHITE	–	13864	320-M
)KORODE SOLDERING PASTE	–	8196	320-M
AGIC LENS CLEANING & ANTI-FOGGING ANTI-STAT FLUID AEROSOL	–	7981	320-M
:AK-TEC 372G	–	7935	320-M
ASTER MECHANIC AEROSOL	–	7957	320-M
/RGEABLE HALOCARBON MIX 601-M2	–	14307	320-M
'RAY NINE	–	6487	320-M
D-40 AEROSOL	–	7705	320-M
Y LIQUID DISHWASHING DETERGENT	–	7172	320-M
/LFURIC ACID	7664-93-9	8929	320-M
/DROCHLORIC ACID	7647-1-0	1287	320-M
RLIFT FRESH, FLORAL & LEMON - AEROSOL	–	3358	320-M
:MON GLO	–	10974	320-M
/LFURIC ACID	7664-93-9	8929	320-M
)WARDS 20 VACUUM PUMP OIL	64742-65-0	10896	320-M
:D-NF DEVELOPER AEROSOL	–	8935	320-M
)RCELAIN AND CERAMIC TILE FOAM CLEANER	–	11419	320-M
:THYL-2-PENTANONE (4-)	108-10-1	2801	320-M
RLIFT FLORAL, FRESH & LEMON SCENTS - BULK	–	9029	320-M
AX CLEANSER NON-PHOSPHATE	–	2642	320-M
)RCELAIN AND CERAMIC TILE FOAM CLEANER	–	11419	320-M
QUID DETERGENT (8%)	–	6290	320-M
:STY FURNITURE POLISH	–	2807	320-M
TRIC ACID	7697-37-2	6885	320-M
AGIC LENS CLEANING & ANTI-FOGGING ANTI-STAT FLUID AEROSOL	–	7981	320-M
:TRABUTYLAMMONIUM DIHYDROGEN PHOSPHATE 1.0M SOLUTION IN	5574-97-0	2513	320-M
:TRABUTYLAMMONIUM PHOSPHATE	5574-97-0	7513	320-M
:ROKROIL	–	1182	320-M
?HENYL	92-52-4	737	320-M
:OMTHYMOL BLUE INDICATOR SOLUTION	–	7236	320-M
AMMABLE SPILL KIT	61790-53-2	2310	320-M
)PROPYL ALCOHOL	67-63-0	6854	320-M

MATERIAL/PRODUCT NAME	CAS NO.	MSDS NO.	BUILDING
ACETONE	67-64-1	10249	320-M
ACETONE	67-64-1	10249	320-M
SLIPSPRAY DRY LUBRICANT AEROSOL :	–	7075	320-M
SNOOP	–	3445	320-M
TETRAHYDROFURAN	109-99-9	7510	320-M
ACETONITRILE	75-5-8	1154	320-M
SCENE WINDOW, GLASS & MULTI-PURPOSE CLEANER	–	7542	320-M
JOY LIQUID DISHWASHING DETERGENT	–	7172	320-M
COMET CLEANSER REGULAR AND LEMON FRESH	–	1534	320-M
HOT SHOT FLYING INSECT KILLER FORMULA 411	–	7655	320-M
BARRIER CREME AEROSOL	–	691	320-M
PAX-SOLV	–	5795	320-M
SKIN CARE LOTION	–	7080	320-M
ACETONITRILE	75-5-8	10263	320-M
THREE-IN-ONE HOUSEHOLD OIL	64742-52-5	7485	320-M
LITHIUM CARBONATE	554-13-2	7886	320-M
BARIUM CHLORIDE	10361-37-2	3364	320-M
LUMINUM CHLORIDE HEXAHYDRATE	7784-13-6	6272	320-M
CERIC AMMONIUM SULFATE DIHYDRATE	10378-47-9	1443	320-M
ZIRCONIUM CHLORIDE	10026-11-6	12754	320-M
SODIUM CHLORIDE	7647-14-5	12747	320-M
STAINLESS STEEL CLEANER AEROSOL	–	1094	320-M
PORCELAIN AND CERAMIC TILE FOAM CLEANER	–	11419	320-M
PROPANOL (2-)	67-63-0	6733	320-M
TFL-50 DRY LUBE	–	3003	320-M
PHOSPHATE ACTIVATOR SOLUTION	–	1171	320-M
DIGESTION SOLUTION FOR COD 0-150 PPM RANGE	–	12058	320-M
PORCELAIN AND CERAMIC TILE FOAM CLEANER	–	11419	320-M
LEMON GLO	–	10974	320-M
FERROUS AMMONIUM SULFATE HEXAHYDRATE	7783-85-9	10801	320-M
AIRLIFT FLORAL, FRESH & LEMON SCENTS - BULK	–	9029	320-M
SOLUSORB	–	5991	320-M
NEUTRACIT-2 CAUSTIC NEUTRALIZER	–	5871	320-M
NEUTRASORB ACID NEUTRALIZER	–	2820	320-M
SULFURIC ACID	7664-93-9	8929	320-M
BORIC ACID	10043-35-3	988	320-M

MATERIAL/PRODUCT NAME	CAS NO.	MSDS NO.	BUILDING
.M 3169 ZIRCONIUM SPECTROMETRIC STANDARD	–	12267	320-M
.M 3132 MANGANESE SPECTROMETRIC STANDARD	–	12262	320-M
.M 3145 RUBIDIUM SPECTROMETRIC STANDARD	–	12428	320-M
.M 3165 VANADIUM SPECTROMETRIC STANDARD	–	12422	320-M
.M 3134 MOLYBDENUM SPECTROMETRIC STANDARD	–	12433	320-M
.M 3138 PALLADIUM SPECTROMETRIC STANDARD	–	12431	320-M
.M 3139 PHOSPHORUS SPECTROMETRIC STANDARD	–	12430	320-M
.M 3140 PLATNIUM SPECTROMETRIC STANDARD	–	12429	320-M
.M 3104 BARIUM SPECTROMETRIC STANDARD	–	12440	320-M
.M 3102 ANTIMONY SPECTROMETRIC STANDARD	–	12438	320-M
.M 3105 BERYLLIUM SPECTROMETRIC STANDARD	–	12441	320-M
)DIUM MOLYBDATE DIHYDRATE	10102-40-6	1898	320-M
'ILBENE 420	27344-41-8	6522	320-M
AGIC SANITIZING MIST	–	7980	320-M
PTISOL SOLUTION WITH IRGASAN	–	7123	320-M
/ORPHORUS SYNTHETIC SILICA GEL	112926-0-8	6930	320-M
'DROCHLORIC ACID	7647-1-0	6966	320-M
)LUSORB	–	5991	320-M
.RBON TETRACHLORIDE	56-23-5	10008	320-M
:THYLENE CHLORIDE	75-9-2	10016	320-M
'LOROFORM	67-66-3	10025	320-M
CHLOROETHANE (1,1-)	75-34-3	10027	320-M
'DROCHLORIC ACID	7647-1-0	7590	320-M
DIUM HYDROXIDE SOLUTION 50%	1310-73-2	1894	320-M
DIUM NITRATE	7631-99-4	8933	320-M
AMYL ACETATE	628-63-7	10367	320-M
'DROGEN PEROXIDE 3%	7722-84-1	10375	320-M
DIUM CHLORIDE	7647-14-5	13744	320-M
OSPHORIC ACID	7664-38-2	6811	320-M
TASSIUM BISULFATE	7646-93-7	8948	320-M
'MONIUM MOLYBDATE TETRAHYDRATE	12054-85-2	760	320-M
LCIUM HYDROXIDE	1305-62-0	1080	320-M
LCIUM OXIDE	1305-78-8	1087	320-M
RIUM CHLORIDE DIHYDRATE	10326-27-9	5224	320-M
TASSIUM PERMANGANATE	7722-64-7	6725	320-M
:RCURIC IODIDE RED	7774-29-0	6838	320-M

MATERIAL/PRODUCT NAME	CAS NO.	MSDS NO.	BUILDING
SODIUM CHLORIDE	7647-14-5	6924	320-M
SODIUM NITRITE	7632-0-0	12776	320-M
AMMONIUM CHLORIDE	12125-2-9	752	320-M
AMMONIUM OXALATE MONOHYDRATE	6009-70-7	12814	320-M
NEUTRACIT-2 CAUSTIC NEUTRALIZER	–	5871	320-M
NEUTRASORB ACID NEUTRALIZER	–	2820	320-M
NITRIC ACID	7697-37-2	6885	320-M
BROMODICHLOROMETHANE IN METHANOL, 200 PPM	–	13502	320-M
BROMOFORM	75-25-2	10015	320-M
DICHLOROPROPANE (1,2-) IN METHANOL, 200 PPM	–	14292	320-M
FLAMMABLE SPILL KIT	61790-53-2	2310	320-M
NITRIC ACID	7697-37-2	6885	320-M
NITRIC ACID	7697-37-2	6885	320-M
KAOWOOL CEMENT B	–	4208	320-M
KAOWOOL RIGIDIZER	–	7847	320-M
BARRIER CREME AEROSOL	–	691	320-M
AIRLIFT FLORAL, FRESH & LEMON SCENTS - BULK	–	9029	320-M
PORCELAIN AND CERAMIC TILE FOAM CLEANER	–	11419	320-M
NEW DAY DISHWASHING LIQUID	–	11300	320-M
FUSER LUBRICANT, FUSER OIL, FUSER WICK	63148-62-9	8938	320-M
PROPANE	74-98-6	8042	320-M
ACETONITRILE	75-5-8	10263	320-M
AMMONIUM CITRATE DIBASIC	3012-65-5	753	320-M
AMMONIUM THIOCYANATE	1762-95-4	3873	320-M
CALCIUM CHLORIDE	10043-52-4	1077	320-M
CHROMIUM TRIOXIDE	1333-82-0	10321	320-M
CITRIC ACID MONOHYDRATE	5949-29-1	5310	320-M
COPPER OXIDE	1317-38-0	10399	320-M
HYDROGEN PEROXIDE SOLUTIONS 30 TO 50%	7722-84-1	9247	320-M
METHYL ORANGE INDICATOR	140-56-7	8303	320-M
MOLYBDIC ANHYDRIDE	1313-27-5	6663	320-M
NICKEL	7440-2-0	6770	320-M
NICKEL SULFATE HEXAHYDRATE	10101-97-0	8842	320-M
NICKELOUS CHLORIDE HEXAHYDRATE	7791-20-0	6772	320-M
NICKELOUS CHLORIDE HEXAHYDRATE	7791-20-0	6772	320-M
NITRIC ACID	7697-37-2	5481	320-M

MATERIAL/PRODUCT NAME	CAS NO.	MSDS NO.	BUILDING
ENOLPHTHALEIN INDICATOR	–	7729	320-M
ENOL	108-95-2	6802	320-M
ENOL	108-95-2	3434	320-M
OSPHOMOLYBDIC ACID	11104-88-4	2118	320-M
TASSIUM HYDROXIDE	1310-58-3	6879	320-M
TASSIUM BROMATE	7758-1-2	5767	320-M
TASSIUM BROMIDE	7758-2-3	5768	320-M
TASSIUM CARBONATE	584-8-7	6876	320-M
TASSIUM CHLORIDE SOLUTIONS FOR ELECTRODES	–	5769	320-M
TASSIUM CHLORIDE	7447-40-7	6745	320-M
TASSIUM DICHROMATE	7778-50-9	10386	320-M
TASSIUM IODIDE	7681-11-0	10387	320-M
TASSIUM OXALATE MONOHYDRATE	6487-48-5	6722	320-M
TASSIUM PERMANGANATE	7722-64-7	10406	320-M
TASSIUM PHOSPHATE DIBASIC	7758-11-4	6726	320-M
S DETERGENT	–	8003	320-M
DIUM CARBONATE	497-19-8	10370	320-M
DIUM CHROMATE TETRAHYDRATE	10034-82-9	5962	320-M
DIUM CITRATE DIHYDRATE	6132-4-3	7053	320-M
DIUM DICHROMATE DIHYDRATE	7789-12-0	7051	320-M
DIUM DICHROMATE DIHYDRATE	7789-12-0	6863	320-M
DIUM FLUORIDE SOLID	7681-49-4	6925	320-M
DIUM FORMATE	141-53-7	10093	320-M
DIUM IODIDE	7681-82-5	5970	320-M
DIUM METABISULFITE	7681-57-4	6797	320-M
DIUM NITRITE	7632-0-0	5973	320-M
DIUM PERSULFATE	7775-27-1	6908	320-M
DIUM PYROPHOSPHATE DECAHYDRATE	13472-36-1	5982	320-M
DIUM SILICATE SOLUTION 37%	6834-92-0	10376	320-M
TRAPHENYLBORON SODIUM SALT	143-66-8	5701	320-M
ARCH SOLUTION	9005-25-8	6504	320-M
ARCH SOLUTION	9005-25-8	6504	320-M
RONTIUM NITRATE	10042-76-9	1932	320-M
ERPHENYL	92-94-4	7779	320-M
ERPHENYL	84-15-1	532	320-M
TRACHLOROETHYLENE	127-18-4	7512	320-M

MATERIAL/PRODUCT NAME	CAS NO.	MSDS NO.	BUILDING
TN	7440-31-5	10092	320-M
TITANIUM SPONGE	7440-32-6	8926	320-M
TITANIUM DIOXIDE	13463-67-7	6665	320-M
TRIBUTYL PHOSPHATE	126-73-8	3023	320-M
TRIETHANOLAMINE	102-71-6	10373	320-M
ZINC POWDER OR DUST, NONPYROPHORIC	7440-66-6	3457	320-M
ZINC	7440-66-6	6843	320-M
ZINC	7440-66-6	6843	320-M
FLURAN	–	8575	320-M
O-PHENANTHROLINE FERROUS SULFATE COMPLEX	14634-91-4	6775	320-M
QUARTZ	14808-60-7	9227	320-M
IONIC STRENGTH ADJUSTOR 5M NANO3	7631-99-4	3442	320-M
DURA CLAD URETHANE MODIFIED GLOSS ENAMEL ACCENT BASE	–	14149	320-M
COMET CLEANSER REGULAR AND LEMON FRESH	–	1534	320-M
RUSTMASTER AEROSOL SPRAY ENAMEL OSHA ORANGE	–	1793	320-M
SODIUM HYDROXIDE 50% SOLUTION	1310-73-2	4008	320-M
POTASSIUM IODATE	7758-5-6	5919	320-M
OWHITE LIQUID BLEACH, 5.25 % SODIUM HYPOCHLORITE	–	6291	320-M
NITRIC ACID FUMING	7697-37-2	6774	320-M
SODIUM CHLORIDE	7647-14-5	6924	320-M
HYDROCHLORIC ACID SOLUTIONS 1N TO N/100	7647-1-0	6952	320-M
SLIPSPRAY DRY LUBRICANT AEROSOL	–	7075	320-M
JOY LIQUID DISHWASHING DETERGENT	–	7172	320-M
SODIUM NITRATE	7631-99-4	7519	320-M
RBS DETERGENT	–	8003	320-M
LEAD METAL	7439-92-1	8688	320-M
PORCELAIN AND CERAMIC TILE FOAM CLEANER	–	11419	320-M
LEMON GLO	–	10974	320-M
MOLYBDENUM POWDER	7439-98-7	11035	320-M
POTASSIUM BIPHTHALATE	877-24-7	6873	320-M
SUPER 77 SPRAY ADHESIVE	–	9552	320-M
NITRIC ACID	7697-37-2	12969	320-M
LENS CLEAN DISINFECTANT SPRAY - AEROSOL	64-17-5	2659	320-M
TMASTER AEROSOL SPRAY ENAMEL SHRUB GREEN	–	3350	320-M
SUPERACRYLIC SPRAY ENAMEL - ORANGE PEEL	–	1605	320-M
SAFETAP	–	13527	320-M

MATERIAL/PRODUCT NAME	CAS NO.	MSDS NO.	BUILDING
AY CLEAN LIQUID FLUX	–	7342	320-M
ID ANT & ROACH KILLER A	–	15340	320-M
STY CONTACT AND CIRCUIT BOARD CLEANER	76-13-1	9792	320-M
OPANE	74-98-6	8044	320-M
RTER'S RUBBER CEMENT	–	1132	320-M
AGNESIUM OXIDE	1309-48-4	12616	320-M
OPANE	74-98-6	8042	320-M
SY-OFF OVEN CLEANER ORIGINAL HEAVY DUTY AEROSOL	–	3483	320-M
LBOND A-20	–	6991	320-M
ON	7439-89-6	7204	320-M
VY AEROSOL	–	3518	320-M
DIUM HYDROXIDE SOLID	1310-73-2	2706	320-M
DIUM HYDROXIDE 50% SOLUTION	1310-73-2	4008	320-M
TRAPHENYLBORON SODIUM SALT	143-66-8	5701	320-M
ETISOL SOLUTION WITH IRGASAN	–	7123	320-M
SOL DISINFECTANT SPRAY - ALL SCENTS	–	7857	320-M
TASSIUM PHOSPHATE MONOBASIC	7778-77-0	5925	320-M
DIUM PHOSPHATE DIBASIC HEPTAHYDRATE	7782-85-6	14725	320-M
EWGARD 315 CORROSION INHIBITOR	–	11078	320-M
S DETERGENT	–	8003	320-M
ARCH	9005-25-8	6476	320-M
CKEL NITRATE HEXAHYDRATE	13478-0-7	10403	320-M
ICA GEL	112926-0-8	10871	320-M
ON (III) AMMONIUM SULFATE DODECAHYDRATE	7783-83-7	11948	320-M
INO-2-NAPHTHOL-4-SULFONIC ACID (1-)	567-13-5	10995	320-M
MONIUM CHLORIDE	12125-2-9	10999	320-M
DMIUM CHIPS	7440-43-9	10768	320-M
LCIUM CARBONATE	471-34-1	11005	320-M
RIC SULFATE	13590-82-4	10949	320-M
UTAMIC ACID	56-86-0	10905	320-M
DROFLUORIC ACID	7664-39-3	11010	320-M
AD (II) OXIDE	1317-36-8	10752	320-M
UTRAL RED	553-24-2	2415	320-M
OBIUM	7440-3-1	10771	320-M
TROBENZENE	98-95-3	10943	320-M
ERAZINE	110-85-0	10828	320-M

MATERIAL/PRODUCT NAME	CAS NO.	MSDS NO.	BUILDING
POTASSIUM OXALATE MONOHYDRATE	6487-48-5	10942	320-M
SODIUM BROMIDE	7647-15-6	10908	320-M
SODIUM METABISULFITE	7681-57-4	10909	320-M
SODIUM SULFITE	7757-83-7	10937	320-M
STRONTIUM CHLORIDE HEXAHYDRATE	10025-70-4	10915	320-M
THENOYLTRIFLUOROACETONE (2-)	326-91-0	4282	320-M
TRIISOOCTYLAMINE	2757-28-0	10890	320-M
VANADYL SULFATE	27774-13-6	6918	320-M
WINDEX GLASS CLEANER BLUE - RETAIL	–	7693	320-M
POTASSIUM CHLORIDE	7447-40-7	5913	320-M
AMMONIUM CITRATE DIBASIC	3012-65-5	753	320-M
OPTI-FLUOR	–	134	320-M
CHROMIUM (IC) ACETATE BASIC	15417-46-6	1493	320-M
BLUE RIBBON CREAM METAL POLISH	–	104	320-M
SULFAMIC ACID	5329-14-6	8930	320-M
TOTAL SEQUESTRANT NO. 1	50-81-7	7122	320-M
TOTAL SEQUESTRANT NO. 1	50-81-7	7122	320-M
TRIC ACID	7697-37-2	6885	320-M
EVEN BETTER	–	8649	320-M
SODIUM ACETATE	127-9-3	3177	320-M
TOTAL SEQUESTRANT NO. 3	–	7120	320-M
TOTAL SEQUESTRANT NO. 2	7647-1-0	7121	320-M
VERSENE 100 CHELATING AGENT	–	6980	320-M
DREWGARD 100 CORROSION INHIBITOR	–	953	320-M
BORIC ACID	10043-35-3	11290	320-M
POTASSIUM DIHYDROGEN PHOSPHATE	7778-77-0	11351	320-M
SODIUM TITANATE	12034-36-5	11350	320-M
TITANIUM (IV) OXIDE	13463-67-7	11284	320-M
ZINC CHLORIDE	7646-85-7	11401	320-M
ACID ACCEPTANCE TEST KIT SOLUTION A	–	12311	320-M
ACID ACCEPTANCE TEST KIT SOLUTION B	–	12311	320-M
BROMTHYMOL BLUE INDICATOR SOLUTION	–	7236	320-M
BUFFER SOLUTION PH 7	–	2696	320-M
FFER SOLUTION PH 7	–	2696	320-M
NICKEL NITRATE HEXAHYDRATE	13478-0-7	11937	320-M
S-200 SILICONE OIL	63148-62-9	12093	320-M

MATERIAL/PRODUCT NAME	CAS NO.	MSDS NO.	BUILDING
:M 40 SODIUM OXALATE REDUCTOMETRIC STANDARD	62-76-0	12280	320-M
)LUENE	108-88-3	11952	320-M
:M 3101 ALUMINUM SPECTROMETRIC STANDARD	–	12268	320-M
JFFER SOLUTION PH 7	–	2696	320-M
:M 3167 YTTRIUM SPECTROMETRIC STANDARD	–	12279	320-M
:M 3150 SILICON SPECTROMETRIC STANDARD	7440-21-3	12281	320-M
:M 3162 TITANIUM SPECTROMETRIC STANDARD	–	12265	320-M
:M 3133 MERCURY SPECTROMETRIC STANDARD	–	12274	320-M
:M 3171 MULTIELEMENT SPECTROMETRIC MIX A STANDARD	–	12284	320-M
:M 3174 MULTIELEMENT SPECTROMETRIC MIX D STANDARD	–	12286	320-M
:M 3172 MULTIELEMENT SPECTROMETRIC MIX B STANDARD	–	12285	320-M
:M 3126 IRON SPECTROMETRIC STANDARD	–	12259	320-M
:M 3147 SAMARIUM SPECTROMETRIC STANDARD	–	12276	320-M
:M 3115 DYSPROSIUM SPECTROMETRIC STANDARD	–	12282	320-M
:M 3117 EUROPIUM SPECTROMETRIC STANDARD	–	12283	320-M
:M 3118 GADOLINIUM SPECTROMETRIC STANDARD	–	12272	320-M
:M 3118 GADOLINIUM SPECTROMETRIC STANDARD	–	12272	320-M
\LLIUM	7440-55-3	12364	320-M
TANIUM	7440-32-6	12377	320-M
:M 3111 CESIUM SPECTROMETRIC STANDARD IN HYDROCHLORIC	–	12437	320-M
:M 3182 CHLORIDE ANION SOLUTION	7447-40-7	12445	320-M
:M 3182 CHLORIDE ANION SOLUTION	7447-40-7	12445	320-M
:M 3103 ARSENIC SPECTROMETRIC STANDARD	–	12439	320-M
:M 3106 BISMUTH SPECTROMETRIC STANDARD	–	12442	320-M
:M 3107 BORON SPECTROMETRIC STANDARD	–	12419	320-M
:M 3107 BORON SPECTROMETRIC STANDARD	–	12419	320-M
:M 3110 CERIUM SPECTROMETRIC STANDARD	–	12443	320-M
:M 3156 TELLURIUM SPECTROMETRIC STANDARD	–	12425	320-M
:M 3157 TERBIUM SPECTROMETRIC STANDARD	–	12424	320-M
:M 3166 YTTERBIUM SPECTROMETRIC STANDARD	–	12420	320-M
:M 3135 NEODYMIUM SPECTROMETRIC STANDARD	–	12432	320-M
:M 3149 SELENIUM SPECTROMETRIC STANDARD	–	12427	320-M
:M 3181 SULFATE ANION SOLUTION	7778-80-5	12444	320-M
:M 3116 ERBIUM SPECTROMETRIC STANDARD	–	12436	320-M
:M 3183 FLUORIDE ANION SOLUTION	7681-49-4	12446	320-M
:M 3119 GALLIUM SPECTROMETRIC STANDARD	–	12435	320-M

MATERIAL/PRODUCT NAME	CAS NO.	MSDS NO.	BUILDING
ETHYL ALCOHOL USP - 190 PROOF	64-17-5	11565	320-M
FUSER OIL FT SERIES COPIERS	63148-62-9	7567	320-M
HEXANE	110-54-3	407	320-M
PHENOL	108-95-2	3434	320-M
AIRLIFT FRESH, FLORAL & LEMON - AEROSOL	–	3358	320-M
HYDROGEN PEROXIDE 30%	7722-84-1	1419	320-M
ALUMINUM NITRATE NONAHYDRATE	7784-27-2	1285	320-M
KODAK PHOTO-FLO 200 SOLUTION	–	7815	320-M
SAVIN	–	10415	320-M
RICOH FT 6080/85 BLACK TONER	–	7568	320-M
ALIZARIN RED S	130-22-3	1224	320-M
MANGANESE POWDER	7439-96-5	2386	320-M
CALMAGITE INDICATOR	–	10039	320-M
TITANIUM (IV) OXIDE	13463-67-7	11284	320-M
TIN	7440-31-5	6666	320-M
SILVER NITRATE	7761-88-8	5949	320-M
SILVER NITRATE	7761-88-8	6934	320-M
RIDINEDICARBOXYLIC ACID (2,6-)	499-83-2	5692	320-M
SRM 3158 THALLIUM SPECTROMETRIC STANDARD	–	12423	320-M
FERROUS AMMONIUM SULFATE HEXAHYDRATE	7783-85-9	10801	320-M
DEVARDA'S METAL	8049-11-4	857	320-M
DEVARDA'S ALLOY	–	5338	320-M
PORCELAIN AND CERAMIC TILE FOAM CLEANER	–	11419	320-M
MANGANOUS SULFATE MONOHYDRATE	10034-96-5	10490	320-M
MAGNESIUM NITRATE HEXAHYDRATE	10213-15-7	3322	320-M
IODINE	7553-56-2	7209	320-M
POTASSIUM CARBONATE	584-8-7	6876	320-M
LEMON GLO	–	10974	320-M
POTASSIUM OXALATE MONOHYDRATE	6487-48-5	8078	320-M
POTASSIUM THIOCYNATE	333-20-0	9645	320-M
STANNOUS CHLORIDE DIHYRATE	10025-69-1	6386	320-M
AMMONIUM CHLORIDE	12125-2-9	752	320-M
SULFOSALICYLIC ACID	97-5-2	6470	320-M
DIUM OXALATE	62-76-0	1900	320-M
BROMOCRESOL GREEN	76-60-8	6784	320-M
ETHYL ALCOHOL USP - 200 PROOF	64-17-5	11566	320-M

MATERIAL/PRODUCT NAME	CAS NO.	MSDS NO.	BUILDING
JPRIC OXIDE	1317-38-0	1357	320-M
IOSPHOMOLYBDIC ACID	11104-88-4	2118	320-M
:MON GLO	–	10974	320-M
ANGANESE CHLORIDE	7773-1-5	6697	320-M
IOSPHORIC ACID	7664-38-2	11883	320-M
)DIUM SULFITE	7757-83-7	11054	320-M
:PTISOL SOLUTION WITH IRGASAN	–	7123	320-M
:A SAND, WASHED	14808-60-7	9227	320-M
.UMINUM CHLORIDE	7446-70-0	1279	320-M
)DIUM OXALATE	62-76-0	1900	320-M
)DIUM MOLYBDATE DIHYDRATE	10102-40-6	5972	320-M
:OPANOL (2-)	67-63-0	6733	320-M
:ETIC ACID GLACIAL	64-19-7	1142	320-M
:HYLENE GLYCOL	107-21-1	5472	320-M
:M 3101 ALUMINUM SPECTROMETRIC STANDARD	–	12268	320-M
)TASSIUM PHOSPHATE MONOBASIC	7778-77-0	5925	320-M
IENANTHROLINE MONOHYDRATE (1,10-)	5144-89-8	6799	320-M
)OCTANE	540-84-1	10374	320-M
ICRO LIQUID LABORATORY CLEANER	–	646	320-M
IORIN	133-33-2	6901	320-M
'INDURA OIL 10	–	9219	320-M
)DIUM SULFATE	7757-82-6	8931	320-M
)TASSIUM NITRATE	7757-79-1	5771	320-M
)TASSIUM FERRICYANIDE	13746-66-2	6750	320-M
)TASSIUM CHROMATE	7789-0-6	11386	320-M
)TASSIUM CHROMATE	7789-0-6	6877	320-M
)TASSIUM CHROMATE	7789-0-6	6746	320-M
)TASSIUM BIPHTHALATE	877-24-7	6873	320-M
Y LIQUID DISHWASHING DETERGENT	–	7172	320-M
:UTRACIT-2 CAUSTIC NEUTRALIZER	–	5871	320-M
:UTRASORB ACID NEUTRALIZER	–	2820	320-M
)LUSORB	–	5991	320-M
JOSEAL VACUUM PUMP OIL	–	290	320-M
:. RED O	1320-6-5	2827	320-M
IE-STROKE VESPHENE	–	5483	320-M
:CENT PLUS 1 ANTIBACTERIAL SKIN LOTION	–	1137	320-M

MATERIAL/PRODUCT NAME	CAS NO.	MSDS NO.	BUILDING
ONE SHOT BULLETIN COLOR VERMILLON	–	1731	320-M
AMMONIUM METAVANADATE	7803-55-6	14344	320-M
ORION APPLICATION SOLUTION CISA PART B	7789-38-0	14314	320-M
MERCURIC OXIDE	21908-53-2	13469	320-M
ALUMINUM OXIDE	1344-28-1	1288	320-M
ALCONOX	–	5184	320-M
SRM 3168 ZINC SPECTROMETRIC STANDARD	–	12266	320-M
AIRLIFT FLORAL, FRESH & LEMON SCENTS - BULK	–	9029	320-M
AIRLIFT FLORAL, FRESH & LEMON SCENTS - BULK	–	9029	320-M
ALUMINUM LUMP	7429-90-5	12609	320-M
ALUMINUM NITRATE NONAHYDRATE	7784-27-2	5186	320-M
AMINO-2-NAPHTHOL-4-SULFONIC ACID MIX (1-)	–	11656	320-M
ARSENIC	7440-38-2	13311	320-M
BARIUM CARBONATE	513-77-9	11344	320-M
BERYLLIUM	7440-41-7	13145	320-M
BISMUTH	7440-69-9	12949	320-M
CADMIUM	7440-43-9	13140	320-M
ADMIUM OXIDE	1306-19-0	2312	320-M
CALCIUM CARBONATE	471-34-1	11358	320-M
SRM 3109 CALCIUM SPECTROMETRIC STANDARD	–	12257	320-M
CALCIUM OXIDE	1305-78-8	13139	320-M
CHROMIUM (VI) OXIDE	1333-82-0	12598	320-M
TITAN YELLOW	1829-0-1	8403	320-M
COBALT ACETATE TETRAHYDRATE	6147-53-1	5311	320-M
COBALT	7440-48-4	12843	320-M
RANDO OIL HD 68	64742-65-0	5619	320-M
FERROUS AMMONIUM SULFATE HEXAHYDRATE	7783-85-9	6638	320-M
FERROUS SULFATE HEPTAHYDRATE	7782-63-0	6649	320-M
GALLIUM OXIDE	12024-21-4	12592	320-M
SRM 3118 GADOLINIUM SPECTROMETRIC STANDARD	–	12272	320-M
HYDROGEN PEROXIDE, 30 TO 52%, PERONE	–	7462	320-M
LANTHANUM CHLORIDE HEPTAHYDRATE	10025-84-0	6762	320-M
SRM 3129 LITHIUM SPECTROMETRIC STANDARD	–	12260	320-M
SOL DISINFECTANT SPRAY - ALL SCENTS	–	7857	320-M
MAGNESIUM CHLORIDE HEXAHYDRATE	7791-18-6	6694	320-M
MANGANESE POWDER	7439-96-5	2386	320-M

MATERIAL/PRODUCT NAME	CAS NO.	MSDS NO.	BUILDING
GNESIUM CHLORIDE HEXAHYDRATE	7791-18-6	5837	320-M
LYBDENUM	7440-98-7	13124	320-M
KEL PELLETS	7440-2-0	12619	320-M
KEL (II) OXIDE	1313-99-1	8239	320-M
QUEL 550 R&O FIRE RESISTANT HYDRAULIC FLUID	–	8727	320-M
AFFIN OIL-WHITE, LIGHT DOMESTIC	8012-95-1	2427	320-M
SHOT FLYING INSECT KILLER FORMULA 411	–	7655	320-M
NOLINOL (2-)	59-31-4	10609	320-M
ENIUM POWDER	7782-49-2	13348	320-M
M 3151 SILVER SPECTROMETRIC STANDARD	–	11643	320-M
VER WIRE	7440-22-4	13350	320-M
DIUM CARBONATE	497-19-8	11357	320-M
ON TICONDEROGA NO 635 GRAPHITE	7782-42-5	12447	320-M
DIUM CHROMATE TETRAHYDRATE	10034-82-9	9234	320-M
DIUM PYROPHOSPHATE DECAHYDRATE	13472-36-1	5982	320-M
NTALUM (V) OXIDE	1314-61-0	7535	320-M
DRIUM NITRATE TETRAHYDRATE	13470-7-0	11388	320-M
YMOLPHTHALEIN	125-20-2	10589	320-M
	7440-31-5	13107	320-M
M 3164 URANIUM SPECTROMETRIC STANDARD	–	12278	320-M
NADIUM (V) OXIDE	1314-62-1	12753	320-M
C OXIDE	1314-13-2	13099	320-M
C SULFATE HEPTAHYDRATE	7446-20-0	5794	320-M
ROUS SULFATE HEPTAHYDRATE	7782-63-0	5382	320-M
RMULA 0-88	5989-27-5	12571	320-M
ROGEN GAS	7727-37-9	8218	320-M
DRIUM NITRATE TETRAHYDRATE	13470-7-0	11388	320-M
TASSIUM DICHROMATE	7778-50-9	6749	320-M
M 3152 SODIUM SPECTROMETRIC STANDARD	–	12277	320-M
LFAMIC ACID	5329-14-6	8930	320-M
DIUM HYDROXIDE DRY SOLID, FLAKE, BEAD OR GRANULAR	1310-73-2	5482	320-M
DROCHLORIC ACID	7647-1-0	6966	320-M
DROXYLAMINE HYDROCHLORIDE	5470-11-1	6955	320-M
TISOL SOLUTION WITH IRGASAN	–	7123	320-M
N POWDER	7439-89-6	7202	320-M
M 3108 CADMIUM SPECTROMETRIC STANDARD	–	12269	320-M

MATERIAL/PRODUCT NAME	CAS NO.	MSDS NO.	BUILDING
ᶜRM 3128 LEAD SPECTROMETRIC STANDARD	–	12434	320-M
SRM 3129 LITHIUM SPECTROMETRIC STANDARD	–	12260	320-M
SRM 3161 TIN SPECTROMETRIC STANDARD	–	12264	320-M
SRM 3141 POTASSIUM SPECTROMETRIC STANDARD	–	12263	320-M
SRM 3153 STRONTIUM SPECTROMETRIC STANDARD	–	12426	320-M
SRM 3151 SILVER SPECTROMETRIC STANDARD	–	11643	320-M
MAGNESIUM SULFATE	7487-88-9	10323	320-M
FERROUS AMMONIUM SULFATE HEXAHYDRATE	7783-85-9	10322	320-M
POTASSIUM DICHROMATE	7778-50-9	5916	320-M
OXYGEN GAS	7782-44-7	8144	320-M
SRM 3136 NICKEL SPECTROMETRIC STANDARD	–	12275	320-M
SRM 3163 TUNGSTEN SPECTROMETRIC STANDARD	–	12421	320-M
SRM 3113 COBALT SPECTROMETRIC STANDARD	–	12271	320-M
FORMIC ACID	64-18-6	13461	320-M
SPRAY MISTER 1000 FLOOR BUFF	–	6486	320-M
HEXAMETHYLENETETRAMINE	100-97-0	6960	320-M
ANTIMONY SHOT	7440-36-0	13571	320-M
ᴺN (II) OXIDE	21651-19-4	13559	320-M
SILICON (IV) CARBIDE	409-21-2	13828	320-M
DEEP BLUE GLASS & WINDOW CLEANER	–	14482	320-M
SHIELD STAINLESS STEEL CLEANER	–	15944	320-M
OPTI-CLEAN NEUTRAL CLEANER	–	14479	320-M
PROFESSIONAL LINE COMET CLEANER WITH CHLORINAL	–	3971	320-M
INSTITUTIONAL BAB-O CLEANSER WITH BLEACH	–	9531	320-M
LEMON-AID FURNITURE POLISH	–	12151	320-M
SRM 84 POTASSIUM HYDROGEN PHTHALATE PRIMARY STANDARD	877-24-7	15311	320-M
ALUMINUM	7429-90-5	14761	320-M
ALUMINA OXIDE	1344-28-1	14762	320-M
POTASSIUM NITRATE	7757-79-1	14360	320-M
SRM 192 SODIUM CARBONATE PH STANDARD	497-19-8	14593	320-M
SRM 185 POTASSIUM HYDROGEN PHTHALATE PH STANDARD	877-24-7	15312	320-M
SILICA GEL	7631-86-9	14586	320-M
SRM 185 POTASSIUM HYDROGEN PHTHALATE PH STANDARD	877-24-7	15312	320-M
ᴿRTER'S HI-LITER	–	1131	320-M
SLIPSPRAY DRY LUBRICANT AEROSOL	–	7075	320-M
LECTRON 13 BULK	76-13-1	7926	320-M

MATERIAL/PRODUCT NAME	CAS NO.	MSDS NO.	BUILDING
,INLESS STEEL CLEANER AEROSOL	–	1094	320-M
:NYLBORIC ACID	98-80-6	7725	320-M
)IUM HYDROXIDE	1310-73-2	7365	320-M
ETHANOLAMINE	102-71-6	10373	320-M
)IUM HYDROXIDE	1310-73-2	7365	320-M
)IUM HYDROXIDE	1310-73-2	7365	320-M
)IUM HYDROXIDE	1310-73-2	7365	320-M
)IUM CHLORIDE	7647-14-5	7055	320-M
TASSIUM CARBONATE	584-8-7	6876	320-M
:RIC ACID	7697-37-2	5481	320-M
:RIC ACID	7697-37-2	5481	320-M
:RIC ACID	7697-37-2	5481	320-M
LFURIC ACID 96%	7664-93-9	6548	320-M
TASSIUM THIOCYANATE	333-20-0	6732	320-M
DROCHLORIC ACID	7647-1-0	6966	320-M
DROCHLORIC ACID	7647-1-0	6966	320-M
DROCHLORIC ACID	7647-1-0	6966	320-M
TASSIUM HYDROXIDE	1310-58-3	6879	320-M
ALIC ACID DIHYDRATE	6153-56-6	8951	320-M
M 3134 MOLYBDENUM SPECTROMETRIC STANDARD	–	12433	320-M
M 3104 BARIUM SPECTROMETRIC STANDARD	–	12440	320-M
RROVER IRON REAGENT 854	–	341	320-M
OSPHORIC ACID	7664-38-2	6805	320-M
OSPHORIC ACID	7664-38-2	6805	320-M
RRIC AMMONIUM SULFATE DODECAHYDRATE	7783-83-7	6652	320-M
NERAL OIL	8012-95-1	5760	320-M
:RCURIC OXIDE	21908-53-2	6704	320-M
:RCUROUS CHLORIDE	7546-30-7	6710	320-M
TASSIUM PHOSPHATE MONOBASIC	7778-77-0	11387	320-M
)T SHOT ROACH & ANT KILLER FORMULA WB2	–	7654	320-M
AGNESIUM CHLORIDE HEXAHYDRATE	7791-18-6	8685	320-M
:KEL SULFATE HEXAHYDRATE	10101-97-0	8842	320-M
NERALS WASTEWATR	–	9103	320-M
MONIUM PERSULFATE	7727-54-0	765	320-M
TRIC ACID	7697-37-2	6885	320-M
M 975 SODIUM CHLORIDE ISOTOPIC REFERENCE STANDARD	7647-14-5	15370	320-M

MATERIAL/PRODUCT NAME	CAS NO.	MSDS NO.	BUILDING
ANI-FLUSH TOILET BOWL CLEANER CRYSTALS	–	6364	320-M
KOLD WELD RESIN-LIQUID & POWDER	–	7803	320-M
BLUE RIBBON CREAM METAL POLISH	–	104	320-M
SEDISPERSE RINSING SOLUTION	–	13862	320-M
TRICHLOROETHANE (1,1,1-)	71-55-6	11339	320-M
TOTAL SEQUESTRANT REAGENT 3	–	15700	320-M
EASAL PAD MARKERS	–	15011	320-M
METHYL ORANGE SOLUTIONS	–	12315	320-M
SODIUM DICHROMATE DIHYDRATE	7778-12-0	8087	320-M
ACID SPILL KIT	–	6564	320-M
ETHYLENEDIAMINETETRACETIC ACID DISODIUM SALT	139-33-3	5778	320-M
ETHYLENEDIAMINETETRACETIC ACID DISODIUM SALT	139-33-3	5778	320-M
CAUSTIC SPILL KIT PART A	77-92-9	2245	320-M
AMMONIUM PARA-MOLYBDATE TETRAHYDRATE	12054-85-2	3363	320-M
PENTAAMINECHLOROHODIUM (III) SULFATE	21360-80-5	13567	320-M
NIOBIUM (V) OXIDE	1313-96-8	8263	320-M
SILICON (IV) OXIDE	7631-86-9	7049	320-M
LENIUM PIECES	7782-49-2	7549	320-M
HYDROCHLORIC ACID	7647-1-0	6966	320-M
SRM 915 CALCIUM CARBONATE	1317-65-3	15308	320-M
AMMONIUM PARA-MOLYBDATE TETRAHYDRATE	12054-85-2	3363	320-M
MICRO LIQUID LABORATORY CLEANER	–	646	320-M
TRICHLOROETHANE (1,1,1-)	71-55-6	11339	320-M
MS-180/CO2 FREON TF SOLVENT	–	8621	320-M
SRM 2213 2,2,4-TRIMETHYLPENTANE (ISOOCTANE)	540-84-1	18692	320-M
SODIUM HYDROXIDE STANDARD SOLUTION 5.0N	1310-73-2	1892	320-M
LEAD (II) NITRATE	10099-74-9	16167	320-M
SODIUM THIOSULFATE PENTAHYDRATE	10102-17-7	14402	320-M
ALUMINUM OXIDE, ACTIVATED GAMMA, ACIDIC	1344-28-1	2212	320-M
VALBOND A-20	–	6991	320-M
CRONEX X-RAY LIQUID FIXER PART B	–	2739	320-M
BUFFER SOLUTION SB114 PH 9.00	–	8903	320-M
DAP WELDWOOD REGULAR CONTACT CEMENT	–	9316	320-M
FFER SOLUTION SB107 PH 7.00 YELLOW	–	13671	320-M
SODIUM HYDROXIDE	1310-73-2	6911	320-M
SODIUM HYDROXIDE	1310-73-2	6911	320-M

MATERIAL/PRODUCT NAME	CAS NO.	MSDS NO.	BUILDING
FURIC ACID	7664-93-9	8929	320-M
IC ACID	7697-37-2	5481	320-M
SPHORIC ACID	7664-38-2	6811	320-M
ROCHLORIC ACID	7647-1-0	3181	320-M
ROCHLORIC ACID	7647-1-0	3181	320-M
IC ACID	7697-37-2	5481	320-M
SPHORIC ACID	7664-38-2	6811	320-M
STAIN BASE MEDIUM	–	1698	320-M
KUT EP-C SOLUBLE OIL	–	16724	320-M
UM META-SILICATE NONAHYDRATE CRYSTAL	6834-92-0	6910	320-M
NYL ACETATE DIHYDRATE	541-9-3	6036	320-M
FER SOLUTION SB115 PH 10.00 BLUE	–	17279	320-M
IONIUM CITRATE DIBASIC	3012-65-5	17062	320-M
ON GLO	–	10974	320-M
HYL RED HYDROCHLORIDE	63451-28-5	10907	320-M
ASSIUM BICARBONATE	298-14-6	17319	320-M
MPHENOL BLUE INDICATOR SOLUTION	–	17571	320-M
MPHENOL BLUE INDICATOR SOLUTION	–	17571	320-M
EFERENCE ELECTRODE INNER FILL SOLUTION	–	9052	320-M
ROCHLORIC ACID	7647-1-0	6966	320-M
ROPYL ALCOHOL	67-63-0	11027	320-M
UM CARBONATE	497-19-8	5960	320-M
UM CHLORIDE	7647-14-5	6924	320-M
FURIC ACID	7664-93-9	6479	320-M
UM SULFATE	7757-82-6	8931	320-M
UM NITRITE	7632-0-0	5973	320-M
ASSIUM PERMANGANATE	7722-64-7	6851	320-M
ASSIUM PERMANGANATE	7722-64-7	6851	320-M
ROCHLORIC ACID	7647-1-0	6966	320-M
ECULAR SIEVE TYPE 5A	–	17979	320-M
136 POTASSIUM DICHROMATE	7778-50-9	17924	320-M
136 POTASSIUM DICHROMATE	7778-50-9	17924	320-M
83 ARSENIC TRIOXIDE REDUCTOMETRIC STANDARD	1327-53-3	15310	320-M
DMASTER INTERIOR OIL WOOD STAIN OIL HICKORY	–	1800	320-M
SPERSE RINSING SOLUTION	–	13862	320-M
ASSIUM BISULFATE	7646-93-7	8948	320-M

BLANK

APPENDIX J

GENERAL ENGINEERING LABORATORY ANALYSES ON SMALL MELTER SCALE UP TEST GLASSES

AND

QA DOCUMENTATION

AND

TECHNICIAN RESUME'S

 Joe Spears 5-5285

JOB # 95107 **JOB LOG SHEET (U)** Rev.9, 7-21-95 Record Initiation Date 3-7-95

Job Title: RME Delisting Efforts

Requesting Division	Org. Code	Activity Code	TWC Code	SMP Customer Rep
ax	V8100	VLETFSUPP		Joe H. Spears, x5-7482

	CONTACT	DEPARTMENT	ADDRESS	PHONE	BEEPER
ustomer	Glenn Diener	RME&T	730-M	5-3371	none
lternate	John B. Pickett	RME&T	730-M	5-9122	none
esults To:	Glenn Diener	RME&T	730-M	5-3371	none

escription f Material: bench-scale treatability studies on F006 mixed waste using process vitrification. See All-in-1 dated 3-7-95 an upfront delisting of F006 Mixed Waste (U) WSRC-TR-95-0014 in file. The glass has depleted U at levels of .024 - .031 per g of glass.See All-in-1 for sample IDs and detailed analytical requirements. JHS.

History f Material: See All-in-1 dated 3-7-95 in file.

Location f Material: CTF North end of Bay | Inside [X] Outside [ ] | RAD Classification: LSA | Area Classification: None

ontainer Info:	Number of: 7	Size/Volume: samples	Condition of: Drum Top:	Overpacked?

Material Destination: Characterization | MSDS available? No # _____

Clearance eeded: L | Training Needed: [ ] OSHA [ ] RCRA [ ] FACILITY SPECIFIC [ ] OTHER:

SpecialProtective equipment/clothing requirements:

90 Day Clock Involved? No | Date Start: | Date End:

Onsite TAT N/A | Offsite TAT Requested Expedite | Offsite TAT Assigned Expedite

RAD Screen Lab: N/A | Onsite Lab: N/A | Offsite Contract: GEL - Contract AB23504N

	RAD SCREEN		Flash Point		Total Halogens		PCB'S		Total Metals (List):
	BTEX		pH		TAL		TOC		TCLP Metals (List):
	BNTEX		Spec. Gravity		TCL		VOA		TCLP (List):
	TPH - D		% Solids		TCL w/ TIC		VOC		Total (List):
	TPH - G		% Moisture		EAV - 22 Isotopes				Diesel Test Kit (Specify):
				#	MEP + U, Ni, N	@	modified appendix IX, CN, S (See All-in-1 that is attached).		

SMP Request 7-18-95 | EMS Reply 7/18/95 | PKG sent to field 8-2-95 | CRCD | CRR 9-30-95

Sample Type	Date Sampled	Sampled By	Date Submitted to Lab	Submitted By	Date EMS Received Analysis	SMP Analysis Receipt	Received By	Date Analysis Sent to Customer	Sent By
onsite		N/A		N/A	Not Applicable			3/7/95	N/A
offsite	8-8-95	customer	8-8-95	JBM	9/20/95				
				PARTIAL		9/25/95	SSJ	9-26-95	JHS

Comments:

0 0 0

#There are seven samples requested for MEP(Meth 1320) substituting TCLP constituents for EP Toxic (mg/L in leachate) with the PQL equal to or less than the TCLP mg/L regulatory limits + U 0.050 mg/L, Ni 0.10 mg/L, N 1.0 mg/L and the pH of each leachate solution.

@ Two of the seven samples need CN and Sulfide ,Total Constiuents in mg/kg, dry wt for Al, B, Ca, Cl, Cr, Cu, Fe, Mg, Mn, Ni, N, P, U, Zn, Si, Na, S with requested detection limits of 1 ppm or the PQL and a modified App. VIII Scan with includes App. IX constituents & TICs.

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CASE NARRATIVE REPORT
for
Westinghouse Savannah River Site
Subcontract No. AB23504N
Job # 95107

September 18, 1995

Laboratory Identification:

General Engineering Laboratories, Inc.

Summary:

Sample receipt

Five solid samples for Westinghouse Savannah River Site (WSRS) arrived at General Engineering Laboratories, Inc., (GEL) Charleston, South Carolina on August 8, 1995, for Environmental Analyses. All samples listed on the chain arrived without any visible signs of tampering or breakage.

The samples identified as MIC4-149C and MIC5-42C had special analytical instructions per WSRS. These instructions are included in this package. The line item "Silica Digestion" refers to a special method provided by WSRS. The instructions for samples requiring this method were altered slightly at GEL's suggestion for Organics, SO4, Total Phosphorous and Metals because the WSRS method did not apply to those tests.

The temperature of the samples at arrival was 4°C. The samples were stored properly according to SW-846 procedures and GEL Standard Operating Procedures (SOP).

The following samples were received by the laboratory:

Sample Description	Laboratory Description
MIC4-144	9508327-01
MIC5-9A	9508327-02
MIC5-13A	9508327-03
MIC5-21A	9508327-04
MIC5-42A	9508327-05
MIC4-149C	9508477-01
MIC5-42C	9508477-02
MIC4-149C	9508477-03
MIC5-42C	9508477-04
MIC4-149C	9508477-05
MIC5-42C	9508477-06
MIC4-149C	9508477-07
MIC5-42C	9508477-08
MIC4-149C	9508477-09
MIC5-42C	9508477-10

Sample Description	Laboratory Description
MIC4-149C EXTRACT 1	9508477-11
MIC4-149C EXTRACT 2	9508477-12
MIC4-149C EXTRACT 3	9508477-13
MIC4-149C EXTRACT 4	9508477-14
MIC4-149C EXTRACT 5	9508477-15
MIC4-149C EXTRACT 6	9508477-16
MIC4-149C EXTRACT 7	9508477-17
MIC4-149C EXTRACT 8	9508477-18
MIC4-149C EXTRACT 9	9508477-19
MIC5-42C EXTRACT 1	9508477-20
MIC5-42C EXTRACT 2	9508477-21
MIC5-42C EXTRACT 3	9508477-22
MIC5-42C EXTRACT 4	9508477-23
MIC5-42C EXTRACT 5	9508477-24
MIC5-42C EXTRACT 6	9508477-25
MIC5-42C EXTRACT 7	9508477-26
MIC5-42C EXTRACT 8	9508477-27
MIC5-42C EXTRACT 9	9508477-28

Case Narrative

Sample analyses were conducted using methodology as outlined in General Engineering Laboratories (GEL) Standard Operating Procedures. Any technical or administrative problems during analysis, data review, and reduction are written by analytical fraction in the enclosed narratives.

Data Package:

The enclosed data package contains the following sections: Case Narrative, Level I Certificate of Analysis, Level II Certificate of Analysis, QC Sample Summaries, Chain of Custody, Sample Tracking Report, Nonconformance Reports if applicable & Electronic Data Hardcopy Report.

The Level I Certificate of Analysis contains the following headings:

Sample ID:	Sample Identification
Lab ID:	This is the laboratory identification number
Matrix:	Sample matrix
Date Collected:	Date of sample collection
Date Received:	Date of sample receipt by the laboratory
Priority:	Internal status of sample turnaround
Collector:	Party responsible for sample collection.

The detail on the Certificate includes the following:

Parameter:	Analyte or characteristic tested for in the sample
Qualifier:	Qualifier used for data interpretation
Result:	Final result of each parameter.
Units:	Units of final result
Method:	Analytical method used for the analysis of the sample

Analyst:	Initials of analyst who performed the test
Date:	Date of analysis
Time:	Time of analysis

The Level II Certificate of Analysis contains the following headings:

Sample ID:	Sample Identification
Lab ID:	This is the laboratory identification number
Matrix:	Sample matrix
Date Collected:	Date of sample collection
Date Received:	Date of sample receipt by the laboratory
Priority:	Internal status of sample turnaround
Collector:	Party responsible for sample collection.

The detail on the Certificate includes the following:

Parameter:	Analyte or characteristic tested for in the sample
Qualifier:	Qualifier used for data interpretation**
Result:	Final result of each parameter.
DL:	Method Detection Limit
RL:	Reporting Limit
Units:	Units of final result
DF:	Dilution factor
Analyst:	Initials of analyst who performed the test
Date:	Date of analysis
Time:	Time of analysis
Batch:	Analytical batch in which the sample was analyzed
Method:	Analytical method used for the analysis of the sample. Identified on the report numerically with a corresponding table.
Surrogate Recovery:	Provided for organics analysis only. Surrogate compound identified.
Test:	Analytical test associated with surrogate compound.
Percent%:	Surrogate percent recovery
Acceptable Limits:	Limits established for surrogate recoveries based upon the method requirements.

The QC Summary Report contains the following headings:

Sample Parameter:	Analyte or characteristic tested for in the QC sample
Type:	Type of QC sample (i.e., blank, dup, LCS, LCS dup, MS, MSD)
Batch:	Analytical batch in which the QC sample was analyzed
NOM:	Nominal concentration of the spiking compound
Sample:	Amount of compound found in the sample associated with the QC sample.
QC:	Amount of compound found in the QC sample.
Units:	Units of final result
RPD%:	Relative percent difference between LCS/LCS dup, MS/MSD, and Sample/Sample duplicate
REC%:	Recovery for the control samples
Range:	Acceptance limits for control samples
Analyst:	Initials of analyst who performed the test

Date:	Date of analysis
Time:	Time of analysis

Types of QC samples that may be found on the QC Summary Report are:

Blank:	Results of the blank analysis for the sample batch
Dup:	Duplicate analysis of sample
LCS:	Lab control sample
LCS dup:	Lab control sample duplicate
MS:	Matrix spike
MSD:	Matrix spike duplicate

The following are definitions of reporting limits used at General Engineering Laboratories:

DL — Detection Limit: The minimum level of an analyte that can be determined (identified not quantified) with 99% confidence. The values are normally achieved by preparing and analyzing seven aliquots of laboratory water spiked 1 to 5 times the estimated MDL, taking the standard deviation and multiplying it against the one-tailed t-statistic at 99%. This computed value is then verified for reasonableness by repeating the study using the concentration found in the initial study, calculating an F-ratio, and computing the final limit. Sample specific preparation and dilution factors are applied to these limits when they are reported.

The detection limit is the minimum concentration of a substance that can be identified, measured, and reported with 99% confidence that the analyte concentration is above zero. It answers the question "Is It Present".

QL — Quantitation Limit: The lowest concentration that can be reliably achieved within specified limits of precision and accuracy during routine laboratory operating conditions. The QL is generally 5 to 10 times the MDL. However, it may be nominally chosen within these guidelines to simplify data reporting. For many analytes the QL analyte concentration is selected as the lowest non-zero standard in the calibration curve. Sample QL's are highly matrix-dependent. Sample specific preparation and dilution factors are applied to these limits when they are reported

The QL is always $\geq$ DL

RL — Reporting Limit: Same as the QL except where driven by contract or client specifications. If the sample specific preparation and dilution factors cause the QL to be elevated above the RL, then the QL is used as the RL.

The quantitation limit is the lowest level at which a chemical may be accurately and reproducibly quantitated. It answers the question "HOW MUCH IS PRESENT".

Interpretation of RESULT column on the Certificate of Analysis:

If the final concentration in the sample was found to be above the RL, then the value reported is reported without a flag;

If the final concentration in the sample was found to be below the RL but above the DL, then the value reported is flagged with a "J";

If the final concentration in the sample was found to be below the DL, the value reported is flagged with a "U".

Quality Control Flags

General Engineering Laboratories maintains acceptance criteria for QC samples through use of statistical process control (SPC). The SPC limits are used to qualify data usability. The flagging criteria identified in WSRC AN95 Format does not necessarily coincide with the laboratory SPC criteria. There may be instances where the Electronic Data Deliverable (EDD) has flagged data based on the AN95 criteria and the lab has not identified the data to be outside of established control limits.

Those instances where the QC has not met laboratory SPC established criteria will be noted in the section case narratives that are included in this package.

This data package, to the best of my knowledge, is in compliance with technical and administrative requirements.

Edith M. Kent
Project Manager

wsrc00194.95107

CASE NARRATIVE
Job# 95107
Metals Analysis

Sample Analysis

The following sample was analyzed for RCRA metals by EPA method 6010A.

Sample Description	Laboratory Description
MIC4-144	9508327-01
MIC5-9A	9508327-02
MIC5-13A	9508327-03
MIC5-21A	9508327-04
MIC5-42A	9508327-05

Holding Times

All samples were analyzed within the recommended holding times.

Blank Analysis

No target analtyes were detected in the method blank for the batch. Barium was detected in the TCLP Extraction Blank for this batch at a concentration between the detection limit and the reporting limit.

Spike Analysis

Matrix Spike (MS) and Matrix Spike Duplicates (MSD) analyzed met recommended quality control limits for recovery and relative percent difference (RPD).

Laboratory Control Sample Analysis

All Laboratory Control Samples (LCS) and Laboratory Control Sample Duplicates (LCSD) analyzed met recommended quality control limits for recoveries and relative percent difference.

Dilutions

Samples were analyzed without dilution.

Internal Tracking

All samples were properly monitored during sample processing.

CASE NARRATIVE
Job 95107
9508327
Mercury Analysis

Sample Analysis

The following sample was analyzed for Mercury by EPA method 7470.

Sample Description	Laboratory Description
MIC4-144	9508327-01
MIC5-9A	9508327-02
MIC5-13A	9508327-03
MIC5-21A	9508327-04
MIC5-42A	9508327-05

Holding Times

All samples were collected on 10/1/94. This is beyond the maximum 56 day holding time for TCLP Mercury Analysis.

Blank Analysis

No target analytes were detected in the method blank for the batch.

Spike Analysis

Matrix Spike and Matrix Spike Duplicates analyzed met recommended quality control limits for recovery and relative percent difference.

Laboratory Control Sample Analysis

All Laboratory Control Samples and Laboratory Control Sample Duplicates analyzed met recommended quality control limits for recoveries and relative percent difference.

Dilutions

Samples were analyzed without dilution.

Internal Tracking

All samples were properly monitored during sample processing.

CASE NARRATIVE REPORT
Job 95107
9508327
Radiochemistry Analysis

Sample Analysis

The following samples were analyzed for Total Uranium by EPI method A-023.

Sample Description	Laboratory Description
MIC4-144	9508327-01
MIC5-9A	9508327-02
MIC5-13A	9508327-03
MIC5-21A	9508327-04
MIC5-42A	9508327-05

Holding Times

All samples were analyzed within the recommended holding times.

Surrogate Analysis

Surrogate analysis does not apply to Radiochemistry.

Blank Analysis

No target analytes were detected in the method blank for the batch .

Spike Analysis

All Matrix Spike and Matrix Spike duplicates analyzed met recommended quality control limits for recoveries and relative percent difference (RPD).

Laboratory Control Sample Analysis

All Laboratory Control Samples (LCS) analyzed met recommended quality control limits for recoveries and relative percent difference (RPD).

Dilutions

The reported samples were analyzed without dilution.

JOB # 95107

CHAIN-OF-CUSTODY (U) (REV. 1, 01/95)

PAGE 1 - 4

Westinghouse Savannah River Company, Savannah River
Environmental Monitoring Section, Environmental Geochemistry Group
Aiken, South Carolina 29808

Shipping Container TID # nA 9508477

Sample Destination: General Engineering Laboratories, Charleston SC

Customer: GLENN DIENER
Dept. RMEAT
Address: 730-N
Phone: 5-3371

Comments: Reference Contract: AB2350[illegible]
Ship to: General Engineering Laboratories
2040 Savage Road
P.O. Box 30712
Charleston, SC 29417
Attn: Edith Kent, Project Manager

STR Authorization: Janet D. C. Crawford
Janet D. C. Crawford

Matrix Key:
S = Soil
SO = Solid
SL = Sludge
O = Organic
A = Aqueous

SAMPLE ANALYSIS REQUESTED

SAVANNAH RIVER SITE
EGG
Environmental Geochemistry Group

SAMPLE I.D.	TID NUMBER	COLLECTION DATE	COLLECTION TIME	MATRIX	NUMBER OF CONTAINERS	TCLP- Full (Prep & Analysis) (Line Item #1)	Reactivity (Prep & Analysis) (Line Item #352)	Multiple Extraction Procedure (Prep & Analysis) (Line Item #18)	Total Metals In addition to MEP (8 RCRA, NI and U) (Lit's 353, 48, 364)		REMARKS
MIC4-149C	nA	nA	nA	SO	1	✓	✓	✓	✓		9508477-01,03,05,07,09 11-19
MIC5-42C	nA	nA	nA	SO	1	✓	✓	✓	✓		9508477-02,04,06,08 10, 20-28

Please size reduce only enough to pass 3/8' for TCLP. Extensive grinding/crushing is not desired

Multi - Paged COC

Relinquished by:	Date / Time	Received by:	2 Relinquished by:	Date / Time	Received by: 8-8-95 1605
(Print) J B Morris	8/8/95	(Print) Phil Dunn	(Print) Phil Dunn	8/8/95	(Print) Kishia M. Gibbs
(Sign) J B Morris	1200 hrs.	(Sign) Phil Dunn	(Sign) Phil Dunn	1605 hrs.	(Sign) Kishia M. Gibbs
3 Relinquished by:	Date / Time	Received by:	4 Relinquished by:	Date / Time	Received by:
(Print)	/ /	(Print)	(Print)	/ /	(Print)
(Sign)	hrs.	(Sign)	(Sign)	hrs.	(Sign)
5 Relinquished by:	Date / Time	Received by:	6 Relinquished by:	Date / Time	Received by:
(Print)	/ /	(Print)	(Print)	/ /	(Print)
(Sign)	hrs.	(Sign)	(Sign)	hrs.	(Sign)

Record Approved by: Date: Time: Record Validated by: Date: Time:

08-03-1995 10:38 803 725 8041 ENV GEOCHEMISTRY P.02

JOB # 95107

CHAIN-OF-CUSTODY (U) (REV. 1, 01/95)

PAGE 2 OF 4

Westinghouse Savannah River Company, Savannah River
Environmental Monitoring Section, Environmental Geochemistry Group
Aiken, South Carolina 29809

Shipping Container TID # nA

Sample Destination: General Engineering Laboratories, Charleston SC

Customer: GLENN DIENER
Dept. RMEAT
Address: 730-M
Phone: 5-3371
Comments: Reference Contract: AB23584N
Ship to: General Engineering Laboratories
2040 Savage Road
P.O. Box 30712
Charleston, SC 29417
Attn: Edith Kent, Project Manager
STR Authorization: Janet D. C. Crawford

Matrix Key:
S = Soil
SO = Solid
SL = Sludge
O = Organic
A = Aqueous

SAVANNAH RIVER SITE
EGG
Environmental Geochemistry Group

SAMPLE ANALYSIS REQUESTED

SAMPLE I.D.	TID NUMBER	COLLECTION DATE	COLLECTION TIME	MATRIX	NUMBER OF CONTAINERS	Silica Digestion (H2O2/HCL Uptake) (Line item #26)	Total Metals: (In addition to H2O2/HCl Uptake) (Al, B, Ca, Cu, Fe, Li, Mg, Mn, Ni, Si, Na, U, & Zn) (U #'s 29, 35, 36, 1, 40, 41, 42, 43, 44, 45, 48, 53, 243, 264 & 58)	Appendix IX - Metals (In addition to H2O2/HCl Uptake) (Prep & Analysis) (Line item #276)	Appendix IX - VOA (In addition to H2O2/HCl Uptake) (Prep & Analysis) (Line item #277)	Appendix IX - BNA (In addition to H2O2/HCl Uptake) (Prep & Analysis) (Line item #278)	REMARKS
MIC4-149C	nA	nA	nA	SO	1	✓	✓	✓	✓	✓	
MIC5-42C	nA	nA	nA	SO	1	✓	✓	✓	✓	✓	

Please size reduce only enough to pass 3/8" for TCLP. Extensive grinding/crushing is not desired.

Multi - Paged COC

Relinquished by:	Date / Time	Received by:	Relinquished by:	Date / Time	Received by:
(Print) J B MORRIS	8-8-95	(Print) Phil Dunn	(Print) Phil Dunn	8/8/95	(Print) 8-8-95 1605 Kishia M. Gibbs
(Sign) J B Morris	1510 hrs.	(Sign) Phil Dunn	(Sign) Phil Dunn	1605 hrs.	(Sign) Kishia M. Gibbs
3 Relinquished by:	Date / Time	Received by:	4 Relinquished by:	Date / Time	Received by:
(Print)	/ /	(Print)	(Print)	/ /	(Print)
(Sign)	hrs.	(Sign)	(Sign)	hrs.	(Sign)
5 Relinquished by:	Date / Time	Received by:	6 Relinquished by:	Date / Time	Received by:
(Print)	/ /	(Print)	(Print)	/ /	(Print)
(Sign)	hrs.	(Sign)	(Sign)	hrs.	(Sign)

Record Approved by: Date: Time: Record Validated by: Date: Time:

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JOB # 95107

CHAIN-OF-CUSTODY (U) (REV. 1, 01/95)

PAGE 3 OF 4

Westinghouse Savannah River Company, Savannah River
Environmental Monitoring Section, Environmental Geochemistry Group
Aiken, South Carolina 29808

Shipping Container TID # nA

Sample Destination: General Engineering Laboratories, Charleston SC

Customer: GLENN DIENER | Dept. RMEAT
Address: 730-M | Phone: 5-3371

Comments: Reference Contract: AB23584N
Ship to: General Engineering Laboratories
2040 Savage Road
P.O. Box 30712
Charleston, SC 29417
Attn: Edith Kent, Project Manager

STR Authorization: Janet D. C. Crawford

Matrix Key:
S = Soil
SO = Solid
SL = Sludge
O = Organic
A = Aqueous

SAVANNAH RIVER SITE
EGG
Environmental Geochemistry Group

SAMPLE ANALYSIS REQUESTED

SAMPLE I.D.	TID NUMBER	COLLECTION DATE	COLLECTION TIME	MATRIX	NUMBER OF CONTAINERS	Appendix IX - Herb (In addition to H2O2/HCl Uptake) (Prep & Analysis) (Line Item #279)	Appendix IX Pest/PCB's (In addition to H2O2/HCl Uptake) (Prep & Analysis) (Line Item #280)	SO4 as S (In addition to H2O2/HCl Uptake) (Prep & Analysis) (Line Item # 175)	PO4 as P (In addition to H2O2/HCl Uptake) (Prep & Analysis) (Line Item # 231)	Silica Digestion (H2O2/H2O or Nitric Acid Uptake) & Chloride analysis (Prep & Analysis) (Line Items #26 & 198a)	REMARKS
MIC4-149C	nA	nA	nA	SO	1	✓	✓	✓	✓	✓	
MIC5-42C	nA	nA	nA	SO	1	✓	✓	✓	✓	✓	

Multi - Paged COC

Relinquished by:	Date / Time	Received by:	2 Relinquished by:	Date / Time	Received by:
(Print) JBMORRIS	8/8/95	(Print) Phil Dunn	(Print) Phil Dunn	8/8/95	8-8-95 1605 (Print) Kishia M. Gibbs
(Sign) JBMorris	1500 hrs.	(Sign) Phil Dunn	(Sign) Phil Dunn	1605 hrs.	(Sign) Kishia M. Gibbs
3 Relinquished by:	Date / Time	Received by:	4 Relinquished by:	Date / Time	Received by:
(Print)	/ /	(Print)	(Print)	/ /	(Print)
(Sign)	hrs.	(Sign)	(Sign)	hrs.	(Sign)
5 Relinquished by:	Date / Time	Received by:	6 Relinquished by:	Date / Time	Received by:
(Print)	/ /	(Print)	(Print)	/ /	(Print)
(Sign)	hrs.	(Sign)	(Sign)	hrs.	(Sign)

Record Approved by: | Date: | Time: | Record Validated by: | Date: | Time:

QC Summary Report

Project Description: Hazardous Waste Contract

cc: WSRC00194 Lab. Sample ID: 9508327% Report Date: September 14, 1995

Sample/Parameter	Type	Batch	NOM	Sample	QC	Units	RPD%	REC%	Range	Analyst	Date	Time
Metals Analysis												
QC302366	BLANK	71750										
Arsenic					-0.0193	mg/l				JSS	08/28/95	1728
Barium					0.000160	mg/l						
Cadmium					-0.00277	mg/l						
Chromium					-0.00314	mg/l						
Lead					-0.0105	mg/l						
Manganese					-0.00145	mg/l						
Nickel					-0.00354	mg/l						
Selenium					-0.00130	mg/l						
Silver					0.00617	mg/l						
QC302367	BLANK	71750										
Arsenic					-0.0941	mg/l				JSS	08/28/95	1730
Barium					0.206	mg/l						
Cadmium					-0.00160	mg/l						
Chromium					-0.00416	mg/l						
Lead					0.00235	mg/l						
Manganese					-0.00145	mg/l						
Nickel					-0.00298	mg/l						
Selenium					0.00631	mg/l						
Silver					0.00782	mg/l						
QC302374	LCS	71750										
Arsenic			0.100		-0.0428	mg/l		-42.8**	(80.0 - 120.)	JSS	08/28/95	1741
Barium			0.100		0.0915	mg/l		91.5	(80.0 - 120.)			
Cadmium			0.100		0.103	mg/l		103	(80.0 - 120.)			
Chromium			0.100		0.0931	mg/l		93.1	(80.0 - 120.)			
Lead			0.100		0.110	mg/l		110	(80.0 - 120.)			
Manganese			0.100		0.0967	mg/l		96.7	(80.0 - 120.)			
Nickel			0.100		0.108	mg/l		108	(80.0 - 120.)			
Selenium			0.100		-0.0327	mg/l		-32.7**	(80.0 - 120.)			
Silver			0.100		0.107	mg/l		107	(80.0 - 120.)			
QC302375	LCS DUP	71750										
Arsenic			0.100		-0.0417	mg/l	-2.6	-41.7**	(0.00 - 20.0)	JSS	08/28/95	1743
Barium			0.100		0.0886	mg/l	3.2	88.6	(0.00 - 20.0)			
Cadmium			0.100		0.100	mg/l	3	100	(0.00 - 20.0)			
Chromium			0.100		0.0863	mg/l	7.6	86.3	(0.00 - 20.0)			
Lead			0.100		0.138	mg/l	22.6	138**	(0.00 - 20.0)			
Manganese			0.100		0.0928	mg/l	4.1	92.8	(0.00 - 20.0)			
Nickel			0.100		0.100	mg/l	7.7	100	(0.00 - 20.0)			
Selenium			0.100		-0.0322	mg/l	-1.5	-32.2**	(0.00 - 20.0)			

QC Summary Report

Project Description: Hazardous Waste Contract

cc: WSRC00194 Lab. Sample ID: 9508327% Report Date: September 14, 1995 Page 2 of 4

Sample/Parameter	Type	Batch	NOM	Sample	QC	Units	RPD%	REC%	Range	Analyst	Date	Time
Silver			0.100		0.101	mg/l	5.8	101	(0.00 - 20.0)	JSS	08/28/95	1743
QC302368	9508327-01MS	71750										
Arsenic			5.00	-0.136	4.84	mg/l		99.5		JSS	08/28/95	1752
Barium			10.0	0.134	9.43	mg/l		93				
Cadmium			1.00	-0.00297	0.968	mg/l		97.1				
Chromium			5.00	0.0360	4.88	mg/l		96.9				
Lead			5.00	-0.00147	4.94	mg/l		98.8				
Manganese			2.00	0.0104	1.88	mg/l		93.5				
Nickel			2.00	0.195	2.16	mg/l		98.3				
Selenium			1.00	0.00291	1.06	mg/l		105.7				
Silver			0.500	0.00726	0.456	mg/l		89.7				
QC302370	9508327-02MS	71750										
Arsenic			5.00	-0.147	4.89	mg/l		100.7		JSS	08/28/95	1755
Barium			10.0	0.154	9.31	mg/l		91.6				
Cadmium			1.00	-0.00224	1.01	mg/l		101.2				
Chromium			5.00	0.0208	4.94	mg/l		98.4				
Lead			5.00	-0.00878	5.17	mg/l		103.6				
Manganese			2.00	0.0120	1.91	mg/l		94.9				
Nickel			2.00	0.169	2.19	mg/l		101.1				
Selenium			1.00	-0.0285	1.05	mg/l		107.9				
Silver			0.500	0.0134	0.467	mg/l		90.7				
QC302371	9508327-03MS	71750										
Arsenic			5.00	-0.158	4.86	mg/l		100.4		JSS	08/28/95	1757
Barium			10.0	0.156	9.25	mg/l		90.9				
Cadmium			1.00	-0.00188	1.02	mg/l		102.2				
Chromium			5.00	0.0102	4.97	mg/l		99.2				
Lead			5.00	0.0129	5.27	mg/l		105.1				
Manganese			2.00	0.0213	1.93	mg/l		95.4				
Nickel			2.00	0.164	2.19	mg/l		101.3				
Selenium			1.00	0.0435	0.998	mg/l		95.5				
Silver			0.500	0.0107	0.466	mg/l		91.1				
QC302372	9508327-04MS	71750										
Arsenic			5.00	-0.187	5.02	mg/l		104.1		JSS	08/28/95	1759
Barium			10.0	0.145	9.49	mg/l		93.5				
Cadmium			1.00	-0.00164	1.04	mg/l		104.2				
Chromium			5.00	0.00656	5.13	mg/l		102.5				
Lead			5.00	0.0162	5.40	mg/l		107.7				
Manganese			2.00	0.0277	2.00	mg/l		98.6				
Nickel			2.00	0.135	2.23	mg/l		104.8				
Selenium			1.00	-0.0233	1.05	mg/l		107.3				

QC Summary Report

Project Description: Hazardous Waste Contract

cc: WSRC00194 Lab. Sample ID: 9508327% Report Date: September 14, 1995 Page 3 of 4

Sample/Parameter	Type	Batch	NOM	Sample	QC	Units	RPD%	REC%	Range	Analyst	Date	Time
Silver			0.500	0.0102	0.471	mg/l		92.2		JSS	08/28/95	1759
QC302373	9508327-05MS	71750										
Arsenic			5.00	-0.147	4.68	mg/l		96.5		JSS	08/28/95	1800
Barium			10.0	0.157	8.78	mg/l		86.2				
Cadmium			1.00	-0.00276	0.973	mg/l		97.6				
Chromium			5.00	0.00866	4.69	mg/l		93.6				
Lead			5.00	-0.0117	5.05	mg/l		101.2				
Manganese			2.00	0.0211	1.83	mg/l		90.4				
Nickel			2.00	0.145	2.08	mg/l		96.8				
Selenium			1.00	-0.0520	0.978	mg/l		103				
Silver			0.500	0.0106	0.442	mg/l		86.3				
QC302369	9508327-01MSD	71750										
Arsenic			5.00	-0.136	4.69	mg/l	3.1	96.5		JSS	08/28/95	1754
Barium			10.0	0.134	9.08	mg/l	3.8	89.5				
Cadmium			1.00	-0.00297	0.962	mg/l	0.6	96.5				
Chromium			5.00	0.0360	4.78	mg/l	2.1	94.9				
Lead			5.00	-0.00147	4.93	mg/l	0.2	98.6				
Manganese			2.00	0.0104	1.84	mg/l	2.2	91.5				
Nickel			2.00	0.195	2.13	mg/l	1.5	96.8				
Selenium			1.00	0.00291	1.01	mg/l	4.8	100.7				
Silver			0.500	0.00726	0.446	mg/l	2.3	87.7				
QC300847	BLANK	71418										
Mercury					-0.000174	mg/l				DVW	08/22/95	2132
QC300848	BLANK	71418										
Mercury					-0.000160	mg/l				DVW	08/22/95	2135
QC300859	LCS	71418										
Mercury			0.00200		0.00198	mg/l		99	(80.0 - 120.)	DVW	08/23/95	0726
QC300860	LCS DUP	71418										
Mercury			0.00200		0.00204	mg/l	3	102	(0.00 - 20.0)	DVW	08/23/95	0728
QC300854	9508327-01MS	71418										
Mercury			0.0200	-0.000790	0.0191	mg/l		99.5		DVW	08/22/95	2152
QC300855	9508327-02MS	71418										
Mercury			0.0200	-0.000560	0.0208	mg/l		106.8		DVW	08/23/95	0716
QC300856	9508327-03MS	71418										
Mercury			0.0200	-0.000580	0.0187	mg/l		96.4		DVW	08/23/95	0719
QC300857	9508327-04MS	71418										
Mercury			0.0200	-0.00231	0.0186	mg/l		104.6		DVW	08/23/95	0721
QC300858	9508327-05MS	71418										
Mercury			0.0200	-0.00195	0.0274	mg/l		146.8		DVW	08/23/95	0724

QC Summary Report

Project Description: Hazardous Waste Contract

cc: WSRC00194 Lab. Sample ID: 9508327% Report Date: September 14, 1995 Page 4 of 4

ample/Parameter	Type	Batch	NOM	Sample	QC	Units	RPD%	REC%	Range	Analyst	Date	Time
adiological												
C300172	BLANK	71291										
Total Uranium					0.00	ug/l					PCW 08/28/95	1416
Accuracy, Total Uranium					0.00	ug/l						
C300173	9508327-05DUP	71291										
Total Uranium				313	313	ug/l	0				PCW 08/28/95	1422
Accuracy, Total Uranium				10.3	10.3	ug/l	0					
C300175	LCS	71291										
Total Uranium			10.0		10.7	ug/l		107	(75.0 - 125.)		PCW 08/28/95	1431
Accuracy, Total Uranium					0.136	ug/l						
C300174	9508327-05MS	71291										
Total Uranium			40.0	313	357	ug/l		110			PCW 08/28/95	1429
Accuracy, Total Uranium				10.3	11.7	ug/l						

Audit Trail by Container

508327%

Printed: 09/02/95 08:36

508327-01.01 - 1000 ml/P

15-AUG-95 18:41:57	Kishia Gibbs	--> Radioactive Cooler
17-AUG-95 08:58:52	Regina Dessaure	--> Delivery
17-AUG-95 10:45:55	Jianguo Li	--> TCLP
18-AUG-95 00:00:58	Paige Morris	--> Radioactive Cooler
18-AUG-95 10:36:05	Regina Dessaure	--> Delivery

76395 - 1000 ml/P

17-AUG-95 10:50:28	Jianguo Li	--> TCLP
21-AUG-95 19:12:44	Bridget James	--> Inorganic Prep
21-AUG-95 23:39:18	Dee Wigger	--> Mercury
24-AUG-95 13:54:56	Pete Wilber	--> Radiological Prep
26-AUG-95 15:24:09	Dee Wigger	--> Inorganic Prep
26-AUG-95 15:25:58	Dee Wigger	--> Delivery

77309 - 2 ml vial

21-AUG-95 19:16:17	Bridget James	--> Inorganic Prep

78319 - 50 ml/P

26-AUG-95 15:25:36	Dee Wigger	--> Inorganic Prep
28-AUG-95 08:36:35	Johanna Starr	--> ICP

508327-02.01 - 1000 ml/P

15-AUG-95 18:41:58	Kishia Gibbs	--> Radioactive Cooler
17-AUG-95 08:58:51	Regina Dessaure	--> Delivery
17-AUG-95 10:45:55	Jianguo Li	--> TCLP
18-AUG-95 00:00:59	Paige Morris	--> Radioactive Cooler
18-AUG-95 10:36:05	Regina Dessaure	--> Delivery

76394 - 1000 ml/P

17-AUG-95 10:50:26	Jianguo Li	--> TCLP
21-AUG-95 19:12:44	Bridget James	--> Inorganic Prep
21-AUG-95 23:39:18	Dee Wigger	--> Mercury
24-AUG-95 13:54:56	Pete Wilber	--> Radiological Prep
26-AUG-95 15:24:09	Dee Wigger	--> Inorganic Prep
26-AUG-95 15:25:58	Dee Wigger	--> Delivery

77312 - 2 ml vial

21-AUG-95 19:19:53	Bridget James	--> Inorganic Prep

78320 - 50 ml/P

26-AUG-95 15:25:45	Dee Wigger	--> Inorganic Prep
28-AUG-95 08:36:35	Johanna Starr	--> ICP

508327-03.01 - 1000 ml/P

15-AUG-95 18:41:57	Kishia Gibbs	--> Radioactive Cooler
17-AUG-95 08:58:52	Regina Dessaure	--> Delivery
17-AUG-95 10:45:55	Jianguo Li	--> TCLP
18-AUG-95 00:00:59	Paige Morris	--> Radioactive Cooler
18-AUG-95 10:36:03	Regina Dessaure	--> Delivery

Internal Chain Of Custody
Audit Trail by Container

Printed: 09/02/95 08:36

)3 - 1000 ml/P
'-AUG-95 10:50:24 Jianguo Li --> TCLP
L-AUG-95 19:12:44 Bridget James --> Inorganic Prep
L-AUG-95 23:39:18 Dee Wigger --> Mercury
1-AUG-95 13:54:56 Pete Wilber --> Radiological Prep
5-AUG-95 15:24:09 Dee Wigger --> Inorganic Prep
5-AUG-95 15:25:58 Dee Wigger --> Delivery

7311 - 2 ml vial
21-AUG-95 19:19:41 Bridget James --> Inorganic Prep

8316 - 50 ml/P
26-AUG-95 15:25:15 Dee Wigger --> Inorganic Prep
28-AUG-95 08:36:35 Johanna Starr --> ICP

27-04.01 - 1000 ml/P
AUG-95 18:41:57 Kishia Gibbs --> Radioactive Cooler
AUG-95 08:58:52 Regina Dessaure --> Delivery
AUG-95 10:45:56 Jianguo Li --> TCLP
AUG-95 00:00:59 Paige Morris --> Radioactive Cooler
AUG-95 10:36:04 Regina Dessaure --> Delivery

92 - 1000 ml/P
7-AUG-95 10:50:19 Jianguo Li --> TCLP
-AUG-95 19:12:44 Bridget James --> Inorganic Prep
-AUG-95 23:39:18 Dee Wigger --> Mercury
4-AUG-95 13:54:56 Pete Wilber --> Radiological Prep
6-AUG-95 15:24:08 Dee Wigger --> Inorganic Prep
6-AUG-95 15:25:58 Dee Wigger --> Delivery

7310 - 2 ml vial
21-AUG-95 19:16:18 Bridget James --> Inorganic Prep

8318 - 50 ml/P
26-AUG-95 15:25:29 Dee Wigger --> Inorganic Prep
28-AUG-95 08:36:35 Johanna Starr --> ICP

327-05.01 - 1000 ml/P
-AUG-95 18:41:58 Kishia Gibbs --> Radioactive Cooler
-AUG-95 08:58:52 Regina Dessaure --> Delivery
-AUG-95 10:45:55 Jianguo Li --> TCLP
-AUG-95 00:00:59 Paige Morris --> Radioactive Cooler
-AUG-95 10:36:05 Regina Dessaure --> Delivery

391 - 1000 ml/P
17-AUG-95 10:50:16 Jianguo Li --> TCLP
21-AUG-95 19:12:44 Bridget James --> Inorganic Prep
21-AUG-95 23:39:17 Dee Wigger --> Mercury
24-AUG-95 13:54:56 Pete Wilber --> Radiological Prep
26-AUG-95 15:24:09 Dee Wigger --> Inorganic Prep
26-AUG-95 15:25:58 Dee Wigger --> Delivery

Internal Chain Of Custody
Audit Trail by Container

9508327% Printed: 09/02/95 08:36

77313 - 2 ml vial
21-AUG-95 19:20:02 Bridget James --> Inorganic Prep

78317 - 50 ml/P
26-AUG-95 15:25:21 Dee Wigger --> Inorganic Prep
28-AUG-95 08:36:34 Johanna Starr --> ICP

JOB # 95107

CHAIN-OF-CUSTODY (U) (REV. 1, 01/95)

Westinghouse Savannah River Company, Savannah River
Environmental Monitoring Section, Environmental Geochemistry Group
Aiken, South Carolina 29808

Shipping Container TID # NA

Sample Destination: General Engineering Laboratories, Charleston SC

Customer: GLENN DIENER	Dept. RMEAT
Address: 730-M	Phone: 6-3371
Comments: Reference Contract: AB2340-M Ship to : General Engineering Laboratories 2040 Savage Road P.O. Box 30712 Charleston, SC 29417 Attn: Edith Kent, Project Manager	Matrix Key: S = Soil SO = Solid SL = Sludge O = Organic A = Aqueous
STR Authorization: Janet D. C. Crawford Janet D. C. Crawford	

SAVANNAH RIVER SITE

EGG

Environmental Geochemistry Group

SAMPLE I.D.	TID NUMBER	COLLECTION DATE	COLLECTION TIME	MATRIX	NUMBER OF CONTAINERS	TCLP Metals: 8 RCRA Metals (Prep & Analysis) (Line Item # 3)	TCLP Metals: U (Prep & Analysis) (Line Item #'s 15 & 36A)	TCLP Metals: Ni (Prep & Analysis) (Line Item #'s 15 & 43)			REMARKS
MIC4-144	NA	10/94	NA	SO	1	✓	✓	✓	9508327-01		
MIC5-9A	NA	10/94	NA	SO	1	✓	✓	✓	9508328-02		
MIC5-13A	NA	10/94	NA	SO	1	✓	✓	✓	9508329-03		Canister Temp. 4°
MIC5-21A	NA	10/94	NA	SO	1	✓	✓	✓	9508330-04		
MIC5-42A	NA	10/94	NA	SO	1	✓	✓	✓	9508331-05		

Please size reduce only enough to pass 3/8" for TCLP. Grinding/crushing is not desired.

Multi - Paged COC

	Date / Time		Date / Time	
1 Relinquished by: (Print) J B MORRIS (Sign) J B Morris	8/8/95 1200 hrs.	Received by: (Print) Phil Dunn (Sign) Phil Dunn	2 Relinquished by: (Print) Phil Dunn (Sign) Phil Dunn	8/8/95 1605 hrs.	Received by: (Print) Kishia M Gibbs (Sign) Kishia M. Gibbs
3 Relinquished by: (Print) (Sign)	/ / hrs.	Received by: (Print) (Sign)	4 Relinquished by: (Print) (Sign)	/ / hrs.	Received by: (Print) (Sign)
5 Relinquished by: (Print) (Sign)	/ / hrs.	Received by: (Print) (Sign)	6 Relinquished by: (Print) (Sign)	/ / hrs.	Received by: (Print) (Sign)
Received for Laboratory by:	Date	Time	Record Verified by:	Date	Time

WSRC-TR-96-0244, Rev. 2; APPENDIX J, Page 23 of 310

GENERAL ENGINEERING LABORATORIES

Meeting today's needs with a vision for tomorrow.

Laboratory Certifications

STATE	GEL	EPI
FL	E87156/87294	E87472/87458
NC	233	
SC	10120	10582
TN	02934	
VA	00151	
WI	99988779	

CERTIFICATE OF ANALYSIS

Client: Westinghouse Savannah River Co.
Bldg. 773-58A, Rm. 1
PO Box 616
Aiken, South Carolina 29803-6105
Contact: Ms. Janet Crawford
Project Description: Hazardous Waste Contract

cc: WSRC00194 Report Date: August 30, 1995

Sample ID : MIC4-144
Lab ID : 9508327-01
Matrix : TCLP
Date Collected : 10/01/94
Date Received : 08/08/95
Priority : Routine
Collector : Client

Parameter	Qualifier	Result		DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Metals Analysis												
Silver	U	0.00726		0.00780	0.500	MGL	1.0	JSS	08/28/95	1732	71750	1
Arsenic	U	-0.136		0.0421	0.500	MGL	1.0					
Barium	J	0.134		0.00220	10.0	MGL	1.0					
Cadmium	U	-0.00297		0.00330	0.100	MGL	1.0					
Chromium	J	0.0360		0.00420	0.500	MGL	1.0					
Nickel		0.195		0.00790	0.0500	MGL	1.0					
Lead	U	-0.00147		0.0364	0.500	MGL	1.0					
Selenium	U	0.00291		0.0841	0.300	MGL	1.0					
Mercury	U	-0.000790		0.000148	0.0200	MGL	1.0	DVW	08/22/95	2115	71418	2
Radiological												
Total Uranium		1120	+/- 36.6	2.28	2.28	UGL	1.0	PCW	08/28/95	1409	71291	3

The following prep procedures were performed:

ICP	DVW	08/26/95	1520	71750 4
Mercury	BBJ	08/21/95	2100	71418 2
TCLP Prep for Metals	JL	08/17/95	2010	71040 5

M = Method	Method-Description
M 1	EPA 6010A
M 2	EPA 7470
M 3	EPI A-023
M 4	EPA 3005
M 5	EPA 1311

GENERAL ENGINEERING LABORATORIES

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TN	02934	
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Bldg. 773-58A, Rm. 1
PO Box 616
Aiken, South Carolina 29803-6105
Contact: Ms. Janet Crawford
Project Description: Hazardous Waste Contract

cc: WSRC00194 Report Date: August 30, 1995

Sample ID : MIC4-144

M = Method	Method-Description

Notes:
The qualifiers in this report are defined as follows:
J indicates the presence of an analyte at a concentration less than the reporting limit (RL) and greater than the detection limit (DL).
U indicates that the analyte was not detected at a concentration greater than the detection limit.
indicate that a quality control analyte recovery is outside of specified acceptance criteria.

This data report has been prepared and reviewed in accordance with General Engineering Laboratories standard operating procedures. Please direct any questions to your Project Manager, Edie Kent at (803) 769-7385.

Analytical Report Specialist

GENERAL ENGINEERING LABORATORIES

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Laboratory Certifications

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FL	E87156/87294	E87472/87458
NC	233	
SC	10120	10582
TN	02934	
VA	00151	
WI	99988779	

CERTIFICATE OF ANALYSIS

Client: Westinghouse Savannah River Co.
Bldg. 773-58A, Rm. 1
PO Box 616
Aiken, South Carolina 29803-6105
Contact: Ms. Janet Crawford
Project Description: Hazardous Waste Contract

cc: WSRC00194

Report Date: August 30, 1995

Sample ID	: MIC4-144
Lab ID	: 9508327-01
Matrix	: TCLP
Date Collected	: 10/01/94
Date Received	: 08/08/95
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result		Units	Method	Analyst	Date	Time	Batch
Metals Analysis									
Silver	<	0.500		MGL	EPA 6010A	JSS	08/28/95	1732	71750
Arsenic	<	0.500		MGL	EPA 6010A				
Barium	<	10.0		MGL	EPA 6010A				
Cadmium	<	0.100		MGL	EPA 6010A				
Chromium	<	0.500		MGL	EPA 6010A				
Nickel		0.195		MGL	EPA 6010A				
Lead	<	0.500		MGL	EPA 6010A				
Selenium	<	0.300		MGL	EPA 6010A				
Mercury	<	0.0200		MGL	EPA 7470	DVW	08/22/95	2115	71418
Radiological									
Total Uranium		1120	+/- 36.6	UGL	EPI A-023	PCW	08/28/95	1409	71291

The following prep procedures were performed:

ICP	EPA 3005	DVW	08/26/95	1520	71750
Mercury	EPA 7470	BBJ	08/21/95	2100	71418
TCLP Prep for Metals	EPA 1311	JL	08/17/95	2010	71040

GENERAL ENGINEERING LABORATORIES

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SC	10120	10582
TN	02934	
VA	00151	
WI	99988779	

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Bldg. 773-58A, Rm. 1
PO Box 616
Aiken, South Carolina 29803-6105
Contact: Ms. Janet Crawford
Project Description: Hazardous Waste Contract

cc: WSRC00194 Report Date: August 30, 1995

Sample ID : MIC4-144

Parameter	Qualifier	Result	Units	Method	Analyst	Date	Time	Batch

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TN	02934	
VA	00151	
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CERTIFICATE OF ANALYSIS

Client: Westinghouse Savannah River Co.
Bldg. 773-58A, Rm. 1
PO Box 616
Aiken, South Carolina 29803-6105
Contact: Ms. Janet Crawford
Project Description: Hazardous Waste Contract

cc: WSRC00194

Report Date: August 30, 1995

Sample ID	: MIC5-9A
Lab ID	: 9508327-02
Matrix	: TCLP
Date Collected	: 10/01/94
Date Received	: 08/08/95
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result		Units	Method	Analyst	Date	Time	Batch
Metals Analysis									
Silver	<	0.500		MGL	EPA 6010A	JSS	08/28/95	1734	71750
Arsenic	<	0.500		MGL	EPA 6010A				
Barium	<	10.0		MGL	EPA 6010A				
Cadmium	<	0.100		MGL	EPA 6010A				
Chromium	<	0.500		MGL	EPA 6010A				
Nickel		0.169		MGL	EPA 6010A				
Lead	<	0.500		MGL	EPA 6010A				
Selenium	<	0.300		MGL	EPA 6010A				
Mercury	<	0.0200		MGL	EPA 7470	DVW	08/22/95	2117	71418
Radiological									
Total Uranium		534	+/- 17.5	UGL	EPI A-023	PCW	08/28/95	1410	71291

The following prep procedures were performed:

ICP	EPA 3005	DVW	08/26/95	1520	71750
Mercury	EPA 7470	BBJ	08/21/95	2100	71418
TCLP Prep for Metals	EPA 1311	JL	08/17/95	2010	71040

GENERAL ENGINEERING LABORATORIES

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Laboratory Certifications

STATE	GEL	EPI
FL	E87156/87294	E87472/87458
NC	233	
SC	10120	10582
TN	02934	
VA	00151	
WI	99988779	

CERTIFICATE OF ANALYSIS

Client: Westinghouse Savannah River Co.
Bldg. 773-58A, Rm. 1
PO Box 616
Aiken, South Carolina 29803-6105
Contact: Ms. Janet Crawford
Project Description: Hazardous Waste Contract

cc: WSRC00194 Report Date: August 30, 1995

Sample ID : MIC5-9A

Parameter	Qualifier	Result	Units	Method	Analyst	Date	Time	Batch

This data report has been prepared and reviewed in accordance with General Engineering Laboratories standard operating procedures. Please direct any questions to your Project Manager, Edie Kent at (803) 769-7385.

Analytical Report Specialist

GENERAL ENGINEERING LABORATORIES

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Laboratory Certifications

STATE	GEL	EPI
FL	E87156/87294	E87472/87458
NC	233	
SC	10120	10582
TN	02934	
VA	00151	
WI	99988779	

CERTIFICATE OF ANALYSIS

Client: Westinghouse Savannah River Co.
Bldg. 773-58A, Rm. 1
PO Box 616
Aiken, South Carolina 29803-6105
Contact: Ms. Janet Crawford
Project Description: Hazardous Waste Contract

cc: WSRC00194

Report Date: August 30, 1995

Sample ID : MIC5-9A
Lab ID : 9508327-02
Matrix : TCLP
Date Collected : 10/01/94
Date Received : 08/08/95
Priority : Routine
Collector : Client

Parameter	Qualifier	Result		DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Metals Analysis												
Silver	J	0.0134		0.00780	0.500	MGL	1.0	JSS	08/28/95	1734	71750	1
Arsenic	U	-0.147		0.0421	0.500	MGL	1.0					
Barium	J	0.154		0.00220	10.0	MGL	1.0					
Cadmium	U	-0.00224		0.00330	0.100	MGL	1.0					
Chromium	J	0.0208		0.00420	0.500	MGL	1.0					
Nickel		0.169		0.00790	0.0500	MGL	1.0					
Lead	U	-0.00878		0.0364	0.500	MGL	1.0					
Selenium	U	-0.0285		0.0841	0.300	MGL	1.0					
Mercury	U	-0.000560		0.000148	0.0200	MGL	1.0	DVW	08/22/95	2117	71418	2
Radiological												
Total Uranium		534	+/- 17.5	2.28	2.28	UGL	1.0	PCW	08/28/95	1410	71291	3

The following prep procedures were performed:

ICP	DVW	08/26/95	1520	71750 4
Mercury	BBJ	08/21/95	2100	71418 2
TCLP Prep for Metals	JL	08/17/95	2010	71040 5

M = Method	Method-Description
M 1	EPA 6010A
M 2	EPA 7470
M 3	EPI A-023
M 4	EPA 3005
M 5	EPA 1311

GENERAL ENGINEERING LABORATORIES

Meeting today's needs with a vision for tomorrow.

Laboratory Certifications

STATE	GEL	EPI
FL	E87156/87294	E87472/87458
NC	233	
SC	10120	10582
TN	02934	
VA	00151	
WI	99988779	

CERTIFICATE OF ANALYSIS

Client: Westinghouse Savannah River Co.
Bldg. 773-58A, Rm. 1
PO Box 616
Aiken, South Carolina 29803-6105
Contact: Ms. Janet Crawford
Project Description: Hazardous Waste Contract

cc: WSRC00194 Report Date: August 30, 1995

Sample ID : MIC5-9A

M = Method	Method-Description

Notes:
The qualifiers in this report are defined as follows:
J indicates the presence of an analyte at a concentration less than the reporting limit (RL) and greater than the detection limit (DL).
U indicates that the analyte was not detected at a concentration greater than the detection limit.
* indicate that a quality control analyte recovery is outside of specified acceptance criteria.

This data report has been prepared and reviewed in accordance with General Engineering Laboratories standard operating procedures. Please direct any questions to your Project Manager, Edie Kent at (803) 769-7385.

Analytical Report Specialist

GENERAL ENGINEERING LABORATORIES

Meeting today's needs with a vision for tomorrow.

Laboratory Certifications

STATE	GEL	EPI
FL	E87156/87294	E87472/87458
NC	233	
SC	10120	10582
TN	02934	
VA	00151	
WI	99988779	

CERTIFICATE OF ANALYSIS

Client: Westinghouse Savannah River Co.
Bldg. 773-58A, Rm. 1
PO Box 616
Aiken, South Carolina 29803-6105
Contact: Ms. Janet Crawford
Project Description: Hazardous Waste Contract

cc: WSRC00194

Report Date: August 30, 1995

Sample ID : MIC5-42A
Lab ID : 9508327-05
Matrix : TCLP
Date Collected : 10/01/94
Date Received : 08/08/95
Priority : Routine
Collector : Client

Parameter	Qualifier	Result		DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Metals Analysis												
Silver	J	0.0106		0.00780	0.500	MGL	1.0	JSS	08/28/95	1739	71750	1
Arsenic	U	-0.147		0.0421	0.500	MGL	1.0					
Barium	J	0.157		0.00220	10.0	MGL	1.0					
Cadmium	U	-0.00276		0.00330	0.100	MGL	1.0					
Chromium	J	0.00866		0.00420	0.500	MGL	1.0					
Nickel		0.145		0.00790	0.0500	MGL	1.0					
Lead	U	-0.0117		0.0364	0.500	MGL	1.0					
Selenium	U	-0.0520		0.0841	0.300	MGL	1.0					
Mercury	U	-0.00195		0.000148	0.0200	MGL	1.0	DVW	08/22/95	2130	71418	2
Radiological												
Total Uranium		313	+/- 10.3	2.28	2.28	UGL	1.0	PCW	08/28/95	1415	71291	3

The following prep procedures were performed:

ICP	DVW	08/26/95	1520	71750 4
Mercury	BBJ	08/21/95	2100	71418 2
TCLP Prep for Metals	JL	08/17/95	2010	71040 5

M = Method	Method-Description
M 1	EPA 6010A
M 2	EPA 7470
M 3	EPI A-023
M 4	EPA 3005
M 5	EPA 1311

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CERTIFICATE OF ANALYSIS

Client: Westinghouse Savannah River Co.
Bldg. 773-58A, Rm. 1
PO Box 616
Aiken, South Carolina 29803-6105
Contact: Ms. Janet Crawford
Project Description: Hazardous Waste Contract

cc: WSRC00194 Report Date: August 30, 1995

Sample ID : MIC5-42A

M = Method	Method-Description

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cc: WSRC00194

Report Date: August 30, 1995

Sample ID	: MIC5-42A
Lab ID	: 9508327-05
Matrix	: TCLP
Date Collected	: 10/01/94
Date Received	: 08/08/95
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result		Units	Method	Analyst	Date	Time	Batch
Metals Analysis									
Silver	<	0.500		MGL	EPA 6010A	JSS	08/28/95	1739	71750
Arsenic	<	0.500		MGL	EPA 6010A				
Barium	<	10.0		MGL	EPA 6010A				
Cadmium	<	0.100		MGL	EPA 6010A				
Chromium	<	0.500		MGL	EPA 6010A				
Nickel		0.145		MGL	EPA 6010A				
Lead	<	0.500		MGL	EPA 6010A				
Selenium	<	0.300		MGL	EPA 6010A				
Mercury	<	0.0200		MGL	EPA 7470	DVW	08/22/95	2130	71418
Radiological									
Total Uranium		313	+/- 10.3	UGL	EPI A-023	PCW	08/28/95	1415	71291

The following prep procedures were performed:

ICP	EPA 3005	DVW	08/26/95	1520	71750
Mercury	EPA 7470	BBJ	08/21/95	2100	71418
TCLP Prep for Metals	EPA 1311	JL	08/17/95	2010	71040

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Contact: Ms. Janet Crawford
Project Description: Hazardous Waste Contract

cc: WSRC00194 Report Date: August 30, 1995

Sample ID : MIC5-42A

Parameter	Qualifier	Result	Units	Method	Analyst	Date	Time	Batch

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Contact: Ms. Janet Crawford

Project Description: Hazardous Waste Contract

cc: WSRC00194

Report Date: August 30, 1995

Sample ID	: MIC5-13A
Lab ID	: 9508327-03
Matrix	: TCLP
Date Collected	: 10/01/94
Date Received	: 08/08/95
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result		DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Metals Analysis												
Silver	J	0.0107		0.00780	0.500	MGL	1.0	JSS	08/28/95	1736	71750	1
Arsenic	U	-0.158		0.0421	0.500	MGL	1.0					
Barium	J	0.156		0.00220	10.0	MGL	1.0					
Cadmium	U	-0.00188		0.00330	0.100	MGL	1.0					
Chromium	J	0.0102		0.00420	0.500	MGL	1.0					
Nickel		0.164		0.00790	0.0500	MGL	1.0					
Lead	U	0.0129		0.0364	0.500	MGL	1.0					
Selenium	U	0.0435		0.0841	0.300	MGL	1.0					
Mercury	U	-0.000580		0.000148	0.0200	MGL	1.0	DVW	08/22/95	2120	71418	2
Radiological												
Total Uranium		354	+/- 11.6	2.28	2.28	UGL	1.0	PCW	08/28/95	1412	71291	3

The following prep procedures were performed:

ICP	DVW	08/26/95	1520	71750	4
Mercury	BBJ	08/21/95	2100	71418	2
TCLP Prep for Metals	JL	08/17/95	2010	71040	5

M = Method	Method-Description
M 1	EPA 6010A
M 2	EPA 7470
M 3	EPI A-023
M 4	EPA 3005
M 5	EPA 1311

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9508327-03

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Project Description: Hazardous Waste Contract

cc: WSRC00194

Report Date: August 30, 1995

Sample ID : MIC5-13A

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Report Date: August 30, 1995

Sample ID	: MIC5-13A
Lab ID	: 9508327-03
Matrix	: TCLP
Date Collected	: 10/01/94
Date Received	: 08/08/95
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result		Units	Method	Analyst	Date	Time	Batch
Metals Analysis									
Silver	<	0.500		MGL	EPA 6010A	JSS	08/28/95	1736	71750
Arsenic	<	0.500		MGL	EPA 6010A				
Barium	<	10.0		MGL	EPA 6010A				
Cadmium	<	0.100		MGL	EPA 6010A				
Chromium	<	0.500		MGL	EPA 6010A				
Nickel		0.164		MGL	EPA 6010A				
Lead	<	0.500		MGL	EPA 6010A				
Selenium	<	0.300		MGL	EPA 6010A				
Mercury	<	0.0200		MGL	EPA 7470	DVW	08/22/95	2120	71418
Radiological									
Total Uranium		354	+/- 11.6	UGL	EPI A-023	PCW	08/28/95	1412	71291

The following prep procedures were performed:

ICP	EPA 3005	DVW	08/26/95	1520	71750
Mercury	EPA 7470	BBJ	08/21/95	2100	71418
TCLP Prep for Metals	EPA 1311	JL	08/17/95	2010	71040

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Contact: Ms. Janet Crawford
Project Description: Hazardous Waste Contract

cc: WSRC00194 Report Date: August 30, 1995

Sample ID : MIC5-13A

Parameter	Qualifier	Result	Units	Method	Analyst	Date	Time	Batch

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Contact: Ms. Janet Crawford
Project Description: Hazardous Waste Contract

cc: WSRC00194

Report Date: August 30, 1995

Sample ID	: MIC5-21A
Lab ID	: 9508327-04
Matrix	: TCLP
Date Collected	: 10/01/94
Date Received	: 08/08/95
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result		DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Metals Analysis												
Silver	J	0.0102		0.00780	0.500	MGL	1.0	JSS	08/28/95	1737	71750	1
Arsenic	U	-0.187		0.0421	0.500	MGL	1.0					
Barium	J	0.145		0.00220	10.0	MGL	1.0					
Cadmium	U	-0.00164		0.00330	0.100	MGL	1.0					
Chromium	J	0.00656		0.00420	0.500	MGL	1.0					
Nickel		0.135		0.00790	0.0500	MGL	1.0					
Lead	U	0.0162		0.0364	0.500	MGL	1.0					
Selenium	U	-0.0233		0.0841	0.300	MGL	1.0					
Mercury	U	-0.00231		0.000148	0.0200	MGL	1.0	DVW	08/22/95	2127	71418	2
Radiological												
Total Uranium		267	+/- 8.76	2.28	2.28	UGL	1.0	PCW	08/28/95	1413	71291	3

The following prep procedures were performed:

ICP	DVW	08/26/95	1520	71750 4
Mercury	BBJ	08/21/95	2100	71418 2
TCLP Prep for Metals	JL	08/17/95	2010	71040 5

M = Method	Method-Description
M 1	EPA 6010A
M 2	EPA 7470
M 3	EPI A-023
M 4	EPA 3005
M 5	EPA 1311

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cc: WSRC00194 Report Date: August 30, 1995

Sample ID : MIC5-21A

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PO Box 616
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Contact: Ms. Janet Crawford
Project Description: Hazardous Waste Contract

cc: WSRC00194

Report Date: August 30, 1995

Sample ID	: MIC5-21A
Lab ID	: 9508327-04
Matrix	: TCLP
Date Collected	: 10/01/94
Date Received	: 08/08/95
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result		Units	Method	Analyst	Date	Time	Batch
Metals Analysis									
Silver	<	0.500		MGL	EPA 6010A	JSS	08/28/95	1737	71750
Arsenic	<	0.500		MGL	EPA 6010A				
Barium	<	10.0		MGL	EPA 6010A				
Cadmium	<	0.100		MGL	EPA 6010A				
Chromium	<	0.500		MGL	EPA 6010A				
Nickel		0.135		MGL	EPA 6010A				
Lead	<	0.500		MGL	EPA 6010A				
Selenium	<	0.300		MGL	EPA 6010A				
Mercury	<	0.0200		MGL	EPA 7470	DVW	08/22/95	2127	71418
Radiological									
Total Uranium		267	+/- 8.76	UGL	EPI A-023	PCW	08/28/95	1413	71291

The following prep procedures were performed:

ICP	EPA 3005	DVW	08/26/95	1520	71750
Mercury	EPA 7470	BBJ	08/21/95	2100	71418
TCLP Prep for Metals	EPA 1311	JL	08/17/95	2010	71040

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Sample ID : MIC5-21A

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PO Box 616
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Project Description: Hazardous Waste Contract

cc: WSRC00194

Report Date: September 14, 1995

Sample ID : MIC4-149C EXTRACT 9

Parameter	Qualifier	Result	Units	Method	Analyst	Date	Time	Batch

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Contact: Ms. Janet Crawford
Project Description: Hazardous Waste Contract

cc: WSRC00194 Report Date: September 14, 1995

Sample ID : MIC4-149C EXTRACT 9
Lab ID : 9508477-19
Matrix : Extract
Date Collected : 08/08/95
Date Received : 08/08/95
Priority : Routine
Collector : Client

Parameter	Qualifier	Result		DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Metals Analysis												
Silver	J	0.0153		0.00780	0.500	MGL	1.0	NRM	09/13/95	1545	72356	1
Arsenic	U	-0.0191		0.0421	0.500	MGL	1.0					
Barium	J	0.0700		0.00220	10.0	MGL	1.0					
Cadmium	U	-0.000380		0.00330	0.100	MGL	1.0					
Chromium	J	0.0730		0.00420	0.500	MGL	1.0					
Nickel		0.433		0.00790	0.0500	MGL	1.0					
Lead	U	0.00178		0.0364	0.500	MGL	1.0					
Selenium	U	0.00635		0.0841	0.300	MGL	1.0					
Mercury	U	-0.000380		0.000148	0.0200	MGL	1.0	BBJ	09/13/95	1251	72357	2
Radiological												
Total Uranium		3050	+/- 97.8	4.57	4.57	UGL	1.0	PCW	09/13/95	1005	71661	3

The following prep procedures were performed:

ICP	DVW	09/11/95	2120	72356 4
Mercury	BBJ	09/12/95	1500	72357 2

M = Method	Method-Description
M 1	EPA 6010A
M 2	EPA 7470
M 3	EPI A-023
M 4	EPA 3005

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cc: WSRC00194

Report Date: September 14, 1995

Sample ID : MIC4-149C EXTRACT 9

M = Method	Method-Description

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cc: WSRC00194 Report Date: September 14, 1995

Sample ID	: MIC4-149C
Lab ID	: 9508477-01
Matrix	: Misc.
Date Collected	: 08/08/95
Date Received	: 08/08/95
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
General Chemistry											
Cyanide, Reactive	U	-8.63	0.624	250	MGKG	1.0	JBG	09/01/95	1406	72036	1
Sulfide, Reactive	U	-0.00998	0.250	500	MGKG	1.0	MCM	09/12/95	1447	72037	2

M = Method	Method-Description
M 1	SW-846 Chapter 7-7.3.3
M 2	SW-846 Chapter 7-7.3.4

Notes:
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cc: WSRC00194

Report Date: September 14, 1995

Sample ID	: MIC4-149C
Lab ID	: 9508477-01
Matrix	: Misc.
Date Collected	: 08/08/95
Date Received	: 08/08/95
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	Units	Method	Analyst	Date	Time	Batch
General Chemistry								
Cyanide, Reactive	<	250	MGKG	SW-846 Chapter 7-7.3.3	JBG	09/01/95	1406	72036
Sulfide, Reactive	<	500	MGKG	SW-846 Chapter 7-7.3.4	MCM	09/12/95	1447	72037

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Robert L. Sullens

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Contact: Ms. Janet Crawford
Project Description: Hazardous Waste Contract

cc: WSRC00194 Report Date: September 14, 1995

Sample ID : MIC4-149C
Lab ID : 9508477-07
Matrix : TCLP
Date Collected : 08/08/95
Date Received : 08/08/95
Priority : Routine
Collector : Client

Parameter	Qualifier	Result	Units	Method	Analyst	Date	Time	Batch
Volatile Organics								
6 TCLP,Volatiles (Prep & Analysis) - 11 items								
1,1-Dichloroethylene	<	20.0	MGL	EPA 8240	JAC	08/28/95	1728	71780
1,2-Dichloroethane	<	0.0500	MGL	EPA 8240				
1,4-Dichlorobenzene	<	0.750	MGL	EPA 8240				
2-Butanone	<	20.0	MGL	EPA 8240				
Benzene	<	0.0500	MGL	EPA 8240				
Carbon Tetrachloride	<	0.0500	MGL	EPA 8240				
Chlorobenzene	<	10.0	MGL	EPA 8240				
Chloroform	<	0.600	MGL	EPA 8240				
Tetrachloroethylene	<	0.0700	MGL	EPA 8240				
Trichloroethylene	<	0.0500	MGL	EPA 8240				
Vinyl chloride	<	0.0200	MGL	EPA 8240				
Extractable Organics								
2 TCLP, BNA Compounds (Prep & Analysis) - 11 items								
2,4,5-Trichlorophenol	<	40.0	MGL	EPA 8270	TNF	09/02/95	1553	72025
2,4,6-Trichlorophenol	<	0.200	MGL	EPA 8270				
2,4-Dinitrotoluene	<	0.130	MGL	EPA 8270				
Hexachlorobenzene	<	0.130	MGL	EPA 8270				
Hexachlorobutadiene	<	0.100	MGL	EPA 8270				
Hexachloroethane	<	0.300	MGL	EPA 8270				
Nitrobenzene	<	0.200	MGL	EPA 8270				
Pentachlorophenol	<	10.0	MGL	EPA 8270				
Pyridine	<	0.500	MGL	EPA 8270				
m,p-Cresol	<	20.0	MGL	EPA 8270				
o-Cresol	<	20.0	MGL	EPA 8270				
4 TCLP, Herbicides - 2 items								
2,4,5-TP	<	0.100	MGL	EPA 8150	JLS	09/13/95	1258	72063
2,4-D	<	1.00	MGL	EPA 8150				
5 TCLP, Pesticides/PCBs - 6 items								

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CERTIFICATE OF ANALYSIS

Client: Westinghouse Savannah River Co.
Bldg. 773-58A, Rm. 1
PO Box 616
Aiken, South Carolina 29803-6105
Contact: Ms. Janet Crawford
Project Description: Hazardous Waste Contract

cc: WSRC00194 Report Date: September 14, 1995

Sample ID : MIC4-149C

Parameter	Qualifier	Result	Units	Method	Analyst	Date	Time	Batch
Chlordane	<	0.0125	MGL	EPA 8080	JEB	09/07/95	0655	72027
Endrin	<	0.00300	MGL	EPA 8080	JEB	09/07/95	0655	72027
Heptachlor & Hep. Epoxide	<	0.00250	MGL	EPA 8080				
Methoxychlor	<	0.0250	MGL	EPA 8080				
Toxaphene	<	0.0500	MGL	EPA 8080				
gamma-BHC	<	0.0400	MGL	EPA 8080				
Metals Analysis								
Silver	<	0.500	MGL	EPA 6010A	NRM	09/13/95	1503	72356
Arsenic	<	0.500	MGL	EPA 6010A				
Barium	<	10.0	MGL	EPA 6010A				
Cadmium	<	0.100	MGL	EPA 6010A				
Chromium	<	0.500	MGL	EPA 6010A				
Lead	<	0.500	MGL	EPA 6010A				
Selenium	<	0.300	MGL	EPA 6010A				
Mercury	<	0.0200	MGL	EPA 7470	BBJ	09/13/95	1222	72357

The following prep procedures were performed:

GC/MS Base/Neutral Compounds	EPA 3500/3520	SRP	09/01/95	1445	72025
Herbicides	EPA 8150	DDT	09/06/95	2300	72063
Pesticides	EPA 3500/3520	CPU	09/01/95	1945	72027
ICP	EPA 3005	DVW	09/11/95	2120	72356
Mercury	EPA 7470	BBJ	09/12/95	1500	72357
TCLP Extraction - Semivolatiles	EPA 1311	JL	08/25/95	2135	71637
TCLP Extraction - Volatiles	EPA 1311	JL	08/25/95	2135	71631
TCLP Prep for Metals	EPA 1311	JL	08/25/95	2135	71639

Comments:
This sample was extracted beyond recommended holding time for Volatiles Organics and Herbicides .

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cc: WSRC00194 Report Date: September 14, 1995

Sample ID : MIC4-149C

Parameter	Qualifier	Result	Units	Method	Analyst	Date	Time	Batch

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Client: Westinghouse Savannah River Co.
Bldg. 773-58A, Rm. 1
PO Box 616
Aiken, South Carolina 29803-6105
Contact: Ms. Janet Crawford
Project Description: Hazardous Waste Contract

cc: WSRC00194 Report Date: September 14, 1995

Sample ID	: MIC4-149C
Lab ID	: 9508477-07
Matrix	: TCLP
Date Collected	: 08/08/95
Date Received	: 08/08/95
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Volatile Organics											
6 TCLP,Volatiles (Prep & Analysis) - 11 items											
1,1-Dichloroethylene	U	0.00	10.0	20.0	MGL	10.	JAC	08/28/95	1728	71780	1
1,2-Dichloroethane	U	0.00	0.0100	0.0500	MGL	10.					
1,4-Dichlorobenzene	U	0.00	0.0100	0.750	MGL	10.					
2-Butanone	U	0.00	0.0500	20.0	MGL	10.					
Benzene	U	0.00	0.0100	0.0500	MGL	10.					
Carbon Tetrachloride	U	0.00	0.0100	0.0500	MGL	10.					
Chlorobenzene	U	0.00	0.0100	10.0	MGL	10.					
Chloroform	U	0.00	0.0100	0.600	MGL	10.					
Tetrachloroethylene	U	0.00	0.0100	0.0700	MGL	10.					
Trichloroethylene	U	0.00	0.0100	0.0500	MGL	10.					
Vinyl chloride	U	0.00	0.0100	0.0200	MGL	10.					
Extractable Organics											
2 TCLP, BNA Compounds (Prep & Analysis) - 11 items											
2,4,5-Trichlorophenol	U	0.00	0.0500	40.0	MGL	10.	TNF	09/02/95	1553	72025	2
2,4,6-Trichlorophenol	U	0.00	0.0500	0.200	MGL	10.					
2,4-Dinitrotoluene	U	0.00	0.0500	0.130	MGL	10.					
Hexachlorobenzene	U	0.00	0.0500	0.130	MGL	10.					
Hexachlorobutadiene	U	0.00	0.0500	0.100	MGL	10.					
Hexachloroethane	U	0.00	0.0500	0.300	MGL	10.					
Nitrobenzene	U	0.00	0.0500	0.200	MGL	10.					
Pentachlorophenol	U	0.00	0.0500	10.0	MGL	10.					
Pyridine	U	0.00	0.0500	0.500	MGL	10.					
m,p-Cresol	U	0.00	0.0500	20.0	MGL	10.					
o-Cresol	U	0.00	0.0500	20.0	MGL	10.					
4 TCLP, Herbicides - 2 items											
2,4,5-TP	U	0.00	0.00250	0.100	MGL	1.0	JLS	09/13/95	1258	72063	3
2,4-D	U	0.00	0.00500	1.00	MGL	1.0					
5 TCLP, Pesticides/PCBs - 6 items											

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Contact: Ms. Janet Crawford
Project Description: Hazardous Waste Contract

cc: WSRC00194 Report Date: September 14, 1995

Sample ID : MIC4-149C

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Chlordane	U	0.00	0.00625	0.0125	MGL	1.0	JEB	09/07/95	0655	72027	4
Endrin	U	0.00	0.00125	0.00300	MGL	1.0	JEB	09/07/95	0655	72027	4
Heptachlor & Hep. Epoxide	U	0.00	0.00125	0.00250	MGL	1.0					
Methoxychlor	U	0.00	0.0125	0.0250	MGL	1.0					
Toxaphene	U	0.00	0.0250	0.0500	MGL	1.0					
gamma-BHC	U	0.00	0.000625	0.0400	MGL	1.0					
Metals Analysis											
Silver	J	0.0162	0.00780	0.500	MGL	1.0	NRM	09/13/95	1503	72356	5
Arsenic	U	-0.0836	0.0421	0.500	MGL	1.0					
Barium	J	0.262	0.00220	10.0	MGL	1.0					
Cadmium	U	-0.00152	0.00330	0.100	MGL	1.0					
Chromium	J	0.0406	0.00420	0.500	MGL	1.0					
Lead	U	0.0234	0.0364	0.500	MGL	1.0					
Selenium	U	-0.00799	0.0841	0.300	MGL	1.0					
Mercury	U	0.0000400	0.000148	0.0200	MGL	1.0	BBJ	09/13/95	1222	72357	6

The following prep procedures were performed:

GC/MS Base/Neutral Compounds	SRP	09/01/95	1445	72025	7
Herbicides	DDT	09/06/95	2300	72063	3
Pesticides	CPU	09/01/95	1945	72027	7
ICP	DVW	09/11/95	2120	72356	8
Mercury	BBJ	09/12/95	1500	72357	6
TCLP Extraction - Semivolatiles	JL	08/25/95	2135	71637	9
TCLP Extraction - Volatiles	JL	08/25/95	2135	71631	9
TCLP Prep for Metals	JL	08/25/95	2135	71639	9

Comments:
This sample was extracted beyond recommended holding time for Volatiles Organics and Herbicides .

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CERTIFICATE OF ANALYSIS

Client: Westinghouse Savannah River Co.
Bldg. 773-58A, Rm. 1
PO Box 616
Aiken, South Carolina 29803-6105
Contact: Ms. Janet Crawford
Project Description: Hazardous Waste Contract

cc: WSRC00194 Report Date: September 14, 1995

Sample ID : MIC4-149C

Surrogate Recovery	Test	Percent%	Acceptable Limits
2,4,6-Tribromophenol	TCLP SEMIVOA	92.3	(10.0 - 123.)
2-Fluorobiphenyl	TCLP SEMIVOA	64.6	(51.0 - 114.)
2-Fluorophenol	TCLP SEMIVOA	58.0	(21.0 - 100.)
Nitrobenzene-d5	TCLP SEMIVOA	67.9	(35.0 - 114.)
Phenol-d6	TCLP SEMIVOA	46.2	(10.0 - 80.9)
p-Terphenyl-d14	TCLP SEMIVOA	69.6	(33.0 - 141.)
4-(2,4-Dichlorophenoxy)Butyric	TCLP HERBICIDES	75.0	(50.0 - 150.)
4CMX	TCLP PESTICIDES	81.4	(35.9 - 114.)
Dibutylchlorendate	TCLP PESTICIDES	85.4	(46.1 - 158.)
1,2-Dichloroethane-d4	TCLP VOA	100.	(81.0 - 114.)
Bromofluorobenzene	TCLP VOA	96.4	(86.6 - 109.)
Toluene-d8	TCLP VOA	96.4	(89.6 - 107.)

M = Method	Method-Description
M 1	EPA 8240
M 2	EPA 8270
M 3	EPA 8150
M 4	EPA 8080
M 5	EPA 6010A
M 6	EPA 7470
M 7	EPA 3500/3520
M 8	EPA 3005
M 9	EPA 1311

Notes:
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J indicates the presence of an analyte at a concentration less than the reporting limit (RL) and greater than the detection limit (DL).
U indicates that the analyte was not detected at a concentration greater than the detection limit.
* indicate that a quality control analyte recovery is outside of specified acceptance criteria.

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cc: WSRC00194 Report Date: September 14, 1995

Sample ID : MIC4-149C

M = Method	Method-Description

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Analytical Report Specialist

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CERTIFICATE OF ANALYSIS

Client: Westinghouse Savannah River Co.
Bldg. 773-58A, Rm. 1
PO Box 616
Aiken, South Carolina 29803-6105
Contact: Ms. Janet Crawford
Project Description: Hazardous Waste Contract

cc: WSRC00194

Report Date: September 14, 1995

Sample ID : MIC4-149C EXTRACT 1
Lab ID : 9508477-11
Matrix : Extract
Date Collected : 08/08/95
Date Received : 08/08/95
Priority : Routine
Collector : Client

Parameter	Qualifier	Result		Units	Method	Analyst	Date	Time	Batch
Metals Analysis									
Silver	<	0.500		MGL	EPA 6010A	NRM	09/13/95	1508	72356
Arsenic	<	0.500		MGL	EPA 6010A				
Barium	<	10.0		MGL	EPA 6010A				
Cadmium	<	0.100		MGL	EPA 6010A				
Chromium	<	0.500		MGL	EPA 6010A				
Nickel		0.537		MGL	EPA 6010A				
Lead	<	0.500		MGL	EPA 6010A				
Selenium	<	0.300		MGL	EPA 6010A				
Mercury	<	0.0200		MGL	EPA 7470	BBJ	09/13/95	1226	72357
Radiological									
Total Uranium		4360	+/- 140	UGL	EPI A-023	PCW	09/13/95	0952	71661

The following prep procedures were performed:

ICP	EPA 3005	DVW	09/11/95	2120	72356
Mercury	EPA 7470	BBJ	09/12/95	1500	72357

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PO Box 616
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Contact: Ms. Janet Crawford
Project Description: Hazardous Waste Contract

cc: WSRC00194 Report Date: September 14, 1995

Sample ID : MIC4-149C EXTRACT 1

Parameter	Qualifier	Result	Units	Method	Analyst	Date	Time	Batch

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cc: WSRC00194

Report Date: September 14, 1995

Sample ID : MIC4-149C EXTRACT 1
Lab ID : 9508477-11
Matrix : Extract
Date Collected : 08/08/95
Date Received : 08/08/95
Priority : Routine
Collector : Client

Parameter	Qualifier	Result		DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Metals Analysis												
Silver	J	0.0146		0.00780	0.500	MGL	1.0	NRM	09/13/95	1508	72356	1
Arsenic	U	-0.0383		0.0421	0.500	MGL	1.0					
Barium	J	0.0382		0.00220	10.0	MGL	1.0					
Cadmium	U	-0.00113		0.00330	0.100	MGL	1.0					
Chromium	J	0.0778		0.00420	0.500	MGL	1.0					
Nickel		0.537		0.00790	0.0500	MGL	1.0					
Lead	U	0.0122		0.0364	0.500	MGL	1.0					
Selenium	U	-0.0467		0.0841	0.300	MGL	1.0					
Mercury	U	-0.000300		0.000148	0.0200	MGL	1.0	BBJ	09/13/95	1226	72357	2
Radiological												
Total Uranium		4360	+/- 140	4.57	4.57	UGL	1.0	PCW	09/13/95	0952	71661	3

The following prep procedures were performed:

ICP	DVW	09/11/95	2120	72356 4
Mercury	BBJ	09/12/95	1500	72357 2

M = Method	Method-Description
M 1	EPA 6010A
M 2	EPA 7470
M 3	EPI A-023
M 4	EPA 3005

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Project Description: Hazardous Waste Contract

cc: WSRC00194

Report Date: September 14, 1995

Sample ID : MIC4-149C EXTRACT 1

M = Method	Method-Description

Notes:
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Robert H. Sullivan

Analytical Report Specialist

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TN	02934	
VA	00151	
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Client: Westinghouse Savannah River Co.
Bldg. 773-58A, Rm. 1
PO Box 616
Aiken, South Carolina 29803-6105
Contact: Ms. Janet Crawford
Project Description: Hazardous Waste Contract

cc: WSRC00194

Report Date: September 14, 1995

Sample ID	: MIC4-149C EXTRACT 2
Lab ID	: 9508477-12
Matrix	: Extract
Date Collected	: 08/08/95
Date Received	: 08/08/95
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result		Units	Method	Analyst	Date	Time	Batch
Metals Analysis									
Silver	<	0.500		MGL	EPA 6010A	NRM	09/13/95	1510	72356
Arsenic	<	0.500		MGL	EPA 6010A				
Barium	<	10.0		MGL	EPA 6010A				
Cadmium	<	0.100		MGL	EPA 6010A				
Chromium	<	0.500		MGL	EPA 6010A				
Nickel		0.636		MGL	EPA 6010A				
Lead	<	0.500		MGL	EPA 6010A				
Selenium	<	0.300		MGL	EPA 6010A				
Mercury	<	0.0200		MGL	EPA 7470	BBJ	09/13/95	1229	72357
Radiological									
Total Uranium		3560	+/- 114	UGL	EPI A-023	PCW	09/13/95	0955	71661

The following prep procedures were performed:

ICP	EPA 3005	DVW	09/11/95	2120	72356
Mercury	EPA 7470	BBJ	09/12/95	1500	72357

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Client: Westinghouse Savannah River Co.
Bldg. 773-58A, Rm. 1
PO Box 616
Aiken, South Carolina 29803-6105
Contact: Ms. Janet Crawford
Project Description: Hazardous Waste Contract

cc: WSRC00194 Report Date: September 14, 1995

Sample ID : MIC4-149C EXTRACT 2

Parameter	Qualifier	Result	Units	Method	Analyst	Date	Time	Batch

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Project Description: Hazardous Waste Contract

cc: WSRC00194

Report Date: September 14, 1995

Sample ID : MIC4-149C EXTRACT 2
Lab ID : 9508477-12
Matrix : Extract
Date Collected : 08/08/95
Date Received : 08/08/95
Priority : Routine
Collector : Client

Parameter	Qualifier	Result		DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Metals Analysis												
Silver	J	0.0163		0.00780	0.500	MGL	1.0	NRM	09/13/95	1510	72356	1
Arsenic	U	-0.0248		0.0421	0.500	MGL	1.0					
Barium	J	0.0632		0.00220	10.0	MGL	1.0					
Cadmium	U	-0.00244		0.00330	0.100	MGL	1.0					
Chromium	J	0.0727		0.00420	0.500	MGL	1.0					
Nickel		0.636		0.00790	0.0500	MGL	1.0					
Lead	U	0.0344		0.0364	0.500	MGL	1.0					
Selenium	U	0.0278		0.0841	0.300	MGL	1.0					
Mercury	U	-0.000520		0.000148	0.0200	MGL	1.0	BBJ	09/13/95	1229	72357	2
Radiological												
Total Uranium		3560	+/- 114	4.57	4.57	UGL	1.0	PCW	09/13/95	0955	71661	3

The following prep procedures were performed:

ICP	DVW	09/11/95	2120	72356 4
Mercury	BBJ	09/12/95	1500	72357 2

M = Method	Method-Description
M 1	EPA 6010A
M 2	EPA 7470
M 3	EPI A-023
M 4	EPA 3005

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SC	10120	10582
TN	02934	
VA	00151	
WI	99988779	

CERTIFICATE OF ANALYSIS

Client: Westinghouse Savannah River Co.
Bldg. 773-58A, Rm. 1
PO Box 616
Aiken, South Carolina 29803-6105

Contact: Ms. Janet Crawford

Project Description: Hazardous Waste Contract

cc: WSRC00194 Report Date: September 14, 1995 Page 2 of 2

Sample ID : MIC4-149C EXTRACT 2

M = Method	Method-Description

Notes:
The qualifiers in this report are defined as follows:
J indicates the presence of an analyte at a concentration less than the reporting limit (RL) and greater than the detection limit (DL).
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* indicate that a quality control analyte recovery is outside of specified acceptance criteria.

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Robert S. Pulo

Analytical Report Specialist

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CERTIFICATE OF ANALYSIS

Client: Westinghouse Savannah River Co.
Bldg. 773-58A, Rm. 1
PO Box 616
Aiken, South Carolina 29803-6105
Contact: Ms. Janet Crawford
Project Description: Hazardous Waste Contract

cc: WSRC00194

Report Date: September 14, 1995

Sample ID	: MIC4-149C EXTRACT 3
Lab ID	: 9508477-13
Matrix	: Extract
Date Collected	: 08/08/95
Date Received	: 08/08/95
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result		Units	Method	Analyst	Date	Time	Batch
Metals Analysis									
Silver	<	0.500		MGL	EPA 6010A	NRM	09/13/95	1512	72356
Arsenic	<	0.500		MGL	EPA 6010A				
Barium	<	10.0		MGL	EPA 6010A				
Cadmium	<	0.100		MGL	EPA 6010A				
Chromium	<	0.500		MGL	EPA 6010A				
Nickel		0.604		MGL	EPA 6010A				
Lead	<	0.500		MGL	EPA 6010A				
Selenium	<	0.300		MGL	EPA 6010A				
Mercury	<	0.0200		MGL	EPA 7470	BBJ	09/13/95	1231	72357
Radiological									
Total Uranium		3170	+/- 102	UGL	EPI A-023	PCW	09/13/95	0957	71661

The following prep procedures were performed:

ICP	EPA 3005	DVW	09/11/95	2120 72356
Mercury	EPA 7470	BBJ	09/12/95	1500 72357

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CERTIFICATE OF ANALYSIS

Client: Westinghouse Savannah River Co.
Bldg. 773-58A, Rm. 1
PO Box 616
Aiken, South Carolina 29803-6105
Contact: Ms. Janet Crawford
Project Description: Hazardous Waste Contract

cc: WSRC00194 Report Date: September 14, 1995

Sample ID : MIC4-149C EXTRACT 3

Parameter	Qualifier	Result	Units	Method	Analyst	Date	Time	Batch

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Bldg. 773-58A, Rm. 1
PO Box 616
Aiken, South Carolina 29803-6105
Contact: Ms. Janet Crawford
Project Description: Hazardous Waste Contract

cc: WSRC00194

Report Date: September 14, 1995

Sample ID : MIC4-149C EXTRACT 3
Lab ID : 9508477-13
Matrix : Extract
Date Collected : 08/08/95
Date Received : 08/08/95
Priority : Routine
Collector : Client

Parameter	Qualifier	Result		DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Metals Analysis												
Silver	J	0.0148		0.00780	0.500	MGL	1.0	NRM	09/13/95	1512	72356	1
Arsenic	U	-0.00809		0.0421	0.500	MGL	1.0					
Barium	J	0.0566		0.00220	10.0	MGL	1.0					
Cadmium	U	-0.000740		0.00330	0.100	MGL	1.0					
Chromium	J	0.0870		0.00420	0.500	MGL	1.0					
Nickel		0.604		0.00790	0.0500	MGL	1.0					
Lead	U	0.0217		0.0364	0.500	MGL	1.0					
Selenium	U	-0.0141		0.0841	0.300	MGL	1.0					
Mercury	U	-0.000460		0.000148	0.0200	MGL	1.0	BBJ	09/13/95	1231	72357	2
Radiological												
Total Uranium		3170	+/- 102	4.57	4.57	UGL	1.0	PCW	09/13/95	0957	71661	3

The following prep procedures were performed:

ICP	DVW	09/11/95	2120	72356	4
Mercury	BBJ	09/12/95	1500	72357	2

M = Method	Method-Description
M 1	EPA 6010A
M 2	EPA 7470
M 3	EPI A-023
M 4	EPA 3005

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Bldg. 773-58A, Rm. 1
PO Box 616
Aiken, South Carolina 29803-6105
Contact: Ms. Janet Crawford
Project Description: Hazardous Waste Contract

cc: WSRC00194 Report Date: September 14, 1995

Sample ID : MIC4-149C EXTRACT 3

M = Method	Method-Description

Notes:
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indicate that a quality control analyte recovery is outside of specified acceptance criteria.

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Robert A. Fuller
Analytical Report Specialist

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Bldg. 773-58A, Rm. 1
PO Box 616
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Contact: Ms. Janet Crawford
Project Description: Hazardous Waste Contract

cc: WSRC00194

Report Date: September 14, 1995

Sample ID	: MIC4-149C EXTRACT 4
Lab ID	: 9508477-14
Matrix	: Extract
Date Collected	: 08/08/95
Date Received	: 08/08/95
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result		Units	Method	Analyst	Date	Time	Batch
Metals Analysis									
Silver	<	0.500		MGL	EPA 6010A	NRM	09/13/95	1514	72356
Arsenic	<	0.500		MGL	EPA 6010A				
Barium	<	10.0		MGL	EPA 6010A				
Cadmium	<	0.100		MGL	EPA 6010A				
Chromium	<	0.500		MGL	EPA 6010A				
Nickel		0.516		MGL	EPA 6010A				
Lead	<	0.500		MGL	EPA 6010A				
Selenium	<	0.300		MGL	EPA 6010A				
Mercury	<	0.0200		MGL	EPA 7470	BBJ	09/13/95	1234	72357
Radiological									
Total Uranium		3130	+/- 100	UGL	EPI A-023	PCW	09/13/95	0958	71661

The following prep procedures were performed:

ICP	EPA 3005	DVW	09/11/95	2120	72356
Mercury	EPA 7470	BBJ	09/12/95	1500	72357

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TN	02934	
VA	00151	
WI	99988779	

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Client: Westinghouse Savannah River Co.
Bldg. 773-58A, Rm. 1
PO Box 616
Aiken, South Carolina 29803-6105
Contact: Ms. Janet Crawford
Project Description: Hazardous Waste Contract

cc: WSRC00194 Report Date: September 14, 1995

Sample ID : MIC4-149C EXTRACT 4

Parameter	Qualifier	Result	Units	Method	Analyst	Date	Time	Batch

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SC	10120	10582
TN	02934	
VA	00151	
WI	999887779	

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Client: Westinghouse Savannah River Co.
Bldg. 773-58A, Rm. 1
PO Box 616
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Contact: Ms. Janet Crawford
Project Description: Hazardous Waste Contract

cc: WSRC00194

Report Date: September 14, 1995

Sample ID	: MIC4-149C EXTRACT 4
Lab ID	: 9508477-14
Matrix	: Extract
Date Collected	: 08/08/95
Date Received	: 08/08/95
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result		DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Metals Analysis												
Silver	J	0.0155		0.00780	0.500	MGL	1.0	NRM	09/13/95	1514	72356	1
Arsenic	U	-0.00169		0.0421	0.500	MGL	1.0					
Barium	J	0.0433		0.00220	10.0	MGL	1.0					
Cadmium	U	-0.00179		0.00330	0.100	MGL	1.0					
Chromium	J	0.0800		0.00420	0.500	MGL	1.0					
Nickel		0.516		0.00790	0.0500	MGL	1.0					
Lead	U	0.0318		0.0364	0.500	MGL	1.0					
Selenium	U	0.000230		0.0841	0.300	MGL	1.0					
Mercury	U	-0.000410		0.000148	0.0200	MGL	1.0	BBJ	09/13/95	1234	72357	2
Radiological												
Total Uranium		3130	+/- 100	4.57	4.57	UGL	1.0	PCW	09/13/95	0958	71661	3

The following prep procedures were performed:

ICP	DVW	09/11/95	2120	72356	4
Mercury	BBJ	09/12/95	1500	72357	2

M = Method	Method-Description
M 1	EPA 6010A
M 2	EPA 7470
M 3	EPI A-023
M 4	EPA 3005

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VA	00151	
WI	99988779	

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PO Box 616
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Contact: Ms. Janet Crawford
Project Description: Hazardous Waste Contract

cc: WSRC00194 Report Date: September 14, 1995

Sample ID : MIC4-149C EXTRACT 4

M = Method	Method-Description

Notes:
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Contact: Ms. Janet Crawford
Project Description: Hazardous Waste Contract

cc: WSRC00194

Report Date: September 14, 1995

Sample ID	: MIC4-149C EXTRACT 5
Lab ID	: 9508477-15
Matrix	: Extract
Date Collected	: 08/08/95
Date Received	: 08/08/95
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result		Units	Method	Analyst	Date	Time	Batch
Metals Analysis									
Silver	<	0.500		MGL	EPA 6010A	NRM	09/13/95	1516	72356
Arsenic	<	0.500		MGL	EPA 6010A				
Barium	<	10.0		MGL	EPA 6010A				
Cadmium	<	0.100		MGL	EPA 6010A				
Chromium	<	0.500		MGL	EPA 6010A				
Nickel		0.555		MGL	EPA 6010A				
Lead	<	0.500		MGL	EPA 6010A				
Selenium	<	0.300		MGL	EPA 6010A				
Mercury	<	0.0200		MGL	EPA 7470	BBJ	09/13/95	1236	72357
Radiological									
Total Uranium		3240	+/- 104	UGL	EPI A-023	PCW	09/13/95	1000	71661

The following prep procedures were performed:

ICP	EPA 3005	DVW	09/11/95	2120	72356
Mercury	EPA 7470	BBJ	09/12/95	1500	72357

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SC	10120	10582
TN	02934	
VA	00151	
WI	99988779	

CERTIFICATE OF ANALYSIS

Client: Westinghouse Savannah River Co.
Bldg. 773-58A, Rm. 1
PO Box 616
Aiken, South Carolina 29803-6105
Contact: Ms. Janet Crawford
Project Description: Hazardous Waste Contract

cc: WSRC00194

Report Date: September 14, 1995

Sample ID : MIC4-149C EXTRACT 5

Parameter	Qualifier	Result	Units	Method	Analyst	Date	Time	Batch

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PO Box 616
Aiken, South Carolina 29803-6105
Contact: Ms. Janet Crawford
Project Description: Hazardous Waste Contract

cc: WSRC00194 Report Date: September 14, 1995

Sample ID	: MIC4-149C EXTRACT 5
Lab ID	: 9508477-15
Matrix	: Extract
Date Collected	: 08/08/95
Date Received	: 08/08/95
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result		DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Metals Analysis												
Silver	J	0.0155		0.00780	0.500	MGL	1.0	NRM	09/13/95	1516	72356	1
Arsenic	U	-0.00461		0.0421	0.500	MGL	1.0					
Barium	J	0.0406		0.00220	10.0	MGL	1.0					
Cadmium	U	-0.00244		0.00330	0.100	MGL	1.0					
Chromium	J	0.0849		0.00420	0.500	MGL	1.0					
Nickel		0.555		0.00790	0.0500	MGL	1.0					
Lead	U	0.0213		0.0364	0.500	MGL	1.0					
Selenium	U	0.0111		0.0841	0.300	MGL	1.0					
Mercury	U	-0.0000700		0.000148	0.0200	MGL	1.0	BBJ	09/13/95	1236	72357	2
Radiological												
Total Uranium		3240	+/- 104	4.57	4.57	UGL	1.0	PCW	09/13/95	1000	71661	3

The following prep procedures were performed:

ICP	DVW	09/11/95	2120	72356	4
Mercury	BBJ	09/12/95	1500	72357	2

M = Method	Method-Description
M 1	EPA 6010A
M 2	EPA 7470
M 3	EPI A-023
M 4	EPA 3005

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TN	02934	
VA	00151	
WI	99988779	

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PO Box 616
Aiken, South Carolina 29803-6105
Contact: Ms. Janet Crawford
Project Description: Hazardous Waste Contract

cc: WSRC00194 Report Date: September 14, 1995

Sample ID : MIC4-149C EXTRACT 5

M = Method	Method-Description

Notes:
The qualifiers in this report are defined as follows:
J indicates the presence of an analyte at a concentration less than the reporting limit (RL) and greater than the detection limit (DL).
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* indicate that a quality control analyte recovery is outside of specified acceptance criteria.

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PO Box 616
Aiken, South Carolina 29803-6105
Contact: Ms. Janet Crawford
Project Description: Hazardous Waste Contract

cc: WSRC00194

Report Date: September 14, 1995

Sample ID	: MIC4-149C EXTRACT 6
Lab ID	: 9508477-16
Matrix	: Extract
Date Collected	: 08/08/95
Date Received	: 08/08/95
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result		Units	Method	Analyst	Date	Time	Batch
Metals Analysis									
Silver	<	0.500		MGL	EPA 6010A	NRM	09/13/95	1519	72356
Arsenic	<	0.500		MGL	EPA 6010A				
Barium	<	10.0		MGL	EPA 6010A				
Cadmium	<	0.100		MGL	EPA 6010A				
Chromium	<	0.500		MGL	EPA 6010A				
Nickel		0.514		MGL	EPA 6010A				
Lead	<	0.500		MGL	EPA 6010A				
Selenium	<	0.300		MGL	EPA 6010A				
Mercury	<	0.0200		MGL	EPA 7470	BBJ	09/13/95	1238	72357
Radiological									
Total Uranium		3240	+/- 104	UGL	EPI A-023	PCW	09/13/95	1001	71661

The following prep procedures were performed:

ICP	EPA 3005	DVW	09/11/95	2120	72356
Mercury	EPA 7470	BBJ	09/12/95	1500	72357

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VA	00151	
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Client: Westinghouse Savannah River Co.
Bldg. 773-58A, Rm. 1
PO Box 616
Aiken, South Carolina 29803-6105
Contact: Ms. Janet Crawford
Project Description: Hazardous Waste Contract

cc: WSRC00194

Report Date: September 14, 1995

Sample ID : MIC4-149C EXTRACT 6

Parameter	Qualifier	Result	Units	Method	Analyst	Date	Time	Batch

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TN	02934	
VA	00151	
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Client: Westinghouse Savannah River Co.
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PO Box 616
Aiken, South Carolina 29803-6105
Contact: Ms. Janet Crawford
Project Description: Hazardous Waste Contract

cc: WSRC00194

Report Date: September 14, 1995

Sample ID : MIC4-149C EXTRACT 6
Lab ID : 9508477-16
Matrix : Extract
Date Collected : 08/08/95
Date Received : 08/08/95
Priority : Routine
Collector : Client

Parameter	Qualifier	Result		DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Metals Analysis												
Silver	J	0.0131		0.00780	0.500	MGL	1.0	NRM	09/13/95	1519	72356	1
Arsenic	U	-0.0160		0.0421	0.500	MGL	1.0					
Barium	J	0.0381		0.00220	10.0	MGL	1.0					
Cadmium	U	-0.00194		0.00330	0.100	MGL	1.0					
Chromium	J	0.0776		0.00420	0.500	MGL	1.0					
Nickel		0.514		0.00790	0.0500	MGL	1.0					
Lead	U	0.0224		0.0364	0.500	MGL	1.0					
Selenium	U	0.0331		0.0841	0.300	MGL	1.0					
Mercury	J	0.000410		0.000148	0.0200	MGL	1.0	BBJ	09/13/95	1238	72357	2
Radiological												
Total Uranium		3240	+/- 104	4.57	4.57	UGL	1.0	PCW	09/13/95	1001	71661	3

The following prep procedures were performed:

ICP	DVW	09/11/95	2120	72356	4
Mercury	BBJ	09/12/95	1500	72357	2

M = Method	Method-Description
M 1	EPA 6010A
M 2	EPA 7470
M 3	EPI A-023
M 4	EPA 3005

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FL	E87156/87294	E87472/87458
NC	233	
SC	10120	10582
TN	02934	
VA	00151	
WI	99988779	

CERTIFICATE OF ANALYSIS

Client: Westinghouse Savannah River Co.
Bldg. 773-58A, Rm. 1
PO Box 616
Aiken, South Carolina 29803-6105

Contact: Ms. Janet Crawford

Project Description: Hazardous Waste Contract

cc: WSRC00194

Report Date: September 14, 1995

Sample ID : MIC4-149C EXTRACT 6

M = Method	Method-Description

Notes:
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PO Box 616
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Contact: Ms. Janet Crawford
Project Description: Hazardous Waste Contract

cc: WSRC00194

Report Date: September 14, 1995

Sample ID	: MIC4-149C EXTRACT 7
Lab ID	: 9508477-17
Matrix	: Extract
Date Collected	: 08/08/95
Date Received	: 08/08/95
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result		Units	Method	Analyst	Date	Time	Batch
Metals Analysis									
Silver	<	0.500		MGL	EPA 6010A	NRM	09/13/95	1521	72356
Arsenic	<	0.500		MGL	EPA 6010A				
Barium	<	10.0		MGL	EPA 6010A				
Cadmium	<	0.100		MGL	EPA 6010A				
Chromium	<	0.500		MGL	EPA 6010A				
Nickel		0.470		MGL	EPA 6010A				
Lead	<	0.500		MGL	EPA 6010A				
Selenium	<	0.300		MGL	EPA 6010A				
Mercury	<	0.0200		MGL	EPA 7470	BBJ	09/13/95	1241	72357
Radiological									
Total Uranium		3130	+/- 100	UGL	EPI A-023	PCW	09/13/95	1002	71661

The following prep procedures were performed:

ICP	EPA 3005	DVW	09/11/95	2120	72356
Mercury	EPA 7470	BBJ	09/12/95	1500	72357

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cc: WSRC00194

Report Date: September 14, 1995

Sample ID : MIC4-149C EXTRACT 7

Parameter	Qualifier	Result	Units	Method	Analyst	Date	Time	Batch

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cc: WSRC00194

Report Date: September 14, 1995

Sample ID	: MIC4-149C EXTRACT 7
Lab ID	: 9508477-17
Matrix	: Extract
Date Collected	: 08/08/95
Date Received	: 08/08/95
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result		DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Metals Analysis												
Silver	J	0.0138		0.00780	0.500	MGL	1.0	NRM	09/13/95	1521	72356	1
Arsenic	U	-0.0176		0.0421	0.500	MGL	1.0					
Barium	J	0.0610		0.00220	10.0	MGL	1.0					
Cadmium	U	-0.00367		0.00330	0.100	MGL	1.0					
Chromium	J	0.0740		0.00420	0.500	MGL	1.0					
Nickel		0.470		0.00790	0.0500	MGL	1.0					
Lead	U	0.0289		0.0364	0.500	MGL	1.0					
Selenium	U	0.0552		0.0841	0.300	MGL	1.0					
Mercury	U	-0.000670		0.000148	0.0200	MGL	1.0	BBJ	09/13/95	1241	72357	2
Radiological												
Total Uranium		3130	+/- 100	4.57	4.57	UGL	1.0	PCW	09/13/95	1002	71661	3

The following prep procedures were performed:

ICP	DVW	09/11/95	2120	72356	4
Mercury	BBJ	09/12/95	1500	72357	2

M = Method	Method-Description
M 1	EPA 6010A
M 2	EPA 7470
M 3	EPI A-023
M 4	EPA 3005

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Project Description: Hazardous Waste Contract

cc: WSRC00194

Report Date: September 14, 1995

Sample ID : MIC4-149C EXTRACT 7

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PO Box 616
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Contact: Ms. Janet Crawford
Project Description: Hazardous Waste Contract

cc: WSRC00194 Report Date: September 14, 1995

Sample ID : MIC4-149C EXTRACT 8
Lab ID : 9508477-18
Matrix : Extract
Date Collected : 08/08/95
Date Received : 08/08/95
Priority : Routine
Collector : Client

Parameter	Qualifier	Result		Units	Method	Analyst	Date	Time	Batch
Metals Analysis									
Silver	<	0.500		MGL	EPA 6010A	NRM	09/13/95	1523	72356
Arsenic	<	0.500		MGL	EPA 6010A				
Barium	<	10.0		MGL	EPA 6010A				
Cadmium	<	0.100		MGL	EPA 6010A				
Chromium	<	0.500		MGL	EPA 6010A				
Nickel		0.453		MGL	EPA 6010A				
Lead	<	0.500		MGL	EPA 6010A				
Selenium	<	0.300		MGL	EPA 6010A				
Mercury	<	0.0200		MGL	EPA 7470	BBJ	09/13/95	1243	72357
Radiological									
Total Uranium		3010	+/- 96.9	UGL	EPI A-023	PCW	09/13/95	1004	71661

The following prep procedures were performed:

ICP					EPA 3005	DVW	09/11/95	2120	72356
Mercury					EPA 7470	BBJ	09/12/95	1500	72357

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VA	00151	
WI	999887799	

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PO Box 616
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Contact: Ms. Janet Crawford
Project Description: Hazardous Waste Contract

cc: WSRC00194 Report Date: September 14, 1995

Sample ID : MIC4-149C EXTRACT 8

Parameter	Qualifier	Result	Units	Method	Analyst	Date	Time	Batch

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Contact: Ms. Janet Crawford
Project Description: Hazardous Waste Contract

cc: WSRC00194

Report Date: September 14, 1995

Sample ID	: MIC5-42C
Lab ID	: 9508477-02
Matrix	: Misc.
Date Collected	: 08/08/95
Date Received	: 08/08/95
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
General Chemistry											
Cyanide, Reactive	U	-10.8	0.623	250	MGKG	1.0	JBG	09/01/95	1407	72036	1
Sulfide, Reactive	U	-0.0299	0.249	500	MGKG	1.0	MCM	09/12/95	1447	72037	2

M = Method	Method-Description
M 1	SW-846 Chapter 7-7.3.3
M 2	SW-846 Chapter 7-7.3.4

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Project Description: Hazardous Waste Contract

cc: WSRC00194 Report Date: September 14, 1995

Sample ID	: MIC5-42C
Lab ID	: 9508477-02
Matrix	: Misc.
Date Collected	: 08/08/95
Date Received	: 08/08/95
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	Units	Method	Analyst	Date	Time	Batch
General Chemistry								
Cyanide, Reactive	<	250	MGKG	SW-846 Chapter 7-7.3.3	JBG	09/01/95	1407	72036
Sulfide, Reactive	<	500	MGKG	SW-846 Chapter 7-7.3.4	MCM	09/12/95	1447	72037

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Bldg. 773-58A, Rm. 1
PO Box 616
Aiken, South Carolina 29803-6105
Contact: Ms. Janet Crawford
Project Description: Hazardous Waste Contract

cc: WSRC00194

Report Date: September 25, 1995

Sample ID	: MIC5-42C
Lab ID	: 9508477-08
Matrix	: TCLP
Date Collected	: 08/08/95
Date Received	: 08/08/95
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Volatile Organics											
6 TCLP,Volatiles (Prep & Analysis) - 11 items											
1,1-Dichloroethylene	U	0.00	10.0	20.0	MGL	10.	JAC	08/29/95	1725	71855	1
1,2-Dichloroethane	U	0.00	0.0100	0.0500	MGL	10.					
1,4-Dichlorobenzene	U	0.00	0.0100	0.750	MGL	10.					
2-Butanone	U	0.00	0.0500	20.0	MGL	10.					
Benzene	U	0.00	0.0100	0.0500	MGL	10.					
Carbon Tetrachloride	U	0.00	0.0100	0.0500	MGL	10.					
Chlorobenzene	U	0.00	0.0100	10.0	MGL	10.					
Chloroform	U	0.00	0.0100	0.600	MGL	10.					
Tetrachloroethylene	U	0.00	0.0100	0.0700	MGL	10.					
Trichloroethylene	U	0.00	0.0100	0.0500	MGL	10.					
Vinyl chloride	U	0.00	0.0100	0.0200	MGL	10.					
Extractable Organics											
2 TCLP, BNA Compounds (Prep & Analysis) - 11 items											
2,4,5-Trichlorophenol	U	0.00	0.0500	40.0	MGL	10.	TNF	09/02/95	1621	72025	2
2,4,6-Trichlorophenol	U	0.00	0.0500	0.200	MGL	10.					
2,4-Dinitrotoluene	U	0.00	0.0500	0.130	MGL	10.					
Hexachlorobenzene	U	0.00	0.0500	0.130	MGL	10.					
Hexachlorobutadiene	U	0.00	0.0500	0.100	MGL	10.					
Hexachloroethane	U	0.00	0.0500	0.300	MGL	10.					
Nitrobenzene	U	0.00	0.0500	0.200	MGL	10.					
Pentachlorophenol	U	0.00	0.0500	10.0	MGL	10.					
Pyridine	U	0.00	0.0500	0.500	MGL	10.					
m,p-Cresol	U	0.00	0.0500	20.0	MGL	10.					
o-Cresol	U	0.00	0.0500	20.0	MGL	10.					
4 TCLP, Herbicides - 2 items											
2,4,5-TP	U	0.00	0.00250	0.100	MGL	1.0	JLS	09/13/95	1319	72063	3
2,4-D	U	0.00	0.00500	1.00	MGL	1.0					
5 TCLP, Pesticides/PCBs - 6 items											

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cc: WSRC00194 Report Date: September 25, 1995

Sample ID : MIC5-42C

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Chlordane	U	0.00	0.00625	0.0125	MGL	1.0	JEB	09/07/95	0731	72027	4
Endrin	U	0.00	0.00125	0.00300	MGL	1.0	JEB	09/07/95	0731	72027	4
Heptachlor & Hep. Epoxide	U	0.00	0.00125	0.00250	MGL	1.0					
Methoxychlor	U	0.00	0.0125	0.0250	MGL	1.0					
Toxaphene	U	0.00	0.0250	0.0500	MGL	1.0					
gamma-BHC	U	0.00	0.000625	0.0400	MGL	1.0					
etals Analysis											
Silver	J	0.0117	0.00780	0.500	MGL	1.0	NRM	09/13/95	1505	72356	5
Arsenic	U	-0.0925	0.0421	0.500	MGL	1.0					
Barium	J	0.172	0.00220	10.0	MGL	1.0					
Cadmium	U	-0.000480	0.00330	0.100	MGL	1.0					
Chromium	J	0.00944	0.00420	0.500	MGL	1.0					
Lead	U	-0.00129	0.0364	0.500	MGL	1.0					
Selenium	U	0.0235	0.0841	0.300	MGL	1.0					
Mercury	U	-0.0000300	0.000148	0.0200	MGL	1.0	BBJ	09/13/95	1224	72357	6

The following prep procedures were performed:

GC/MS Base/Neutral Compounds	SRP	09/01/95	1445	72025	7
Herbicides	DDT	09/06/95	2300	72063	3
Pesticides	CPU	09/01/95	1945	72027	7
ICP	DVW	09/11/95	2120	72356	8
Mercury	BBJ	09/12/95	1500	72357	6
TCLP Extraction - Semivolatiles	JL	08/25/95	2135	71637	9
TCLP Extraction - Volatiles	JL	08/25/95	2135	71631	9
TCLP Prep for Metals	JL	08/25/95	2135	71639	9

Comments:
This sample was analyzed beyond the recommended holding time for the following:

TCLP Extraction-Volatiles
TCLP Extraction-Semivolatiles
TCLP Extraction-Herbicibes

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cc: WSRC00194 Report Date: September 25, 1995

Sample ID : MIC5-42C

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Preparation of Herbicides TCLP Extraction-Pesticides											

Surrogate Recovery	Test	Percent%	Acceptable Limits
2,4,6-Tribromophenol	TCLP SEMIVOA	102.	(34.6 - 123.)
2-Fluorobiphenyl	TCLP SEMIVOA	65.3	(50.4 - 114.)
2-Fluorophenol	TCLP SEMIVOA	54.9	(27.0 - 93.6)
Nitrobenzene-d5	TCLP SEMIVOA	65.6	(35.0 - 107.)
Phenol-d6	TCLP SEMIVOA	47.5	(21.2 - 75.6)
p-Terphenyl-d14	TCLP SEMIVOA	77.6	(33.0 - 130.)
4-(2,4-Dichlorophenoxy)Butyric	TCLP HERBICIDES	71.0	(50.0 - 150.)
4CMX	TCLP PESTICIDES	60.0	(35.9 - 114.)
Dibutylchlorendate	TCLP PESTICIDES	78.4	(46.1 - 158.)
1,2-Dichloroethane-d4	TCLP VOA	102.	(81.0 - 114.)
Bromofluorobenzene	TCLP VOA	102.	(86.6 - 109.)
Toluene-d8	TCLP VOA	99.2	(89.6 - 107.)

M = Method	Method-Description
M 1	EPA 8240
M 2	EPA 8270
M 3	EPA 8150
M 4	EPA 8080
M 5	EPA 6010A
M 6	EPA 7470
M 7	EPA 3500/3520
M 8	EPA 3005
M 9	EPA 1311

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Sample ID : MIC5-42C

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Kendra Middleton
Analytical Report Specialist

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Contact: Ms. Janet Crawford
Project Description: Hazardous Waste Contract

cc: WSRC00194

Report Date: September 14, 1995

Sample ID	: MIC5-42C
Lab ID	: 9508477-08
Matrix	: TCLP
Date Collected	: 08/08/95
Date Received	: 08/08/95
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	Units	Method	Analyst	Date	Time	Batch
Volatile Organics								
6 TCLP,Volatiles (Prep & Analysis) - 11 items								
1,1-Dichloroethylene	<	20.0	MGL	EPA 8240	JAC	08/29/95	1725	71855
1,2-Dichloroethane	<	0.0500	MGL	EPA 8240				
1,4-Dichlorobenzene	<	0.750	MGL	EPA 8240				
2-Butanone	<	20.0	MGL	EPA 8240				
Benzene	<	0.0500	MGL	EPA 8240				
Carbon Tetrachloride	<	0.0500	MGL	EPA 8240				
Chlorobenzene	<	10.0	MGL	EPA 8240				
Chloroform	<	0.600	MGL	EPA 8240				
Tetrachloroethylene	<	0.0700	MGL	EPA 8240				
Trichloroethylene	<	0.0500	MGL	EPA 8240				
Vinyl chloride	<	0.0200	MGL	EPA 8240				
Extractable Organics								
2 TCLP, BNA Compounds (Prep & Analysis) - 11 items								
2,4,5-Trichlorophenol	<	40.0	MGL	EPA 8270	TNF	09/02/95	1621	72025
2,4,6-Trichlorophenol	<	0.200	MGL	EPA 8270				
2,4-Dinitrotoluene	<	0.130	MGL	EPA 8270				
Hexachlorobenzene	<	0.130	MGL	EPA 8270				
Hexachlorobutadiene	<	0.100	MGL	EPA 8270				
Hexachloroethane	<	0.300	MGL	EPA 8270				
Nitrobenzene	<	0.200	MGL	EPA 8270				
Pentachlorophenol	<	10.0	MGL	EPA 8270				
Pyridine	<	0.500	MGL	EPA 8270				
m,p-Cresol	<	20.0	MGL	EPA 8270				
o-Cresol	<	20.0	MGL	EPA 8270				
4 TCLP, Herbicides - 2 items								
2,4,5-TP	<	0.100	MGL	EPA 8150	JLS	09/13/95	1319	72063
2,4-D	<	1.00	MGL	EPA 8150				
5 TCLP, Pesticides/PCBs - 6 items								

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NC	233	
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TN	02934	
VA	00151	
WI	99988779	

CERTIFICATE OF ANALYSIS

Client: Westinghouse Savannah River Co.
Bldg. 773-58A, Rm. 1
PO Box 616
Aiken, South Carolina 29803-6105
Contact: Ms. Janet Crawford
Project Description: Hazardous Waste Contract

cc: WSRC00194 Report Date: September 14, 1995

Sample ID : MIC5-42C

Parameter	Qualifier	Result	Units	Method	Analyst	Date	Time	Batch
Chlordane	<	0.0125	MGL	EPA 8080	JEB	09/07/95	0731	72027
Endrin	<	0.00300	MGL	EPA 8080	JEB	09/07/95	0731	72027
Heptachlor & Hep. Epoxide	<	0.00250	MGL	EPA 8080				
Methoxychlor	<	0.0250	MGL	EPA 8080				
Toxaphene	<	0.0500	MGL	EPA 8080				
gamma-BHC	<	0.0400	MGL	EPA 8080				
Metals Analysis								
Silver	<	0.500	MGL	EPA 6010A	NRM	09/13/95	1505	72356
Arsenic	<	0.500	MGL	EPA 6010A				
Barium	<	10.0	MGL	EPA 6010A				
Cadmium	<	0.100	MGL	EPA 6010A				
Chromium	<	0.500	MGL	EPA 6010A				
Lead	<	0.500	MGL	EPA 6010A				
Selenium	<	0.300	MGL	EPA 6010A				
Mercury	<	0.0200	MGL	EPA 7470	BBJ	09/13/95	1224	72357

The following prep procedures were performed:

GC/MS Base/Neutral Compounds	EPA 3500/3520	SRP	09/01/95	1445	72025
Herbicides	EPA 8150	DDT	09/06/95	2300	72063
Pesticides	EPA 3500/3520	CPU	09/01/95	1945	72027
ICP	EPA 3005	DVW	09/11/95	2120	72356
Mercury	EPA 7470	BBJ	09/12/95	1500	72357
TCLP Extraction - Semivolatiles	EPA 1311	JL	08/25/95	2135	71637
TCLP Extraction - Volatiles	EPA 1311	JL	08/25/95	2135	71631
TCLP Prep for Metals	EPA 1311	JL	08/25/95	2135	71639

Comments:
This sample was extracted beyond recommended holding time for Volatiles Organics and Herbicides .

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PO Box 616
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cc: WSRC00194

Report Date: September 14, 1995

Sample ID : MIC5-42C

Parameter	Qualifier	Result	Units	Method	Analyst	Date	Time	Batch

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Client: Westinghouse Savannah River Co.
Bldg. 773-58A, Rm. 1
PO Box 616
Aiken, South Carolina 29803-6105
Contact: Ms. Janet Crawford
Project Description: Hazardous Waste Contract

cc: WSRC00194 Report Date: September 14, 1995

Sample ID : MIC5-42C EXTRACT 1
Lab ID : 9508477-20
Matrix : Extract
Date Collected : 08/08/95
Date Received : 08/08/95
Priority : Routine
Collector : Client

Parameter	Qualifier	Result		Units	Method	Analyst	Date	Time	Batch
Metals Analysis									
Silver	<	0.500		MGL	EPA 6010A	NRM	09/13/95	1547	72356
Arsenic	<	0.500		MGL	EPA 6010A				
Barium	<	10.0		MGL	EPA 6010A				
Cadmium	<	0.100		MGL	EPA 6010A				
Chromium	<	0.500		MGL	EPA 6010A				
Nickel		0.430		MGL	EPA 6010A				
Lead	<	0.500		MGL	EPA 6010A				
Selenium	<	0.300		MGL	EPA 6010A				
Mercury	<	0.0200		MGL	EPA 7470	BBJ	09/13/95	1253	72357
Radiological									
Total Uranium		1140	+/- 36.6	UGL	EPI A-023	PCW	09/13/95	1006	71661

The following prep procedures were performed:

ICP	EPA 3005	DVW	09/11/95	2120	72356
Mercury	EPA 7470	BBJ	09/12/95	1500	72357

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PO Box 616
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Project Description: Hazardous Waste Contract

cc: WSRC00194 Report Date: September 14, 1995

Sample ID : MIC5-42C EXTRACT 1

Parameter	Qualifier	Result	Units	Method	Analyst	Date	Time	Batch

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Robert L. Sullens

Analytical Report Specialist

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Project Description: Hazardous Waste Contract

cc: WSRC00194 Report Date: September 14, 1995

Sample ID : MIC5-42C EXTRACT 1
Lab ID : 9508477-20
Matrix : Extract
Date Collected : 08/08/95
Date Received : 08/08/95
Priority : Routine
Collector : Client

Parameter	Qualifier	Result		DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Metals Analysis												
Silver	J	0.0127		0.00780	0.500	MGL	1.0	NRM	09/13/95	1547	72356	1
Arsenic	U	-0.0163		0.0421	0.500	MGL	1.0					
Barium	J	0.0311		0.00220	10.0	MGL	1.0					
Cadmium	U	-0.00129		0.00330	0.100	MGL	1.0					
Chromium	J	0.0183		0.00420	0.500	MGL	1.0					
Nickel		0.430		0.00790	0.0500	MGL	1.0					
Lead	U	0.00623		0.0364	0.500	MGL	1.0					
Selenium	U	-0.0396		0.0841	0.300	MGL	1.0					
Mercury	U	-0.000220		0.000148	0.0200	MGL	1.0	BBJ	09/13/95	1253	72357	2
Radiological												
Total Uranium		1140	+/- 36.6	4.57	4.57	UGL	1.0	PCW	09/13/95	1006	71661	3

The following prep procedures were performed:

ICP	DVW	09/11/95	2120	72356 4
Mercury	BBJ	09/12/95	1500	72357 2

M = Method	Method-Description
M 1	EPA 6010A
M 2	EPA 7470
M 3	EPI A-023
M 4	EPA 3005

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WI	99988779	

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Project Description: Hazardous Waste Contract

cc: WSRC00194

Report Date: September 14, 1995

Sample ID : MIC5-42C EXTRACT 1

M = Method	Method-Description

Notes:
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Robert Gullans
Analytical Report Specialist

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Contact: Ms. Janet Crawford
Project Description: Hazardous Waste Contract

cc: WSRC00194

Report Date: September 14, 1995

Sample ID	: MIC5-42C EXTRACT 2
Lab ID	: 9508477-21
Matrix	: Extract
Date Collected	: 08/08/95
Date Received	: 08/08/95
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result		Units	Method	Analyst	Date	Time	Batch
Metals Analysis									
Silver	<	0.500		MGL	EPA 6010A	NRM	09/13/95	1549	72356
Arsenic	<	0.500		MGL	EPA 6010A				
Barium	<	10.0		MGL	EPA 6010A				
Cadmium	<	0.100		MGL	EPA 6010A				
Chromium	<	0.500		MGL	EPA 6010A				
Nickel		0.453		MGL	EPA 6010A				
Lead	<	0.500		MGL	EPA 6010A				
Selenium	<	0.300		MGL	EPA 6010A				
Mercury	<	0.0200		MGL	EPA 7470	BBJ	09/13/95	1255	72357
Radiological									
Total Uranium		1310	+/- 41.9	UGL	EPI A-023	PCW	09/13/95	1010	71661

The following prep procedures were performed:

ICP	EPA 3005	DVW	09/11/95	2120	72356
Mercury	EPA 7470	BBJ	09/12/95	1500	72357

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cc: WSRC00194

Report Date: September 14, 1995

Sample ID : MIC5-42C EXTRACT 2

Parameter	Qualifier	Result	Units	Method	Analyst	Date	Time	Batch

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cc: WSRC00194

Report Date: September 14, 1995

Sample ID	: MIC5-42C EXTRACT 2
Lab ID	: 9508477-21
Matrix	: Extract
Date Collected	: 08/08/95
Date Received	: 08/08/95
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result		DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Metals Analysis												
Silver	J	0.0114		0.00780	0.500	MGL	1.0	NRM	09/13/95	1549	72356	1
Arsenic	U	-0.00469		0.0421	0.500	MGL	1.0					
Barium	J	0.0302		0.00220	10.0	MGL	1.0					
Cadmium	U	-0.000640		0.00330	0.100	MGL	1.0					
Chromium	J	0.0215		0.00420	0.500	MGL	1.0					
Nickel		0.453		0.00790	0.0500	MGL	1.0					
Lead	U	0.00450		0.0364	0.500	MGL	1.0					
Selenium	U	-0.0261		0.0841	0.300	MGL	1.0					
Mercury	U	-0.000360		0.000148	0.0200	MGL	1.0	BBJ	09/13/95	1255	72357	2
Radiological												
Total Uranium		1310	+/- 41.9	4.57	4.57	UGL	1.0	PCW	09/13/95	1010	71661	3

The following prep procedures were performed:

ICP	DVW	09/11/95	2120	72356 4
Mercury	BBJ	09/12/95	1500	72357 2

M = Method	Method-Description
M 1	EPA 6010A
M 2	EPA 7470
M 3	EPI A-023
M 4	EPA 3005

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NC	233	
SC	10120	10582
TN	02934	
VA	00151	
WI	99988779	

CERTIFICATE OF ANALYSIS

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PO Box 616
Aiken, South Carolina 29803-6105
Contact: Ms. Janet Crawford
Project Description: Hazardous Waste Contract

cc: WSRC00194

Report Date: September 14, 1995

Sample ID : MIC5-42C EXTRACT 2

M = Method	Method-Description

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NC	233	
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TN	02934	
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PO Box 616
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Contact: Ms. Janet Crawford
Project Description: Hazardous Waste Contract

cc: WSRC00194 Report Date: September 14, 1995

Sample ID : MIC5-42C EXTRACT 3
Lab ID : 9508477-22
Matrix : Extract
Date Collected : 08/08/95
Date Received : 08/08/95
Priority : Routine
Collector : Client

Parameter	Qualifier	Result		Units	Method	Analyst	Date	Time	Batch
Metals Analysis									
Silver	<	0.500		MGL	EPA 6010A	NRM	09/13/95	1551	72356
Arsenic	<	0.500		MGL	EPA 6010A				
Barium	<	10.0		MGL	EPA 6010A				
Cadmium	<	0.100		MGL	EPA 6010A				
Chromium	<	0.500		MGL	EPA 6010A				
Nickel		0.391		MGL	EPA 6010A				
Lead	<	0.500		MGL	EPA 6010A				
Selenium	<	0.300		MGL	EPA 6010A				
Mercury	<	0.0200		MGL	EPA 7470	BBJ	09/13/95	1258	72357
Radiological									
Total Uranium		1260	+/- 40.6	UGL	EPI A-023	PCW	09/13/95	1012	71661

The following prep procedures were performed:

ICP	EPA 3005	DVW	09/11/95	2120	72356
Mercury	EPA 7470	BBJ	09/12/95	1500	72357

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TN	02934	
VA	00151	
WI	99988779	

CERTIFICATE OF ANALYSIS

Client: Westinghouse Savannah River Co.
Bldg. 773-58A, Rm. 1
PO Box 616
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Contact: Ms. Janet Crawford
Project Description: Hazardous Waste Contract

cc: WSRC00194

Report Date: September 14, 1995

Sample ID : MIC5-42C EXTRACT 3

Parameter	Qualifier	Result	Units	Method	Analyst	Date	Time	Batch

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TN	02934	
VA	00151	
WI	99988779	

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PO Box 616
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Project Description: Hazardous Waste Contract

cc: WSRC00194 Report Date: September 14, 1995

Sample ID : MIC5-42C EXTRACT 3
Lab ID : 9508477-22
Matrix : Extract
Date Collected : 08/08/95
Date Received : 08/08/95
Priority : Routine
Collector : Client

Parameter	Qualifier	Result		DL	RL	Units	DF	Analyst	Date	Time	Batch	M
etals Analysis												
Silver	J	0.0140		0.00780	0.500	MGL	1.0	NRM	09/13/95	1551	72356	1
Arsenic	U	-0.00808		0.0421	0.500	MGL	1.0					
Barium	J	0.0536		0.00220	10.0	MGL	1.0					
Cadmium	U	-0.00105		0.00330	0.100	MGL	1.0					
Chromium	J	0.0292		0.00420	0.500	MGL	1.0					
Nickel		0.391		0.00790	0.0500	MGL	1.0					
Lead	U	0.0147		0.0364	0.500	MGL	1.0					
Selenium	U	0.0223		0.0841	0.300	MGL	1.0					
Mercury	U	-0.000360		0.000148	0.0200	MGL	1.0	BBJ	09/13/95	1258	72357	2
Radiological												
Total Uranium		1260	+/- 40.6	4.57	4.57	UGL	1.0	PCW	09/13/95	1012	71661	3

The following prep procedures were performed:

ICP	DVW	09/11/95	2120	72356	4
Mercury	BBJ	09/12/95	1500	72357	2

M = Method	Method-Description
M 1	EPA 6010A
M 2	EPA 7470
M 3	EPI A-023
M 4	EPA 3005

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NC	233	
SC	10120	10582
TN	02934	
VA	00151	
WI	999887791	

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Project Description: Hazardous Waste Contract

cc: WSRC00194

Report Date: September 14, 1995

Sample ID : MIC5-42C EXTRACT 3

M = Method	Method-Description

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Robert Hullans

Analytical Report Specialist

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PO Box 616
Aiken, South Carolina 29803-6105
Contact: Ms. Janet Crawford
Project Description: Hazardous Waste Contract

cc: WSRC00194 Report Date: September 14, 1995

Sample ID : MIC5-42C EXTRACT 4
Lab ID : 9508477-23
Matrix : Extract
Date Collected : 08/08/95
Date Received : 08/08/95
Priority : Routine
Collector : Client

Parameter	Qualifier	Result		Units	Method	Analyst	Date	Time	Batch
Metals Analysis									
Silver	<	0.500		MGL	EPA 6010A	NRM	09/13/95	1554	72356
Arsenic	<	0.500		MGL	EPA 6010A				
Barium	<	10.0		MGL	EPA 6010A				
Cadmium	<	0.100		MGL	EPA 6010A				
Chromium	<	0.500		MGL	EPA 6010A				
Nickel		0.378		MGL	EPA 6010A				
Lead	<	0.500		MGL	EPA 6010A				
Selenium	<	0.300		MGL	EPA 6010A				
Mercury	<	0.0200		MGL	EPA 7470	BBJ	09/13/95	1300	72357
Radiological									
Total Uranium		1270	+/- 40.6	UGL	EPI A-023	PCW	09/13/95	1013	71661

The following prep procedures were performed:

ICP	EPA 3005	DVW	09/11/95	2120	72356
Mercury	EPA 7470	BBJ	09/12/95	1500	72357

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SC	10120	10582
TN	02934	
VA	00151	
WI	999887791	

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Client: Westinghouse Savannah River Co.
Bldg. 773-58A, Rm. 1
PO Box 616
Aiken, South Carolina 29803-6105

Contact: Ms. Janet Crawford

Project Description: Hazardous Waste Contract

cc: WSRC00194

Report Date: September 14, 1995

Sample ID : MIC5-42C EXTRACT 4

Parameter	Qualifier	Result	Units	Method	Analyst	Date	Time	Batch

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TN	02934	
VA	00151	
WI	99988779	

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Project Description: Hazardous Waste Contract

cc: WSRC00194 Report Date: September 14, 1995

Sample ID : MIC5-42C EXTRACT 4
Lab ID : 9508477-23
Matrix : Extract
Date Collected : 08/08/95
Date Received : 08/08/95
Priority : Routine
Collector : Client

Parameter	Qualifier	Result		DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Metals Analysis												
Silver	J	0.0123		0.00780	0.500	MGL	1.0	NRM	09/13/95	1554	72356	1
Arsenic	U	-0.0224		0.0421	0.500	MGL	1.0					
Barium	J	0.0321		0.00220	10.0	MGL	1.0					
Cadmium	U	-0.000390		0.00330	0.100	MGL	1.0					
Chromium	J	0.0200		0.00420	0.500	MGL	1.0					
Nickel		0.378		0.00790	0.0500	MGL	1.0					
Lead	U	0.0142		0.0364	0.500	MGL	1.0					
Selenium	U	0.00996		0.0841	0.300	MGL	1.0					
Mercury	U	-0.000530		0.000148	0.0200	MGL	1.0	BBJ	09/13/95	1300	72357	2
Radiological												
Total Uranium		1270	+/- 40.6	4.57	4.57	UGL	1.0	PCW	09/13/95	1013	71661	3

The following prep procedures were performed:

ICP	DVW	09/11/95	2120	72356 4
Mercury	BBJ	09/12/95	1500	72357 2

M = Method	Method-Description
M 1	EPA 6010A
M 2	EPA 7470
M 3	EPI A-023
M 4	EPA 3005

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CERTIFICATE OF ANALYSIS

Client: Westinghouse Savannah River Co.
Bldg. 773-58A, Rm. 1
PO Box 616
Aiken, South Carolina 29803-6105
Contact: Ms. Janet Crawford
Project Description: Hazardous Waste Contract

cc: WSRC00194

Report Date: September 14, 1995

Sample ID : MIC5-42C EXTRACT 4

M = Method	Method-Description

Notes:
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cc: WSRC00194

Report Date: September 14, 1995

Sample ID	: MIC5-42C EXTRACT 5
Lab ID	: 9508477-24
Matrix	: Extract
Date Collected	: 08/08/95
Date Received	: 08/08/95
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result		Units	Method	Analyst	Date	Time	Batch
Metals Analysis									
Silver	<	0.500		MGL	EPA 6010A	NRM	09/13/95	1556	72356
Arsenic	<	0.500		MGL	EPA 6010A				
Barium	<	10.0		MGL	EPA 6010A				
Cadmium	<	0.100		MGL	EPA 6010A				
Chromium	<	0.500		MGL	EPA 6010A				
Nickel		0.444		MGL	EPA 6010A				
Lead	<	0.500		MGL	EPA 6010A				
Selenium	<	0.300		MGL	EPA 6010A				
Mercury	<	0.0200		MGL	EPA 7470	BBJ	09/13/95	1303	72357
Radiological									
Total Uranium		1270	+/- 40.8	UGL	EPI A-023	PCW	09/13/95	1014	71661

The following prep procedures were performed:

ICP	EPA 3005	DVW	09/11/95	2120	72356
Mercury	EPA 7470	BBJ	09/12/95	1500	72357

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cc: WSRC00194

Report Date: September 14, 1995

Sample ID : MIC5-42C EXTRACT 5

Parameter	Qualifier	Result	Units	Method	Analyst	Date	Time	Batch

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cc: WSRC00194 Report Date: September 14, 1995

Sample ID : MIC5-42C EXTRACT 5
Lab ID : 9508477-24
Matrix : Extract
Date Collected : 08/08/95
Date Received : 08/08/95
Priority : Routine
Collector : Client

Parameter	Qualifier	Result		DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Metals Analysis												
Silver	J	0.0119		0.00780	0.500	MGL	1.0	NRM	09/13/95	1556	72356	1
Arsenic	U	-0.00521		0.0421	0.500	MGL	1.0					
Barium	J	0.0768		0.00220	10.0	MGL	1.0					
Cadmium	U	-0.00197		0.00330	0.100	MGL	1.0					
Chromium	J	0.0213		0.00420	0.500	MGL	1.0					
Nickel		0.444		0.00790	0.0500	MGL	1.0					
Lead	U	0.0197		0.0364	0.500	MGL	1.0					
Selenium	U	0.0245		0.0841	0.300	MGL	1.0					
Mercury	J	0.000870		0.000148	0.0200	MGL	1.0	BBJ	09/13/95	1303	72357	2
Radiological												
Total Uranium		1270	+/- 40.8	4.57	4.57	UGL	1.0	PCW	09/13/95	1014	71661	3

The following prep procedures were performed:

ICP	DVW	09/11/95	2120	72356	4
Mercury	BBJ	09/12/95	1500	72357	2

M = Method	Method-Description
M 1	EPA 6010A
M 2	EPA 7470
M 3	EPI A-023
M 4	EPA 3005

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Project Description: Hazardous Waste Contract

cc: WSRC00194 Report Date: September 14, 1995

Sample ID : MIC5-42C EXTRACT 5

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Robert Williams
Analytical Report Specialist

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Contact: Ms. Janet Crawford
Project Description: Hazardous Waste Contract

cc: WSRC00194 Report Date: September 14, 1995

Sample ID	: MIC5-42C EXTRACT 6
Lab ID	: 9508477-25
Matrix	: Extract
Date Collected	: 08/08/95
Date Received	: 08/08/95
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result		Units	Method	Analyst	Date	Time	Batch
Metals Analysis									
Silver	<	0.500		MGL	EPA 6010A	NRM	09/13/95	1558	72356
Arsenic	<	0.500		MGL	EPA 6010A				
Barium	<	10.0		MGL	EPA 6010A				
Cadmium	<	0.100		MGL	EPA 6010A				
Chromium	<	0.500		MGL	EPA 6010A				
Nickel		0.356		MGL	EPA 6010A				
Lead	<	0.500		MGL	EPA 6010A				
Selenium	<	0.300		MGL	EPA 6010A				
Mercury	<	0.0200		MGL	EPA 7470	BBJ	09/13/95	1305	72357
Radiological									
Total Uranium		1250	+/- 40.2	UGL	EPI A-023	PCW	09/13/95	1016	71661

The following prep procedures were performed:

ICP	EPA 3005	DVW	09/11/95	2120	72356
Mercury	EPA 7470	BBJ	09/12/95	1500	72357

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cc: WSRC00194 Report Date: September 14, 1995

Sample ID : MIC5-42C EXTRACT 6

Parameter	Qualifier	Result	Units	Method	Analyst	Date	Time	Batch

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Robert Williams

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cc: WSRC00194 Report Date: September 14, 1995

Sample ID : MIC5-42C EXTRACT 6
Lab ID : 9508477-25
Matrix : Extract
Date Collected : 08/08/95
Date Received : 08/08/95
Priority : Routine
Collector : Client

Parameter	Qualifier	Result		DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Metals Analysis												
Silver	J	0.0157		0.00780	0.500	MGL	1.0	NRM	09/13/95	1558	72356	1
Arsenic	U	0.0113		0.0421	0.500	MGL	1.0					
Barium	J	0.0570		0.00220	10.0	MGL	1.0					
Cadmium	U	-0.000810		0.00330	0.100	MGL	1.0					
Chromium	J	0.0239		0.00420	0.500	MGL	1.0					
Nickel		0.356		0.00790	0.0500	MGL	1.0					
Lead	U	0.0243		0.0364	0.500	MGL	1.0					
Selenium	U	0.0191		0.0841	0.300	MGL	1.0					
Mercury	U	-0.000750		0.000148	0.0200	MGL	1.0	BBJ	09/13/95	1305	72357	2
Radiological												
Total Uranium		1250	+/- 40.2	4.57	4.57	UGL	1.0	PCW	09/13/95	1016	71661	3

The following prep procedures were performed:

ICP	DVW	09/11/95	2120	72356	4
Mercury	BBJ	09/12/95	1500	72357	2

M = Method	Method-Description
M 1	EPA 6010A
M 2	EPA 7470
M 3	EPI A-023
M 4	EPA 3005

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cc: WSRC00194

Report Date: September 14, 1995

Sample ID : MIC5-42C EXTRACT 6

M = Method	Method-Description

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Contact: Ms. Janet Crawford
Project Description: Hazardous Waste Contract

cc: WSRC00194

Report Date: September 14, 1995

Sample ID : MIC5-42C EXTRACT 7
Lab ID : 9508477-26
Matrix : Extract
Date Collected : 08/08/95
Date Received : 08/08/95
Priority : Routine
Collector : Client

Parameter	Qualifier	Result		Units	Method	Analyst	Date	Time	Batch
Metals Analysis									
Silver	<	0.500		MGL	EPA 6010A	NRM	09/13/95	1600	72356
Arsenic	<	0.500		MGL	EPA 6010A				
Barium	<	10.0		MGL	EPA 6010A				
Cadmium	<	0.100		MGL	EPA 6010A				
Chromium	<	0.500		MGL	EPA 6010A				
Nickel		0.389		MGL	EPA 6010A				
Lead	<	0.500		MGL	EPA 6010A				
Selenium	<	0.300		MGL	EPA 6010A				
Mercury	<	0.0200		MGL	EPA 7470	BBJ	09/13/95	1307	72357
Radiological									
Total Uranium		1250	+/- 40.2	UGL	EPI A-023	PCW	09/13/95	1017	71661

The following prep procedures were performed:

ICP	EPA 3005	DVW	09/11/95	2120	72356
Mercury	EPA 7470	BBJ	09/12/95	1500	72357

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cc: WSRC00194

Report Date: September 14, 1995

Sample ID : MIC5-42C EXTRACT 7

Parameter	Qualifier	Result	Units	Method	Analyst	Date	Time	Batch

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cc: WSRC00194 Report Date: September 14, 1995

Sample ID	: MIC5-42C EXTRACT 7
Lab ID	: 9508477-26
Matrix	: Extract
Date Collected	: 08/08/95
Date Received	: 08/08/95
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result		DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Metals Analysis												
Silver	J	0.0122		0.00780	0.500	MGL	1.0	NRM	09/13/95	1600	72356	1
Arsenic	U	-0.00244		0.0421	0.500	MGL	1.0					
Barium	J	0.0386		0.00220	10.0	MGL	1.0					
Cadmium	U	-0.00109		0.00330	0.100	MGL	1.0					
Chromium	J	0.0281		0.00420	0.500	MGL	1.0					
Nickel		0.389		0.00790	0.0500	MGL	1.0					
Lead	U	0.0300		0.0364	0.500	MGL	1.0					
Selenium	U	0.0454		0.0841	0.300	MGL	1.0					
Mercury	U	-0.000320		0.000148	0.0200	MGL	1.0	BBJ	09/13/95	1307	72357	2
Radiological												
Total Uranium		1250	+/- 40.2	4.57	4.57	UGL	1.0	PCW	09/13/95	1017	71661	3

The following prep procedures were performed:

ICP	DVW	09/11/95	2120	72356	4
Mercury	BBJ	09/12/95	1500	72357	2

M = Method	Method-Description
M 1	EPA 6010A
M 2	EPA 7470
M 3	EPI A-023
M 4	EPA 3005

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Project Description: Hazardous Waste Contract

cc: WSRC00194

Report Date: September 14, 1995

Sample ID : MIC5-42C EXTRACT 7

M = Method	Method-Description

Notes:
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Analytical Report Specialist

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Contact: Ms. Janet Crawford
Project Description: Hazardous Waste Contract

cc: WSRC00194 Report Date: September 14, 1995

Sample ID	: MIC5-42C EXTRACT 8
Lab ID	: 9508477-27
Matrix	: Extract
Date Collected	: 08/08/95
Date Received	: 08/08/95
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result		Units	Method	Analyst	Date	Time	Batch
Metals Analysis									
Silver	<	0.500		MGL	EPA 6010A	NRM	09/13/95	1602	72356
Arsenic	<	0.500		MGL	EPA 6010A				
Barium	<	10.0		MGL	EPA 6010A				
Cadmium	<	0.100		MGL	EPA 6010A				
Chromium	<	0.500		MGL	EPA 6010A				
Nickel		0.355		MGL	EPA 6010A				
Lead	<	0.500		MGL	EPA 6010A				
Selenium	<	0.300		MGL	EPA 6010A				
Mercury	<	0.0200		MGL	EPA 7470	BBJ	09/13/95	1310	72357
Radiological									
Total Uranium		1220	+/- 39.3	UGL	EPI A-023	PCW	09/13/95	1018	71661

The following prep procedures were performed:

ICP	EPA 3005	DVW	09/11/95	2120	72356
Mercury	EPA 7470	BBJ	09/12/95	1500	72357

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PO Box 616
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Contact: Ms. Janet Crawford
Project Description: Hazardous Waste Contract

cc: WSRC00194

Report Date: September 14, 1995

Sample ID : MIC5-42C EXTRACT 8

Parameter	Qualifier	Result	Units	Method	Analyst	Date	Time	Batch

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Robert Hullans

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cc: WSRC00194 Report Date: September 14, 1995

Sample ID : MIC5-42C EXTRACT 8
Lab ID : 9508477-27
Matrix : Extract
Date Collected : 08/08/95
Date Received : 08/08/95
Priority : Routine
Collector : Client

Parameter	Qualifier	Result		DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Metals Analysis												
Silver	J	0.0154		0.00780	0.500	MGL	1.0	NRM	09/13/95	1602	72356	1
Arsenic	U	-0.00754		0.0421	0.500	MGL	1.0					
Barium	J	0.117		0.00220	10.0	MGL	1.0					
Cadmium	U	0.000750		0.00330	0.100	MGL	1.0					
Chromium	J	0.0281		0.00420	0.500	MGL	1.0					
Nickel		0.355		0.00790	0.0500	MGL	1.0					
Lead	U	0.0110		0.0364	0.500	MGL	1.0					
Selenium	U	-0.00111		0.0841	0.300	MGL	1.0					
Mercury	U	-0.000450		0.000148	0.0200	MGL	1.0	BBJ	09/13/95	1310	72357	2
Radiological												
Total Uranium		1220	+/- 39.3	4.57	4.57	UGL	1.0	PCW	09/13/95	1018	71661	3

The following prep procedures were performed:

ICP	DVW	09/11/95	2120	72356 4
Mercury	BBJ	09/12/95	1500	72357 2

M = Method	Method-Description
M 1	EPA 6010A
M 2	EPA 7470
M 3	EPI A-023
M 4	EPA 3005

GENERAL ENGINEERING LABORATORIES

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Laboratory Certifications

STATE	GEL	EPI
FL	E87156/87294	E87472/87458
NC	233	
SC	10120	10582
TN	02934	
VA	00151	
WI	99988779	

CERTIFICATE OF ANALYSIS

Client: Westinghouse Savannah River Co.
Bldg. 773-58A, Rm. 1
PO Box 616
Aiken, South Carolina 29803-6105
Contact: Ms. Janet Crawford
Project Description: Hazardous Waste Contract

cc: WSRC00194

Report Date: September 14, 1995

Sample ID : MIC5-42C EXTRACT 8

M = Method	Method-Description

Notes:
The qualifiers in this report are defined as follows:
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U indicates that the analyte was not detected at a concentration greater than the detection limit.
* indicate that a quality control analyte recovery is outside of specified acceptance criteria.

This data report has been prepared and reviewed in accordance with General Engineering Laboratories standard operating procedures. Please direct any questions to your Project Manager, Edie Kent at (803) 769-7385.

Robert Williams
Analytical Report Specialist

GENERAL ENGINEERING LABORATORIES

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Laboratory Certifications

STATE	GEL	EPI
FL	E87156/87294	E87472/87458
NC	233	
SC	10120	10582
TN	02934	
VA	00151	
WI	99988779	

CERTIFICATE OF ANALYSIS

Client: Westinghouse Savannah River Co.
Bldg. 773-58A, Rm. 1
PO Box 616
Aiken, South Carolina 29803-6105
Contact: Ms. Janet Crawford
Project Description: Hazardous Waste Contract

cc: WSRC00194 Report Date: September 14, 1995

Sample ID : MIC5-42C EXTRACT 9
Lab ID : 9508477-28
Matrix : Extract
Date Collected : 08/08/95
Date Received : 08/08/95
Priority : Routine
Collector : Client

Parameter	Qualifier	Result		Units	Method	Analyst	Date	Time	Batch
Metals Analysis									
Silver	<	0.500		MGL	EPA 6010A	NRM	09/13/95	1605	72356
Arsenic	<	0.500		MGL	EPA 6010A				
Barium	<	10.0		MGL	EPA 6010A				
Cadmium	<	0.100		MGL	EPA 6010A				
Chromium	<	0.500		MGL	EPA 6010A				
Nickel		0.345		MGL	EPA 6010A				
Lead	<	0.500		MGL	EPA 6010A				
Selenium	<	0.300		MGL	EPA 6010A				
Mercury	<	0.0200		MGL	EPA 7470	BBJ	09/13/95	1312	72357
Radiological									
Total Uranium		1280	+/- 41.1	UGL	EPI A-023	PCW	09/13/95	1020	71661

The following prep procedures were performed:

ICP					EPA 3005	DVW	09/11/95	2120	72356
Mercury					EPA 7470	BBJ	09/12/95	1500	72357

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Laboratory Certifications

STATE	GEL	EPI
FL	E87156/87294	E87472/87458
NC	233	
SC	10120	10582
TN	02934	
VA	00151	
WI	999887779	

CERTIFICATE OF ANALYSIS

Client: Westinghouse Savannah River Co.
Bldg. 773-58A, Rm. 1
PO Box 616
Aiken, South Carolina 29803-6105
Contact: Ms. Janet Crawford
Project Description: Hazardous Waste Contract

cc: WSRC00194

Report Date: September 14, 1995

Sample ID : MIC5-42C EXTRACT 9

Parameter	Qualifier	Result	Units	Method	Analyst	Date	Time	Batch

This data report has been prepared and reviewed in accordance with General Engineering Laboratories standard operating procedures. Please direct any questions to your Project Manager, Edie Kent at (803) 769-7385.

Analytical Report Specialist

GENERAL ENGINEERING LABORATORIES

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Laboratory Certifications

STATE	GEL	EPI
FL	E87156/87294	E87472/87458
NC	233	
SC	10120	10582
TN	02934	
VA	00151	
WI	99988779	

CERTIFICATE OF ANALYSIS

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Project Description: Hazardous Waste Contract

cc: WSRC00194

Report Date: September 14, 1995

Sample ID : MIC5-42C EXTRACT 9
Lab ID : 9508477-28
Matrix : Extract
Date Collected : 08/08/95
Date Received : 08/08/95
Priority : Routine
Collector : Client

Parameter	Qualifier	Result		DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Metals Analysis												
Silver	J	0.0173		0.00780	0.500	MGL	1.0	NRM	09/13/95	1605	72356	1
Arsenic	U	-0.0128		0.0421	0.500	MGL	1.0					
Barium	J	0.0325		0.00220	10.0	MGL	1.0					
Cadmium	U	-0.00109		0.00330	0.100	MGL	1.0					
Chromium	J	0.0253		0.00420	0.500	MGL	1.0					
Nickel		0.345		0.00790	0.0500	MGL	1.0					
Lead	U	0.00765		0.0364	0.500	MGL	1.0					
Selenium	U	0.0192		0.0841	0.300	MGL	1.0					
Mercury	U	-0.000490		0.000148	0.0200	MGL	1.0	BBJ	09/13/95	1312	72357	2
Radiological												
Total Uranium		1280	+/- 41.1	4.57	4.57	UGL	1.0	PCW	09/13/95	1020	71661	3

The following prep procedures were performed:

ICP	DVW	09/11/95	2120	72356	4
Mercury	BBJ	09/12/95	1500	72357	2

M = Method	Method-Description
M 1	EPA 6010A
M 2	EPA 7470
M 3	EPI A-023
M 4	EPA 3005

GENERAL ENGINEERING LABORATORIES

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Laboratory Certifications

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SC	10120	10582
TN	02934	
VA	00151	
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CERTIFICATE OF ANALYSIS

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PO Box 616
Aiken, South Carolina 29803-6105

Contact: Ms. Janet Crawford

Project Description: Hazardous Waste Contract

cc: WSRC00194

Report Date: September 14, 1995

Sample ID : MIC5-42C EXTRACT 9

M = Method	Method-Description

Notes:
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* indicate that a quality control analyte recovery is outside of specified acceptance criteria.

This data report has been prepared and reviewed in accordance with General Engineering Laboratories standard operating procedures. Please direct any questions to your Project Manager, Edie Kent at (803) 769-7385.

Analytical Report Specialist

EGG

Environmental Geochemistry Group

WESTINGHOUSE SAVANNAH RIVER COMPANY
INTER-OFFICE MEMORANDUM

EGG-JCC-95107

Date: October 3, 1995

TO: Susan S. Jurgensen, 5-0200, 705-A

From: JDC Crawford, 773-58A, 5-4538

Job 95107

Attached are the results reported by General Engineering Laboratories (GEL) for the analysis of your samples for Job **95107**. Please note that this the second part of the original report. There are three case narratives and some more resumès to be issued before this report is complete.

If additional information is needed, please give me a call.

Janet

Reviewed By:

Janet D C Crawford 10/03/95

Janet D. C. Crawford/ Environmental Geochemistry Group

RECEIVED
SEP 29 1995
JDC CRAWFORD

CASE NARRATIVE
Job # 95107
9508477
Volatiles Analysis

Sample Analysis

The following samples were analyzed for Volatiles using EPA Method 8240.

Sample Description	Laboratory Description
MIC4-149C	9508477-03
MIC5-42C	9508477-04

Holding Times

All samples were not analyzed within the recommended holding times due to samples being placed on hold by client until August 14, 1995. See NCR# GEL-AS-OE-348.

Surrogate Analysis

All surrogate spiking compounds associated with these samples met the recovery criteria.

Blank Analysis

Target analytes were detected in the method blank for the batch below the PQL.

Spike Analysis

All Matrix Spike and Matrix Spike duplicates analyzed met recommended quality control limits for recoveries and relative percent difference (RPD).

Laboratory Control Sample Analysis

There were no LCS and LCS dup analyzed with these samples.

Dilutions

The samples were analyzed without dilution.

Internal Tracking

All samples were properly monitored during sample processing.

CASE NARRATIVE
Job # 95107
9508477
Volatiles Analysis

Sample Analysis

The following samples were analyzed for TCLP Volatiles using EPA Method 8240.

Sample Description	Laboratory Description
MIC4-149C	9508477-07

Holding Times

The TCLP extraction was performed beyond the recommended holding time but the samples were analyzed within the fourteen day holding period from filtration of Leachate. See NCR# GEL-AS-OE-358. The delay in TCLP extraction was due to the delay in logging the samples waiting on instructions from SRS as well as the subsequent special handling required on these samples.

Surrogate Analysis

All surrogate spiking compounds associated with these samples met the recovery criteria.

Blank Analysis

There were no target analytes detected in the method blank for the batch above the PQL.

Spike Analysis

All Matrix Spike and Matrix Spike duplicates analyzed met recommended quality control limits for recoveries and relative percent difference (RPD).

Laboratory Control Sample Analysis

There were no LCS and LCS dup analyzed with these samples.

Dilutions

The reported samples were analyzed at the standard 10x dilution for TCLP.

Internal Tracking

All samples were properly monitored during sample processing.

CASE NARRATIVE
Job # 95107
9508477
Volatiles Analysis

Sample Analysis

The following samples were analyzed for TCLP Volatiles using EPA Method 8240.

Sample Description	Laboratory Description
MIC5-42C	9508477-08

Holding Times

The TCLP extraction was performed beyond the recommended holding time but the samples were analyzed within the fourteen day holding period from filtration of Leachate. See NCR# GEL-AS-OE-358. The delay in TCLP extraction was due to the delay in logging the samples waiting on instructions from SRS as well as the subsequent special handling required on these samples.

Surrogate Analysis

All surrogate spiking compounds associated with these samples met the recovery criteria.

Blank Analysis

There were no target analytes detected in the method blank for the batch above the PQL.

Spike Analysis

All Matrix Spike (MS) and Matrix Spike Duplicates (MSD) analyzed did not meet recommended quality control limits for recoveries and relative percent difference (RPD). Compounds Benzene and Chlorobenzene were not within limits. Ran a LCS to confirm that matrix interference was the problem.

Laboratory Control Sample Analysis

A Laboratory Control Sample (LCS) was run to confirm matrix interference.

Dilutions

The reported samples were analyzed at the standard 10x dilution for TCLP.

Internal Tracking

All samples were properly monitored during sample processing.

CASE NARRATIVE
Job # 95107
Semivolatiles Analysis

Sample Analysis

The following samples were analyzed for Semivolatiles using EPA Method 8270.

Sample Description	Laboratory Description
MIC4-149C	9508477-03
MIC5-42C	9508477-04

Holding Times

The samples were not analyzed within the recommended holding times due to samples being placed on hold by client until August 14, 1995. See NCR# GEL-AS-OE-348.

Surrogate Analysis

All surrogate spiking compounds associated with these samples met the recovery criteria.

Blank Analysis

Target compounds were detected in the method blank but were below the PQL.

Spike Analysis

All Matrix Spike and Matrix Spike duplicates analyzed met recommended quality control limits for recoveries and relative percent difference (RPD).

Laboratory Control Sample Analysis

There were no LCS and LCS dup analyzed with these samples.

Dilutions

The samples were analyzed without dilution.

Tracking

All samples were properly monitored during sample processing.

CASE NARRATIVE
Job # 95107
9508477
Semivolatiles Analysis

Sample Analysis

The following samples were analyzed for TCLP Semivolatiles using EPA Method 8270.

Sample Description	Laboratory Description
MIC4-149C	9508477-07
MIC5-42C	9508477-08

Holding Times

The TCLP extraction was performed beyond the recommended holding time but the samples were extracted within the seven day holding period from filtration of Leachate. See NCR# GEL-AS-OE-358. The delay in TCLP extraction was due to the delay in logging the samples waiting on instructions from SRS as well as the subsequent special handling required on these samples.

Surrogate Analysis

All surrogate spiking compounds associated with these samples met the recovery criteria.

Blank Analysis

Target compounds were detected in the method blank but were below the PQL.

Spike Analysis

All Matrix Spike and Matrix Spike duplicates analyzed met recommended quality control limits for recoveries and relative percent difference (RPD).

Laboratory Control Sample Analysis

All Laboratory Control Samples (LCS) and Lab Control Sample Duplicates (LCSD) analyzed met recommended quality control limits for recoveries and relative percent difference (RPD).

Dilutions

The sample was analyzed at the standard 10x dilution for TCLP samples as outlined in our Standard Operating Procedures (SOP).

Tracking

All samples were properly monitored during sample processing.

CASE NARRATIVE REPORT
Job# 95107
Pesticide/PCB Analysis

Sample Analysis

The following sample was analyzed for Pesticides/PCBs using EPA Method 8080.

Sample Description	Laboratory Description
MIC4-149C	9508477-03
MIC5-42C	9508477-04

Holding Times

The samples were not analyzed within the recommended holding times due to samples being placed on hold by client until August 14, 1995. See NCR# GEL-AS-OE-348.

Surrogate Analysis

All surrogate spiking compounds associated with these samples met the recovery criteria.

Blank Analysis

No target analytes were detected in the method blank.

Spike Analysis

All Matrix Spike and Matrix Spike duplicates analyzed met recommended quality control limits for recoveries and relative percent difference (RPD).

Laboratory Control Sample Analysis

All Laboratory Control Samples (LCS) and Lab Control Sample Duplicates (LCSD) analyzed met recommended quality control limits for recoveries and relative percent difference (RPD).

Dilutions

The samples were analyzed without dilution.

Internal Tracking

All samples were properly monitored during sample processing.

CASE NARRATIVE REPORT
Job# 95107
Pesticide/PCB Analysis

Sample Analysis

The following sample was analyzed for TCLP/Pesticides/PCBs using EPA Method 8080.

Sample Description	Laboratory Description
MIC4-149C	9508477-07
MIC5-42C	9508477-08

Holding Times

The TCLP extraction was performed beyond the recommended holding time but the samples were extracted within the seven day holding period from filtration of Leachate. See NCR# GEL-AS-OE-358. The delay in TCLP extraction was due to the delay in logging the samples waiting on instructions from SRS as well as the subsequent special handling required on these samples.

Surrogate Analysis

All surrogate spiking compounds associated with these samples met the recovery criteria.

Blank Analysis

No target analytes were detected in the method blank.

Spike Analysis

All Matrix Spike and Matrix Spike duplicates analyzed met recommended quality control limits for recoveries and relative percent difference (RPD).

Laboratory Control Sample Analysis

All Laboratory Control Samples (LCS) and Lab Control Sample Duplicates (LCSD) analyzed met recommended quality control limits for recoveries and relative percent difference (RPD).

Dilutions

The samples were analyzed without dilution.

Internal Tracking

All samples were properly monitored during sample processing.

CASE NARRATIVE REPORT
Job # 95107
9508477
Herbicide Analysis

Sample Analysis

The following sample was analyzed for Herbicides using EPA Method 8150.

Sample Description	Laboratory Description
MIC4-149C	9508477-03
MIC5-42C	9508477-04

Holding Times

The samples were not analyzed within the recommended holding times due to samples being placed on hold by client until August 14, 1995. See NCR# GEL-AS-OE-348.

Surrogate Analysis

All surrogate spiking compounds associated with these samples did not meet the recovery criteria. See NCR# GEL-AS-OE-348.

Blank Analysis

No target analytes were detected in the method blank.

Spike Analysis

All Matrix Spike (MS) and Matrix Spike Duplicates (MSD) analyzed met recommended quality control limits for recoveries and relative percent difference (RPD).

Laboratory Control Sample Analysis

All Laboratory Control Samples (LCS) and Lab Control Sample Duplicates (LCSD) analyzed met recommended quality control limits for recoveries and relative percent difference (RPD).

Dilutions

A standard 10x dilution was made on all samples and their QCs.

Internal Tracking

All samples were properly monitored during sample processing.

CASE NARRATIVE REPORT
Job # 95107
9508477
Herbicide Analysis

Sample Analysis

The following sample was analyzed for TCLP Herbicides using EPA Method 8150.

Sample Description	Laboratory Description
MIC4-149C	9508477-07
MIC5-42C	9508477-08

Holding Times

The TCLP extraction was performed beyond the recommended holding time and the samples were extracted beyond the seven day holding period from filtration of Leachate. See NCR# GEL-AS-OE-358. The delay in TCLP extraction and sample extraction was due to the delay in logging the samples waiting on instructions from SRS as well as the subsequent special handling required on these samples.

Surrogate Analysis

All surrogate spiking compounds associated with these samples met the recovery criteria.

Blank Analysis

No target analytes were detected in the method blank.

Spike Analysis

All Matrix Spike (MS) and Matrix Spike Duplicates (MSD) analyzed met recommended quality control limits for recoveries and relative percent difference (RPD).

Laboratory Control Sample Analysis

All Laboratory Control Samples (LCS) and Lab Control Sample Duplicates (LCSD) analyzed met recommended quality control limits for recoveries and relative percent difference (RPD).

Dilutions

The samples were analyzed without dilution.

Internal Tracking

All samples were properly monitored during sample processing.

CASE NARRATIVE
Job 95107
9508477
Metals Analysis

Sample Analysis

The following samples were analyzed for metals using EPA Method 6010A for analysis by ICP and using WSRC Method L16.1 A05-2502 for digestion by (Sodium Peroxide Dissolution) of Al, B, Cu, Fe, Li, Mg, Mn, Ni, Zn, and SiO_2.

Sample Description	Laboratory Identification
MIC4-149C	9508477-03
MIC5-42C	9508477-04

Holding Times

All samples were analyzed within the recommended holding times.

Blank Analysis

Aluminum and Iron were detected in the method blank at a concentration above the reporting limit but below one tenth of the sample's concentration. Nickel and Zinc were detected in the method blank at a concentration above the MDL but below the reporting limit. Silica's concentration in the method blank and each sample was suppressed by approximately 3.5 mg/l due to spectral interference from Sodium. This signal suppression corresponds to approximately 1% of each sample's total signal for Silica.

Duplicate Analysis

Matrix Duplicates analyzed met recommended quality control limits for relative percent differences (RPD).

Laboratory Control Sample Analysis

The Laboratory Control Samples (LCS) analyzed met recommended quality control limits for recovery.

Dilutions

The samples were analyzed without dilution.

Internal Tracking

All samples were properly monitored during sample processing.

CASE NARRATIVE
Job# 95107
9508477
Metals Analysis

Sample Analysis

The following sample was analyzed for Silver, Arsenic, Barium, Cadmium, Chromium, Nickel, Lead and Selenium by EPA method 6010A.

Sample Description	Laboratory Description
MIC4-149C	9508477-07
MIC5-42C	9508477-08
MIC4-149C EXTRACT 1	9508477-11
MIC4-149C EXTRACT 2	9508477-12
MIC4-149C EXTRACT 3	9508477-13
MIC4-149C EXTRACT 4	9508477-14
MIC4-149C EXTRACT 5	9508477-15
MIC4-149C EXTRACT 6	9508477-16
MIC4-149C EXTRACT 7	9508477-17
MIC4-149C EXTRACT 8	9508477-18
MIC4-149C EXTRACT 9	9508477-19
MIC5-42C EXTRACT 1	9508477-20
MIC5-42C EXTRACT 2	9508477-21
MIC5-42C EXTRACT 3	9508477-22
MIC5-42C EXTRACT 4	9508477-23
MIC5-42C EXTRACT 5	9508477-24
MIC5-42C EXTRACT 6	9508477-25
MIC5-42C EXTRACT 7	9508477-26
MIC5-42C EXTRACT 8	9508477-27
MIC5-42C EXTRACT 9	9508477-28

Holding Times

All samples were analyzed within the recommended holding times.

Blank Analysis

Silver were detected in the method blank at a conc. above the MDL but below the reporting limit.

Spike Analysis

Matrix Spike and Matrix Spike duplicate recoveries for ICP analytes of interest to these samples met expected quality control limits for recoveries and relative percent difference (RPD).

Laboratory Control Sample Analysis

Laboratory Control Sample (LCS) and Lab Control Sample Duplicate (LCSD) analyzed met recommended quality control limits for recoveries and relative percent difference.

Dilutions

The reported samples were analyzed without dilution.

Internal Tracking

All samples were properly tracked during processing.

CASE NARRATIVE
Job# 95107
9508477
Mercury Analysis

Sample Analysis

The following sample was analyzed for Mercury by EPA method 7470.

Sample Description	Laboratory Description
MIC4-149C	9508477-07
MIC5-42C	9508477-08
MIC4-149C EXTRACT 1	9508477-11
MIC4-149C EXTRACT 2	9508477-12
MIC4-149C EXTRACT 3	9508477-13
MIC4-149C EXTRACT 4	9508477-14
MIC4-149C EXTRACT 5	9508477-15
MIC4-149C EXTRACT 6	9508477-16
MIC4-149C EXTRACT 7	9508477-17
MIC4-149C EXTRACT 8	9508477-18
MIC4-149C EXTRACT 9	9508477-19
MIC5-42C EXTRACT 1	9508477-20
MIC5-42C EXTRACT 2	9508477-21
MIC5-42C EXTRACT 3	9508477-22
MIC5-42C EXTRACT 4	9508477-23
MIC5-42C EXTRACT 5	9508477-24
MIC5-42C EXTRACT 6	9508477-25
MIC5-42C EXTRACT 7	9508477-26
MIC5-42C EXTRACT 8	9508477-27
MIC5-42C EXTRACT 9	9508477-28

Holding Times

All samples were analyzed within the recommended holding times.

Blank Analysis

No target analytes were detected in t he method blank for the batch.

Spike Analysis

Matrix Spike and Matrix Spike duplicates analyzed met recommended quality control limits for recovery and relative percent difference.

Laboratory Control Sample Analysis

Laboratory Control Sample (LCS) and Lab Control Sample Duplicate (LCSD) analyzed met recommended quality control limits for recoveries and relative percent difference.

Dilutions

The reported samples were analyzed without dilution.

Internal Tracking

All samples were properly tracked during processing.

CASE NARRATIVE REPORT
Job 95107
9508477
Radiochemistry Analysis

Sample Analysis

The following samples were analyzed for Total Uranium by EPI method A-023.

Sample Description	Laboratory Description
MIC4-149C	9508477-03
MIC5-42C	9508477-04

Holding Times

All samples were analyzed within the recommended holding times.

Surrogate Analysis

Surrogate analysis does not apply to Radiochemistry.

Blank Analysis

No target analytes were detected in the method blank for the batch .

Spike Analysis

All Matrix Spike (MS) and Matrix Spike Duplicates (MSD) analyzed met recommended quality control limits for recoveries and relative percent difference (RPD).

Laboratory Control Sample Analysis

All Laboratory Control Samples (LCS) analyzed met recommended quality control limits for recoveries and relative percent difference (RPD).

Dilutions

The reported samples were analyzed without dilution.

CASE NARRATIVE REPORT
Job 95107
9508477
Radiochemistry Analysis

Sample Analysis

The following samples were analyzed for Total Uranium by EPI method A-023.

Sample Description	Laboratory Description
MIC4-149C EXTRACT 1	9508477-11
MIC4-149C EXTRACT 2	9508477-12
MIC4-149C EXTRACT 3	9508477-13
MIC4-149C EXTRACT 4	9508477-14
MIC4-149C EXTRACT 5	9508477-15
MIC4-149C EXTRACT 6	9508477-16
MIC4-149C EXTRACT 7	9508477-17
MIC4-149C EXTRACT 8	9508477-18
MIC4-149C EXTRACT 9	9508477-19
MIC5-42C EXTRACT 1	9508477-20
MIC5-42C EXTRACT 2	9508477-21
MIC5-42C EXTRACT 3	9508477-22
MIC5-42C EXTRACT 4	9508477-23
MIC5-42C EXTRACT 5	9508477-24
MIC5-42C EXTRACT 6	9508477-25
MIC5-42C EXTRACT 7	9508477-26
MIC5-42C EXTRACT 8	9508477-27
MIC5-42C EXTRACT 9	9508477-28

Holding Times

All samples were analyzed within the recommended holding times.

Surrogate Analysis

Surrogate analysis does not apply to Radiochemistry.

Blank Analysis

No target analytes were detected in the method blank for the batch .

Spike Analysis

All Matrix Spike (MS) and Matrix Spike Duplicates (MSD) analyzed met recommended quality control limits for recoveries and relative percent difference (RPD).

Laboratory Control Sample Analysis

All Laboratory Control Samples (LCS) analyzed met recommended quality control limits for recoveries and relative percent difference (RPD).

Dilutions

The reported samples were analyzed without dilution.

CASE NARRATIVE
95107
9508477
Total Phosphorus Analysis

Sample Analysis

The following samples were analyzed for Total Phosphorus using EPA Method 365.4.

Sample Description	Laboratory Identification
MIC4-149C	9508477-03
MIC5-42C	9508477-04

Holding Times

The samples were analyzed within the method holding time of 28 days

Surrogate Analysis

Surrogate analysis does not apply to the Total Phosphorus method.

Blank Analysis

No target analytes were detected in the method blank for the batch .

Spike Analysis

Matrix spike was not within the limits of 70-130%. The reason for this was the spike concentration was diluted out during analysis.

Laboratory Control Sample Analysis

The LCS and LCS Dup were both within the control limits of 70-130% recovery for solid matrix Total Phosphorus samples.

Dilutions

Sample 9508477-03 was analyzed with a 50X dilution. Sample 9508477-04 was analyzed with a 200X dilution. The reason for the dilutions was high sample concentration The samples were prepped with a prep factor of approximately 20.

Internal Tracking

Samples showed proper chain of custody.

CASE NARRATIVE
Job # 95107
9508477
Ion Chromatography (IC) Analysis

Sample Analysis

The following samples were analyzed for Sulfate by Ion Chromatography (IC).

Sample Description	Laboratory Description
MIC4-149C	9508477-03
MIC5-42C	9508477-04

Instrument Calibration

All criteria were met for the initial and continuing calibrations.

Holding Times

All samples were analyzed within the technical holding times.

Blank Analysis

The blank is a bomb combustion prep blank and passes acceptable criteria for Sulfate.

Spike Analysis

The Matrix Spike (MS) met the recommended quality control criteria for percent recovery (%REC).

Laboratory Control Sample Analysis

KKG 10/03/95

All Laboratory Control Samples (LCS) and Laboratory Control Sample Duplicates (LCSD) analyzed met the recommended quality control limits for recoveries and relative percent difference (RPD).

Dilutions

The samples were analyzed without dilution.

Internal Tracking

All samples were properly monitored during sample processing.

Additional Comments

The sample duplicate did not meet acceptable relative percent difference (RPD) but the sample value and the duplicate were below the PQL for Sulfate.

CASE NARRATIVE
95107
9508477
Reactive Cyanide Analysis

Sample Analysis

The following samples were analyzed for Reactive Cyanide using EPA Method SW-846 Chapter 7.

Sample Description	Laboratory Identification
MIC4-149C	9508477-01
MIC5-42C	9508477-02

Holding Times

The method specifies no certain holding time. GEL uses the Total Cyanide method holding time of 14 days. The samples were analyzed within this hold time

Surrogate Analysis

Surrogate analysis does not apply to the Reactive Cyanide method.

Blank Analysis

No target analytes were detected in the method blank for the batch .

Spike Analysis

Matrix spike analysis does not apply to the Reactive Cyanide method.

Laboratory Control Sample Analysis

The LCS and LCS Dup were both within the control limits of 0-20% recovery for Reactive CN samples.

Dilutions

The sample was analyzed without dilution. The samples were prepped with a prep factor of approximately 5, as is specified in the method.

Internal Tracking

Samples showed proper chain of custody.

Comments

Sources at EPA confirmed that a low LCS recovery is to be expected using this method.

CASE NARRATIVE
Job 95107
9508477
H2S-reactive

Sample Analysis

The following samples were analyzed for H2S-reactive:

Sample Identification	Laboratory Identification
MIC4-149C	9508477-01
MIC5-42C	9508477-02

Holding Times

Holding times were met where applicable.

Surrogate Analysis

Surrogate analysis does not apply to H2S-reactive.

Blank Analysis

No contamination was detected in the method blank.

Duplicate and Spike Analysis

Spikes are not required by this method. The duplicate RPD is within acceptable limits because the [H2S-reactive] of both the sample and the duplicate were < PQL.

Laboratory Control Sample Analysis

LCS and LCS duplicates were analyzed for H2S-reactive. All of the LCS and LCS duplicate recoveries fell within our current acceptance limits.

Dilutions

No dilutions were made.

Internal Tracking

The samples were properly monitored during sample processing.

Aditional Information

GENERAL ENGINEERING LABORATORIES

Meeting today's needs with a vision for tomorrow.

Laboratory Certifications

STATE	GEL	EPI
FL	E87156/87294	E87472/87458
NC	233	
SC	10120	10582
TN	02934	
VA	00151	
WI	99988779	

CERTIFICATE OF ANALYSIS

Client: Westinghouse Savannah River Co.
Bldg. 773-58A, Rm. 1
PO Box 616
Aiken, South Carolina 29803-6105
Contact: Ms. Janet Crawford
Project Description: Hazardous Waste Contract

cc: WSRC00194 Report Date: September 26, 1995

Sample ID : MIC5-42C
Lab ID : 9508477-04
Matrix : Misc.
Date Collected : 08/08/95
Date Received : 08/08/95
Priority : Routine
Collector : Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Volatile Organics											
Appendix IX Volatiles - 53 items											
1,1,1,2-Tetrachloroethane	U	0.00	125	500	UGKG	25.	JAC	08/26/95	1733	71732	1
1,1,1-Trichloroethane	U	0.00	50.0	250	UGKG	25.					
1,1,2,2-Tetrachloroethane	U	0.00	50.0	250	UGKG	25.					
1,1,2-Trichloroethane	U	0.00	50.0	250	UGKG	25.					
1,1-Dichloroethane	U	0.00	50.0	250	UGKG	25.					
1,1-Dichloroethylene	U	0.00	50.0	250	UGKG	25.					
1,2,3-Trichloropropane	U	0.00	125	500	UGKG	25.					
1,2-Dibromo-3-chloropropane	U	0.00	125	500	UGKG	25.					
1,2-Dibromoethane	U	0.00	125	500	UGKG	25.					
1,2-Dichloroethane	U	0.00	50.0	250	UGKG	25.					
1,2-Dichloropropane	U	0.00	50.0	250	UGKG	25.					
1,2-trans-Dichloroethylene	U	0.00	50.0	250	UGKG	25.					
2-Butanone	U	0.00	250	500	UGKG	25.					
2-Hexanone	U	0.00	250	500	UGKG	25.					
4-Methyl-2-pentanone	U	0.00	250	500	UGKG	25.					
Acetone	U	0.00	250	500	UGKG	25.					
Acetonitrile	U	0.00	125	500	UGKG	25.					
Acrolein	U	0.00	1250	2500	UGKG	25.					
Acrylonitrile	U	0.00	1250	2500	UGKG	25.					
Allyl Chloride	U	0.00	125	500	UGKG	25.					
Benzene	U	0.00	50.0	250	UGKG	25.					
Bromoform	U	0.00	50.0	250	UGKG	25.					
Carbon Disulfide	U	0.00	50.0	500	UGKG	25.					
Carbon Tetrachloride	U	0.00	50.0	250	UGKG	25.					
Chlorobenzene	U	0.00	50.0	250	UGKG	25.					
Chlorodibromomethane	U	0.00	50.0	250	UGKG	25.					
Chloroethane	U	0.00	50.0	250	UGKG	25.					

GENERAL ENGINEERING LABORATORIES

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PO Box 616
Aiken, South Carolina 29803-6105
Contact: Ms. Janet Crawford
Project Description: Hazardous Waste Contract

cc: WSRC00194 Report Date: September 26, 1995

Sample ID : MIC5-42C

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Chloroform	U	0.00	50.0	250	UGKG	25.					
Chloroprene	U	0.00	125	1000	UGKG	25.	JAC	08/26/95	1733	71732	1
Dibromomethane	U	0.00	125	500	UGKG	25.					
Dichlorobromomethane	U	0.00	50.0	250	UGKG	25.					
Dichlorodifluoromethane	U	0.00	50.0	250	UGKG	25.					
Ethylbenzene	U	0.00	50.0	250	UGKG	25.					
Isobutyl Alcohol	U	0.00	250	500	UGKG	25.					
Methacrylonitrile	U	0.00	125	500	UGKG	25.					
Methyl Bromide	U	0.00	50.0	250	UGKG	25.					
Methyl Chloride	U	0.00	50.0	250	UGKG	25.					
Methyl Iodide	U	0.00	125	500	UGKG	25.					
Methyl Methacrylate	U	0.00	250	500	UGKG	25.					
Methylene Chloride	U	0.00	50.0	250	UGKG	25.					
Propionitrile	U	0.00	500	1250	UGKG	25.					
Styrene	U	0.00	50.0	250	UGKG	25.					
Tetrachloroethylene	U	0.00	50.0	250	UGKG	25.					
Toluene	U	0.00	50.0	250	UGKG	25.					
Trichloroethylene	U	0.00	50.0	250	UGKG	25.					
Trichlorofluoromethane	U	0.00	50.0	250	UGKG	25.					
Vinyl Acetate	U	0.00	250	500	UGKG	25.					
Vinyl chloride	U	0.00	50.0	250	UGKG	25.					
Xylenes (TOTAL)	U	0.00	100	1000	UGKG	25.					
bis(2-Chloromethylethyl)ether	U	0.00	1250	1250	UGKG	25.					
cis-1,3-Dichloropropylene	U	0.00	50.0	250	UGKG	25.					
trans-1,3-Dichloropropylene	U	0.00	50.0	250	UGKG	25.					
trans-1,4-Dichloro-2-butene	U	0.00	125	500	UGKG	25.					
Extractable Organics											
Appendix IX Semivolatile Compounds - 120 items											
1,2,4,5-Tetrachlorobenzene	U	0.00	166	332	UGKG	1.0	HNM	09/01/95	1702	71952	2
1,2,4-Trichlorobenzene	U	0.00	166	332	UGKG	1.0					
1,2-Dichlorobenzene	U	0.00	166	332	UGKG	1.0					
1,3-Dichlorobenzene	U	0.00	166	332	UGKG	1.0					
1,4-Dichlorobenzene	U	0.00	166	332	UGKG	1.0					
1,4-Dioxane	U	0.00	166	332	UGKG	1.0					
1,4-Naphthoquinone	U	0.00	166	332	UGKG	1.0					

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PO Box 616
Aiken, South Carolina 29803-6105
Contact: Ms. Janet Crawford
Project Description: Hazardous Waste Contract

cc: WSRC00194 Report Date: September 26, 1995

Sample ID : MIC5-42C

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
1-Naphthylamine	U	0.00	166	332	UGKG	1.0					
2,3,4,6-Tetrachlorophenol	U	0.00	166	332	UGKG	1.0	HNM	09/01/95	1702	71952	2
2,4,5-Trichlorophenol	U	0.00	166	332	UGKG	1.0					
2,4,6-Trichlorophenol	U	0.00	166	332	UGKG	1.0					
2,4-Dichlorophenol	U	0.00	166	332	UGKG	1.0					
2,4-Dimethylphenol	U	0.00	166	332	UGKG	1.0					
2,4-Dinitrophenol	U	0.00	332	1490	UGKG	1.0					
2,4-Dinitrotoluene	U	0.00	166	332	UGKG	1.0					
2,6-Dichlorophenol	U	0.00	166	332	UGKG	1.0					
2,6-Dinitrotoluene	U	0.00	166	332	UGKG	1.0					
2-Acetylaminofluorene	U	0.00	166	332	UGKG	1.0					
2-Chloronaphthalene.	U	0.00	166	332	UGKG	1.0					
2-Chlorophenol	U	0.00	166	332	UGKG	1.0					
2-Methylnaphthalene	U	0.00	166	332	UGKG	1.0					
2-Naphthylamine	U	0.00	166	332	UGKG	1.0					
2-Nitrophenol	U	0.00	166	332	UGKG	1.0					
2-Picoline	U	0.00	166	332	UGKG	1.0					
2-methyl-4,6-dinitrophenol	U	0.00	98.3	1650	UGKG	1.0					
2-sec-Butyl-4,6-Dinitrophenol	U	0.00	83.3	332	UGKG	1.0					
3,3'-Dichlorobenzidine	U	0.00	1660	1660	UGKG	1.0					
3,3'-Dimethylbenzidine	U	0.00	830	1660	UGKG	1.0					
3-Methylcholanthrene	U	0.00	49.8	332	UGKG	1.0					
4-Bromophenyl phenyl ether	U	0.00	199	332	UGKG	1.0					
4-Chloroaniline	U	0.00	166	332	UGKG	1.0					
4-Chlorophenyl phenyl ether	U	0.00	166	332	UGKG	1.0					
4-Nitrophenol	U	0.00	332	664	UGKG	1.0					
4-Nitroquinoline	U	0.00	166	332	UGKG	1.0					
4-aminobiphenyl	U	0.00	166	332	UGKG	1.0					
4-chloro-3-methyl phenol	U	0.00	166	332	UGKG	1.0					
5-Nitro-o-toluidine	U	0.00	166	332	UGKG	1.0					
7,12-Dimethylbenz(a)anthracene	U	0.00	166	332	UGKG	1.0					
Acenaphthene	U	0.00	166	332	UGKG	1.0					
Acenaphthylene	U	0.00	166	332	UGKG	1.0					
Acetophenone	U	0.00	166	332	UGKG	1.0					
Aniline	U	0.00	166	332	UGKG	1.0					

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PO Box 616
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Contact: Ms. Janet Crawford
Project Description: Hazardous Waste Contract

cc: WSRC00194 Report Date: September 26, 1995

Sample ID : MIC5-42C

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Anthracene	U	0.00	166	332	UGKG	1.0					
Aramite	U	0.00	166	332	UGKG	1.0	HNM	09/01/95	1702	71952	2
Benzo(a)anthracene	U	0.00	166	332	UGKG	1.0					
Benzo(a)pyrene	U	0.00	166	332	UGKG	1.0					
Benzo(b)fluoranthene	U	0.00	166	332	UGKG	1.0					
Benzo(ghi)perylene	U	0.00	166	332	UGKG	1.0					
enzo(k)fluoranthene	U	0.00	166	332	UGKG	1.0					
Benzyl Alcohol	U	0.00	166	332	UGKG	1.0					
Butyl benzyl phthalate	U	0.00	166	332	UGKG	1.0					
Chlorobenzilate	U	0.00	830	1660	UGKG	1.0					
Chrysene	U	0.00	166	332	UGKG	1.0					
Di-n-butyl phthalate	U	26.6	166	332	UGKG	1.0					
Di-n-octyl phthalate	U	0.00	166	332	UGKG	1.0					
Diallate	U	0.00	166	332	UGKG	1.0					
Dibenzo(a,h)anthracene	U	0.00	166	332	UGKG	1.0					
Dibenzofuran	U	0.00	166	332	UGKG	1.0					
Diethyl phthalate	U	0.00	129	332	UGKG	1.0					
Dimethoate	U	0.00	830	1660	UGKG	1.0					
Dimethyl phthalate	U	0.00	166	332	UGKG	1.0					
Diphenylamine	U	0.00	56.8	332	UGKG	1.0					
Disulfoton	U	0.00	166	332	UGKG	1.0					
Ethyl Methanesulfonate	U	0.00	166	332	UGKG	1.0					
Ethyl methacrylate	U	0.00	11000	11000	UGKG	1.0					
Famphur	U	0.00	166	332	UGKG	1.0					
Fluoranthene	U	0.00	166	332	UGKG	1.0					
Fluorene	U	0.00	166	332	UGKG	1.0					
Hexachlorobenzene	U	0.00	199	332	UGKG	1.0					
Hexachlorobutadiene	U	0.00	166	332	UGKG	1.0					
Hexachlorocyclopentadiene	U	0.00	232	332	UGKG	1.0					
Hexachloroethane	U	0.00	166	332	UGKG	1.0					
Hexachlorophene	U	0.00	8300	16600	UGKG	1.0					
Hexachloropropene	U	0.00	166	332	UGKG	1.0					
Indeno(1,2,3-c,d)pyrene	U	0.00	166	332	UGKG	1.0					
Isodrin	U	0.00	166	332	UGKG	1.0					
Isophorone	U	0.00	166	332	UGKG	1.0					

GENERAL ENGINEERING LABORATORIES

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Aiken, South Carolina 29803-6105
Contact: Ms. Janet Crawford
Project Description: Hazardous Waste Contract

cc: WSRC00194 Report Date: September 26, 1995

Sample ID : MIC5-42C

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Isosafrole	U	0.00	166	332	UGKG	1.0					
Kepone	U	0.00	166	332	UGKG	1.0	HNM	09/01/95	1702	71952	2
Methapyrilene	U	0.00	830	1660	UGKG	1.0					
Methyl Methanesulfonate	U	0.00	166	332	UGKG	1.0					
N-Nitrosodi-n-butylamine	U	0.00	166	332	UGKG	1.0					
N-Nitrosodiethylamine	U	0.00	166	332	UGKG	1.0					
N-Nitrosodimethylamine	U	0.00	166	332	UGKG	1.0					
N-Nitrosodiphenylamine	U	0.00	166	332	UGKG	1.0					
N-Nitrosodipropylamine	U	0.00	166	332	UGKG	1.0					
N-Nitrosomethylethylamine	U	0.00	166	332	UGKG	1.0					
N-Nitrosomorpholine	U	0.00	166	332	UGKG	1.0					
N-Nitrosopiperidine	U	0.00	166	332	UGKG	1.0					
N-Nitrosopyrolidine	U	0.00	166	332	UGKG	1.0					
Naphthalene	U	0.00	166	332	UGKG	1.0					
Nitrobenzene	U	0.00	166	332	UGKG	1.0					
O,O,O-Triethylphosphorothioate	U	0.00	34.9	332	UGKG	1.0					
Pentachlorobenzene	U	0.00	166	332	UGKG	1.0					
Pentachloroethane	U	0.00	166	332	UGKG	1.0					
Pentachloronitrobenzene	U	0.00	166	332	UGKG	1.0					
Pentachlorophenol	U	0.00	266	332	UGKG	1.0					
Phenacetin	U	0.00	166	332	UGKG	1.0					
Phenanthrene	U	0.00	166	332	UGKG	1.0					
Phenol	U	0.00	166	332	UGKG	1.0					
Pronamide	U	0.00	166	332	UGKG	1.0					
Pyrene	U	0.00	166	332	UGKG	1.0					
Pyridine	U	0.00	166	332	UGKG	1.0					
Safrole	U	0.00	166	332	UGKG	1.0					
Sulfotepp	U	0.00	166	332	UGKG	1.0					
Thionazin	U	0.00	166	332	UGKG	1.0					
a-,a-Dimethylphenethylamine	U	0.00	199	332	UGKG	1.0					
bis(2-Chloroethoxy)methane	U	0.00	166	332	UGKG	1.0					
bis(2-Chloroethyl) ether	U	0.00	166	332	UGKG	1.0					
bis(2-Ethylhexyl)phthalate	U	35.5	166	332	UGKG	1.0					
m,p-Cresol	U	0.00	116	332	UGKG	1.0					
m-Dinitrobenzene	U	0.00	166	332	UGKG	1.0					

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Aiken, South Carolina 29803-6105
Contact: Ms. Janet Crawford
Project Description: Hazardous Waste Contract

cc: WSRC00194 Report Date: September 26, 1995

Sample ID : MIC5-42C

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
m-Nitroaniline	U	0.00	259	332	UGKG	1.0					
o-Cresol	U	0.00	122	332	UGKG	1.0	HNM	09/01/95	1702	71952	2
o-Nitroaniline	U	0.00	93.0	332	UGKG	1.0					
o-Toluidine	U	0.00	166	332	UGKG	1.0					
p-Dimethylaminoazobenzene	U	0.00	166	332	UGKG	1.0					
p-Nitroaniline	U	0.00	136	332	UGKG	1.0					
p-Phenylenediamine	U	0.00	332	664	UGKG	1.0					
sym-Trinitrobenzene	U	0.00	1070	1660	UGKG	1.0					
Appendix IX - Herbicides - 3 items											
2,4,5-T	U	0.00	4.96	9.91	UGKG	10.	JLS	09/06/95	0351	71972	3
2,4,5-TP	U	0.00	2.48	4.96	UGKG	10.					
2,4-D	U	0.00	4.96	9.91	UGKG	10.					
Appendix IX - Pesticides & PCBs - 29 items											
4,4'-DDD	U	0.00	1.66	3.32	UGKG	1.0	JEB	09/06/95	0713	71953	4
4,4'-DDE	U	0.00	0.830	3.00	UGKG	1.0					
4,4'-DDT	U	0.00	1.66	3.32	UGKG	1.0					
Aldrin	U	0.00	0.415	3.00	UGKG	1.0					
Chlordane	U	0.00	4.15	8.30	UGKG	1.0					
Dieldrin	U	0.00	0.830	3.00	UGKG	1.0					
Endosulfan I	U	0.00	0.830	3.00	UGKG	1.0					
Endosulfan II	U	0.00	1.66	3.32	UGKG	1.0					
Endosulfan sulfate	U	0.00	1.66	3.32	UGKG	1.0					
Endrin	U	0.00	0.830	3.00	UGKG	1.0					
Endrin aldehyde	U	0.00	2.08	4.15	UGKG	1.0					
Heptachlor	U	0.00	0.830	3.00	UGKG	1.0					
Heptachlor epoxide	U	0.00	0.830	3.00	UGKG	1.0					
Methoxychlor	U	0.00	8.30	16.6	UGKG	1.0					
PCB-1016	U	0.00	3.32	4.15	UGKG	1.0					
PCB-1221	U	0.00	3.32	4.15	UGKG	1.0					
PCB-1232	U	0.00	3.32	4.15	UGKG	1.0					
PCB-1242	U	0.00	3.32	4.15	UGKG	1.0					
PCB-1248	U	0.00	3.32	4.15	UGKG	1.0					
PCB-1254	U	0.00	3.32	4.15	UGKG	1.0					
PCB-1260	U	0.00	3.32	4.15	UGKG	1.0					
Parathion	U	0.00	0.830	3.00	UGKG	1.0					

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Contact: Ms. Janet Crawford
Project Description: Hazardous Waste Contract

cc: WSRC00194 Report Date: September 26, 1995

Sample ID : MIC5-42C

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Parathion, methyl	U	0.00	0.830	3.00	UGKG	1.0					
Phorate	U	0.00	0.830	3.00	UGKG	1.0	JEB	09/06/95	0713	71953	4
Toxaphene	U	0.00	16.6	33.2	UGKG	1.0					
alpha-BHC	U	0.00	0.415	3.00	UGKG	1.0					
beta-BHC	U	0.00	0.830	3.00	UGKG	1.0					
delta-BHC	U	0.00	0.830	3.00	UGKG	1.0					
gamma-BHC	U	0.00	0.415	3.00	UGKG	1.0					
Metals Analysis											
Arsenic		6390	498	2490	UGKG	10.	RMJ	08/31/95	1932	71805	5
Lead		50200	498	5000	UGKG	10.	RMJ	08/30/95	1106	71805	6
Antimony	U	642	996	5000	UGKG	10.	RMJ	08/31/95	1547	71805	7
Selenium		5060	996	4980	UGKG	20.	RMJ	09/01/95	1444	71805	8
Thallium	U	139	996	5000	UGKG	20.	RMJ	09/05/95	1529	71805	9
Silver	J	2.30	0.388	2.50	MGKG	1.0	JSS	08/31/95	1632	71753	10
Aluminum		72500	17.5	255	MGKG	1.0	JSS	09/19/95	1741	72379	10
Boron		21400	16.5	510	MGKG	1.0					
Barium		165	0.110	25.0	MGKG	1.0	JSS	08/31/95	1632	71753	10
Beryllium	J	0.933	0.0149	10.0	MGKG	1.0					
Calcium		2450	0.349	12.5	MGKG	1.0					
Cadmium	J	0.819	0.164	1.00	MGKG	1.0					
Cobalt	J	8.04	0.169	10.0	MGKG	1.0					
Chromium		332	0.209	25.0	MGKG	1.0					
Copper		67.9	8.57	25.5	MGKG	1.0	JSS	09/19/95	1741	72379	10
Iron		5510	9.18	102	MGKG	1.0					
Lithium		25100	19.7	25.5	MGKG	1.0					
Magnesium		1630	22.4	102	MGKG	1.0					
Manganese		314	2.55	10.2	MGKG	1.0					
Sodium		71000	7.56	49.8	MGKG	1.0	JSS	08/31/95	1632	71753	10
Nickel		4390	8.06	25.5	MGKG	1.0	JSS	09/19/95	1741	72379	10
Silica		405000	47.9	47.9	MGKG	1.0					
Tin	J	4.27	1.17	100	MGKG	1.0	JSS	08/31/95	1632	71753	10
Vanadium	U	-5.30	0.209	10.0	MGKG	1.0					
Zinc		142	2.14	20.4	MGKG	1.0	JSS	09/19/95	1741	72379	10
Mercury	J	13.1	2.23	100	UGKG	1.0	BBJ	08/31/95	2018	71865	11
General Chemistry											

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CERTIFICATE OF ANALYSIS

Client: Westinghouse Savannah River Co.
Bldg. 773-58A, Rm. 1
PO Box 616
Aiken, South Carolina 29803-6105
Contact: Ms. Janet Crawford
Project Description: Hazardous Waste Contract

cc: WSRC00194 Report Date: September 26, 1995

Sample ID : MIC5-42C

Parameter	Qualifier	Result		DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Sulfate as SO4	U	4.06		8.67	10.2	MGKG	1.0	BJW	08/29/95	1228	71815	12
Phosphorus, Total as PO4		6070		173	384	MGKG	200	CEG	08/30/95	0935	71789	13
Radiological												
Total Uranium		14200	+/- 455	11.7	11.7	UGG	1.0	PCW	09/13/95	0809	71863	14

The following prep procedures were performed:

GC/MS 5970 Extractables	MBB	08/30/95	2320	71952	15
Herbicides	MBB	08/31/95	1300	71972	3
Pesticides	MBB	08/30/95	2345	71953	15
Graphite Furnace	FGD	08/29/95	1750	71805	16
ICP	FGD	08/29/95	1645	71753	16
ICP	PJM	09/16/95	2100	72379	16
Mercury	BBJ	08/31/95	1300	71865	11
Silica Digestion (Peroxide Dissolution)	JSS	09/19/95	1741	72379	16

Comments:

A dilution was required for Volatile Organics and Herbicides due to matrix interference and a dilution was required for Metals Analysis due to high concentration of target compound(s). As a result, the detection limits are elevated.

This sample was analyzed beyond recommended holding for the following:
Volatile Organics
Preparation of Extractable Organics
Preparation of Herbicides
Preparation of Pesticides

Surrogate Recovery	Test	Percent%	Acceptable Limits
2,4,6-Tribromophenol	APP 9 SEMIVOA	99.5	(19.0 - 122.)
2-Fluorobiphenyl	APP 9 SEMIVOA	84.5	(30.0 - 114.)

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cc: WSRC00194 Report Date: September 26, 1995

Sample ID : MIC5-42C

Surrogate Recovery	Test	Percent%	Acceptable Limits
2-Fluorophenol	APP 9 SEMIVOA	81.1	(44.0 - 102.)
Nitrobenzene-d5	APP 9 SEMIVOA	73.2	(23.0 - 120.)
Phenol-d6	APP 9 SEMIVOA	84.0	(45.0 - 111.)
p-Terphenyl-d14	APP 9 SEMIVOA	94.3	(52.0 - 135.)
4-(2,4-Dichlorophenoxy)Butyric	APP 9 HERBICIDES	968.*	(50.0 - 150.)
4CMX	APP 9 PESTICIDES	96.2	(28.6 - 127.)
Dibutylchlorendate	APP 9 PESTICIDES	87.2	(52.5 - 156.)
1,2-Dichloroethane-d4	APP 9 VOA	102.	(86.6 - 109.)
Bromofluorobenzene	APP 9 VOA	98.4	(89.6 - 106.)
Toluene-d8	APP 9 VOA	100.	(81.0 - 114.)

M = Method	Method-Description
M 1	EPA 8240 extended
M 2	EPA 8270
M 3	EPA 8150
M 4	EPA 8080
M 5	EPA 7060
M 6	EPA 7421
M 7	EPA 7041
M 8	EPA 7740
M 9	EPA 7841
M 10	EPA 6010A
M 11	EPA 7471
M 12	EPA 300.0
M 13	EPA 365.4 modified
M 14	EPI A-023
M 15	EPA 3500/3520
M 16	ASTM E926-83

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Sample ID : MIC5-42C

M = Method	Method-Description

Notes:
The qualifiers in this report are defined as follows:
J indicates the presence of an analyte at a concentration less than the reporting limit (RL) and greater than the detection limit (DL).
U indicates that the analyte was not detected at a concentration greater than the detection limit.
indicate that a quality control analyte recovery is outside of specified acceptance criteria.

This data report has been prepared and reviewed in accordance with General Engineering Laboratories standard operating procedures. Please direct any questions to your Project Manager, Edie Kent at (803) 769-7385.

Kendra Middleton
Analytical Report Specialist

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PO Box 616
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Contact: Ms. Janet Crawford
Project Description: Hazardous Waste Contract

cc: WSRC00194 Report Date: September 26, 1995

Sample ID : MIC5-42C
Lab ID : 9508477-04
Matrix : Misc.
Date Collected : 08/08/95
Date Received : 08/08/95
Priority : Routine
Collector : Client

Parameter	Qualifier	Result	Units	Method	Analyst	Date	Time	Batch
Volatile Organics								
Appendix IX Volatiles - 53 items								
1,1,1,2-Tetrachloroethane	<	500	UGKG	EPA 8240 extended	JAC	08/26/95	1733	71732
1,1,1-Trichloroethane	<	250	UGKG	EPA 8240 extended				
1,1,2,2-Tetrachloroethane	<	250	UGKG	EPA 8240 extended				
1,1,2-Trichloroethane	<	250	UGKG	EPA 8240 extended				
1,1-Dichloroethane	<	250	UGKG	EPA 8240 extended				
1,1-Dichloroethylene	<	250	UGKG	EPA 8240 extended				
1,2,3-Trichloropropane	<	500	UGKG	EPA 8240 extended				
1,2-Dibromo-3-chloropropane	<	500	UGKG	EPA 8240 extended				
1,2-Dibromoethane	<	500	UGKG	EPA 8240 extended				
1,2-Dichloroethane	<	250	UGKG	EPA 8240 extended				
1,2-Dichloropropane	<	250	UGKG	EPA 8240 extended				
1,2-trans-Dichloroethylene	<	250	UGKG	EPA 8240 extended				
2-Butanone	<	500	UGKG	EPA 8240 extended				
2-Hexanone	<	500	UGKG	EPA 8240 extended				
4-Methyl-2-pentanone	<	500	UGKG	EPA 8240 extended				
Acetone	<	500	UGKG	EPA 8240 extended				
Acetonitrile	<	500	UGKG	EPA 8240 extended				
Acrolein	<	2500	UGKG	EPA 8240 extended				
Acrylonitrile	<	2500	UGKG	EPA 8240 extended				
Allyl Chloride	<	500	UGKG	EPA 8240 extended				
Benzene	<	250	UGKG	EPA 8240 extended				
Bromoform	<	250	UGKG	EPA 8240 extended				
Carbon Disulfide	<	500	UGKG	EPA 8240 extended				
Carbon Tetrachloride	<	250	UGKG	EPA 8240 extended				
Chlorobenzene	<	250	UGKG	EPA 8240 extended				
Chlorodibromomethane	<	250	UGKG	EPA 8240 extended				
Chloroethane	<	250	UGKG	EPA 8240 extended				

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Sample ID : MIC5-42C

Parameter	Qualifier	Result	Units	Method	Analyst	Date	Time	Batch
Chloroform	<	250	UGKG	EPA 8240 extended				
Chloroprene	<	1000	UGKG	EPA 8240 extended	JAC	08/26/95	1733	71732
Dibromomethane	<	500	UGKG	EPA 8240 extended				
Dichlorobromomethane	<	250	UGKG	EPA 8240 extended				
Dichlorodifluoromethane	<	250	UGKG	EPA 8240 extended				
Ethylbenzene	<	250	UGKG	EPA 8240 extended				
obutyl Alcohol	<	500	UGKG	EPA 8240 extended				
Methacrylonitrile	<	500	UGKG	EPA 8240 extended				
Methyl Bromide	<	250	UGKG	EPA 8240 extended				
Methyl Chloride	<	250	UGKG	EPA 8240 extended				
Methyl Iodide	<	500	UGKG	EPA 8240 extended				
Methyl Methacrylate	<	500	UGKG	EPA 8240 extended				
Methylene Chloride	<	250	UGKG	EPA 8240 extended				
Propionitrile	<	1250	UGKG	EPA 8240 extended				
Styrene	<	250	UGKG	EPA 8240 extended				
Tetrachloroethylene	<	250	UGKG	EPA 8240 extended				
Toluene	<	250	UGKG	EPA 8240 extended				
Trichloroethylene	<	250	UGKG	EPA 8240 extended				
Trichlorofluoromethane	<	250	UGKG	EPA 8240 extended				
Vinyl Acetate	<	500	UGKG	EPA 8240 extended				
Vinyl chloride	<	250	UGKG	EPA 8240 extended				
Xylenes (TOTAL)	<	1000	UGKG	EPA 8240 extended				
bis(2-Chloromethylethyl)ether	<	1250	UGKG	EPA 8240 extended				
cis-1,3-Dichloropropylene	<	250	UGKG	EPA 8240 extended				
trans-1,3-Dichloropropylene	<	250	UGKG	EPA 8240 extended				
trans-1,4-Dichloro-2-butene	<	500	UGKG	EPA 8240 extended				
Extractable Organics								
Appendix IX Semivolatile Compounds - 120 items								
1,2,4,5-Tetrachlorobenzene	<	332	UGKG	EPA 8270	HNM	09/01/95	1702	71952
1,2,4-Trichlorobenzene	<	332	UGKG	EPA 8270				
1,2-Dichlorobenzene	<	332	UGKG	EPA 8270				
1,3-Dichlorobenzene	<	332	UGKG	EPA 8270				
1,4-Dichlorobenzene	<	332	UGKG	EPA 8270				
1,4-Dioxane	<	332	UGKG	EPA 8270				
1,4-Naphthoquinone	<	332	UGKG	EPA 8270				

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Contact: Ms. Janet Crawford
Project Description: Hazardous Waste Contract

cc: WSRC00194 Report Date: September 26, 1995

Sample ID : MIC5-42C

Parameter	Qualifier	Result	Units	Method	Analyst	Date	Time	Batch
1-Naphthylamine	<	332	UGKG	EPA 8270				
2,3,4,6-Tetrachlorophenol	<	332	UGKG	EPA 8270	HNM	09/01/95	1702	71952
2,4,5-Trichlorophenol	<	332	UGKG	EPA 8270				
2,4,6-Trichlorophenol	<	332	UGKG	EPA 8270				
2,4-Dichlorophenol	<	332	UGKG	EPA 8270				
2,4-Dimethylphenol	<	332	UGKG	EPA 8270				
2,4-Dinitrophenol	<	1490	UGKG	EPA 8270				
2,4-Dinitrotoluene	<	332	UGKG	EPA 8270				
2,6-Dichlorophenol	<	332	UGKG	EPA 8270				
2,6-Dinitrotoluene	<	332	UGKG	EPA 8270				
2-Acetylaminofluorene	<	332	UGKG	EPA 8270				
2-Chloronaphthalene	<	332	UGKG	EPA 8270				
2-Chlorophenol	<	332	UGKG	EPA 8270				
2-Methylnaphthalene	<	332	UGKG	EPA 8270				
2-Naphthylamine	<	332	UGKG	EPA 8270				
2-Nitrophenol	<	332	UGKG	EPA 8270				
2-Picoline	<	332	UGKG	EPA 8270				
2-methyl-4,6-dinitrophenol	<	1650	UGKG	EPA 8270				
2-sec-Butyl-4,6-Dinitrophenol	<	332	UGKG	EPA 8270				
3,3'-Dichlorobenzidine	<	1660	UGKG	EPA 8270				
3,3'-Dimethylbenzidine	<	1660	UGKG	EPA 8270				
3-Methylcholanthrene	<	332	UGKG	EPA 8270				
4-Bromophenyl phenyl ether	<	332	UGKG	EPA 8270				
4-Chloroaniline	<	332	UGKG	EPA 8270				
4-Chlorophenyl phenyl ether	<	332	UGKG	EPA 8270				
4-Nitrophenol	<	664	UGKG	EPA 8270				
4-Nitroquinoline	<	332	UGKG	EPA 8270				
4-aminobiphenyl	<	332	UGKG	EPA 8270				
4-chloro-3-methyl phenol	<	332	UGKG	EPA 8270				
5-Nitro-o-toluidine	<	332	UGKG	EPA 8270				
7,12-Dimethylbenz(a)anthracene	<	332	UGKG	EPA 8270				
Acenaphthene	<	332	UGKG	EPA 8270				
Acenaphthylene	<	332	UGKG	EPA 8270				
Acetophenone	<	332	UGKG	EPA 8270				
Aniline	<	332	UGKG	EPA 8270				

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PO Box 616
Aiken, South Carolina 29803-6105
Contact: Ms. Janet Crawford
Project Description: Hazardous Waste Contract

cc: WSRC00194 Report Date: September 26, 1995

Sample ID : MIC5-42C

Parameter	Qualifier	Result	Units	Method	Analyst	Date	Time	Batch
Anthracene	<	332	UGKG	EPA 8270				
Aramite	<	332	UGKG	EPA 8270	HNM	09/01/95	1702	71952
Benzo(a)anthracene	<	332	UGKG	EPA 8270				
Benzo(a)pyrene	<	332	UGKG	EPA 8270				
Benzo(b)fluoranthene	<	332	UGKG	EPA 8270				
Benzo(ghi)perylene	<	332	UGKG	EPA 8270				
Benzo(k)fluoranthene	<	332	UGKG	EPA 8270				
Benzyl Alcohol	<	332	UGKG	EPA 8270				
Butyl benzyl phthalate	<	332	UGKG	EPA 8270				
Chlorobenzilate	<	1660	UGKG	EPA 8270				
Chrysene	<	332	UGKG	EPA 8270				
Di-n-butyl phthalate	<	332	UGKG	EPA 8270				
Di-n-octyl phthalate	<	332	UGKG	EPA 8270				
Diallate	<	332	UGKG	EPA 8270				
Dibenzo(a,h)anthracene	<	332	UGKG	EPA 8270				
Dibenzofuran	<	332	UGKG	EPA 8270				
Diethyl phthalate	<	332	UGKG	EPA 8270				
Dimethoate	<	1660	UGKG	EPA 8270				
Dimethyl phthalate	<	332	UGKG	EPA 8270				
Diphenylamine	<	332	UGKG	EPA 8270				
Disulfoton	<	332	UGKG	EPA 8270				
Ethyl Methanesulfonate	<	332	UGKG	EPA 8270				
Ethyl methacrylate	<	11000	UGKG	EPA 8270				
Famphur	<	332	UGKG	EPA 8270				
Fluoranthene	<	332	UGKG	EPA 8270				
Fluorene	<	332	UGKG	EPA 8270				
Hexachlorobenzene	<	332	UGKG	EPA 8270				
Hexachlorobutadiene	<	332	UGKG	EPA 8270				
Hexachlorocyclopentadiene	<	332	UGKG	EPA 8270				
Hexachloroethane	<	332	UGKG	EPA 8270				
Hexachlorophene	<	16600	UGKG	EPA 8270				
Hexachloropropene	<	332	UGKG	EPA 8270				
Indeno(1,2,3-c,d)pyrene	<	332	UGKG	EPA 8270				
Isodrin	<	332	UGKG	EPA 8270				
Isophorone	<	332	UGKG	EPA 8270				

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Project Description: Hazardous Waste Contract

cc: WSRC00194 Report Date: September 26, 1995

Sample ID : MIC5-42C

Parameter	Qualifier	Result	Units	Method	Analyst	Date	Time	Batch
Isosafrole	<	332	UGKG	EPA 8270				
Kepone	<	332	UGKG	EPA 8270	HNM	09/01/95	1702	71952
Methapyrilene	<	1660	UGKG	EPA 8270				
Methyl Methanesulfonate	<	332	UGKG	EPA 8270				
N-Nitrosodi-n-butylamine	<	332	UGKG	EPA 8270				
N-Nitrosodiethylamine	<	332	UGKG	EPA 8270				
N-Nitrosodimethylamine	<	332	UGKG	EPA 8270				
N-Nitrosodiphenylamine	<	332	UGKG	EPA 8270				
N-Nitrosodipropylamine	<	332	UGKG	EPA 8270				
N-Nitrosomethylethylamine	<	332	UGKG	EPA 8270				
N-Nitrosomorpholine	<	332	UGKG	EPA 8270				
N-Nitrosopiperidine	<	332	UGKG	EPA 8270				
N-Nitrosopyrolidine	<	332	UGKG	EPA 8270				
Naphthalene	<	332	UGKG	EPA 8270				
Nitrobenzene	<	332	UGKG	EPA 8270				
O,O,O-Triethylphosphorothioate	<	332	UGKG	EPA 8270				
Pentachlorobenzene	<	332	UGKG	EPA 8270				
Pentachloroethane	<	332	UGKG	EPA 8270				
Pentachloronitrobenzene	<	332	UGKG	EPA 8270				
Pentachlorophenol	<	332	UGKG	EPA 8270				
Phenacetin	<	332	UGKG	EPA 8270				
Phenanthrene	<	332	UGKG	EPA 8270				
Phenol	<	332	UGKG	EPA 8270				
Pronamide	<	332	UGKG	EPA 8270				
Pyrene	<	332	UGKG	EPA 8270				
Pyridine	<	332	UGKG	EPA 8270				
Safrole	<	332	UGKG	EPA 8270				
Sulfotepp	<	332	UGKG	EPA 8270				
Thionazin	<	332	UGKG	EPA 8270				
a-,a-Dimethylphenethylamine	<	332	UGKG	EPA 8270				
bis(2-Chloroethoxy)methane	<	332	UGKG	EPA 8270				
bis(2-Chloroethyl) ether	<	332	UGKG	EPA 8270				
bis(2-Ethylhexyl)phthalate	<	332	UGKG	EPA 8270				
m,p-Cresol	<	332	UGKG	EPA 8270				
m-Dinitrobenzene	<	332	UGKG	EPA 8270				

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Contact: Ms. Janet Crawford
Project Description: Hazardous Waste Contract

cc: WSRC00194 Report Date: September 26, 1995

Sample ID : MIC5-42C

Parameter	Qualifier	Result	Units	Method	Analyst	Date	Time	Batch
m-Nitroaniline	<	332	UGKG	EPA 8270				
o-Cresol	<	332	UGKG	EPA 8270	HNM	09/01/95	1702	71952
o-Nitroaniline	<	332	UGKG	EPA 8270				
o-Toluidine	<	332	UGKG	EPA 8270				
p-Dimethylaminoazobenzene	<	332	UGKG	EPA 8270				
o-Nitroaniline	<	332	UGKG	EPA 8270				
-Phenylenediamine	<	664	UGKG	EPA 8270				
sym-Trinitrobenzene	<	1660	UGKG	EPA 8270				
Appendix IX - Herbicides - 3 items								
2,4,5-T	<	9.91	UGKG	EPA 8150	JLS	09/06/95	0351	71972
2,4,5-TP	<	4.96	UGKG	EPA 8150				
2,4-D	<	9.91	UGKG	EPA 8150				
Appendix IX - Pesticides & PCBs - 29 items								
4,4'-DDD	<	3.32	UGKG	EPA 8080	JEB	09/06/95	0713	71953
4,4'-DDE	<	3.00	UGKG	EPA 8080				
4,4'-DDT	<	3.32	UGKG	EPA 8080				
Aldrin	<	3.00	UGKG	EPA 8080				
Chlordane	<	8.30	UGKG	EPA 8080				
Dieldrin	<	3.00	UGKG	EPA 8080				
Endosulfan I	<	3.00	UGKG	EPA 8080				
Endosulfan II	<	3.32	UGKG	EPA 8080				
Endosulfan sulfate	<	3.32	UGKG	EPA 8080				
Endrin	<	3.00	UGKG	EPA 8080				
Endrin aldehyde	<	4.15	UGKG	EPA 8080				
Heptachlor	<	3.00	UGKG	EPA 8080				
Heptachlor epoxide	<	3.00	UGKG	EPA 8080				
Methoxychlor	<	16.6	UGKG	EPA 8080				
PCB-1016	<	4.15	UGKG	EPA 8080				
PCB-1221	<	4.15	UGKG	EPA 8080				
PCB-1232	<	4.15	UGKG	EPA 8080				
PCB-1242	<	4.15	UGKG	EPA 8080				
PCB-1248	<	4.15	UGKG	EPA 8080				
PCB-1254	<	4.15	UGKG	EPA 8080				
PCB-1260	<	4.15	UGKG	EPA 8080				
Parathion	<	3.00	UGKG	EPA 8080				

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WI	99988779	

CERTIFICATE OF ANALYSIS

Client: Westinghouse Savannah River Co.
Bldg. 773-58A, Rm. 1
PO Box 616
Aiken, South Carolina 29803-6105
Contact: Ms. Janet Crawford
Project Description: Hazardous Waste Contract

cc: WSRC00194

Report Date: September 26, 1995

Sample ID	: MIC5-42C
Lab ID	: 9508477-06
Matrix	: Misc.
Date Collected	: 08/08/95
Date Received	: 08/08/95
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
General Chemistry											
Chlorides	U	0.00	4900	12300	MGKG	50.	JPB	09/20/95	1203	72152	1

The following prep procedures were performed:

ICP							PJM	09/16/95	2100	72379	2

Comments:
A dilution was required for this sample due to matrix interference.
As a result,the detection limit is elevated.

This sample was analyzed beyond recommended holding.

M = Method	Method-Description
M 1	EPA 300.0
M 2	EPA 3050/3005

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Contact: Ms. Janet Crawford
Project Description: Hazardous Waste Contract

cc: WSRC00194 Report Date: September 26, 1995

Sample ID : MIC5-42C

M = Method	Method-Description

Notes:
The qualifiers in this report are defined as follows:
J indicates the presence of an analyte at a concentration less than the reporting limit (RL) and greater than the detection limit (DL).
U indicates that the analyte was not detected at a concentration greater than the detection limit.
* indicate that a quality control analyte recovery is outside of specified acceptance criteria.

This data report has been prepared and reviewed in accordance with General Engineering Laboratories standard operating procedures. Please direct any questions to your Project Manager, Edie Kent at (803) 769-7385.

Kendra Middleton
Analytical Report Specialist

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PO Box 616
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Contact: Ms. Janet Crawford
Project Description: Hazardous Waste Contract

cc: WSRC00194 Report Date: September 26, 1995

Sample ID	: MIC5-42C
Lab ID	: 9508477-06
Matrix	: Misc.
Date Collected	: 08/08/95
Date Received	: 08/08/95
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	Units	Method	Analyst	Date	Time	Batch
General Chemistry								
Chlorides	<	12300	MGKG	EPA 300.0	JPB	09/20/95	1203	72152
The following prep procedures were performed:								
ICP				EPA 3050/3005	PJM	09/16/95	2100	72379

Comments:
A dilution was required for this sample due to matrix interference.
As a result,the detection limit is elevated.

This sample was analyzed beyond recommended holding.

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Project Description: Hazardous Waste Contract

cc: WSRC00194 Report Date: September 26, 1995

Sample ID : MIC5-42C

Parameter	Qualifier	Result	Units	Method	Analyst	Date	Time	Batch

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Sandra P. Middleton
Analytical Report Specialist

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Client: Westinghouse Savannah River Co.
Bldg. 773-58A, Rm. 1
PO Box 616
Aiken, South Carolina 29803-6105
Contact: Ms. Janet Crawford
Project Description: Hazardous Waste Contract

cc: WSRC00194 Report Date: September 26, 1995

Sample ID : MIC4-149C
Lab ID : 9508477-03
Matrix : Misc.
Date Collected : 08/08/95
Date Received : 08/08/95
Priority : Routine
Collector : Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Volatile Organics											
Appendix IX Volatiles - 53 items											
1,1,1,2-Tetrachloroethane	U	0.00	125	500	UGKG	25.	JAC	08/26/95	1659	71732	1
1,1,1-Trichloroethane	U	0.00	50.0	250	UGKG	25.					
1,1,2,2-Tetrachloroethane	U	0.00	50.0	250	UGKG	25.					
1,1,2-Trichloroethane	U	0.00	50.0	250	UGKG	25.					
1,1-Dichloroethane	U	0.00	50.0	250	UGKG	25.					
1,1-Dichloroethylene	U	0.00	50.0	250	UGKG	25.					
1,2,3-Trichloropropane	U	0.00	125	500	UGKG	25.					
1,2-Dibromo-3-chloropropane	U	0.00	125	500	UGKG	25.					
1,2-Dibromoethane	U	0.00	125	500	UGKG	25.					
1,2-Dichloroethane	U	0.00	50.0	250	UGKG	25.					
1,2-Dichloropropane	U	0.00	50.0	250	UGKG	25.					
1,2-trans-Dichloroethylene	U	0.00	50.0	250	UGKG	25.					
2-Butanone	U	0.00	250	500	UGKG	25.					
2-Hexanone	U	0.00	250	500	UGKG	25.					
4-Methyl-2-pentanone	U	0.00	250	500	UGKG	25.					
Acetone	U	0.00	250	500	UGKG	25.					
Acetonitrile	U	0.00	125	500	UGKG	25.					
Acrolein	U	0.00	1250	2500	UGKG	25.					
Acrylonitrile	U	0.00	1250	2500	UGKG	25.					
Allyl Chloride	U	0.00	125	500	UGKG	25.					
Benzene	U	0.00	50.0	250	UGKG	25.					
Bromoform	U	0.00	50.0	250	UGKG	25.					
Carbon Disulfide	U	0.00	50.0	500	UGKG	25.					
Carbon Tetrachloride	U	0.00	50.0	250	UGKG	25.					
Chlorobenzene	U	3.18	50.0	250	UGKG	25.					
Chlorodibromomethane	U	0.00	50.0	250	UGKG	25.					
Chloroethane	U	0.00	50.0	250	UGKG	25.					

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Bldg. 773-58A, Rm. 1
PO Box 616
Aiken, South Carolina 29803-6105
Contact: Ms. Janet Crawford
Project Description: Hazardous Waste Contract

cc: WSRC00194 Report Date: September 26, 1995

Sample ID : MIC4-149C

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Chloroform	U	0.00	50.0	250	UGKG	25.					
Chloroprene	U	0.00	125	1000	UGKG	25.	JAC	08/26/95	1659	71732	1
Dibromomethane	U	0.00	125	500	UGKG	25.					
Dichlorobromomethane	U	0.00	50.0	250	UGKG	25.					
Dichlorodifluoromethane	U	0.00	50.0	250	UGKG	25.					
Ethylbenzene	U	0.00	50.0	250	UGKG	25.					
sobutyl Alcohol	U	0.00	250	500	UGKG	25.					
Methacrylonitrile	U	0.00	125	500	UGKG	25.					
Methyl Bromide	U	0.00	50.0	250	UGKG	25.					
Methyl Chloride	U	0.00	50.0	250	UGKG	25.					
Methyl Iodide	U	0.00	125	500	UGKG	25.					
Methyl Methacrylate	U	0.00	250	500	UGKG	25.					
Methylene Chloride	U	0.00	50.0	250	UGKG	25.					
Propionitrile	U	0.00	500	1250	UGKG	25.					
Styrene	U	0.00	50.0	250	UGKG	25.					
Tetrachloroethylene	U	0.00	50.0	250	UGKG	25.					
Toluene	U	0.00	50.0	250	UGKG	25.					
Trichloroethylene	U	0.00	50.0	250	UGKG	25.					
Trichlorofluoromethane	U	0.00	50.0	250	UGKG	25.					
Vinyl Acetate	U	0.00	250	500	UGKG	25.					
Vinyl chloride	U	0.00	50.0	250	UGKG	25.					
Xylenes (TOTAL)	U	0.00	100	1000	UGKG	25.					
bis(2-Chloromethylethyl)ether	U	0.00	1250	1250	UGKG	25.					
cis-1,3-Dichloropropylene	U	0.00	50.0	250	UGKG	25.					
trans-1,3-Dichloropropylene	U	0.00	50.0	250	UGKG	25.					
trans-1,4-Dichloro-2-butene	U	0.00	125	500	UGKG	25.					
Extractable Organics											
Appendix IX Semivolatile Compounds - 120 items											
1,2,4,5-Tetrachlorobenzene	U	0.00	165	330	UGKG	1.0	HNM	09/01/95	1554	71952	2
1,2,4-Trichlorobenzene	U	0.00	165	330	UGKG	1.0					
1,2-Dichlorobenzene	U	0.00	165	330	UGKG	1.0					
1,3-Dichlorobenzene	U	0.00	165	330	UGKG	1.0					
1,4-Dichlorobenzene	U	0.00	165	330	UGKG	1.0					
1,4-Dioxane	U	0.00	165	330	UGKG	1.0					
1,4-Naphthoquinone	U	0.00	165	330	UGKG	1.0					

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PO Box 616
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Contact: Ms. Janet Crawford
Project Description: Hazardous Waste Contract

cc: WSRC00194 Report Date: September 26, 1995

Sample ID : MIC4-149C

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
1-Naphthylamine	U	0.00	165	330	UGKG	1.0					
2,3,4,6-Tetrachlorophenol	U	0.00	165	330	UGKG	1.0	HNM	09/01/95	1554	71952	2
2,4,5-Trichlorophenol	U	0.00	165	330	UGKG	1.0					
2,4,6-Trichlorophenol	U	0.00	165	330	UGKG	1.0					
2,4-Dichlorophenol	U	0.00	165	330	UGKG	1.0					
2,4-Dimethylphenol	U	0.00	165	330	UGKG	1.0					
2,4-Dinitrophenol	U	0.00	330	1490	UGKG	1.0					
2,4-Dinitrotoluene	U	0.00	165	330	UGKG	1.0					
2,6-Dichlorophenol	U	0.00	165	330	UGKG	1.0					
2,6-Dinitrotoluene	U	0.00	165	330	UGKG	1.0					
2-Acetylaminofluorene	U	0.00	165	330	UGKG	1.0					
2-Chloronaphthalene	U	0.00	165	330	UGKG	1.0					
2-Chlorophenol	U	0.00	165	330	UGKG	1.0					
2-Methylnaphthalene	U	0.00	165	330	UGKG	1.0					
2-Naphthylamine	U	0.00	165	330	UGKG	1.0					
2-Nitrophenol	U	0.00	165	330	UGKG	1.0					
2-Picoline	U	0.00	165	330	UGKG	1.0					
2-methyl-4,6-dinitrophenol	U	0.00	97.7	1650	UGKG	1.0					
2-sec-Butyl-4,6-Dinitrophenol	U	0.00	82.8	330	UGKG	1.0					
3,3'-Dichlorobenzidine	U	0.00	1650	1650	UGKG	1.0					
3,3'-Dimethylbenzidine	U	0.00	825	1650	UGKG	1.0					
3-Methylcholanthrene	U	0.00	49.5	330	UGKG	1.0					
4-Bromophenyl phenyl ether	U	0.00	198	330	UGKG	1.0					
4-Chloroaniline	U	0.00	165	330	UGKG	1.0					
4-Chlorophenyl phenyl ether	U	0.00	165	330	UGKG	1.0					
4-Nitrophenol	U	0.00	330	660	UGKG	1.0					
4-Nitroquinoline	U	0.00	165	330	UGKG	1.0					
4-aminobiphenyl	U	0.00	165	330	UGKG	1.0					
4-chloro-3-methyl phenol	U	0.00	165	330	UGKG	1.0					
5-Nitro-o-toluidine	U	0.00	165	330	UGKG	1.0					
7,12-Dimethylbenz(a)anthracene	U	0.00	165	330	UGKG	1.0					
Acenaphthene	U	0.00	165	330	UGKG	1.0					
Acenaphthylene	U	0.00	165	330	UGKG	1.0					
Acetophenone	U	0.00	165	330	UGKG	1.0					
Aniline	U	0.00	165	330	UGKG	1.0					

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Contact: Ms. Janet Crawford
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cc: WSRC00194 Report Date: September 26, 1995

Sample ID : MIC4-149C

Parameter	Qualifier	Result		DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Sulfate as SO4	U	0.818		8.18	9.62	MGKG	1.0	BJW	08/29/95	1219	71815	12
Phosphorus, Total as PO4		910		45.0	100	MGKG	50.	CEG	08/30/95	0935	71789	13
Radiological												
Total Uranium		33100	+/- 1090	22.6	22.6	UGG	1.0	PCW	09/13/95	0831	71863	14

UGG 10/03/95

UGG 10/03/95

The following prep procedures were performed:

GC/MS 5970 Extractables	MBB	08/30/95	2320	71952	15
Herbicides	MBB	08/31/95	1300	71972	3
Pesticides	MBB	08/30/95	2345	71953	15
Graphite Furnace	FGD	08/29/95	1750	71805	16
ICP	FGD	08/29/95	1645	71753	16
ICP	PJM	09/16/95	2100	72379	16
Mercury	BBJ	08/31/95	1300	71865	11
Silica Digestion (Peroxide Dissolution)	JSS	09/19/95	1733	72379	16

Comments:

A dilution was required for Volatile Organics and Herbicides due to matrix interference and a dilution was required for Metals Analysis due to high concentration of target compound(s). As a result, the detection limits are elevated.

This sample was analyzed beyond recommended holding for the following:
Volatile Organics
Preparation of Extractable Organics
Preparation of Herbicides
Preparation of Pesticides

Surrogate Recovery	Test	Percent%	Acceptable Limits
2,4,6-Tribromophenol	APP 9 SEMIVOA	91.4	(19.0 - 122.)
2-Fluorobiphenyl	APP 9 SEMIVOA	75.8	(30.0 - 114.)

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Project Description: Hazardous Waste Contract

cc: WSRC00194 Report Date: September 26, 1995

Sample ID : MIC4-149C

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Parathion, methyl	U	0.00	0.833	3.00	UGKG	1.0					
Phorate	U	0.00	0.833	3.00	UGKG	1.0	JEB	09/06/95	0633	71953	4
Toxaphene	U	0.00	16.7	33.3	UGKG	1.0					
alpha-BHC	U	0.00	0.416	3.00	UGKG	1.0					
beta-BHC	U	0.00	0.833	3.00	UGKG	1.0					
delta-BHC	U	0.00	0.833	3.00	UGKG	1.0					
gamma-BHC	U	0.00	0.416	3.00	UGKG	1.0					
Metals Analysis											
Arsenic	J	3950	994	4970	UGKG	20.	RMJ	09/01/95	1554	71805	5
Lead		34600	497	5000	UGKG	10.	RMJ	08/30/95	1052	71805	6
Antimony	U	-731	994	5000	UGKG	10.	RMJ	08/31/95	1532	71805	7
Selenium		6770	994	4970	UGKG	20.	RMJ	09/01/95	1419	71805	8
Thallium	U	1590	4970	24900	UGKG	100	RMJ	09/05/95	1514	71805	9
Silver		15.3	1.55	4.97	MGKG	4.0	JSS	08/31/95	1640	71753	10
Aluminum		68100	16.4	239	MGKG	1.0	JSS	09/19/95	1733	72379	10
Boron		24600	15.5	477	MGKG	1.0					
Barium		268	0.437	25.0	MGKG	4.0	JSS	08/31/95	1640	71753	10
Beryllium	J	0.525	0.0596	10.0	MGKG	4.0					
Calcium		5040	1.39	49.7	MGKG	4.0					
Cadmium		2.14	0.656	1.00	MGKG	4.0					
Cobalt	J	3.64	0.676	10.0	MGKG	4.0					
Chromium		1140	0.835	25.0	MGKG	4.0					
Copper		70.8	8.01	25.0	MGKG	1.0	JSS	09/19/95	1733	72379	10
Iron		11000	8.59	95.4	MGKG	1.0					
Lithium		23900	18.4	23.9	MGKG	1.0					
Magnesium		4830	21.0	95.4	MGKG	1.0					
Manganese		177	2.39	9.54	MGKG	1.0					
Sodium		108000	30.2	199	MGKG	4.0	JSS	08/31/95	1640	71753	10
Nickel		5460	7.54	25.0	MGKG	1.0	JSS	09/19/95	1733	72379	10
Silica		347000	44.8	44.8	MGKG	1.0					
Tin	J	13.5	4.65	100	MGKG	4.0	JSS	08/31/95	1640	71753	10
Vanadium	U	-16.2	0.835	10.0	MGKG	4.0					
Zinc		126	2.00	20.0	MGKG	1.0	JSS	09/19/95	1733	72379	10
Mercury	J	3.15	2.46	100	UGKG	1.0	BBJ	08/31/95	2016	71865	11
General Chemistry											

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PO Box 616
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Contact: Ms. Janet Crawford

Project Description: Hazardous Waste Contract

cc: WSRC00194 Report Date: September 26, 1995

Sample ID : MIC4-149C

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
n-Nitroaniline	U	0.00	257	330	UGKG	1.0					
)-Cresol	U	0.00	121	330	UGKG	1.0	HNM	09/01/95	1554	71952	2
)-Nitroaniline	U	0.00	92.4	330	UGKG	1.0					
)-Toluidine	U	0.00	165	330	UGKG	1.0					
)-Dimethylaminoazobenzene	U	0.00	165	330	UGKG	1.0					
)-Nitroaniline	U	0.00	135	330	UGKG	1.0					
Phenylenediamine	U	0.00	330	660	UGKG	1.0					
;ym-Trinitrobenzene	U	0.00	1060	1650	UGKG	1.0					
Appendix IX - Herbicides - 3 items											
2,4,5-T	U	0.00	4.91	9.82	UGKG	10.	JLS	09/06/95	0330	71972	3
2,4,5-TP	U	0.00	2.46	4.91	UGKG	10.					
2,4-D	U	0.00	4.91	9.82	UGKG	10.					
Appendix IX - Pesticides & PCBs - 29 items											
4,4'-DDD	U	0.00	1.67	3.33	UGKG	1.0	JEB	09/06/95	0633	71953	4
4,4'-DDE	U	0.00	0.833	3.00	UGKG	1.0					
4,4'-DDT	U	0.00	1.67	3.33	UGKG	1.0					
Aldrin	U	0.00	0.416	3.00	UGKG	1.0					
Chlordane	U	0.00	4.16	8.33	UGKG	1.0					
Dieldrin	U	0.00	0.833	3.00	UGKG	1.0					
Endosulfan I	U	0.00	0.833	3.00	UGKG	1.0					
Endosulfan II	U	0.00	1.67	3.33	UGKG	1.0					
Endosulfan sulfate	U	0.00	1.67	3.33	UGKG	1.0					
Endrin	U	0.00	0.833	3.00	UGKG	1.0					
Endrin aldehyde	U	0.00	2.08	4.16	UGKG	1.0					
Heptachlor	U	0.00	0.833	3.00	UGKG	1.0					
Heptachlor epoxide	U	0.00	0.833	3.00	UGKG	1.0					
Methoxychlor	U	0.00	8.33	16.7	UGKG	1.0					
PCB-1016	U	0.00	3.33	4.16	UGKG	1.0					
PCB-1221	U	0.00	3.33	4.16	UGKG	1.0					
PCB-1232	U	0.00	3.33	4.16	UGKG	1.0					
PCB-1242	U	0.00	3.33	4.16	UGKG	1.0					
PCB-1248	U	0.00	3.33	4.16	UGKG	1.0					
PCB-1254	U	0.00	3.33	4.16	UGKG	1.0					
PCB-1260	U	0.00	3.33	4.16	UGKG	1.0					
Parathion	U	0.00	0.833	3.00	UGKG	1.0					

GENERAL ENGINEERING LABORATORIES

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Laboratory Certifications

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FL	E87156/87294	E87472/87458
NC	233	
SC	10120	10582
TN	02934	
VA	00151	
WI	99988779	

CERTIFICATE OF ANALYSIS

Client: Westinghouse Savannah River Co.
Bldg. 773-58A, Rm. 1
PO Box 616
Aiken, South Carolina 29803-6105
Contact: Ms. Janet Crawford
Project Description: Hazardous Waste Contract

cc: WSRC00194 Report Date: September 26, 1995

Sample ID : MIC4-149C

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Isosafrole	U	0.00	165	330	UGKG	1.0					
Kepone	U	0.00	165	330	UGKG	1.0	HNM	09/01/95	1554	71952	2
Methapyrilene	U	0.00	825	1650	UGKG	1.0					
Methyl Methanesulfonate	U	0.00	165	330	UGKG	1.0					
N-Nitrosodi-n-butylamine	U	0.00	165	330	UGKG	1.0					
N-Nitrosodiethylamine	U	0.00	165	330	UGKG	1.0					
N-Nitrosodimethylamine	U	0.00	165	330	UGKG	1.0					
N-Nitrosodiphenylamine	U	0.00	165	330	UGKG	1.0					
N-Nitrosodipropylamine	U	0.00	165	330	UGKG	1.0					
N-Nitrosomethylethylamine	U	0.00	165	330	UGKG	1.0					
N-Nitrosomorpholine	U	0.00	165	330	UGKG	1.0					
N-Nitrosopiperidine	U	0.00	165	330	UGKG	1.0					
N-Nitrosopyrolidine	U	0.00	165	330	UGKG	1.0					
Naphthalene	U	0.00	165	330	UGKG	1.0					
Nitrobenzene	U	0.00	165	330	UGKG	1.0					
O,O,O-Triethylphosphorothioate	U	0.00	34.7	330	UGKG	1.0					
Pentachlorobenzene	U	0.00	165	330	UGKG	1.0					
Pentachloroethane	U	0.00	165	330	UGKG	1.0					
Pentachloronitrobenzene	U	0.00	165	330	UGKG	1.0					
Pentachlorophenol	U	0.00	264	330	UGKG	1.0					
Phenacetin	U	0.00	165	330	UGKG	1.0					
Phenanthrene	U	0.00	165	330	UGKG	1.0					
Phenol	U	0.00	165	330	UGKG	1.0					
Pronamide	U	0.00	165	330	UGKG	1.0					
Pyrene	U	6.60	165	330	UGKG	1.0					
Pyridine	U	0.00	165	330	UGKG	1.0					
Safrole	U	0.00	165	330	UGKG	1.0					
Sulfotepp	U	0.00	165	330	UGKG	1.0					
Thionazin	U	0.00	165	330	UGKG	1.0					
a-,a-Dimethylphenethylamine	U	0.00	198	330	UGKG	1.0					
bis(2-Chloroethoxy)methane	U	0.00	165	330	UGKG	1.0					
bis(2-Chloroethyl) ether	U	0.00	165	330	UGKG	1.0					
bis(2-Ethylhexyl)phthalate	U	20.5	165	330	UGKG	1.0					
m,p-Cresol	U	0.00	116	330	UGKG	1.0					
m-Dinitrobenzene	U	0.00	165	330	UGKG	1.0					

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cc: WSRC00194 Report Date: September 26, 1995

Sample ID : MIC4-149C

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Anthracene	U	0.00	165	330	UGKG	1.0					
Aramite	U	0.00	165	330	UGKG	1.0	HNM	09/01/95	1554	71952	2
Benzo(a)anthracene	U	0.00	165	330	UGKG	1.0					
Benzo(a)pyrene	U	0.00	165	330	UGKG	1.0					
Benzo(b)fluoranthene	U	0.00	165	330	UGKG	1.0					
Benzo(ghi)perylene	U	0.00	165	330	UGKG	1.0					
enzo(k)fluoranthene	U	0.00	165	330	UGKG	1.0					
Benzyl Alcohol	U	0.00	165	330	UGKG	1.0					
Butyl benzyl phthalate	U	0.00	165	330	UGKG	1.0					
Chlorobenzilate	U	0.00	825	1650	UGKG	1.0					
Chrysene	U	0.00	165	330	UGKG	1.0					
Di-n-butyl phthalate	U	30.4	165	330	UGKG	1.0					
Di-n-octyl phthalate	U	0.00	165	330	UGKG	1.0					
Diallate	U	0.00	165	330	UGKG	1.0					
Dibenzo(a,h)anthracene	U	0.00	165	330	UGKG	1.0					
Dibenzofuran	U	0.00	165	330	UGKG	1.0					
Diethyl phthalate	U	0.00	128	330	UGKG	1.0					
Dimethoate	U	0.00	825	1650	UGKG	1.0					
Dimethyl phthalate	U	0.00	165	330	UGKG	1.0					
Diphenylamine	U	0.00	56.4	330	UGKG	1.0					
Disulfoton	U	0.00	165	330	UGKG	1.0					
Ethyl Methanesulfonate	U	0.00	165	330	UGKG	1.0					
Ethyl methacrylate	U	0.00	10900	10900	UGKG	1.0					
Famphur	U	0.00	165	330	UGKG	1.0					
Fluoranthene	U	0.00	165	330	UGKG	1.0					
Fluorene	U	0.00	165	330	UGKG	1.0					
Hexachlorobenzene	U	0.00	198	330	UGKG	1.0					
Hexachlorobutadiene	U	0.00	165	330	UGKG	1.0					
Hexachlorocyclopentadiene	U	0.00	231	330	UGKG	1.0					
Hexachloroethane	U	0.00	165	330	UGKG	1.0					
Hexachlorophene	U	0.00	8250	16500	UGKG	1.0					
Hexachloropropene	U	0.00	165	330	UGKG	1.0					
Indeno(1,2,3-c,d)pyrene	U	0.00	165	330	UGKG	1.0					
Isodrin	U	0.00	165	330	UGKG	1.0					
Isophorone	U	0.00	165	330	UGKG	1.0					

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Project Description: Hazardous Waste Contract

cc: WSRC00194 Report Date: September 26, 1995

Sample ID : MIC4-149C

Surrogate Recovery	Test	Percent%	Acceptable Limits
2-Fluorophenol	APP 9 SEMIVOA	61.1	(44.0 - 102.)
Nitrobenzene-d5	APP 9 SEMIVOA	52.2	(23.0 - 120.)
Phenol-d6	APP 9 SEMIVOA	73.9	(45.0 - 111.)
p-Terphenyl-d14	APP 9 SEMIVOA	91.3	(52.0 - 135.)
4-(2,4-Dichlorophenoxy)Butyric	APP 9 HERBICIDES	1090*	(50.0 - 150.)
4CMX	APP 9 PESTICIDES	96.4	(28.6 - 127.)
Dibutylchlorendate	APP 9 PESTICIDES	91.2	(52.5 - 156.)
1,2-Dichloroethane-d4	APP 9 VOA	106.	(86.6 - 109.)
Bromofluorobenzene	APP 9 VOA	100.	(89.6 - 106.)
Toluene-d8	APP 9 VOA	100.	(81.0 - 114.)

M = Method	Method-Description
M 1	EPA 8240 extended
M 2	EPA 8270
M 3	EPA 8150
M 4	EPA 8080
M 5	EPA 7060
M 6	EPA 7421
M 7	EPA 7041
M 8	EPA 7740
M 9	EPA 7841
M 10	EPA 6010A
M 11	EPA 7471
M 12	EPA 300.0
M 13	EPA 365.4 modified
M 14	EPI A-023
M 15	EPA 3500/3520
M 16	ASTM E926-83

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PO Box 616
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Contact: Ms. Janet Crawford
Project Description: Hazardous Waste Contract

cc: WSRC00194 Report Date: September 26, 1995

Sample ID : MIC4-149C

M = Method	Method-Description

lotes:
he qualifiers in this report are defined as follows:
indicates the presence of an analyte at a concentration less than the reporting limit (RL) and greater than the detection limit (DL).
' indicates that the analyte was not detected at a concentration greater than the detection limit.
ndicate that a quality control analyte recovery is outside of specified acceptance criteria.

his data report has been prepared and reviewed
n accordance with General Engineering Laboratories
tandard operating procedures. Please direct
ny questions to your Project Manager, Edie Kent at (803) 769-7385.

Kendra Middleton

Analytical Report Specialist

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PO Box 616
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Contact: Ms. Janet Crawford
Project Description: Hazardous Waste Contract

cc: WSRC00194 Report Date: September 26, 1995

Sample ID	: MIC4-149C
Lab ID	: 9508477-03
Matrix	: Misc.
Date Collected	: 08/08/95
Date Received	: 08/08/95
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	Units	Method	Analyst	Date	Time	Batch
Volatile Organics								
Appendix IX Volatiles - 53 items								
1,1,1,2-Tetrachloroethane	<	500	UGKG	EPA 8240 extended	JAC	08/26/95	1659	71732
1,1,1-Trichloroethane	<	250	UGKG	EPA 8240 extended				
1,1,2,2-Tetrachloroethane	<	250	UGKG	EPA 8240 extended				
1,1,2-Trichloroethane	<	250	UGKG	EPA 8240 extended				
1,1-Dichloroethane	<	250	UGKG	EPA 8240 extended				
1,1-Dichloroethylene	<	250	UGKG	EPA 8240 extended				
1,2,3-Trichloropropane	<	500	UGKG	EPA 8240 extended				
1,2-Dibromo-3-chloropropane	<	500	UGKG	EPA 8240 extended				
1,2-Dibromoethane	<	500	UGKG	EPA 8240 extended				
1,2-Dichloroethane	<	250	UGKG	EPA 8240 extended				
1,2-Dichloropropane	<	250	UGKG	EPA 8240 extended				
1,2-trans-Dichloroethylene	<	250	UGKG	EPA 8240 extended				
2-Butanone	<	500	UGKG	EPA 8240 extended				
2-Hexanone	<	500	UGKG	EPA 8240 extended				
4-Methyl-2-pentanone	<	500	UGKG	EPA 8240 extended				
Acetone	<	500	UGKG	EPA 8240 extended				
Acetonitrile	<	500	UGKG	EPA 8240 extended				
Acrolein	<	2500	UGKG	EPA 8240 extended				
Acrylonitrile	<	2500	UGKG	EPA 8240 extended				
Allyl Chloride	<	500	UGKG	EPA 8240 extended				
Benzene	<	250	UGKG	EPA 8240 extended				
Bromoform	<	250	UGKG	EPA 8240 extended				
Carbon Disulfide	<	500	UGKG	EPA 8240 extended				
Carbon Tetrachloride	<	250	UGKG	EPA 8240 extended				
Chlorobenzene	<	250	UGKG	EPA 8240 extended				
Chlorodibromomethane	<	250	UGKG	EPA 8240 extended				
Chloroethane	<	250	UGKG	EPA 8240 extended				

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Bldg. 773-58A, Rm. 1
PO Box 616
Aiken, South Carolina 29803-6105
Contact: Ms. Janet Crawford
Project Description: Hazardous Waste Contract

cc: WSRC00194 Report Date: September 26, 1995

Sample ID : MIC4-149C

Parameter	Qualifier	Result	Units	Method	Analyst	Date	Time	Batch
Chloroform	<	250	UGKG	EPA 8240 extended				
Chloroprene	<	1000	UGKG	EPA 8240 extended	JAC	08/26/95	1659	71732
Dibromomethane	<	500	UGKG	EPA 8240 extended				
Dichlorobromomethane	<	250	UGKG	EPA 8240 extended				
Dichlorodifluoromethane	<	250	UGKG	EPA 8240 extended				
Ethylbenzene	<	250	UGKG	EPA 8240 extended				
Isobutyl Alcohol	<	500	UGKG	EPA 8240 extended				
Methacrylonitrile	<	500	UGKG	EPA 8240 extended				
Methyl Bromide	<	250	UGKG	EPA 8240 extended				
Methyl Chloride	<	250	UGKG	EPA 8240 extended				
Methyl Iodide	<	500	UGKG	EPA 8240 extended				
Methyl Methacrylate	<	500	UGKG	EPA 8240 extended				
Methylene Chloride	<	250	UGKG	EPA 8240 extended				
Propionitrile	<	1250	UGKG	EPA 8240 extended				
Styrene	<	250	UGKG	EPA 8240 extended				
Tetrachloroethylene	<	250	UGKG	EPA 8240 extended				
Toluene	<	250	UGKG	EPA 8240 extended				
Trichloroethylene	<	250	UGKG	EPA 8240 extended				
Trichlorofluoromethane	<	250	UGKG	EPA 8240 extended				
Vinyl Acetate	<	500	UGKG	EPA 8240 extended				
Vinyl chloride	<	250	UGKG	EPA 8240 extended				
Xylenes (TOTAL)	<	1000	UGKG	EPA 8240 extended				
bis(2-Chloromethylethyl)ether	<	1250	UGKG	EPA 8240 extended				
cis-1,3-Dichloropropylene	<	250	UGKG	EPA 8240 extended				
trans-1,3-Dichloropropylene	<	250	UGKG	EPA 8240 extended				
trans-1,4-Dichloro-2-butene	<	500	UGKG	EPA 8240 extended				
Extractable Organics								
Appendix IX Semivolatile Compounds - 120 items								
1,2,4,5-Tetrachlorobenzene	<	330	UGKG	EPA 8270	HNM	09/01/95	1554	71952
1,2,4-Trichlorobenzene	<	330	UGKG	EPA 8270				
1,2-Dichlorobenzene	<	330	UGKG	EPA 8270				
1,3-Dichlorobenzene	<	330	UGKG	EPA 8270				
1,4-Dichlorobenzene	<	330	UGKG	EPA 8270				
1,4-Dioxane	<	330	UGKG	EPA 8270				
1,4-Naphthoquinone	<	330	UGKG	EPA 8270				

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CERTIFICATE OF ANALYSIS

Client: Westinghouse Savannah River Co.
Bldg. 773-58A, Rm. 1
PO Box 616
Aiken, South Carolina 29803-6105
Contact: Ms. Janet Crawford
Project Description: Hazardous Waste Contract

cc: WSRC00194 Report Date: September 26, 1995

Sample ID : MIC4-149C

Parameter	Qualifier	Result	Units	Method	Analyst	Date	Time	Batch
1-Naphthylamine	<	330	UGKG	EPA 8270				
2,3,4,6-Tetrachlorophenol	<	330	UGKG	EPA 8270	HNM	09/01/95	1554	71952
2,4,5-Trichlorophenol	<	330	UGKG	EPA 8270				
2,4,6-Trichlorophenol	<	330	UGKG	EPA 8270				
2,4-Dichlorophenol	<	330	UGKG	EPA 8270				
2,4-Dimethylphenol	<	330	UGKG	EPA 8270				
2,4-Dinitrophenol	<	1490	UGKG	EPA 8270				
2,4-Dinitrotoluene	<	330	UGKG	EPA 8270				
2,6-Dichlorophenol	<	330	UGKG	EPA 8270				
2,6-Dinitrotoluene	<	330	UGKG	EPA 8270				
2-Acetylaminofluorene	<	330	UGKG	EPA 8270				
2-Chloronaphthalene	<	330	UGKG	EPA 8270				
2-Chlorophenol	<	330	UGKG	EPA 8270				
2-Methylnaphthalene	<	330	UGKG	EPA 8270				
2-Naphthylamine	<	330	UGKG	EPA 8270				
2-Nitrophenol	<	330	UGKG	EPA 8270				
2-Picoline	<	330	UGKG	EPA 8270				
2-methyl-4,6-dinitrophenol	<	1650	UGKG	EPA 8270				
2-sec-Butyl-4,6-Dinitrophenol	<	330	UGKG	EPA 8270				
3,3'-Dichlorobenzidine	<	1650	UGKG	EPA 8270				
3,3'-Dimethylbenzidine	<	1650	UGKG	EPA 8270				
3-Methylcholanthrene	<	330	UGKG	EPA 8270				
4-Bromophenyl phenyl ether	<	330	UGKG	EPA 8270				
4-Chloroaniline	<	330	UGKG	EPA 8270				
4-Chlorophenyl phenyl ether	<	330	UGKG	EPA 8270				
4-Nitrophenol	<	660	UGKG	EPA 8270				
4-Nitroquinoline	<	330	UGKG	EPA 8270				
4-aminobiphenyl	<	330	UGKG	EPA 8270				
4-chloro-3-methyl phenol	<	330	UGKG	EPA 8270				
5-Nitro-o-toluidine	<	330	UGKG	EPA 8270				
7,12-Dimethylbenz(a)anthracene	<	330	UGKG	EPA 8270				
Acenaphthene	<	330	UGKG	EPA 8270				
Acenaphthylene	<	330	UGKG	EPA 8270				
Acetophenone	<	330	UGKG	EPA 8270				
Aniline	<	330	UGKG	EPA 8270				

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Contact: Ms. Janet Crawford

Project Description: Hazardous Waste Contract

cc: WSRC00194 Report Date: September 26, 1995

Sample ID : MIC4-149C

Parameter	Qualifier	Result	Units	Method	Analyst	Date	Time	Batch
Anthracene	<	330	UGKG	EPA 8270				
Aramite	<	330	UGKG	EPA 8270	HNM	09/01/95	1554	71952
Benzo(a)anthracene	<	330	UGKG	EPA 8270				
Benzo(a)pyrene	<	330	UGKG	EPA 8270				
Benzo(b)fluoranthene	<	330	UGKG	EPA 8270				
Benzo(ghi)perylene	<	330	UGKG	EPA 8270				
Benzo(k)fluoranthene	<	330	UGKG	EPA 8270				
Benzyl Alcohol	<	330	UGKG	EPA 8270				
Butyl benzyl phthalate	<	330	UGKG	EPA 8270				
Chlorobenzilate	<	1650	UGKG	EPA 8270				
Chrysene	<	330	UGKG	EPA 8270				
Di-n-butyl phthalate	<	330	UGKG	EPA 8270				
Di-n-octyl phthalate	<	330	UGKG	EPA 8270				
Diallate	<	330	UGKG	EPA 8270				
Dibenzo(a,h)anthracene	<	330	UGKG	EPA 8270				
Dibenzofuran	<	330	UGKG	EPA 8270				
Diethyl phthalate	<	330	UGKG	EPA 8270				
Dimethoate	<	1650	UGKG	EPA 8270				
Dimethyl phthalate	<	330	UGKG	EPA 8270				
Diphenylamine	<	330	UGKG	EPA 8270				
Disulfoton	<	330	UGKG	EPA 8270				
Ethyl Methanesulfonate	<	330	UGKG	EPA 8270				
Ethyl methacrylate	<	10900	UGKG	EPA 8270				
Famphur	<	330	UGKG	EPA 8270				
Fluoranthene	<	330	UGKG	EPA 8270				
Fluorene	<	330	UGKG	EPA 8270				
Hexachlorobenzene	<	330	UGKG	EPA 8270				
Hexachlorobutadiene	<	330	UGKG	EPA 8270				
Hexachlorocyclopentadiene	<	330	UGKG	EPA 8270				
Hexachloroethane	<	330	UGKG	EPA 8270				
Hexachlorophene	<	16500	UGKG	EPA 8270				
Hexachloropropene	<	330	UGKG	EPA 8270				
Indeno(1,2,3-c,d)pyrene	<	330	UGKG	EPA 8270				
Isodrin	<	330	UGKG	EPA 8270				
Isophorone	<	330	UGKG	EPA 8270				

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cc: WSRC00194 Report Date: September 26, 1995

Sample ID : MIC4-149C

Parameter	Qualifier	Result	Units	Method	Analyst	Date	Time	Batch
Isosafrole	<	330	UGKG	EPA 8270				
Kepone	<	330	UGKG	EPA 8270	HNM	09/01/95	1554	71952
Methapyrilene	<	1650	UGKG	EPA 8270				
Methyl Methanesulfonate	<	330	UGKG	EPA 8270				
N-Nitrosodi-n-butylamine	<	330	UGKG	EPA 8270				
N-Nitrosodiethylamine	<	330	UGKG	EPA 8270				
N-Nitrosodimethylamine	<	330	UGKG	EPA 8270				
N-Nitrosodiphenylamine	<	330	UGKG	EPA 8270				
N-Nitrosodipropylamine	<	330	UGKG	EPA 8270				
N-Nitrosomethylethylamine	<	330	UGKG	EPA 8270				
N-Nitrosomorpholine	<	330	UGKG	EPA 8270				
N-Nitrosopiperidine	<	330	UGKG	EPA 8270				
N-Nitrosopyrolidine	<	330	UGKG	EPA 8270				
Naphthalene	<	330	UGKG	EPA 8270				
Nitrobenzene	<	330	UGKG	EPA 8270				
O,O,O-Triethylphosphorothioate	<	330	UGKG	EPA 8270				
Pentachlorobenzene	<	330	UGKG	EPA 8270				
Pentachloroethane	<	330	UGKG	EPA 8270				
Pentachloronitrobenzene	<	330	UGKG	EPA 8270				
Pentachlorophenol	<	330	UGKG	EPA 8270				
Phenacetin	<	330	UGKG	EPA 8270				
Phenanthrene	<	330	UGKG	EPA 8270				
Phenol	<	330	UGKG	EPA 8270				
Pronamide	<	330	UGKG	EPA 8270				
Pyrene	<	330	UGKG	EPA 8270				
Pyridine	<	330	UGKG	EPA 8270				
Safrole	<	330	UGKG	EPA 8270				
Sulfotepp	<	330	UGKG	EPA 8270				
Thionazin	<	330	UGKG	EPA 8270				
a-,a-Dimethylphenethylamine	<	330	UGKG	EPA 8270				
bis(2-Chloroethoxy)methane	<	330	UGKG	EPA 8270				
bis(2-Chloroethyl) ether	<	330	UGKG	EPA 8270				
bis(2-Ethylhexyl)phthalate	<	330	UGKG	EPA 8270				
m,p-Cresol	<	330	UGKG	EPA 8270				
m-Dinitrobenzene	<	330	UGKG	EPA 8270				

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FL	E87156/87294	E87472/87458
NC	233	
SC	10120	10582
TN	02934	
VA	00151	
WI	99988779	

CERTIFICATE OF ANALYSIS

Client: Westinghouse Savannah River Co.
Bldg. 773-58A, Rm. 1
PO Box 616
Aiken, South Carolina 29803-6105
Contact: Ms. Janet Crawford
Project Description: Hazardous Waste Contract

cc: WSRC00194 Report Date: September 26, 1995

Sample ID : MIC4-149C

Parameter	Qualifier	Result	Units	Method	Analyst	Date	Time	Batch
m-Nitroaniline	<	330	UGKG	EPA 8270				
o-Cresol	<	330	UGKG	EPA 8270	HNM	09/01/95	1554	71952
o-Nitroaniline	<	330	UGKG	EPA 8270				
o-Toluidine	<	330	UGKG	EPA 8270				
p-Dimethylaminoazobenzene	<	330	UGKG	EPA 8270				
p-Nitroaniline	<	330	UGKG	EPA 8270				
p-Phenylenediamine	<	660	UGKG	EPA 8270				
sym-Trinitrobenzene	<	1650	UGKG	EPA 8270				
Appendix IX - Herbicides - 3 items								
2,4,5-T	<	9.82	UGKG	EPA 8150	JLS	09/06/95	0330	71972
2,4,5-TP	<	4.91	UGKG	EPA 8150				
2,4-D	<	9.82	UGKG	EPA 8150				
Appendix IX - Pesticides & PCBs - 29 items								
4,4'-DDD	<	3.33	UGKG	EPA 8080	JEB	09/06/95	0633	71953
4,4'-DDE	<	3.00	UGKG	EPA 8080				
4,4'-DDT	<	3.33	UGKG	EPA 8080				
Aldrin	<	3.00	UGKG	EPA 8080				
Chlordane	<	8.33	UGKG	EPA 8080				
Dieldrin	<	3.00	UGKG	EPA 8080				
Endosulfan I	<	3.00	UGKG	EPA 8080				
Endosulfan II	<	3.33	UGKG	EPA 8080				
Endosulfan sulfate	<	3.33	UGKG	EPA 8080				
Endrin	<	3.00	UGKG	EPA 8080				
Endrin aldehyde	<	4.16	UGKG	EPA 8080				
Heptachlor	<	3.00	UGKG	EPA 8080				
Heptachlor epoxide	<	3.00	UGKG	EPA 8080				
Methoxychlor	<	16.7	UGKG	EPA 8080				
PCB-1016	<	4.16	UGKG	EPA 8080				
PCB-1221	<	4.16	UGKG	EPA 8080				
PCB-1232	<	4.16	UGKG	EPA 8080				
PCB-1242	<	4.16	UGKG	EPA 8080				
PCB-1248	<	4.16	UGKG	EPA 8080				
PCB-1254	<	4.16	UGKG	EPA 8080				
PCB-1260	<	4.16	UGKG	EPA 8080				
Parathion	<	3.00	UGKG	EPA 8080				

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Bldg. 773-58A, Rm. 1
PO Box 616
Aiken, South Carolina 29803-6105
Contact: Ms. Janet Crawford
Project Description: Hazardous Waste Contract

cc: WSRC00194 Report Date: September 26, 1995

Sample ID : MIC4-149C

Parameter	Qualifier	Result	Units	Method	Analyst	Date	Time	Batch
Parathion, methyl	<	3.00	UGKG	EPA 8080				
Phorate	<	3.00	UGKG	EPA 8080	JEB	09/06/95	0633	71953
Toxaphene	<	33.3	UGKG	EPA 8080				
alpha-BHC	<	3.00	UGKG	EPA 8080				
beta-BHC	<	3.00	UGKG	EPA 8080				
delta-BHC	<	3.00	UGKG	EPA 8080				
gamma-BHC	<	3.00	UGKG	EPA 8080				
Metals Analysis								
Arsenic	<	4970	UGKG	EPA 7060	RMJ	09/01/95	1554	71805
Lead		34600	UGKG	EPA 7421	RMJ	08/30/95	1052	71805
Antimony	<	5000	UGKG	EPA 7041	RMJ	08/31/95	1532	71805
Selenium		6770	UGKG	EPA 7740	RMJ	09/01/95	1419	71805
Thallium	<	24900	UGKG	EPA 7841	RMJ	09/05/95	1514	71805
Silver		15.3	MGKG	EPA 6010A	JSS	08/31/95	1640	71753
Aluminum		68100	MGKG	EPA 6010A	JSS	09/19/95	1733	72379
Boron		24600	MGKG	EPA 6010A				
Barium		268	MGKG	EPA 6010A	JSS	08/31/95	1640	71753
Beryllium	<	10.0	MGKG	EPA 6010A				
Calcium		5040	MGKG	EPA 6010A				
Cadmium		2.14	MGKG	EPA 6010A				
Cobalt	<	10.0	MGKG	EPA 6010A				
Chromium		1140	MGKG	EPA 6010A				
Copper		70.8	MGKG	EPA 6010A	JSS	09/19/95	1733	72379
Iron		11000	MGKG	EPA 6010A				
Lithium		23900	MGKG	EPA 6010A				
Magnesium		4830	MGKG	EPA 6010A				
Manganese		177	MGKG	EPA 6010A				
Sodium		108000	MGKG	EPA 6010A	JSS	08/31/95	1640	71753
Nickel		5460	MGKG	EPA 6010A	JSS	09/19/95	1733	72379
Silica		347000	MGKG	EPA 6010A				
Tin	<	100	MGKG	EPA 6010A	JSS	08/31/95	1640	71753
Vanadium	<	10.0	MGKG	EPA 6010A				
Zinc		126	MGKG	EPA 6010A	JSS	09/19/95	1733	72379
Mercury	<	100	UGKG	EPA 7471	BBJ	08/31/95	2016	71865
General Chemistry								

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Bldg. 773-58A, Rm. 1
PO Box 616
Aiken, South Carolina 29803-6105
Contact: Ms. Janet Crawford
Project Description: Hazardous Waste Contract

cc: WSRC00194 Report Date: September 26, 1995

Sample ID : MIC4-149C

Parameter	Qualifier	Result		Units	Method	Analyst	Date	Time	Batch
Sulfate as SO4	<	9.62		MGKG	EPA 300.0	BJW	08/29/95	1219	71815
Phosphorus, Total as PO4		910		MGKG	EPA 365.4 modified	CEG	08/30/95	0935	71789
Radiological									
Total Uranium		33100	+/- 1090	UGG	EPI A-023	PCW	09/13/95	0831	71863

The following prep procedures were performed:

GC/MS 5970 Extractables	EPA 3500/3520	MBB	08/30/95	2320	71952
Herbicides	EPA 8150	MBB	08/31/95	1300	71972
Pesticides	EPA 3500/3520	MBB	08/30/95	2345	71953
Graphite Furnace	ASTM E926-83	FGD	08/29/95	1750	71805
ICP	ASTM E926-83	FGD	08/29/95	1645	71753
ICP	ASTM E926-83	PJM	09/16/95	2100	72379
Mercury	EPA 7471	BBJ	08/31/95	1300	71865
Silica Digestion (Peroxide Dissolution)	ASTM E926-83	JSS	09/19/95	1733	72379

Comments:

A dilution was required for Volatile Organics and Herbicides due to matrix interference and a dilution was required for Metals Analysis due to high concentration of target compound(s). As a result, the detection limits are elevated.

This sample was analyzed beyond recommended holding for the following:
Volatile Organics
Preparation of Extractable Organics
Preparation of Herbicides
Preparation of Pesticides

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Project Description: Hazardous Waste Contract

cc: WSRC00194 Report Date: September 26, 1995

Sample ID : MIC4-149C

Parameter	Qualifier	Result	Units	Method	Analyst	Date	Time	Batch

This data report has been prepared and reviewed in accordance with General Engineering Laboratories standard operating procedures. Please direct any questions to your Project Manager, Edie Kent at (803) 769-7385.

Kendra Middleton

Analytical Report Specialist

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Bldg. 773-58A, Rm. 1
PO Box 616
Aiken, South Carolina 29803-6105
Contact: Ms. Janet Crawford
Project Description: Hazardous Waste Contract

cc: WSRC00194 Report Date: September 26, 1995

Sample ID	: MIC4-149C
Lab ID	: 9508477-05
Matrix	: Misc.
Date Collected	: 08/08/95
Date Received	: 08/08/95
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
General Chemistry											
Chlorides	U	0.00	4980	12500	MGKG	50.	JPB	09/20/95	1101	72152	1
The following prep procedures were performed:											
ICP							PJM	09/16/95	2100	72379	2

Comments:
A dilution was required for this sample due to matrix interference.
As a result, the detection limit is elevated.

This sample was analyzed beyond recommended holding.

M = Method	Method-Description
M 1	EPA 300.0
M 2	EPA 3050/3005

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Aiken, South Carolina 29803-6105
Contact: Ms. Janet Crawford
Project Description: Hazardous Waste Contract

cc: WSRC00194

Report Date: September 26, 1995

Sample ID : MIC4-149C

M = Method	Method-Description

Notes:
The qualifiers in this report are defined as follows:
J indicates the presence of an analyte at a concentration less than the reporting limit (RL) and greater than the detection limit (DL).
U indicates that the analyte was not detected at a concentration greater than the detection limit.
* indicate that a quality control analyte recovery is outside of specified acceptance criteria.

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Kendra W Middleton

Analytical Report Specialist

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cc: WSRC00194

Report Date: September 26, 1995

Sample ID	: MIC4-149C
Lab ID	: 9508477-05
Matrix	: Misc.
Date Collected	: 08/08/95
Date Received	: 08/08/95
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	Units	Method	Analyst	Date	Time	Batch
'eneral Chemistry								
Chlorides	<	12500	MGKG	EPA 300.0	JPB	09/20/95	1101	72152
The following prep procedures were performed:								
ICP				EPA 3050/3005	PJM	09/16/95	2100	72379

Comments:
A dilution was required for this sample due to matrix interference.
As a result,the detection limit is elevated.

This sample was analyzed beyond recommended holding.

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SC	10120	10582
TN	02934	
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CERTIFICATE OF ANALYSIS

Client: Westinghouse Savannah River Co.
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PO Box 616
Aiken, South Carolina 29803-6105
Contact: Ms. Janet Crawford
Project Description: Hazardous Waste Contract

cc: WSRC00194

Report Date: September 26, 1995

Sample ID : MIC4-149C

Parameter	Qualifier	Result	Units	Method	Analyst	Date	Time	Batch

This data report has been prepared and reviewed in accordance with General Engineering Laboratories standard operating procedures. Please direct any questions to your Project Manager, Edie Kent at (803) 769-7385.

Sandra Middleton

Analytical Report Specialist

QC Summary Report

Project Description: Hazardous Waste Contract

cc: WSRC00194 Lab. Sample ID: 9508477% Report Date: September 28, 1995 Page 1 of 33

mple/Parameter	Type	Batch	NOM	Sample	QC	Units	RPD%	REC%	Range	Analyst	Date	Time
olatile Organics												
C302296	BLANK	71732								JAC	08/26/95	0949
1,1-Dichloroethylene					0.00	ug/l						
1,2-Dichloroethane					0.00	ug/l						
1,4-Dichlorobenzene					0.00	mg/l						
2-Butanone					0.00	ug/l						
Benzene					0.00	ug/l						
Carbon Tetrachloride					0.00	ug/l						
Chlorobenzene					0.00	ug/l						
Chloroform					0.00	ug/l						
Tetrachloroethylene					0.00	ug/l						
Toluene					0.00	ug/l						
Trichloroethylene					0.00	ug/l						
Vinyl chloride					0.00	ug/l						
*1,2-Dichloroethane-d4			25.0		24.9	ug/l		99.6	(76.0 - 114.)			
*Bromofluorobenzene			25.0		25.7	ug/l		102.8	(86.4 - 108.)			
*Toluene-d8			25.0		24.3	ug/l		97.2	(88.0 - 110.)			
1,1,1,2-Tetrachloroethane					0.00	ug/l						
1,1,1-Trichloroethane					0.00	ug/l						
1,1,2,2-Tetrachloroethane					0.00	ug/l						
1,1,2-Trichloroethane					0.00	ug/l						
1,1-Dichloroethane					0.00	ug/l						
1,2,3-Trichloropropane					0.00	ug/l						
1,2-Dibromo-3-chloropropane					0.00	ug/l						
1,2-Dibromoethane					0.00	ug/l						
1,2-Dichloroethane					0.00	ug/l						
1,2-Dichloropropane					0.00	ug/l						
1,2-trans-Dichloroethylene					0.00	ug/l						
2-Butanone					0.00	ug/l						
2-Hexanone					0.00	ug/l						
4-Methyl-2-pentanone					0.00	ug/l						
Acetone					0.00	ug/l						
Acetonitrile					0.00	ug/l						
Acrolein					0.00	ug/l						
Acrylonitrile					0.00	ug/l						
Allyl Chloride					0.00	ug/l						
Bromoform					0.00	ug/l						
Carbon Disulfide					0.00	ug/l						
Carbon Tetrachloride					0.00	ug/l						
Chlorodibromomethane					0.00	ug/l						

QC Summary Report

Project Description: Hazardous Waste Contract

cc: WSRC00194 Lab. Sample ID: 9508477% Report Date: September 28, 1995

Sample/Parameter	Type	Batch	NOM	Sample	QC	Units	RPD%	REC%	Range	Analyst	Date	Time
Chloroethane					0.00	ug/l				JAC	08/26/95	0949
Chloroform					0.00	ug/l						
Chloroprene					0.00	ug/l						
Dibromomethane					0.00	ug/l						
Dichlorobromomethane					0.00	ug/l						
Dichlorodifluoromethane					0.00	ug/l						
Ethylbenzene					0.00	ug/l						
Isobutyl Alcohol					0.00	ug/l						
Methacrylonitrile					0.00	ug/l						
Methyl Bromide					0.00	ug/l						
Methyl Chloride					0.00	ug/l						
Methyl Iodide					0.00	ug/l						
Methyl Methacrylate					0.00	ug/l						
Methylene Chloride					0.00	ug/l						
Propionitrile					0.00	ug/l						
Styrene					0.00	ug/l						
Tetrachloroethylene					0.00	ug/l						
Trichlorofluoromethane					0.00	ug/l						
Vinyl Acetate					0.00	ug/l						
Vinyl chloride					0.00	ug/l						
Xylenes (TOTAL)					0.00	ug/l						
bis(2-Chloromethylethyl)ether					0.00	ug/l						
cis-1,3-Dichloropropylene					0.00	ug/l						
trans-1,3-Dichloropropylene					0.00	ug/l						
trans-1,4-Dichloro-2-butene					0.00	ug/l						
QC302561	BLANK	71780										
1,1-Dichloroethylene					0.00	ug/l				JAC	08/28/95	0906
1,2-Dichloroethane					0.00	ug/l						
1,4-Dichlorobenzene					0.00	mg/l						
2-Butanone					0.00	mg/l						
Benzene					0.00	ug/l						
Carbon Tetrachloride					0.00	ug/l						
Chlorobenzene					0.00	ug/l						
Chloroform					0.00	ug/l						
Tetrachloroethylene					0.00	ug/l						
Toluene					0.00	ug/l						
Trichloroethylene					0.00	ug/l						
Vinyl chloride					0.00	ug/l						
*1,2-Dichloroethane-d4			25.0		24.0	ug/l		96	(76.0 - 114.)			
*Bromofluorobenzene			25.0		25.5	ug/l		102	(86.4 - 108.)			

QC Summary Report

Project Description: Hazardous Waste Contract

c: WSRC00194 Lab. Sample ID: 9508477% Report Date: September 28, 1995 Page 3 of 33

nple/Parameter	Type	Batch	NOM	Sample	QC	Units	RPD%	REC%	Range	Analyst	Date	Time
oluene-d8			25.0		24.2	ug/l		96.8	(88.0 - 110.)	JAC	08/28/95	0906
302891	BLANK	71855										
,1-Dichloroethylene					0.00	ug/l				JAC	08/29/95	1130
,2-Dichloroethane					0.00	ug/l						
,4-Dichlorobenzene					0.00	ug/l						
-Butanone					0.00	mg/l						
enzene					0.00	ug/l						
arbon Tetrachloride					0.00	ug/l						
hlorobenzene					0.00	ug/l						
hloroform					0.00	ug/l						
etrachloroethylene					0.00	ug/l						
luene					0.00	ug/l						
richloroethylene					0.00	ug/l						
inyl chloride					0.00	ug/l						
,2-Dichloroethane-d4			25.0		24.7	ug/l		98.8	(81.0 - 114.)			
romofluorobenzene			25.0		25.6	ug/l		102.4	(86.6 - 109.)			
oluene-d8			25.0		24.3	ug/l		97.2	(89.6 - 107.)			
302299	9508353-13DUP	71732										
,1-Dichloroethylene				0.00	0.00	ug/l	0			JAC	08/26/95	1550
,2-Dichloroethane				0.00	0.00	ug/l	0					
-Butanone				0.00	0.00	ug/l	0					
enzene				0.00	0.00	ug/l	0					
arbon Tetrachloride				0.00	0.00	ug/l	0					
hlorobenzene				0.00	0.00	ug/l	0					
hloroform				0.00	0.00	ug/l	0					
etrachloroethylene				0.00	0.00	ug/l	0					
oluene				0.00	0.00	ug/l	0					
richloroethylene				0.00	0.00	ug/l	0					
inyl chloride				0.00	0.00	ug/l	0					
,2-Dichloroethane-d4			25.0		25.4	ug/l	6.1	101.6	(76.0 - 114.)			
romofluorobenzene			25.0		25.9	ug/l	0.4	103.6	(86.4 - 108.)			
oluene-d8			25.0		24.5	ug/l	1.2	98	(88.0 - 110.)			
,1,1,2-Tetrachloroethane				0.00	0.00	ug/l	0					
,1,1-Trichloroethane				0.00	0.00	ug/l	0					
,1,2,2-Tetrachloroethane				0.00	0.00	ug/l	0					
,1,2-Trichloroethane				0.00	0.00	ug/l	0					
,1-Dichloroethane				0.00	0.00	ug/l	0					
,2,3-Trichloropropane				0.00	0.00	ug/l	0					
,2-Dibromo-3-chloropropane				0.00	0.00	ug/l	0					
,2-Dibromoethane				0.00	0.00	ug/l	0					

QC Summary Report

Project Description: Hazardous Waste Contract

cc: WSRC00194 Lab. Sample ID: 9508477% Report Date: September 28, 1995 Page 4 of 33

Sample/Parameter	Type	Batch	NOM	Sample	QC	Units	RPD%	REC%	Range	Analyst	Date	Time
1,2-Dichloroethane				0.00	0.00	ug/l	0			JAC	08/26/95	1550
1,2-Dichloropropane				0.00	0.00	ug/l	0					
1,2-trans-Dichloroethylene				0.00	0.00	ug/l	0					
2-Butanone				0.00	0.00	ug/l	0					
2-Hexanone				0.00	0.00	ug/l	0					
4-Methyl-2-pentanone				0.00	0.00	ug/l	0					
Acetone				0.00	0.00	ug/l	0					
Acetonitrile				0.00	0.00	ug/l	0					
Acrolein				0.00	0.00	ug/l	0					
Acrylonitrile				0.00	0.00	ug/l	0					
Allyl Chloride				0.00	0.00	ug/l	0					
Bromoform				0.00	0.00	ug/l	0					
Carbon Disulfide				0.00	0.00	ug/l	0					
Carbon Tetrachloride				0.00	0.00	ug/l	0					
Chlorodibromomethane				0.00	0.00	ug/l	0					
Chloroethane				0.00	0.00	ug/l	0					
Chloroform				0.00	0.00	ug/l	0					
Chloroprene				0.00	0.00	ug/l	0					
Dibromomethane				0.00	0.00	ug/l	0					
Dichlorobromomethane				0.00	0.00	ug/l	0					
Dichlorodifluoromethane				0.00	0.00	ug/l	0					
Ethylbenzene				0.00	0.00	ug/l	0					
Isobutyl Alcohol				0.00	0.00	ug/l	0					
Methacrylonitrile				0.00	0.00	ug/l	0					
Methyl Bromide				0.00	0.00	ug/l	0					
Methyl Chloride				0.00	0.00	ug/l	0					
Methyl Iodide				0.00	0.00	ug/l	0					
Methyl Methacrylate				0.00	0.00	ug/l	0					
Methylene Chloride				0.00	0.00	ug/l	0					
Propionitrile				0.00	0.00	ug/l	0					
Styrene				0.00	0.00	ug/l	0					
Tetrachloroethylene				0.00	0.00	ug/l	0					
Trichlorofluoromethane				0.00	0.00	ug/l	0					
Vinyl Acetate				0.00	0.00	ug/l	0					
Vinyl chloride				0.00	0.00	ug/l	0					
Xylenes (TOTAL)				0.00	0.00	ug/l	0					
bis(2-Chloromethylethyl)ether				0.00	0.00	ug/l	0					
cis-1,3-Dichloropropylene				0.00	0.00	ug/l	0					
trans-1,3-Dichloropropylene				0.00	0.00	ug/l	0					
trans-1,4-Dichloro-2-butene				0.00	0.00	ug/l	0					

QC Summary Report

Project Description: Hazardous Waste Contract

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mple/Parameter	Type	Batch	NOM	Sample	QC	Units	RPD%	REC%	Range	Analyst	Date	Time
C302564 9508418-06DUP		71780										
1,1-Dichloroethylene				0.00	0.00	ug/l	0			JAC	08/28/95	1219
1,2-Dichloroethane				0.00	0.00	ug/l	0					
Benzene				0.00	0.00	ug/l	0					
Carbon Tetrachloride				0.00	0.00	ug/l	0					
Chlorobenzene				0.00	0.00	ug/l	0					
Chloroform				0.00	0.00	ug/l	0					
Tetrachloroethylene				0.977	0.949	ug/l	2.9					
Toluene				0.00	0.00	ug/l	0					
Trichloroethylene				0.00	0.00	ug/l	0					
Vinyl chloride				0.00	0.00	ug/l	0					
1,2-Dichloroethane-d4			25.0		25.3	ug/l	0.8	101.2	(76.0 - 114.)			
Bromofluorobenzene			25.0		25.7	ug/l	1.2	102.8	(86.4 - 108.)			
Toluene-d8			25.0		24.6	ug/l	2.9	98.4	(88.0 - 110.)			
C302297 9508353-13MS		71732										
1,1-Dichloroethylene			20.0	0.00	18.3	ug/l		91.5	(64.5 - 132.)	JAC	08/26/95	1415
1,2-Dichloroethane				0.00	0.00	ug/l						
2-Butanone				0.00	0.00	ug/l						
Benzene			20.0	0.00	20.4	ug/l		102	(63.5 - 132.)			
Carbon Tetrachloride				0.00	0.00	ug/l						
Chlorobenzene			20.0	0.00	22.8	ug/l		114	(72.8 - 126.)			
Chloroform				0.00	0.00	ug/l						
Tetrachloroethylene				0.00	0.00	ug/l						
Toluene			20.0	0.00	20.2	ug/l		101	(69.2 - 124.)			
Trichloroethylene			20.0	0.00	22.4	ug/l		112	(71.2 - 128.)			
Vinyl chloride				0.00	0.00	ug/l						
1,2-Dichloroethane-d4			25.0		26.4	ug/l		105.6	(76.0 - 114.)			
Bromofluorobenzene			25.0		26.1	ug/l		104.4	(86.4 - 108.)			
Toluene-d8			25.0		24.7	ug/l		98.8	(88.0 - 110.)			
C302562 9508418-05MS		71780										
1,1-Dichloroethylene			20.0	0.00	21.3	ug/l		106.5	(64.5 - 132.)	JAC	08/28/95	1026
1,2-Dichloroethane				0.00	0.00	ug/l						
Benzene			20.0	0.00	21.6	ug/l		108	(63.5 - 132.)			
Carbon Tetrachloride				0.00	0.00	ug/l						
Chlorobenzene			20.0	0.00	23.8	ug/l		119	(72.8 - 126.)			
Chloroform				0.00	0.00	ug/l						
Tetrachloroethylene				0.00	0.00	ug/l						
Toluene			20.0	0.00	21.4	ug/l		107	(69.2 - 124.)			
Trichloroethylene			20.0	2.08	26.3	ug/l		121.1	(71.2 - 128.)			
Vinyl chloride				0.00	0.00	ug/l						

QC Summary Report

Project Description: Hazardous Waste Contract

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Sample/Parameter	Type	Batch	NOM	Sample	QC	Units	RPD%	REC%	Range	Analyst	Date	Time
*1,2-Dichloroethane-d4			25.0		24.4	ug/l		97.6	(76.0 - 114.)	JAC	08/28/95	1026
*Bromofluorobenzene			25.0		25.2	ug/l		100.8	(86.4 - 108.)			
*Toluene-d8			25.0		24.3	ug/l		97.2	(88.0 - 110.)			
QC302298 9508353-13MSD		71732										
1,1-Dichloroethylene			20.0	0.00	20.3	ug/l	10.4	101.5	(0.00 - 21.4)	JAC	08/26/95	1444
1,2-Dichloroethane				0.00	0.00	ug/l						
2-Butanone				0.00	0.00	ug/l						
Benzene			20.0	0.00	21.0	ug/l	2.9	105	(0.00 - 15.3)			
Carbon Tetrachloride				0.00	0.00	ug/l						
Chlorobenzene			20.0	0.00	23.3	ug/l	2.2	116.5	(0.00 - 15.7)			
Chloroform				0.00	0.00	ug/l						
Tetrachloroethylene				0.00	0.00	ug/l						
Toluene			20.0	0.00	21.1	ug/l	4.4	105.5	(0.00 - 15.8)			
Trichloroethylene			20.0	0.00	23.2	ug/l	3.5	116	(0.00 - 17.9)			
Vinyl chloride				0.00	0.00	ug/l						
*1,2-Dichloroethane-d4			25.0		26.8	ug/l	1.5	107.2	(76.0 - 114.)			
*Bromofluorobenzene			25.0		25.9	ug/l	0.8	103.6	(86.4 - 108.)			
*Toluene-d8			25.0		25.2	ug/l	2	100.8	(88.0 - 110.)			
QC302563 9508418-05MSD		71780										
1,1-Dichloroethylene			20.0	0.00	19.4	ug/l	9.3	97	(0.00 - 21.4)	JAC	08/28/95	1054
1,2-Dichloroethane				0.00	0.00	ug/l						
Benzene			20.0	0.00	21.2	ug/l	1.9	106	(0.00 - 15.3)			
Carbon Tetrachloride				0.00	0.00	ug/l						
Chlorobenzene			20.0	0.00	23.4	ug/l	1.7	117	(0.00 - 15.7)			
Chloroform				0.00	0.00	ug/l						
Tetrachloroethylene				0.00	0.00	ug/l						
Toluene			20.0	0.00	20.4	ug/l	4.8	102	(0.00 - 15.8)			
Trichloroethylene			20.0	2.08	25.4	ug/l	3.8	116.6	(0.00 - 17.9)			
Vinyl chloride				0.00	0.00	ug/l						
*1,2-Dichloroethane-d4			25.0		25.3	ug/l	3.6	101.2	(76.0 - 114.)			
*Bromofluorobenzene			25.0		25.6	ug/l	1.6	102.4	(86.4 - 108.)			
*Toluene-d8			25.0		24.1	ug/l	0.8	96.4	(88.0 - 110.)			

* represent a surrogate.

Internal Chain Of Custody
Audit Trail by Container

Printed: 09/28/95 18:05

477-01.01 - 1000 ml/P
-AUG-95 19:59:59 Paige Morris --> Radioactive Cooler
-AUG-95 16:29:39 Tim Kinard --> Radioactive Cooler
-AUG-95 14:19:16 Regina Dessaure --> Radioactive Cooler
-SEP-95 09:25:33 Brian Getsinger --> General Chemistry Prep
-SEP-95 09:25:55 Brian Getsinger --> General Chemistry Prep
-SEP-95 09:26:15 Brian Getsinger --> General Chemistry Prep
-SEP-95 12:07:49 Brian Getsinger --> General Chemistry Prep
-SEP-95 12:45:08 Brian Getsinger --> Delivery
-SEP-95 12:45:23 Brian Getsinger --> Delivery
-SEP-95 14:52:11 Donna Ward --> Radioactive Cooler

127 - 40 ml vial
01-SEP-95 12:03:40 Brian Getsinger --> General Chemistry Prep

129 - 40 ml vial
01-SEP-95 12:08:08 Brian Getsinger --> General Chemistry Prep
12-SEP-95 14:15:10 Camilla Munn --> D7NONE

477-02.01 - 1000 ml/P
-AUG-95 20:00:00 Paige Morris --> Radioactive Cooler
-AUG-95 16:29:38 Tim Kinard --> Radioactive Cooler
-AUG-95 14:19:16 Regina Dessaure --> Radioactive Cooler
-SEP-95 09:25:34 Brian Getsinger --> General Chemistry Prep
-SEP-95 09:25:55 Brian Getsinger --> General Chemistry Prep
-SEP-95 09:26:15 Brian Getsinger --> General Chemistry Prep
SEP-95 12:07:49 Brian Getsinger --> General Chemistry Prep
-SEP-95 12:45:09 Brian Getsinger --> Delivery
-SEP-95 12:45:23 Brian Getsinger --> Delivery
-SEP-95 14:52:11 Donna Ward --> Radioactive Cooler

126 - 40 ml vial
01-SEP-95 12:03:35 Brian Getsinger --> General Chemistry Prep

128 - 40 ml vial
01-SEP-95 12:08:06 Brian Getsinger --> General Chemistry Prep
12-SEP-95 14:15:10 Camilla Munn --> D7NONE

3477-03.01 - 1000 ml/P
3-AUG-95 19:59:59 Paige Morris --> Radioactive Cooler
3-AUG-95 10:44:57 Regina Dessaure --> Delivery
3-AUG-95 13:31:43 Roberta McGhee --> General Chemistry Prep
3-AUG-95 13:32:09 Roberta McGhee --> Delivery
3-AUG-95 16:29:39 Tim Kinard --> Radioactive Cooler
1-AUG-95 14:19:16 Regina Dessaure --> Radioactive Cooler

3374 - 40 ml vial
28-AUG-95 13:31:59 Roberta McGhee --> General Chemistry Prep
29-AUG-95 12:40:09 Charles Guzman --> Technicon
30-AUG-95 12:39:28 Charles Guzman --> Empty Container for Disposal

Audit Trail by Container

9508477% Printed: 09/28/95 18:05

9508477-03.02 - Other

25-AUG-95 15:26:25	Mindy Lowe	--> Radioactive Cooler
27-AUG-95 15:28:41	Dee Wigger	--> Inorganic Prep
27-AUG-95 15:33:45	Dee Wigger	--> Delivery
28-AUG-95 16:55:35	Regina Dessaure	--> Delivery
29-AUG-95 10:46:57	Frankie Davis	--> Inorganic Prep
29-AUG-95 10:48:16	Frankie Davis	--> Delivery
29-AUG-95 10:53:17	Frankie Davis	--> Inorganic Prep
29-AUG-95 10:55:26	Frankie Davis	--> Delivery
29-AUG-95 16:12:28	Regina Dessaure	--> Radioactive Cooler
29-AUG-95 16:48:41	Kevin Merritt	--> Inorganic Prep
29-AUG-95 16:49:47	Kevin Merritt	--> Delivery
29-AUG-95 20:26:38	Tim Kinard	--> Radioactive Cooler
30-AUG-95 20:20:32	Tim Kinard	--> Delivery
06-SEP-95 11:37:11	Jeff Overcash	--> Radiological Prep

78343 - 50 ml/P

27-AUG-95 15:31:45	Dee Wigger	--> Inorganic Prep
31-AUG-95 14:42:50	Johanna Starr	--> ICP

78580 - 50 ml/P

29-AUG-95 10:47:29	Frankie Davis	--> Inorganic Prep
30-AUG-95 09:46:04	Rose Jenkins	--> Graphite Furnace

78724 - 60 ml/G

29-AUG-95 16:49:24	Kevin Merritt	--> Inorganic Prep
31-AUG-95 20:08:28	Bridget James	--> Mercury
01-SEP-95 08:53:06	Bridget James	--> Empty Container for Disposal

79535 - 2 ml vial

06-SEP-95 11:37:35	Jeff Overcash	--> Radiological Prep
11-SEP-95 16:44:16	Pete Wilber	--> Radiological Prep
12-SEP-95 09:31:14	Pete Wilber	--> Empty Container for Disposal

9508477-03.03 - 250 ml/G

29-AUG-95 09:58:48	Regina Dessaure	--> Radioactive Cooler
29-AUG-95 09:59:08	Regina Dessaure	--> Delivery
30-AUG-95 23:15:19	Michael Bauer	--> Organic Prep
30-AUG-95 23:16:24	Michael Bauer	--> Delivery
31-AUG-95 00:22:41	Michael Bauer	--> Organic Prep
31-AUG-95 00:23:12	Michael Bauer	--> Delivery
31-AUG-95 09:19:34	Regina Dessaure	--> Delivery
31-AUG-95 12:43:40	Michael Bauer	--> Organic Prep
31-AUG-95 12:44:19	Michael Bauer	--> Delivery
31-AUG-95 16:25:10	Regina Dessaure	--> Radioactive Cooler

78856 - 2 ml vial

30-AUG-95 23:16:12	Michael Bauer	--> Organic Prep
01-SEP-95 09:57:33	Herbert Maier	--> GC/MS Extractables
05-SEP-95 10:43:54	Herbert Maier	--> Empty Container for Disposal

Internal Chain Of Custody
Audit Trail by Container

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8866 - 2 ml vial
31-AUG-95 00:22:59 Michael Bauer --> Organic Prep
31-AUG-95 13:04:02 Denni Grunstra --> BNA Cooler
05-SEP-95 12:50:41 Johnny Bell --> ECD

8957 - 2 ml vial
31-AUG-95 12:44:12 Michael Bauer --> Organic Prep
01-SEP-95 18:23:49 Denni Grunstra --> BNA Cooler
05-SEP-95 17:28:36 Jannie Shaw-Busby --> ECD

8477-03.04 - 125 ml/G
5-AUG-95 15:25:31 Regina Dessaure --> Radioactive Cooler
5-AUG-95 15:27:30 Jennifer Cummings --> GC/MS Volatiles

8477-03.05 - Other
5-AUG-95 15:26:25 Mindy Lowe --> Radioactive Cooler
9-AUG-95 08:37:24 Regina Dessaure --> Delivery
9-AUG-95 08:58:59 Boni Jo Wheeler --> Ion Chromatography
9-AUG-95 16:41:54 Joan Patrick-Bottoms --> Delivery
9-AUG-95 20:25:40 Tim Kinard --> Ambient Storage
9-AUG-95 20:26:37 Tim Kinard --> Radioactive Cooler
6-SEP-95 14:30:03 Regina Dessaure --> Radioactive Cooler
1-SEP-95 14:45:41 Regina Dessaure --> Delivery
1-SEP-95 21:17:46 Dee Wigger --> Inorganic Prep
1-SEP-95 21:19:41 Dee Wigger --> Delivery
-SEP-95 23:34:27 Tim Kinard --> Radioactive Cooler

78587 - 50 ml/P
29-AUG-95 10:52:17 Boni Jo Wheeler --> Ion Chromatography

30158 - 50 ml/P
11-SEP-95 21:19:18 Dee Wigger --> Inorganic Prep
19-SEP-95 09:45:30 Johanna Starr --> ICP

08477-04.01 - 1000 ml/P
23-AUG-95 20:00:00 Paige Morris --> Radioactive Cooler
28-AUG-95 10:44:58 Regina Dessaure --> Delivery
28-AUG-95 13:31:41 Roberta McGhee --> General Chemistry Prep
28-AUG-95 13:32:09 Roberta McGhee --> Delivery
28-AUG-95 16:29:39 Tim Kinard --> Radioactive Cooler
31-AUG-95 14:19:15 Regina Dessaure --> Radioactive Cooler

78373 - 40 ml vial
28-AUG-95 13:31:58 Roberta McGhee --> General Chemistry Prep
29-AUG-95 12:40:09 Charles Guzman --> Technicon
30-AUG-95 12:39:28 Charles Guzman --> Empty Container for Disposal

08477-04.02 - Other
25-AUG-95 15:26:25 Mindy Lowe --> Radioactive Cooler
29-AUG-95 08:37:25 Regina Dessaure --> Delivery
29-AUG-95 08:59:00 Boni Jo Wheeler --> Ion Chromatography
29-AUG-95 16:41:54 Joan Patrick-Bottoms --> Delivery
29-AUG-95 20:26:38 Tim Kinard --> Radioactive Cooler
06-SEP-95 14:30:03 Regina Dessaure --> Radioactive Cooler
11-SEP-95 14:45:41 Regina Dessaure --> Delivery
11-SEP-95 21:17:47 Dee Wigger --> Inorganic Prep
11-SEP-95 21:19:41 Dee Wigger --> Delivery
11-SEP-95 23:34:26 Tim Kinard --> Radioactive Cooler

Internal Chain Of Custody
Audit Trail by Container

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78586 - 50 ml/P
29-AUG-95 10:52:12 Boni Jo Wheeler --> Ion Chromatography

80157 - 50 ml/P
11-SEP-95 21:19:18 Dee Wigger --> Inorganic Prep
19-SEP-95 09:45:31 Johanna Starr --> ICP

9508477-04.03 - Other
25-AUG-95 15:26:25 Mindy Lowe --> Radioactive Cooler
29-AUG-95 09:58:35 Regina Dessaure --> Delivery
30-AUG-95 23:15:19 Michael Bauer --> Organic Prep
30-AUG-95 23:16:24 Michael Bauer --> Delivery
31-AUG-95 00:22:41 Michael Bauer --> Organic Prep
31-AUG-95 00:23:11 Michael Bauer --> Delivery
31-AUG-95 09:19:35 Regina Dessaure --> Delivery
31-AUG-95 12:43:38 Michael Bauer --> Organic Prep
31-AUG-95 12:44:19 Michael Bauer --> Delivery
31-AUG-95 16:25:12 Regina Dessaure --> Radioactive Cooler

78855 - 2 ml vial
30-AUG-95 23:16:10 Michael Bauer --> Organic Prep
01-SEP-95 09:57:33 Herbert Maier --> GC/MS Extractables
05-SEP-95 10:43:52 Herbert Maier --> Empty Container for Disposal

78865 - 2 ml vial
31-AUG-95 00:22:58 Michael Bauer --> Organic Prep
31-AUG-95 13:04:02 Denni Grunstra --> BNA Cooler
05-SEP-95 12:50:41 Johnny Bell --> ECD

78956 - 2 ml vial
31-AUG-95 12:44:08 Michael Bauer --> Organic Prep
01-SEP-95 18:23:49 Denni Grunstra --> BNA Cooler
05-SEP-95 17:28:34 Jannie Shaw-Busby --> ECD

9508477-04.04 - Other
25-AUG-95 15:26:25 Mindy Lowe --> Radioactive Cooler
27-AUG-95 15:28:42 Dee Wigger --> Inorganic Prep
27-AUG-95 15:33:45 Dee Wigger --> Delivery
28-AUG-95 16:55:35 Regina Dessaure --> Delivery
29-AUG-95 10:46:57 Frankie Davis --> Inorganic Prep
29-AUG-95 10:48:16 Frankie Davis --> Delivery
29-AUG-95 10:53:17 Frankie Davis --> Inorganic Prep
29-AUG-95 10:55:11 Frankie Davis --> Delivery
29-AUG-95 16:12:28 Regina Dessaure --> Radioactive Cooler
29-AUG-95 16:48:40 Kevin Merritt --> Inorganic Prep
29-AUG-95 16:49:47 Kevin Merritt --> Delivery
29-AUG-95 20:26:38 Tim Kinard --> Radioactive Cooler
30-AUG-95 20:20:31 Tim Kinard --> Delivery
06-SEP-95 11:37:10 Jeff Overcash --> Radiological Prep

78342 - 50 ml/P
27-AUG-95 15:31:44 Dee Wigger --> Inorganic Prep
31-AUG-95 14:42:50 Johanna Starr --> ICP

Internal Chain Of Custody
Audit Trail by Container

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3 - 50 ml/P
-AUG-95 10:47:27 Frankie Davis --> Inorganic Prep
-AUG-95 09:46:05 Rose Jenkins --> Graphite Furnace

3 - 60 ml/G
-AUG-95 16:49:21 Kevin Merritt --> Inorganic Prep
-AUG-95 20:08:28 Bridget James --> Mercury
-SEP-95 08:53:06 Bridget James --> Empty Container for Disposal

4 - 2 ml vial
-SEP-95 11:37:33 Jeff Overcash --> Radiological Prep
-SEP-95 16:44:17 Pete Wilber --> Radiological Prep
-SEP-95 09:31:15 Pete Wilber --> Empty Container for Disposal

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7-04.05 - 125 ml/G
UG-95 15:25:31 Regina Dessaure --> Radioactive Cooler
UG-95 15:27:31 Jennifer Cummings --> GC/MS Volatiles

7-05.01 - 1000 ml/P
UG-95 20:00:00 Paige Morris --> Radioactive Cooler
UG-95 08:37:23 Regina Dessaure --> Delivery
UG-95 08:58:59 Boni Jo Wheeler --> Ion Chromatography
UG-95 16:41:54 Joan Patrick-Bottoms --> Delivery
UG-95 20:26:38 Tim Kinard --> Radioactive Cooler
?-95 08:35:10 Regina Dessaure --> Delivery
EP-95 14:30:03 Regina Dessaure --> Radioactive Cooler
EP-95 14:45:41 Regina Dessaure --> Delivery
EP-95 21:17:47 Dee Wigger --> Inorganic Prep
EP-95 21:19:41 Dee Wigger --> Delivery
EP-95 23:34:27 Tim Kinard --> Radioactive Cooler

5 - 50 ml/P
-AUG-95 10:52:08 Boni Jo Wheeler --> Ion Chromatography

6 - 50 ml/P
-SEP-95 21:19:18 Dee Wigger --> Inorganic Prep
-SEP-95 10:56:49 Joan Patrick-Bottoms --> Ion Chromatography

7-06.01 - 1000 ml/P
UG-95 20:00:00 Paige Morris --> Radioactive Cooler
UG-95 08:37:24 Regina Dessaure --> Delivery
UG-95 08:59:00 Boni Jo Wheeler --> Ion Chromatography
UG-95 16:41:54 Joan Patrick-Bottoms --> Delivery
UG-95 20:26:38 Tim Kinard --> Radioactive Cooler
EP-95 08:35:11 Regina Dessaure --> Delivery
EP-95 14:30:04 Regina Dessaure --> Radioactive Cooler
EP-95 14:45:40 Regina Dessaure --> Delivery
EP-95 21:17:47 Dee Wigger --> Inorganic Prep
EP-95 21:19:41 Dee Wigger --> Delivery
EP-95 23:34:27 Tim Kinard --> Radioactive Cooler

Internal Chain Of Custody
Audit Trail by Container

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78584 - 50 ml/P
29-AUG-95 10:52:03 Boni Jo Wheeler --> Ion Chromatography

80155 - 50 ml/P
11-SEP-95 21:19:17 Dee Wigger --> Inorganic Prep
20-SEP-95 10:56:49 Joan Patrick-Bottoms --> Ion Chromatography

508477-07.01 - 1000 ml/P
23-AUG-95 20:00:00 Paige Morris --> Radioactive Cooler
25-AUG-95 15:30:08 Regina Dessaure --> Delivery
25-AUG-95 15:31:49 Jianguo Li --> TCLP
25-AUG-95 15:33:03 Jianguo Li --> TCLP
25-AUG-95 15:37:33 Jianguo Li --> TCLP
31-AUG-95 16:25:13 Regina Dessaure --> Radioactive Cooler

78188 - 1000 ml/P
25-AUG-95 15:32:25 Jianguo Li --> TCLP
12-SEP-95 10:39:27 Frankie Davis --> Inorganic Prep

80308 - 50 ml/P
12-SEP-95 10:40:08 Frankie Davis --> Inorganic Prep
12-SEP-95 14:25:50 Nic Matutina --> ICP

78193 - 1000 ml Plastic Bag
25-AUG-95 15:37:00 Jianguo Li --> TCLP
28-AUG-95 10:04:09 Jennifer Cummings --> GC/MS Volatiles
30-AUG-95 10:37:49 Jennifer Cummings --> Sample Archives
27-SEP-95 22:47:00 Tim Kinard --> Sample Archives
27-SEP-95 22:47:00 Tim Kinard --> Sample Archives

78199 - 1000 ml/G
25-AUG-95 15:37:57 Jianguo Li --> TCLP
01-SEP-95 14:37:55 Steve Patel --> Organic Prep
01-SEP-95 21:45:01 Cornelia Uytingco --> Organic Prep
01-SEP-95 21:45:32 Cornelia Uytingco --> Delivery
02-SEP-95 09:52:28 Denni Grunstra --> BNA Cooler
06-SEP-95 00:16:03 Damon Tyree --> Organic Prep
06-SEP-95 00:16:43 Damon Tyree --> Organic Prep
06-SEP-95 10:36:03 Johnny Bell --> ECD
07-SEP-95 17:05:42 Denni Grunstra --> BNA Cooler
13-SEP-95 10:21:44 Jannie Shaw-Busby --> ECD

79171 - 2 ml vial
01-SEP-95 14:41:26 Steve Patel --> Organic Prep
01-SEP-95 18:35:10 Denni Grunstra --> BNA Cooler
02-SEP-95 08:47:26 Todd Fite --> GC/MS Extractables
07-SEP-95 07:53:19 Todd Fite --> Empty Container for Disposal

78201 - 1000 ml/G
25-AUG-95 15:38:37 Jianguo Li --> TCLP
01-SEP-95 14:39:54 Steve Patel --> Empty Container for Disposal

QC Summary Report

Project Description: Hazardous Waste Contract

c: WSRC00194 Lab. Sample ID: 9508477% Report Date: September 28, 1995

nple/Parameter	Type	Batch	NOM	Sample	QC	Units	RPD%	REC%	Range	Analyst	Date	Time
ractable Organics												
303260	BLANK	71952										
,4-Dinitrotoluene					0.00	ug/kg				HNM	09/01/95	1412
-Chlorophenol					0.00	ug/kg						
-Nitrophenol					0.00	ug/kg						
-chloro-3-methyl phenol					0.00	ug/kg						
cenaphthene					0.00	ug/kg						
-Nitrosodipropylamine					0.00	ug/kg						
entachlorophenol					0.00	ug/kg						
henol					0.00	ug/kg						
yrene					0.00	ug/kg						
,4,6-Tribromophenol			3290		3260	ug/kg		99.2	(19.0 - 122.)			
-Fluorobiphenyl			1640		1430	ug/kg		86.9	(30.0 - 114.)			
-Fluorophenol			3290		2660	ug/kg		81	(44.0 - 102.)			
Nitrobenzene-d5			1640		1220	ug/kg		73.9	(23.0 - 120.)			
Phenol-d6			3290		2790	ug/kg		84.9	(45.0 - 111.)			
-Terphenyl-d14			1640		1570	ug/kg		95.6	(52.0 - 135.)			
,2,4,5-Tetrachlorobenzene					0.00	ug/kg						
,2,4-Trichlorobenzene					0.00	ug/kg						
,2-Dichlorobenzene					0.00	ug/kg						
,3-Dichlorobenzene					0.00	ug/kg						
,4-Dichlorobenzene					0.00	ug/kg						
,4-Dioxane					0.00	ug/kg						
,4-Naphthoquinone					0.00	ug/kg						
-Naphthylamine					0.00	ug/kg						
,3,4,6-Tetrachlorophenol					0.00	ug/kg						
,4,5-Trichlorophenol					0.00	ug/kg						
,4,6-Trichlorophenol					0.00	ug/kg						
,4-Dichlorophenol					0.00	ug/kg						
,4-Dimethylphenol					0.00	ug/kg						
,4-Dinitrophenol					0.00	ug/kg						
,6-Dichlorophenol					0.00	ug/kg						
,6-Dinitrotoluene					0.00	ug/kg						
-Acetylaminofluorene					0.00	ug/kg						
-Chloronaphthalene					0.00	ug/kg						
-Methylnaphthalene					0.00	ug/kg						
-Naphthylamine					0.00	ug/kg						
-Nitrophenol					0.00	ug/kg						
-Picoline					0.00	ug/kg						
-methyl-4,6-dinitrophenol					0.00	ug/kg						

QC Summary Report

Project Description: Hazardous Waste Contract

cc: WSRC00194 Lab. Sample ID: 9508477% Report Date: September 28, 1995 Page 8 of 33

Sample/Parameter	Type	Batch	NOM	Sample	QC	Units	RPD%	REC%	Range	Analyst	Date	Time
2-sec-Butyl-4,6-Dinitrophenol					0.00	ug/kg				HNM	09/01/95	1412
3,3'-Dichlorobenzidine					0.00	ug/kg						
3,3'-Dimethylbenzidine					0.00	ug/kg						
3-Methylcholanthrene					0.00	ug/kg						
4-Bromophenyl phenyl ether					0.00	ug/kg						
4-Chloroaniline					0.00	ug/kg						
4-Chlorophenyl phenyl ether					0.00	ug/kg						
4-Nitroquinoline					0.00	ug/kg						
4-aminobiphenyl					0.00	ug/kg						
5-Nitro-o-toluidine					0.00	ug/kg						
7,12-Dimethylbenz(a)anthracene					0.00	ug/kg						
Acenaphthylene					0.00	ug/kg						
Acetophenone					0.00	ug/kg						
Aniline					0.00	ug/kg						
Anthracene					0.00	ug/kg						
Aramite					0.00	ug/kg						
Benzo(a)anthracene					0.00	ug/kg						
Benzo(a)pyrene					0.00	ug/kg						
Benzo(b)fluoranthene					0.00	ug/kg						
Benzo(ghi)perylene					0.00	ug/kg						
Benzo(k)fluoranthene					0.00	ug/kg						
Benzyl Alcohol					0.00	ug/kg						
Butyl benzyl phthalate					0.00	ug/kg						
Chlorobenzilate					0.00	ug/kg						
Chrysene					0.00	ug/kg						
Di-n-butyl phthalate					26.6	ug/kg						
Di-n-octyl phthalate					0.00	ug/kg						
Diallate					0.00	ug/kg						
Dibenzo(a,h)anthracene					0.00	ug/kg						
Dibenzofuran					0.00	ug/kg						
Diethyl phthalate					0.00	ug/kg						
Dimethoate					0.00	ug/kg						
Dimethyl phthalate					0.00	ug/kg						
Diphenylamine					0.00	ug/kg						
Disulfoton					0.00	ug/kg						
Ethyl Methanesulfonate					0.00	ug/kg						
Ethyl methacrylate					0.00	ug/kg						
Famphur					0.00	ug/kg						
Fluoranthene					0.00	ug/kg						
Fluorene					0.00	ug/kg						

QC Summary Report

Project Description: Hazardous Waste Contract

cc: WSRC00194 Lab. Sample ID: 9508477% Report Date: September 28, 1995 Page 9 of 33

mple/Parameter	Type	Batch	NOM	Sample	QC	Units	RPD%	REC%	Range	Analyst	Date	Time
Hexachlorobenzene					0.00	ug/kg				HNM	09/01/95	1412
Hexachlorobutadiene					0.00	ug/kg						
Hexachlorocyclopentadiene					0.00	ug/kg						
Hexachloroethane					0.00	ug/kg						
Hexachlorophene					0.00	ug/kg						
Hexachloropropene					0.00	ug/kg						
Indeno(1,2,3-c,d)pyrene					0.00	ug/kg						
Isodrin					0.00	ug/kg						
Isophorone					0.00	ug/kg						
Isosafrole					0.00	ug/kg						
Kepone					0.00	ug/kg						
Methapyrilene					0.00	ug/kg						
Methyl Methanesulfonate					0.00	ug/kg						
N-Nitrosodi-n-butylamine					0.00	ug/kg						
N-Nitrosodiethylamine					0.00	ug/kg						
N-Nitrosodimethylamine					0.00	ug/kg						
N-Nitrosodiphenylamine					0.00	ug/kg						
N-Nitrosomethylethylamine					0.00	ug/kg						
N-Nitrosomorpholine					0.00	ug/kg						
N-Nitrosopiperidine					0.00	ug/kg						
N-Nitrosopyrolidine					0.00	ug/kg						
Naphthalene					0.00	ug/kg						
Nitrobenzene					0.00	ug/kg						
O,O,O-Triethylphosphorothioate					0.00	ug/kg						
Pentachlorobenzene					0.00	ug/kg						
Pentachloroethane					0.00	ug/kg						
Pentachloronitrobenzene					0.00	ug/kg						
Phenacetin					0.00	ug/kg						
Phenanthrene					0.00	ug/kg						
Pronamide					0.00	ug/kg						
Pyridine					0.00	ug/kg						
Safrole					0.00	ug/kg						
Sulfotepp					0.00	ug/kg						
Thionazin					0.00	ug/kg						
a-,a-Dimethylphenethylamine					0.00	ug/kg						
bis(2-Chloroethoxy)methane					0.00	ug/kg						
bis(2-Chloroethyl) ether					0.00	ug/kg						
bis(2-Ethylhexyl)phthalate					17.1	ug/kg						
m,p-Cresol					0.00	ug/kg						
m-Dinitrobenzene					0.00	ug/kg						

EMPLOYEE: WHEELER, BONI JO

Seminar	Date
AI-450 Workstation: Operation and Automation - Dionex	07/15/93
ASSE Safety Issues Today	/ /
Batch Update Training	04/27/93
CPR	03/08/93
CPR	03/15/94
Certificate of Analysis	07/07/93
Dionex - Maintenance and Troubleshooting Ion Chromatography	03/23/94
Fire and Emergency Training	06/21/93
General Safety Training	01/26/94
Intro to Word II	05/11/95
Mercury Spill Cleanup	08/04/93
Operational Techniques of Ion Chromatography	07/13/93
PDT	03/08/93
PDT	03/17/94
Radiation Health and Safety	01/11/94
Radiation Safety Training	01/13/95
SPC/LIMS Orientation	12/12/93
SPC/LIMS Update	05/13/94
Safe Handling of Radioactive Materials	07/21/93
Safe Sample Handling	06/17/94
Solvent Issue Procedures	10/20/93
Standard First Aid	03/08/93
Standard First Aid	03/17/94
Top Down Training	02/23/95
Using the Internet	02/21/95

EMPLOYEE: WHEELER,BONI JO JOB TITLE: ANALY II/SAFETY

EDUCATION	PREVIOUS EXPERIENCE PRIOR TO GEL	YEARS WITH GEL
BA CHEMISTRY	17 YR	3

ANALYSES

SAFETY CHAIR PERSON

SOP NUMBER	SOP NAME	SOP EFFECTIVE	DATE TRAINED	REVISION NUMBER
GL-LB-E-001	Determination of Method Detection Limits	11/01/92	08/24/93	1
GL-LB-E-002	Balance	11/01/92	12/01/93	0
GL-LB-E-004	Temperature Monitoring and Documentation Requirements for Refrigerators, Freezers, Ovens, Incubators and Other Similar Devices	12/08/92	02/16/94	1
GL-LB-E-007	Laboratory Standards Documentation	07/01/93	05/26/93	0
GL-LB-E-007	Laboratory Standards Documentation	07/01/93	06/15/94	0
GL-LB-E-008	Basic requirements for the Use and Maintenance of Laboratory Notebooks, Logbooks, Forms and Other Record Keeping Devices	06/01/93	12/08/93	0
GL-LB-E-009	Run Logs	05/24/93	06/15/94	0
GL-LB-E-009	Run Logs	05/24/93	05/26/93	0
GL-LB-E-011	Laboratory Waste	10/26/93	06/11/93	0
GL-QS-E-002	Conducting Corrective Action	06/24/93	05/25/93	0
GL-QS-E-004	Nonconformance Identification Control, Documentation, Reporting and Dispositioning	05/01/93	05/19/93	0

EMPLOYEE: PATRICK-BOTTOMS,JO

Seminar	Date
Certificate of Analysis	07/07/93
Contracts Training	05/04/94
Fire and Emergency Training	06/21/93
General Safety Training	01/26/94
Mercury Spill Cleanup	08/04/93
PDT	03/08/93
Radiation Health and Safety	01/11/94
Radiation Safety Training	01/13/95
Safe Handling of Radioactive Materials	07/21/93
Safe Sample Handling	06/10/94
Solvent Issue Procedures	10/20/93

SOP NUMBER	SOP NAME	SOP EFFECTIVE	DATE TRAINED	REVISION NUMBER
GL-OA-E-013	Extraction of Semivolatile Pesticides and Polychlorinated Biphenyls (PCB) form Groundwater, astewater, and TCLP Leachates	02/15/93	08/12/93	0
GL-OA-E-024	Cleanup and Extraction of Polyurethane Foam Cartridge (PUF) for Semivolatile Analysis	09/29/93	02/15/94	0
GL-OA-E-025	Ion Chromatography	10/06/93	12/21/93	0
GL-OA-E-027	Extraction of Herbicides from soil and sludge samples	07/01/94	07/01/94	0

EMPLOYEE: PATRICK-BOTTOMS,JO **JOB TITLE:** TECHNICIAN II

EDUCATION	PREVIOUS EXPERIENCE PRIOR TO GEL	YEARS WITH GEL
1 YR MEDICAL ASS'T	0 YR	4

ANALYSES

IC

SOP NUMBER	SOP NAME	SOP EFFECTIVE	DATE TRAINED	REVISION NUMBER
GL-EPI-E-S006	Radiation Worker Training	12/08/92	04/19/93	0
GL-LB-E-003	Glassware Preparation	11/01/92	08/18/93	1
GL-LB-E-004	Temperature Monitoring and Documentation Requirements for Refrigerators, Freezers, Ovens, Incubators and Other Similar Devices	12/08/92	08/17/93	1
GL-LB-E-005	Data Review/Validation	12/15/92	09/09/93	0
GL-OA-E-002	Organic Standards Preparation and Traceability	12/30/92	08/09/93	1
GL-OA-E-010	Extraction of Semivolatile Organic Compounds from Soil and Sludge Samples	02/15/93	02/15/93	0
GL-OA-E-010	Extraction of Semivolatile Organic Compounds from Soil and Sludge Samples	02/15/93	08/11/93	0
GL-OA-E-015	Extraction of Herbicides From Groundwater,Wastewater, and TCLP Leachates	02/15/93	08/10/93	0
GL-OA-E-016	Extraction of Semivolatile Base-Neutral/Acid (BNA) Compounds from Groundwater and Wastewater	02/19/93	08/13/93	0
GL-OA-E-019	Extraction of Pesticides and Polychlorinated Biphenyls (PCB) from Soil and Sludge Samples	03/08/93	08/11/93	0
GL-OA-E-020	Percent Moisture	04/01/93	08/11/93	0
GL-QS-E-004	Nonconformance Identification Control, Documentation, Reporting and Dispositioning	05/01/93	05/19/93	0
GL-LB-E-002	Balance	11/01/92	08/17/93	0
GL-LB-E-007	Laboratory Standards Documentation	07/01/93	08/09/93	0
GL-LB-E-008	Basic requirements for the Use and Maintenance of Laboratory Notebooks, Logbooks, Forms and Other Record Keeping Devices	06/01/93	12/08/93	0
GL-LB-E-011	Laboratory Waste	10/26/93	06/23/93	0
GL-OA-E-010	Extraction of Semivolatile Organic Compounds from Soil and Sludge Samples	02/15/93	07/01/94	1

EMPLOYEE: GRUNSTRA, DENNI

Seminar	Date
Acid Spill Actions and Cleanup	07/14/93
Assessment of Environmental Impact - Are You at Risk	10/20/93
CPR	03/15/94
Certificate of Analysis	07/07/93
Contracts Training	05/04/94
EPA Analytical Conference - Solid Phase Extractions	05/06/92
Effective Writing	11/02/92
Fire and Emergency Training	11/17/93
GC/MS and RTE-A Fundamentals	03/01/92
General Safety Training	01/26/94
Group Leader/Section Head/Managers Safety Training	01/12/95
Group Leader/Section Head/Managers Safety Training	02/01/95
Mercury Spill Cleanup	08/04/93
PDT	03/08/93
Radiation Health and Safety	01/11/94
Radiation Safety Training	01/13/95
SPC/LIMS Update	05/13/94
Safe Sample Handling	06/10/94
Solvent Issue Procedures	10/20/93
Standard First Aid	03/17/94
Supervisory Loss Control - Accident Investigation	03/23/94
Using the Internet	02/21/95

SOP NUMBER	SOP NAME	SOP EFFECTIVE	DATE TRAINED	REVISION NUMBER
GL-OA-E-016	Base-Neutral/Acid (BNA) Compounds from Groundwater and Wastewater			
GL-OA-E-019	Extraction of Pesticides and Polychlorinated Biphenyls (PCB) from Soil and Sludge Samples	03/08/93	07/01/94	1
GL-OA-E-019	Extraction of Pesticides and Polychlorinated Biphenyls (PCB) from Soil and Sludge Samples	03/08/93	03/08/93	0
GL-OA-E-020	Percent Moisture	04/01/93	08/01/94	1
GL-OA-E-024	Cleanup and Extraction of Polyurethane Foam Cartridge (PUF) for Semivolatile Analysis	09/29/93	09/29/93	0
GL-OA-E-027	Extraction of Herbicides from soil and sludge samples	07/01/94	07/01/94	0
GL-QS-E-004	Nonconformance Identification Control, Documentation, Reporting and Dispositioning	05/01/93	06/16/93	0
GL-RC-E-001	Receipt and Inspection of Material and Services	02/15/93	10/15/93	0

EMPLOYEE: GRUNSTRA, DENNI JOB TITLE: LAB GROUP LEADER

EDUCATION		PREVIOUS EXPERIENCE PRIOR TO GEL	YEARS WITH GEL
BS	CHEMISTRY	0 YR	4

ANALYSES

ORGANIC EXTRACTIONS: WATER/SOIL/AIR, VOLATILE ORGANIC USING SEMI/MS

SOP NUMBER	SOP NAME	SOP EFFECTIVE	DATE TRAINED	REVISION NUMBER
GL-EPI-E-S006	Radiation Worker Training	12/08/92	04/19/93	0
GL-LB-E-003	Glassware Preparation	11/01/92	03/10/94	2
GL-LB-E-004	Temperature Monitoring and Documentation Requirements for Refrigerators, Freezers, Ovens, Incubators and Other Similar Devices	12/08/92	02/16/94	1
GL-LB-E-008	Basic requirements for the Use and Maintenance of Laboratory Notebooks, Logbooks, Forms and Other Record Keeping Devices	06/01/93	12/08/93	0
GL-LB-E-011	Laboratory Waste	10/26/93	02/02/94	0
GL-OA-E-002	Organic Standards Preparation and Traceability	12/30/92	07/01/93	1
GL-OA-E-002	Organic Standards Preparation and Traceability	12/30/92	12/30/92	0
GL-OA-E-002	Organic Standards Preparation and Traceability	12/30/92	09/27/93	2
GL-OA-E-010	Extraction of Semivolatile Organic Compounds from Soil and Sludge Samples	02/15/93	07/01/94	1
GL-OA-E-010	Extraction of Semivolatile Organic Compounds from Soil and Sludge Samples	02/15/93	02/15/93	0
GL-OA-E-013	Extraction of Semivolatile Pesticides and Polychlorinated Biphenyls (PCB) form Groundwater, astewater, and TCLP Leachates	02/15/93	02/15/93	0
GL-OA-E-013	Extraction of Semivolatile Pesticides and Polychlorinated Biphenyls (PCB) form Groundwater, astewater, and TCLP Leachates	02/15/93	08/01/94	1
GL-OA-E-015	Extraction of Herbicides From Groundwater,Wastewater, and TCLP Leachates	02/15/93	02/15/93	1
GL-OA-E-015	Extraction of Herbicides From Groundwater,Wastewater, and TCLP Leachates	02/15/93	02/15/93	0
GL-OA-E-016	Extraction of Semivolatile Base-Neutral/Acid (BNA) Compounds from Groundwater and Wastewater	02/19/93	02/19/93	0
GL-OA-E-016	Extraction of Semivolatile	02/19/93	08/01/94	1

EMPLOYEE: BAUER,MICHAEL

Seminar	Date
Fire Safety Training	04/13/95
Haz Com Training	04/13/95

58

EMPLOYEE: BAUER,MICHAEL **JOB TITLE:** TECHNICIAN I

EDUCATION		PREVIOUS EXPERIENCE PRIOR TO GEL	YEARS WITH GEL
BS	BIOLOGY	3 YRS	1

ANALYSES

ORGANIC EXTRACTIONS: WATER/SOIL

SOP NUMBER	SOP NAME	SOP EFFECTIVE	DATE TRAINED	REVISION NUMBER
GL-EPI-E-S001	Radiation Survey	12/08/92	03/07/95	2
GL-EPI-E-S002	Radiation Related Emergency	12/08/92	03/07/95	0
GL-EPI-E-S003	Radioactive Material Procurement	12/08/92	03/07/95	0
GL-EPI-E-S004	Radioactive Material Handling	12/08/92	03/07/95	1
GL-EPI-E-S005	Radioactive Waste Handling	12/08/92	03/07/95	1
GL-EPI-E-S006	Radiation Worker Training	12/08/92	03/07/95	1
GL-EPI-E-S007	Receiving of Radioactive Samples	07/01/93	03/07/95	1
GL-EPI-E-S008	Shipping of Radioactive Samples Sample Residues	07/01/93	03/07/95	1
GL-EPI-E-S009	Dosimetry Procedures	11/15/93	03/07/95	1

EMPLOYEE: SPITZ,JACK

Seminar	Date
Acid Spill Actions and Cleanup	07/14/93
Certificate of Analysis	07/07/93
Fire and Emergency Training	06/21/93
Gas Cylinder Safety	03/25/92
Mercury Spill Cleanup	08/04/93
PDT	03/08/93
Radiation Health and Safety	01/07/94
Radiation Safety Training	01/17/95
SPC	03/26/93
Safe Handling of Radioactive Materials	07/21/93
Safe Sample Handling	06/17/94
Solvent Issue Procedure	10/20/93

SOP NUMBER	SOP NAME	SOP EFFECTIVE	DATE TRAINED	REVISION NUMBER
GL-OA-E-023	Flame Ioninization Detector			
GL-QS-E-002	Conducting Corrective Action	06/24/93	05/25/93	0
GL-QS-E-004	Nonconformance Identification Control, Documentation, Reporting and Dispositioning	05/01/93	05/25/93	0

EMPLOYEE: SPITZ,JACK

JOB TITLE: LAB GROUP LEADER

EDUCATION		PREVIOUS EXPERIENCE PRIOR TO GEL	YEARS WITH GEL
BS	MICROBIOLOGY	7 YR	4

ANALYSES

VOLATILE ORGANIC USING VOA/MS, PID, ELCD

SOP NUMBER	SOP NAME	SOP EFFECTIVE	DATE TRAINED	REVISION NUMBER
GL-LB-E-001	Determination of Method Detection Limits	11/01/92	08/25/93	1
GL-LB-E-002	Balance	11/01/92	08/25/93	0
GL-LB-E-004	Temperature Monitoring and Documentation Requirements for Refrigerators, Freezers, Ovens, Incubators and Other Similar Devices	12/08/92	08/25/93	1
GL-LB-E-005	Data Review/Validation	12/15/92	08/25/93	0
GL-LB-E-006	Toxicity Characteristic Leaching Procedure Preparation	04/15/93	08/25/93	0
GL-LB-E-007	Laboratory Standards Documentation	07/01/93	08/25/93	0
GL-LB-E-008	Basic requirements for the Use and Maintenance of Laboratory Notebooks, Logbooks, Forms and Other Record Keeping Devices	06/01/93	12/08/93	0
GL-LB-E-009	Run Logs	05/24/93	08/25/93	0
GL-LB-E-011	Laboratory Waste	10/26/93	06/23/93	0
GL-OA-E-001	Establishing Retention Time Windows for Gas Chromatographic Analysis	11/01/92	08/25/93	0
GL-OA-E-001	Establishing Retention Time Windows for Gas Chromatographic Analysis	11/01/92	11/01/95	0
GL-OA-E-008	Volatile Organic Compounds By Gas Chromatograph/Mass Spectrometer	02/03/93	08/25/93	1
GL-OA-E-014	Volatile Organic Hydrocarbons By GC/ELCD	02/15/93	02/15/93	0
GL-OA-E-014	Volatile Organic Hydrocarbons By GC/ELCD	02/15/93	07/01/93	1
GL-OA-E-014	Volatile Organic Hydrocarbons By GC/ELCD	02/15/93	08/25/93	1
GL-OA-E-021	Volatile Organic Aromatic Compounds by Gas Chromatograph and Photoionization Detector	08/13/93	08/13/93	0
GL-OA-E-021	Volatile Organic Aromatic Compounds by Gas Chromatograph and Photoionization Detector	08/13/93	08/25/93	0
GL-OA-E-022	Volatile Organic Compounds By Gas Chromatograph/Mass Spectrometer	06/22/93	12/06/93	0
GL-OA-E-023	BTEX Volatile Organic Aromatics by Gas Chromatograph and Photoionization and	09/20/93	09/20/93	0

EMPLOYEE: BEARDEN,CAMERON

Seminar	Date
Acid Spill Actions and Cleanup	07/14/93
Assessing Environmental Impact - Are You At Risk	09/29/93
CPR	03/08/94
Certificate of Analysis	07/07/93
Fire and Emergency Training	06/21/93
GC/MS and RTE-A Fundamentals	03/01/92
General Safety Training	01/26/94
Group Leader/Section Head/Managers Safety Training	01/12/95
Group Leader/Section Head/Managers Safety Training	02/03/95
Mac Word Advanced	02/15/93
Mac Word Basic	02/15/93
Mercury Spill Cleanup	08/04/93
OSHA Hazardous Communications Standard	04/26/93
Radiation Health and Safety	01/12/94
Radiation Safety Training	01/17/95
SPC/LIMS Orientation	01/07/94
SPC/LIMS Update	05/13/94
Safe Handling of Radioactive Materials	07/21/93
Solvent Issue Procedures	10/20/93
Standard First Aid	03/10/94
Supervisory Loss Control -Accident Investigation	03/23/94
Using the Internet	05/09/95

SOP NUMBER	SOP NAME	SOP EFFECTIVE	DATE TRAINED	REVISION NUMBER
GL-QS-E-002	Conducting Corrective Action	06/24/93	06/16/94	1
GL-QS-E-004	Nonconformance Identification Control, Documentation, Reporting and Dispositioning	05/01/93	06/16/94	0

EMPLOYEE: BEARDEN, CAMERON JOB TITLE: LAB GROUP LEADER

EDUCATION		:	PREVIOUS EXPERIENCE PRIOR TO GEL	YEARS WITH GEL
BS	BIOLOGY		2 YR	5

ANALYSES

VOLATILE ORGANIC USING VOA/MS, SEMI/MS, ECD, FID

SOP NUMBER	SOP NAME	SOP EFFECTIVE	DATE TRAINED	REVISION NUMBER
GL-LB-E-001	Determination of Method Detection Limits	11/01/92	06/16/94	1
GL-LB-E-002	Balance	11/01/92	12/01/93	0
GL-LB-E-004	Temperature Monitoring and Documentation Requirements for Refrigerators, Freezers, Ovens, Incubators and Other Similar Devices	12/08/92	02/16/94	1
GL-LB-E-007	Laboratory Standards Documentation	07/01/93	06/16/94	0
GL-LB-E-008	Basic requirements for the Use and Maintenance of Laboratory Notebooks, Logbooks, Forms and Other Record Keeping Devices	06/01/93	12/08/93	0
GL-LB-E-011	Laboratory Waste	10/26/93	06/16/94	1
GL-LB-E-011	Laboratory Waste	10/26/93	06/11/93	0
GL-OA-E-008	Volatile Organic Compounds By Gas Chromatograph/Mass Spectrometer	02/03/93	07/01/93	1
GL-OA-E-008	Volatile Organic Compounds By Gas Chromatograph/Mass Spectrometer	02/03/93	06/16/94	1
GL-OA-E-009	Semivolatile Analysis By Gas Chromatograph/Mass Spectrometer	02/04/93	02/04/93	0
GL-OA-E-009	Semivolatile Analysis By Gas Chromatograph/Mass Spectrometer	02/04/93	07/01/93	1
GL-OA-E-009	Semivolatile Analysis By Gas Chromatograph/Mass Spectrometer	02/04/93	04/04/94	3
GL-OA-E-009	Semivolatile Analysis By Gas Chromatograph/Mass Spectrometer	02/04/93	06/16/94	3
GL-OA-E-009	Semivolatile Analysis By Gas Chromatograph/Mass Spectrometer	02/04/93	07/01/93	2
GL-OA-E-011	Chlorophenoxy Acid Herbicides	02/22/93	06/16/94	1
GL-OA-E-017	Polychlorinated Biphenyls	02/22/93	06/16/94	1
GL-OA-E-017	Polychlorinated Biphenyls	02/22/93	06/16/94	2
GL-OA-E-024	Cleanup and Extraction of Polyurethane Foam Cartridge (PUF) for Semivolatile Analysis	09/29/93	09/29/93	0

EMPLOYEE: BELL, JOHNNY

JOB TITLE: TECHNICIAN III

EDUCATION		PREVIOUS EXPERIENCE PRIOR TO GEL	YEARS WITH GEL
DIPL	HIGH SCHOOL	0 YR	13

ANALYSES

ORGANICS USING FID, ECD

SOP NUMBER	SOP NAME	SOP EFFECTIVE	DATE TRAINED	REVISION NUMBER
GL-LB-E-001	Determination of Method Detection Limits	11/01/92	08/11/93	1
GL-LB-E-002	Balance	11/01/92	08/10/93	0
GL-LB-E-002	Balance	11/01/92	06/16/94	0
GL-LB-E-004	Temperature Monitoring and Documentation Requirements for Refrigerators, Freezers, Ovens, Incubators and Other Similar Devices	12/08/92	08/04/93	1
GL-LB-E-005	Data Review/Validation	12/15/92	08/09/93	0
GL-LB-E-007	Laboratory Standards Documentation	07/01/93	06/16/94	0
GL-LB-E-008	Basic requirements for the Use and Maintenance of Laboratory Notebooks, Logbooks, Forms and Other Record Keeping Devices	06/01/93	12/08/93	0
GL-LB-E-009	Run Logs	05/24/93	08/04/93	0
GL-LB-E-011	Laboratory Waste	10/26/93	06/16/94	1
GL-OA-E-001	Establishing Retention Time Windows for Gas Chromatographic Analysis	11/01/92	11/01/92	0
GL-OA-E-011	Chlorophenoxy Acid Herbicides	02/22/93	02/22/93	0
GL-OA-E-011	Chlorophenoxy Acid Herbicides	02/22/93	07/01/93	1
GL-OA-E-017	Polychlorinated Biphenyls	02/22/93	02/22/93	0
GL-OA-E-018	Organochlorine Pesticide	03/01/93	11/01/93	2
GL-OA-E-018	Organochlorine Pesticide	03/01/93	03/01/93	1
GL-OA-E-019	Extraction of Pesticides and Polychlorinated Biphenyls (PCB) from Soil and Sludge Samples	03/08/93	03/08/93	0
GL-QS-E-002	Conducting Corrective Action	06/24/93	06/16/94	1
GL-QS-E-004	Nonconformance Identification Control, Documentation, Reporting and Dispositioning	05/01/93	06/16/94	0

EMPLOYEE: BELL, JOHNNY

Seminar	Date
Acid Spill Actions and Cleanup	07/14/93
Certificate of Analysis	07/07/93
Fire and Emergency Training	06/21/93
General Safety Training	01/26/94
Mercury Spill Cleanup	08/04/93
Radiation Health and Safety	01/12/94
Radiation Safety Training	01/17/95
SPC/LIMS Update	05/13/94
Safe Handling of Radioactive Materials	07/21/93
Solvent Issue Procedures	10/20/93
TQM Awareness Seminar	10/29/92

EMPLOYEE: FITE, TODD

Seminar	Date
General Safety Training	01/10/94
Radiation Health and Safety	01/12/94
Radiation Safety Training	01/17/95
Safe Sample Handling	06/17/94

EMPLOYEE: FITE,TODD JOB TITLE: ANALYST I

EDUCATION		:	PREVIOUS EXPERIENCE PRIOR TO GEL	YEARS WITH GEL
BA	CHEMISTRY		3 YR	2

ANALYSES

SEMI VOLATILE ORGANIC USING GC/MS

SOP NUMBER	SOP NAME	SOP EFFECTIVE	DATE TRAINED	REVISION NUMBER
GL-LB-E-001	Determination of Method Detection Limits	11/01/92	06/20/94	1
GL-LB-E-002	Balance	11/01/92	06/20/94	0
GL-LB-E-004	Temperature Monitoring and Documentation Requirements for Refrigerators, Freezers, Ovens, Incubators and Other Similar Devices	12/08/92	02/16/94	1
GL-LB-E-004	Temperature Monitoring and Documentation Requirements for Refrigerators, Freezers, Ovens, Incubators and Other Similar Devices	12/08/92	01/30/95	2
GL-LB-E-005	Data Review/Validation	12/15/92	06/20/94	1
GL-LB-E-007	Laboratory Standards Documentation	07/01/93	06/20/94	0
GL-LB-E-008	Basic requirements for the Use and Maintenance of Laboratory Notebooks, Logbooks, Forms and Other Record Keeping Devices	06/01/93	06/20/94	0
GL-LB-E-009	Run Logs	05/24/93	06/20/94	0
GL-LB-E-011	Laboratory Waste	10/26/93	06/20/94	1
GL-OA-E-002	Organic Standards Preparation and Traceability	12/30/92	06/20/94	0
GL-OA-E-009	Semivolatile Analysis By Gas Chromatograph/Mass Spectrometer	02/04/93	06/10/94	3
GL-QS-E-002	Conducting Corrective Action	06/24/93	04/14/94	0
GL-QS-E-004	Nonconformance Identification Control, Documentation, Reporting and Dispositioning	05/01/93	04/14/94	0

SOP NUMBER	SOP NAME	SOP EFFECTIVE	DATE TRAINED	REVISION NUMBER
GL-QS-E-004	Nonconformance Identification Control, Documentation, Reporting and Dispositioning	05/01/93	06/16/94	0
GL-LB-E-001	Determination of Method Detection Limits	11/01/92	09/14/94	1
GL-LB-E-007	Laboratory Standards Documentation	07/01/93	05/26/93	0
GL-LB-E-008	Basic requirements for the Use and Maintenance of Laboratory Notebooks, Logbooks, Forms and Other Record Keeping Devices	06/01/93	12/08/93	0
GL-LB-E-009	Run Logs	05/24/93	08/02/93	0
GL-OA-E-007	Dioxins and Furans	02/01/93	02/01/93	0
GL-OA-E-009	Semivolatile Analysis By Gas Chromatograph/Mass Spectrometer	02/04/93	02/04/93	0
GL-OA-E-009	Semivolatile Analysis By Gas Chromatograph/Mass Spectrometer	02/04/93	04/04/94	3
GL-QS-E-002	Conducting Corrective Action	06/24/93	05/25/93	0
GL-QS-E-002	Conducting Corrective Action	06/24/93	06/16/94	2

EMPLOYEE: MAIER, HERB **JOB TITLE:** ANALYST II

EDUCATION		:	PREVIOUS EXPERIENCE PRIOR TO GEL	YEARS WITH GEL
BS	CHEMISTRY		13 YR	4

ANALYSES

SEMI VOLATILE ORGANIC USING GC/MS, 8280 DIOXIN, VOLATILES BY GC/MS, HPLC EXPLOSIVES

SOP NUMBER	SOP NAME	SOP EFFECTIVE	DATE TRAINED	REVISION NUMBER
GL-LB-E-001	Determination of Method Detection Limits	11/01/92	08/11/93	1
GL-LB-E-005	Data Review/Validation	12/15/92	08/09/93	0
GL-LB-E-007	Laboratory Standards Documentation	07/01/93	06/16/94	0
GL-LB-E-009	Run Logs	05/24/93	09/14/94	0
GL-LB-E-011	Laboratory Waste	10/26/93	06/16/94	1
GL-OA-E-002	Organic Standards Preparation and Traceability	12/30/92	08/12/93	1
GL-OA-E-007	Dioxins and Furans	02/01/93	07/01/93	1
GL-OA-E-009	Semivolatile Analysis By Gas Chromatograph/Mass Spectrometer	02/04/93	07/01/93	1
GL-OA-E-009	Semivolatile Analysis By Gas Chromatograph/Mass Spectrometer	02/04/93	07/01/93	2
GL-OA-E-009	Semivolatile Analysis By Gas Chromatograph/Mass Spectrometer	02/04/93	08/20/93	2
GL-QS-E-004	Nonconformance Identification Control, Documentation, Reporting and Dispositioning	05/01/93	05/19/93	0
GL-LB-E-001	Determination of Method Detection Limits	11/01/92	01/11/93	0
GL-LB-E-002	Balance	11/01/92	08/10/93	0
GL-LB-E-004	Temperature Monitoring and Documentation Requirements for Refrigerators, Freezers, Ovens, Incubators and Other Similar Devices	12/08/92	08/04/93	1
GL-LB-E-004	Temperature Monitoring and Documentation Requirements for Refrigerators, Freezers, Ovens, Incubators and Other Similar Devices	12/08/92	09/14/94	2
GL-LB-E-005	Data Review/Validation	12/15/92	09/14/94	1
GL-OA-E-002	Organic Standards Preparation and Traceability	12/30/92	09/14/94	2
GL-OA-E-007	Dioxins and Furans	02/01/93	08/10/93	1
GL-OA-E-008	Volatile Organic Compounds By Gas Chromatograph/Mass Spectrometer	02/03/93	05/13/94	0

JAMES B. WESTMORELAND

Publications

1992. "Radium-228 in Natural Waters Via Extraction Chromatography" 38th Annual Convention on Bioassay, Analytical, Environmental, and Radiochemistry

1993. "A Simple Self-Absorption Correction for Gamma Ray Counting of Soils and Sediments" 39th Annual Conference on Bioassay, Analytical, Environmental and Radiochemistry

ENVIRONMENTAL PHYSICS, INC.

JAMES B. WESTMORELAND

Title	Laboratory Manager
Education	Bachelor of Science in Chemistry, Bob Jones University, 1987
Experience and Qualifications	Environmental Physics, Inc.: 1993 - Present As Laboratory Manager for Environmental Physics, Inc., Mr. Westmoreland is responsible for all laboratory and related operations. This includes the personnel management, production of chemical analyses, method development activities, nuclear instrumentation, radiation safety, radioactive waste disposal, associated quality control and support of business development. General Engineering Laboratories: 1991 - 1993 As Radiochemistry Group Leader/Radiological Safety Officer Mr. Westmoreland was responsible for management of all personnel and radiochemistry activities in the laboratory. This included sample analysis activities as well as Radiation Safety activities such as maintaining the radioactive material inventory, performing laboratory inspections, training, updating SOP's for handling radioactive material, and ensuring laboratory compliance with state and federal regulations. Chem-Nuclear Laboratory Services/Clemson Technical Center, Anderson, SC: 1987 - 1991 As Senior Analytical Radiochemist/Radiation Safety Officer Mr. Westmoreland was responsible for supervision of radioanalytical technicians duties as Radiation Safety Officer, maintaining radioactive material license.
Training	Alpha Spectroscopy Sample PreparationTechniques: On site training at Oak Ridge National Laboratory on various techniques available for spectroscopy mounting. Gamma Spectroscopy Interpretation: On site training at The Nucleus Inc. on software and specifics for interpreting gamma spectroscopy data. Radiation Safety Officer: Forty hour training on establishing and maintaining an effective radiation safety program by Radiation Safety Associates, Hebron, Connecticut. Radioactive Waste Packaging and Disposal Workshop: Forty hour training on Department of Transporation and Nuclear Regulatory Commission regulations on shipping and disposal of radioactive material. Chem-Nuclear Systems, Inc., Columbia, South Carolina. Nuclear Chemistry: Advanced principles of radiochemistry with emphasis on separations and nuclear instrumentation. 1992. College of Charleston.

JAMES T. CHAMBERS

Title Laboratory Manager

Education

BS Business Administration, Troy State University, 1977
United States Air Force Electronic Training, 1973-1974
Electronic and Hardware Theory Courses for Quadrupole Mass Spectrometers, Finnigan Corporation
System Operation and Theory of FTIR Instrumentation, Nicolet Corporation
Zeeger Miller Frontline Leadership, 1989
Executive Management Training, Harvard Business School
Leading for Total Quality Performance

Experience and Qualifications

General Engineering Laboratories: 1990 - Present
Responsible for overall technical management of environmental laboratory, including direct supervision of over 75 chemists, degreed analysts, technicians, and laboratory support personnel. Responsible for cost control, budgeting, scheduling, and responding to clients' specific analytical needs.

CompuChem Laboratories: 1984 - 1990
Director of Technical Services (1990) - Responsible for preparation of laboratory for changes in the EPA-90 Statement of Work. This task involved major changes in the extraction procedures of liquid samples, the choice and set-up of a liquid-liquid system to meet production needs, and selection of new mass spectrometers and their implementation into normal production mode. Served as Project Manager for automation and technology project to improve data processing of the environmental product.

ChemWest, CompuChem Laboratories: 1989 - 1990
Operation Manager - Responsible for daily operations of laboratory, with particular emphasis on process backlog, quality of product to customer, and on-time percentage rate.

CompuChem Laboratories: 1988 - 1989
Manager of Organic Laboratory - Responsible for overseeing Extraction, GC, and GC/MS Departments and supervision of a staff of three managers, 30 chemists, and 28 technicians. Implemented a Management Training Program for section leaders. Maintained production goals and increased on-time rate to customer through implementation of a more visible tracking program.

CompuChem Laboratories: 1984 - 1987
Manager of Laboratory Instrumentation - Responsible for organization and training of a technical work force to provide preventative and unscheduled maintenance for $5,000,000 of analytical instrumentation.

EDITH M. KENT

Title

Project Manager

Education

AB History, Erskine College, 1976
MPA Public Administration, University of South Carolina, 1977

Experience and Qualifications

General Engineering Laboratories: 1986-present
Project Manager (1995-present): Responsible for large contractual analytical projects with responsibilities for total management of each project through coordination of interdepartmental activities in order to meet the specifications of the project/contract.

Serves as Project Manager for Department of Energy Savannah River Site hazardous waste analytical contract, Sandia National Laboratories analytical contract, and several large commercial clients.

Client Services Representative (1988 - 1995): Responsible for assigned analytical projects with responsibilities for cost control, scheduling sampling and analysis, reviewing analytical data, providing special client requested reports and serving as liaison between laboratory and client. Prepares proposals for both new and current clients.

Served as Project Manager for Department of Energy Savannah River Site hazardous waste analytical contract as well as client representative for numerous Department of Defense indefinite delivery contracts for the U.S. Navy, Defense Industrial Supply Center, U.S. Army Corps of Engineers, Fleet Industrial Supply Center and other government and commercial clients.

Served on committee to develop Nonconformance Reporting and Corrective Action. Served on training team to provide training to employees on Nonconformance Reporting.

Office Manager (1986 - 1988): Responsible for supervision of clerical staff. Responsible for inventory control on all office materials. Maintained service contracts on all office equipment including copy machines and telephone equipment. Assisted company president in client relations and setting up fee structures and proposals. Has a working knowledge of the hazardous waste and drinking water regulations. Experience in receiving and logging in samples. Has provided training on the LIMS™ system.

Association for Retarded Citizens of Dorchester County: 1982-1986
Executive Director of agency responsible for fiscal management, personnel management, budgetary process, and overall administration of the agency.

Employee: Uytingco, Cornelia **Job Title:** Technician I

Education		Previous Experience Prior to GEL	Years With GEL
BS	Chemical Engineering	20 yr.	0

Analyses

Organic Extraction

Training

SW-846 Methods 3510 and 3550

Standards Methods Herbicide Extraction Method 6640

EMPLOYEE: TYREE, DAMON JOB TITLE: TECHNICIAN I

EDUCATION	PREVIOUS EXPERIENCE PRIOR TO GEL	YEARS WITH GEL
3 MO CHEMICAL ENGINEERING	4 YR	1

ANALYSES

ORGANIC EXTRACTIONS: WATER/SOIL

SOP NUMBER	SOP NAME	SOP EFFECTIVE	DATE TRAINED	REVISION NUMBER
EPI-SOP-A-015	Microwave Digestion for Soils and Sand	12/08/92	03/20/95	0
GL-EPI-E-S001	Radiation Survey	12/08/92	03/08/95	2
GL-EPI-E-S002	Radiation Related Emergency	12/08/92	03/08/95	0
GL-EPI-E-S003	Radioactive Material Procurement	12/08/92	03/08/95	0
GL-EPI-E-S004	Radioactive Material Handling	12/08/92	03/08/95	1
GL-EPI-E-S005	Radioactive Waste Handling	12/08/92	03/08/95	1
GL-EPI-E-S006	Radiation Worker Training	12/08/92	03/08/95	1
GL-EPI-E-S007	Receiving of Radioactive Samples	07/01/93	03/08/95	1
GL-EPI-E-S008	Shipping of Radioactive Samples Sample Residues	07/01/93	03/08/95	1
GL-EPI-E-S009	Dosimetry Procedures	11/15/93	03/08/95	1
GL-OA-E-010	Extraction of Semivolatile Organic Compounds from Soil and Sludge Samples	02/15/93	07/13/95	1
GL-OA-E-013	Extraction of Semivolatile Pesticides and Polychlorinated Biphenyls (PCB) form Groundwater, astewater, and TCLP Leachates	02/15/93	07/12/95	1
GL-OA-E-016	Extraction of Semivolatile Base-Neutral/Acid (BNA) Compounds from Groundwater and Wastewater	02/19/93	08/10/95	1

EMPLOYEE: CUMMINGS,JENNIFER **JOB TITLE:** ANALYST I

EDUCATION		PREVIOUS EXPERIENCE PRIOR TO GEL	YEARS WITH GEL
MA	BIOLOGY	3 YR	0

ANALYSES

VOA/MS

SOP NUMBER	SOP NAME	SOP EFFECTIVE	DATE TRAINED	REVISION NUMBER
GL-LB-E-001	Determination of Method Detection Limits	11/01/92	08/25/95	2
GL-LB-E-002	Balance	11/01/92	08/25/95	1
GL-LB-E-004	Temperature Monitoring and Documentation Requirements for Refrigerators, Freezers, Ovens, Incubators and Other Similar Devices	12/08/92	08/25/95	2
GL-LB-E-005	Data Review/Validation	12/15/92	08/25/95	1
GL-LB-E-007	Laboratory Standards Documentation	07/01/93	08/25/95	0
GL-LB-E-009	Run Logs	05/24/93	08/25/95	0
GL-LB-E-012	Verifying the Maintenance of Sample Integrity	11/15/93	08/25/95	0
GL-OA-E-002	Organic Standards Preparation and Traceability	12/30/92	08/25/95	2
GL-OA-E-008	Volatile Organic Compounds By Gas Chromatograph/Mass Spectrometer	02/03/93	08/25/95	1

EMPLOYEE: WILBER, PETER JOB TITLE: TECHNICIAN II

EDUCATION	PREVIOUS EXPERIENCE PRIOR TO GEL	YEARS WITH GEL
CERT US NAVY-RAD CONTROL	4 YR	1

ANALYSES

LASER PHOSPHORESCENCE, ALPHA SPECTROSCOPY-PREP & ANALYSIS

SOP NUMBER	SOP NAME	SOP EFFECTIVE	DATE TRAINED	REVISION NUMBER
EPI-SOP-A-011B	Total Isotopic Determination of Iranium Americium and Curium in Soil and Vegetation	10/27/23	02/09/95	3
EPI-SOP-A-015	Microwave Digestion for Soils and Sand	12/08/92	03/20/95	0

Employee: Patel, Steve **Job Title:** Technician I

Education		Previous Experience Prior to GEL	Years With GEL
BS	Biology	0	0

Analyses

Organic Extraction

Training

SW-846 Methods 3510 and 3550

Standards Methods Herbicide Extraction Method 6640

EMPLOYEE: SHAW-BUSBY,JANNIE JOB TITLE: ANALYST I/TTL

EDUCATION		PREVIOUS EXPERIENCE PRIOR TO GEL	YEARS WITH GEL
BS	CHEMISTRY	2 YR	4

ANALYSES

VOLATILE ORGANIC USING ECD

SOP NUMBER	SOP NAME	SOP EFFECTIVE	DATE TRAINED	REVISION NUMBER
GL-LB-E-001	Determination of Method Detection Limits	11/01/92	08/11/93	1
GL-LB-E-002	Balance	11/01/92	11/01/93	0
GL-LB-E-004	Temperature Monitoring and Documentation Requirements for Refrigerators, Freezers, Ovens, Incubators and Other Similar Devices	12/08/92	02/16/94	1
GL-LB-E-005	Data Review/Validation	12/15/92	08/09/93	0
GL-LB-E-007	Laboratory Standards Documentation	07/01/93	06/21/94	0
GL-LB-E-008	Basic requirements for the Use and Maintenance of Laboratory Notebooks, Logbooks, Forms and Other Record Keeping Devices	06/01/93	08/06/93	0
GL-LB-E-009	Run Logs	05/24/93	08/04/93	0
GL-LB-E-011	Laboratory Waste	10/26/93	06/23/93	0
GL-LB-E-011	Laboratory Waste	10/26/93	06/21/94	1
GL-OA-E-001	Establishing Retention Time Windows for Gas Chromatographic Analysis	11/01/92	11/01/92	0
GL-OA-E-001	Establishing Retention Time Windows for Gas Chromatographic Analysis	11/01/92	06/21/94	0
GL-OA-E-002	Organic Standards Preparation and Traceability	12/30/92	08/12/93	1
GL-OA-E-011	Chlorophenoxy Acid Herbicides	02/22/93	02/22/93	0
GL-OA-E-011	Chlorophenoxy Acid Herbicides	02/22/93	07/01/93	1
GL-OA-E-011	Chlorophenoxy Acid Herbicides	02/22/93	08/05/93	1
GL-OA-E-012	Determination of Trace Amounts of Otto Fuel II in Water and Soil Samples by GC/ECD	02/15/93	08/01/93	0
GL-OA-E-013	Extraction of Semivolatile Pesticides and Polychlorinated Biphenyls (PCB) form Groundwater, astewater, and TCLP Leachates	02/15/93	02/15/93	0
GL-OA-E-015	Extraction of Herbicides From Groundwater,Wastewater, and TCLP Leachates	02/15/93	02/15/93	0
GL-OA-E-017	Polychlorinated Biphenyls	02/22/93	08/05/93	1

SOP NUMBER	SOP TITLE	SOP EFFECTIVE DATE	DATE REVISION APPROVED	REVISION NUMBER
GL-OA-E-017	Polychlorinated Biphenyls	02/22/93	02/22/93	0
GL-OA-E-018	Organochlorine Pesticide	03/01/93	03/01/93	1
GL-OA-E-018	Organochlorine Pesticide	03/01/93	06/23/93	1
GL-OA-E-018	Organochlorine Pesticide	03/01/93	06/21/94	2
GL-QS-E-002	Conducting Corrective Action	06/24/93	06/21/94	1
GL-QS-E-004	Nonconformance Identification Control, Documentation, Reporting and Dispositioning	05/01/93	05/19/93	0
GL-QS-E-004	Nonconformance Identification Control, Documentation, Reporting and Dispositioning	05/01/93	06/21/94	0

EMPLOYEE: SHAW-BUSBY,JANNIE

Seminar	Date
Acid Spill Actions and Cleanup	07/14/93
Certificate of Analysis	07/07/93
Contract and Client Requirements	05/04/94
Fire and Emergency Training	06/21/93
General Safety Training	01/26/94
Immuno Assay Testing	11/04/93
Internal Chain of Custody	12/20/93
Mecury Spill Cleanup	08/04/93
Radiation Health and Safety	01/12/94
Radiation Safety Training	01/17/95
SPC/LIMS Update	05/13/94
Safe Sample Handling	06/17/94
Satellite Waste Disposal Training - PCB's Waste - Semi Volatiles	01/20/95
Solvent Issue Procedure	10/20/93

EMPLOYEE: McABEE, GEORGE **JOB TITLE:** SECTION HEAD

EDUCATION		:	PREVIOUS EXPERIENCE PRIOR TO GEL	YEARS WITH GEL
BS	BIOLOGY		10 YR	6

ANALYSES

VARIOUS ORGANIC ANALYSES

SOP NUMBER	SOP NAME	SOP EFFECTIVE	DATE TRAINED	REVISION NUMBER
GL-LB-E-001	Determination of Method Detection Limits	11/01/92	02/22/93	1
GL-LB-E-001	Determination of Method Detection Limits	11/01/92	01/11/93	0
GL-LB-E-001	Determination of Method Detection Limits	11/01/92	11/01/92	0
GL-LB-E-002	Balance	11/01/92	11/01/92	0
GL-LB-E-002	Balance	11/01/92	09/15/94	1
GL-LB-E-003	Glassware Preparation	11/01/92	11/01/92	0
GL-LB-E-003	Glassware Preparation	11/01/92	02/22/93	1
GL-LB-E-004	Temperature Monitoring and Documentation Requirements for Refrigerators, Freezers, Ovens, Incubators and Other Similar Devices	12/08/92	01/11/93	1
GL-LB-E-004	Temperature Monitoring and Documentation Requirements for Refrigerators, Freezers, Ovens, Incubators and Other Similar Devices	12/08/92	12/08/92	0
GL-LB-E-004	Temperature Monitoring and Documentation Requirements for Refrigerators, Freezers, Ovens, Incubators and Other Similar Devices	12/08/92	02/16/94	1
GL-LB-E-004	Temperature Monitoring and Documentation Requirements for Refrigerators, Freezers, Ovens, Incubators and Other Similar Devices	12/08/92	06/01/94	2
GL-LB-E-005	Data Review/Validation	12/15/92	12/15/92	0
GL-LB-E-005	Data Review/Validation	12/15/92	11/15/93	1
GL-LB-E-007	Laboratory Standards Documentation	07/01/93	05/26/93	0
GL-LB-E-007	Laboratory Standards Documentation	07/01/93	07/01/93	0
GL-LB-E-008	Basic requirements for the Use and Maintenance of Laboratory Notebooks, Logbooks, Forms and Other Record Keeping Devices	06/01/93	05/26/93	0
GL-LB-E-008	Basic requirements for the Use and Maintenance of Laboratory Notebooks, Logbooks, Forms and Other Record Keeping Devices	06/01/93	06/01/93	0

		SOP EFFECTIVE	DATE TRAINED	REVISION NUMBER
GL-LB-E-008	Basic requirements for the Use and Maintenance of Laboratory Notebooks, Logbooks, Forms and Other Record Keeping Devices	06/01/93	07/01/94	1
GL-LB-E-009	Run Logs	05/24/93	05/26/93	0
GL-OA-E-004	Volatile Total petroleum Hydrocarbons by Flame Ionization Detector	08/01/93	02/15/93	0
GL-OA-E-008	Volatile Organic Compounds By Gas Chromatograph/Mass Spectrometer	02/03/93	02/03/93	0
GL-OA-E-008	Volatile Organic Compounds By Gas Chromatograph/Mass Spectrometer	02/03/93	07/01/93	1
GL-OA-E-009	Semivolatile Analysis By Gas Chromatograph/Mass Spectrometer	02/04/93	07/01/93	1
GL-OA-E-009	Semivolatile Analysis By Gas Chromatograph/Mass Spectrometer	02/04/93	02/04/93	0
GL-OA-E-011	Chlorophenoxy Acid Herbicides	02/22/93	02/22/93	0
GL-OA-E-011	Chlorophenoxy Acid Herbicides	02/22/93	07/01/93	1
GL-OA-E-014	Volatile Organic Hydrocarbons By GC/ELCD	02/15/93	02/15/93	0
GL-OA-E-014	Volatile Organic Hydrocarbons By GC/ELCD	02/15/93	07/01/93	1
GL-OA-E-017	Polychlorinated Biphenyls	02/22/93	02/22/93	0
GL-OA-E-018	Organochlorine Pesticide	03/01/93	03/01/93	0
GL-OA-E-018	Organochlorine Pesticide	03/01/93	03/01/93	1
GL-QS-E-002	Conducting Corrective Action	06/24/93	05/25/93	0
GL-QS-E-002	Conducting Corrective Action	06/24/93	06/24/93	0
GL-QS-E-004	Nonconformance Identification Control, Documentation, Reporting and Dispositioning	05/01/93	05/19/93	0

EMPLOYEE: McABEE, GEORGE

Seminar	Date
Group Leader/Section Head/Managers Safety Training	01/16/95
Group Leader/Section Head/Managers Safety Training	02/03/95

EMPLOYEE: MUNN,CAMILLA JOB TITLE: TECHNICIAN II

EDUCATION :	PREVIOUS EXPERIENCE PRIOR TO GEL	YEARS WITH GEL
BA JOURNALISM	2 YR	2

ANALYSES

pH, TURBIDITY, CONDUCTIVITY, FLASHPOINT, BTU, FLUORIDE, KARL FISCHER, OIL & GREASE, COLORIMETRIC, SOLIDS, FTIR

SOP NUMBER	SOP NAME	SOP EFFECTIVE	DATE TRAINED	REVISION NUMBER
GL-GC-E-001	Total Dissolved Solids	02/25/93	11/02/93	1
GL-GC-E-002	Fluoride	03/01/93	08/31/93	1
GL-GC-E-002	Fluoride	03/01/93	02/01/94	1
GL-GC-E-004	Standards - Definitions & Preparation	06/27/93	12/20/93	0
GL-GC-E-008	pH	09/13/93	08/11/93	0
GL-GC-E-008	pH	09/13/93	03/01/94	0
GL-GC-E-009	Conductivity	08/16/93	07/12/93	0
GL-GC-E-009	Conductivity	08/16/93	06/01/94	0
GL-GC-E-010	Paint Filter Test	08/16/93	06/03/93	0
GL-GC-E-010	Paint Filter Test	08/16/93	06/30/94	0
GL-GC-E-023	Corrosivity by pH	10/15/93	06/17/93	0
GL-GC-E-027	Pensky-Martens closed Cup Flashpoint	10/18/93	01/19/94	0
GL-GC-E-029	Corrosivity Toward Steel	10/20/93	10/20/93	0
GL-GC-E-030	Flammability Potential Screening Analysis of Waste	10/20/93	10/20/93	0
GL-GC-E-031	Fecal Coliform by Membrane Filter	11/01/93	06/30/94	0
GL-GC-E-033	Alkalinity - Total, Bicarbonate, Carbonate, Hydroxide, and Phenolphthalein	11/01/93	06/30/94	0
GL-GC-E-034	Fecal Coliform Most Probable (5 Tube Dilution)	11/01/93	06/30/94	0
GL-GC-E-049	Formaldehyde	11/01/93	12/15/93	0
GL-GC-E-052	Sulfide (Methylene Blue Method)	11/01/93	07/01/93	0
GL-GC-E-052	Sulfide (Methylene Blue Method)	11/01/93	04/15/94	0
GL-GC-E-054	Total Coliform by Membrane Filter	05/01/94	06/30/94	0
GL-GC-E-061	Chemical Oxygen Demand - Digestion Reactor Method	11/01/93	06/30/94	0
GL-GC-E-063	Total Coliform By Most Probable Number (5 Tube Dilution)	05/01/94	06/30/94	0
GL-GC-E-064	Density	06/01/94	06/11/93	0

SOP NUMBER	SOP TITLE	EFFECTIVE	DATE REVISED	REVISION
GL-GC-E-065	Specific Gravity	06/01/95	01/28/94	0
GL-GC-E-066	Flashpoint by Setaflash	07/01/94	06/30/94	0
GL-GC-E-070	Determination of Kinematic and Dynamic Viscosity Using a Glass Capillary Viscometer	03/10/95	03/10/95	0
GL-LB-E-001	Determination of Method Detection Limits	11/01/92	01/11/93	0
GL-LB-E-001	Determination of Method Detection Limits	11/01/92	08/19/93	1
GL-LB-E-002	Balance	11/01/92	12/01/93	0
GL-LB-E-003	Glassware Preparation	11/01/92	12/21/93	1
GL-LB-E-004	Temperature Monitoring and Documentation Requirements for Refrigerators, Freezers, Ovens, Incubators and Other Similar Devices	12/08/92	12/21/93	1
GL-LB-E-004	Temperature Monitoring and Documentation Requirements for Refrigerators, Freezers, Ovens, Incubators and Other Similar Devices	12/08/92	02/16/94	1
GL-LB-E-005	Data Review/Validation	12/15/92	12/21/93	1
GL-LB-E-008	Basic requirements for the Use and Maintenance of Laboratory Notebooks, Logbooks, Forms and Other Record Keeping Devices	06/01/93	12/08/93	0
GL-LB-E-010	Maintenance and Use of Air Displacement Pipets	09/17/93	12/21/93	0
GL-LB-E-011	Laboratory Waste	10/26/93	06/11/93	0
GL-QS-E-002	Conducting Corrective Action	06/24/93	05/25/93	0
GL-QS-E-004	Nonconformance Identification Control, Documentation, Reporting and Dispositioning	05/01/93	05/26/93	0

EMPLOYEE: MUNN, CAMILLA

Seminar	Date
Acid Spill Actions and Cleanup	07/14/93
Assessing Environmental Impact - Are You at Risk	09/29/93
Certificate of Analysis	07/07/93
Fire and Emergency Training	06/21/93
Karl Fischer	08/06/93
Karl Fischer	05/10/94
Mercury Spill Cleanup	08/04/93
Radiation Health and Safety	01/06/94
Radiation Safety Training	01/13/95
Residual Chlorine	08/17/94
Safe Handling of Radioactive Materials	07/21/93
Safe Sample Handling	06/10/94
Satellite Waste Disposal Training - Hazardous Waste Lab & COD Waste-General Chemistry	01/18/95
Setaflash	04/30/93

EMPLOYEE: FORD, KAREN

JOB TITLE: LAB GROUP LEADER

EDUCATION		PREVIOUS EXPERIENCE PRIOR TO GEL	YEARS WITH GEL
BS	CHEMISTRY/BIOLOGY	2 YR	5

ANALYSES

DATA REVIEW, SOLIDS ANALYSES, WET CHEMISTRY, BOD, BACTI, CONDUCTIVITY, pH, FLUORIDE, FLASHPOINTS, BTU, OIL & GREASE, COLORIMETRIC, FTIR, IMMEDIATES & TITRAMETRIC

SOP NUMBER	SOP NAME	SOP EFFECTIVE	DATE TRAINED	REVISION NUMBER
GL-EPI-E-S001	Radiation Survey	12/08/92	05/03/95	2
GL-EPI-E-S002	Radiation Related Emergency	12/08/92	05/03/95	0
GL-EPI-E-S003	Radioactive Material Procurement	12/08/92	05/03/95	0
GL-EPI-E-S004	Radioactive Material Handling	12/08/92	05/03/95	1
GL-EPI-E-S005	Radioactive Waste Handling	12/08/92	05/03/95	1
GL-EPI-E-S006	Radiation Worker Training	12/08/92	05/03/95	1
GL-EPI-E-S007	Receiving of Radioactive Samples	07/01/93	05/03/95	2
GL-EPI-E-S008	Shipping of Radioactive Samples Sample Residues	07/01/93	05/03/95	1
GL-EPI-E-S009	Dosimetry Procedures	11/15/93	05/03/95	1
GL-GC-E-002	Fluoride	03/01/93	03/01/93	0
GL-GC-E-002	Fluoride	03/01/93	07/01/93	1
GL-GC-E-003	Iodine	03/01/93	03/01/93	0
GL-GC-E-003	Iodine	03/01/93	03/22/93	1
GL-GC-E-003	Iodine	03/01/93	07/01/93	2
GL-GC-E-004	Standards - Definitions & Preparation	06/27/93	06/27/93	0
GL-GC-E-008	pH	09/13/93	09/13/93	0
GL-GC-E-010	Paint Filter Test	08/16/93	08/16/93	0
GL-GC-E-011	Total Solids	09/13/93	09/13/93	0
GL-GC-E-012	Total Suspended Solids	09/13/93	03/24/95	1
GL-GC-E-016	Release of Cyanide and Sulfide	09/27/93	09/27/93	0
GL-GC-E-017	Gravimetric Total Petroleum Hydrocarbons (TPH) Liquids	10/01/93	10/01/93	0
GL-GC-E-018	Oil and Grease Total Petroleum Hydrocarbons (TPH) Gravimetric for Solids	10/08/93	10/08/93	0
GL-GC-E-020	Oil and Grease	10/08/93	10/08/93	0
GL-GC-E-021	Determination of Total petroleum Hydrocarbons Solid by Infrared Spectrophotometry	10/18/93	10/18/93	0

		DP EFFECTIVE	DATE TRAINED	REVISION NUMBER
GL-GC-E-023	Corrosivity by pH	10/15/93	10/15/93	0
GL-GC-E-023	Corrosivity by pH	10/15/93	04/28/95	1
GL-GC-E-024	General Chemistry: Data Entry and Data Review Procedures	08/01/94	08/01/94	0
GL-GC-E-025	Hardness by Calculation	10/15/93	10/15/93	0
GL-GC-E-026	Total Phosphorus	10/20/93	10/20/93	0
GL-GC-E-027	Pensky-Martens closed Cup Flashpoint	10/18/93	10/18/93	0
GL-GC-E-032	Carbon Dioxide (Total and Free) by Calculation	11/01/93	11/01/93	0
GL-GC-E-035	Volatile Suspended Solids	11/01/93	11/01/93	0
GL-GC-E-036	Color Determination by Visual Comparison	10/27/93	04/28/95	1
GL-GC-E-042	Cation-Exchange Capacity of Soils (Ammonium Acetate)	11/01/93	11/01/93	0
GL-GC-E-043	Cation Exchange Capacity of Soils (Sodium Acetate)	11/01/93	11/01/93	0
GL-GC-E-057	Volatile solids and % Ash-550-Procedure for Water Samples	11/01/93	11/01/93	0
GL-GC-E-058	Volatile Solids and % Ash-550-Procedure for Solid and Semisolid Samples	11/01/93	11/01/93	0
GL-GC-E-068	Viscosity	06/01/94	06/01/94	0
GL-GC-E-070	Determination of Kinematic and Dynamic Viscosity Using a Glass Capillary Viscometer	03/10/95	03/10/95	0
GL-GC-E-076	Total Residual Chlorine	05/01/95	05/01/95	0
GL-HR-E-001	Assessment ofEmployee Training Needs	02/01/93	08/17/94	1
GL-LB-E-001	Determination of Method Detection Limits	11/01/92	11/01/92	0
GL-LB-E-001	Determination of Method Detection Limits	11/01/92	02/22/93	1
GL-LB-E-002	Balance	11/01/92	11/01/92	0
GL-LB-E-003	Glassware Preparation	11/01/92	11/01/92	0
GL-LB-E-003	Glassware Preparation	11/01/92	02/22/93	1
GL-LB-E-004	Temperature Monitoring and Documentation Requirements for Refrigerators, Freezers, Ovens, Incubators and Other Similar Devices	12/08/92	12/08/92	0
GL-LB-E-004	Temperature Monitoring and Documentation Requirements for Refrigerators, Freezers, Ovens, Incubators and Other Similar Devices	12/08/92	01/11/93	1
GL-LB-E-005	Data Review/Validation	12/15/92	12/15/92	0
GL-QS-E-004	Nonconformance Identification Control, Documentation, Reporting and Dispositioning	05/01/93	06/08/93	0
GL-QS-E-005	Review of Monitoring Devie Logs	02/01/93	06/01/94	2

EMPLOYEE: FORD, KAREN

Seminar	Date
Acid Spill Actions and Cleanup	07/14/93
CPR	12/16/92
Effective Writing	11/18/92
Facilitation Training	03/30/93
Fire and Emergency Training	06/21/93
General Safety Training	01/26/94
Group Leader/Section Head/Managers Safety Training	01/16/95
Group Leader/Section Head/Managers Safety Training	02/01/95
How to Write an SOP	10/08/92
Radiation Health and Safety	01/06/94
SPC Implementation	12/02/93
SPC/LIMS Orientation	12/21/93
SPC/LIMS Update	05/13/94
Safe Handling of Radioactive Materials	07/21/93
Satellite Waste Disposal Training - Hazardous Waste Lab & COD Waste-General Chemistry	01/18/95

EMPLOYEE: GUZMAN, CHARLES JOB TITLE: TECHNICIAN III

EDUCATION		PREVIOUS EXPERIENCE PRIOR TO GEL	YEARS WITH GEL
AS	NUCLEAR ENG TEC	15 YR	4

ANALYSES

AUTOMATED COLORIMETRIC: NH3, TKN, NO2/NO3, CN, PHENOL

SOP NUMBER	SOP NAME	SOP EFFECTIVE	DATE TRAINED	REVISION NUMBER
GL-GC-E-007	Total Organic Halogen Using the Cosa Tox-10 Analyzer	08/18/93	08/18/93	0
GL-GC-E-014	Total Cyanide Analysis by Alpkem RFA	09/20/93	06/29/95	2
GL-GC-E-019	Ammonia Determination by Traccs 800 Methodology	10/01/93	01/11/95	0
GL-GC-E-019	Ammonia Determination by Traccs 800 Methodology	10/01/93	11/07/93	0
GL-GC-E-019	Ammonia Determination by Traccs 800 Methodology	10/01/93	10/01/93	0
GL-GC-E-026	Total Phosphorus	10/20/93	09/20/93	0
GL-GC-E-041	Nitrate/Nitrite by Traacs 800 Methodology	11/01/93	11/01/93	0
GL-GC-E-041	Nitrate/Nitrite by Traacs 800 Methodology	11/01/93	05/11/94	0
GL-GC-E-041	Nitrate/Nitrite by Traacs 800 Methodology	11/01/93	01/11/95	0
GL-GC-E-055	Total Kjeldahl Nitrogen, Total Organic Nitrogen, and Total Nitrogen by Traacs 800 Methodology	11/01/93	11/03/93	0
GL-LB-E-001	Determination of Method Detection Limits	11/01/92	06/30/95	1
GL-LB-E-001	Determination of Method Detection Limits	11/01/92	01/11/93	0
GL-LB-E-002	Balance	11/01/92	11/04/93	0
GL-LB-E-002	Balance	11/01/92	06/30/95	1
GL-LB-E-004	Temperature Monitoring and Documentation Requirements for Refrigerators, Freezers, Ovens, Incubators and Other Similar Devices	12/08/92	06/30/95	2
GL-LB-E-004	Temperature Monitoring and Documentation Requirements for Refrigerators, Freezers, Ovens, Incubators and Other Similar Devices	12/08/92	02/16/94	1
GL-LB-E-004	Temperature Monitoring and Documentation Requirements for Refrigerators, Freezers, Ovens, Incubators and Other Similar Devices	12/08/92	11/11/93	0
GL-LB-E-005	Data Review/Validation	12/15/92	06/30/95	1

SOP NUMBER	SOP NAME	EFFECTIVE	TRAINED	REVISION NUMBER
GL-LB-E-005	Data Review/Validation	12/15/92	11/11/93	0
GL-LB-E-007	Laboratory Standards Documentation	07/01/93	06/30/95	0
GL-LB-E-007	Laboratory Standards Documentation	07/01/93	11/11/93	0
GL-LB-E-008	Basic requirements for the Use and Maintenance of Laboratory Notebooks, Logbooks, Forms and Other Record Keeping Devices	06/01/93	06/30/95	1
GL-LB-E-009	Run Logs	05/24/93	11/11/93	0
GL-LB-E-009	Run Logs	05/24/93	06/30/95	0
GL-LB-E-010	Maintenance and Use of Air Displacement Pipets	09/17/93	11/11/93	0
GL-LB-E-010	Maintenance and Use of Air Displacement Pipets	09/17/93	06/30/95	0
GL-LB-E-011	Laboratory Waste	10/26/93	06/30/95	1
GL-LB-E-012	Verifying the Maintenance of Sample Integrity	11/15/93	06/30/95	0
GL-QS-E-004	Nonconformance Identification Control, Documentation, Reporting and Dispositioning	05/01/93	05/26/93	0

EMPLOYEE: GUZMAN,CHARLES

Seminar	Date
Batch Update Training	04/27/93
Certificate of Analysis	07/07/93
Fire and Emergency Training	06/21/93
General Safety Training	01/26/94
Mercury Spill Cleanup	08/04/93
Radiation Health and Safety	01/07/94
Radiation Safety Training	01/17/95
Safe Handling of Radioactive Materials	07/21/93
Safe Sample Handling	06/10/94

EMPLOYEE: GETSINGER, BRIAN JOB TITLE: TECHNICIAN I

EDUCATION		PREVIOUS EXPERIENCE PRIOR TO GEL	YEARS WITH GEL
AS	SCIENCE	0 YR	4

ANALYSES

AUTOMATED COLORIMETRIC: NH3, TKN, NO2/NO3, CN, PHENOL, INOPGANIC PREP

SOP NUMBER	SOP NAME	SOP EFFECTIVE	DATE TRAINED	REVISION NUMBER
GL-ADM-E-001	Preparation, Authorization, Change and Release of Standard Operating Procedures	09/01/92	10/15/93	1
GL-GC-E-002	Fluoride	03/01/93	07/01/93	1
GL-GC-E-019	Ammonia Determination by Traccs 800 Methodology	10/01/93	11/03/93	0
GL-GC-E-026	Total Phosphorus	10/20/93	04/14/95	1
GL-GC-E-026	Total Phosphorus	10/20/93	10/13/93	0
GL-GC-E-041	Nitrate/Nitrite by Traacs 800 Methodology	11/01/93	11/01/93	0
GL-GC-E-055	Total Kjeldahl Nitrogen, Total Organic Nitrogen, and Total Nitrogen by Traacs 800 Methodology	11/01/93	11/03/93	0
GL-GC-E-069	Reactive Cyanide and Sulfide	11/18/94	12/20/94	0
GL-GC-E-073	Free Cyanide Analysis By Microdiffusion	04/14/95	04/14/95	0
GL-LB-E-001	Determination of Method Detection Limits	11/01/92	10/15/93	1
GL-LB-E-001	Determination of Method Detection Limits	11/01/92	06/30/95	1
GL-LB-E-002	Balance	11/01/92	06/30/95	1
GL-LB-E-002	Balance	11/01/92	11/10/93	0
GL-LB-E-004	Temperature Monitoring and Documentation Requirements for Refrigerators, Freezers, Ovens, Incubators and Other Similar Devices	12/08/92	11/10/93	0
GL-LB-E-004	Temperature Monitoring and Documentation Requirements for Refrigerators, Freezers, Ovens, Incubators and Other Similar Devices	12/08/92	06/30/95	2
GL-LB-E-005	Data Review/Validation	12/15/92	11/10/93	0
GL-LB-E-005	Data Review/Validation	12/15/92	06/30/95	1
GL-LB-E-006	Toxicity Characteristic Leaching Procedure Preparation	04/15/93	05/18/94	1
GL-LB-E-007	Laboratory Standards Documentation	07/01/93	11/10/93	0
GL-LB-E-007	Laboratory Standards Documentation	07/01/93	06/30/95	0
GL-LB-E-008	Basic requirements for the Use and	06/01/93	06/30/95	1

SOP NUMBER	SOP NAME	SOP EFFECTIVE	DATE TRAINED	REVISION NUMBER
GL-LB-E-008	Maintenance of Laboratory Notebooks, Logbooks, Forms and Other Record Keeping Devices			
GL-LB-E-008	Basic requirements for the Use and Maintenance of Laboratory Notebooks, Logbooks, Forms and Other Record Keeping Devices	06/01/93	11/10/93	0
GL-LB-E-009	Run Logs	05/24/93	11/10/93	0
GL-LB-E-009	Run Logs	05/24/93	06/30/95	0
GL-LB-E-010	Maintenance and Use of Air Displacement Pipets	09/17/93	01/24/95	1
GL-LB-E-010	Maintenance and Use of Air Displacement Pipets	09/17/93	06/30/95	0
GL-LB-E-011	Laboratory Waste	10/26/93	06/30/95	1
GL-LB-E-012	Verifying the Maintenance of Sample Integrity	11/15/93	06/30/95	0
GL-QS-E-002	Conducting Corrective Action	06/24/93	10/15/93	0
GL-QS-E-004	Nonconformance Identification Control, Documentation, Reporting and Dispositioning	05/01/93	07/06/93	0
GL-QS-E-005	Review of Monitoring Devie Logs	02/01/93	10/15/93	1

EMPLOYEE: GETSINGER, BRIAN

Seminar	Date
Batch Update Training	04/27/93
Certificate of Analysis	07/07/93
Fire and Emergency Training	06/21/93
Radiation Health and Safety	01/07/94
Radiation Safety Training	01/17/95
Safe Handling of Radioactive Materials	07/21/93

EMPLOYEE: CROOK,JAKE **JOB TITLE:** LAB GROUP LEADER

EDUCATION		PREVIOUS EXPERIENCE PRIOR TO GEL	YEARS WITH GEL
BS	BIOLOGY	0 YR	4

ANALYSES

COLORIMETRIC: NH3, TKN, NO2/NO3, CN, PHENOL, INORGANIC PREP, TOX, TOC, DATA REVIEW

SOP NUMBER	SOP NAME	SOP EFFECTIVE	DATE TRAINED	REVISION NUMBER
GL-GC-E-001	Total Dissolved Solids	02/25/93	07/01/93	1
GL-GC-E-001	Total Dissolved Solids	02/25/93	02/25/93	0
GL-GC-E-002	Fluoride	03/01/93	03/01/93	0
GL-GC-E-002	Fluoride	03/01/93	07/01/93	1
GL-GC-E-003	Iodine	03/01/93	07/01/93	2
GL-GC-E-003	Iodine	03/01/93	03/01/93	0
GL-GC-E-003	Iodine	03/01/93	03/22/93	1
GL-GC-E-004	Standards - Definitions & Preparation	06/27/93	06/27/93	0
GL-GC-E-006	Total, Total Inorganic & Total Organic Carbon Using the Dohrmann DC-80 TOC Analyzer	08/16/09	08/16/93	0
GL-GC-E-006	Total, Total Inorganic & Total Organic Carbon Using the Dohrmann DC-80 TOC Analyzer	08/16/09	10/15/94	1
GL-GC-E-007	Total Organic Halogen Using the Cosa Tox-10 Analyzer	08/18/93	08/18/93	0
GL-GC-E-008	pH	09/13/93	09/13/93	0
GL-GC-E-013	Total Phenol by Alpkem Flow Solution RFA	09/20/93	09/20/93	0
GL-GC-E-014	Total Cyanide Analysis by Alpkem RFA	09/20/93	07/01/94	1
GL-GC-E-014	Total Cyanide Analysis by Alpkem RFA	09/20/93	09/20/93	0
GL-GC-E-014	Total Cyanide Analysis by Alpkem RFA	09/20/93	04/14/95	2
GL-GC-E-019	Ammonia Determination by Traccs 800 Methodology	10/01/93	10/01/93	0
GL-GC-E-022	Determination of Total Petroleum Hydrocarbons Liquid By Infrared Spectrophotometry	10/18/93	10/18/93	0
GL-GC-E-026	Total Phosphorus	10/20/93	04/14/95	1
GL-GC-E-040	Cyanide Amenable to Chlorination by Alpkem Flow Solution RFA	11/01/93	04/14/95	1
GL-GC-E-040	Cyanide Amenable to Chlorination by Alpkem Flow Solution RFA	11/01/93	11/01/93	0

[illegible]	[illegible]	[illegible]	DATE TRAINED	REVISION NUMBER
GL-GC-E-041	Nitrate/Nitrite by Traacs 800 Methodology	11/01/93	11/01/93	0
GL-GC-E-055	Total Kjeldahl Nitrogen, Total Organic Nitrogen, and Total Nitrogen by Traacs 800 Methodology	11/01/93	11/01/93	0
GL-GC-E-062	Total Carbon and Total Organic Carbon Analysis Using the Dohrmann DC-190 Boat Sampler	11/01/93	10/15/94	1
GL-GC-E-062	Total Carbon and Total Organic Carbon Analysis Using the Dohrmann DC-190 Boat Sampler	11/01/93	11/01/93	0
GL-GC-E-067	Total Cyanide Sample Preparation	07/01/94	03/10/95	1
GL-GC-E-067	Total Cyanide Sample Preparation	07/01/94	07/01/94	0
GL-GC-E-071	Total Phosphorous Sample Preparation	04/14/95	04/14/95	0
GL-GC-E-072	Ammonia Sample Preparation	04/14/95	04/14/95	0
GL-GC-E-073	Free Cyanide Analysis By Microdiffusion	04/14/95	04/14/95	0
GL-GC-E-074	Extractable Organic Halides (EOX) Using the Dohrmann DX-2000 Analyzer	04/07/95	04/07/95	0
GL-GC-E-075	Total Organic Halogen (TOX) Analysis on Liquid Samples Using the Dohrmann DX-2000 Analyzer	04/07/95	04/07/95	0
GL-HR-E-001	Assessment ofEmployee Training Needs	02/01/93	08/17/94	1
GL-HR-E-002	Employee Training	02/01/93	08/17/94	2
GL-LB-E-001	Determination of Method Detection Limits	11/01/92	01/13/93	0
GL-LB-E-001	Determination of Method Detection Limits	11/01/92	06/30/95	1
GL-LB-E-002	Balance	11/01/92	06/30/95	1
GL-LB-E-004	Temperature Monitoring and Documentation Requirements for Refrigerators, Freezers, Ovens, Incubators and Other Similar Devices	12/08/92	06/30/95	2
GL-LB-E-005	Data Review/Validation	12/15/92	06/30/95	1
GL-LB-E-007	Laboratory Standards Documentation	07/01/93	07/01/93	0
GL-LB-E-007	Laboratory Standards Documentation	07/01/93	06/30/95	0
GL-LB-E-008	Basic requirements for the Use and Maintenance of Laboratory Notebooks, Logbooks, Forms and Other Record Keeping Devices	06/01/93	12/08/93	0
GL-LB-E-008	Basic requirements for the Use and Maintenance of Laboratory Notebooks, Logbooks, Forms and Other Record Keeping Devices	06/01/93	06/30/95	1
GL-LB-E-009	Run Logs	05/24/93	06/30/95	0
GL-LB-E-010	Maintenance and Use of Air Displacement Pipets	09/17/93	06/30/95	0
GL-LB-E-011	Laboratory Waste	10/26/93	06/30/95	1
GL-LB-E-012	Verifying the Maintenance of Sample Integrity	11/15/93	06/30/95	0
GL-QS-E-002	Conducting Corrective Action	06/24/93	05/25/93	0
GL-QS-E-004	Nonconformance Identification Control, Documentation, Reporting and	05/01/93	06/16/93	0

SOP NUMBER	SOP NAME	EFFECTIVE	DATE TRAINED	REVISION NUMBER
GL-QS-E-004	Dispositioning			

EMPLOYEE: CROOK,JAKE

Seminar	Date
Acid Spill Actions and Cleanup	07/14/93
CPR	03/15/94
Certificate of Analysis	07/07/93
Fire and Emergency Training	06/21/93
General Safety Training	01/26/94
Group Leader/Section Head/Managers Safety Training	01/12/95
Group Leader/Section Head/Managers Safety Training	02/01/95
Mercury Spill Cleanup	08/04/93
PDT	03/08/93
PDT	03/17/94
Radiation Health and Safety	01/07/94
Radiation Health and Safety	01/07/94
Radiation Safety Training	01/13/95
SPC Implementation	12/02/93
SPC/LIMS Orientation	12/21/93
Safe Handling of Radioactive Materials	07/21/93
Safe Sample Handling	06/10/94
Standard First Aid	03/17/94
Supervisory Loss Control - Accident Investigation	03/23/94

EMPLOYEE: WIGGER, DEE **JOB TITLE:** TECHNICIAN I

EDUCATION	PREVIOUS EXPERIENCE PRIOR TO GEL	YEARS WITH GEL
2 YR SCIENCE	5 YR	1

ANALYSES

METALS PREP, DATA ENTRY, CVAA

SOP NUMBER	SOP NAME	SOP EFFECTIVE	DATE TRAINED	REVISION NUMBER
GL-EPI-E-S001	Radiation Survey	12/08/92	05/03/95	2
GL-EPI-E-S002	Radiation Related Emergency	12/08/92	05/03/95	0
GL-EPI-E-S003	Radioactive Material Procurement	12/08/92	05/03/95	0
GL-EPI-E-S004	Radioactive Material Handling	12/08/92	05/03/95	1
GL-EPI-E-S005	Radioactive Waste Handling	12/08/92	05/03/95	1
GL-EPI-E-S006	Radiation Worker Training	12/08/92	05/03/95	1
GL-EPI-E-S007	Receiving of Radioactive Samples	07/01/93	05/03/95	2
GL-EPI-E-S008	Shipping of Radioactive Samples Sample Residues	07/01/93	05/03/95	1
GL-EPI-E-S009	Dosimetry Procedures	11/15/93	05/03/95	1

EMPLOYEE: WIGGER,DEE

Seminar	Date
Fire Safety Training	04/13/95
Haz Com Training	04/13/95
Haz Com Training	04/13/95

3

EMPLOYEE: STARR, JOHANNA JOB TITLE: TEAM TASK LEADER

EDUCATION		PREVIOUS EXPERIENCE PRIOR TO GEL	YEARS WITH GEL
BS	CHEMICAL ENGINEERING	17 YR	4

ANALYSES

ICP-AES

SOP NUMBER	SOP NAME	SOP EFFECTIVE	DATE TRAINED	REVISION NUMBER
GL-LB-E-001	Determination of Method Detection Limits	11/01/92	01/23/95	1
GL-LB-E-001	Determination of Method Detection Limits	11/01/92	10/14/93	1
GL-LB-E-002	Balance	11/01/92	10/14/93	0
GL-LB-E-002	Balance	11/01/92	01/23/95	1
GL-LB-E-005	Data Review/Validation	12/15/92	01/23/95	1
GL-LB-E-005	Data Review/Validation	12/15/92	10/14/93	0
GL-LB-E-007	Laboratory Standards Documentation	07/01/93	01/23/95	0
GL-LB-E-007	Laboratory Standards Documentation	07/01/93	10/14/93	0
GL-LB-E-008	Basic requirements for the Use and Maintenance of Laboratory Notebooks, Logbooks, Forms and Other Record Keeping Devices	06/01/93	10/14/93	0
GL-LB-E-008	Basic requirements for the Use and Maintenance of Laboratory Notebooks, Logbooks, Forms and Other Record Keeping Devices	06/01/93	01/23/95	1
GL-LB-E-009	Run Logs	05/24/93	10/14/93	0
GL-LB-E-009	Run Logs	05/24/93	01/23/95	0
GL-LB-E-010	Maintenance and Use of Air Displacement Pipets	09/17/93	10/14/93	0
GL-LB-E-010	Maintenance and Use of Air Displacement Pipets	09/17/93	01/23/95	0
GL-LB-E-011	Laboratory Waste	10/26/93	06/11/93	0
GL-LB-E-012	Verifying the Maintenance of Sample Integrity	11/15/93	05/18/94	0
GL-MA-E-002	Determination of Metals by ICP with the Thermo Jarrell Ash ICAP-61E Spectrometer	04/01/93	01/24/95	1
GL-MA-E-002	Determination of Metals by ICP with the Thermo Jarrell Ash ICAP-61E Spectrometer	04/01/93	10/14/93	0
GL-MA-E-004	Metals Standards	03/15/93	10/14/93	1
GL-MA-E-004	Metals Standards	03/15/93	01/23/95	2
GL-MA-E-011	Determination of Metals by ICP with the	02/15/94	02/15/94	0

	SOP NAME	EFFECTIVE	TRAINED	REVISION NUMBER
GL-MA-E-011	Thermo Jarrell Ash Enviro II Spectrometer			
GL-MA-E-011	Determination of Metals by ICP with the Thermo Jarrell Ash Enviro II Spectrometer	02/15/94	05/01/94	1
GL-MA-E-011	Determination of Metals by ICP with the Thermo Jarrell Ash Enviro II Spectrometer	02/15/94	05/18/94	1
GL-QS-E-004	Nonconformance Identification Control, Documentation, Reporting and Dispositioning	05/01/93	05/01/93	0

EMPLOYEE: STARR,JOHANNA

Seminar	Date
Certificate of Analysis	07/07/93
Fire and Emergency Training	11/17/93
General Safety Training	01/26/94
Inductively Coupled Argon Plasma Emission Spectroscopy	12/17/93
Mercury Spill Cleanup	08/04/93
Radiation Health and Safety	01/05/94
Radiation Safety Training	01/17/95
SPC	12/22/92
Safe Handling of Radioactive Materials	07/21/93
Safe Sample Handling	06/14/94

EMPLOYEE: MATUTINA,NIC **JOB TITLE:** ANALYST II

EDUCATION		PREVIOUS EXPERIENCE PRIOR TO GEL	YEARS WITH GEL
BS	CHEMISTRY	1 YR	5

ANALYSES

CVAA, GRAPHITE FURNACE, ICP-AES

SOP NUMBER	SOP NAME	SOP EFFECTIVE	DATE TRAINED	REVISION NUMBER
GL-LB-E-001	Determination of Method Detection Limits	11/01/92	10/14/93	1
GL-LB-E-001	Determination of Method Detection Limits	11/01/92	01/12/95	1
GL-LB-E-002	Balance	11/01/92	01/12/95	1
GL-LB-E-002	Balance	11/01/92	10/14/93	0
GL-LB-E-004	Temperature Monitoring and Documentation Requirements for Refrigerators, Freezers, Ovens, Incubators and Other Similar Devices	12/08/92	02/16/94	1
GL-LB-E-004	Temperature Monitoring and Documentation Requirements for Refrigerators, Freezers, Ovens, Incubators and Other Similar Devices	12/08/92	01/12/95	2
GL-LB-E-005	Data Review/Validation	12/15/92	10/14/93	0
GL-LB-E-005	Data Review/Validation	12/15/92	01/12/95	1
GL-LB-E-007	Laboratory Standards Documentation	07/01/93	10/14/93	0
GL-LB-E-007	Laboratory Standards Documentation	07/01/93	01/12/95	0
GL-LB-E-008	Basic requirements for the Use and Maintenance of Laboratory Notebooks, Logbooks, Forms and Other Record Keeping Devices	06/01/93	01/12/95	1
GL-LB-E-008	Basic requirements for the Use and Maintenance of Laboratory Notebooks, Logbooks, Forms and Other Record Keeping Devices	06/01/93	10/14/93	0
GL-LB-E-009	Run Logs	05/24/93	01/12/95	0
GL-LB-E-009	Run Logs	05/24/93	10/14/93	0
GL-LB-E-010	Maintenance and Use of Air Displacement Pipets	09/17/93	01/12/95	0
GL-LB-E-010	Maintenance and Use of Air Displacement Pipets	09/17/93	10/14/93	0
GL-LB-E-012	Verifying the Maintenance of Sample Integrity	11/15/93	01/12/95	0
GL-LB-E-012	Verifying the Maintenance of Sample Integrity	11/15/93	05/18/94	0

SOP NUMBER	SOP NAME	EFFECTIVE	DATE TRAINED	REVISION NUMBER
GL-MA-E-001	Determination of Mercury by Cold Vapor Atomic Absorption Spectrometry	04/01/93	01/09/95	1
GL-MA-E-002	Determination of Metals by ICP with the Thermo Jarrell Ash ICAP-61E Spectrometer	04/01/93	01/20/95	1
GL-MA-E-003	Perkin-Elmer Zeeman 5100 Graphite Furnace Atomic Absorption Spectrometer	04/01/93	05/01/94	1
GL-MA-E-003	Perkin-Elmer Zeeman 5100 Graphite Furnace Atomic Absorption Spectrometer	04/01/93	01/20/95	1
GL-MA-E-003	Perkin-Elmer Zeeman 5100 Graphite Furnace Atomic Absorption Spectrometer	04/01/93	11/10/93	0
GL-MA-E-003	Perkin-Elmer Zeeman 5100 Graphite Furnace Atomic Absorption Spectrometer	04/01/93	04/01/93	0
GL-MA-E-004	Metals Standards	03/15/93	10/14/93	1
GL-MA-E-004	Metals Standards	03/15/93	01/12/95	2
GL-MA-E-005	Thermo Jarrell Ash Auto AA 4000 Furnace	08/01/94	04/01/93	0
GL-MA-E-005	Thermo Jarrell Ash Auto AA 4000 Furnace	08/01/94	11/10/93	0
GL-MA-E-010	Mercury analysis Using the Leeman PS200 Automated Mercury Analyzer	05/01/94	08/11/94	0
GL-MA-E-011	Determination of Metals by ICP with the Thermo Jarrell Ash Enviro II Spectrometer	02/15/94	05/18/94	1
GL-QS-E-002	Conducting Corrective Action	06/24/93	05/25/93	0
GL-QS-E-004	Nonconformance Identification Control, Documentation, Reporting and Dispositioning	05/01/93	05/25/93	0

EMPLOYEE: LI,JIANGUO **JOB TITLE:** TECHNICIAN I

EDUCATION		PREVIOUS EXPERIENCE PRIOR TO GEL	YEARS WITH GEL
BS	CHEMISTRY	10 YR	2

ANALYSES

TCLP EXTRACTION, METALS PREP

SOP NUMBER	SOP NAME	SOP EFFECTIVE	DATE TRAINED	REVISION NUMBER
GL-EPI-E-S006	Radiation Worker Training	12/08/92	08/18/94	1
GL-LB-E-002	Balance	11/01/92	10/13/93	0
GL-LB-E-002	Balance	11/01/92	01/20/95	1
GL-LB-E-004	Temperature Monitoring and Documentation Requirements for Refrigerators, Freezers, Ovens, Incubators and Other Similar Devices	12/08/92	01/20/95	2
GL-LB-E-005	Data Review/Validation	12/15/92	01/20/95	1
GL-LB-E-006	Toxicity Characteristic Leaching Procedure Preparation	04/15/93	10/13/93	0
GL-LB-E-006	Toxicity Characteristic Leaching Procedure Preparation	04/15/93	01/20/95	0
GL-LB-E-007	Laboratory Standards Documentation	07/01/93	11/03/93	0
GL-LB-E-007	Laboratory Standards Documentation	07/01/93	01/20/95	0
GL-LB-E-008	Basic requirements for the Use and Maintenance of Laboratory Notebooks, Logbooks, Forms and Other Record Keeping Devices	06/01/93	12/08/93	0
GL-LB-E-008	Basic requirements for the Use and Maintenance of Laboratory Notebooks, Logbooks, Forms and Other Record Keeping Devices	06/01/93	08/18/94	1
GL-LB-E-008	Basic requirements for the Use and Maintenance of Laboratory Notebooks, Logbooks, Forms and Other Record Keeping Devices	06/01/93	01/20/95	1
GL-LB-E-010	Maintenance and Use of Air Displacement Pipets	09/17/93	10/13/93	0
GL-LB-E-010	Maintenance and Use of Air Displacement Pipets	09/17/93	01/20/95	0
GL-LB-E-012	Verifying the Maintenance of Sample Integrity	11/15/93	05/18/94	0
GL-LB-E-012	Verifying the Maintenance of Sample Integrity	11/15/93	01/20/95	0
GL-MA-E-004	Metals Standards	03/15/93	08/18/94	2

SOP NUMBER	SOP NAME	SOP EFFECTIVE	DATE TRAINED	REVISION NUMBER
GL-MA-E-004	Metals Standards	03/15/93	01/20/95	2
GL-MA-E-006	Acid Digestion of Total Recoverable or Dissolved Metals inSurvace and Groundwater Samples for Analysis by FLAA or ICP	08/20/93	05/18/94	0
GL-MA-E-007	Acid Digestion of Aqueous Samples and Extracts for Analysis by GFAA	08/20/93	05/18/94	0
GL-MA-E-008	Acid Digestion of Total Metals in Aqueous Samples and Extracts for Analysis by FLAA or ICP	08/20/93	05/18/94	0
GL-MA-E-009	Acid Digestion of Sediments, Sludges, and Soils	08/20/93	11/17/93	0
GL-MA-E-009	Acid Digestion of Sediments, Sludges, and Soils	08/20/93	01/20/95	1
GL-QS-E-002	Conducting Corrective Action	06/24/93	11/09/93	0
GL-QS-E-004	Nonconformance Identification Control, Documentation, Reporting and Dispositioning	05/01/93	11/09/93	0
GL-QS-E-007	Thermometer Calibration	04/15/93	10/13/93	0
GL-QS-E-007	Thermometer Calibration	04/15/93	01/20/95	0

EMPLOYEE: LI,JIANGUO

Seminar	Date
Satellite Waste Disposal Training-TCLP Lab - Liquids	01/20/95
Top Down Training	02/23/95

EMPLOYEE: JENKINS, ROSE **JOB TITLE:** ANALYST I

EDUCATION	PREVIOUS EXPERIENCE PRIOR TO GEL	YEARS WITH GEL
BS BIOLOGY	0 YR	6

ANALYSES

GFAA, CVAA, METALS PREP

SOP NUMBER	SOP NAME	SOP EFFECTIVE	DATE TRAINED	REVISION NUMBER
GL-LB-E-001	Determination of Method Detection Limits	11/01/92	01/05/95	1
GL-LB-E-001	Determination of Method Detection Limits	11/01/92	11/05/93	1
GL-LB-E-002	Balance	11/01/92	11/05/93	0
GL-LB-E-002	Balance	11/01/92	01/23/95	1
GL-LB-E-004	Temperature Monitoring and Documentation Requirements for Refrigerators, Freezers, Ovens, Incubators and Other Similar Devices	12/08/92	01/23/95	2
GL-LB-E-004	Temperature Monitoring and Documentation Requirements for Refrigerators, Freezers, Ovens, Incubators and Other Similar Devices	12/08/92	02/16/94	1
GL-LB-E-005	Data Review/Validation	12/15/92	11/05/93	0
GL-LB-E-005	Data Review/Validation	12/15/92	01/23/95	1
GL-LB-E-007	Laboratory Standards Documentation	07/01/93	01/23/95	0
GL-LB-E-007	Laboratory Standards Documentation	07/01/93	11/05/93	0
GL-LB-E-008	Basic requirements for the Use and Maintenance of Laboratory Notebooks, Logbooks, Forms and Other Record Keeping Devices	06/01/93	12/08/93	0
GL-LB-E-008	Basic requirements for the Use and Maintenance of Laboratory Notebooks, Logbooks, Forms and Other Record Keeping Devices	06/01/93	01/23/95	1
GL-LB-E-009	Run Logs	05/24/93	11/05/93	0
GL-LB-E-009	Run Logs	05/24/93	01/23/95	0
GL-LB-E-010	Maintenance and Use of Air Displacement Pipets	09/17/93	11/05/93	0
GL-LB-E-010	Maintenance and Use of Air Displacement Pipets	09/17/93	01/23/95	0
GL-LB-E-012	Verifying the Maintenance of Sample Integrity	11/15/93	01/23/95	0
GL-LB-E-012	Verifying the Maintenance of Sample Integrity	11/15/93	05/18/94	0

		ACTIVE	DATE TRAINED	REVISION NUMBER
GL-MA-E-003	Perkin-Elmer Zeeman 5100 Graphite Furnace Atomic Absorption Spectrometer	04/01/93	11/05/93	0
GL-MA-E-003	Perkin-Elmer Zeeman 5100 Graphite Furnace Atomic Absorption Spectrometer	04/01/93	01/23/95	1
GL-MA-E-004	Metals Standards	03/15/93	11/05/93	1
GL-MA-E-004	Metals Standards	03/15/93	01/23/95	2
GL-QS-E-002	Conducting Corrective Action	06/24/93	05/25/93	0
GL-QS-E-004	Nonconformance Identification Control, Documentation, Reporting and Dispositioning	05/01/93	05/26/93	0

EMPLOYEE: JENKINS,ROSE

Seminar	Date
Acid Spill Actions and Cleanup	07/14/93
Certificate of Analysis	07/07/93
Facilitation Training	03/30/93
Fire and Emergency Training	06/21/93
General Safety Training	01/26/94
How to Write an SOP	10/08/92
Mac Basics	03/07/95
Mercury Spill Cleanup	08/04/93
Radiation Safety Training	01/17/95
SPC	12/22/92
Safe Sample Handling	06/14/94

EMPLOYEE: JAMES,BRIDGET **JOB TITLE:** TECHNICIAN II

EDUCATION		PREVIOUS EXPERIENCE PRIOR TO GEL	YEARS WITH GEL
BS	BIOLOGY	1 YR	2

ANALYSES

METALS PREP, TCLP, CVAA

SOP NUMBER	SOP NAME	SOP EFFECTIVE	DATE TRAINED	REVISION NUMBER
GL-EPI-E-S006	Radiation Worker Training	12/08/92	08/18/94	1
GL-LB-E-002	Balance	11/01/92	01/25/95	1
GL-LB-E-002	Balance	11/01/92	12/01/93	0
GL-LB-E-004	Temperature Monitoring and Documentation Requirements for Refrigerators, Freezers, Ovens, Incubators and Other Similar Devices	12/08/92	05/18/94	1
GL-LB-E-004	Temperature Monitoring and Documentation Requirements for Refrigerators, Freezers, Ovens, Incubators and Other Similar Devices	12/08/92	02/16/94	1
GL-LB-E-005	Data Review/Validation	12/15/92	05/18/94	1
GL-LB-E-005	Data Review/Validation	12/15/92	01/25/95	1
GL-LB-E-007	Laboratory Standards Documentation	07/01/93	01/25/95	0
GL-LB-E-007	Laboratory Standards Documentation	07/01/93	05/18/94	0
GL-LB-E-008	Basic requirements for the Use and Maintenance of Laboratory Notebooks, Logbooks, Forms and Other Record Keeping Devices	06/01/93	05/18/94	0
GL-LB-E-008	Basic requirements for the Use and Maintenance of Laboratory Notebooks, Logbooks, Forms and Other Record Keeping Devices	06/01/93	08/18/94	1
GL-LB-E-008	Basic requirements for the Use and Maintenance of Laboratory Notebooks, Logbooks, Forms and Other Record Keeping Devices	06/01/93	12/08/93	0
GL-LB-E-010	Maintenance and Use of Air Displacement Pipets	09/17/93	10/26/93	0
GL-LB-E-010	Maintenance and Use of Air Displacement Pipets	09/17/93	01/25/95	0
GL-LB-E-012	Verifying the Maintenance of Sample Integrity	11/15/93	05/18/94	0
GL-LB-E-012	Verifying the Maintenance of Sample Integrity	11/15/93	01/25/95	0

		SOP EFFECTIVE	DATE TRAINED	REVISION NUMBER
GL-MA-E-004	Metals Standards	03/15/93	08/18/94	2
GL-MA-E-004	Metals Standards	03/15/93	05/18/94	1
GL-MA-E-006	Acid Digestion of Total Recoverable or Dissolved Metals inSurvace and Groundwater Samples for Analysis by FLAA or ICP	08/20/93	10/28/93	0
GL-MA-E-006	Acid Digestion of Total Recoverable or Dissolved Metals inSurvace and Groundwater Samples for Analysis by FLAA or ICP	08/20/93	01/25/95	1
GL-MA-E-007	Acid Digestion of Aqueous Samples and Extracts for Analysis by GFAA	08/20/93	10/28/93	0
GL-MA-E-007	Acid Digestion of Aqueous Samples and Extracts for Analysis by GFAA	08/20/93	01/25/95	1
GL-MA-E-008	Acid Digestion of Total Metals in Aqueous Samples and Extracts for Analysis by FLAA or ICP	08/20/93	10/29/93	0
GL-MA-E-008	Acid Digestion of Total Metals in Aqueous Samples and Extracts for Analysis by FLAA or ICP	08/20/93	01/25/95	1
GL-MA-E-009	Acid Digestion of Sediments, Sludges, and Soils	08/20/93	11/01/93	0
GL-MA-E-009	Acid Digestion of Sediments, Sludges, and Soils	08/20/93	01/25/95	1
GL-MA-E-009	Acid Digestion of Sediments, Sludges, and Soils	08/20/93	05/18/94	0
GL-QS-E-002	Conducting Corrective Action	06/24/93	11/08/93	0
GL-QS-E-004	Nonconformance Identification Control, Documentation, Reporting and Dispositioning	05/01/93	11/08/93	0

EMPLOYEE: JAMES, BRIDGET

Seminar	Date
Fire and Emergency Training :	11/17/93
General Safety Training	01/26/94
Radiation Health and Safety	01/05/94
Radiation Safety Training	01/17/95
Safe Sample Handling	06/14/94
The Art of Sample Preparation and Quantitative Spectrochemical Analysis	06/10/94

1

EMPLOYEE: DAVIS,FRANKIE JOB TITLE: TEAM TASK LEADER

EDUCATION :	PREVIOUS EXPERIENCE PRIOR TO GEL	YEARS WITH GEL
3 YR PUBLIC ADMIN	0 YR	6

ANALYSES

METALS PREP

SOP NUMBER	SOP NAME	SOP EFFECTIVE	DATE TRAINED	REVISION NUMBER
GL-LB-E-002	Balance	11/01/92	01/20/95	1
GL-LB-E-002	Balance	11/01/92	11/16/93	0
GL-LB-E-004	Temperature Monitoring and Documentation Requirements for Refrigerators, Freezers, Ovens, Incubators and Other Similar Devices	12/08/92	11/16/93	1
GL-LB-E-004	Temperature Monitoring and Documentation Requirements for Refrigerators, Freezers, Ovens, Incubators and Other Similar Devices	12/08/92	02/16/94	1
GL-LB-E-004	Temperature Monitoring and Documentation Requirements for Refrigerators, Freezers, Ovens, Incubators and Other Similar Devices	12/08/92	01/20/95	2
GL-LB-E-005	Data Review/Validation	12/15/92	01/20/95	1
GL-LB-E-005	Data Review/Validation	12/15/92	11/16/93	0
GL-LB-E-007	Laboratory Standards Documentation	07/01/93	11/10/93	0
GL-LB-E-007	Laboratory Standards Documentation	07/01/93	01/20/95	0
GL-LB-E-008	Basic requirements for the Use and Maintenance of Laboratory Notebooks, Logbooks, Forms and Other Record Keeping Devices	06/01/93	11/10/93	0
GL-LB-E-008	Basic requirements for the Use and Maintenance of Laboratory Notebooks, Logbooks, Forms and Other Record Keeping Devices	06/01/93	01/20/95	1
GL-LB-E-010	Maintenance and Use of Air Displacement Pipets	09/17/93	11/16/93	0
GL-LB-E-010	Maintenance and Use of Air Displacement Pipets	09/17/93	01/20/95	0
GL-LB-E-012	Verifying the Maintenance of Sample Integrity	11/15/93	05/18/94	0
GL-LB-E-012	Verifying the Maintenance of Sample Integrity	11/15/93	01/26/95	0
GL-MA-E-004	Metals Standards	03/15/93	05/18/94	1

EMPLOYEE: DAVIS,FRANKIE

Seminar	Date
Acid Spill Actions and Cleanup :	07/14/93
Certificate of Analysis	07/07/93
Fire and Emergency Training	11/17/93
Lab Safety and Health	02/09/94
Mercury Spill Cleanup	08/04/93
Radiation Health and Safety	01/05/94
Radiation Safety Training	01/17/95
SPC	12/22/92
Safe Sample Handling	06/14/94
The Art of Sample Preparation and Quantitative Spectrochemical Analysis	06/18/93
The Art of Sample Preparation and Quantitative Spectrochemical Analysis	06/10/94

EMPLOYEE: MARK, PAUL

JOB TITLE: LAB GROUP LEADER

EDUCATION		PREVIOUS EXPERIENCE PRIOR TO GEL	YEARS WITH GEL
BA	GENERAL/CHEMISTRY	4 YR	4

ANALYSES

TCLP, METALS PREP, GFAA, CVAA, ICP-AES, DATA REVIEW

SOP NUMBER	SOP NAME	SOP EFFECTIVE	DATE TRAINED	REVISION NUMBER
GL-LB-E-001	Determination of Method Detection Limits	11/01/92	10/14/93	1
GL-LB-E-001	Determination of Method Detection Limits	11/01/92	01/25/95	1
GL-LB-E-001	Determination of Method Detection Limits	11/01/92	01/15/93	0
GL-LB-E-002	Balance	11/01/92	10/14/93	0
GL-LB-E-002	Balance	11/01/92	01/25/95	1
GL-LB-E-002	Balance	11/01/92	11/01/92	0
GL-LB-E-003	Glassware Preparation	11/01/92	03/10/94	2
GL-LB-E-004	Temperature Monitoring and Documentation Requirements for Refrigerators, Freezers, Ovens, Incubators and Other Similar Devices	12/08/92	10/14/93	1
GL-LB-E-004	Temperature Monitoring and Documentation Requirements for Refrigerators, Freezers, Ovens, Incubators and Other Similar Devices	12/08/92	01/25/95	2
GL-LB-E-005	Data Review/Validation	12/15/92	10/14/93	0
GL-LB-E-005	Data Review/Validation	12/15/92	01/25/95	1
GL-LB-E-006	Toxicity Characteristic Leaching Procedure Preparation	04/15/93	05/18/94	1
GL-LB-E-007	Laboratory Standards Documentation	07/01/93	10/14/93	0
GL-LB-E-007	Laboratory Standards Documentation	07/01/93	01/25/95	0
GL-LB-E-008	Basic requirements for the Use and Maintenance of Laboratory Notebooks, Logbooks, Forms and Other Record Keeping Devices	06/01/93	01/25/95	1
GL-LB-E-008	Basic requirements for the Use and Maintenance of Laboratory Notebooks, Logbooks, Forms and Other Record Keeping Devices	06/01/93	10/14/93	0
GL-LB-E-009	Run Logs	05/24/93	10/14/93	0
GL-LB-E-009	Run Logs	05/24/93	01/25/95	0
GL-LB-E-010	Maintenance and Use of Air Displacement Pipets	09/17/93	09/17/93	0

SOP NUMBER	SOP TITLE	SOP EFFECTIVE	DATE TRAINED	REVISION NUMBER
GL-LB-E-010	Maintenance and Use of Air Displacement Pipets	09/17/93	01/25/95	0
GL-LB-E-010	Maintenance and Use of Air Displacement Pipets	09/17/93	10/14/93	0
GL-LB-E-012	Verifying the Maintenance of Sample Integrity	11/15/93	05/18/94	0
GL-MA-E-001	Determination of Mercury by Cold Vapor Atomic Absorption Spectrometry	04/01/93	11/17/93	0
GL-MA-E-002	Determination of Metals by ICP with the Thermo Jarrell Ash ICAP-61E Spectrometer	04/01/93	11/17/93	0
GL-MA-E-003	Perkin-Elmer Zeeman 5100 Graphite Furnace Atomic Absorption Spectrometer	04/01/93	05/18/94	1
GL-MA-E-003	Perkin-Elmer Zeeman 5100 Graphite Furnace Atomic Absorption Spectrometer	04/01/93	04/01/93	0
GL-MA-E-004	Metals Standards	03/15/93	01/25/95	2
GL-MA-E-004	Metals Standards	03/15/93	10/14/93	1
GL-MA-E-004	Metals Standards	03/15/93	08/01/94	2
GL-MA-E-004	Metals Standards	03/15/93	07/01/93	1
GL-MA-E-004	Metals Standards	03/15/93	03/15/93	0
GL-MA-E-005	Thermo Jarrell Ash Auto AA 4000 Furnace	08/01/94	04/01/93	0
GL-MA-E-005	Thermo Jarrell Ash Auto AA 4000 Furnace	08/01/94	11/10/93	0
GL-MA-E-006	Acid Digestion of Total Recoverable or Dissolved Metals inSurvace and Groundwater Samples for Analysis by FLAA or ICP	08/20/93	06/22/93	0
GL-MA-E-006	Acid Digestion of Total Recoverable or Dissolved Metals inSurvace and Groundwater Samples for Analysis by FLAA or ICP	08/20/93	08/20/93	0
GL-MA-E-007	Acid Digestion of Aqueous Samples and Extracts for Analysis by GFAA	08/20/93	08/20/93	0
GL-MA-E-007	Acid Digestion of Aqueous Samples and Extracts for Analysis by GFAA	08/20/93	07/26/93	0
GL-MA-E-008	Acid Digestion of Total Metals in Aqueous Samples and Extracts for Analysis by FLAA or ICP	08/20/93	08/04/93	0
GL-MA-E-008	Acid Digestion of Total Metals in Aqueous Samples and Extracts for Analysis by FLAA or ICP	08/20/93	08/20/93	0
GL-MA-E-009	Acid Digestion of Sediments, Sludges, and Soils	08/20/93	08/20/93	0
GL-MA-E-009	Acid Digestion of Sediments, Sludges, and Soils	08/20/93	08/02/93	0
GL-MA-E-012	Inorganic CLP Sample Digestions	05/01/94	05/01/94	0
GL-QS-E-002	Conducting Corrective Action	06/24/93	05/25/93	0
GL-QS-E-004	Nonconformance Identification Control, Documentation, Reporting and Dispositioning	05/01/93	05/19/93	0

EMPLOYEE: MARK, PAUL

Seminar	Date
Group Leader/Section Head/Managers Safety Training	01/12/95
Group Leader/Section Head/Managers Safety Training	02/01/95
Using the Internet	05/09/95

EMPLOYEE: RODES,KEN **JOB TITLE:** SECTION HEAD

EDUCATION :		PREVIOUS EXPERIENCE PRIOR TO GEL	YEARS WITH GEL
BS	BIOLOGY	4 YR	4

ANALYSES

VARIOUS INORGANIC ANALYSES

SOP NUMBER	SOP NAME	SOP EFFECTIVE	DATE TRAINED	REVISION NUMBER
GL-HR-E-001	Assessment ofEmployee Training Needs	02/01/93	08/17/94	1
GL-HR-E-002	Employee Training	02/01/93	08/17/94	2
GL-LB-E-001	Determination of Method Detection Limits	11/01/92	10/14/93	1
GL-LB-E-001	Determination of Method Detection Limits	11/01/92	02/22/93	1
GL-LB-E-001	Determination of Method Detection Limits	11/01/92	01/15/93	0
GL-LB-E-001	Determination of Method Detection Limits	11/01/92	11/01/92	0
GL-LB-E-002	Balance	11/01/92	11/01/92	0
GL-LB-E-002	Balance	11/01/92	12/01/93	0
GL-LB-E-002	Balance	11/01/92	09/15/94	1
GL-LB-E-003	Glassware Preparation	11/01/92	11/01/92	0
GL-LB-E-003	Glassware Preparation	11/01/92	02/22/93	1
GL-LB-E-004	Temperature Monitoring and Documentation Requirements for Refrigerators, Freezers, Ovens, Incubators and Other Similar Devices	12/08/92	02/16/94	1
GL-LB-E-004	Temperature Monitoring and Documentation Requirements for Refrigerators, Freezers, Ovens, Incubators and Other Similar Devices	12/08/92	06/01/94	2
GL-LB-E-004	Temperature Monitoring and Documentation Requirements for Refrigerators, Freezers, Ovens, Incubators and Other Similar Devices	12/08/92	01/11/93	1
GL-LB-E-004	Temperature Monitoring and Documentation Requirements for Refrigerators, Freezers, Ovens, Incubators and Other Similar Devices	12/08/92	12/08/92	0
GL-LB-E-005	Data Review/Validation	12/15/92	11/15/93	1
GL-LB-E-005	Data Review/Validation	12/15/92	10/14/93	0
GL-LB-E-005	Data Review/Validation	12/15/92	12/15/92	0
GL-LB-E-007	Laboratory Standards Documentation	07/01/93	10/14/93	0
GL-LB-E-007	Laboratory Standards Documentation	07/01/93	07/01/93	0

SOP NUMBER	SOP NAME	SOP EFFECTIVE	DATE TRAINED	REVISION NUMBER
GL-LB-E-008	Basic requirements for the Use and Maintenance of Laboratory Notebooks, Logbooks, Forms and Other Record Keeping Devices	06/01/93	12/08/93	0
GL-LB-E-008	Basic requirements for the Use and Maintenance of Laboratory Notebooks, Logbooks, Forms and Other Record Keeping Devices	06/01/93	07/01/94	1
GL-LB-E-009	Run Logs	05/24/93	05/26/93	0
GL-LB-E-011	Laboratory Waste	10/26/93	06/23/93	0
GL-MA-E-002	Determination of Metals by ICP with the Thermo Jarrell Ash ICAP-61E Spectrometer	04/01/93	04/01/93	0
GL-MA-E-004	Metals Standards	03/15/93	03/15/93	0
GL-MA-E-004	Metals Standards	03/15/93	07/01/93	1
GL-QS-E-002	Conducting Corrective Action	06/24/93	05/25/93	0
GL-QS-E-002	Conducting Corrective Action	06/24/93	06/24/93	0
GL-QS-E-004	Nonconformance Identification Control, Documentation, Reporting and Dispositioning	05/01/93	05/26/93	0

EMPLOYEE: RODES,KEN

Seminar	Date
Acid Spill Actions and Cleanup :	07/14/93
Assessing Environmental Impact - Are You at Risk	09/29/93
CPR	03/15/94
Certificate of Analysis	07/07/93
Effective Writing Seminars	11/18/92
Emergency Response	06/14/93
Ethical Fitness Program	10/17/93
Facilitation Training	03/30/93
General Safety Training	01/26/94
Group Leader/Section Head/Managers Safety Training	01/12/95
Group Leader/Section Head/Managers Safety Training	02/03/95
Inductively Coupled Argon Plasma Emission Spectroscopy	03/26/92
Mercury Spill Cleanup	08/04/93
PDT	03/08/93
Radiation Safety Training	01/13/95
SPC	12/22/92
SPC Implementation	12/02/93
SPC/LIMS Orientation	01/06/94
SPC/LIMS Update	05/13/94
Solvent Issue Procedures	10/20/93
Standard First Aid	03/17/94
Using the Internet	05/09/95
Zenger Miller Front Line Leadership	09/06/93
safe Handling of Radioactive Materials	07/21/93

QC Summary Report

Project Description: Hazardous Waste Contract

cc: WSRC00194 Lab. Sample ID: 9508477% Report Date: September 28, 1995

ample/Parameter	Type	Batch	NOM	Sample	QC	Units	RPD%	REC%	Range	Analyst	Date	Time
m-Nitroaniline					0.00	ug/kg				HNM	09/01/95	1412
o-Cresol					0.00	ug/kg						
o-Nitroaniline					0.00	ug/kg						
o-Toluidine					0.00	ug/kg						
p-Dimethylaminoazobenzene					0.00	ug/kg						
p-Nitroaniline					0.00	ug/kg						
p-Phenylenediamine					0.00	ug/kg						
sym-Trinitrobenzene					0.00	ug/kg						
C303649	BLANK	72025										
2,4,5-Trichlorophenol					0.00	mg/l				TNF	09/02/95	1017
2,4,6-Trichlorophenol					0.00	mg/l						
4-Dinitrotoluene					0.00	mg/l						
Hexachlorobenzene					0.00	mg/l						
Hexachlorobutadiene					0.00	mg/l						
Hexachloroethane					0.00	mg/l						
Nitrobenzene					0.00	mg/l						
Pentachlorophenol					0.00	mg/l						
Pyridine					0.00	mg/l						
m,p-Cresol					0.00	mg/l						
o-Cresol					0.00	mg/l						
2,4,6-Tribromophenol			10.0		0.877	mg/l		87.7	(34.6 - 123.)			
2-Fluorobiphenyl			5.00		0.304	mg/l		60.9	(50.4 - 114.)			
2-Fluorophenol			10.0		0.528	mg/l		52.8	(27.0 - 93.6)			
Nitrobenzene-d5			5.00		0.309	mg/l		61.9	(35.0 - 107.)			
Phenol-d6			10.0		0.468	mg/l		46.8	(21.2 - 75.6)			
p-Terphenyl-d14			5.00		0.356	mg/l		71.1	(33.0 - 130.)			
C303650	BLANK	72025										
2,4,5-Trichlorophenol					0.00	mg/l				TNF	09/02/95	1045
2,4,6-Trichlorophenol					0.00	mg/l						
2,4-Dinitrotoluene					0.00	mg/l						
Hexachlorobenzene					0.00	mg/l						
Hexachlorobutadiene					0.00	mg/l						
Hexachloroethane					0.00	mg/l						
Nitrobenzene					0.00	mg/l						
Pentachlorophenol					0.00	mg/l						
Pyridine					0.00	mg/l						
m,p-Cresol					0.00	mg/l						
o-Cresol					0.00	mg/l						
2,4,6-Tribromophenol			10.0		0.821	mg/l		82.1	(34.6 - 123.)			
2-Fluorobiphenyl			5.00		0.261	mg/l		52.1	(50.4 - 114.)			

QC Summary Report

Project Description: Hazardous Waste Contract

cc: WSRC00194 Lab. Sample ID: 9508477% Report Date: September 28, 1995

Sample/Parameter	Type	Batch	NOM	Sample	QC	Units	RPD%	REC%	Range	Analyst	Date	Time
*2-Fluorophenol			10.0		0.432	mg/l		43.2	(27.0 - 93.6)	TNF	09/02/95	1045
*Nitrobenzene-d5			5.00		0.250	mg/l		50	(35.0 - 107.)			
*Phenol-d6			10.0		0.356	mg/l		35.6	(21.2 - 75.6)			
*p-Terphenyl-d14			5.00		0.337	mg/l		67.4	(33.0 - 130.)			
QC303264 9508477-04DUP		71952										
2,4-Dinitrotoluene				0.00	0.00	ug/kg	0			HNM	09/01/95	1736
2-Chlorophenol				0.00	0.00	ug/kg	0					
4-Nitrophenol				0.00	0.00	ug/kg	0					
4-chloro-3-methyl phenol				0.00	0.00	ug/kg	0					
Acenaphthene				0.00	0.00	ug/kg	0					
N-Nitrosodipropylamine				0.00	0.00	ug/kg	0					
Pentachlorophenol				0.00	0.00	ug/kg	0					
Phenol				0.00	0.00	ug/kg	0					
Pyrene				0.00	0.00	ug/kg	0					
*2,4,6-Tribromophenol			3300		3220	ug/kg	1.9	97.6	(19.0 - 122.)			
*2-Fluorobiphenyl			1650		1260	ug/kg	9.9	76.5	(30.0 - 114.)			
*2-Fluorophenol			3300		2280	ug/kg	16	69.1	(44.0 - 102.)			
*Nitrobenzene-d5			1650		1010	ug/kg	18	61.1	(23.0 - 120.)			
*Phenol-d6			3300		2420	ug/kg	13.6	73.3	(45.0 - 111.)			
*p-Terphenyl-d14			1650		1530	ug/kg	1.6	92.8	(52.0 - 135.)			
1,2,4,5-Tetrachlorobenzene				0.00	0.00	ug/kg	0					
1,2,4-Trichlorobenzene				0.00	0.00	ug/kg	0					
1,2-Dichlorobenzene				0.00	0.00	ug/kg	0					
1,3-Dichlorobenzene				0.00	0.00	ug/kg	0					
1,4-Dichlorobenzene				0.00	0.00	ug/kg	0					
1,4-Dioxane				0.00	0.00	ug/kg	0					
1,4-Naphthoquinone				0.00	0.00	ug/kg	0					
1-Naphthylamine				0.00	0.00	ug/kg	0					
2,3,4,6-Tetrachlorophenol				0.00	0.00	ug/kg	0					
2,4,5-Trichlorophenol				0.00	0.00	ug/kg	0					
2,4,6-Trichlorophenol				0.00	0.00	ug/kg	0					
2,4-Dichlorophenol				0.00	0.00	ug/kg	0					
2,4-Dimethylphenol				0.00	0.00	ug/kg	0					
2,4-Dinitrophenol				0.00	0.00	ug/kg	0					
2,6-Dichlorophenol				0.00	0.00	ug/kg	0					
2,6-Dinitrotoluene				0.00	0.00	ug/kg	0					
2-Acetylaminofluorene				0.00	0.00	ug/kg	0					
2-Chloronaphthalene				0.00	0.00	ug/kg	0					
2-Methylnaphthalene				0.00	0.00	ug/kg	0					
2-Naphthylamine				0.00	0.00	ug/kg	0					

QC Summary Report

Project Description: Hazardous Waste Contract

cc: WSRC00194 Lab. Sample ID: 9508477% Report Date: September 28, 1995

ample/Parameter	Type	Batch	NOM	Sample	QC	Units	RPD%	REC%	Range	Analyst	Date	Time
2-Nitrophenol				0.00	0.00	ug/kg	0			HNM	09/01/95	1736
2-Picoline				0.00	0.00	ug/kg	0					
2-methyl-4,6-dinitrophenol				0.00	0.00	ug/kg	0					
2-sec-Butyl-4,6-Dinitrophenol				0.00	0.00	ug/kg	0					
3,3'-Dichlorobenzidine				0.00	0.00	ug/kg	0					
3,3'-Dimethylbenzidine				0.00	0.00	ug/kg	0					
3-Methylcholanthrene				0.00	0.00	ug/kg	0					
4-Bromophenyl phenyl ether				0.00	0.00	ug/kg	0					
4-Chloroaniline				0.00	0.00	ug/kg	0					
4-Chlorophenyl phenyl ether				0.00	0.00	ug/kg	0					
4-Nitroquinoline				0.00	0.00	ug/kg	0					
'-aminobiphenyl				0.00	0.00	ug/kg	0					
-Nitro-o-toluidine				0.00	0.00	ug/kg	0					
7,12-Dimethylbenz(a)anthracene				0.00	0.00	ug/kg	0					
Acenaphthylene				0.00	0.00	ug/kg	0					
Acetophenone				0.00	0.00	ug/kg	0					
Aniline				0.00	0.00	ug/kg	0					
Anthracene				0.00	0.00	ug/kg	0					
Aramite				0.00	0.00	ug/kg	0					
Benzo(a)anthracene				0.00	0.00	ug/kg	0					
Benzo(a)pyrene				0.00	0.00	ug/kg	0					
Benzo(b)fluoranthene				0.00	0.00	ug/kg	0					
Benzo(ghi)perylene				0.00	0.00	ug/kg	0					
Benzo(k)fluoranthene				0.00	0.00	ug/kg	0					
Benzyl Alcohol				0.00	0.00	ug/kg	0					
Butyl benzyl phthalate				0.00	0.00	ug/kg	0					
Chlorobenzilate				0.00	0.00	ug/kg	0					
Chrysene				0.00	0.00	ug/kg	0					
Di-n-butyl phthalate				26.6	24.8	ug/kg	7					
Di-n-octyl phthalate				0.00	0.00	ug/kg	0					
Diallate				0.00	0.00	ug/kg	0					
Dibenzo(a,h)anthracene				0.00	0.00	ug/kg	0					
Dibenzofuran				0.00	0.00	ug/kg	0					
Diethyl phthalate				0.00	0.00	ug/kg	0					
Dimethoate				0.00	0.00	ug/kg	0					
Dimethyl phthalate				0.00	0.00	ug/kg	0					
Diphenylamine				0.00	0.00	ug/kg	0					
Disulfoton				0.00	0.00	ug/kg	0					
Ethyl Methanesulfonate				0.00	0.00	ug/kg	0					
Ethyl methacrylate				0.00	0.00	ug/kg	0					

QC Summary Report

Project Description: Hazardous Waste Contract

cc: WSRC00194 Lab. Sample ID: 9508477% Report Date: September 28, 1995

Sample/Parameter	Type	Batch	NOM	Sample	QC	Units	RPD%	REC%	Range	Analyst	Date	Time
Famphur				0.00	0.00	ug/kg	0			HNM	09/01/95	1736
Fluoranthene				0.00	0.00	ug/kg	0					
Fluorene				0.00	0.00	ug/kg	0					
Hexachlorobenzene				0.00	0.00	ug/kg	0					
Hexachlorobutadiene				0.00	0.00	ug/kg	0					
Hexachlorocyclopentadiene				0.00	0.00	ug/kg	0					
Hexachloroethane				0.00	0.00	ug/kg	0					
Hexachlorophene				0.00	0.00	ug/kg	0					
Hexachloropropene				0.00	0.00	ug/kg	0					
Indeno(1,2,3-c,d)pyrene				0.00	0.00	ug/kg	0					
Isodrin				0.00	0.00	ug/kg	0					
Isophorone				0.00	0.00	ug/kg	0					
Isosafrole				0.00	0.00	ug/kg	0					
Kepone				0.00	0.00	ug/kg	0					
Methapyrilene				0.00	0.00	ug/kg	0					
Methyl Methanesulfonate				0.00	0.00	ug/kg	0					
N-Nitrosodi-n-butylamine				0.00	0.00	ug/kg	0					
N-Nitrosodiethylamine				0.00	0.00	ug/kg	0					
N-Nitrosodimethylamine				0.00	0.00	ug/kg	0					
N-Nitrosodiphenylamine				0.00	0.00	ug/kg	0					
N-Nitrosomethylethylamine				0.00	0.00	ug/kg	0					
N-Nitrosomorpholine				0.00	0.00	ug/kg	0					
N-Nitrosopiperidine				0.00	0.00	ug/kg	0					
N-Nitrosopyrolidine				0.00	0.00	ug/kg	0					
Naphthalene				0.00	0.00	ug/kg	0					
Nitrobenzene				0.00	0.00	ug/kg	0					
O,O,O-Triethylphosphorothioate				0.00	0.00	ug/kg	0					
Pentachlorobenzene				0.00	0.00	ug/kg	0					
Pentachloroethane				0.00	0.00	ug/kg	0					
Pentachloronitrobenzene				0.00	0.00	ug/kg	0					
Phenacetin				0.00	0.00	ug/kg	0					
Phenanthrene				0.00	0.00	ug/kg	0					
Prenamide				0.00	0.00	ug/kg	0					
Pyridine				0.00	0.00	ug/kg	0					
Safrole				0.00	0.00	ug/kg	0					
Sulfotepp				0.00	0.00	ug/kg	0					
Thionazin				0.00	0.00	ug/kg	0					
a-,a-Dimethylphenethylamine				0.00	0.00	ug/kg	0					
bis(2-Chloroethoxy)methane				0.00	0.00	ug/kg	0					
bis(2-Chloroethyl) ether				0.00	0.00	ug/kg	0					

QC Summary Report

Project Description: Hazardous Waste Contract

cc: WSRC00194 Lab. Sample ID: 9508477% Report Date: September 28, 1995

Sample/Parameter	Type	Batch	NOM	Sample	QC	Units	RPD%	REC%	Range	Analyst	Date	Time
bis(2-Ethylhexyl)phthalate				35.5	0.00	ug/kg	200			HNM	09/01/95	1736
m,p-Cresol				0.00	0.00	ug/kg	0					
m-Dinitrobenzene				0.00	0.00	ug/kg	0					
m-Nitroaniline				0.00	0.00	ug/kg	0					
o-Cresol				0.00	0.00	ug/kg	0					
o-Nitroaniline				0.00	0.00	ug/kg	0					
o-Toluidine				0.00	0.00	ug/kg	0					
p-Dimethylaminoazobenzene				0.00	0.00	ug/kg	0					
p-Nitroaniline				0.00	0.00	ug/kg	0					
p-Phenylenediamine				0.00	0.00	ug/kg	0					
sym-Trinitrobenzene				0.00	0.00	ug/kg	0					
303261	LCS	71952										
2,4-Dinitrotoluene			1660		1520	ug/kg		91.6	(54.3 - 115.)	HNM	09/01/95	1446
2-Chlorophenol			3310		2510	ug/kg		75.8	(58.2 - 94.4)			
4-Nitrophenol			3310		3010	ug/kg		90.9	(36.0 - 113.)			
4-chloro-3-methyl phenol			3310		2880	ug/kg		87	(65.9 - 103.)			
Acenaphthene			1660		1380	ug/kg		83.1	(69.6 - 110.)			
N-Nitrosodipropylamine			1660		1280	ug/kg		77.1	(52.2 - 120.)			
Pentachlorophenol			3310		3190	ug/kg		96.4	(55.0 - 135.)			
Phenol			3310		2000	ug/kg		60.4	(41.1 - 107.)			
Pyrene			1660		1700	ug/kg		102.4	(68.0 - 115.)			
*2,4,6-Tribromophenol			3310		3280	ug/kg		99	(19.0 - 122.)			
*2-Fluorobiphenyl			1660		1370	ug/kg		82.8	(30.0 - 114.)			
*2-Fluorophenol			3310		2670	ug/kg		80.5	(44.0 - 102.)			
*Nitrobenzene-d5			1660		1200	ug/kg		72.3	(23.0 - 120.)			
*Phenol-d6			3310		2560	ug/kg		77.2	(45.0 - 111.)			
*p-Terphenyl-d14			1660		1540	ug/kg		92.9	(52.0 - 135.)			
QC303651	LCS	72025										
2,4,5-Trichlorophenol			10.1		0.676	mg/l		6.7**	(50.0 - 150.)	TNF	09/02/95	1141
2,4,6-Trichlorophenol			10.5		0.634	mg/l		6**	(50.0 - 150.)			
2,4-Dinitrotoluene			9.98		0.806	mg/l		8.1**	(50.0 - 150.)			
Hexachlorobenzene			10.3		0.757	mg/l		7.3**	(50.0 - 150.)			
Hexachlorobutadiene			10.2		0.472	mg/l		4.6**	(50.0 - 150.)			
Hexachloroethane			10.0		0.561	mg/l		5.6**	(50.0 - 150.)			
Nitrobenzene			10.5		0.798	mg/l		7.6**	(50.0 - 150.)			
Pentachlorophenol			10.0		0.963	mg/l		9.6**	(50.0 - 150.)			
Pyridine			10.1		0.197	mg/l		2**	(50.0 - 150.)			
m,p-Cresol			10.0		0.637	mg/l		6.4**	(50.0 - 150.)			
o-Cresol			10.5		0.655	mg/l		6.2**	(50.0 - 150.)			
*2,4,6-Tribromophenol			10.0		0.934	mg/l		93.4	(34.6 - 123.)			

QC Summary Report

Project Description: Hazardous Waste Contract

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Sample/Parameter	Type	Batch	NOM	Sample	QC	Units	RPD%	REC%	Range	Analyst	Date	Time
*2-Fluorobiphenyl			5.00		0.315	mg/l		62.9	(50.4 - 114.)	TNF	09/02/95	1141
*2-Fluorophenol			10.0		0.542	mg/l		54.2	(27.0 - 93.6)			
*Nitrobenzene-d5			5.00		0.288	mg/l		57.7	(35.0 - 107.)			
*Phenol-d6			10.0		0.426	mg/l		42.6	(21.2 - 75.6)			
*p-Terphenyl-d14			5.00		0.336	mg/l		67.2	(33.0 - 130.)			
QC303262	LCS DUP	71952										
2,4-Dinitrotoluene			1640		1490	ug/kg	0.8	90.9	(-11.2 - 21.6)	HNM	09/01/95	1519
2-Chlorophenol			3280		2360	ug/kg	5.1	72	(-6.88 - 17.1)			
4-Nitrophenol			3280		3010	ug/kg	1	91.8	(-13.8 - 32.6)			
4-chloro-3-methyl phenol			3280		2860	ug/kg	0.2	87.2	(-8.58 - 18.1)			
Acenaphthene			1640		1330	ug/kg	2.4	81.1	(-13.3 - 24.8)			
N-Nitrosodipropylamine			1640		1180	ug/kg	6.8	72	(-14.8 - 26.5)			
Pentachlorophenol			3280		3240	ug/kg	2.5	98.8	(-15.0 - 32.6)			
Phenol			3280		1910	ug/kg	3.7	58.2	(-15.6 - 27.6)			
Pyrene			1640		1660	ug/kg	1.2	101.2	(-10.4 - 21.8)			
*2,4,6-Tribromophenol			3280		3240	ug/kg	0.3	98.7	(19.0 - 122.)			
*2-Fluorobiphenyl			1640		1290	ug/kg	5.2	78.6	(30.0 - 114.)			
*2-Fluorophenol			3280		2540	ug/kg	4.1	77.3	(44.0 - 102.)			
*Nitrobenzene-d5			1640		1120	ug/kg	6.1	68	(23.0 - 120.)			
*Phenol-d6			3280		2420	ug/kg	4.4	73.9	(45.0 - 111.)			
*p-Terphenyl-d14			1640		1490	ug/kg	2.4	90.7	(52.0 - 135.)			
QC303652	LCS DUP	72025										
2,4,5-Trichlorophenol			10.1		0.689	mg/l	1.5	6.8	(0.00 - 30.0)	TNF	09/02/95	1209
2,4,6-Trichlorophenol			10.5		0.629	mg/l	0	6	(0.00 - 30.0)			
2,4-Dinitrotoluene			9.98		0.831	mg/l	2.4	8.3	(0.00 - 30.0)			
Hexachlorobenzene			10.3		0.769	mg/l	2.7	7.5	(0.00 - 30.0)			
Hexachlorobutadiene			10.2		0.447	mg/l	4.4	4.4	(0.00 - 30.0)			
Hexachloroethane			10.0		0.523	mg/l	7.4	5.2	(0.00 - 30.0)			
Nitrobenzene			10.5		0.896	mg/l	11.2	8.5	(0.00 - 30.0)			
Pentachlorophenol			10.0		0.991	mg/l	3.1	9.9	(0.00 - 30.0)			
Pyridine			10.1		0.303	mg/l	40	3**	(0.00 - 30.0)			
m,p-Cresol			10.0		0.646	mg/l	1.6	6.5	(0.00 - 30.0)			
o-Cresol			10.5		0.676	mg/l	3.2	6.4	(0.00 - 30.0)			
*2,4,6-Tribromophenol			10.0		0.895	mg/l	4.3	89.5	(34.6 - 123.)			
*2-Fluorobiphenyl			5.00		0.328	mg/l	4	65.5	(50.4 - 114.)			
*2-Fluorophenol			10.0		0.567	mg/l	4.5	56.7	(27.0 - 93.6)			
*Nitrobenzene-d5			5.00		0.337	mg/l	15.5	67.4	(35.0 - 107.)			
*Phenol-d6			10.0		0.504	mg/l	16.8	50.4	(21.2 - 75.6)			
*p-Terphenyl-d14			5.00		0.371	mg/l	10	74.3	(33.0 - 130.)			
QC303263	9508477-03MS	71952										

QC Summary Report

Project Description: Hazardous Waste Contract

cc: WSRC00194 Lab. Sample ID: 9508477% Report Date: September 28, 1995

mple/Parameter	Type	Batch	NOM	Sample	QC	Units	RPD%	REC%	Range	Analyst	Date	Time
2,4-Dinitrotoluene			1650	0.00	1400	ug/kg		84.8	(39.6 - 130.)	HNM	09/01/95	1628
2-Chlorophenol			3290	0.00	2490	ug/kg		75.7	(50.0 - 110.)	HNM	09/01/95	1628
4-Nitrophenol			3290	0.00	2720	ug/kg		82.7	(10.1 - 132.)			
4-chloro-3-methyl phenol			3290	0.00	2840	ug/kg		86.3	(69.3 - 118.)			
Acenaphthene			1650	0.00	1360	ug/kg		82.4	(61.2 - 117.)			
N-Nitrosodipropylamine			1650	0.00	1240	ug/kg		75.2	(50.6 - 122.)			
Pentachlorophenol			3290	0.00	3040	ug/kg		92.4	(14.0 - 147.)			
Phenol			3290	0.00	2000	ug/kg		60.8	(57.0 - 103.)			
Pyrene			1650	6.60	1700	ug/kg		102.6	(52.0 - 115.)			
2,4,6-Tribromophenol			3290		3160	ug/kg		95.9	(19.0 - 122.)			
2-Fluorobiphenyl			1650		1360	ug/kg		82.6	(30.0 - 114.)			
Fluorophenol			3290		2740	ug/kg		83.3	(44.0 - 102.)			
Nitrobenzene-d5			1650		1190	ug/kg		72.5	(23.0 - 120.)			
Phenol-d6			3290		2600	ug/kg		78.9	(45.0 - 111.)			
p-Terphenyl-d14			1650		1500	ug/kg		91.4	(52.0 - 135.)			
C303653 9508477-07MS		72025										
2,4,5-Trichlorophenol			10.1	0.00	0.668	mg/l		6.6		TNF	09/02/95	1333
2,4,6-Trichlorophenol			10.5	0.00	0.593	mg/l		5.6				
2,4-Dinitrotoluene			9.98	0.00	0.852	mg/l		8.5				
Hexachlorobenzene			10.3	0.00	0.733	mg/l		7.1				
Hexachlorobutadiene			10.2	0.00	0.485	mg/l		4.8				
Hexachloroethane			10.0	0.00	0.563	mg/l		5.6				
Nitrobenzene			10.5	0.00	0.893	mg/l		8.5				
Pentachlorophenol			10.0	0.00	1.05	mg/l		10.5				
Pyridine			10.1	0.00	0.414	mg/l		4.1				
m,p-Cresol			10.0	0.00	0.639	mg/l		6.4				
o-Cresol			10.5	0.00	0.650	mg/l		6.2				
*2,4,6-Tribromophenol			10.0		0.890	mg/l		89	(34.6 - 123.)			
*2-Fluorobiphenyl			5.00		0.301	mg/l		60.2	(50.4 - 114.)			
*2-Fluorophenol			10.0		0.562	mg/l		56.2	(27.0 - 93.6)			
*Nitrobenzene-d5			5.00		0.307	mg/l		61.5	(35.0 - 107.)			
*Phenol-d6			10.0		0.457	mg/l		45.7	(21.2 - 75.6)			
*p-Terphenyl-d14			5.00		0.320	mg/l		64	(33.0 - 130.)			
C303654 9508477-08MS		72025										
2,4,5-Trichlorophenol			10.1	0.00	0.725	mg/l		7.2		TNF	09/02/95	1401
2,4,6-Trichlorophenol			10.5	0.00	0.627	mg/l		6				
2,4-Dinitrotoluene			9.98	0.00	0.876	mg/l		8.8				
Hexachlorobenzene			10.3	0.00	0.803	mg/l		7.8				
Hexachlorobutadiene			10.2	0.00	0.577	mg/l		5.7				
Hexachloroethane			10.0	0.00	0.643	mg/l		6.4				

QC Summary Report

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cc: WSRC00194 Lab. Sample ID: 9508477% Report Date: September 28, 1995

Sample/Parameter	Type	Batch	NOM	Sample	QC	Units	RPD%	REC%	Range	Analyst	Date	Time
Nitrobenzene			10.5	0.00	0.958	mg/l		9.1		TNF	09/02/95	1401
Pentachlorophenol			10.0	0.00	1.14	mg/l		11.4				
Pyridine			10.1	0.00	0.423	mg/l		4.2				
m,p-Cresol			10.0	0.00	0.711	mg/l		7.1				
o-Cresol			10.5	0.00	0.703	mg/l		6.7				
*2,4,6-Tribromophenol			10.0		0.969	mg/l		96.9	(34.6 - 123.)			
*2-Fluorobiphenyl			5.00		0.330	mg/l		65.9	(50.4 - 114.)			
*2-Fluorophenol			10.0		0.629	mg/l		62.9	(27.0 - 93.6)			
*Nitrobenzene-d5			5.00		0.357	mg/l		71.3	(35.0 - 107.)			
*Phenol-d6			10.0		0.521	mg/l		52.1	(21.2 - 75.6)			
*p-Terphenyl-d14			5.00		0.366	mg/l		73.1	(33.0 - 130.)			
QC303655 9508477-08MSD		72025										
2,4,5-Trichlorophenol			10.1	0.00	0.742	mg/l	1.4	7.3		TNF	09/02/95	1429
2,4,6-Trichlorophenol			10.5	0.00	0.637	mg/l	1.7	6.1				
2,4-Dinitrotoluene			9.98	0.00	0.883	mg/l	0	8.8				
Hexachlorobenzene			10.3	0.00	0.793	mg/l	1.3	7.7				
Hexachlorobutadiene			10.2	0.00	0.559	mg/l	3.6	5.5				
Hexachloroethane			10.0	0.00	0.641	mg/l	0	6.4				
Nitrobenzene			10.5	0.00	0.932	mg/l	2.2	8.9				
Pentachlorophenol			10.0	0.00	1.13	mg/l	0.9	11.3				
Pyridine			10.1	0.00	0.409	mg/l	4.9	4				
m,p-Cresol			10.0	0.00	0.693	mg/l	2.9	6.9				
o-Cresol			10.5	0.00	0.695	mg/l	1.5	6.6				
*2,4,6-Tribromophenol			10.0		1.01	mg/l	4.3	101.2	(34.6 - 123.)			
*2-Fluorobiphenyl			5.00		0.324	mg/l	1.7	64.8	(50.4 - 114.)			
*2-Fluorophenol			10.0		0.575	mg/l	9	57.5	(27.0 - 93.6)			
*Nitrobenzene-d5			5.00		0.317	mg/l	11.7	63.4	(35.0 - 107.)			
*Phenol-d6			10.0		0.484	mg/l	7.4	48.4	(21.2 - 75.6)			
*p-Terphenyl-d14			5.00		0.375	mg/l	2.6	75	(33.0 - 130.)			
QC303341	BLANK	71972										
2,4,5-T					0.00	ug/kg				JLS	09/06/95	0123
2,4,5-TP					0.00	ug/kg						
2,4-D					0.00	ug/kg						
*4-(2,4-Dichlorophenoxy)Butyric			99.7		94.9	ug/kg		951.8**	(50.0 - 150.)			
QC303842	BLANK	72063										
2,4,5-TP					0.00	mg/l				JLS	09/13/95	1031
2,4-D					0.00	mg/l						
*4-(2,4-Dichlorophenoxy)Butyric			0.100		0.0730	mg/l		73	(50.0 - 150.)			
2,4,5-T					0.00	mg/l						
QC303843	BLANK	72063										

QC Summary Report

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cc: WSRC00194 Lab. Sample ID: 9508477% Report Date: September 28, 1995

Sample/Parameter	Type	Batch	NOM	Sample	QC	Units	RPD%	REC%	Range	Analyst	Date	Time
2,4,5-TP					0.00	mg/l				JLS	09/13/95	1052
2,4-D					0.00	mg/l				JLS	09/13/95	1052
*4-(2,4-Dichlorophenoxy)Butyric			0.100		0.0750	mg/l		75	(50.0 - 150.)			
2,4,5-T					0.00	mg/l						
QC303345	9508498-01DUP	71972										
2,4,5-T				0.00	4.79	ug/kg	200			JLS	09/06/95	0248
2,4,5-TP				0.00	0.00	ug/kg	0					
2,4-D				0.00	0.00	ug/kg	0					
*4-(2,4-Dichlorophenoxy)Butyric			99.6		106	ug/kg	11.3	1065.2**	(50.0 - 150.)			
QC303342	LCS	71972										
2,4,5-T			40.0		34.0	ug/kg		85	(50.0 - 150.)	JLS	09/06/95	0145
2,4,5-TP			20.0		18.6	ug/kg		93	(50.0 - 150.)			
2,4-D			40.0		41.5	ug/kg		103.8	(50.0 - 150.)			
*4-(2,4-Dichlorophenoxy)Butyric			99.9		113	ug/kg		1133.1**	(50.0 - 150.)			
QC303844	LCS	72063										
2,4,5-TP			0.0200		0.0140	mg/l		70	(50.0 - 150.)	JLS	09/13/95	1113
2,4-D			0.0400		0.0360	mg/l		90	(50.0 - 150.)			
*4-(2,4-Dichlorophenoxy)Butyric			0.100		0.0670	mg/l		67	(50.0 - 150.)			
QC303343	LCS DUP	71972										
2,4,5-T			39.9		38.8	ug/kg	13.4	97.2	(0.00 - 30.0)	JLS	09/06/95	0206
2,4,5-TP			19.9		21.1	ug/kg	13.1	106	(0.00 - 30.0)			
2,4-D			39.9		46.7	ug/kg	12	117	(0.00 - 30.0)			
*4-(2,4-Dichlorophenoxy)Butyric			99.7		116	ug/kg	2.7	1164.2**	(50.0 - 150.)			
QC303845	LCS DUP	72063										
2,4,5-TP			0.0200		0.0150	mg/l	6.9	75	(0.00 - 30.0)	JLS	09/13/95	1134
2,4-D			0.0400		0.0360	mg/l	0	90	(0.00 - 30.0)			
*4-(2,4-Dichlorophenoxy)Butyric			0.100		0.0760	mg/l	12.6	76	(50.0 - 150.)			
QC303344	9508477-03MS	71972										
2,4,5-T			39.4	0.00	38.0	ug/kg		96.4	(50.0 - 150.)	JLS	09/06/95	0227
2,4,5-TP			19.7	0.00	21.6	ug/kg		109.6	(50.0 - 150.)			
2,4-D			39.4	0.00	47.3	ug/kg		120.1	(50.0 - 150.)			
*4-(2,4-Dichlorophenoxy)Butyric			98.5		115	ug/kg		1165.8**	(50.0 - 150.)			
QC303848	9508477-07MS	72063										
2,4,5-TP			0.0200	0.00	0.0140	mg/l		70		JLS	09/13/95	1155
2,4-D			0.0400	0.00	0.0360	mg/l		90				
*4-(2,4-Dichlorophenoxy)Butyric			0.100		0.0760	mg/l		76	(50.0 - 150.)			
QC303850	9508477-08MS	72063										
2,4,5-TP			0.0200	0.00	0.0140	mg/l		70		JLS	09/13/95	1237
2,4-D			0.0400	0.00	0.0350	mg/l		87.5				
*4-(2,4-Dichlorophenoxy)Butyric			0.100		0.0720	mg/l		72	(50.0 - 150.)			

QC Summary Report

Project Description: Hazardous Waste Contract

cc: WSRC00194 Lab. Sample ID: 9508477% Report Date: September 28, 1995

Sample/Parameter	Type	Batch	NOM	Sample	QC	Units	RPD%	REC%	Range	Analyst	Date	Time
QC303849 9508477-07MSD		72063										
2,4,5-TP			0.0200	0.00	0.0150	mg/l	6.9	75		JLS	09/13/95	1216
2,4-D			0.0400	0.00	0.0360	mg/l	0	90				
*4-(2,4-Dichlorophenoxy)Butyric			0.100		0.0790	mg/l	3.9	79	(50.0 - 150.)			
QC303265	BLANK	71953										
4,4'-DDT					0.00	ug/kg				JEB	09/09/95	1542
Aldrin					0.00	ug/kg						
Dieldrin					0.00	ug/kg						
Endrin					0.00	ug/kg						
Heptachlor					0.00	ug/kg						
gamma-BHC					0.00	ug/kg						
*4CMX			16.5		12.7	ug/kg		76.9	(28.6 - 127.)			
*Dibutylchlorendate			16.5		11.2	ug/kg		68.1	(52.5 - 156.)			
4,4'-DDD					0.00	ug/kg						
4,4'-DDE					0.00	ug/kg						
Chlordane					0.00	ug/kg						
Endosulfan I					0.00	ug/kg						
Endosulfan II					0.00	ug/kg						
Endosulfan sulfate					0.00	ug/kg						
Endrin aldehyde					0.00	ug/kg						
Heptachlor epoxide					0.00	ug/kg						
Methoxychlor					0.00	ug/kg						
PCB-1016					0.00	ug/kg						
PCB-1221					0.00	ug/kg						
PCB-1232					0.00	ug/kg						
PCB-1242					0.00	ug/kg						
PCB-1248					0.00	ug/kg						
PCB-1254					0.00	ug/kg						
PCB-1260					0.00	ug/kg						
Parathion					0.00	ug/kg						
Parathion, methyl					0.00	ug/kg						
Phorate					0.00	ug/kg						
Toxaphene					0.00	ug/kg						
alpha-BHC					0.00	ug/kg						
beta-BHC					0.00	ug/kg						
delta-BHC					0.00	ug/kg						
QC303661	BLANK	72027										
Chlordane					0.00	mg/l				JEB	09/06/95	2011
Endrin					0.00	mg/l						
Heptachlor & Hep. Epoxide					0.00	mg/l						

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ample/Parameter	Type	Batch	NOM	Sample	QC	Units	RPD%	REC%	Range	Analyst	Date	Time
Methoxychlor					0.00	mg/l				JEB	09/06/95	2011
Toxaphene					0.00	mg/l						
gamma-BHC					0.00	mg/l						
*4CMX			0.0250		0.0161	mg/l		64.4	(35.9 - 114.)			
*Dibutylchlorendate			0.0250		0.0216	mg/l		86.2	(46.1 - 158.)			
C303662	BLANK	72027										
Chlordane					0.00	mg/l				JEB	09/06/95	2047
Endrin					0.00	mg/l						
Heptachlor & Hep. Epoxide					0.00	mg/l						
Methoxychlor					0.00	mg/l						
Toxaphene					0.00	mg/l						
amma-BHC					0.00	mg/l						
+CMX			0.0250		0.0142	mg/l		56.8	(35.9 - 114.)			
*Dibutylchlorendate			0.0250		0.0201	mg/l		80.2	(46.1 - 158.)			
C303269	9508400-07DUP	71953										
4,4'-DDT				0.00	0.00	ug/kg	0			JEB	09/06/95	0039
Aldrin				0.00	0.00	ug/kg	0					
Dieldrin				0.00	0.00	ug/kg	0					
Endrin				0.00	0.00	ug/kg	0					
Heptachlor				0.00	0.00	ug/kg	0					
gamma-BHC				0.00	0.00	ug/kg	0					
*4CMX			16.6		16.3	ug/kg	23.2	98.2	(28.6 - 127.)			
*Dibutylchlorendate			16.6		15.4	ug/kg	26.6	92.8	(52.5 - 156.)			
4,4'-DDD				0.00	0.00	ug/kg	0					
4,4'-DDE				0.00	0.00	ug/kg	0					
Endosulfan I				0.00	0.00	ug/kg	0					
Endosulfan II				0.00	0.00	ug/kg	0					
Endosulfan sulfate				0.00	0.00	ug/kg	0					
Heptachlor epoxide				0.00	0.00	ug/kg	0					
Methoxychlor				0.00	0.00	ug/kg	0					
PCB-1016				0.00	0.00	ug/kg	0					
PCB-1221				0.00	0.00	ug/kg	0					
PCB-1232				0.00	0.00	ug/kg	0					
PCB-1242				0.00	0.00	ug/kg	0					
PCB-1248				0.00	0.00	ug/kg	0					
PCB-1254				0.00	0.00	ug/kg	0					
PCB-1260				0.00	0.00	ug/kg	0					
Toxaphene				0.00	0.00	ug/kg	0					
alpha-BHC				0.00	0.00	ug/kg	0					
beta-BHC				0.00	0.00	ug/kg	0					

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Sample/Parameter	Type	Batch	NOM	Sample	QC	Units	RPD%	REC%	Range	Analyst	Date	Time
delta-BHC				0.00	0.00	ug/kg	0			JEB	09/06/95	0039
QC303266	LCS	71953										
4,4'-DDT			8.26		6.87	ug/kg		83.2	(60.8 - 152.)	JEB	09/05/95	2242
Aldrin			3.30		3.60	ug/kg		109.1	(59.1 - 143.)			
Dieldrin			8.26		8.33	ug/kg		100.8	(62.6 - 146.)			
Endrin			8.26		7.66	ug/kg		92.7	(70.9 - 152.)			
Heptachlor			3.30		3.70	ug/kg		112.1	(62.8 - 155.)			
gamma-BHC			3.30		3.37	ug/kg		102.1	(62.5 - 130.)			
*4CMX			16.5		13.2	ug/kg		80	(28.6 - 127.)			
*Dibutylchlorendate			16.5		11.2	ug/kg		67.8	(52.5 - 156.)			
QC303663	LCS	72027										
Chlordane			0.100		0.0982	mg/l		98.2	(50.0 - 150.)	JEB	09/06/95	2122
Endrin			0.00500		0.00375	mg/l		75	(50.0 - 150.)			
Heptachlor & Hep. Epoxide			0.0100		0.00750	mg/l		75	(50.0 - 150.)			
Methoxychlor			0.0500		0.0517	mg/l		103.4	(50.0 - 150.)			
Toxaphene			0.100		0.0959	mg/l		95.9	(50.0 - 150.)			
gamma-BHC			0.00500		0.00395	mg/l		79	(50.0 - 150.)			
*4CMX			0.0250		0.0149	mg/l		59.4	(35.9 - 114.)			
*Dibutylchlorendate			0.0250		0.0169	mg/l		67.6	(46.1 - 158.)			
QC303267	LCS DUP	71953										
4,4'-DDT			8.25		9.14	ug/kg	28.5	110.8**	(0.00 - 16.4)	JEB	09/05/95	2321
Aldrin			3.30		4.26	ug/kg	16.8	129.1	(0.00 - 18.6)			
Dieldrin			8.25		9.83	ug/kg	16.7	119.2	(0.00 - 20.0)			
Endrin			8.25		9.01	ug/kg	16.3	109.2	(0.00 - 20.0)			
Heptachlor			3.30		4.12	ug/kg	10.7	124.8	(0.00 - 24.1)			
gamma-BHC			3.30		3.83	ug/kg	12.8	116.1	(0.00 - 18.3)			
*4CMX			16.5		16.4	ug/kg	21.4	99.2	(28.6 - 127.)			
*Dibutylchlorendate			16.5		15.0	ug/kg	29.2	91	(52.5 - 156.)			
QC303664	LCS DUP	72027										
Chlordane			0.100		0.112	mg/l	13.1	112	(0.00 - 30.0)	JEB	09/06/95	2310
Endrin			0.00500		0.00370	mg/l	1.3	74	(0.00 - 30.0)			
Heptachlor & Hep. Epoxide			0.0100		0.00790	mg/l	5.2	79	(0.00 - 30.0)			
Methoxychlor			0.0500		0.0543	mg/l	4.9	108.6	(0.00 - 30.0)			
Toxaphene			0.100		0.102	mg/l	6.2	102	(0.00 - 30.0)			
gamma-BHC			0.00500		0.00380	mg/l	3.9	76	(0.00 - 30.0)			
*4CMX			0.0250		0.0161	mg/l	7.8	64.2	(35.9 - 114.)			
*Dibutylchlorendate			0.0250		0.0193	mg/l	13	77	(46.1 - 158.)			
QC303268	9508400-06MS	71953										
4,4'-DDT			8.21	0.00	9.09	ug/kg		110.7	(25.0 - 160.)	JEB	09/06/95	0000
Aldrin			3.28	0.00	4.07	ug/kg		124.1**	(42.0 - 122.)			

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Sample/Parameter	Type	Batch	NOM	Sample	QC	Units	RPD%	REC%	Range	Analyst	Date	Time
Dieldrin			8.21	0.00	9.88	ug/kg		120.3	(36.0 - 146.)	JEB	09/06/95	0000
Endrin			8.21	0.00	9.23	ug/kg		112.4	(30.0 - 147.)			
Heptachlor			3.28	0.00	4.30	ug/kg		131.1**	(34.0 - 111.)			
gamma-BHC			3.28	0.00	3.94	ug/kg		120.1	(32.0 - 127.)			
*4CMX			16.4		16.3	ug/kg		99.6	(28.6 - 127.)			
*Dibutylchlorendate			16.4		14.9	ug/kg		90.8	(52.5 - 156.)			
QC303665	9508477-07MS	72027										
Chlordane			0.100	0.00	0.0921	mg/l		92.1		JEB	09/07/95	0057
Endrin			0.00500	0.00	0.00330	mg/l		66				
Heptachlor & Hep. Epoxide			0.0100	0.00	0.00725	mg/l		72.5				
Methoxychlor			0.0500	0.00	0.0477	mg/l		95.4				
Toxaphene			0.100	0.00	0.105	mg/l		105				
gamma-BHC			0.00500	0.00	0.00345	mg/l		69				
*4CMX			0.0250		0.0167	mg/l		66.8	(35.9 - 114.)			
*Dibutylchlorendate			0.0250		0.0200	mg/l		79.8	(46.1 - 158.)			
QC303666	9508477-08MS	72027										
Chlordane			0.100	0.00	0.110	mg/l		110		JEB	09/07/95	0320
Endrin			0.00500	0.00	0.00380	mg/l		76				
Heptachlor & Hep. Epoxide			0.0100	0.00	0.0102	mg/l		102				
Methoxychlor			0.0500	0.00	0.0639	mg/l		127.8				
Toxaphene			0.100	0.00	0.0985	mg/l		98.5				
gamma-BHC			0.00500	0.00	0.00425	mg/l		85				
*4CMX			0.0250		0.0237	mg/l		94.8	(35.9 - 114.)			
*Dibutylchlorendate			0.0250		0.0239	mg/l		95.6	(46.1 - 158.)			
QC303667	9508477-08MSD	72027										
Chlordane			0.100	0.00	0.0827	mg/l	28.3	82.7		JEB	09/07/95	0507
Endrin			0.00500	0.00	0.00320	mg/l	17.1	64				
Heptachlor & Hep. Epoxide			0.0100	0.00	0.00750	mg/l	30.5	75				
Methoxychlor			0.0500	0.00	0.0495	mg/l	25.4	99				
Toxaphene			0.100	0.00	0.0963	mg/l	2.3	96.3				
gamma-BHC			0.00500	0.00	0.00355	mg/l	17.9	71				
*4CMX			0.0250		0.0220	mg/l	7.4	88	(35.9 - 114.)			
*Dibutylchlorendate			0.0250		0.0200	mg/l	18	79.8	(46.1 - 158.)			

* represent a surrogate.

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Sample/Parameter	Type	Batch	NOM	Sample	QC	Units	RPD%	REC%	Range	Analyst	Date	Time
Metals Analysis												
QC302685	BLANK	71805										
Antimony					0.00328	mg/kg				RMJ	08/31/95	1527
Arsenic					-0.00161	mg/kg				RMJ	08/31/95	1902
Lead					0.000350	mg/kg				NRM	08/29/95	2338
Selenium					-0.00328	mg/kg				NRM	08/31/95	1527
Thallium					0.000650	mg/kg						
QC302689	9508502-01DUP	71805										
Antimony				126	117	mg/kg	7.4			RMJ	08/31/95	1616
Arsenic				22.5	21.8	mg/kg	3.2			RMJ	08/31/95	2016
Lead				3260	3210	mg/kg	1.5			RMJ	08/30/95	1115
QC302690	LCS	71805										
Antimony			74.3		234	mg/kg		314.9**	(80.0 - 120.)	RMJ	08/31/95	1635
Arsenic			62.5		70.5	mg/kg		112.8	(80.0 - 120.)	RMJ	08/31/95	1852
Lead			188		238	mg/kg		126.6**	(80.0 - 120.)	NRM	08/29/95	2328
Selenium			86.2		84.7	mg/kg		98.3	(80.0 - 120.)	NRM	08/31/95	1635
Thallium			87.0		59.2	mg/kg		68**	(80.0 - 120.)			
QC302691	LCS DUP	71805										
Antimony			74.3		234	mg/kg	0	314.9	(0.00 - 20.0)	RMJ	08/31/95	1640
Arsenic			62.5		71.4	mg/kg	1.2	114.2	(0.00 - 20.0)	RMJ	08/31/95	1857
Lead			188		234	mg/kg	1.7	124.5	(0.00 - 20.0)	NRM	08/29/95	2333
Selenium			86.2		81.8	mg/kg	3.5	94.9	(0.00 - 20.0)	NRM	08/31/95	1640
Thallium			87.0		57.5	mg/kg	2.8	66.1	(0.00 - 20.0)			
QC302688	9508502-01MS	71805										
Antimony			99.6	126	198	mg/kg		72.3	(70.0 - 130.)	RMJ	08/31/95	1703
Arsenic			39.8	22.5	63.3	mg/kg		102.5	(70.0 - 130.)	RMJ	08/31/95	2021
Lead			1990	3260	5160	mg/kg		95.5	(70.0 - 130.)	RMJ	08/30/95	1120
QC302692	9508477-03MS	71805										
Antimony			19.9	-0.731	21.3	mg/kg		110.7	(70.0 - 130.)	RMJ	08/31/95	1537
Arsenic			39.9	3.95	35.9	mg/kg		80.1	(70.0 - 130.)	RMJ	09/01/95	1559
Lead			19.9	34.6	55.6	mg/kg		105.5	(70.0 - 130.)	RMJ	08/30/95	1056
Selenium			39.9	6.77	46.5	mg/kg		99.6	(70.0 - 130.)	RMJ	09/01/95	1424
Thallium			199	1.59	106	mg/kg		52.5**	(70.0 - 130.)	RMJ	09/05/95	1519
QC302693	9508477-03MSD	71805										
Antimony			19.9	-0.731	22.0	mg/kg	3.1	114.2	(0.00 - 30.0)	RMJ	08/31/95	1542
Arsenic			39.9	3.95	36.3	mg/kg	1.2	81.1	(0.00 - 30.0)	RMJ	09/01/95	1604
Lead			19.9	34.6	55.3	mg/kg	1.4	104	(0.00 - 30.0)	RMJ	08/30/95	1101
Selenium			39.9	6.77	39.2	mg/kg	20.2	81.3	(0.00 - 30.0)	RMJ	09/01/95	1439
Thallium			199	1.59	110	mg/kg	3.7	54.5	(0.00 - 30.0)	RMJ	09/05/95	1524
QC302400	BLANK	71753										

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Sample/Parameter	Type	Batch	NOM	Sample	QC	Units	RPD%	REC%	Range	Analyst	Date	Time
Barium					0.0166	mg/kg				NRM	08/29/95	2239
Beryllium					0.0000100	mg/kg				NRM	08/29/95	2239
Cadmium					0.000540	mg/kg						
Calcium					0.0707	mg/kg						
Chromium					0.0107	mg/kg						
Cobalt					0.00266	mg/kg						
Lead					0.0502	mg/kg						
Manganese					0.00481	mg/kg						
Nickel					0.00712	mg/kg						
Silver					-0.0224	mg/kg						
Sodium					0.0178	mg/kg						
Tin					0.00305	mg/kg				JSS	08/31/95	1625
Vanadium					0.00242	mg/kg				NRM	08/29/95	2239
QC305225	BLANK	72356										
Arsenic					0.00354	mg/l				NRM	09/13/95	1617
Barium					0.000120	mg/l						
Cadmium					0.000790	mg/l						
Chromium					-0.00322	mg/l						
Lead					0.0213	mg/l						
Manganese					-0.00191	mg/l						
Nickel					0.000160	mg/l						
Selenium					-0.00853	mg/l						
Silver					0.0168	mg/l						
QC305226	BLANK	72356										
Arsenic					0.00963	mg/l				NRM	09/13/95	1619
Barium					0.106	mg/l						
Cadmium					0.000260	mg/l						
Chromium					0.00129	mg/l						
Lead					0.0256	mg/l						
Manganese					-0.00180	mg/l						
Nickel					0.000160	mg/l						
Selenium					0.0426	mg/l						
Silver					0.0206	mg/l						
QC305337	BLANK	72379										
Aluminum					0.0566	mg/kg				JSS	09/19/95	1731
Barium					-0.00350	mg/kg						
Copper					-0.00446	mg/kg						
Iron					0.151	mg/kg						
Lead					0.0178	mg/kg						
Magnesium					-0.106	mg/kg						

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Sample/Parameter	Type	Batch	NOM	Sample	QC	Units	RPD%	REC%	Range	Analyst	Date	Time
Manganese					0.00161	mg/kg				JSS	09/19/95	1731
Nickel					0.0439	mg/kg						
Silica					-3.49	mg/kg						
Silver					0.369	mg/kg						
Zinc					0.0199	mg/kg						
Boron					0.0143	mg/kg						
Lithium					0.0147	mg/kg						
QC305229	9508477-07DUP	72356										
Arsenic				-0.0836	-0.0498	mg/l	-50.7			NRM	09/13/95	1625
Barium				0.262	0.333	mg/l	23.9					
Cadmium				-0.00152	0.00599	mg/l	336					
Chromium				0.0406	0.0808	mg/l	66.2					
Lead				0.0234	0.0480	mg/l	68.9					
Manganese				0.0274	0.0412	mg/l	40.2					
Nickel				0.343	0.391	mg/l	13.1					
Selenium				-0.00799	0.0334	mg/l	325.8					
Silver				0.0162	0.0238	mg/l	38					
QC305232	9508477-08DUP	72356										
Arsenic				-0.0925	-0.0697	mg/l	-28.1			NRM	09/13/95	1634
Barium				0.172	0.163	mg/l	5.4					
Cadmium				-0.000480	-0.000740	mg/l	-42.6					
Chromium				0.00944	0.0134	mg/l	34.7					
Lead				-0.00129	0.0225	mg/l	224.3					
Manganese				0.0167	0.0160	mg/l	4.3					
Nickel				0.123	0.129	mg/l	4.8					
Selenium				0.0235	0.000790	mg/l	187					
Silver				0.0117	0.0268	mg/l	78.4					
QC305338	9508477-03DUP	72379										
Aluminum				68100	68300	mg/kg	0.3			JSS	09/19/95	1738
Barium				268	289	mg/kg	7.5					
Copper				70.8	70.1	mg/kg	1					
Iron				11000	11400	mg/kg	3.6					
Lead				49.0	106	mg/kg	73.5					
Magnesium				4830	5060	mg/kg	4.7					
Manganese				192	180	mg/kg	6.5					
Nickel				5850	5670	mg/kg	3.1					
Silica				347000	338000	mg/kg	2.6					
Silver				79.7	95.0	mg/kg	17.5					
Zinc				126	136	mg/kg	7.6					
Boron				24600	23500	mg/kg	4.6					

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Sample/Parameter	Type	Batch	NOM	Sample	QC	Units	RPD%	REC%	Range	Analyst	Date	Time
Lithium				23900	22700	mg/kg	5.2			JSS	09/19/95	1738
QC305339 9508477-04DUP		72379										
Aluminum				72200	74000	mg/kg	2.5			JSS	09/19/95	1744
Barium				165	199	mg/kg	18.7					
Copper				67.6	60.3	mg/kg	11.4					
Iron				5490	5620	mg/kg	2.3					
Lead				51.2	146	mg/kg	96.1					
Magnesium				1620	1610	mg/kg	0.6					
Manganese				277	320	mg/kg	14.4					
Nickel				3650	4470	mg/kg	20.2					
Silica				404000	417000	mg/kg	3.2					
Silver				55.8	51.0	mg/kg	9					
Zinc				141	149	mg/kg	5.5					
Boron				21300	21400	mg/kg	0.5					
Lithium				25000	24600	mg/kg	1.6					
QC302404	LCS	71753										
Barium			197		839	mg/kg		425.9**	(70.0 - 130.)	NRM	08/29/95	2242
Beryllium			91.0		88.3	mg/kg		97	(70.0 - 130.)			
Cadmium			123		121	mg/kg		98.4	(70.0 - 130.)			
Calcium			2380		7500	mg/kg		315.1**	(70.0 - 130.)	NRM	08/31/95	1653
Chromium			77.8		86.4	mg/kg		111.1	(70.0 - 130.)	NRM	08/29/95	2242
Cobalt			141		138	mg/kg		97.9	(70.0 - 130.)			
Lead			188		191	mg/kg		101.6	(70.0 - 130.)			
Manganese			214		306	mg/kg		143**	(70.0 - 130.)			
Nickel			70.1		70.9	mg/kg		101.1	(70.0 - 130.)			
Silver			117		129	mg/kg		110.3	(70.0 - 130.)			
Sodium			313		12200	mg/kg		3897.8**	(70.0 - 130.)	NRM	08/31/95	1653
Tin			(nom_conc = 0)		6.58	mg/kg				JSS	08/31/95	1653
Vanadium			183		221	mg/kg		120.8	(70.0 - 130.)	NRM	08/29/95	2242
QC305233	LCS	72356										
Arsenic			5.00		4.48	mg/l		89.6	(80.0 - 120.)	NRM	09/13/95	1637
Barium			10.0		7.96	mg/l		79.6**	(80.0 - 120.)			
Cadmium			1.00		0.947	mg/l		94.7	(80.0 - 120.)			
Chromium			5.00		4.38	mg/l		87.6	(80.0 - 120.)			
Lead			5.00		4.86	mg/l		97.2	(80.0 - 120.)			
Manganese			2.00		1.70	mg/l		85	(80.0 - 120.)			
Nickel			2.00		1.84	mg/l		92	(80.0 - 120.)			
Selenium			1.00		0.926	mg/l		92.6	(80.0 - 120.)			
Silver			0.500		0.432	mg/l		86.4	(80.0 - 120.)			
QC307020	LCS	72379										

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Aluminum			64400		52000	mg/kg		80.7	(70.0 - 130.)	JSS	09/19/95	1748
Barium			707		530	mg/kg		75	(70.0 - 130.)	JSS	09/19/95	1748
Copper			2950		2090	mg/kg		70.8	(70.0 - 130.)			
Iron			33800		28400	mg/kg		84	(70.0 - 130.)			
Lead			5530		5410	mg/kg		97.8	(70.0 - 130.)			
Magnesium			8530		8180	mg/kg		95.9	(70.0 - 130.)			
Manganese			10100		8440	mg/kg		83.6	(70.0 - 130.)			
Nickel			14.3		50.9	mg/kg		355.9**	(70.0 - 130.)			
Silica			620000		522000	mg/kg		84.2	(70.0 - 130.)			
Silver			35.3		112	mg/kg		317.3**	(70.0 - 130.)			
Zinc			6950		5620	mg/kg		80.9	(70.0 - 130.)			
QC302405	LCS DUP	71753										
Barium			197		821	mg/kg	2.2	416.8	(0.00 - 30.0)	NRM	08/29/95	2244
Beryllium			91.0		87.8	mg/kg	0.5	96.5	(0.00 - 30.0)			
Cadmium			123		120	mg/kg	0.8	97.6	(0.00 - 30.0)			
Calcium			2380		7780	mg/kg	3.7	326.9	(0.00 - 30.0)	NRM	08/31/95	1655
Chromium			77.8		85.6	mg/kg	1	110	(0.00 - 30.0)	NRM	08/29/95	2244
Cobalt			141		137	mg/kg	0.7	97.2	(0.00 - 30.0)			
Lead			188		190	mg/kg	0.5	101.1	(0.00 - 30.0)			
Manganese			214		285	mg/kg	7.1	133.2	(0.00 - 30.0)			
Nickel			70.1		70.6	mg/kg	0.4	100.7	(0.00 - 30.0)			
Silver			117		128	mg/kg	0.8	109.4	(0.00 - 30.0)			
Sodium			313		12700	mg/kg	4	4057.5	(0.00 - 30.0)	NRM	08/31/95	1655
Tin		(nom_conc = 0)			6.34	mg/kg				JSS	08/31/95	1655
Vanadium			183		220	mg/kg	0.5	120.2	(0.00 - 30.0)	NRM	08/29/95	2244
QC305234	LCS DUP	72356										
Arsenic			5.00		4.59	mg/l	2.4	91.8	(0.00 - 20.0)	NRM	09/13/95	1639
Barium			10.0		8.11	mg/l	1.9	81.1	(0.00 - 20.0)			
Cadmium			1.00		0.951	mg/l	0.4	95.1	(0.00 - 20.0)			
Chromium			5.00		4.44	mg/l	1.4	88.8	(0.00 - 20.0)			
Lead			5.00		4.91	mg/l	1	98.2	(0.00 - 20.0)			
Manganese			2.00		1.72	mg/l	1.2	86	(0.00 - 20.0)			
Nickel			2.00		1.87	mg/l	1.6	93.5	(0.00 - 20.0)			
Selenium			1.00		0.879	mg/l	5.2	87.9	(0.00 - 20.0)			
Silver			0.500		0.445	mg/l	3	89	(0.00 - 20.0)			
QC302401	9508477-03MS	71753										
Barium			199	268	466	mg/kg		99.5	(70.0 - 130.)	JSS	08/31/95	1647
Beryllium			199	0.525	188	mg/kg		94.2	(70.0 - 130.)			
Cadmium			199	2.14	212	mg/kg		105.5	(70.0 - 130.)			
Calcium			997	5040	6120	mg/kg		108.3	(70.0 - 130.)			

QC Summary Report

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Sample/Parameter	Type	Batch	NOM	Sample	QC	Units	RPD%	REC%	Range	Analyst	Date	Time
Chromium			199	1140	1340	mg/kg		100.5	(70.0 - 130.)	JSS	08/31/95	1647
Cobalt			199	3.64	204	mg/kg		100.7	(70.0 - 130.)			
Lead			199	49.0	260	mg/kg		106	(70.0 - 130.)			
Manganese			199	192	391	mg/kg		100	(70.0 - 130.)			
Nickel			199	5850	6040	mg/kg		95.5	(70.0 - 130.)			
Silver			199	79.7	236	mg/kg		78.5	(70.0 - 130.)			
Sodium			1620	108000	110000	mg/kg		123.5	(70.0 - 130.)			
Tin			199	13.5	214	mg/kg		100.8	(70.0 - 130.)			
Vanadium			199	-16.2	191	mg/kg		104.1	(70.0 - 130.)			
QC302406	9508489-02MS	71753										
Barium			49.9	890	638	mg/kg		-505**	(70.0 - 130.)	NRM	08/29/95	2247
Lead			49.9	2640	2540	mg/kg		-200.4**	(70.0 - 130.)			
Manganese			49.9	50.2	89.5	mg/kg		78.8	(70.0 - 130.)			
Nickel			49.9	29.9	69.5	mg/kg		79.4	(70.0 - 130.)			
Silver			49.9	-1.53	14.9	mg/kg		32.9**	(70.0 - 130.)			
QC305227	9508477-07MS	72356										
Arsenic			5.00	-0.0836	4.44	mg/l		90.5		NRM	09/13/95	1621
Barium			10.0	0.262	8.45	mg/l		81.9				
Cadmium			1.00	-0.00152	0.885	mg/l		88.7				
Chromium			5.00	0.0406	4.29	mg/l		85				
Lead			5.00	0.0234	4.44	mg/l		88.3				
Manganese			2.00	0.0274	1.67	mg/l		82.1				
Nickel			2.00	0.343	2.07	mg/l		86.4				
Selenium			1.00	-0.00799	0.933	mg/l		94.1				
Silver			0.500	0.0162	0.414	mg/l		79.6				
QC305230	9508477-08MS	72356										
Arsenic			5.00	-0.0925	4.77	mg/l		97.3		NRM	09/13/95	1627
Barium			10.0	0.172	8.73	mg/l		85.6				
Cadmium			1.00	-0.000480	0.958	mg/l		95.8				
Chromium			5.00	0.00944	4.56	mg/l		91				
Lead			5.00	-0.00129	4.91	mg/l		98.2				
Manganese			2.00	0.0167	1.78	mg/l		88.2				
Nickel			2.00	0.123	2.02	mg/l		94.9				
Selenium			1.00	0.0235	1.02	mg/l		99.7				
Silver			0.500	0.0117	0.443	mg/l		86.3				
QC302402	9508477-03MSD	71753										
Barium			199	268	462	mg/kg	2	97.5	(0.00 - 30.0)	JSS	08/31/95	1649
Beryllium			199	0.525	188	mg/kg	0	94.2	(0.00 - 30.0)			
Cadmium			199	2.14	215	mg/kg	1.4	107	(0.00 - 30.0)			
Calcium			997	5040	6210	mg/kg	8.1	117.4	(0.00 - 30.0)			

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Sample/Parameter	Type	Batch	NOM	Sample	QC	Units	RPD%	REC%	Range	Analyst	Date	Time
Chromium			199	1140	1350	mg/kg	4.9	105.5	(0.00 - 30.0)	JSS	08/31/95	1649
Cobalt			199	3.64	207	mg/kg	1.5	102.2	(0.00 - 30.0)			
Lead			199	49.0	270	mg/kg	4.7	111.1	(0.00 - 30.0)			
Manganese			199	192	393	mg/kg	1	101	(0.00 - 30.0)			
Nickel			199	5850	6110	mg/kg	31.1	130.7**	(0.00 - 30.0)			
Silver			199	79.7	237	mg/kg	0.6	79	(0.00 - 30.0)			
Sodium			1620	108000	110000	mg/kg	0	123.5	(0.00 - 30.0)			
Tin			199	13.5	219	mg/kg	2.4	103.3	(0.00 - 30.0)			
Vanadium			199	-16.2	191	mg/kg	0	104.1	(0.00 - 30.0)			
QC302503	9508489-02MSD	71753										
Barium			49.7	890	631	mg/kg	3.1	-521.1	(0.00 - 30.0)	NRM	08/29/95	2251
Lead			49.7	2640	2570	mg/kg	34.9	-140.8**	(0.00 - 30.0)			
Manganese			49.7	50.2	93.1	mg/kg	9.1	86.3	(0.00 - 30.0)			
Nickel			49.7	29.9	74.0	mg/kg	11.1	88.7	(0.00 - 30.0)			
Silver			49.7	-1.53	19.5	mg/kg	25	42.3	(0.00 - 30.0)			
QC305228	9508477-07MSD	72356										
Arsenic			5.00	-0.0836	4.45	mg/l	0.2	90.7		NRM	09/13/95	1623
Barium			10.0	0.262	8.35	mg/l	1.2	80.9				
Cadmium			1.00	-0.00152	0.895	mg/l	1.1	89.7				
Chromium			5.00	0.0406	4.29	mg/l	0	85				
Lead			5.00	0.0234	4.53	mg/l	2	90.1				
Manganese			2.00	0.0274	1.67	mg/l	0	82.1				
Nickel			2.00	0.343	2.08	mg/l	0.6	86.9				
Selenium			1.00	-0.00799	0.987	mg/l	5.6	99.5				
Silver			0.500	0.0162	0.414	mg/l	0	79.6				
QC305231	9508477-08MSD	72356										
Arsenic			5.00	-0.0925	4.71	mg/l	1.2	96.1		NRM	09/13/95	1630
Barium			10.0	0.172	8.46	mg/l	3.2	82.9				
Cadmium			1.00	-0.000480	0.963	mg/l	0.5	96.3				
Chromium			5.00	0.00944	4.49	mg/l	1.6	89.6				
Lead			5.00	-0.00129	4.86	mg/l	1	97.2				
Manganese			2.00	0.0167	1.75	mg/l	1.7	86.7				
Nickel			2.00	0.123	1.98	mg/l	2.1	92.9				
Selenium			1.00	0.0235	0.995	mg/l	2.5	97.2				
Silver			0.500	0.0117	0.436	mg/l	1.6	84.9				
QC302951	BLANK	71865										
Mercury					0.0560	ug/kg				BBJ	08/31/95	2021
QC305235	BLANK	72357										
Mercury					-0.0000610	mg/l				BBJ	09/13/95	1320
QC302954	9508361-01DUP	71865										

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ter	Type	Batch	NOM	Sample	QC	Units	RPD%	REC%	Range	Analyst	Date	Time
9508477-07DUP		72357		4790	5920	ug/kg	21.1			BBJ	09/01/95	0457
9508477-08DUP		72357		0.0000400	-0.000400	mg/l	-244.4			BBJ	09/13/95	1329
	LCS	71865		-0.0000300	-0.000810	mg/l	-185.7			BBJ	09/13/95	1337
	LCS	72357	2290		2280	ug/kg		99.6	(53.1 - 150.)	BBJ	08/31/95	2033
	LCS DUP	71865	0.00200		0.00201	mg/l		100.5	(80.0 - 120.)	BBJ	09/13/95	1339
	LCS DUP	72357	2290		2780	ug/kg	19.7	121.4	(0.00 - 20.0)	BBJ	08/31/95	2035
9508361-01MS		71865	0.00200		0.00199	mg/l	1	99.5	(0.00 - 20.0)	BBJ	09/13/95	1342
9508477-07MS		72357	306	4790	4980	ug/kg		62.1**	(75.0 - 125.)	BBJ	09/01/95	0452
9508477-08MS		72357	0.0200	0.0000400	0.0191	mg/l		95.3		BBJ	09/13/95	1325
9508361-01MSD		71865	0.0200	-0.0000300	0.0193	mg/l		96.7		BBJ	09/13/95	1332
9508477-07MSD		72357	324	4790	5230	ug/kg	74.5	135.8**	(0.00 - 20.0)	BBJ	09/01/95	0454
9508477-08MSD		72357	0.0200	0.0000400	0.0191	mg/l	0	95.3		BBJ	09/13/95	1327
			0.0200	-0.0000300	0.0191	mg/l	1	95.7		BBJ	09/13/95	1334

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Sample/Parameter	Type	Batch	NOM	Sample	QC	Units	RPD%	REC%	Range	Analyst	Date	Time
General Chemistry												
QC303708	BLANK	72036										
Cyanide, Reactive					-9.65	mg/kg				JBG	09/01/95	1409
QC303707	9508477-02DUP	72036										
Cyanide, Reactive				-10.8	-12.6	mg/kg	-15.4			JBG	09/01/95	1408
QC303709	LCS	72036										
Cyanide, Reactive			1000000		45600	mg/kg		4.6	(0.00 - 20.0)	JBG	09/01/95	1411
QC303710	LCS DUP	72036										
Cyanide, Reactive			1000000		35500	mg/kg	24.4	3.6**	(0.00 - 20.0)	JBG	09/01/95	1412
QC303713	BLANK	72037										
Sulfide, Reactive					-0.0550	mg/kg				MCM	09/12/95	1447
QC303711	9508477-02DUP	72037										
Sulfide, Reactive				-0.0299	-0.00996	mg/kg	-100.1					
QC303714	LCS	72037										
Sulfide, Reactive			570		0.350	mg/kg		0.1	(0.00 - 120.)			
QC303715	LCS DUP	72037										
Sulfide, Reactive			570		0.605	mg/kg	0	0.1	(0.00 - 200.)			
QC302728	BLANK	71815										
Sulfate as SO4					1.96	mg/kg				BJW	08/29/95	1148
QC304300	BLANK	72152										
Chlorides					0.00	mg/kg				JPB	09/20/95	1046
QC302731	9508477-03DUP	71815										
Sulfate as SO4				0.817	1.57	mg/kg	63.1			BJW	08/29/95	1337
QC304303	9508477-05DUP	72152										
Chlorides				0.00	0.00	mg/kg	0			JPB	09/20/95	1111
QC302729	LCS	71815										
Sulfate as SO4			104		106	mg/kg		101.9	(90.0 - 110.)	BJW	08/29/95	1157
QC304301	LCS	72152										
Chlorides			5.00		4.52	mg/kg		90.4	(90.0 - 110.)	JPB	09/19/95	1525
QC302730	LCS DUP	71815										
Sulfate as SO4			101		103	mg/kg	0.1	102	(0.00 - 30.0)	BJW	08/29/95	1206
QC304302	LCS DUP	72152										
Chlorides			5.00		4.52	mg/kg	0	90.4	(0.00 - 30.0)	JPB	09/19/95	1536
QC302732	9508477-03MS	71815										
Sulfate as SO4			102	0.817	98.0	mg/kg		95.3	(80.0 - 120.)	BJW	08/29/95	1346
QC304304	9508477-05MS	72152										
Chlorides			249000	0.00	225000	mg/kg		90.4	(80.0 - 120.)	JPB	09/20/95	112
QC304305	9508477-06MS	72152										
Chlorides			245000	0.00	220000	mg/kg		89.8	(80.0 - 120.)	JPB	09/20/95	1224
QC302733	9508477-03MSD	71815										

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ample/Parameter	Type	Batch	NOM	Sample	QC	Units	RPD%	REC%	Range	Analyst	Date	Time
Sulfate as SO4			102	0.817	101	mg/kg	3	98.2	(0.00 - 30.0)	BJW	08/29/95	1356
C302600	BLANK	71789										
Phosphorus, Total as PO4					0.0100	mg/kg				CEG	08/30/95	0935
C302598	9508477-04DUP	71789										
Phosphorus, Total as PO4				6080	6330	mg/kg	4					
C302601	LCS	71789										
Phosphorus, Total as PO4			1.00		0.930	mg/kg		93	(73.0 - 122.)			
C302602	LCS DUP	71789										
Phosphorus, Total as PO4			1.00		0.980	mg/kg	5.2	98	(0.00 - 30.0)			
C302599	9508477-04MS	71789										
hosphorus, Total as PO4			3960	6080	5150	mg/kg		-23.5**	(70.0 - 130.)			

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Sample/Parameter	Type	Batch	NOM	Sample	QC	Units	RPD%	REC%	Range	Analyst	Date	Time
Radiological												
QC301975	BLANK	71661										
Total Uranium					0.00	ug/l				PCW	09/13/95	1021
Accuracy, Total Uranium					0.00	ug/l						
QC302938	BLANK	71863										
Total Uranium					0.00	ug/g				PCW	09/13/95	0827
Accuracy, Total Uranium					0.00	ug/g						
QC301976 9508477-24DUP		71661										
Total Uranium				1270	1230	ug/l	3.2			PCW	09/13/95	1023
Accuracy, Total Uranium				40.8	39.5	ug/l	3.2					
QC302939 9508477-04DUP		71863										
Total Uranium				14200	15000	ug/g	5.5			PCW	09/13/95	0811
Accuracy, Total Uranium				455	480	ug/g	5.3					
QC301978	LCS	71661										
Total Uranium			20.0		20.1	ug/l		100.5	(75.0 - 125.)	PCW	09/13/95	1028
Accuracy, Total Uranium					0.218	ug/l						
QC302941	LCS	71863										
Total Uranium			1.00		1.01	ug/g		101	(75.0 - 125.)	PCW	09/13/95	0824
Accuracy, Total Uranium					0.0108	ug/g						
QC301977 9508477-24MS		71661										
Total Uranium			300	1270	1620	ug/l		116.7		PCW	09/13/95	1026
Accuracy, Total Uranium				40.8	52.2	ug/l						
QC302940 9508477-04MS		71863										
Total Uranium			21.8	14200	14200	ug/g		0**	(75.0 - 125.)	PCW	09/13/95	0812
Accuracy, Total Uranium				455	455	ug/g						

APPENDIX K

RESUME`

PREPARER OF WASTEFORM SAMPLING PLAN

AND

DELISTING PETITION AUTHOR

BLANK

VITA

NAME: John B. Pickett

BIRTHPLACE: Madison, Davidson County, Tennessee

MARRIED: 1 child

EDUCATION: B.A., 1962. Chemistry, Vanderbilt University, Nashville, TN.

Ph.D., 1970. Inorganic Chemistry, University of Georgia, Athens, GA. Thesis Title: "An ESR, NMR, UV-Visible Spectroscopic Investigation of Unsaturated Organosilicon Radical Anions and Dianions".

WORK EXPERIENCE

•4/89-10/00 Westinghouse Savannah River Company, Aiken, SC. Hazardous and nuclear waste management, environmental remediation, wastewater treatment and operations support, vitrification of mixed wastes, RCRA and CWA regulatory compliance, acute and chronic toxicity studies, subcontract management, and remediation of hazardous and radioactive waste disposal sites.

•9/77-3/89 E. I. du Pont de Nemours and Company, Savannah River Plant, Aiken, SC. Nuclear fuel reprocessing, nuclear waste management, and environmental activities.

•10/69-8/77 E. I. du Pont de Nemours and Company, Chattanooga, TN. Textile fibers production, research and development.

•6/62-9/64 E. I. du Pont de Nemours and Company, Chattanooga, TN. Textile fibers.

SUMMARY

As a Principal Technical Advisor, Dr. Pickett is currently associated with environmental and regulatory activities in the Facilities Disposition Division (FDD), Engineering Department at the Savannah River Site. His specialties include uranium chemistry, (precipitation, wastewater treatment, and biological toxicity), regulatory compliance (RCRA and CWA), and waste treatment (including cementatious stabilization and vitrification). His fields of competence include process chemistry, waste minimization, effluent treatment, groundwater monitoring, treatment, and remediation, characterization of hazardous waste sites and solid waste management units, RCRA closure plan development and closure of hazardous/radioactive (mixed) waste surface impoundments, delisting of hazardous and mixed wastes, RCRA Part B Permits (preparation and modification), RCRA regulatory compliance, NPDES guidelines, ecological studies on receiving streams, whole effluent toxicity studies, and subcontract procurement and contract management.

He has demonstrated the vision and ability to define and implement innovative and cost effective approaches to the management and remediation of radioactive, hazardous, and mixed wastes. His experience includes all aspects of complex program management; including technical process definition, comparative cost studies, program planning, safety documentation, NEPA compliance, state and federal regulatory permits, and compliance with DOE orders and standards.

KEY ACCOMPLISHMENTS AND PROJECTS (1977-1997)

- Dr. Pickett and a co-worker (H. Lee Martin), conceived of a privatization approach in 1991 for the stabilization of a radioactive and hazardous (mixed) waste remaining from nuclear weapons production programs in the site's M-Area. The privatization approach involved preparing Life-Cycle-Cost studies, convincing Westinghouse and Department of Energy Management of the cost effectiveness of the proposal, and obtaining concurrence from the U.S. Environmental Protection Agency (Region IV) for the new approach. He was the primary author on the contract specifications and Scope of Work, and led the contract evaluation team. He also contributed to the M-Area sludge treatability studies included with the Request for Proposals, which were critical to obtaining private company responses. He contributed to the National Environmental Protection Act (NEPA) documentation, and was a key member of a site wide team which conducted a critical Technical Review of the subcontractor's proposed process. He was the Subcontract Technical Representative from 11/93 to 7/96, and kept the project on schedule and under the SRS budget. His vision, planning, teamwork, technical competence, and persuasiveness led to one of the first successful large scale privatizations of mixed waste treatment in the DOE complex.

- He has recently made a substantial contribution to the process control model used for the SRS Defense Waste Processing Facility (DWPF). He is a co-author of a revised theoretical model which allows control of the high level radioactive waste vitrification process such that the final vitrified product will meet the wasteform durability requirements. He included a basic understanding of the dissolution chemistry of the vitrified waste in the revised model, which allows the control of the vitrification process based on only thermodynamic first principals. An independent review board stated that the revised model was "state of the art" with respect to predicting the durability of vitrified materials. He has studied the effects of various glass formulations on durability and leaching.

- He has conducted comparative cost studies on the treatment and stabilization of mixed and radioactive wastes. The studies included the technical viability of all viable options, and the costs of regulatory permitting, safety documentation, waste treatment, and final treated waste disposal. These cost studies allowed the selection of the most cost effective option for various SRS waste streams.

- He is a site expert in the RCRA Land Disposal Restrictions, RCRA waste characterization, and RCRA interim status and final permit preparation and RCRA compliance. He assisted the site in preparing the Approved Site Treatment Plan in 1995 for mixed wastes, which was a requirement of the Federal Facilities Compliance Act of 1992. He provided regulatory compliance support to the personnel in M-Area from 1990 to 1996, which contributed to a record of no RCRA regulatory non-compliances in M-Area during that period.

- Chemical experiments that he conducted in 1982-1984 on the precipitation and removal of dissolved uranium (and other metallic constituents) from the M-Area plating line wastewaters led to the ability to conform with the requirement's of the site's NPDES permit for the M-Area Liquid Effluent Treatment Facility (an industrial Wastewater Treatment Facility). The uranium chemistry studies also led to treatment of the supernatant associated with the plating line sludges in 1990 to 1994. The reduction in volume of the total amount of waste to be eventually stabilized saved over $2.5 million in treatment and disposal costs.

- In 1988-1991 he prepared and submitted to the U. S. Environmental Protection Agency (EPA), the first delisting petition in the DOE complex for a mixed (radioactive/hazardous) waste. He also contributed to the first delisting petition for a stabilized (cement based) mixed waste (prepared by SRTC). Both delisting petitions were subsequently withdrawn, due to changes in the EPA's drinking

water Maximum Concentration Limits (MCL's). He used the experience gained to submit the DOE's first "Upfront" delisting petition for a vitrified mixed waste to the EPA in 1996.

- In 1989-90, he contracted an independent consulting laboratory to determine the acute and chronic toxicity of various uranium compounds in the site's receiving waters. This led to defining the uranium discharge concentrations which would not affect the instream biological community, and provided a basis for negotiating the site's NPDES permit.

- He conducted a series of biological studies on the receiving stream for the M-Area wastewater effluents, from 1987 through 1992. These studies indicated that the treated wastewater effluent releases were not having any significant deleterious affects on the instream biological community.

- He conducted the first demonstration of vacuum extraction of chlorinated solvents from the vadose zone at the Savannah River Site in 1987.

- In 1985 through 1988 he provided consultation to the team designing and operating the groundwater remediation facilities treating the contaminated groundwater, which resulted from solvent discharges to the M-Area Settling Basin. He defined monitoring and remediation well locations and sampling schedules which would allow both minimum sampling and analysis costs and ensure compliance with the RCRA remediation permit. He defined the type and extent of inorganic contamination in the groundwater plume(s), and used the results to obtain a 1987 modification to the site's Hazardous Waste Management Permit for the M-Area Basin groundwater program.

He was a main author of a number Environmental Information Documents which supported the SRS Groundwater Management Environmental Impact Statement. He assisted in modifying an existing radionuclide transport code (PATHRAE) to include chemical constituents, and helped in validating the revised model.

- In 1984-85 he was the Project Manager for an extensive characterization of the soils, sludges, and waters associated with the M-Area Settling basin, utilizing outside environmental consulting and sampling organizations. This was the first in-depth characterization of a hazardous and radioactive waste disposal site at the Savannah River site. The characterization was the basis for a RCRA interim status closure plan for the M-Area surface impoundment (as a landfill). The precedent established by the successful closure plan for the M-Area basin led to other similar closures of seepage and settling basins (F, H, and Metallurgical Laboratory) at the Savannah River Site.

- Between 1982 and 1984 he conducted numerous bench scale analyses on the dissolution of uranium and uranium oxides. These results were used to design a new Uranium Recovery Facility for M-Area. He characterized the uranium precipitates from the production of slightly enriched uranium targets, and demonstrated that they could not be pyrophoric, by using X-Ray diffraction to determine the oxidation state of the uranium oxide.

- In 1982 he studied an alternative approach to solidifying the treated HLW salt-supernate. The approach involved additional removal of cesium and technetium remaining in the salt-supernate (after tetra phenyl boron precipitation). The alternative was not selected due to the high cost of the additional decontamination.

- In 1979-81 he studied alternatives to vitrifying the SRS High Level Waste. This involved preparing surrogate HLW wastes (nominal, high aluminum, and high iron), and transmitting samples to each of the outside laboratories who were testing the alternatives. He designed and built a small scale spray calciner, which was intended to test actual SRS waste in the SRTC High Level Caves. He was the contract monitor for the Rockwell International and Lawrence Livermore Laboratory test

programs. The program was canceled when the SRS decided that the vitrification approach (DWPF) was the most technically advanced and cost effective approach.

• From 1977 to 1979 he studied the treatment and reprocessing of thorium based fuels in the SRTC High Level Caves. The objective of the program was to support the Carter Adminstration's desires to define proliferation resistant fuel cycles. During the study the determined the ability of mixed uranium and thorium fuel pellets to be oxidized and then dissolved. The program was canceled when the administration decided not to reprocess any commercial nuclear fuels.

AWARDS

George Westinghouse **Corporate** Signature Award, 6/97 (Vitrification of Mixed Wastes)

Reactors Division Total Quality (TQ) Award, 9/94 (Permit for M-Area Vendor)
ESH&Q Division TQ Award, 7/94 (LDR FFCA Bridging Agreement)

Westinghouse Patent Disclosure Innovation Award, 9/93; "Method for Treating Materials for Solidification"
EPD Environmental Awareness Awards, 1993 (Conceptual Site Treatment Plan and Interim Mixed Waste Inventory Report)

George Westinghouse Site Signature Award, 3/92 (New Approach for M-Area Waste Treatment)

BS&F-Division TQ Award 3/91
Reactor Materials-Department TQ Award 3/91
George Westinghouse **Corporate** Signature Award 4/91 (Stabilization of Hazardous Waste)

George Westinghouse Site Signature Award 3/90, (M-Area Basin Closure)
SRL Division TQ award 11/90
Waste Minimization Recognition 8/90
ESH&Q-Site TQ Award 11/90

PATENTS

Applied
July, 1998 Low Melting Lithia Glass Compositions and Methods

Granted:
#5,434,333; July 18, 1995. "Method for Treating Materials for Solidification"
#5,273,661; December 28, 1993. "Method for Treating Aqueous Wastes"
#5, 846,278; December 9, 1998, "Method of Determining Glass Durability"

MEMBERSHIPS

American Chemical Society (current)
ASTM (current, C-26 and D-34 committees)
American Ceramics Society (current, Nuclear Division)
American Nuclear Society (past)

OUTSIDE PUBLICATIONS

- C. M. Jantzen, K. G. Brown, J. B. Pickett, and T. B. Edwards, "Statistical Process Control for Vitrification of Waste Glasses Using Compositional - Property Relationships", **Invited Presentation at American Nuclear Society Special Session,** 6/1-5/97, Orlando, FL.

- S. W. Norford and J. B. Pickett, "M-Area Vendor Treatment Facility", **Presentation at the AICHE Spring National Meeting**, 3/9-13/97, Houston, TX.

- C. M. Jantzen, J. C. Whitehouse, M. E. Smith, J. B. Pickett, W. G. Ramsey, and D. K. Peeler "Waste Vitrification Projects Throughout the U. S. Initiated at the Savannah River Site", **Presentation at American Ceramic Society Fall Meeting,** 10/30-11/2/96, San Antonio, TX,

- R. E. Hottel, J. B. Pickett, J. R. Kosko, and L. D. MacLean, "Privatization of Waste Management Programs at the Savannah River Site", **Presentation at Waste Management '96 Conference, Tucson AZ, 2/25-2/29/96,** University of Arizona, Tucson, AZ.

- C. M. Jantzen, J. B. Pickett, D. K. Peeler, and T. M. Gilliam, "Transportable Vitrification System (TVS) Support; Laboratory and Pilot Scale Treatability Studies with Real Waste", **Presentation at Waste Management '96 Conference, Tucson AZ, 2/25-2/29/96,** University of Arizona, Tucson, AZ.

- D. G. Poulos, J. B. Pickett, and C. M. Jantzen, "Upfront Delisting Petition of Vitrified F006 Mixed Waste", **Presentation at Waste Management '95 Conference, Tucson AZ, 2/26-3/2/95,** University of Arizona, Tucson, AZ.

- C. M. Jantzen, J. B. Pickett, W. G. Ramsey and D. C. Beam, 1994. "Treatability Studies on Mixed (Radioactive and Hazardous) M-Area F006 Sludge; Vitrification via the Reactive Additive Stabilization Process (RASP)", **Proceedings of International Topical Meeting on Nuclear and Hazardous Waste Management SPECTRUM '94, 8/14-18/94,** American Nuclear Society, La Grange Park, IL 60525.

- J. B. Pickett, J. C. Musall, A. F. Hayes, and E. A. Campbell, "Novel Procurement Concepts Utilized to Award Subcontract for Vitrification of an F006 Mixed Waste Sludge", 1994. **Proceedings of International Topical Meeting on Nuclear and Hazardous Waste Management SPECTRUM '94, 8/14-18/94,** American Nuclear Society, La Grange Park, IL 60525.

- C. M. Jantzen and J. B. Pickett, "Mixed Wastes Solidified in Glass; Analytic Techniques and Tools", 1994. **Presentation at the Canadian Society of Chemistry, Winnipeg, Canada, 5/29-5/2/94,** University of Manitoba, Winnipeg, MB R3T 2N2.

- J. B. Pickett, J. C. Musall, and H. L. Martin, "Treatment and Disposal of a Mixed Waste Plating Line Sludge at the Savannah River Site", 1993. **Proceedings of the Second International Mixed Waste Symposium, 9/17-20/1993,** A. A. Moghissi, R. K. Blauvelt, G. A. Benda, and N. E Rothermich, (Eds), University of Maryland, Baltimore, MD.

- J. B. Pickett, G. A. Diener, S. J. Carroll, and J. M. Steingard, "Treatment of Mixed F006 Contaminated Material to Meet the New EPA Debris Rule at the Savannah River Site", 1993. **Proceedings of the Second International Mixed Waste Symposium, 9/17-20/1993,** A. A. Moghissi, R. K. Blauvelt, G. A. Benda, and N. E Rothermich, (Eds), University of Maryland, Baltimore, MD.

- C. M. Jantzen, J. B. Pickett, and W. G. Ramsey, 1993. "Reactive Additive Stabilization Process for Hazardous and Mixed Waste Vitrification", 1993. **Proceedings of the Second International Mixed Waste Symposium, 9/17-20/1993,** A. A. Moghissi, R. K. Blauvelt, G. A. Benda, and N. E Rothermich, (Eds), University of Maryland, Baltimore, MD.

- J. B. Pickett, J. L. England, and H. L. Martin, 1993. "Life Cycle Cost Analysis Changes Mixed Waste Treatment Program at the Savannah River Site", 1993. **Proceedings of the Federal Environmental Restoration Conference, May 25-27, 1993,** WSRC-MS-92-346, Rev. 1, Westinghouse Savannah River Co. Aiken, SC 29808.

- C. M. Jantzen, J. B. Pickett, and W. G. Ramsey, 1993. "Reactive Additive Stabilization Process (RASP) for Vitrification of Hazardous and Mixed Waste", **Proceedings of American Ceramic Society Symposium on Nuclear and Hazardous Waste Disposal, April 1993,** WSRC-MS-93-121, Westinghouse Savannah River Co. Aiken, SC 29808.

- C. M. Jantzen, J. B. Pickett, and W. G. Ramsey, 1992. "Glassification of Hazardous and Mixed Wastes", **Proceedings of American Chemical Society Symposium on Emerging Technologies for Hazardous Waste Management, 9/21-23-92**, WSRC-MS-92-261, Westinghouse Savannah River Co. Aiken, SC 29808.

- H. L. Martin, J. B. Pickett, and C. A. Langton, 1991. "Radioactive and Hazardous Wastewater Treatment and Sludge Stabilization by Filtration", **American Filtration Society 1991 Annual Meeting,** WSRC-MS-91-235, Westinghouse Savannah River Co. Aiken, SC.

- D. A. Jackson, L. F. Boone, W. P. Colven, J. B. Pickett, and J. D. Bauer, 1989. "Planning an Environmental Restoration: Closing the Mixed Waste Settling Basin at the Savannah River Plant". **Waste Management '89, Tucson, Ariz.**, DOE/SR-1003, U. S. Department of Energy, Savannah River Plant, Aiken, SC.

- C. M. King, W. L. Marter, B. B. Looney, J. B. Pickett, J. E. Till, K. R. Meyer, G. C. Merrel, V. C. Rogers, G. A. Holton, and D. F. Montague, 1988. "Performance Assessment Methods For Mixed Waste Sites At the Savannah River Plant"; **Proceedings of the Ninth Annual DOE Low-Level Radioactive Waste Management Conference, August, 1987, Vol. III**, EG&G Idaho, Inc., Idaho Falls, Idaho.

- W. P. Colven, J. B. Pickett, and L. P. Fernandez, 1985. DP-MS-85-49, "Development of a Closure Plan for a Hazardous Waste Surface Impoundment". **Proceedings of the Sixth Annual Meeting of the Society of Environment Toxicology and Chemistry**, November, 1985.

- J. B. Pickett, 1985. "Improved Uranium Recovery From the Process Streams In an Electroplating Facility"; **Scientific Basis for Nuclear Waste Management VIII**, C. M. Jantzen, et. al., editors. Material Research Society, Pittsburgh, Pa.

- J. B. Pickett and J. S. Allender, 1984. "Effect of Spray Calcination Conditions on Synroc-D Crystalline Phases"; **Advances in Ceramics, Volume 8, Nuclear Waste Management**, G. G. Wicks and W. A. Ross (editors). The American Ceramic Society, Columbus, Ohio.

- J. B. Pickett, 1980. "Hot Cell Studies of Tritium Removal From and Dissolution of an Irradiated Thoria Fuel"; **National Topical Meeting on Nuclear Fuel Cycles for the Eighties, Summaries of Proceedings**. CONF-800934, U. S. Dept. of Energy.

The data in Appendix L (TLCP analyses on final vitrified glass) was supplied to WSRC as a part of the subcontract between WSRC and GTS Duratek. The TCLP data for each "batch" are summarized in Table 24 of the main document. During discussions with Dr. Sophianopoulos of the EPA Region IV staff, she informed WSRC that inclusion of the TCLP laboratory reports in the Delisting report would be desirable. Since the analyses were conducted over a two year period, WSRC did not request Duratek or the General Engineering Laboratory to provide resume's of the laboratory technicians. For the final confirmatory analyses (given in Appendix M), the techician's resume's are included.

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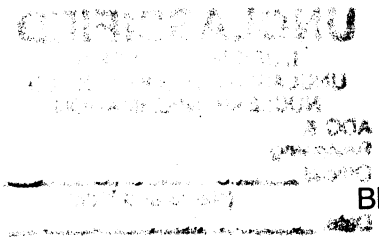
ADC &
Reviewing
Official _____
(Name and Title)
Date: 29 March 2001



Blank

DURATEK
10100 Old Columbia Road
Columbia, Maryland 21046
410/312-5100 Fax 410/290-9070

L-99-028

May 28, 1999

Mr. Dan Bills
Subcontract Technical Representative
Westinghouse Savannah River Company
Building 730-M
Aiken, SC 29802

Final Wasteform Treatment Standards and Acceptance Criteria

Dear Mr. Bills:

GTS Duratek has completed sampling and analysis of the final wasteform, "Surrogate Batch" and "Paint Filter Test", on glass gems from drums 2862, 2863, 2864, 2883, and 2884. The results of the analysis, including the analysis technique, is attached for your review. The analysis was performed by General Engineering Laboratories, a State of South Carolina certified lab, and verified by Mr. Innocent Joseph, Manager of Technology, GTS Duratek.

Results of the analysis indicate Batch "Surrogate" is within the contractual specifications. A total of 22 drums of glass were produced. Should you have any questions, please contact Innocent Joseph or myself.

Sincerely,

GTS DURATEK

Tom Huck
Facility Operations Manager

TH/vb
attachment

cc: S. Campbell
C. Coker
M. Spainhour

GTS DURATEK
10100 Old Columbia Road
Columbia, Maryland 21046
410/312-5100 Fax 410/290-9070

May 24, 1999

Dr. James Pope
General Manager
Vendor Treatment Facility (M-area)
GTS Duratek
WSRC/USDOE Savannah River Site
Aiken, SC 29801

Dear Dr. Pope:

Please find enclosed the results of the "TCLP" and 'Paint Filter Test" on glass gems from drums 2862, 2863, 2864, 2883, and 2884. The test were performed according to methods specified in the "Sampling Plan" for GTS Duratek's Vendor Treatment Facility at the Savannah River site. 1-tailed t-tests were performed on the TCLP data, and the upper acceptance limits for 95% confidence were calculated. The TCLP values are well below the upper acceptance limits for 95% confidence. All of the samples passed the "Paint Filter Test." The glass produced during the turnover of the melter composition have therefore met all of the acceptance criteria for the glass product.

The calculations for sample means, variances, upper acceptance limits for 95% confidence, data sheets from General Engineering Laboratories, and samples chain of custody record are enclosed. If you have any questions, please contact me at (410) 312-5120.

Sincerely

Innocent Joseph
Manager, Technology
GTS Duratek

cc: B. Bowan
G. Hildebrandt
C. Coker

Samples of the glass produced during the turnover of the melter composition at the GTS Duratek M-area facility were subjected to "paint filter test" for free water, and "TCLP" for leaching characteristics at General Engineering Laboratories, a South Carolina licensed laboratory. The "paint filter test" and the "TCLP" were done according to EPA procedures 9095 and 1311, respectively. Please find enclosed the results for glass samples from drums 2862 to 2884. The results of the tests are summarized below. 1-tailed t-tests were performed, and the upper limits for 95% confidence were calculated.

The TCLP values are below the acceptance limit for 95% confidence.

Table 1. Summary of TCLP results

Sample ID	Chromium (mg/L)	Nickel (mg/L)	Lead (mg/L)	Uranium (mg/L)	Nitrate (as N)	Paint filter test
GEM Drum # 2862	0.1060	0.9650	0.00	0.4680	0.00	Pass
GEM Drum # 2863	0.0420	0.0637	0.00	0.0737	0.00	Pass
GEM Drum # 2864	0.0232	0.0305	0.00	0.0456	0.00	Pass
GEM Drum # 2883	0.0123	0.0364	0.00	0.0551	0.0140	Pass
GEM Drum # 2884	0.0113	0.0352	0.00	0.0538	0.00	Pass

Student t-test

Number of samples = n = 5

Mean = $\bar{x} = \sum x_i / n$

Variance = $s^2 = \sum(x_i - \bar{x})^2 / (n-1)$

Degrees of freedom for n observations = n-1 = 4

From standard t-tables, the factor "z" for 95% confidence limit ($t_{0.95}$ or $\alpha_{0.05}$) for 4 degrees of freedom is 2.13.

Upper acceptance limit for 95% confidence for a 1-tailed t-test, at 4 degrees of freedom is:

$$\text{Acceptance limit} - (s \times 2.13)/n^{1/2}$$

Table 2. TCLP means, variances, and upper acceptance limits for 95% confidence.

Element	mean ($\bar{x}$)	Variance (s^2)	s	Acceptance limit (mg/L)	Upper acceptance limit for 95% confidence
Chromium	0.0390	0.00156	0.0395	0.86	0.8224
Nickel	0.2262	0.17076	0.4132	5.0	4.6064
Lead	0.00	0.00	0.00	0.37	0.37
Uranium	0.1392	0.03388	0.1841	4.0	3.8247

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STATE	GEL	EPI
FL	E87156/87294	E87472/87458
NC	233	
NJ	79002	79002
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

:c: GTSD00196 Report Date: May 20, 1999

Sample ID	: VTF-1793
Lab ID	: 9905464-01
Matrix	: TCLP
Date Collected	: 03/29/99
Date Received	: 05/13/99
Priority	: Routine
Collector	: Client

arameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
:tals Analysis											
hromium		106	5.98	30.0	ug/l	10.	AME	05/18/99	1541	149315	1
ickel		965	7.86	7.86	ug/l	10.					
:ad	U	ND	3.11	3.11	ug/l	10.					
ranium		468	0.251	2.00	ug/l	10.					
neral Chemistry											
itrogen, Nitrate	U	ND	0.0127	0.0500	mg/l	1.0	RWS	05/19/99	1505	149438	2

e following prep procedures were performed:

:P Mass Spec	AJM	05/17/99	1545	149315 3
:LP Prep for Metals	JJ	05/14/99	1430	149181 4

[= Method	Method-Description
:1	EPA 6020
:2	EPA 300.0
:3	EPA 3005
:4	EPA 1311

tes:
: qualifiers in this report are defined as follows:
) indicates that the analyte was not detected at a concentration greater than the detection limit.
ıdicates presence of analyte at a concentration less than the reporting limit (RL) and greater than the detection limit (DL).
ndicates that the analyte was not detected at a concentration greater than the detection limit.
ıdicates that a quality control analyte recovery is outside of specified acceptance criteria.

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9905464-01

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STATE	GEL	EPI
FL	E87156/87294	E87472/87458
NC	233	
NJ	79002	79002
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

cc: GTSD00196 Report Date: May 20, 1999

Sample ID : VTF-1793

M = Method **Method-Description**

This data report has been prepared and reviewed in accordance with General Engineering Laboratories standard operating procedures. Please direct any questions to your Project Manager, Jack Spitz at (843) 769-7390.

Reviewed By

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9905464-01

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Laboratory Certifications

STATE	GEL	EPI
FL	E87156/87294	E87472/87458
NC	233	
NJ	79002	79002
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

:c: GTSD00196 Report Date: May 20, 1999 Page 1 of 1

Sample ID	: VTF-1793
Lab ID	: 9905464-02
Matrix	: Misc.
Date Collected	: 03/29/99
Date Received	: 05/13/99
Priority	: Routine
Collector	: Client

arameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
neral Chemistry											
int Filter Test		Pass.					JEN	05/17/99	1545	149196	1

= Method	Method-Description
1	EPA 9095

tes:
e qualifiers in this report are defined as follows:
) indicates that the analyte was not detected at a concentration greater than the detection limit.
ıdicates presence of analyte at a concentration less than the reporting limit (RL) and greater than the detection limit (DL).
ndicates that the analyte was not detected at a concentration greater than the detection limit.
ıdicates that a quality control analyte recovery is outside of specified acceptance criteria.

is data report has been prepared and reviewed
ıccordance with General Engineering Laboratories
ndard operating procedures. Please direct
/ questions to your Project Manager, Jack Spitz at (843) 769-7390.

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STATE	GEL	EPI
FL	E87156/87294	E87472/87458
NC	233	
NJ	79002	79002
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

cc: GTSD00196 Report Date: May 20, 1999

Sample ID	: VTF-1794
Lab ID	: 9905464-03
Matrix	: TCLP
Date Collected	: 03/30/99
Date Received	: 05/13/99
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Metals Analysis											
Chromium		42.0	5.98	30.0	ug/l	10.	AME	05/18/99	1547	149315	1
Nickel		63.7	7.86	7.86	ug/l	10.					
Lead	U	ND	3.11	3.11	ug/l	10.					
Uranium		73.7	0.251	2.00	ug/l	10.					
General Chemistry											
Nitrogen, Nitrate	U	ND	0.0127	0.0500	mg/l	1.0	RWS	05/19/99	1545	149438	2

The following prep procedures were performed:

ICP Mass Spec	AJM	05/17/99	1545	149315 3
TCLP Prep for Metals	JJ	05/14/99	1430	149181 4

M = Method	Method-Description
M 1	EPA 6020
M 2	EPA 300.0
M 3	EPA 3005
M 4	EPA 1311

Notes:
The qualifiers in this report are defined as follows:
ND indicates that the analyte was not detected at a concentration greater than the detection limit.
J indicates presence of analyte at a concentration less than the reporting limit (RL) and greater than the detection limit (DL).
U indicates that the analyte was not detected at a concentration greater than the detection limit.
* indicates that a quality control analyte recovery is outside of specified acceptance criteria.

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STATE	GEL	EPI
FL	E87156/87294	E87472/87458
NC	233	
NJ	79002	79002
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

: GTSD00196 Report Date: May 20, 1999

Sample ID : VTF-1794

= Method | Method-Description

data report has been prepared and reviewed
:ordance with General Engineering Laboratories
lard operating procedures. Please direct
questions to your Project Manager, Jack Spitz at (843) 769-7390.

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STATE	GEL	EPI
FL	E87156/87294	E87472/87458
NC	233	
NJ	79002	79002
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

cc: GTSD00196 Report Date: May 20, 1999

Sample ID	: VTF-1794
Lab ID	: 9905464-04
Matrix	: Misc.
Date Collected	: 03/30/99
Date Received	: 05/13/99
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
General Chemistry											
Paint Filter Test		Pass.					JEN	05/17/99	1545	149196	1

M = Method	Method-Description
M 1	EPA 9095

Notes:
The qualifiers in this report are defined as follows:
ND indicates that the analyte was not detected at a concentration greater than the detection limit.
J indicates presence of analyte at a concentration less than the reporting limit (RL) and greater than the detection limit (DL).
U indicates that the analyte was not detected at a concentration greater than the detection limit.
* indicates that a quality control analyte recovery is outside of specified acceptance criteria.

This data report has been prepared and reviewed in accordance with General Engineering Laboratories standard operating procedures. Please direct any questions to your Project Manager, Jack Spitz at (843) 769-7390.

Reviewed By

9905464-04

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Laboratory Certifications

STATE	GEL	EPI
FL	E87156/87294	E87472/87458
NC	233	
NJ	79002	79002
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

c: GTSD00196 Report Date: May 20, 1999

Sample ID	: VTF-1795
Lab ID	: 9905464-05
Matrix	: TCLP
Date Collected	: 03/30/99
Date Received	: 05/13/99
Priority	: Routine
Collector	: Client

rameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
tals Analysis											
romium	J	23.2	5.98	30.0	ug/l	10.	AME	05/18/99	1610	149315	1
ckel		30.5	7.86	7.86	ug/l	10.					
ad	U	ND	3.11	3.11	ug/l	10.					
anium		45.6	0.251	2.00	ug/l	10.					
ieral Chemistry											
trogen, Nitrate	U	ND	0.0127	0.0500	mg/l	1.0	RWS	05/19/99	1559	149438	2

following prep procedures were performed:

P Mass Spec	AJM	05/17/99	1545	149315 3
LP Prep for Metals	JJ	05/14/99	1430	149181 4

= Method	Method-Description
1	EPA 6020
2	EPA 300.0
3	EPA 3005
4	EPA 1311

es:
qualifiers in this report are defined as follows:
indicates that the analyte was not detected at a concentration greater than the detection limit.
dicates presence of analyte at a concentration less than the reporting limit (RL) and greater than the detection limit (DL).
ıdicates that the analyte was not detected at a concentration greater than the detection limit.
dicates that a quality control analyte recovery is outside of specified acceptance criteria.

9905464 05

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NJ	79002	79002
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

cc: GTSD00196 Report Date: May 20, 1999

Sample ID : VTF-1795

M = Method **Method-Description**

This data report has been prepared and reviewed in accordance with General Engineering Laboratories standard operating procedures. Please direct any questions to your Project Manager, Jack Spitz at (843) 769-7390.

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SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

: GTSD00196 Report Date: May 20, 1999 Page 1 of 1

Sample ID	: VTF-1795
Lab ID	: 9905464-06
Matrix	: Misc.
Date Collected	: 03/30/99
Date Received	: 05/13/99
Priority	: Routine
Collector	: Client

ameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
eral Chemistry											
it Filter Test		Pass.					JEN	05/17/99	1545	149196	1

= Method	Method-Description
	EPA 9095

s:
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FL	E87156/87294	E87472/87458
NC	233	
NJ	79002	79002
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

cc: GTSD00196 Report Date: May 20, 1999

Sample ID	: VTF-1796
Lab ID	: 9905464-07
Matrix	: TCLP
Date Collected	: 04/18/99
Date Received	: 05/13/99
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Metals Analysis											
Chromium	J	12.3	5.98	30.0	ug/l	10.	AME	05/18/99	1616	149315	1
Nickel		36.4	7.86	7.86	ug/l	10.					
Lead	U	ND	3.11	3.11	ug/l	10.					
Uranium		55.1	0.251	2.00	ug/l	10.					
General Chemistry											
Nitrogen, Nitrate	J	0.0140	0.0127	0.0500	mg/l	1.0	RWS	05/19/99	1612	149438	2

The following prep procedures were performed:

ICP Mass Spec	AJM	05/17/99	1545	149315 3
TCLP Prep for Metals	JJ	05/14/99	1430	149181 4

M = Method	Method-Description
M 1	EPA 6020
M 2	EPA 300.0
M 3	EPA 3005
M 4	EPA 1311

Notes:
The qualifiers in this report are defined as follows:
ND indicates that the analyte was not detected at a concentration greater than the detection limit.
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U indicates that the analyte was not detected at a concentration greater than the detection limit.
* indicates that a quality control analyte recovery is outside of specified acceptance criteria.

9905464-07

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STATE	GEL	EPI
FL	E87156/87294	E87472/87458
NC	233	
NJ	79002	79002
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

: GTSD00196 Report Date: May 20, 1999 Page 2 of 2

Sample ID : VTF-1796

= Method **Method-Description**

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lard operating procedures. Please direct
questions to your Project Manager, Jack Spitz at (843) 769-7390.

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STATE	GEL	EPI
FL	E87156/87294	E87472/87458
NC	233	
NJ	79002	79002
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

cc: GTSD00196 Report Date: May 20, 1999

Sample ID	: VTF-1796
Lab ID	: 9905464-08
Matrix	: Misc.
Date Collected	: 04/18/99
Date Received	: 05/13/99
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
General Chemistry											
Paint Filter Test		Pass.					JEN	05/17/99	1545	149196	1

M = Method	Method-Description
M 1	EPA 9095

Notes:
The qualifiers in this report are defined as follows:
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FL	E87156/87294	E87472/87458
NC	233	
NJ	79002	79002
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

: GTSD00196 Report Date: May 20, 1999

Sample ID	: VTF-1797
Lab ID	: 9905464-09
Matrix	: TCLP
Date Collected	: 04/18/99
Date Received	: 05/13/99
Priority	: Routine
Collector	: Client

rameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
als Analysis											
romium	J	11.3	5.98	30.0	ug/l	10.	AME	05/18/99	1621	149315	1
:kel		35.2	7.86	7.86	ug/l	10.					
ıd	U	ND	3.11	3.11	ug/l	10.					
ınium		53.8	0.251	2.00	ug/l	10.					
ıeral Chemistry											
rogen, Nitrate	U	ND	0.0127	0.0500	mg/l	1.0	RWS	05/19/99	1625	149438	2

following prep procedures were performed:

? Mass Spec	AJM	05/17/99	1545	149315 3
LP Prep for Metals	JJ	05/14/99	1430	149181 4

= Method	Method-Description
1	EPA 6020
2	EPA 300.0
3	EPA 3005
4	EPA 1311

es:
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STATE	GEL	EPI
FL	E87156/87294	E87472/87458
NC	233	
NJ	79002	79002
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

cc: GTSD00196 Report Date: May 20, 1999

Sample ID : VTF-1797

M = Method	Method-Description

This data report has been prepared and reviewed in accordance with General Engineering Laboratories standard operating procedures. Please direct any questions to your Project Manager, Jack Spitz at (843) 769-7390.

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STATE	GEL	EPI
FL	E87156/87294	E87472/87458
NC	233	
NJ	79002	79002
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

: GTSD00196 Report Date: May 20, 1999 Page 1 of 1

Sample ID	: VTF-1797
Lab ID	: 9905464-10
Matrix	: Misc.
Date Collected	: 04/18/99
Date Received	: 05/13/99
Priority	: Routine
Collector	: Client

ameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
ɜral Chemistry											
ıt Filter Test		Pass.					JEN	05/17/99	1545	149196	1

: Method	Method-Description
	EPA 9095

s:
ıualifiers in this report are defined as follows:
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ıuestions to your Project Manager, Jack Spitz at (843) 769-7390.

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9905464-10

GTS DURATEK SHIPPING MANIFEST

M-Area Batch - Turnover Glass TCLP Samples RM-99-03

Q# 31771 : 1 : 2

SHIPMENT DESTINED TO	SAMPLE CONTAINER IDENTIFICATION		DATE/TIME OF PACKAGING		SAMPLE NET WEIGHT	SHIPPING CONTAINER/ CONTAINER GROSS WEIGHT	SEAL # (IF APPLICABLE)
General Engineering Laboratories	Sample#	Drum#			Grams	Grams	N/A
-01/-02	VTF-1793	2862	03/29/99	1700	526	630	
2040 Savage Rd. -03/-04	VTF-1794	2863	03/30/99	1400	398	502	
Chasn. SC 29414 -05/-06	VTF-1795	2864	03/30/99	1800	278	382	
-07/-08	VTF-1796	2883	04/18/99	0800	790	894	
-09/-10	VTF-1797	2884	04/18/99	1700	475	579	
	Shipping Container		N/A		7 lbs	12 lbs	

INFORMATION ONLY

Comments: Shipping Number SRS-16822

Relinquished by:	Date:	Time:	Received by:	Relinqished by:	Date:	Time:	Received by:
M. Spumhaus	5/12/99	0730	Kya P. B[illegible]				
Relinquished by:	Date:	Time:	Received by:	Relinqished by:	Date:	Time:	Received by:

C:\...\RCO\Shipping For

DURATEK

10100 Old Columbia Road
Columbia, Maryland 21046
410/312-5100 Fax 410/290-9070

L-99-012

April 13, 1999

Mr. Dan Bills

Subcontract Technical Representative
Westinghouse Savannah River Company
Building 730-M
Aiken, SC 29802

Final Wasteform Treatment Standards and Acceptance Criteria

Dear Mr. Bills:

GTS Duratek has completed sampling and analysis of the final wasteform, Batch #43, drums 2806, 2808, 2812, and the Batch containing the wastestream W-082, drums 2818 and 2820. The results of the analysis, including the analysis technique, is attached for your review. The analysis was performed by General Engineering Laboratories, a State of South Carolina certified lab, and verified by Mr. Innocent Joseph, Manager of Technology, GTS Duratek.

Results of the analysis indicate Batch #43 and wastestream W-082 are within the contractual specifications. A total of 85 drums of glass were produced. Should you have any questions, please contact Innocent Joseph or myself.

Sincerely,

GTS DURATEK

Jim L. Bunton
Facility Operations Manager

JLB/vb
attachment

cc: S. Campbell
C. Coker

DURATEK
10100 Old Columbia Road
Columbia, Maryland 21046
410/312-5100 Fax 410/290-9070

April 5, 1999

Dr. James Pope
General Manager
Vendor Treatment Facility (M-area)
GTS Duratek
WSRC/USDOE Savannah River Site
Aiken, SC 29801

Dear Dr. Pope:

Please find enclosed the results of the "TCLP" and 'Paint Filter Test" on glass gems from drums 2806, 2808, 2812, 2818, and 2820. The test were performed according to methods specified in the "Sampling Plan" for GTS Duratek's Vendor Treatment Facility at the Savannah River site. 1-tailed t-tests were performed on the TCLP data, and the upper acceptance limits for 95% confidence were calculated. The TCLP values are well below the upper acceptance limits for 95% confidence. All of the samples passed the "Paint Filter Test." The samples from Batch # 43 have therefore met all of the acceptance criteria for the glass product.

The calculations for sample means, variances, upper acceptance limits for 95% confidence, data sheets from General Engineering Laboratories, and samples chain of custody record are enclosed. If you have any questions, please contact me at (410) 312-5120.

Sincerely

Innocent Joseph

Innocent Joseph
Manager, Technology
GTS Duratek

cc: B. Bowan
G. Hildebrandt
C. Coker

The glass gems from batch 43, produced at the GTS Duratek M-area facility, were subjected to "paint filter test" for free water, and "TCLP" for leaching characteristics at General Engineering Laboratories, a South Carolina licensed laboratory. The "paint filter test" and the "TCLP" were done according to EPA procedures 9095 and 1311, respectively. Please find enclosed the results for glass samples from drums 2806 to 2820. The results of the tests are summarized below. 1-tailed t-tests were performed, and the upper limits for 95% confidence were calculated.

The TCLP values are below the acceptance limit for 95% confidence.

Table 1. Summary of TCLP results

Sample ID	Chromium (mg/L)	Nickel (mg/L)	Lead (mg/L)	Uranium (mg/L)	Nitrate (as N)	Paint filter test
GEM Drum # 2806	0.0171	0.0978	0.0135	0.363	0.0	Pass
GEM Drum # 2808	0.0163	0.0834	0.0057	0.320	0.0	Pass
GEM Drum # 2812	0.0175	0.0695	0.0035	0.192	0.02	Pass
GEM Drum # 2818	0.0139	0.0312	0.00	0.077	0.0	Pass
GEM Drum # 2820	0.0163	0.0617	0.0034	0.152	0.0	Pass

Student t-test

Number of samples = n = 5

Mean = $\bar{x} = \sum x_i / n$

Variance = $s^2 = \sum(x_i - \bar{x})^2 / (n-1)$

Degrees of freedom for n observations = n-1 = 4

From standard t-tables, the factor "z" for 95% confidence limit ($t_{0.95}$ or $\alpha_{0.05}$) for 4 degrees of freedom is 2.13.

Upper acceptance limit for 95% confidence for a 1-tailed t-test, at 4 degrees of freedom is:

$$\text{Acceptance limit} - (s \times 2.13)/n^{1/2}$$

Table 2. TCLP means, variances, and upper acceptance limits for 95% confidence.

Element	mean ($\bar{x}$)	Variance (s^2)	s	Acceptance limit (mg/L)	Upper acceptance limit for 95% confidence
Chromium	0.0162	1.95 E-6	0.0014	0.86	0.8587
Nickel	0.0687	0.00063	0.0251	5.0	4.9761
Lead	0.0052	2.55 E-5	0.0051	0.37	0.3652
Uranium	0.2209	0.01405	0.1186	4.0	3.8871

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SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

ɜTSD00196 Report Date: April 01, 1999

Sample ID	: VTF-1716 DRUM#2806
Lab ID	: 9903927-01
Matrix	: TCLP
Date Collected	: 01/28/99
Date Received	: 03/25/99
Priority	: Routine
Collector	: Client

neter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Analysis											
nium		17.1	2.99	15.0	ug/l	5.0	AME	03/31/99	1407	145665	1
l		97.8	3.93	3.93	ug/l	5.0					
		13.5	1.55	1.55	ug/l	5.0					
ım		363	0.126	1.00	ug/l	5.0					
al Chemistry											
;en, Nitrate	U	ND	0.0127	0.0500	mg/l	1.0	RWS	03/30/99	1533	145497	2

llowing prep procedures were performed:

lass Spec	AJM	03/30/99	1700	145665 3
Prep for Metals	JJ	03/29/99	1720	145549 4

Method	Method-Description
	EPA 6020
	EPA 300.0
	EPA 3005
	EPA 1311

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STATE	GEL	EPI
FL	E87156/87294	E87472/87458
NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

cc: GTSD00196 Report Date: April 01, 1999

Sample ID : VTF-1716 DRUM#2806

M = Method	Method-Description

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FL	E87156/87294	E87472/87458
NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

GTSD00196 Report Date: April 01, 1999 Page 1 of 1

Sample ID	: VTF-1716 DRUM#2806
Lab ID	: 9903927-02
Matrix	: Misc.
Date Collected	: 01/28/99
Date Received	: 03/25/99
Priority	: Routine
Collector	: Client

meter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
ral Chemistry											
: Filter Test		Pass.					ERH	03/26/99	1537	145452	1

Method	Method-Description
	EPA 9095

:

ualifiers in this report are defined as follows:
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STATE	GEL	EPI
FL	E87156/87294	E87472/87458
NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

cc: GTSD00196 Report Date: April 01, 1999

Sample ID	: VTF-1726 DRUM#2808
Lab ID	: 9903927-03
Matrix	: TCLP
Date Collected	: 02/01/99
Date Received	: 03/25/99
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Metals Analysis											
Chromium		16.3	2.99	15.0	ug/l	5.0	AME	03/31/99	1414	145665	1
Nickel		83.4	3.93	3.93	ug/l	5.0					
Lead		5.72	1.55	1.55	ug/l	5.0					
Uranium		320	0.126	1.00	ug/l	5.0					
General Chemistry											
Nitrogen, Nitrate	U	ND	0.0127	0.0500	mg/l	1.0	RWS	03/30/99	1615	145497	2

The following prep procedures were performed:

ICP Mass Spec	AJM	03/30/99	1700	145665	3
TCLP Prep for Metals	JJ	03/29/99	1720	145549	4

M = Method	Method-Description
M 1	EPA 6020
M 2	EPA 300.0
M 3	EPA 3005
M 4	EPA 1311

Notes:
The qualifiers in this report are defined as follows:
ND indicates that the analyte was not detected at a concentration greater than the detection limit.
J indicates presence of analyte at a concentration less than the reporting limit (RL) and greater than the detection limit (DL).
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* indicates that a quality control analyte recovery is outside of specified acceptance criteria.

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9903927-03

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STATE	GEL	EPI
FL	E87156/87294	E87472/87458
NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

TSD00196 Report Date: April 01, 1999

Sample ID : VTF-1726 DRUM#2808

Method	Method-Description

ta report has been prepared and reviewed
rdance with General Engineering Laboratories
d operating procedures. Please direct
stions to your Project Manager, Jack Spitz at (843) 769-7390.

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STATE	GEL	EPI
FL	E87156/87294	E87472/87458
NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

cc: GTSD00196 Report Date: April 01, 1999

Sample ID	: VTF-1726 DRUM#2808
Lab ID	: 9903927-04
Matrix	: Misc.
Date Collected	: 02/01/99
Date Received	: 03/25/99
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
General Chemistry											
Paint Filter Test		Pass.					ERH	03/26/99	1537	145452	1

M = Method	Method-Description
M 1	EPA 9095

Notes:
The qualifiers in this report are defined as follows:
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* indicates that a quality control analyte recovery is outside of specified acceptance criteria.

This data report has been prepared and reviewed in accordance with General Engineering Laboratories standard operating procedures. Please direct any questions to your Project Manager, Jack Spitz at (843) 769-7390.

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Laboratory Certifications

STATE	GEL	EPI
FL	E87156/87294	E87472/87458
NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

GTSD00196 Report Date: April 01, 1999

Sample ID	: VTF-1731 DRUM#2812
Lab ID	: 9903927-05
Matrix	: TCLP
Date Collected	: 02/06/99
Date Received	: 03/25/99
Priority	: Routine
Collector	: Client

ımeter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
ls Analysis											
ımium		17.5	2.99	15.0	ug/l	5.0	AME	03/31/99	1421	145665	1
el		69.5	3.93	3.93	ug/l	5.0					
l		3.53	1.55	1.55	ug/l	5.0					
ium		192	0.126	1.00	ug/l	5.0					
ral Chemistry											
ɔgen, Nitrate	J	0.0200	0.0127	0.0500	mg/l	1.0	RWS	03/30/99	1628	145497	2

ollowing prep procedures were performed:

Mass Spec	AJM	03/30/99	1700	145665 3
P Prep for Metals	JJ	03/29/99	1720	145549 4

Method	Method-Description
	EPA 6020
	EPA 300.0
	EPA 3005
	EPA 1311

ualifiers in this report are defined as follows:
ıdicates that the analyte was not detected at a concentration greater than the detection limit.
cates presence of analyte at a concentration less than the reporting limit (RL) and greater than the detection limit (DL).
icates that the analyte was not detected at a concentration greater than the detection limit.
cates that a quality control analyte recovery is outside of specified acceptance criteria.

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9903927-05

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STATE	GEL	EPI
FL	E87156/87294	E87472/87458
NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

cc: GTSD00196 Report Date: April 01, 1999

Sample ID : VTF-1731 DRUM#2812

M = Method	Method-Description

This data report has been prepared and reviewed in accordance with General Engineering Laboratories standard operating procedures. Please direct any questions to your Project Manager, Jack Spitz at (843) 769-7390.

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STATE	GEL	EPI
FL	E87156/87294	E87472/87458
NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

GTSD00196 Report Date: April 01, 1999 Page 1 of 1

Sample ID	: VTF-1731 DRUM#2812
Lab ID	: 9903927-06
Matrix	: Misc.
Date Collected	: 02/06/99
Date Received	: 03/25/99
Priority	: Routine
Collector	: Client

meter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
al Chemistry											
Filter Test		Pass.					ERH	03/26/99	1537	145452	1

Method	Method-Description
	EPA 9095

ıalifiers in this report are defined as follows:
dicates that the analyte was not detected at a concentration greater than the detection limit.
:ates presence of analyte at a concentration less than the reporting limit (RL) and greater than the detection limit (DL).
cates that the analyte was not detected at a concentration greater than the detection limit.
:ates that a quality control analyte recovery is outside of specified acceptance criteria.

ata report has been prepared and reviewed
ordance with General Engineering Laboratories
rd operating procedures. Please direct
ıestions to your Project Manager, Jack Spitz at (843) 769-7390.

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STATE	GEL	EPI
FL	E87156/87294	E87472/87458
NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

cc: GTSD00196 Report Date: April 01, 1999

Sample ID	: VTF-1738 DRUM#2818
Lab ID	: 9903927-07
Matrix	: TCLP
Date Collected	: 02/10/99
Date Received	: 03/25/99
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Metals Analysis											
Chromium	J	13.9	2.99	15.0	ug/l	5.0	AME	03/31/99	1428	145665	1
Nickel		31.2	3.93	3.93	ug/l	5.0					
Lead	U	ND	1.55	1.55	ug/l	5.0					
Uranium		77.3	0.126	1.00	ug/l	5.0					
General Chemistry											
Nitrogen, Nitrate	U	ND	0.0127	0.0500	mg/l	1.0	RWS	03/30/99	1642	145497	2

The following prep procedures were performed:

ICP Mass Spec	AJM	03/30/99	1700	145665 3
TCLP Prep for Metals	JJ	03/29/99	1720	145549 4

M = Method	Method-Description
M 1	EPA 6020
M 2	EPA 300.0
M 3	EPA 3005
M 4	EPA 1311

Notes:
The qualifiers in this report are defined as follows:
ND indicates that the analyte was not detected at a concentration greater than the detection limit.
J indicates presence of analyte at a concentration less than the reporting limit (RL) and greater than the detection limit (DL).
U indicates that the analyte was not detected at a concentration greater than the detection limit.
* indicates that a quality control analyte recovery is outside of specified acceptance criteria.

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STATE	GEL	EPI
FL	E87156/87294	E87472/87458
NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

GTSD00196 Report Date: April 01, 1999 Page 2 of 2

Sample ID : VTF-1738 DRUM#2818

Method	Method-Description

ata report has been prepared and reviewed
ordance with General Engineering Laboratories
rd operating procedures. Please direct
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NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

cc: GTSD00196 Report Date: April 01, 1999

Sample ID	: VTF-1738 DRUM#2818
Lab ID	: 9903927-08
Matrix	: Misc.
Date Collected	: 02/10/99
Date Received	: 03/25/99
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
General Chemistry											
Paint Filter Test		Pass.					ERH	03/26/99	1537	145452	1

M = Method	Method-Description
M 1	EPA 9095

Notes:
The qualifiers in this report are defined as follows:
ND indicates that the analyte was not detected at a concentration greater than the detection limit.
J indicates presence of analyte at a concentration less than the reporting limit (RL) and greater than the detection limit (DL).
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* indicates that a quality control analyte recovery is outside of specified acceptance criteria.

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FL	E87156/87294	E87472/87458
NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

GTSD00196 Report Date: April 01, 1999

Sample ID	: VTF-1750 DRUM#2820
Lab ID	: 9903927-09
Matrix	: TCLP
Date Collected	: 02/20/99
Date Received	: 03/25/99
Priority	: Routine
Collector	: Client

ımeter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
ls Analysis											
ımium		16.3	2.99	15.0	ug/l	5.0	AME	03/31/99	1456	145665	1
:el		61.7	3.93	3.93	ug/l	5.0					
l		3.43	1.55	1.55	ug/l	5.0					
ıium		152	0.126	1.00	ug/l	5.0					
ral Chemistry											
ɔgen, Nitrate	U	ND	0.0127	0.0500	mg/l	1.0	RWS	03/30/99	1656	145497	2

ollowing prep procedures were performed:

Mass Spec	AJM	03/30/99	1700	145665 3
.P Prep for Metals	JJ	03/29/99	1720	145549 4

Method	Method-Description
	EPA 6020
	EPA 300.0
	EPA 3005
	EPA 1311

s:
ualifiers in this report are defined as follows:
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NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

cc: GTSD00196 Report Date: April 01, 1999

Sample ID : VTF-1750 DRUM#2820

M = Method	Method-Description

This data report has been prepared and reviewed in accordance with General Engineering Laboratories standard operating procedures. Please direct any questions to your Project Manager, Jack Spitz at (843) 769-7390.

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NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

GTSD00196 Report Date: April 01, 1999 Page 1 of 1

Sample ID	: VTF-1750 DRUM#2820
Lab ID	: 9903927-10
Matrix	: Misc.
Date Collected	: 02/20/99
Date Received	: 03/25/99
Priority	: Routine
Collector	: Client

ameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
ral Chemistry											
t Filter Test		Pass.					ERH	03/26/99	1537	145452	1

Method	Method-Description
	EPA 9095

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ndicates that the analyte was not detected at a concentration greater than the detection limit.
cates presence of analyte at a concentration less than the reporting limit (RL) and greater than the detection limit (DL).
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data report has been prepared and reviewed
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ard operating procedures. Please direct
uestions to your Project Manager, Jack Spitz at (843) 769-7390.

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9903927-10

M-Area Batch #43 Glass TCLP Samples RM-99-02

9903927 %

SHIPMENT DESTINED TO	SAMPLE CONTAINER IDENTIFICATION		DATE/TIME OF PACKAGING		SAMPLE NET WEIGHT	SHIPPING CONTAINER/ CONTAINER GROSS WEIGHT	SEAL # (IF APPLICABLE)
General Engineering Laboratories 2040 Savage Rd. Chasn. SC 29414	Sample#	Drum#			Grams	Grams	N/A
	VTF-1716	2806	01/28/99	0000	319	359	
	VTF-1726	2808	02/01/99	0300	215	255	
	VTF-1731	2812	02/06/99	1500	265	305	
	VTF-1738	2818	02/10/99	1710	74	113	
	VTF-1750	2820	02/20/99	1515	259	299	
	Shipping Container		N/A		3 Lbs	9 Lbs	

INFORMATION ONLY

Comments: Shipping Number

Relinquished by:	Date:	Time:	Received by:	Relinquished by:	Date:	Time:	Received by:
Relinquished by	Date	Time:	Received by:	Relinquished by:	Date:	Time:	Received by:

3/25/99

C:\...\ARCO\Shipping Forms\

WSRC-TR-96-0244, Rev. 2; APPENDIX L, Page 42 of 694

DURATEK
10100 Old Columbia Road
Columbia, Maryland 21046
410/312-5100 Fax 410/290-9070

L-99-011

February 3, 1999

Mr. Dan Bills
Subcontract Technical Representative
Westinghouse Savannah River Company
Building 730-M
Aiken, SC 29802

Final Wasteform Treatment Standards and Acceptance Criteria

Dear Mr. Bills:

GTS Duratek has completed sampling and analysis of the final wasteform, Batch #42, drums 2724, 2726, 2728, 2730, and 2732. The results of the analysis, including the analysis technique, is attached for your review. The analysis was performed by General Engineering Laboratories, a State of South Carolina certified lab, and verified by Mr. Innocent Joseph, Manager of Technology, GTS Duratek.

Results of the analysis indicate Batch #42 is within the contractual specifications. A total of 36 drums of glass were produced for Batch #42. Should you have any questions, please contact Innocent Joseph or myself.

Sincerely,

GTS DURATEK

Jim L. Bunton
Facility Operations Manager

JLB/mlb
attachment

cc: S. Campbell
C. Coker

DURATEK

8955 Guilford Road, Suite 200
Columbia, Maryland 21046
410/312-5100 Fax 301/621-8211

February 1, 1999

Dr. James Pope
General Manager
Vendor Treatment Facility (M-area)
GTS Duratek
WSRC/USDOE Savannah River Site
Aiken, SC 29801

Dear Dr. Pope:

Please find enclosed the results of the "TCLP" and 'Paint Filter Test" on glass gems from drums 2724, 2726, 2728, 2730, 2732. The test were performed according to methods specified in the "Sampling Plan" for GTS Duratek's Vendor Treatment Facility at the Savannah River site. 1-tailed t-tests were performed on the TCLP data, and the upper acceptance limits for 95% confidence were calculated. The TCLP values are well below the upper acceptance limits for 95% confidence. All of the samples passed the "Paint Filter Test." The samples from Batch # 42 have therefore met all of the acceptance criteria for the glass product.

The calculations for sample means, variances, upper acceptance limits for 95% confidence, data sheets from General Engineering Laboratories, and samples chain of custody record are enclosed. If you have any questions, please contact me at (410) 309-1318.

Sincerely

Glenn Diener
M-Area Site Engineer
GTS Duratek

cc: B. Bowan
G. Hildebrandt
C. Coker

The glass gems from batch 42, produced at the GTS Duratek M-area facility, were subjected to "paint filter test" for free water, and "TCLP" for leaching characteristics at General Engineering Laboratories, a South Carolina licensed laboratory. The "paint filter test" and the "TCLP" were done according to EPA procedures 9095 and 1311, respectively. Please find enclosed the results for glass samples from drums 2724 to 2732. The results of the tests are summarized below. 1-tailed t-tests were performed, and the upper limits for 95% confidence were calculated.

The TCLP values are below the acceptance limit for 95% confidence.

Table 1. Summary of TCLP results

Sample ID	Chromium (mg/L)	Nickel (mg/L)	Lead (mg/L)	Uranium (mg/L)	Nitrate (as N)	Paint filter test
GEM Drum # 2724	0.0175	0.388	0.00659	1.260	0.0	Pass
GEM Drum # 2726	0.0187	0.352	0.00391	1.180	0.0	Pass
GEM Drum # 2728	0.0207	0.338	0.118	1.100	0.0	Pass
GEM Drum # 2730	0.0205	0.390	0.00435	1.280	0.0	Pass
GEM Drum # 2732	0.0225	0.357	0.0039	1.160	0.02	Pass

Student t-test

Number of samples = n = 5

Mean = $\bar{x} = \sum x_i / n$

Variance = $s^2 = \sum(x_i - \bar{x})^2 / (n-1)$

Degrees of freedom for n observations = n-1 = 4

From standard t-tables, the factor "z" for 95% confidence limit ($t_{0.95}$ or $\alpha_{0.05}$) for 4 degrees of freedom is 2.13.

Upper acceptance limit for 95% confidence for a 1-tailed t-test, at 4 degrees of freedom is:

$$\text{Acceptance limit} - (s \times 2.13)/n^{1/2}$$

Table 2. TCLP means, variances, and upper acceptance limits for 95% confidence.

Element	mean ($\bar{x}$)	Variance (s^2)	s	Acceptance limit (mg/L)	Upper acceptance limit for 95% confidence
Chromium	0.0200	3.72 E-6	0.0019	0.86	0.8582
Nickel	0.3650	0.00053	0.0230	5.0	4.9781
Lead	0.0275	0.00257	0.0507	0.37	0.3217
Uranium	1.1960	0.00548	0.0740	4.0	3.9295

4701558 1

SHIPMENT DESTINED TO	SAMPLE CONTAINER IDENTIFICATION		DATE/TIME OF PACKAGING		SAMPLE NET WEIGHT	SHIPPING CONTAINER/ CONTAINER GROSS WEIGHT	SEAL # (IF APPLICABLE)
General Engineering Laboratories 2040 Savage Rd. Chasn. SC 29414	Sample#	Drum#			Grams	Grams	N/A
	VTF-1669	2724	12/26/98	1500	228	266	
	VTF-1675	2726	12/27/98	2330	187	226	
	VTF-1690	2728	12/29/98	1745	144	183	
	VTF-1691	2730	12/31/98	2025	258	297	
	VTF-1692	2732	12/31/98	1500	267	306	
	Shipping Container		N/A		3 lbs	8 lbs	

Comments: Shipping Number

SRS-16628

INFORMATION ONLY

Relinquished by:	Date:	Time:	Received by:	Relinqished by:	Date:	Time:	Received by:
S Schubert	1-15-99	1330	B Franco		1/19/99		
Relinquished by:	Date:	Time:	Received by:	Relinqished by:	Date:	Time:	Received by:

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STATE	GEL	EPI
FL	E87156/87294	E87472/87458
NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

cc: GTSD00196 Report Date: January 28, 1999

Sample ID	: VTF-1669 #2724
Lab ID	: 9901558-01
Matrix	: TCLP
Date Collected	: 12/26/98
Date Received	: 01/19/99
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Metals Analysis											
Chromium		17.5	2.99	15.0	ug/l	5.0	AME	01/26/99	1245	140458	1
Nickel		388	3.93	3.93	ug/l	5.0					
Lead		6.59	1.55	1.55	ug/l	5.0					
Uranium		1260	0.126	1.00	ug/l	5.0					
General Chemistry											
Nitrogen, Nitrate	U	ND	0.0127	0.0500	mg/l	1.0	JLG	01/22/99	1358	140270	2

The following prep procedures were performed:

ICP Mass Spec	FGD	01/25/99	1500	140458 3
TCLP Prep for Metals	JL	01/20/99	2110	140191 4

M = Method	Method-Description
M 1	EPA 6020
M 2	EPA 300.0
M 3	EPA 3005
M 4	EPA 1311

Notes:
The qualifiers in this report are defined as follows:
ND indicates that the analyte was not detected at a concentration greater than the detection limit.
J indicates presence of analyte at a concentration less than the reporting limit (RL) and greater than the detection limit (DL).
U indicates that the analyte was not detected at a concentration greater than the detection limit.
* indicates that a quality control analyte recovery is outside of specified acceptance criteria.

9901558-01

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Laboratory Certifications

STATE	GEL	EPI
FL	E87156/87294	E87472/87458
NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

GTSD00196 Report Date: January 28, 1999

Sample ID : VTF-1669 #2724

Method	Method-Description

lata report has been prepared and reviewed
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ard operating procedures. Please direct
uestions to your Project Manager, Jack Spitz at (843) 769-7390.

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STATE	GEL	EPI
FL	E87156/87294	E87472/87458
NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

cc: GTSD00196

Report Date: January 29, 1999

Sample ID	: VTF-1669 #2724
Lab ID	: 9901558-02
Matrix	: TCLP.
Date Collected	: 12/26/98
Date Received	: 01/19/99
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
General Chemistry											
Paint Filter Test		Pass.					JEN	01/28/99	1230	140971	N

Notes:
The qualifiers in this report are defined as follows:
ND indicates that the analyte was not detected at a concentration greater than the detection limit.
J indicates presence of analyte at a concentration less than the reporting limit (RL) and greater than the detection limit (DL).
U indicates that the analyte was not detected at a concentration greater than the detection limit.
* indicates that a quality control analyte recovery is outside of specified acceptance criteria.

This data report has been prepared and reviewed in accordance with General Engineering Laboratories standard operating procedures. Please direct any questions to your Project Manager, Jack Spitz at (843) 769-7390.

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9901558-02

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STATE	GEL	EPI
FL	E87156/87294	E87472/87458
NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

GTSD00196 Report Date: January 28, 1999

Sample ID	: VTF-1675 #2726
Lab ID	: 9901558-03
Matrix	: TCLP
Date Collected	: 12/27/98
Date Received	: 01/19/99
Priority	: Routine
Collector	: Client

ameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
ıls Analysis											
omium		18.7	2.99	15.0	ug/l	5.0	AME	01/26/99	1252	140458	1
kel		352	3.93	3.93	ug/l	5.0					
d		3.91	1.55	1.55	ug/l	5.0					
nium		1180	0.126	1.00	ug/l	5.0					
ɛral Chemistry											
ʻogen, Nitrate	U	ND	0.0127	0.0500	mg/l	1.0	JLG	01/22/99	1506	140270	2

following prep procedures were performed:

Mass Spec	FGD	01/25/99	1500	140458 3
LP Prep for Metals	JL	01/20/99	2110	140191 4

= Method	Method-Description
	EPA 6020
	EPA 300.0
	EPA 3005
	EPA 1311

s:
qualifiers in this report are defined as follows:
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icates presence of analyte at a concentration less than the reporting limit (RL) and greater than the detection limit (DL).
licates that the analyte was not detected at a concentration greater than the detection limit.
licates that a quality control analyte recovery is outside of specified acceptance criteria.

9901558-03

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NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

cc: GTSD00196 Report Date: January 28, 1999

Sample ID : VTF-1675 #2726

M = Method	Method-Description

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Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

GTSD00196 Report Date: January 29, 1999 Page 1 of 1

Sample ID	: VTF-1675 #2726
Lab ID	: 9901558-04
Matrix	: TCLP.
Date Collected	: 12/27/98
Date Received	: 01/19/99
Priority	: Routine
Collector	: Client

ımeter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
ral Chemistry											
t Filter Test		Pass.					JEN	01/28/99	1230	140971	N

:

ualifiers in this report are defined as follows:
ıdicates that the analyte was not detected at a concentration greater than the detection limit.
cates presence of analyte at a concentration less than the reporting limit (RL) and greater than the detection limit (DL).
icates that the analyte was not detected at a concentration greater than the detection limit.
cates that a quality control analyte recovery is outside of specified acceptance criteria.

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NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

cc: GTSD00196 Report Date: January 28, 1999

Sample ID : VTF-1690 #2728
Lab ID : 9901558-05
Matrix : TCLP
Date Collected : 12/29/98
Date Received : 01/19/99
Priority : Routine
Collector : Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Metals Analysis											
Chromium		20.7	2.99	15.0	ug/l	5.0	AME	01/26/99	1300	140458	1
Nickel		338	3.93	3.93	ug/l	5.0					
Lead		118	1.55	1.55	ug/l	5.0					
Uranium		1100	0.126	1.00	ug/l	5.0					
General Chemistry											
Nitrogen, Nitrate	U	ND	0.0127	0.0500	mg/l	1.0	JLG	01/22/99	1520	140270	2

The following prep procedures were performed:

ICP Mass Spec	FGD	01/25/99	1500	140458 3
TCLP Prep for Metals	JL	01/20/99	2110	140191 4

M = Method	Method-Description
M 1	EPA 6020
M 2	EPA 300.0
M 3	EPA 3005
M 4	EPA 1311

Notes:
The qualifiers in this report are defined as follows:
ND indicates that the analyte was not detected at a concentration greater than the detection limit.
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U indicates that the analyte was not detected at a concentration greater than the detection limit.
* indicates that a quality control analyte recovery is outside of specified acceptance criteria.

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NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

GTSD00196 Report Date: January 28, 1999

Sample ID : VTF-1690 #2728

Method	Method-Description

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SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

cc: GTSD00196 Report Date: January 29, 1999 Page 1 of 1

Sample ID	: VTF-1690 #2728
Lab ID	: 9901558-06
Matrix	: TCLP.
Date Collected	: 12/29/98
Date Received	: 01/19/99
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
General Chemistry											
Paint Filter Test		Pass.					JEN	01/28/99	1230	140971	N

Notes:
The qualifiers in this report are defined as follows:
ND indicates that the analyte was not detected at a concentration greater than the detection limit.
J indicates presence of analyte at a concentration less than the reporting limit (RL) and greater than the detection limit (DL).
U indicates that the analyte was not detected at a concentration greater than the detection limit.
* indicates that a quality control analyte recovery is outside of specified acceptance criteria.

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Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

GTSD00196 Report Date: January 28, 1999

Sample ID	: VTF-1691 #2730
Lab ID	: 9901558-07
Matrix	: TCLP
Date Collected	: 12/31/98
Date Received	: 01/19/99
Priority	: Routine
Collector	: Client

ameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
ls Analysis											
omium		20.5	2.99	15.0	ug/l	5.0	AME	01/26/99	1336	140458	1
cel		390	3.93	3.93	ug/l	5.0					
l		4.35	1.55	1.55	ug/l	5.0					
ium		1280	0.126	1.00	ug/l	5.0					
ral Chemistry											
ogen, Nitrate	U	ND	0.0127	0.0500	mg/l	1.0	JLG	01/22/99	1533	140270	2

ollowing prep procedures were performed:

Mass Spec	FGD	01/25/99	1500	140458 3
P Prep for Metals	JL	01/20/99	2110	140191 4

Method	Method-Description
	EPA 6020
	EPA 300.0
	EPA 3005
	EPA 1311

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licates that the analyte was not detected at a concentration greater than the detection limit.
icates that a quality control analyte recovery is outside of specified acceptance criteria.

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STATE	GEL	EPI
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NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

cc: GTSD00196 Report Date: January 28, 1999

Sample ID : VTF-1691 #2730

M = Method	Method-Description

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Client: GTS Duratek
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Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

: GTSD00196 Report Date: January 29, 1999 Page 1 of 1

Sample ID	: VTF-1691 #2730
Lab ID	: 9901558-08
Matrix	: TCLP.
Date Collected	: 12/31/98
Date Received	: 01/19/99
Priority	: Routine
Collector	: Client

ameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
:ral Chemistry											
it Filter Test		Pass.					JEN	01/28/99	1230	140971	N

s:
qualifiers in this report are defined as follows:
ndicates that the analyte was not detected at a concentration greater than the detection limit.
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SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

cc: GTSD00196 Report Date: January 28, 1999

Sample ID : VTF-1692 #2732
Lab ID : 9901558-09
Matrix : TCLP
Date Collected : 12/31/98
Date Received : 01/19/99
Priority : Routine
Collector : Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Metals Analysis											
Chromium		22.5	2.99	15.0	ug/l	5.0	AME	01/26/99	1342	140458	1
Nickel		357	3.93	3.93	ug/l	5.0					
Lead		3.90	1.55	1.55	ug/l	5.0					
Uranium		1160	0.126	1.00	ug/l	5.0					
General Chemistry											
Nitrogen, Nitrate	J	0.0200	0.0127	0.0500	mg/l	1.0	JLG	01/22/99	1547	140270	2

The following prep procedures were performed:

ICP Mass Spec	FGD	01/25/99	1500	140458 3
TCLP Prep for Metals	JL	01/20/99	2110	140191 4

M = Method	Method-Description
M 1	EPA 6020
M 2	EPA 300.0
M 3	EPA 3005
M 4	EPA 1311

Notes:
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Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

GTSD00196 Report Date: January 28, 1999 Page 2 of 2

Sample ID : VTF-1692 #2732

Method	Method-Description

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SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

cc: GTSD00196

Report Date: January 29, 1999

Sample ID	: VTF-1692 #2732
Lab ID	: 9901558-10
Matrix	: TCLP.
Date Collected	: 12/31/98
Date Received	: 01/19/99
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
General Chemistry											
Paint Filter Test		Pass.					JEN	01/28/99	1230	140971	N

Notes:
The qualifiers in this report are defined as follows:
ND indicates that the analyte was not detected at a concentration greater than the detection limit.
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This data report has been prepared and reviewed in accordance with General Engineering Laboratories standard operating procedures. Please direct any questions to your Project Manager, Jack Spitz at (843) 769-7390.

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DURATEK
10100 Old Columbia Road
Columbia, Maryland 21046
410/312-5100 Fax 410/290-9070

L-99-009

January 25, 1999

Mr. Dan Bills
Subcontract Technical Representative
Westinghouse Savannah River Company
Building 730-M
Aiken, SC 29802

Final Wasteform Treatment Standards and Acceptance Criteria

Dear Mr. Bills:

GTS Duratek has completed sampling and analysis of the final wasteform, Batch #41, drums 2688, 2690, 2692, 2694, and 2696. The results of the analysis, including the analysis technique, is attached for your review. The analysis was performed by General Engineering Laboratories, a State of South Carolina certified lab, and verified by Mr. Innocent Joseph, Manager of Technology, GTS Duratek.

Results of the analysis indicate Batch #41 is within the contractual specifications. A total of 35 drums of glass were produced for Batch #41. Should you have any questions, please contact Innocent Joseph or myself.

Sincerely,

GTS DURATEK

Jim L. Bunton
Facility Operations Manager

JLB/mlb
attachment

cc: S. Campbell
C. Coker

DURATEK
10100 Old Columbia Road
Columbia, Maryland 21046
410/312-5100 Fax 410/290-9070

January 21, 1998

Dr. James Pope
General Manager
Vendor Treatment Facility (M-area)
GTS Duratek
WSRC/USDOE Savannah River Site
Aiken, SC 29801

Dear Dr. Pope:

Please find enclosed the results of the "TCLP" and 'Paint Filter Test" on glass gems from drums 2688, 2690, 2692, 2694, 2696. The test were performed according to methods specified in the "Sampling Plan" for GTS Duratek's Vendor Treatment Facility at the Savannah River site. 1-tailed t-tests were performed on the TCLP data, and the upper acceptance limits for 95% confidence were calculated. The TCLP values are well below the upper acceptance limits for 95% confidence. All of the samples passed the "Paint Filter Test." The samples from Batch # 41 have therefore met all of the acceptance criteria for the glass product.

The calculations for sample means, variances, upper acceptance limits for 95% confidence, data sheets from General Engineering Laboratories, and samples chain of custody record are enclosed. If you have any questions, please contact me at (410) 312-5120.

Sincerely

Innocent Joseph

Innocent Joseph
Manager, Technology
GTS Duratek

cc: B. Bowan
G. Hildebrandt
C. Coker

The glass gems from batch 41, produced at the GTS Duratek M-area facility, were subjected to "paint filter test" for free water, and "TCLP" for leaching characteristics at General Engineering Laboratories, a South Carolina licensed laboratory. The "paint filter test" and the "TCLP" were done according to EPA procedures 9095 and 1311, respectively. Please find enclosed the results for glass samples from drums 2688 to 2696. The results of the tests are summarized below. 1-tailed t-tests were performed, and the upper limits for 95% confidence were calculated.

The TCLP values are below the acceptance limit for 95% confidence.

Table 1. Summary of TCLP results

Sample ID	Chromium (mg/L)	Nickel (mg/L)	Lead (mg/L)	Uranium (mg/L)	Nitrate (as N)	Paint filter test
GEM Drum # 2688	0.0074	0.343	0.0034	1.230	0.0	Pass
GEM Drum # 2690	0.0063	0.298	0.0026	1.070	0.238	Pass
GEM Drum # 2692	0.0048	0.242	0.0025	0.907	0.0	Pass
GEM Drum # 2694	0.0049	0.268	0.0030	0.992	0.055	Pass
GEM Drum # 2696	0.0041	0.320	0.0027	1.180	0.0	Pass

Student t-test

Number of samples = n = 5

Mean = $\bar{x} = \sum x_i / n$

Variance = $s^2 = \sum (x_i - \bar{x})^2 / (n-1)$

Degrees of freedom for n observations = n-1 = 4

From standard t-tables, the factor "z" for 95% confidence limit ($t_{0.95}$ or $\alpha_{0.05}$) for 4 degrees of freedom is 2.13.

Upper acceptance limit for 95% confidence for a 1-tailed t-test, at 4 degrees of freedom is:

$$\text{Acceptance limit} - (s \times 2.13)/n^{1/2}$$

Table 2. TCLP means, variances, and upper acceptance limits for 95% confidence.

Element	mean ($\bar{x}$)	Variance (s^2)	s	Acceptance limit (mg/L)	Upper acceptance limit for 95% confidence
Chromium	0.0055	1.75 E-6	0.0013	0.86	0.8587
Nickel	0.2942	0.00162	0.0402	5.0	4.9617
Lead	0.0028	1.27 E-7	0.0004	0.37	0.3697
Uranium	1.0758	0.01755	0.1325	4.0	3.8738

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TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

GTSD00196 Report Date: January 08, 1999

Sample ID	: VTF-1646 #2688
Lab ID	: 9812E01-01
Matrix	: TCLP
Date Collected	: 12/16/98
Date Received	: 12/30/98
Priority	: Routine
Collector	: Client

ımeter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
ls Analysis											
ımium	J	7.37	2.99	15.0	ug/l	5.0	AME	01/06/99	1437	139088	1
el		343	3.93	3.93	ug/l	5.0					
l		3.39	1.55	1.55	ug/l	5.0					
ıium		1230	0.126	1.00	ug/l	5.0					
ral Chemistry											
ɔgen, Nitrate	U	ND	0.0127	0.0500	mg/l	1.0	JLG	01/05/99	1743	138976	2

ollowing prep procedures were performed:

Mass Spec	FGD	01/05/99	1800	139088	3
P Prep for Metals	JL	01/04/99	1500	138997	4

Method	Method-Description
	EPA 6020
	EPA 300.0
	EPA 3005
	EPA 1311

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SC	10120	10582
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Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

cc: GTSD00196 Report Date: January 08, 1999

Sample ID : VTF-1646 #2688

M = Method	Method-Description

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Karen Blakeney
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NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

GTSD00196 Report Date: January 08, 1999 Page 1 of 1

Sample ID	: VTF-1646 #2688
Lab ID	: 9812E01-02
Matrix	: Misc.
Date Collected	: 12/16/98
Date Received	: 12/30/98
Priority	: Routine
Collector	: Client

ımeter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
ral Chemistry											
t Filter Test		pass					LIB	01/04/99	1130	139011	1

Method	Method-Description
	EPA 9095

:

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Karen Blakely

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NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

cc: GTSD00196 Report Date: January 08, 1999

Sample ID	: VTF-1647 #2690
Lab ID	: 9812E01-03
Matrix	: TCLP
Date Collected	: 12/16/98
Date Received	: 12/30/98
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Metals Analysis											
Chromium	J	6.27	2.99	15.0	ug/l	5.0	AME	01/06/99	1443	139088	1
Nickel		298	3.93	3.93	ug/l	5.0					
Lead		2.61	1.55	1.55	ug/l	5.0					
Uranium		1070	0.126	1.00	ug/l	5.0					
General Chemistry											
Nitrogen, Nitrate		0.238	0.0127	0.0500	mg/l	1.0	JLG	01/05/99	1851	138976	2

The following prep procedures were performed:

ICP Mass Spec	FGD	01/05/99	1800	139088	3
TCLP Prep for Metals	JL	01/04/99	1500	138997	4

M = Method	Method-Description
M 1	EPA 6020
M 2	EPA 300.0
M 3	EPA 3005
M 4	EPA 1311

Notes:
The qualifiers in this report are defined as follows:
ND indicates that the analyte was not detected at a concentration greater than the detection limit.
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* indicates that a quality control analyte recovery is outside of specified acceptance criteria.

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NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

: GTSD00196 Report Date: January 08, 1999

Sample ID : VTF-1647 #2690

= Method **Method-Description**

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questions to your Project Manager, Jack Spitz at (843) 769-7390.

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STATE	GEL	EPI
FL	E87156/87294	E87472/87458
NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

cc: GTSD00196

Report Date: January 08, 1999

Sample ID	: VTF-1647 #2690
Lab ID	: 9812E01-04
Matrix	: Misc.
Date Collected	: 12/16/98
Date Received	: 12/30/98
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
General Chemistry											
Paint Filter Test		pass					LIB	01/04/99	1130	139011	1

M = Method	Method-Description
M 1	EPA 9095

Notes:
The qualifiers in this report are defined as follows:
ND indicates that the analyte was not detected at a concentration greater than the detection limit.
J indicates presence of analyte at a concentration less than the reporting limit (RL) and greater than the detection limit (DL).
U indicates that the analyte was not detected at a concentration greater than the detection limit.
* indicates that a quality control analyte recovery is outside of specified acceptance criteria.

This data report has been prepared and reviewed in accordance with General Engineering Laboratories standard operating procedures. Please direct any questions to your Project Manager, Jack Spitz at (843) 769-7390.

Karen Blakely
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Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

GTSD00196 Report Date: January 08, 1999

Sample ID	: VTF-1648 #2692
Lab ID	: 9812E01-05
Matrix	: TCLP
Date Collected	: 12/17/98
Date Received	: 12/30/98
Priority	: Routine
Collector	: Client

ımeter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
ls Analysis											
ımium	J	4.80	2.99	15.0	ug/l	5.0	AME	01/06/99	1450	139088	1
el		242	3.93	3.93	ug/l	5.0					
		2.49	1.55	1.55	ug/l	5.0					
ium		907	0.126	1.00	ug/l	5.0					
ral Chemistry											
ıgen, Nitrate	U	ND	0.0127	0.0500	mg/l	1.0	JLG	01/05/99	1905	138976	2

ollowing prep procedures were performed:

Mass Spec	FGD	01/05/99	1800	139088 3
P Prep for Metals	JL	01/04/99	1500	138997 4

Method	Method-Description
	EPA 6020
	EPA 300.0
	EPA 3005
	EPA 1311

:

ualifiers in this report are defined as follows:
dicates that the analyte was not detected at a concentration greater than the detection limit.
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:ates that a quality control analyte recovery is outside of specified acceptance criteria.

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SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

cc: GTSD00196 Report Date: January 08, 1999

Sample ID : VTF-1648 #2692

M = Method	Method-Description

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NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

GTSD00196 Report Date: January 08, 1999 Page 1 of 1

Sample ID	: VTF-1648 #2692
Lab ID	: 9812E01-06
Matrix	: Misc.
Date Collected	: 12/17/98
Date Received	: 12/30/98
Priority	: Routine
Collector	: Client

ımeter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
ral Chemistry											
t Filter Test		pass					LIB	01/04/99	1130	139011	1

Method	Method-Description
	EPA 9095

ualifiers in this report are defined as follows:
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cates that a quality control analyte recovery is outside of specified acceptance criteria.

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9812E01-06

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NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

cc: GTSD00196 Report Date: January 08, 1999

Sample ID : VTF-1649 #2694
Lab ID : 9812E01-07
Matrix : TCLP
Date Collected : 12/18/98
Date Received : 12/30/98
Priority : Routine
Collector : Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Metals Analysis											
Chromium	J	4.92	2.99	15.0	ug/l	5.0	AME	01/06/99	1457	139088	1
Nickel		268	3.93	3.93	ug/l	5.0					
Lead		2.95	1.55	1.55	ug/l	5.0					
Uranium		992	0.126	1.00	ug/l	5.0					
General Chemistry											
Nitrogen, Nitrate		0.0550	0.0127	0.0500	mg/l	1.0	JLG	01/05/99	1919	138976	2

The following prep procedures were performed:

ICP Mass Spec	FGD	01/05/99	1800	139088 3
TCLP Prep for Metals	JL	01/04/99	1500	138997 4

M = Method	Method-Description
M 1	EPA 6020
M 2	EPA 300.0
M 3	EPA 3005
M 4	EPA 1311

Notes:
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9812E01-07

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NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

: GTSD00196 Report Date: January 08, 1999

Sample ID : VTF-1649 #2694

= Method	Method-Description

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cordance with General Engineering Laboratories
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questions to your Project Manager, Jack Spitz at (843) 769-7390.

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FL	E87156/87294	E87472/87458
NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
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Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

cc: GTSD00196 Report Date: January 08, 1999 Page 1 of 1

Sample ID	: VTF-1649 #2694
Lab ID	: 9812E01-08
Matrix	: Misc.
Date Collected	: 12/18/98
Date Received	: 12/30/98
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
General Chemistry											
Paint Filter Test		pass					LIB	01/04/99	1130	139011	1

M = Method	Method-Description
M 1	EPA 9095

Notes:
The qualifiers in this report are defined as follows:
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TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

GTSD00196 Report Date: January 08, 1999 Page 1 of 2

Sample ID	: VTF-1650 #2696
Lab ID	: 9812E01-09
Matrix	: TCLP
Date Collected	: 12/18/98
Date Received	: 12/30/98
Priority	: Routine
Collector	: Client

meter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
s Analysis											
mium	J	4.06	2.99	15.0	ug/l	5.0	AME	01/06/99	1503	139088	1
el		320	3.93	3.93	ug/l	5.0					
		2.70	1.55	1.55	ug/l	5.0					
ium		1180	0.126	1.00	ug/l	5.0					
ral Chemistry											
gen, Nitrate	U	ND	0.0127	0.0500	mg/l	1.0	JLG	01/05/99	1932	138976	2

ollowing prep procedures were performed:

Mass Spec	FGD	01/05/99	1800	139088 3
P Prep for Metals	JL	01/04/99	1500	138997 4

Method	Method-Description
	EPA 6020
	EPA 300.0
	EPA 3005
	EPA 1311

:

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9812E01-09

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SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

cc: GTSD00196 Report Date: January 08, 1999

Sample ID : VTF-1650 #2696

M = Method	Method-Description

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Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

GTSD00196 Report Date: January 08, 1999 Page 1 of 1

Sample ID	: VTF-1650 #2696
Lab ID	: 9812E01-10
Matrix	: Misc.
Date Collected	: 12/18/98
Date Received	: 12/30/98
Priority	: Routine
Collector	: Client

ımeter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
ral Chemistry											
t Filter Test		pass					LIB	01/04/99	1130	139011	1

Method	Method-Description
	EPA 9095

:

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Karen Blakeney
wed By

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9812E01-10

M-Area Batch #41 Glass TCLP Samples RM-98-43

98|2E01 %

Q#37771

SHIPMENT DESTINED TO	SAMPLE CONTAINER IDENTIFICATION		DATE/TIME OF PACKAGING		SAMPLE NET WEIGHT	SHIPPING CONTAINER/ CONTAINER GROSS WEIGHT	SEAL # (IF APPLICABLE)
General Engineering Laboratories 2040 Savage Rd. Chasn. SC 29414	Sample#	Drum#			Grams	Grams	N/A
	VTF-1646	2688	12/16/98	1445	218	257	
	VTF-1647	2690	12/16/98	2330	239	278	
	VTF-1648	2692	12/17/98	1445	153	192	
	VTF-1649	2694	12/18/98	0330	238	277	
	VTF-1650	2696	12/18/98	0930	146	185	
	Shipping Container		N/A		4 lbs	8 lbs	

Comments: Shipping Number SRS 16616

INFORMATION ONLY

Relinquished by:	Date:	Time:	Received by:	Relinqished by:	Date:	Time:	Received by:
M. S. L	12/28/98	1300	D Franco		12/30/98		
Relinquished by:	Date:	Time:	Received by:	Relinqished by:	Date:	Time:	Received by:

C:\...\RCO\Shipping Forms\...

DURATEK

10100 Old Columbia Road
Columbia, Maryland 21046
410/312-5100 Fax 410/290-9070

L-99-006

January 14, 1999

Mr. Dan Bills
Subcontract Technical Representative
Westinghouse Savannah River Company
Building 730-M
Aiken, SC 29802

Final Wasteform Treatment Standards and Acceptance Criteria

Dear Mr. Bills:

GTS Duratek has completed sampling and analysis of the final wasteform, Batch #40, drums 2652, 2654, 2656, 2658, and 2660. The results of the analysis, including the analysis technique, is attached for your review. The analysis was performed by General Engineering Laboratories, a State of South Carolina certified lab, and verified by Mr. Innocent Joseph, Manager of Technology, GTS Duratek.

Results of the analysis indicate Batch #40 is within the contractual specifications. A total of 47 drums of glass were produced for Batch #40. Should you have any questions, please contact Innocent Joseph or myself.

Sincerely,

GTS DURATEK

Jim L. Bunton
Facility Operations Manager

JLB/mlb
attachment

cc: S. Campbell
C. Coker

DURATEK

10100 Old Columbia Road
Columbia, Maryland 21046
410/312-5100 Fax 410/290-9070

December 28, 1998

Mr. Dan Macias
Operations Manger
Vendor Treatment Facility (M-area)
GTS Duratek
WSRC/USDOE Savannah River Site
Aiken, SC 29801

Dear Mr. Macias:

Please find enclosed the results of the "TCLP" and 'Paint Filter Test" on glass gems from drums 2652, 2654, 2656, 2658, and 2660. The tests were performed according to methods specified in the "Sampling Plan" for GTS Duratek's Vendor Treatment Facility at the Savannah River site. 1-tailed t-tests were performed on the TCLP data, and the upper acceptance limits for 95% confidence were calculated. The TCLP values are well below the upper acceptance limits for 95% confidence. All of the samples passed the "Paint Filter Test." The samples from Batch # 40 have therefore met all of the acceptance criteria for the glass product.

The calculations for sample means, variances, upper acceptance limits for 95% confidence, data sheets from General Engineering Laboratories, and a sample chain of custody record are enclosed. If you have any questions, please contact me at (410) 312-5120.

Sincerely

Innocent Joseph

Innocent Joseph
Manager, Technology
GTS Duratek

cc: J. Pope
B. Bowan
G. Hildebrandt
C. Coker

The glass gems from batch 40, produced at the GTS Duratek M-area facility, were subjected to "paint filter test" for free water, and "TCLP" for leaching characteristics at General Engineering Laboratories, a South Carolina licensed laboratory. The "paint filter test" and the "TCLP" were done according to EPA procedures 9095 and 1311, respectively. Please find enclosed the results for glass samples from drums 2652 to 2660. The results of the tests are summarized below. 1-tailed t-tests were performed, and the upper limits for 95% confidence were calculated.

The TCLP values are below the acceptance limit for 95% confidence.

Table 1. Summary of TCLP results

Sample ID	Chromium (mg/L)	Nickel (mg/L)	Lead (mg/L)	Uranium (mg/L)	Nitrate (as N)	Paint filter test
GEM Drum # 2652	0.0170	0.432	0.0031	1.580	0.0	Pass
GEM Drum # 2654	0.0207	0.440	0.0043	1.550	0.0	Pass
GEM Drum # 2656	0.0193	0.404	0.0028	1.510	0.0	Pass
GEM Drum # 2658	0.0227	0.447	0.0029	1.760	0.0	Pass
GEM Drum # 2660	0.0190	0.460	0.0054	1.650	0.0	Pass

Student t-test

Number of samples = n = 5

Mean = $\bar{x} = \sum x_i / n$

Variance = $s^2 = \sum(x_i - \bar{x})^2 / (n-1)$

Degrees of freedom for n observations = n-1 = 4

From standard t-tables, the factor "z" for 95% confidence limit ($t_{0.95}$ or $\alpha_{0.05}$) for 4 degrees of freedom is 2.13.

Upper acceptance limit for 95% confidence for a 1-tailed t-test, at 4 degrees of freedom is:

$$\text{Acceptance limit} - (s \times 2.13)/n^{1/2}$$

Table 2. TCLP means, variances, and upper acceptance limits for 95% confidence.

Element	mean ($\bar{x}$)	Variance (s^2)	s	Acceptance limit (mg/L)	Upper acceptance limit for 95% confidence
Chromium	0.0197	4.48 E-6	0.0021	0.86	0.8580
Nickel	0.4366	0.00044	0.0209	5.0	4.9801
Lead	0.0037	1.31 E-6	0.0011	0.37	0.3689
Uranium	1.6100	0.00965	0.0982	4.0	3.9064

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SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

GTSD00196 Report Date: December 23, 1998

Sample ID	: VTF-1607 #2652
Lab ID	: 9812637-01
Matrix	: TCLP
Date Collected	: 12/03/98
Date Received	: 12/16/98
Priority	: Routine
Collector	: Client

meter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
s Analysis											
nium		17.0	2.99	15.0	ug/l	5.0	JSS	12/22/98	1924	138255	1
el		432	3.93	3.93	ug/l	5.0					
		3.07	1.55	1.55	ug/l	5.0					
um		1580	0.126	1.00	ug/l	5.0					
al Chemistry											
gen, Nitrate	U	ND	0.0127	0.0500	mg/l	1.0	RWS	12/18/98	1244	138254	2

llowing prep procedures were performed:

Mass Spec	FGD	12/21/98	1330	138255 3
Prep for Metals	JL	12/17/98	1500	138048 4

Method	Method-Description
	EPA 6020
	EPA 300.0
	EPA 3005
	EPA 1311

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9812637-01

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STATE	GEL	EPI
FL	E87156/87294	E87472/87458
NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

cc: GTSD00196 Report Date: December 23, 1998

Sample ID : VTF-1607 #2652

M = Method	Method-Description

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STATE	GEL	EPI
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NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

GTSD00196 Report Date: December 23, 1998 Page 1 of 1

Sample ID	: VTF-1607 #2652
Lab ID	: 9812637-02
Matrix	: Misc.
Date Collected	: 12/03/98
Date Received	: 12/16/98
Priority	: Routine
Collector	: Client

meter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
al Chemistry											
Filter Test		PASS					BJR	12/23/98	1230	138589	1

Method	Method-Description
	EPA 9095

ıalifiers in this report are defined as follows:
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9812637-02

GENERAL ENGINEERING LABORATORIES

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Laboratory Certifications

STATE	GEL	EPI
FL	E87156/87294	E87472/87458
NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

cc: GTSD00196

Report Date: December 23, 1998

Sample ID	: VTF-1609 #2654
Lab ID	: 9812637-03
Matrix	: TCLP
Date Collected	: 12/04/98
Date Received	: 12/16/98
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Metals Analysis											
Chromium		20.7	2.99	15.0	ug/l	5.0	JSS	12/22/98	1931	138255	1
Nickel		440	3.93	3.93	ug/l	5.0					
Lead		4.27	1.55	1.55	ug/l	5.0					
Uranium		1550	0.126	1.00	ug/l	5.0					
General Chemistry											
Nitrogen, Nitrate	U	ND	0.0127	0.0500	mg/l	1.0	RWS	12/18/98	1325	138254	2

The following prep procedures were performed:

ICP Mass Spec	FGD	12/21/98	1330	138255	3
TCLP Prep for Metals	JL	12/17/98	1500	138048	4

M = Method	Method-Description
M 1	EPA 6020
M 2	EPA 300.0
M 3	EPA 3005
M 4	EPA 1311

Notes:
The qualifiers in this report are defined as follows:
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U indicates that the analyte was not detected at a concentration greater than the detection limit.
* indicates that a quality control analyte recovery is outside of specified acceptance criteria.

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9812637-03

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SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

GTSD00196 Report Date: December 23, 1998 Page 2 of 2

Sample ID : VTF-1609 #2654

Method	Method-Description

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rdance with General Engineering Laboratories
d operating procedures. Please direct
estions to your Project Manager, Jack Spitz at (843) 769-7390.

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Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

cc: GTSD00196

Report Date: December 23, 1998

Sample ID	: VTF-1609 #2654
Lab ID	: 9812637-04
Matrix	: Misc.
Date Collected	: 12/04/98
Date Received	: 12/16/98
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
General Chemistry											
Paint Filter Test		PASS					BJR	12/23/98	1230	138589	1

M = Method	Method-Description
M 1	EPA 9095

Notes:
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* indicates that a quality control analyte recovery is outside of specified acceptance criteria.

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Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

GTSD00196 Report Date: December 23, 1998

Sample ID	: VTF-1612 #2656
Lab ID	: 9812637-05
Matrix	: TCLP
Date Collected	: 12/05/98
Date Received	: 12/16/98
Priority	: Routine
Collector	: Client

meter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
s Analysis											
mium		19.3	2.99	15.0	ug/l	5.0	JSS	12/22/98	1937	138255	1
el		404	3.93	3.93	ug/l	5.0					
		2.76	1.55	1.55	ug/l	5.0					
ium		1510	0.126	1.00	ug/l	5.0					
al Chemistry											
gen, Nitrate	U	ND	0.0127	0.0500	mg/l	1.0	RWS	12/18/98	1406	138254	2

llowing prep procedures were performed:

Mass Spec	FGD	12/21/98	1330	138255 3
P Prep for Metals	JL	12/17/98	1500	138048 4

Method	Method-Description
	EPA 6020
	EPA 300.0
	EPA 3005
	EPA 1311

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SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

cc: GTSD00196 Report Date: December 23, 1998

Sample ID : VTF-1612 #2656

M = Method	Method-Description

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Client: GTS Duratek
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Contact: Mr. Innocent Joseph

GTSD00196 Report Date: December 23, 1998 Page 1 of 1

Sample ID	: VTF-1612 #2656
Lab ID	: 9812637-06
Matrix	: Misc.
Date Collected	: 12/05/98
Date Received	: 12/16/98
Priority	: Routine
Collector	: Client

ımeter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
ral Chemistry											
t Filter Test		PASS					BJR	12/23/98	1230	138589	1

Method	Method-Description
	EPA 9095

:
ualifiers in this report are defined as follows:
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SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

cc: GTSD00196

Report Date: December 23, 1998

Sample ID	: VTF-1613 #2658
Lab ID	: 9812637-07
Matrix	: TCLP
Date Collected	: 12/05/98
Date Received	: 12/16/98
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Metals Analysis											
Chromium		22.7	2.99	15.0	ug/l	5.0	JSS	12/22/98	1947	138255	1
Nickel		447	3.93	3.93	ug/l	5.0					
Lead		2.93	1.55	1.55	ug/l	5.0					
Uranium		1760	0.126	1.00	ug/l	5.0					
General Chemistry											
Nitrogen, Nitrate	U	ND	0.0127	0.0500	mg/l	1.0	RWS	12/18/98	1420	138254	2

The following prep procedures were performed:

ICP Mass Spec	FGD	12/21/98	1330	138255	3
TCLP Prep for Metals	JL	12/17/98	1500	138048	4

M = Method	Method-Description
M 1	EPA 6020
M 2	EPA 300.0
M 3	EPA 3005
M 4	EPA 1311

Notes:
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GTSD00196 Report Date: December 23, 1998 Page 2 of 2

Sample ID : VTF-1613 #2658

Method	Method-Description

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TN	02934	02934

Client: GTS Duratek
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Contact: Mr. Innocent Joseph

cc: GTSD00196 Report Date: December 23, 1998 Page 1 of 1

Sample ID	: VTF-1613 #2658
Lab ID	: 9812637-08
Matrix	: Misc.
Date Collected	: 12/05/98
Date Received	: 12/16/98
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
General Chemistry											
Paint Filter Test		PASS					BJR	12/23/98	1230	138589	1

M = Method	Method-Description
M 1	EPA 9095

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Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

GTSD00196 Report Date: December 23, 1998

Sample ID	: VTF-1614 #2660
Lab ID	: 9812637-09
Matrix	: TCLP
Date Collected	: 12/06/98
Date Received	: 12/16/98
Priority	: Routine
Collector	: Client

meter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
s Analysis											
mium		19.0	2.99	15.0	ug/l	5.0	JSS	12/22/98	2011	138255	1
el		460	3.93	3.93	ug/l	5.0					
		5.44	1.55	1.55	ug/l	5.0					
ium		1650	0.126	1.00	ug/l	5.0					
al Chemistry											
gen, Nitrate	U	ND	0.0127	0.0500	mg/l	1.0	RWS	12/18/98	1434	138254	2

llowing prep procedures were performed:

Mass Spec	FGD	12/21/98	1330	138255 3
P Prep for Metals	JL	12/17/98	1500	138048 4

Method	Method-Description
	EPA 6020
	EPA 300.0
	EPA 3005
	EPA 1311

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SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

cc: GTSD00196 Report Date: December 23, 1998

Sample ID : VTF-1614 #2660

M = Method	Method-Description

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SC	10120	10582
TN	02934	02934

Client: GTS Duratek
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Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

GTSD00196 Report Date: December 23, 1998 Page 1 of 1

Sample ID	: VTF-1614 #2660
Lab ID	: 9812637-10
Matrix	: Misc.
Date Collected	: 12/06/98
Date Received	: 12/16/98
Priority	: Routine
Collector	: Client

meter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
al Chemistry											
Filter Test		PASS					BJR	12/23/98	1230	138589	1

Method	Method-Description
	EPA 9095

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rd operating procedures. Please direct
estions to your Project Manager, Jack Spitz at (843) 769-7390.

ved By

GTS DURATEK SHIPPING MANIFEST

M-Area Batch #40 Glass TCLP Samples RM-98-42

9812637 J/

SHIPMENT DESTINED TO	SAMPLE CONTAINER IDENTIFICATION		DATE/TIME OF PACKAGING		SAMPLE NET WEIGHT	SHIPPING CONTAINER/ CONTAINER GROSS WEIGHT	SEAL # (IF APPLICABLE)
General Engineering Laboratories 2040 Savage Rd. Chasn. SC 29414	Sample#	Drum#			Grams	Grams	N/A
	VTF-1607	2652	12/03/98	0600	244	283	
	VTF-1609	2654	12/04/98	0145	311	350	
	VTF-1612	2656	12/05/98	0930	254	293	
	VTF-1613	2658	12/05/98	1930	312	351	
	VTF-1614	2660	12/06/98	0130	283	322	
	Shipping Container		N/A		3 lbs	8 lbs	

Comments: Shipping Number SRS-16583

EXPEDITE ONLY

Relinquished by:	Date:	Time:	Received by:	Relinqished by:	Date:	Time:	Received by:
[signature]	12/15/98	1315	[signature] 12/16/98				
Relinquished by:	Date:	Time:	Received by:	Relinqished by:	Date:	Time:	Received by:

C:\...\RCO\Shipping Forms\

WSRC-IH-96-0244, Rev. 2; APPENDIX L, Page 102 of 694

DURATEK

10100 Old Columbia Road
Columbia, Maryland 21046
410/312-5100 Fax 410/290-9070

L-98-098

)ecember 22, 1998

Mr. Dan Bills
Subcontract Technical Representative
Vestinghouse Savannah River Company
Building 730-M
Aiken, SC 29802

Final Wasteform Treatment Standards and Acceptance Criteria

)ear Mr. Bills:

GTS Duratek has completed sampling and analysis of the final wasteform, Batch #39, drums 2604, 2606, 2608, 2610, and 2612. The results of the analysis, including the analysis technique, is attached for your review. The analysis was performed by General Engineering Laboratories, a State of South Carolina certified lab, and verified by Mr. Innocent Joseph, Manager of Technology, GTS Duratek.

Results of the analysis indicate Batch #39 is within the contractual specifications. A total of 66 drums of glass were produced for Batch #39. Should you have any questions, please contact Innocent Joseph or myself.

Sincerely,

GTS DURATEK

Daniel Macias
Director of Operations

DM/mlb
Attachment

cc: S. Campbell
C. Coker

DURATEK

10100 Old Columbia Road
Columbia, Maryland 21046
410/312-5100 Fax 410/290-9070

December 14, 1998

Mr. Dan Macias
Operations Manger
Vendor Treatment Facility (M-area)
GTS Duratek
WSRC/USDOE Savannah River Site
Aiken, SC 29801

Dear Mr. Macias:

Please find enclosed the results of the "TCLP" and 'Paint Filter Test" on glass gems from drums 2604, 2606, 2608, 2610, and 2612. The tests were performed according to methods specified in the "Sampling Plan" for GTS Duratek's Vendor Treatment Facility at the Savannah River site. 1-tailed t-tests were performed on the TCLP data, and the upper acceptance limits for 95% confidence were calculated. The TCLP values are well below the upper acceptance limits for 95% confidence. All of the samples passed the "Paint Filter Test." The samples from Batch # 39 have therefore met all of the acceptance criteria for the glass product.

The calculations for sample means, variances, upper acceptance limits for 95% confidence, data sheets from General Engineering Laboratories, and a sample chain of custody record are enclosed. If you have any questions, please contact me at (410) 312-5120.

Sincerely

Innocent Joseph

Innocent Joseph
Manager, Technology
GTS Duratek

cc: J. Pope
B. Bowan
G. Hildebrandt
C. Coker

The glass gems from batch 39, produced at the GTS Duratek M-area facility, were subjected to "paint filter test" for free water, and "TCLP" for leaching characteristics at General Engineering Laboratories, a South Carolina licensed laboratory. The "paint filter test" and the "TCLP" were done according to EPA procedures 9095 and 1311, respectively. Please find enclosed the results for glass samples from drums 2604 to 2612. The results of the tests are summarized below. 1-tailed t-tests were performed, and the upper limits for 95% confidence were calculated.

The TCLP values are below the acceptance limit for 95% confidence.

Table 1. Summary of TCLP results

Sample ID	Chromium (mg/L)	Nickel (mg/L)	Lead (mg/L)	Uranium (mg/L)	Nitrate (as N)	Paint filter test
GEM Drum # 2604	0.0109	0.341	0.0096	1.450	0.0	Pass
GEM Drum # 2606	0.0133	0.397	0.0060	1.620	0.0	Pass
GEM Drum # 2608	0.0098	0.433	0.0071	1.750	0.0	Pass
GEM Drum # 2610	0.0107	0.406	0.0075	1.720	0.0	Pass
GEM Drum # 2612	0.0098	0.425	0.0052	1.690	0.0	Pass

Student t-test

Number of samples = n = 5

Mean = $\bar{x} = \sum x_i / n$

Variance = $s^2 = \sum(x_i - \bar{x})^2 / (n-1)$

Degrees of freedom for n observations = n-1 = 4

From standard t-tables, the factor "z" for 95% confidence limit ($t_{0.95}$ or $\alpha_{0.05}$) for 4 degrees of freedom is 2.13.

Upper acceptance limit for 95% confidence for a 1-tailed t-test, at 4 degrees of freedom is:

$$\text{Acceptance limit} - (s \times 2.13)/n^{1/2}$$

Table 2. TCLP means, variances, and upper acceptance limits for 95% confidence.

Element	mean ($\bar{x}$)	Variance (s^2)	s	Acceptance limit (mg/L)	Upper acceptance limit for 95% confidence
Chromium	0.0109	2.10 E-6	0.0014	0.86	0.8586
Nickel	0.4004	0.00131	0.0362	5.0	4.9655
Lead	0.0071	2.79 E-6	0.0017	0.37	0.3684
Uranium	1.6460	0.01433	0.1197	4.0	3.8860

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TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

GTSD00196 Report Date: December 11, 1998

Sample ID	: VTF-1576 #2604
Lab ID	: 9812245-01
Matrix	: TCLP
Date Collected	: 11/23/98
Date Received	: 12/05/98
Priority	: Routine
Collector	: Client

ımeter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
ls Analysis											
ımium	J	10.9	2.99	15.0	ug/l	5.0	JSS	12/09/98	2213	137428	1
el		341	3.93	3.93	ug/l	5.0					
		9.56	1.55	1.55	ug/l	5.0					
ium		1450	0.126	1.00	ug/l	5.0					
ral Chemistry											
ɔgen, Nitrate	U	ND	0.0127	0.0500	mg/l	1.0	JLG	12/08/98	1511	137297	2

ollowing prep procedures were performed:

Mass Spec	FGD	12/09/98	1100	137428 3
P Prep for Metals	JL	12/07/98	1720	137312 4

Method	Method-Description
	EPA 6020
	EPA 300.0
	EPA 3005
	EPA 1311

:

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FL	E87156/87294	E87472/87458
NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

cc: GTSD00196 Report Date: December 11, 1998

Sample ID : VTF-1576 #2604

M = Method	Method-Description

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TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

GTSD00196 Report Date: December 11, 1998 Page 1 of 1

Sample ID	: VTF-1576 #2604
Lab ID	: 9812245-02
Matrix	: Misc.
Date Collected	: 11/23/98
Date Received	: 12/05/98
Priority	: Routine
Collector	: Client

ımeter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
ral Chemistry											
t Filter Test		Pass.					JEN	12/08/98	1445	137342	1

Method	Method-Description
	EPA 9095

:

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NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

cc: GTSD00196

Report Date: December 11, 1998

Sample ID	: VTF-1577 #2606
Lab ID	: 9812245-03
Matrix	: TCLP
Date Collected	: 11/23/98
Date Received	: 12/05/98
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Metals Analysis											
Chromium	J	13.3	2.99	15.0	ug/l	5.0	JSS	12/09/98	2219	137428	1
Nickel		397	3.93	3.93	ug/l	5.0					
Lead		6.00	1.55	1.55	ug/l	5.0					
Uranium		1620	0.126	1.00	ug/l	5.0					
General Chemistry											
Nitrogen, Nitrate	U	ND	0.0127	0.0500	mg/l	1.0	JLG	12/08/98	1553	137297	2

The following prep procedures were performed:

ICP Mass Spec	FGD	12/09/98	1100	137428 3
TCLP Prep for Metals	JL	12/07/98	1720	137312 4

M = Method	Method-Description
M 1	EPA 6020
M 2	EPA 300.0
M 3	EPA 3005
M 4	EPA 1311

Notes:
The qualifiers in this report are defined as follows:
ND indicates that the analyte was not detected at a concentration greater than the detection limit.
J indicates presence of analyte at a concentration less than the reporting limit (RL) and greater than the detection limit (DL).
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* indicates that a quality control analyte recovery is outside of specified acceptance criteria.

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SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

GTSD00196 Report Date: December 11, 1998 Page 2 of 2

Sample ID : VTF-1577 #2606

Method	Method-Description

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iestions to your Project Manager, Jack Spitz at (843) 769-7390.

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SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

cc: GTSD00196 Report Date: December 11, 1998

Sample ID	: VTF-1577 #2606
Lab ID	: 9812245-04
Matrix	: Misc.
Date Collected	: 11/23/98
Date Received	: 12/05/98
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
General Chemistry											
Paint Filter Test		Pass.					JEN	12/08/98	1445	137342	1

M = Method	Method-Description
M 1	EPA 9095

Notes:
The qualifiers in this report are defined as follows:
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U indicates that the analyte was not detected at a concentration greater than the detection limit.
* indicates that a quality control analyte recovery is outside of specified acceptance criteria.

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Reviewed By

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TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

GTSD00196 Report Date: December 11, 1998

Sample ID	: VTF-1578 #2608
Lab ID	: 9812245-05
Matrix	: TCLP
Date Collected	: 11/24/98
Date Received	: 12/05/98
Priority	: Routine
Collector	: Client

meter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
s Analysis											
mium	J	9.75	2.99	15.0	ug/l	5.0	JSS	12/09/98	2226	137428	1
el		433	3.93	3.93	ug/l	5.0					
		7.10	1.55	1.55	ug/l	5.0					
ium		1750	0.126	1.00	ug/l	5.0					
:al Chemistry											
›gen, Nitrate	U	ND	0.0127	0.0500	mg/l	1.0	JLG	12/08/98	1606	137297	2

ollowing prep procedures were performed:

Mass Spec	FGD	12/09/98	1100	137428 3
P Prep for Metals	JL	12/07/98	1720	137312 4

Method	Method-Description
	EPA 6020
	EPA 300.0
	EPA 3005
	EPA 1311

:
ualifiers in this report are defined as follows:
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SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

cc: GTSD00196 Report Date: December 11, 1998

Sample ID : VTF-1578 #2608

M = Method	Method-Description

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9812245-05

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NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

GTSD00196 Report Date: December 11, 1998 Page 1 of 1

Sample ID	: VTF-1578 #2608
Lab ID	: 9812245-06
Matrix	: Misc.
Date Collected	: 11/24/98
Date Received	: 12/05/98
Priority	: Routine
Collector	: Client

ameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
ral Chemistry											
t Filter Test		Pass.					JEN	12/08/98	1445	137342	1

Method	Method-Description
	EPA 9095

s:
qualifiers in this report are defined as follows:
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NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

cc: GTSD00196

Report Date: December 11, 1998

Sample ID	: VTF-1579 #2610
Lab ID	: 9812245-07
Matrix	: TCLP
Date Collected	: 11/24/98
Date Received	: 12/05/98
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Metals Analysis											
Chromium	J	10.7	2.99	15.0	ug/l	5.0	JSS	12/09/98	2232	137428	1
Nickel		406	3.93	3.93	ug/l	5.0					
Lead		7.47	1.55	1.55	ug/l	5.0					
Uranium		1720	0.126	1.00	ug/l	5.0					
General Chemistry											
Nitrogen, Nitrate	U	ND	0.0127	0.0500	mg/l	1.0	JLG	12/08/98	1620	137297	2

The following prep procedures were performed:

ICP Mass Spec	FGD	12/09/98	1100	137428	3
TCLP Prep for Metals	JL	12/07/98	1720	137312	4

M = Method	Method-Description
M 1	EPA 6020
M 2	EPA 300.0
M 3	EPA 3005
M 4	EPA 1311

Notes:
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Client: GTS Duratek
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GTSD00196 Report Date: December 11, 1998 Page 2 of 2

Sample ID : VTF-1579 #2610

Method	Method-Description

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Client: GTS Duratek
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Contact: Mr. Innocent Joseph

cc: GTSD00196

Report Date: December 11, 1998

Sample ID	: VTF-1579 #2610
Lab ID	: 9812245-08
Matrix	: Misc.
Date Collected	: 11/24/98
Date Received	: 12/05/98
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
General Chemistry											
Paint Filter Test		Pass.					JEN	12/08/98	1445	137342	1

M = Method	Method-Description
M 1	EPA 9095

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The qualifiers in this report are defined as follows:
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Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

: GTSD00196 Report Date: December 11, 1998

Sample ID	: VTF-1580 #2612
Lab ID	: 9812245-09
Matrix	: TCLP
Date Collected	: 11/24/98
Date Received	: 12/05/98
Priority	: Routine
Collector	: Client

ameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
als Analysis											
omium	J	9.77	2.99	15.0	ug/l	5.0	JSS	12/09/98	2238	137428	1
kel		425	3.93	3.93	ug/l	5.0					
d		5.16	1.55	1.55	ug/l	5.0					
nium		1690	0.126	1.00	ug/l	5.0					
eral Chemistry											
rogen, Nitrate	U	ND	0.0127	0.0500	mg/l	1.0	JLG	12/08/98	1634	137297	2

following prep procedures were performed:

Mass Spec	FGD	12/09/98	1100	137428	3
LP Prep for Metals	JL	12/07/98	1720	137312	4

= Method	Method-Description
1	EPA 6020
2	EPA 300.0
3	EPA 3005
4	EPA 1311

es:
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SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

cc: GTSD00196 Report Date: December 11, 1998

Sample ID : VTF-1580 #2612

M = Method	Method-Description

This data report has been prepared and reviewed in accordance with General Engineering Laboratories standard operating procedures. Please direct any questions to your Project Manager, Jack Spitz at (843) 769-7390.

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Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

GTSD00196 Report Date: December 11, 1998 Page 1 of 1

Sample ID	: VTF-1580 #2612
Lab ID	: 9812245-10
Matrix	: Misc.
Date Collected	: 11/24/98
Date Received	: 12/05/98
Priority	: Routine
Collector	: Client

ımeter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
ral Chemistry											
t Filter Test		Pass.					JEN	12/08/98	1445	137342	1

Method	Method-Description
	EPA 9095

:

ualifiers in this report are defined as follows:
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data report has been prepared and reviewed
ɔordance with General Engineering Laboratories
ard operating procedures. Please direct
uestions to your Project Manager, Jack Spitz at (843) 769-7390.

ɛwed By

M-Area Batch #39 Glass TCLP Samples RM-98-41

SHIPMENT DESTINED TO	SAMPLE CONTAINER IDENTIFICATION		DATE/TIME OF PACKAGING		SAMPLE NET WEIGHT	SHIPPING CONTAINER/ CONTAINER GROSS WEIGHT	SEAL # (IF APPLICABLE)
General Engineering Laboratories 2040 Savage Rd. Chasn. SC 29414	Sample#	Drum#			Grams	Grams	N/A
	VTF-1576	2604	11/23/98	1040	103	135	
	VTF-1577	2606	11/23/98	1625	196	226	
	VTF-1578	2608	11/24/98	2130	191	223	
	VTF-1579	2610	11/24/98	0340	212	244	
	VTF-1580	2612	11/24/98	1130	196	228	
	Shipping Container		N/A		3 lbs	8 lbs	

Comments: Shipping Number
SRS-16567

INFORMATION ONLY

Relinquished by:	Date:	Time:	Received by:	Relinquished by:	Date:	Time:	Received by:
	12/3/98	1030					
Relinquished by:	Date:	Time:	Received by:	Relinquished by:	Date:	Time:	Received by:

C:\...\RCO\Shipping Forms\...

WSRC-TR-96-0244, Rev. 2; APPENDIX L, Page 122 of 694

DURATEK
10100 Old Columbia Road
Columbia, Maryland 21046
410/312-5100 Fax 410/290-9070

L-98-097

December 22, 1998

Mr. Dan Bills
Subcontract Technical Representative
Westinghouse Savannah River Company
Building 730-M
Aiken, SC 29802

Final Wasteform Treatment Standards and Acceptance Criteria

Dear Mr. Bills:

GTS Duratek has completed sampling and analysis of the final wasteform, Batch #38, drums 2540, 2542, 2544, 2546, and 2548. The results of the analysis, including the analysis technique, is attached for your review. The analysis was performed by General Engineering Laboratories, a State of South Carolina certified lab, and verified by Mr. Innocent Joseph, Manager of Technology, GTS Duratek.

Results of the analysis indicate Batch #38 is within the contractual specifications. A total of 54 drums of glass were produced for Batch #38. Should you have any questions, please contact Innocent Joseph or myself.

Sincerely,

GTS DURATEK

Daniel Macias
Director of Operations

DM/mlb
attachment

cc: S. Campbell
C. Coker

DURATEK

10100 Old Columbia Road
Columbia, Maryland 21046
410/312-5100 Fax 410/290-9070

December 10, 1998

Mr. Dan Macias
Operations Manger
Vendor Treatment Facility (M-area)
GTS Duratek
WSRC/USDOE Savannah River Site
Aiken, SC 29801

Dear Mr. Macias:

Please find enclosed the results of the "TCLP" and 'Paint Filter Test" on glass gems from drums 2540, 2542, 2544, 2546, and 2548. The tests were performed according to methods specified in the "Sampling Plan" for GTS Duratek's Vendor Treatment Facility at the Savannah River site. 1-tailed t-tests were performed on the TCLP data, and the upper acceptance limits for 95% confidence were calculated. The TCLP values are well below the upper acceptance limits for 95% confidence. All of the samples passed the "Paint Filter Test." The samples from Batch # 38 have therefore met all of the acceptance criteria for the glass product.

The calculations for sample means, variances, upper acceptance limits for 95% confidence, data sheets from General Engineering Laboratories, and a sample chain of custody record are enclosed. If you have any questions, please contact me at (410) 312-5120.

Sincerely

Innocent Joseph

Innocent Joseph
Manager, Technology
GTS Duratek

cc: J. Pope
B. Bowan
G. Hildebrandt
C. Coker

The glass gems from batch 38, produced at the GTS Duratek M-area facility, were subjected to "paint filter test" for free water, and "TCLP" for leaching characteristics at General Engineering Laboratories, a South Carolina licensed laboratory. The "paint filter test" and the "TCLP" were done according to EPA procedures 9095 and 1311, respectively. Please find enclosed the results for glass samples from drums 2540 to 2548. The results of the tests are summarized below. 1-tailed t-tests were performed, and the upper limits for 95% confidence were calculated.

The TCLP values are below the acceptance limit for 95% confidence.

Table 1. Summary of TCLP results

Sample ID	Chromium (mg/L)	Nickel (mg/L)	Lead (mg/L)	Uranium (mg/L)	Nitrate (as N)	Paint filter test
GEM Drum # 2540	0.0102	0.293	0.0040	1.910	0.0	Pass
GEM Drum # 2542	0.0101	0.293	0.0033	1.880	0.0	Pass
GEM Drum # 2544	0.0098	0.273	0.0033	1.770	0.0	Pass
GEM Drum # 2546	0.0105	0.275	0.0037	1.800	0.0	Pass
GEM Drum # 2548	0.0110	0.307	0.0104	1.980	0.0	Pass

Student t-test

Number of samples = n = 5

Mean = $\bar{x} = \sum x_i / n$

Variance = $s^2 = \sum(x_i - \bar{x})^2 / (n-1)$

Degrees of freedom for n observations = n-1 = 4

From standard t-tables, the factor "z" for 95% confidence limit ($t_{0.95}$ or $\alpha_{0.05}$) for 4 degrees of freedom is 2.13.

Upper acceptance limit for 95% confidence for a 1-tailed t-test, at 4 degrees of freedom is:

$$\text{Acceptance limit} - (s \times 2.13)/n^{1/2}$$

Table 2. TCLP means, variances, and upper acceptance limits for 95% confidence.

Element	mean ($\bar{x}$)	Variance (s^2)	s	Acceptance limit (mg/L)	Upper acceptance limit for 95% confidence
Chromium	0.0103	2.15 E-7	0.0005	0.86	0.8596
Nickel	0.2882	0.00020	0.0142	5.0	4.9865
Lead	0.0049	9.44 E-6	0.0031	0.37	0.3671
Uranium	1.8680	0.00717	0.0847	4.0	3.9193

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SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

GTSD00196 Report Date: December 08, 1998

Sample ID	: VTF-1534
Lab ID	: 9812046-01
Matrix	: TCLP
Date Collected	: 11/12/98
Date Received	: 12/01/98
Priority	: Routine
Collector	: Client

ımeter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
ls Analysis											
ɔmium	J	10.2	2.99	15.0	ug/l	5.0	JSS	12/04/98	1821	137233	1
:el		293	3.93	3.93	ug/l	5.0					
ı		4.04	1.55	1.55	ug/l	5.0					
ıium		1910	0.126	1.00	ug/l	5.0					
ral Chemistry											
ɔgen, Nitrate	U	ND	0.0127	0.0500	mg/l	1.0	RWS	12/04/98	1201	137134	2

ollowing prep procedures were performed:

Mass Spec	FGD	12/04/98	1330	137233 3
.P Prep for Metals	JL	12/03/98	1425	137111 4

Method	Method-Description
	EPA 6020
	EPA 300.0
	EPA 3005
	EPA 1311

s:
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9812046-01

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NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr Innocent Joseph

cc: GTSD00196 Report Date: December 08, 1998

Sample ID : VTF-1534

M = Method **Method-Description**

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FL	E87156/87294	E87472/87458
NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

GTSD00196 Report Date: December 08, 1998 Page 1 of 1

Sample ID	: VTF-1534
Lab ID	: 9812046-02
Matrix	: Misc.
Date Collected	: 11/12/98
Date Received	: 12/01/98
Priority	: Routine
Collector	: Client

ımeter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
ral Chemistry											
t Filter Test		Pass.					JEN	12/08/98	1445	137342	1

Method	Method-Description
	EPA 9095

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9812046-02

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STATE	GEL	EPI
FL	E87156/87294	E87472/87458
NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

cc: GTSD00196 Report Date: December 08, 1998

Sample ID	: VTF-1537
Lab ID	: 9812046-03
Matrix	: TCLP
Date Collected	: 11/13/98
Date Received	: 12/01/98
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Metals Analysis											
Chromium	J	10.1	2.99	15.0	ug/l	5.0	JSS	12/04/98	1828	137233	1
Nickel		293	3.93	3.93	ug/l	5.0					
Lead		3.25	1.55	1.55	ug/l	5.0					
Uranium		1880	0.126	1.00	ug/l	5.0					
General Chemistry											
Nitrogen, Nitrate	U	ND	0.0127	0.0500	mg/l	1.0	RWS	12/04/98	1242	137134	2

The following prep procedures were performed:

ICP Mass Spec	FGD	12/04/98	1330	137233 3
TCLP Prep for Metals	JL	12/03/98	1425	137111 4

M = Method	Method-Description
M 1	EPA 6020
M 2	EPA 300.0
M 3	EPA 3005
M 4	EPA 1311

Notes:
The qualifiers in this report are defined as follows:
ND indicates that the analyte was not detected at a concentration greater than the detection limit.
J indicates presence of analyte at a concentration less than the reporting limit (RL) and greater than the detection limit (DL).
U indicates that the analyte was not detected at a concentration greater than the detection limit.
* indicates that a quality control analyte recovery is outside of specified acceptance criteria.

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STATE	GEL	EPI
FL	E87156/87294	E87472/87458
NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

: GTSD00196 Report Date: December 08, 1998

Sample ID : VTF-1537

: Method	Method-Description

data report has been prepared and reviewed
cordance with General Engineering Laboratories
ard operating procedures. Please direct
uestions to your Project Manager, Jack Spitz at (843) 769-7390.

ewed By

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9812046-03

GENERAL ENGINEERING LABORATORIES

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Laboratory Certifications

STATE	GEL	EPI
FL	E87156/87294	E87472/87458
NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

cc: GTSD00196 Report Date: December 08, 1998

Sample ID	: VTF-1537
Lab ID	: 9812046-04
Matrix	: Misc.
Date Collected	: 11/13/98
Date Received	: 12/01/98
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
General Chemistry											
Paint Filter Test		Pass.					JEN	12/08/98	1445	137342	1

M = Method	Method-Description
M 1	EPA 9095

Notes:
The qualifiers in this report are defined as follows:
ND indicates that the analyte was not detected at a concentration greater than the detection limit.
J indicates presence of analyte at a concentration less than the reporting limit (RL) and greater than the detection limit (DL).
U indicates that the analyte was not detected at a concentration greater than the detection limit.
* indicates that a quality control analyte recovery is outside of specified acceptance criteria.

This data report has been prepared and reviewed in accordance with General Engineering Laboratories standard operating procedures. Please direct any questions to your Project Manager, Jack Spitz at (843) 769-7390.

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9812046-04

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Laboratory Certifications

STATE	GEL	EPI
FL	E87156/87294	E87472/87458
NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

GTSD00196 Report Date: December 08, 1998 Page 1 of 2

Sample ID	: VTF-1538
Lab ID	: 9812046-05
Matrix	: TCLP
Date Collected	: 11/13/98
Date Received	: 12/01/98
Priority	: Routine
Collector	: Client

ameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
ls Analysis											
omium	J	9.77	2.99	15.0	ug/l	5.0	JSS	12/04/98	1834	137233	1
cel		273	3.93	3.93	ug/l	5.0					
l		3.30	1.55	1.55	ug/l	5.0					
ium		1770	0.126	1.00	ug/l	5.0					
ral Chemistry											
ogen, Nitrate	U	ND	0.0127	0.0500	mg/l	1.0	RWS	12/04/98	1256	137134	2

following prep procedures were performed:

Mass Spec	FGD	12/04/98	1330	137233	3
P Prep for Metals	JL	12/03/98	1425	137111	4

Method	Method-Description
	EPA 6020
	EPA 300.0
	EPA 3005
	EPA 1311

s:
qualifiers in this report are defined as follows:
ndicates that the analyte was not detected at a concentration greater than the detection limit.
cates presence of analyte at a concentration less than the reporting limit (RL) and greater than the detection limit (DL).
licates that the analyte was not detected at a concentration greater than the detection limit.
icates that a quality control analyte recovery is outside of specified acceptance criteria.

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9812046-05

GENERAL ENGINEERING LABORATORIES

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Laboratory Certifications

STATE	GEL	EPI
FL	E87156/87294	E87472/87458
NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

cc: GTSD00196 Report Date: December 08, 1998

Sample ID : VTF-1538

M = Method	Method-Description

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STATE	GEL	EPI
FL	E87156/87294	E87472/87458
NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

GTSD00196 Report Date: December 08, 1998 Page 1 of 1

Sample ID	: VTF-1538
Lab ID	: 9812046-06
Matrix	: Misc.
Date Collected	: 11/13/98
Date Received	: 12/01/98
Priority	: Routine
Collector	: Client

ameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
ral Chemistry											
t Filter Test		Pass.					JEN	12/08/98	1445	137342	1

Method	Method-Description
	EPA 9095

s:
qualifiers in this report are defined as follows:
ndicates that the analyte was not detected at a concentration greater than the detection limit.
icates presence of analyte at a concentration less than the reporting limit (RL) and greater than the detection limit (DL).
licates that the analyte was not detected at a concentration greater than the detection limit.
icates that a quality control analyte recovery is outside of specified acceptance criteria.

data report has been prepared and reviewed
cordance with General Engineering Laboratories
lard operating procedures. Please direct
questions to your Project Manager, Jack Spitz at (843) 769-7390.

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9812046-06

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Laboratory Certifications

STATE	GEL	EPI
FL	E87156/87294	E87472/87458
NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

cc: GTSD00196 Report Date: December 08, 1998

Sample ID	: VTF-1539
Lab ID	: 9812046-07
Matrix	: TCLP
Date Collected	: 11/13/98
Date Received	: 12/01/98
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Metals Analysis											
Chromium	J	10.5	2.99	15.0	ug/l	5.0	JSS	12/04/98	1840	137233	1
Nickel		275	3.93	3.93	ug/l	5.0					
Lead		3.68	1.55	1.55	ug/l	5.0					
Uranium		1800	0.126	1.00	ug/l	5.0					
General Chemistry											
Nitrogen, Nitrate	U	ND	0.0127	0.0500	mg/l	1.0	RWS	12/04/98	1310	137134	2

The following prep procedures were performed:

ICP Mass Spec	FGD	12/04/98	1330	137233 3
TCLP Prep for Metals	JL	12/03/98	1425	137111 4

M = Method	Method-Description
M 1	EPA 6020
M 2	EPA 300.0
M 3	EPA 3005
M 4	EPA 1311

Notes:
The qualifiers in this report are defined as follows:
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J indicates presence of analyte at a concentration less than the reporting limit (RL) and greater than the detection limit (DL).
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STATE	GEL	EPI
FL	E87156/87294	E87472/87458
NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

: GTSD00196 Report Date: December 08, 1998

Sample ID : VTF-1539

= Method	Method-Description

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questions to your Project Manager, Jack Spitz at (843) 769-7390.

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STATE	GEL	EPI
FL	E87156/87294	E87472/87458
NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

cc: GTSD00196 Report Date: December 08, 1998

Sample ID	: VTF-1539
Lab ID	: 9812046-08
Matrix	: Misc.
Date Collected	: 11/13/98
Date Received	: 12/01/98
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
General Chemistry											
Paint Filter Test		Pass.					JEN	12/08/98	1445	137342	1

M = Method	Method-Description
M 1	EPA 9095

Notes:
The qualifiers in this report are defined as follows:
ND indicates that the analyte was not detected at a concentration greater than the detection limit.
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U indicates that the analyte was not detected at a concentration greater than the detection limit.
* indicates that a quality control analyte recovery is outside of specified acceptance criteria.

This data report has been prepared and reviewed in accordance with General Engineering Laboratories standard operating procedures. Please direct any questions to your Project Manager, Jack Spitz at (843) 769-7390.

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9812046-08

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STATE	GEL	EPI
FL	E87156/87294	E87472/87458
NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

GTSD00196 Report Date: December 08, 1998

Sample ID	: VTF-1540
Lab ID	: 9812046-09
Matrix	: TCLP
Date Collected	: 11/14/98
Date Received	: 12/01/98
Priority	: Routine
Collector	: Client

ameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
ls Analysis											
omium	J	11.0	2.99	15.0	ug/l	5.0	JSS	12/04/98	1905	137233	1
kel		307	3.93	3.93	ug/l	5.0					
d		10.4	1.55	1.55	ug/l	5.0					
nium		1980	0.126	1.00	ug/l	5.0					
ral Chemistry											
ogen, Nitrate	U	ND	0.0127	0.0500	mg/l	1.0	RWS	12/04/98	1324	137134	2

following prep procedures were performed:

Mass Spec	FGD	12/04/98	1330	137233 3
LP Prep for Metals	JL	12/03/98	1425	137111 4

= Method	Method-Description
	EPA 6020
)	EPA 300.0
)	EPA 3005
)	EPA 1311

s:
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dicates that the analyte was not detected at a concentration greater than the detection limit.
licates that a quality control analyte recovery is outside of specified acceptance criteria.

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9812046-09

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STATE	GEL	EPI
FL	E87156/87294	E87472/87458
NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

cc: GTSD00196 Report Date: December 08, 1998

Sample ID : VTF-1540

M = Method **Method-Description**

This data report has been prepared and reviewed in accordance with General Engineering Laboratories standard operating procedures. Please direct any questions to your Project Manager, Jack Spitz at (843) 769-7390.

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9812046-09

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Laboratory Certifications

STATE	GEL	EPI
FL	E87156/87294	E87472/87458
NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

GTSD00196 Report Date: December 08, 1998 Page 1 of 1

Sample ID	: VTF-1540
Lab ID	: 9812046-10
Matrix	: Misc.
Date Collected	: 11/14/98
Date Received	: 12/01/98
Priority	: Routine
Collector	: Client

ımeter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
ral Chemistry											
t Filter Test		Pass.					JEN	12/08/98	1445	137342	1

Method	Method-Description
	EPA 9095

:

ualifiers in this report are defined as follows:
ıdicates that the analyte was not detected at a concentration greater than the detection limit.
cates presence of analyte at a concentration less than the reporting limit (RL) and greater than the detection limit (DL).
icates that the analyte was not detected at a concentration greater than the detection limit.
icates that a quality control analyte recovery is outside of specified acceptance criteria.

data report has been prepared and reviewed
ordance with General Engineering Laboratories
ard operating procedures. Please direct
uestions to your Project Manager, Jack Spitz at (843) 769-7390.

ewed By

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9812046-10

JGS2

GTS DURATEK SHIPPING MANIFEST

M-Area Batch #38 Glass TCLP Samples RM-98-40

981204C

~~23007~~ 31791 1 & 2

SHIPMENT DESTINED TO	SAMPLE CONTAINER IDENTIFICATION		DATE/TIME OF PACKAGING		SAMPLE NET WEIGHT	SHIPPING CONTAINER/ CONTAINER GROSS WEIGHT	SEAL # (IF APPLICABLE)
General Engineering Laboratories	Sample#	Drum#			Grams	Grams	N/A
1,2	VTF-15340 ~~F,G~~	2540	11/12/98	2230	211	250	
3,4 2040 Savage Rd.	VTF-15370 ~~1,07~~	2542	11/13/98	0630	301	340	
Chasn. SC 29414 5,6	VTF-15380 ~~1,08~~	2544	11/13/98	1330	297	336	
7,8	VTF-15390 ~~4,09~~	2546	11/13/98	2130	236	276	
9,10	VTF-15400 ~~5,10~~	2548	11/14/98	0245	213	252	
	Shipping Container		N/A		3 lbs	8 lbs	

Comments: Shipping Number SRS-16533

INFORMATION ONLY

Relinquished by:	Date:	Time:	Received by:	Relinqished by:	Date:	Time:	Received by:
[signature]	11/30/98	1245	[signature] 12-1-98 1600				
Relinquished by:	Date:	Time:	Received by:	Relinqished by:	Date:	Time:	Received by:

C:\..\RCO\Shipp...

DURATEK
10100 Old Columbia Road
Columbia, Maryland 21046
410/312-5100 Fax 410/290-9070

L-98-095

)ecember 10, 1998

Ir. Dan Bills
ubcontract Technical Representative
Vestinghouse Savannah River Company
uilding 730-M
iken, SC 29802

inal Wasteform Treatment Standards and Acceptance Criteria

)ear Mr. Bills:

TS Duratek has completed sampling and analysis of the final wasteform, Batch #37, drums 2484, 486, 2488, 2490, and 2492. The results of the analysis, including the analysis technique, is ttached for your review. The analysis was performed by General Engineering Laboratories, a State f South Carolina certified lab, and verified by Mr. Innocent Joseph, Manager of Technology, GTS)uratek.

esults of the analysis indicate Batch #37 is within the contractual specifications. A total of 47 rums of glass were produced for Batch #37. Should you have any questions, please contact nnocent Joseph or myself.

incerely,

TS DURATEK

)aniel Macias
)irector of Operations

)M/mlb
ttachment

c: S. Campbell
C. Coker

DURATEK

10100 Old Columbia Road
Columbia, Maryland 21046
410/312-5100 Fax 410/290-9070

December 1, 1998

Mr. Dan Macias
Operations Manger
Vendor Treatment Facility (M-area)
GTS Duratek
WSRC/USDOE Savannah River Site
Aiken, SC 29801

Dear Mr. Macias:

Please find enclosed the results of the "TCLP" and 'Paint Filter Test" on glass gems from drums 2484, 2486, 2488, 2490, and 2492. The tests were performed according to methods specified in the "Sampling Plan" for GTS Duratek's Vendor Treatment Facility at the Savannah River site. 1-tailed t-tests were performed on the TCLP data, and the upper acceptance limits for 95% confidence were calculated. The TCLP values are well below the upper acceptance limits for 95% confidence. All of the samples passed the "Paint Filter Test." The samples from Batch # 37 have therefore met all of the acceptance criteria for the glass product.

The calculations for sample means, variances, upper acceptance limits for 95% confidence, data sheets from General Engineering Laboratories, and a sample chain of custody record are enclosed. If you have any questions, please contact me at (410) 312-5120.

Sincerely

Innocent Joseph

Innocent Joseph
Manager, Technology
GTS Duratek

cc: J. Pope
B. Bowan
G. Hildebrandt
C. Coker

The glass gems from batch 37, produced at the GTS Duratek M-area facility, were subjected to "paint filter test" for free water, and "TCLP" for leaching characteristics at General Engineering Laboratories, a South Carolina licensed laboratory. The "paint filter test" and the "TCLP" were done according to EPA procedures 9095 and 1311, respectively. Please find enclosed the results for glass samples from drums 2484 to 2492. The results of the tests are summarized below. 1-tailed t-tests were performed, and the upper limits for 95% confidence were calculated.

The TCLP values are below the acceptance limit for 95% confidence.

Table 1. Summary of TCLP results

Sample ID	Chromium (mg/L)	Nickel (mg/L)	Lead (mg/L)	Uranium (mg/L)	Nitrate (as N)	Paint filter test
GEM Drum # 2484	0.0158	0.281	0.0037	1.690	0.0	Pass
GEM Drum # 2486	0.0161	0.279	0.0041	1.690	0.0	Pass
GEM Drum # 2488	0.0177	0.248	0.0106	1.550	0.0	Pass
GEM Drum # 2490	0.0175	0.285	0.0035	1.720	0.0	Pass
GEM Drum # 2492	0.0164	0.267	0.0032	1.640	0.0	Pass

Student t-test

Number of samples = n = 5

Mean = $\bar{x} = \sum x_i / n$

Variance = $s^2 = \sum(x_i - \bar{x})^2 / (n-1)$

Degrees of freedom for n observations = n-1 = 4

From standard t-tables, the factor "z" for 95% confidence limit ($t_{0.95}$ or $\alpha_{0.05}$) for 4 degrees of freedom is 2.13.

Upper acceptance limit for 95% confidence for a 1-tailed t-test, at 4 degrees of freedom is:

$$\text{Acceptance limit} - (s \times 2.13)/n^{1/2}$$

Table 2. TCLP means, variances, and upper acceptance limits for 95% confidence.

Element	mean ($\bar{x}$)	Variance (s^2)	s	Acceptance limit (mg/L)	Upper acceptance limit for 95% confidence
Chromium	0.0167	7.25 E-7	0.0009	0.86	0.8592
Nickel	0.2720	0.00023	0.0150	5.0	4.9857
Lead	0.0050	9.87 E-6	0.0031	0.37	0.3670
Uranium	1.6580	0.00447	0.0669	4.0	3.9363

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STATE	GEL	EPI
FL	E87156/87294	E87472/87458
NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

:: GTSD00196 Report Date: November 30, 1998

Sample ID	: VTF-1501 #2484
Lab ID	: 9811681-01
Matrix	: TCLP
Date Collected	: 11/05/98
Date Received	: 11/19/98
Priority	: Routine
Collector	: Client

rameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
:als Analysis											
romium	J	15.8	5.98	30.0	ug/l	10.	JSS	11/25/98	0316	136707	1
:kel		281	7.86	7.86	ug/l	10.					
ad		3.68	3.11	3.11	ug/l	10.					
anium		1690	0.251	2.00	ug/l	10.					
ieral Chemistry											
rogen, Nitrate	U	ND	0.0254	0.100	mg/l	2.0	JLG	11/24/98	1412	136683	2

following prep procedures were performed:

? Mass Spec	FGD	11/24/98	1530	136707 3
LP Prep for Metals	JL	11/23/98	1650	136584 4

= Method	Method-Description
1	EPA 6020
2	EPA 300.0
3	EPA 3005
4	EPA 1311

:s:
qualifiers in this report are defined as follows:
indicates that the analyte was not detected at a concentration greater than the detection limit.
licates presence of analyte at a concentration less than the reporting limit (RL) and greater than the detection limit (DL).
dicates that the analyte was not detected at a concentration greater than the detection limit.
licates that a quality control analyte recovery is outside of specified acceptance criteria.

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Laboratory Certifications

STATE	GEL	EPI
FL	E87156/87294	E87472/87458
NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

cc: GTSD00196

Report Date: November 30, 1998

Sample ID : VTF-1501 #2484

M = Method	Method-Description

This data report has been prepared and reviewed in accordance with General Engineering Laboratories standard operating procedures. Please direct any questions to your Project Manager, Jack Spitz at (843) 769-7390.

Reviewed By

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Laboratory Certifications

STATE	GEL	EPI
FL	E87156/87294	E87472/87458
NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

:: GTSD00196 Report Date: November 30, 1998 Page 1 of 1

Sample ID	: VTF-1501 #2484
Lab ID	: 9811681-02
Matrix	: Misc.
Date Collected	: 11/05/98
Date Received	: 11/19/98
Priority	: Routine
Collector	: Client

rameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
eral Chemistry											
nt Filter Test		Pass					BJR	11/23/98	1405	136622	1

= Method	Method-Description
1	EPA 9095

s:
qualifiers in this report are defined as follows:
indicates that the analyte was not detected at a concentration greater than the detection limit.
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licates that a quality control analyte recovery is outside of specified acceptance criteria.

data report has been prepared and reviewed
cordance with General Engineering Laboratories
lard operating procedures. Please direct
questions to your Project Manager, Jack Spitz at (843) 769-7390.

ewed By

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STATE	GEL	EPI
FL	E87156/87294	E87472/87458
NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

cc: GTSD00196

Report Date: November 30, 1998

Sample ID	: VTF-1502 #2486
Lab ID	: 9811681-03
Matrix	: TCLP
Date Collected	: 11/05/98
Date Received	: 11/19/98
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Metals Analysis											
Chromium	J	16.1	5.98	30.0	ug/l	10.	JSS	11/25/98	0324	136707	1
Nickel		279	7.86	7.86	ug/l	10.					
Lead		4.09	3.11	3.11	ug/l	10.					
Uranium		1690	0.251	2.00	ug/l	10.					
General Chemistry											
Nitrogen, Nitrate	U	ND	0.0254	0.100	mg/l	2.0	JLG	11/24/98	1453	136683	2

The following prep procedures were performed:

ICP Mass Spec	FGD	11/24/98	1530	136707 3
TCLP Prep for Metals	JL	11/23/98	1650	136584 4

M = Method	Method-Description
M 1	EPA 6020
M 2	EPA 300.0
M 3	EPA 3005
M 4	EPA 1311

Notes:
The qualifiers in this report are defined as follows:
ND indicates that the analyte was not detected at a concentration greater than the detection limit.
J indicates presence of analyte at a concentration less than the reporting limit (RL) and greater than the detection limit (DL).
U indicates that the analyte was not detected at a concentration greater than the detection limit.
* indicates that a quality control analyte recovery is outside of specified acceptance criteria.

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FL	E87156/87294	E87472/87458
NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

: GTSD00196 Report Date: November 30, 1998 Page 2 of 2

Sample ID : VTF-1502 #2486

= Method	Method-Description

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uestions to your Project Manager, Jack Spitz at (843) 769-7390.

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NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

cc: GTSD00196 Report Date: November 30, 1998

Sample ID	: VTF-1502 #2486
Lab ID	: 9811681-04
Matrix	: Misc.
Date Collected	: 11/05/98
Date Received	: 11/19/98
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
General Chemistry											
Paint Filter Test		Pass					BJR	11/23/98	1405	136622	1

M = Method	Method-Description
M 1	EPA 9095

Notes:
The qualifiers in this report are defined as follows:
ND indicates that the analyte was not detected at a concentration greater than the detection limit.
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U indicates that the analyte was not detected at a concentration greater than the detection limit.
* indicates that a quality control analyte recovery is outside of specified acceptance criteria.

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Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

: GTSD00196 Report Date: November 30, 1998

Sample ID	: VTF-1503 #2488
Lab ID	: 9811681-05
Matrix	: TCLP
Date Collected	: 11/05/98
Date Received	: 11/19/98
Priority	: Routine
Collector	: Client

ameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
ıls Analysis											
ɔmium	J	17.7	5.98	30.0	ug/l	10.	JSS	11/25/98	0331	136707	1
ɛel		248	7.86	7.86	ug/l	10.					
ɨ		10.6	3.11	3.11	ug/l	10.					
ıium		1550	0.251	2.00	ug/l	10.					
ɨral Chemistry											
ogen, Nitrate	U	ND	0.0254	0.100	mg/l	2.0	JLG	11/24/98	1507	136683	2

ollowing prep procedures were performed:

Mass Spec	FGD	11/24/98	1530	136707 3
.P Prep for Metals	JL	11/23/98	1650	136584 4

Method	Method-Description
	EPA 6020
	EPA 300.0
	EPA 3005
	EPA 1311

:

ualifiers in this report are defined as follows:
ıdicates that the analyte was not detected at a concentration greater than the detection limit.
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icates that the analyte was not detected at a concentration greater than the detection limit.
cates that a quality control analyte recovery is outside of specified acceptance criteria.

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NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

cc: GTSD00196 Report Date: November 30, 1998

Sample ID : VTF-1503 #2488

M = Method	Method-Description

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SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

: GTSD00196 Report Date: November 30, 1998 Page 1 of 1

Sample ID	: VTF-1503 #2488
Lab ID	: 9811681-06
Matrix	: Misc.
Date Collected	: 11/05/98
Date Received	: 11/19/98
Priority	: Routine
Collector	: Client

ameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
eral Chemistry											
it Filter Test		Pass					BJR	11/23/98	1405	136622	1

= Method	Method-Description
	EPA 9095

s:
qualifiers in this report are defined as follows:
ndicates that the analyte was not detected at a concentration greater than the detection limit.
icates presence of analyte at a concentration less than the reporting limit (RL) and greater than the detection limit (DL).
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ard operating procedures. Please direct
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NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

cc: GTSD00196

Report Date: November 30, 1998

Sample ID	: VTF-1504 #2490
Lab ID	: 9811681-07
Matrix	: TCLP
Date Collected	: 11/06/98
Date Received	: 11/19/98
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Metals Analysis											
Chromium	J	17.5	5.98	30.0	ug/l	10.	JSS	11/25/98	0338	136707	1
Nickel		285	7.86	7.86	ug/l	10.					
Lead		3.45	3.11	3.11	ug/l	10.					
Uranium		1720	0.251	2.00	ug/l	10.					
General Chemistry											
Nitrogen, Nitrate	U	ND	0.0254	0.100	mg/l	2.0	JLG	11/24/98	1520	136683	2

The following prep procedures were performed:

ICP Mass Spec	FGD	11/24/98	1530	136707 3
TCLP Prep for Metals	JL	11/23/98	1650	136584 4

M = Method	Method-Description
M 1	EPA 6020
M 2	EPA 300.0
M 3	EPA 3005
M 4	EPA 1311

Notes:
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SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

GTSD00196 Report Date: November 30, 1998

Sample ID : VTF-1504 #2490

Method	Method-Description

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NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

cc: GTSD00196

Report Date: November 30, 1998

Sample ID	: VTF-1504 #2490
Lab ID	: 9811681-08
Matrix	: Misc.
Date Collected	: 11/06/98
Date Received	: 11/19/98
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
General Chemistry											
Paint Filter Test		Pass					BJR	11/23/98	1405	136622	1

M = Method	Method-Description
M 1	EPA 9095

Notes:
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This data report has been prepared and reviewed in accordance with General Engineering Laboratories standard operating procedures. Please direct any questions to your Project Manager, Jack Spitz at (843) 769-7390.

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NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

:: GTSD00196 Report Date: November 30, 1998

Sample ID	: VTF-1505 #2492
Lab ID	: 9811681-09
Matrix	: TCLP
Date Collected	: 11/06/98
Date Received	: 11/19/98
Priority	: Routine
Collector	: Client

rameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
als Analysis											
romium	J	16.4	5.98	30.0	ug/l	10.	JSS	11/25/98	0346	136707	1
kel		267	7.86	7.86	ug/l	10.					
d		3.23	3.11	3.11	ug/l	10.					
nium		1640	0.251	2.00	ug/l	10.					
eral Chemistry											
rogen, Nitrate	U	ND	0.0254	0.100	mg/l	2.0	JLG	11/24/98	1534	136683	2

following prep procedures were performed:

Mass Spec				
LP Prep for Metals	FGD	11/24/98	1530	136707 3
	JL	11/23/98	1650	136584 4

= Method	Method-Description
	EPA 6020
	EPA 300.0
	EPA 3005
	EPA 1311

s:
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licates that the analyte was not detected at a concentration greater than the detection limit.
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NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

cc: GTSD00196 Report Date: November 30, 1998

Sample ID : VTF-1505 #2492

M = Method	Method-Description

This data report has been prepared and reviewed in accordance with General Engineering Laboratories standard operating procedures. Please direct any questions to your Project Manager, Jack Spitz at (843) 769-7390.

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STATE	GEL	EPI
FL	E87156/87294	E87472/87458
NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

:c: GTSD00196

Report Date: November 30, 1998

Sample ID	: VTF-1505 #2492
Lab ID	: 9811681-10
Matrix	: Misc.
Date Collected	: 11/06/98
Date Received	: 11/19/98
Priority	: Routine
Collector	: Client

ırameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
ıeral Chemistry											
int Filter Test		Pass					BJR	11/23/98	1405	136622	1

= Method	Method-Description
1	EPA 9095

:s:
qualifiers in this report are defined as follows:
indicates that the analyte was not detected at a concentration greater than the detection limit.
licates presence of analyte at a concentration less than the reporting limit (RL) and greater than the detection limit (DL).
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data report has been prepared and reviewed
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lard operating procedures. Please direct
luestions to your Project Manager, Jack Spitz at (843) 769-7390.

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9811681-10

GTS DURATEK SHIPPING MANIFEST

JGS 2

M-Area Batch #37 Glass TCLP Samples RM-98-39

9811681 %

QH 31771 Tz

SHIPMENT DESTINED TO	SAMPLE CONTAINER IDENTIFICATION		DATE/TIME OF PACKAGING		SAMPLE NET WEIGHT	SHIPPING CONTAINER/ CONTAINER GROSS WEIGHT	SEAL # (IF APPLICABLE)
General Engineering Laboratories 2040 Savage Rd. Chasn. SC 29414	Sample#	Drum#			Grams	Grams	N/A
	VTF-1501	2484	11/05/98	0730	237	276	
	VTF-1502	2486	11/05/98	1515	243	282	
	VTF-1503	2488	11/05/98	2245	246	285	
	VTF-1504	2490	11/06/98	0530	222	261	
	VTF-1505	2492	11/06/98	1410	211	250	
	Shipping Container		N/A		3.25 lbs	8.25 lbs	

Comments: Shipping Number SRS. 16519

INFORMATION ONLY

Relinquished by:	Date:	Time:	Received by:	Relinqished by:	Date:	Time:	Received by:
[signature]	11/18/98	1254	[signature] 11/18/98				
Relinquished by:	Date:	Time:	Received by:	Relinqished by:	Date:	Time:	Received by:

\RCO\Shipping Fo

DURATEK
10100 Old Columbia Road
Columbia, Maryland 21046
410/312-5100 Fax 410/290-9070

L-98-089

November 20, 1998

Mr. Dan Bills
Subcontract Technical Representative
Westinghouse Savannah River Company
Building 730-M
Aiken, SC 29802

Final Wasteform Treatment Standards and Acceptance Criteria

Dear Mr. Bills:

GTS Duratek has completed sampling and analysis of the final wasteform, Batch #36, drums 2438, 2440, 2442, 2444, and 2446. The results of the analysis, including the analysis technique, is attached for your review. The analysis was performed by General Engineering Laboratories, a State of South Carolina certified lab, and verified by Mr. Innocent Joseph, Manager of Technology, GTS Duratek.

Results of the analysis indicate Batch #36 is within the contractual specifications. A total of 66 drums of glass were produced for Batch #36. Should you have any questions, please contact Innocent Joseph or myself.

Sincerely,

GTS DURATEK

Daniel Macias
Director of Operations

DM/mlb
attachment

cc: S. Campbell
C. Coker

DURATEK
10100 Old Columbia Road
Columbia, Maryland 21046
410/312-5100 Fax 410/290-9070

November 11, 1998

Mr. Dan Macias
Operations Manger
Vendor Treatment Facility (M-area)
GTS Duratek
WSRC/USDOE Savannah River Site
Aiken, SC 29801

Dear Mr. Macias:

Please find enclosed the results of the "TCLP" and 'Paint Filter Test" on glass gems from drums 2438, 2440, 2442, 2444, and 2446. The tests were performed according to methods specified in the "Sampling Plan" for GTS Duratek's Vendor Treatment Facility at the Savannah River site. 1-tailed t-tests were performed on the TCLP data, and the upper acceptance limits for 95% confidence were calculated. The TCLP values are well below the upper acceptance limits for 95% confidence. All of the samples passed the "Paint Filter Test." The samples from Batch # 36 have therefore met all of the acceptance criteria for the glass product.

The calculations for sample means, variances, upper acceptance limits for 95% confidence, data sheets from General Engineering Laboratories, and a sample chain of custody record are enclosed. If you have any questions, please contact me at (410) 312-5120.

Sincerely

Innocent Joseph

Innocent Joseph
Manager, Technology
GTS Duratek

cc: J. Pope
B. Bowan
G. Hildebrandt
C. Coker

The glass gems from batch 36, produced at the GTS Duratek M-area facility, were subjected to "paint filter test" for free water, and "TCLP" for leaching characteristics at General Engineering Laboratories, a South Carolina licensed laboratory. The "paint filter test" and the "TCLP" were done according to EPA procedures 9095 and 1311, respectively. Please find enclosed the results for glass samples from drums 2438 to 2446. The results of the tests are summarized below. 1-tailed t-tests were performed, and the upper limits for 95% confidence were calculated.

The TCLP values are below the acceptance limit for 95% confidence.

Table 1. Summary of TCLP results

Sample ID	Chromium (mg/L)	Nickel (mg/L)	Lead (mg/L)	Uranium (mg/L)	Nitrate (as N)	Paint filter test
GEM Drum # 2438	0.0081	0.408	0.0049	1.970	0.0	Pass
GEM Drum # 2440	0.0083	0.454	0.0048	2.160	0.0	Pass
GEM Drum # 2442	0.0100	0.435	0.0036	2.050	0.0	Pass
GEM Drum # 2444	0.0082	0.449	0.0036	2.100	0.0	Pass
GEM Drum # 2446	0.0095	0.497	0.0038	2.310	0.0	Pass

Student t-test

Number of samples = n = 5

Mean = $\bar{x} = \sum x_i / n$

Variance = $s^2 = \sum(x_i - \bar{x})^2 / (n-1)$

Degrees of freedom for n observations = n-1 = 4

From standard t-tables, the factor "z" for 95% confidence limit ($t_{0.95}$ or $\alpha_{0.05}$) for 4 degrees of freedom is 2.13.

Upper acceptance limit for 95% confidence for a 1-tailed t-test, at 4 degrees of freedom is:

$$\text{Acceptance limit} - (s \times 2.13)/n^{1/2}$$

Table 2. TCLP means, variances, and upper acceptance limits for 95% confidence.

Element	mean ($\bar{x}$)	Variance (s^2)	s	Acceptance limit (mg/L)	Upper acceptance limit for 95% confidence
Chromium	0.0088	7.56 E-7	0.0009	0.86	0.8592
Nickel	0.4486	0.00105	0.0324	5.0	4.9691
Lead	0.0042	4.32 E-7	0.0007	0.37	0.3694
Uranium	2.1180	0.01637	0.1279	4.0	3.8781

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SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

: GTSD00196 Report Date: November 10, 1998

Sample ID	: VTF-1471 #2438
Lab ID	: 9811098-01
Matrix	: TCLP
Date Collected	: 10/27/98
Date Received	: 11/03/98
Priority	: Routine
Collector	: Client

ameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
ıls Analysis											
omium	J	8.06	5.98	30.0	ug/l	10.	AME	11/09/98	1125	135339	1
kel		408	7.86	7.86	ug/l	10.					
d		4.90	3.11	3.11	ug/l	10.					
nium		1970	0.251	2.00	ug/l	10.					
ɛral Chemistry											
ogen, Nitrate	U	ND	0.0254	0.100	mg/l	2.0	JLG	11/06/98	1750	135262	2

following prep procedures were performed:

Mass Spec	AJM	11/06/98	1645	135339	3
LP Prep for Metals	JL	11/05/98	1805	135276	4

= Method	Method-Description
	EPA 6020
	EPA 300.0
	EPA 3005
	EPA 1311

s:
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STATE	GEL	EPI
FL	E87156/87294	E87472/87458
NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

cc: GTSD00196 Report Date: November 10, 1998

Sample ID : VTF-1471 #2438

M = Method	Method-Description

This data report has been prepared and reviewed in accordance with General Engineering Laboratories standard operating procedures. Please direct any questions to your Project Manager, Jack Spitz at (843) 769-7390.

Reviewed By

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NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

GTSD00196 Report Date: November 10, 1998 Page 1 of 1

Sample ID	: VTF-1471 #2438
Lab ID	: 9811098-02
Matrix	: Misc.
Date Collected	: 10/27/98
Date Received	: 11/03/98
Priority	: Routine
Collector	: Client

ımeter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
ral Chemistry											
t Filter Test		Pass.					JEN	11/04/98	1115	135200	1

Method	Method-Description
	EPA 9095

:

ıualifiers in this report are defined as follows:
ıdicates that the analyte was not detected at a concentration greater than the detection limit.
cates presence of analyte at a concentration less than the reporting limit (RL) and greater than the detection limit (DL).
licates that the analyte was not detected at a concentration greater than the detection limit.
icates that a quality control analyte recovery is outside of specified acceptance criteria.

data report has been prepared and reviewed
:ordance with General Engineering Laboratories
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9811098-02

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NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

cc: GTSD00196 Report Date: November 10, 1998

Sample ID	: VTF-1472 #2440
Lab ID	: 9811098-03
Matrix	: TCLP
Date Collected	: 10/27/98
Date Received	: 11/03/98
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Metals Analysis											
Chromium	J	8.31	5.98	30.0	ug/l	10.	AME	11/09/98	1131	135339	1
Nickel		454	7.86	7.86	ug/l	10.					
Lead		4.84	3.11	3.11	ug/l	10.					
Uranium		2160	0.251	2.00	ug/l	10.					
General Chemistry											
Nitrogen, Nitrate	U	ND	0.0254	0.100	mg/l	2.0	JLG	11/06/98	1831	135262	2

The following prep procedures were performed:

ICP Mass Spec	AJM	11/06/98	1645	135339 3
TCLP Prep for Metals	JL	11/05/98	1805	135276 4

M = Method	Method-Description
M 1	EPA 6020
M 2	EPA 300.0
M 3	EPA 3005
M 4	EPA 1311

Notes:
The qualifiers in this report are defined as follows:
ND indicates that the analyte was not detected at a concentration greater than the detection limit.
J indicates presence of analyte at a concentration less than the reporting limit (RL) and greater than the detection limit (DL).
U indicates that the analyte was not detected at a concentration greater than the detection limit.
* indicates that a quality control analyte recovery is outside of specified acceptance criteria.

9811098-03

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NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046

Contact: Mr. Innocent Joseph

: GTSD00196 Report Date: November 10, 1998 Page 2 of 2

Sample ID : VTF-1472 #2440

: Method **Method-Description**

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uestions to your Project Manager, Jack Spitz at (843) 769-7390.

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Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

: GTSD00196 Report Date: November 10, 1998 Page 1 of 1

Sample ID	: VTF-1472 #2440
Lab ID	: 9811098-04
Matrix	: Misc.
Date Collected	: 10/27/98
Date Received	: 11/03/98
Priority	: Routine
Collector	: Client

ameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
eral Chemistry											
it Filter Test		Pass.					JEN	11/04/98	1115	135200	1

= Method	Method-Description
	EPA 9095

s:
qualifiers in this report are defined as follows:
ndicates that the analyte was not detected at a concentration greater than the detection limit.
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dicates that the analyte was not detected at a concentration greater than the detection limit.
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cordance with General Engineering Laboratories
lard operating procedures. Please direct
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NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

cc: GTSD00196 Report Date: November 10, 1998

Sample ID	: VTF-1473 #2442
Lab ID	: 9811098-05
Matrix	: TCLP
Date Collected	: 10/27/98
Date Received	: 11/03/98
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Metals Analysis											
Chromium	J	9.96	5.98	30.0	ug/l	10.	AME	11/09/98	1137	135339	1
Nickel		435	7.86	7.86	ug/l	10.					
Lead		3.63	3.11	3.11	ug/l	10.					
Uranium		2050	0.251	2.00	ug/l	10.					
General Chemistry											
Nitrogen, Nitrate	U	ND	0.0254	0.100	mg/l	2.0	JLG	11/06/98	1845	135262	2

The following prep procedures were performed:

ICP Mass Spec	AJM	11/06/98	1645	135339 3
TCLP Prep for Metals	JL	11/05/98	1805	135276 4

M = Method	Method-Description
M 1	EPA 6020
M 2	EPA 300.0
M 3	EPA 3005
M 4	EPA 1311

Notes:
The qualifiers in this report are defined as follows:
ND indicates that the analyte was not detected at a concentration greater than the detection limit.
J indicates presence of analyte at a concentration less than the reporting limit (RL) and greater than the detection limit (DL).
U indicates that the analyte was not detected at a concentration greater than the detection limit.
* indicates that a quality control analyte recovery is outside of specified acceptance criteria.

9811098-05

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NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

: GTSD00196 Report Date: November 10, 1998 Page 2 of 2

Sample ID : VTF-1473 #2442

= Method	Method-Description

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lard operating procedures. Please direct
questions to your Project Manager, Jack Spitz at (843) 769-7390.

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NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

cc: GTSD00196

Report Date: November 10, 1998

Sample ID	: VTF-1473 #2442
Lab ID	: 9811098-06
Matrix	: Misc.
Date Collected	: 10/27/98
Date Received	: 11/03/98
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
General Chemistry											
Paint Filter Test		Pass.					JEN	11/04/98	1115	135200	1

M = Method	Method-Description
M 1	EPA 9095

Notes:
The qualifiers in this report are defined as follows:
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* indicates that a quality control analyte recovery is outside of specified acceptance criteria.

This data report has been prepared and reviewed in accordance with General Engineering Laboratories standard operating procedures. Please direct any questions to your Project Manager, Jack Spitz at (843) 769-7390.

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9811098-06

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NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

: GTSD00196 Report Date: November 10, 1998

Sample ID	: VTF-1474 #2444
Lab ID	: 9811098-07
Matrix	: TCLP
Date Collected	: 10/28/98
Date Received	: 11/03/98
Priority	: Routine
Collector	: Client

ameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
ıls Analysis											
omium	J	8.19	5.98	30.0	ug/l	10.	AME	11/09/98	1144	135339	1
kel		449	7.86	7.86	ug/l	10.					
d		3.60	3.11	3.11	ug/l	10.					
nium		2100	0.251	2.00	ug/l	10.					
ɛral Chemistry											
ʻogen, Nitrate	U	ND	0.0254	0.100	mg/l	2.0	JLG	11/06/98	1859	135262	2

following prep procedures were performed:

' Mass Spec	AJM	11/06/98	1645	135339 3
⌊P Prep for Metals	JL	11/05/98	1805	135276 4

= Method	Method-Description
	EPA 6020
!	EPA 300.0
;	EPA 3005
ł	EPA 1311

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SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

cc: GTSD00196 Report Date: November 10, 1998

Sample ID : VTF-1474 #2444

M = Method	Method-Description

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SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

GTSD00196 Report Date: November 10, 1998

Sample ID	: VTF-1474 #2444
Lab ID	: 9811098-08
Matrix	: Misc.
Date Collected	: 10/28/98
Date Received	: 11/03/98
Priority	: Routine
Collector	: Client

ameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
eral Chemistry											
it Filter Test		Pass.					JEN	11/04/98	1115	135200	1

= Method	Method-Description
	EPA 9095

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SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

cc: GTSD00196 Report Date: November 10, 1998

Sample ID	: VTF-1475 #2446
Lab ID	: 9811098-09
Matrix	: TCLP
Date Collected	: 10/28/98
Date Received	: 11/03/98
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Metals Analysis											
Chromium	J	9.52	5.98	30.0	ug/l	10.	AME	11/09/98	1150	135339	1
Nickel		497	7.86	7.86	ug/l	10.					
Lead		3.81	3.11	3.11	ug/l	10.					
Uranium		2310	0.251	2.00	ug/l	10.					
General Chemistry											
Nitrogen, Nitrate	U	ND	0.0254	0.100	mg/l	2.0	JLG	11/06/98	1912	135262	2

The following prep procedures were performed:

ICP Mass Spec	AJM	11/06/98	1645	135339 3
TCLP Prep for Metals	JL	11/05/98	1805	135276 4

M = Method	Method-Description
M 1	EPA 6020
M 2	EPA 300.0
M 3	EPA 3005
M 4	EPA 1311

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* indicates that a quality control analyte recovery is outside of specified acceptance criteria.

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TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

: GTSD00196 Report Date: November 10, 1998 Page 2 of 2

Sample ID : VTF-1475 #2446

: Method	Method-Description

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cordance with General Engineering Laboratories
lard operating procedures. Please direct
uestions to your Project Manager, Jack Spitz at (843) 769-7390.

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FL	E87156/87294	E87472/87458
NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

cc: GTSD00196 Report Date: November 10, 1998 Page 1 of 1

Sample ID : VTF-1475 #2446
Lab ID : 9811098-10
Matrix : Misc.
Date Collected : 10/28/98
Date Received : 11/03/98
Priority : Routine
Collector : Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
General Chemistry											
Paint Filter Test		Pass.					JEN	11/04/98	1115	135200	1

M = Method	Method Description
M 1	EPA 9095

Notes:
The qualifiers in this report are defined as follows:
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This data report has been prepared and reviewed in accordance with General Engineering Laboratories standard operating procedures. Please direct any questions to your Project Manager, Jack Spitz at (843) 769-7390.

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9811098-10

JGS 2

M-Area Batch #36 Glass TCLP Samples RM-98-38

9811098 2/2

SHIPMENT DESTINED TO	SAMPLE CONTAINER IDENTIFICATION		DATE/TIME OF PACKAGING		SAMPLE NET WEIGHT	SHIPPING CONTAINER/ CONTAINER GROSS WEIGHT	SEAL # (IF APPLICABLE)
	Sample#	Drum#			Grams	Grams	N/A
General Engineering Laboratories 01 02	VTF-1471	2438	10/27/98	0630	610	716	
03 04	VTF-1472	2440	10/27/98	1115	834	940	
2040 Savage Rd. Chasn. SC 29414 05 06	VTF-1473	2442	10/27/98	2130	429	535	
07 08	VTF-1474	2444	10/28/98	0345	467	573	
09 10	VTF-1475	2446	10/28/98	0720	707	813	
	Shipping Container		N/A		8 lbs	13 lbs	

Comments: Shipping Number

SRS-16504

INFORMATION ONLY

Relinquished by:	Date:	Time:	Received by:	Relinqished by:	Date:	Time:	Received by
M. Grunhom	11/3/98	0730					
Relinquished by:	Date: 11/3/98	Time: 1800	Received by: Francis	Relinqished by:	Date:	Time:	Received by

Blank

10100 Old Columbia Road
Columbia, Maryland 21046
410/312-5100 Fax 410/290-9070

L-98-088

November 20, 1998

Mr. Dan Bills
Subcontract Technical Representative
Westinghouse Savannah River Company
Building 730-M
Aiken, SC 29802

Final Wasteform Treatment Standards and Acceptance Criteria

Dear Mr. Bills:

GTS Duratek has completed sampling and analysis of the final wasteform, Batch #35, drums 2372, 2374, 2376, 2378, and 2380. The results of the analysis, including the analysis technique, is attached for your review. The analysis was performed by General Engineering Laboratories, a State of South Carolina certified lab, and verified by Mr. Innocent Joseph, Manager of Technology, GTS Duratek.

Results of the analysis indicate Batch #35 is within the contractual specifications. A total of 63 drums of glass were produced for Batch #35. Should you have any questions, please contact Innocent Joseph or myself.

Sincerely,

GTS DURATEK

Daniel Macias
Director of Operations

DM/mlb
attachment

cc: S. Campbell
C. Coker

DURATEK
10100 Old Columbia Road
Columbia, Maryland 21046
410/312-5100 Fax 410/290-9070

November 11, 1998

Mr. Dan Macias
Operations Manger
Vendor Treatment Facility (M-area)
GTS Duratek
WSRC/USDOE Savannah River Site
Aiken, SC 29801

Dear Mr. Macias:

Please find enclosed the results of the "TCLP" and 'Paint Filter Test" on glass gems from drums 2372, 2374, 2376, 2378, and 2380. The tests were performed according to methods specified in the "Sampling Plan" for GTS Duratek's Vendor Treatment Facility at the Savannah River site. 1-tailed t-tests were performed on the TCLP data, and the upper acceptance limits for 95% confidence were calculated. The TCLP values are well below the upper acceptance limits for 95% confidence. All of the samples passed the "Paint Filter Test." The samples from Batch # 35 have therefore met all of the acceptance criteria for the glass product.

The calculations for sample means, variances, upper acceptance limits for 95% confidence, data sheets from General Engineering Laboratories, and a sample chain of custody record are enclosed. If you have any questions, please contact me at (410) 312-5120.

Sincerely
Innocent Joseph
Innocent Joseph
Manager, Technology
GTS Duratek

cc: J. Pope
B. Bowan
G. Hildebrandt
C. Coker

The glass gems from batch 35, produced at the GTS Duratek M-area facility, were subjected to "paint filter test" for free water, and "TCLP" for leaching characteristics at General Engineering Laboratories, a South Carolina licensed laboratory. The "paint filter test" and the "TCLP" were done according to EPA procedures 9095 and 1311, respectively. Please find enclosed the results for glass samples from drums 2372 to 2380. The results of the tests are summarized below. 1-tailed t-tests were performed, and the upper limits for 95% confidence were calculated.

The TCLP values are below the acceptance limit for 95% confidence.

Table 1. Summary of TCLP results

Sample ID	Chromium (mg/L)	Nickel (mg/L)	Lead (mg/L)	Uranium (mg/L)	Nitrate (as N)	Paint filter test
GEM Drum # 2372	< 0.006	0.283	0.0049	2.070	0.0	Pass
GEM Drum # 2374	0.0071	0.278	< 0.003	2.030	0.0	Pass
GEM Drum # 2376	0.0076	0.267	0.0033	1.950	0.0	Pass
GEM Drum # 2378	0.0074	0.272	0.0230	1.940	0.0	Pass
GEM Drum # 2380	0.0096	0.289	0.0038	2.080	0.0	Pass

Student t-test

Number of samples = n = 5

Mean = $\bar{x} = \sum x_i / n$

Variance = $s^2 = \sum(x_i - \bar{x})^2 / (n-1)$

Degrees of freedom for n observations = n-1 = 4

From standard t-tables, the factor "z" for 95% confidence limit ($t_{0.95}$ or $\alpha_{0.05}$) for 4 degrees of freedom is 2.13.

Upper acceptance limit for 95% confidence for a 1-tailed t-test, at 4 degrees of freedom is:

$$\text{Acceptance limit} - (s \times 2.13)/n^{1/2}$$

Table 2. TCLP means, variances, and upper acceptance limits for 95% confidence.

Element	mean ($\bar{x}$)	Variance (s^2)	s	Acceptance limit (mg/L)	Upper acceptance limit for 95% confidence
Chromium	0.0063	1.35 E-5	0.0037	0.86	0.8565
Nickel	0.2778	7.57 E-5	0.0087	5.0	4.9917
Lead	0.0070	8.34 E-5	0.0091	0.37	0.3613
Uranium	2.0140	0.00433	0.0658	4.0	3.9373

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FL	E87156/87294	E87472/87458
NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

GTSD00196 Report Date: November 10, 1998

Sample ID	: VTF-1434 #2372
Lab ID	: 9811099-01
Matrix	: TCLP
Date Collected	: 10/17/98
Date Received	: 11/03/98
Priority	: Routine
Collector	: Client

ameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
ls Analysis											
mium	U	ND	5.98	30.0	ug/l	10.	AME	11/09/98	1215	135339	1
el		283	7.86	7.86	ug/l	10.					
		4.91	3.11	3.11	ug/l	10.					
ium		2070	0.251	2.00	ug/l	10.					
ral Chemistry											
ogen, Nitrate	U	ND	0.0254	0.100	mg/l	2.0	JLG	11/06/98	1926	135262	2

ollowing prep procedures were performed:

Mass Spec	AJM	11/06/98	1645	135339 3
P Prep for Metals	JL	11/05/98	1805	135276 4

Method	Method-Description
	EPA 6020
	EPA 300.0
	EPA 3005
	EPA 1311

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cates presence of analyte at a concentration less than the reporting limit (RL) and greater than the detection limit (DL).

icates that the analyte was not detected at a concentration greater than the detection limit.

cates that a quality control analyte recovery is outside of specified acceptance criteria.

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NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

cc: GTSD00196 Report Date: November 10, 1998

Sample ID : VTF-1434 #2372

M = Method **Method-Description**

This data report has been prepared and reviewed in accordance with General Engineering Laboratories standard operating procedures. Please direct any questions to your Project Manager, Jack Spitz at (843) 769-7390.

Reviewed By

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TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

: GTSD00196 Report Date: November 10, 1998 Page 1 of 1

Sample ID	: VTF-1434 #2372
Lab ID	: 9811099-02
Matrix	: Misc.
Date Collected	: 10/17/98
Date Received	: 11/03/98
Priority	: Routine
Collector	: Client

ameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
eral Chemistry											
it Filter Test		Pass.					JEN	11/04/98	1115	135200	1

: Method	Method-Description
	EPA 9095

s:
qualifiers in this report are defined as follows:
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9811099-02

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FL	E87156/87294	E87472/87458
NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

cc: GTSD00196 Report Date: November 10, 1998

Sample ID : VTF-1435 #2374
Lab ID : 9811099-03
Matrix : TCLP
Date Collected : 10/17/98
Date Received : 11/03/98
Priority : Routine
Collector : Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Metals Analysis											
Chromium	J	7.10	5.98	30.0	ug/l	10.	AME	11/09/98	1221	135339	1
Nickel		278	7.86	7.86	ug/l	10.					
Lead	U	ND	3.11	3.11	ug/l	10.					
Uranium		2030	0.251	2.00	ug/l	10.					
General Chemistry											
Nitrogen, Nitrate	U	ND	0.0254	0.100	mg/l	2.0	JLG	11/07/98	1437	135262	2

The following prep procedures were performed:

ICP Mass Spec	AJM	11/06/98	1645	135339	3
TCLP Prep for Metals	JL	11/05/98	1805	135276	4

M = Method	Method-Description
M 1	EPA 6020
M 2	EPA 300.0
M 3	EPA 3005
M 4	EPA 1311

Notes:
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ND indicates that the analyte was not detected at a concentration greater than the detection limit.
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U indicates that the analyte was not detected at a concentration greater than the detection limit.
* indicates that a quality control analyte recovery is outside of specified acceptance criteria.

9811099-03

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NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact. Mr. Innocent Joseph

:: GTSD00196 Report Date: November 10, 1998

Sample ID : VTF-1435 #2374

= Method	Method-Description

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SC	10120	10582
TN	02934	02934

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10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

cc: GTSD00196 Report Date: November 10, 1998 Page 1 of 1

Sample ID	: VTF-1435 #2374
Lab ID	: 9811099-04
Matrix	: Misc.
Date Collected	: 10/17/98
Date Received	: 11/03/98
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
General Chemistry											
Paint Filter Test		Pass.					JEN	11/04/98	1115	135200	1

M = Method	Method-Description
M 1	EPA 9095

Notes:
The qualifiers in this report are defined as follows:
ND indicates that the analyte was not detected at a concentration greater than the detection limit.
J indicates presence of analyte at a concentration less than the reporting limit (RL) and greater than the detection limit (DL).
U indicates that the analyte was not detected at a concentration greater than the detection limit.
* indicates that a quality control analyte recovery is outside of specified acceptance criteria.

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9811099-04

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NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

: GTSD00196 Report Date: November 10, 1998

Sample ID	: VTF-1436 #2376
Lab ID	: 9811099-05
Matrix	: TCLP
Date Collected	: 10/18/98
Date Received	: 11/03/98
Priority	: Routine
Collector	: Client

ameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
ls Analysis											
omium	J	7.63	5.98	30.0	ug/l	10.	AME	11/09/98	1227	135339	1
kel		267	7.86	7.86	ug/l	10.					
d		3.32	3.11	3.11	ug/l	10.					
nium		1950	0.251	2.00	ug/l	10.					
eral Chemistry											
ogen, Nitrate	U	ND	0.0254	0.100	mg/l	2.0	JLG	11/07/98	1451	135262	2

following prep procedures were performed:

Mass Spec	AJM	11/06/98	1645	135339 3
LP Prep for Metals	JL	11/05/98	1805	135276 4

= Method	Method-Description
	EPA 6020
	EPA 300.0
	EPA 3005
	EPA 1311

s:
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NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

cc: GTSD00196 Report Date: November 10, 1998

Sample ID : VTF-1436 #2376

M = Method **Method-Description**

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SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

: GTSD00196 Report Date: November 10, 1998 Page 1 of 1

Sample ID	: VTF-1436 #2376
Lab ID	: 9811099-06
Matrix	: Misc.
Date Collected	: 10/18/98
Date Received	: 11/03/98
Priority	: Routine
Collector	: Client

ameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
:ral Chemistry											
it Filter Test		Pass.					JEN	11/04/98	1115	135200	1

: Method	Method-Description
	EPA 9095

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TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

cc: GTSD00196 Report Date: November 10, 1998

Sample ID : VTF-1437 #2378
Lab ID : 9811099-07
Matrix : TCLP
Date Collected : 10/18/98
Date Received : 11/03/98
Priority : Routine
Collector : Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Metals Analysis											
Chromium	J	7.43	5.98	30.0	ug/l	10.	AME	11/09/98	1235	135339	1
Nickel		272	7.86	7.86	ug/l	10.					
Lead		23.0	3.11	3.11	ug/l	10.					
Uranium		1940	0.251	2.00	ug/l	10.					
General Chemistry											
Nitrogen, Nitrate	U	ND	0.0254	0.100	mg/l	2.0	JLG	11/07/98	1505	135262	2

The following prep procedures were performed:

ICP Mass Spec	AJM	11/06/98	1645	135339 3
TCLP Prep for Metals	JL	11/05/98	1805	135276 4

M = Method	Method-Description
M 1	EPA 6020
M 2	EPA 300.0
M 3	EPA 3005
M 4	EPA 1311

Notes:
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9811099-07

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SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

: GTSD00196 Report Date: November 10, 1998

Sample ID : VTF-1437 #2378

= Method	Method-Description

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SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

cc: GTSD00196

Report Date: November 10, 1998

Sample ID	: VTF-1437 #2378
Lab ID	: 9811099-08
Matrix	: Misc.
Date Collected	: 10/18/98
Date Received	: 11/03/98
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
General Chemistry											
Paint Filter Test		Pass.					JEN	11/04/98	1115	135200	1

M = Method	Method-Description
M 1	EPA 9095

Notes:
The qualifiers in this report are defined as follows:
ND indicates that the analyte was not detected at a concentration greater than the detection limit.
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This data report has been prepared and reviewed in accordance with General Engineering Laboratories standard operating procedures. Please direct any questions to your Project Manager, Jack Spitz at (843) 769-7390.

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SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

: GTSD00196 Report Date: November 10, 1998

Sample ID	: VTF-1438 #2380
Lab ID	: 9811099-09
Matrix	: TCLP
Date Collected	: 10/18/98
Date Received	: 11/03/98
Priority	: Routine
Collector	: Client

ameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
ıls Analysis											
omium	J	9.56	5.98	30.0	ug/l	10.	AME	11/09/98	1241	135339	1
kel		289	7.86	7.86	ug/l	10.					
d		3.75	3.11	3.11	ug/l	10.					
nium		2080	0.251	2.00	ug/l	10.					
:ral Chemistry											
ogen, Nitrate	U	ND	0.0254	0.100	mg/l	2.0	JLG	11/07/98	1518	135262	2

following prep procedures were performed:

Mass Spec	AJM	11/06/98	1645	135339 3
LP Prep for Metals	JL	11/05/98	1805	135276 4

: Method	Method-Description
	EPA 6020
	EPA 300.0
	EPA 3005
	EPA 1311

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NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

cc: GTSD00196 Report Date: November 10, 1998

Sample ID : VTF-1438 #2380

M = Method **Method-Description**

This data report has been prepared and reviewed in accordance with General Engineering Laboratories standard operating procedures. Please direct any questions to your Project Manager, Jack Spitz at (843) 769-7390.

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NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

: GTSD00196 Report Date: November 10, 1998 Page 1 of 1

Sample ID	: VTF-1438 #2380
Lab ID	: 9811099-10
Matrix	: Misc.
Date Collected	: 10/18/98
Date Received	: 11/03/98
Priority	: Routine
Collector	: Client

ameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
eral Chemistry											
nt Filter Test		Pass.					JEN	11/04/98	1115	135200	1

= Method	Method-Description
l	EPA 9095

s:
qualifiers in this report are defined as follows:
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data report has been prepared and reviewed
cordance with General Engineering Laboratories
lard operating procedures. Please direct
questions to your Project Manager, Jack Spitz at (843) 769-7390.

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JGS2

GTS DURATEK SHIPPING MANIFEST

M-Area Batch #35 Glass TCLP Samples RM-98-37 98110976

SHIPMENT DESTINED TO	SAMPLE CONTAINER IDENTIFICATION		DATE/TIME OF PACKAGING		SAMPLE NET WEIGHT	SHIPPING CONTAINER/ CONTAINER GROSS WEIGHT	SEAL # (IF APPLICABLE)
General Engineering Laboratories 2040 Savage Rd. Chasn. SC 29414	Sample#	Drum#			Grams	Grams	N/A
52	VTF-1434	2372	10/17/98	0945	293	325	
53/54	VTF-1435	2374	10/17/98	2120	213	245	
56	VTF-1436	2376	10/18/98	2376	276	308	
57/58	VTF-1437	2378	10/18/98	2378	294	326	
09/10	VTF-1438	2380	10/18/98	2380	313	345	
	Shipping Container		N/A		4 lbs	11 lbs	

Comments: Shipping Number SRS-10495

INFORMATION ONLY

Relinquished by:	Date:	Time:	Received by	Relinqished by:	Date:	Time:	Received by:
M. Spurlock	11/3/98	0730					
Relinquished by	Date:	Time:	Received by	Relinqished by:	Date:	Time:	Received by:
	11/3/98	1800	Francis				

RCO Shipping

DURATEK
10100 Old Columbia Road
Columbia, Maryland 21046
410/312-5100 Fax 410/290-9070

L-98-085

November 6, 1998

Mr. Dan Bills
Subcontract Technical Representative
Westinghouse Savannah River Company
Building 730-M
Aiken, SC 29802

Final Wasteform Treatment Standards and Acceptance Criteria

Dear Mr. Bills:

GTS Duratek has completed sampling and analysis of the final wasteform, Batch #34, drums 2308, 2310, 2312, 2314, and 2316. The results of the analysis, including the analysis technique, is attached for your review. The analysis was performed by General Engineering Laboratories, a State of South Carolina certified lab, and verified by Mr. Innocent Joseph, Manager of Technology, GTS Duratek.

Results of the analysis indicate Batch #34 is within the contractual specifications. A total of 66 drums of glass were produced for Batch #34. Should you have any questions, please contact Innocent Joseph or myself.

Sincerely,

GTS DURATEK

Daniel Macias
Director of Operations

DM/mlb
attachment

cc: S. Campbell
C. Coker

DURATEK

10100 Old Columbia Road
Columbia, Maryland 21046
410/312-5100 Fax 410/290-9070

November 2, 1998

Mr. Dan Macias
Operations Manger
Vendor Treatment Facility (M-area)
GTS Duratek
WSRC/USDOE Savannah River Site
Aiken, SC 29801

Dear Mr. Macias:

Please find enclosed the results of the "TCLP" and 'Paint Filter Test" on glass gems from drums 2308, 2310, 2312, 2314, and 2316. The tests were performed according to methods specified in the "Sampling Plan" for GTS Duratek's Vendor Treatment Facility at the Savannah River site. 1-tailed t-tests were performed on the TCLP data, and the upper acceptance limits for 95% confidence were calculated. The TCLP values are well below the upper acceptance limits for 95% confidence. All of the samples passed the "Paint Filter Test." The samples from Batch # 34 have therefore met all of the acceptance criteria for the glass product.

The calculations for sample means, variances, upper acceptance limits for 95% confidence, data sheets from General Engineering Laboratories, and a sample chain of custody record are enclosed. If you have any questions, please contact me at (410) 312-5120.

Sincerely

Innocent Joseph

Innocent Joseph
Manager, Technology
GTS Duratek

cc: J. Pope
B. Bowan
G. Hildebrandt
C. Coker

The glass gems from batch 34, produced at the GTS Duratek M-area facility, were subjected to "paint filter test" for free water, and "TCLP" for leaching characteristics at General Engineering Laboratories, a South Carolina licensed laboratory. The "paint filter test" and the "TCLP" were done according to EPA procedures 9095 and 1311, respectively. Please find enclosed the results for glass samples from drums 2308 to 2316. The results of the tests are summarized below. 1-tailed t-tests were performed, and the upper limits for 95% confidence were calculated.

The TCLP values are below the acceptance limit for 95% confidence.

Table 1. Summary of TCLP results

Sample ID	Chromium (mg/L)	Nickel (mg/L)	Lead (mg/L)	Uranium (mg/L)	Nitrate (as N)	Paint filter test
GEM Drum # 2308	0.0139	0.257	0.0046	1.960	0.0	Pass
GEM Drum # 2310	0.0136	0.256	0.0029	2.090	0.0	Pass
GEM Drum # 2312	0.0120	0.283	0.0029	2.280	0.0	Pass
GEM Drum # 2314	0.0136	0.285	0.0380	2.230	0.0	Pass
GEM Drum # 2316	0.0145	0.296	0.0037	2.410	0.0	Pass

Student t-test

Number of samples = n = 5

Mean = $\bar{x} = \sum x_i / n$

Variance = $s^2 = \sum (x_i - \bar{x})^2 / (n-1)$

Degrees of freedom for n observations = n-1 = 4

From standard t-tables, the factor "z" for 95% confidence limit ($t_{0.95}$ or $\alpha_{0.05}$) for 4 degrees of freedom is 2.13.

Upper acceptance limit for 95% confidence for a 1-tailed t-test, at 4 degrees of freedom is:

$$\text{Acceptance limit} - (s \times 2.13)/n^{1/2}$$

Table 2. TCLP means, variances, and upper acceptance limits for 95% confidence.

Element	mean ($\bar{x}$)	Variance (s^2)	s	Acceptance limit (mg/L)	Upper acceptance limit for 95% confidence
Chromium	0.0135	8.57 E-7	0.0009	0.86	0.8591
Nickel	0.2754	0.00032	0.0180	5.0	4.9829
Lead	0.0104	0.00024	0.0154	0.37	0.3553
Uranium	2.1940	0.03023	0.1739	4.0	3.8344

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SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

GTSD00196 Report Date: October 29, 1998

Sample ID	: VTF-1390 #2308
Lab ID	: 9810738-01
Matrix	: TCLP
Date Collected	: 10/08/98
Date Received	: 10/21/98
Priority	: Routine
Collector	: Client

ameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
ls Analysis											
omium	J	13.9	2.99	15.0	ug/l	5.0	JSS	10/28/98	1708	134366	1
cel		257	3.93	3.93	ug/l	5.0					
d		4.57	1.55	1.55	ug/l	5.0					
ium		1960	0.126	1.00	ug/l	5.0					
ral Chemistry											
ogen, Nitrate	U	ND	0.0254	0.100	mg/l	2.0	RWS	10/26/98	0916	134314	2

ollowing prep procedures were performed:

Mass Spec	FGD	10/28/98	1100	134366 3
P Prep for Metals	JL	10/22/98	1550	134267 4

Method	Method-Description
	EPA 6020
	EPA 300.0
	EPA 3005
	EPA 1311

ualifiers in this report are defined as follows:
ndicates that the analyte was not detected at a concentration greater than the detection limit.
cates presence of analyte at a concentration less than the reporting limit (RL) and greater than the detection limit (DL).
icates that the analyte was not detected at a concentration greater than the detection limit.
cates that a quality control analyte recovery is outside of specified acceptance criteria.

9810738-01

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TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

cc: GTSD00196

Report Date: October 29, 1998

Sample ID : VTF-1390 #2308

M = Method	Method-Description

This data report has been prepared and reviewed in accordance with General Engineering Laboratories standard operating procedures. Please direct any questions to your Project Manager, Jack Spitz at (843) 769-7390.

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Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

: GTSD00196 Report Date: October 29, 1998 Page 1 of 1

Sample ID	: VTF-1390 #2308
Lab ID	: 9810738-02
Matrix	: Misc.
Date Collected	: 10/08/98
Date Received	: 10/21/98
Priority	: Routine
Collector	: Client

ameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
eral Chemistry											
it Filter Test		Pass.					JEN	10/27/98	1400	134582	1

: Method	Method-Description
	EPA 9095

s:
qualifiers in this report are defined as follows:
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NC	233	
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TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

cc: GTSD00196

Report Date: October 29, 1998

Sample ID	: VTF-1394 #2310
Lab ID	: 9810738-03
Matrix	: TCLP
Date Collected	: 10/08/98
Date Received	: 10/21/98
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Metals Analysis											
Chromium	J	13.6	2.99	15.0	ug/l	5.0	JSS	10/28/98	1714	134366	1
Nickel		256	3.93	3.93	ug/l	5.0					
Lead		2.89	1.55	1.55	ug/l	5.0					
Uranium		2090	0.126	1.00	ug/l	5.0					
General Chemistry											
Nitrogen, Nitrate	U	ND	0.0254	0.100	mg/l	2.0	JLG	10/26/98	0957	134314	2

The following prep procedures were performed:

ICP Mass Spec	FGD	10/28/98	1100	134366 3
TCLP Prep for Metals	JL	10/22/98	1550	134267 4

M = Method	Method-Description
M 1	EPA 6020
M 2	EPA 300.0
M 3	EPA 3005
M 4	EPA 1311

Notes:
The qualifiers in this report are defined as follows:
ND indicates that the analyte was not detected at a concentration greater than the detection limit.
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Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

GTSD00196 Report Date: October 29, 1998 Page 2 of 2

Sample ID : VTF-1394 #2310

Method	Method-Description

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Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

cc: GTSD00196

Report Date: October 29, 1998

Sample ID	: VTF-1394 #2310
Lab ID	: 9810738-04
Matrix	: Misc.
Date Collected	: 10/08/98
Date Received	: 10/21/98
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
General Chemistry											
Paint Filter Test		Pass.					JEN	10/27/98	1400	134582	1

M = Method	Method-Description
M 1	EPA 9095

Notes:
The qualifiers in this report are defined as follows:
ND indicates that the analyte was not detected at a concentration greater than the detection limit.
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* indicates that a quality control analyte recovery is outside of specified acceptance criteria.

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Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

: GTSD00196 Report Date: October 29, 1998

Sample ID	: VTF-1395 #2312
Lab ID	: 9810738-05
Matrix	: TCLP
Date Collected	: 10/08/98
Date Received	: 10/21/98
Priority	: Routine
Collector	: Client

·ameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
als Analysis											
·omium	J	12.0	2.99	15.0	ug/l	5.0	JSS	10/28/98	1720	134366	1
kel		283	3.93	3.93	ug/l	5.0					
ıd		2.90	1.55	1.55	ug/l	5.0					
ınium		2280	0.126	1.00	ug/l	5.0					
eral Chemistry											
rogen, Nitrate	U	ND	0.0254	0.100	mg/l	2.0	JLG	10/26/98	1011	134314	2

following prep procedures were performed:

' Mass Spec	FGD	10/28/98	1100	134366 3
LP Prep for Metals	JL	10/22/98	1550	134267 4

= Method	Method-Description
	EPA 6020
)	EPA 300.0
}	EPA 3005
{	EPA 1311

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Client: GTS Duratek
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Contact. Mr. Innocent Joseph

cc: GTSD00196 Report Date: October 29, 1998

Sample ID : VTF-1395 #2312

M = Method **Method-Description**

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TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
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Contact: Mr. Innocent Joseph

c: GTSD00196 Report Date: October 29, 1998

Sample ID	: VTF-1395 #2312
Lab ID	: 9810738-06
Matrix	: Misc.
Date Collected	: 10/08/98
Date Received	: 10/21/98
Priority	: Routine
Collector	: Client

rameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
eral Chemistry											
nt Filter Test		Pass.					JEN	10/27/98	1400	134582	1

= Method	Method-Description
1	EPA 9095

s:
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data report has been prepared and reviewed
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SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

cc: GTSD00196

Report Date: October 29, 1998

Sample ID	: VTF-1398 #2314
Lab ID	: 9810738-07
Matrix	: TCLP
Date Collected	: 10/10/98
Date Received	: 10/21/98
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Metals Analysis											
Chromium	J	13.6	2.99	15.0	ug/l	5.0	JSS	10/28/98	1726	134366	1
Nickel		285	3.93	3.93	ug/l	5.0					
Lead		38.0	1.55	1.55	ug/l	5.0					
Uranium		2230	0.126	1.00	ug/l	5.0					
General Chemistry											
Nitrogen, Nitrate	U	ND	0.0254	0.100	mg/l	2.0	JLG	10/26/98	1025	134314	2

The following prep procedures were performed:

ICP Mass Spec	FGD	10/28/98	1100	134366 3
TCLP Prep for Metals	JL	10/22/98	1550	134267 4

M = Method	Method-Description
M 1	EPA 6020
M 2	EPA 300.0
M 3	EPA 3005
M 4	EPA 1311

Notes:
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: GTSD00196 Report Date: October 29, 1998 Page 2 of 2

Sample ID : VTF-1398 #2314

: Method	Method-Description

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SC	10120	10582
TN	02934	02934

Client: GTS Duratek
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Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

cc: GTSD00196

Report Date: October 29, 1998

Sample ID	: VTF-1398 #2314
Lab ID	: 9810738-08
Matrix	: Misc.
Date Collected	: 10/10/98
Date Received	: 10/21/98
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
General Chemistry											
Paint Filter Test		Pass.					JEN	10/27/98	1400	134582	1

M = Method	Method-Description
M 1	EPA 9095

Notes:
The qualifiers in this report are defined as follows:
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This data report has been prepared and reviewed in accordance with General Engineering Laboratories standard operating procedures. Please direct any questions to your Project Manager, Jack Spitz at (843) 769-7390.

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SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

GTSD00196 Report Date: October 29, 1998

Sample ID	: VTF-1399 #2316
Lab ID	: 9810738-09
Matrix	: TCLP
Date Collected	: 10/10/98
Date Received	: 10/21/98
Priority	: Routine
Collector	: Client

ımeter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
ls Analysis											
ımium	J	14.5	2.99	15.0	ug/l	5.0	JSS	10/28/98	1731	134366	1
:el		296	3.93	3.93	ug/l	5.0					
l		3.69	1.55	1.55	ug/l	5.0					
ıium		2410	0.126	1.00	ug/l	5.0					
ral Chemistry											
)gen, Nitrate	U	ND	0.0254	0.100	mg/l	2.0	JLG	10/26/98	1039	134314	2

ollowing prep procedures were performed:

Mass Spec	FGD	10/28/98	1100	134366	3
P Prep for Metals	JL	10/22/98	1550	134267	4

Method	Method-Description
	EPA 6020
	EPA 300.0
	EPA 3005
	EPA 1311

:

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SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

cc: GTSD00196 Report Date: October 29, 1998

Sample ID : VTF-1399 #2316

M = Method **Method-Description**

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SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

: GTSD00196 Report Date: October 29, 1998 Page 1 of 1

Sample ID	: VTF-1399 #2316
Lab ID	: 9810738-10
Matrix	: Misc.
Date Collected	: 10/10/98
Date Received	: 10/21/98
Priority	: Routine
Collector	: Client

ameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
ral Chemistry											
it Filter Test		Pass.					JEN	10/27/98	1400	134582	1

: Method	Method-Description
	EPA 9095

s:
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9810738 10

M-Area Batch #34 Glass TCLP Samples RM-98-36

9810738%

SHIPMENT DESTINED TO	SAMPLE CONTAINER IDENTIFICATION		DATE/TIME OF PACKAGING		SAMPLE NET WEIGHT	SHIPPING CONTAINER/ CONTAINER GROSS WEIGHT	SEAL # (IF APPLICABLE)
	Sample#	Drum#			Grams	Grams	N/A
General Engineering Laboratories 2040 Savage Rd. Chasn. SC 29414	VTF-1390	2308	10/08/98	0130	224	256	
	VTF-1394	2310	10/08/98	1000	222	254	
	VTF-1395	2312	10/08/98	1600	304	336	
	VTF-1398	2314	10/10/98	0300	278	310	
	VTF-1399	2316	10/10/98	0615	180	212	
	Shipping Container		N/A		6 lbs	12 lbs	

Comments: Shipping Number SRS-16449-MLS 10/16/98
16448

INFORMATION ONLY

Relinquished by:	Date:	Time:	Received by:	Relinqished by:	Date:	Time:	Received by:
			10/20/98				
Relinquished by:	Date:	Time:	Received by:	Relinqished by:	Date:	Time:	Received by:

C:\..\RCO\Shipping Forms\...

DURATEK
10100 Old Columbia Road
Columbia, Maryland 21046
410/312-5100 Fax 410/290-9070

L-98-084

November 6, 1998

Mr. Dan Bills
Subcontract Technical Representative
Westinghouse Savannah River Company
Building 730-M
Aiken, SC 29802

Final Wasteform Treatment Standards and Acceptance Criteria

Dear Mr. Bills:

GTS Duratek has completed sampling and analysis of the final wasteform, Batch #33, drums 2242, 2244, 2246, 2248, and 2250. The results of the analysis, including the analysis technique, is attached for your review. The analysis was performed by General Engineering Laboratories, a State of South Carolina certified lab, and verified by Mr. Innocent Joseph, Manager of Technology, GTS Duratek.

Results of the analysis indicate Batch #33 is within the contractual specifications. A total of 58 drums of glass were produced for Batch #33. Should you have any questions, please contact Innocent Joseph or myself.

Sincerely,

GTS DURATEK

Daniel Macias
Director of Operations

DM/mlb
attachment

cc: S. Campbell
C. Coker

DURATEK

10100 Old Columbia Road
Columbia, Maryland 21046
410/312-5100 Fax 410/290-9070

November 2, 1998

Mr. Dan Macias
Operations Manger
Vendor Treatment Facility (M-area)
GTS Duratek
WSRC/USDOE Savannah River Site
Aiken, SC 29801

Dear Mr. Macias:

Please find enclosed the results of the "TCLP" and 'Paint Filter Test" on glass gems from drums 2242, 2244, 2246, 2248, and 2250. The tests were performed according to methods specified in the "Sampling Plan" for GTS Duratek's Vendor Treatment Facility at the Savannah River site. 1-tailed t-tests were performed on the TCLP data, and the upper acceptance limits for 95% confidence were calculated. The TCLP values are well below the upper acceptance limits for 95% confidence. All of the samples passed the "Paint Filter Test." The samples from Batch # 33 have therefore met all of the acceptance criteria for the glass product.

The calculations for sample means, variances, upper acceptance limits for 95% confidence, data sheets from General Engineering Laboratories, and a sample chain of custody record are enclosed. If you have any questions, please contact me at (410) 312-5120.

Sincerely

Innocent Joseph

Innocent Joseph
Manager, Technology
GTS Duratek

cc: J. Pope
B. Bowan
G. Hildebrandt
C. Coker

The glass gems from batch 33, produced at the GTS Duratek M-area facility, were subjected to "paint filter test" for free water, and "TCLP" for leaching characteristics at General Engineering Laboratories, a South Carolina licensed laboratory. The "paint filter test" and the "TCLP" were done according to EPA procedures 9095 and 1311, respectively. Please find enclosed the results for glass samples from drums 2242 to 2250. The results of the tests are summarized below. 1-tailed t-tests were performed, and the upper limits for 95% confidence were calculated.

The TCLP values are below the acceptance limit for 95% confidence.

Table 1. Summary of TCLP results

Sample ID	Chromium (mg/L)	Nickel (mg/L)	Lead (mg/L)	Uranium (mg/L)	Nitrate (as N)	Paint filter test
GEM Drum # 2242	0.0139	0.269	0.0121	2.010	0.0	Pass
GEM Drum # 2244	0.0145	0.264	0.0032	1.850	0.0	Pass
GEM Drum # 2246	0.0147	0.263	0.0045	1.870	0.0	Pass
GEM Drum # 2248	0.0141	0.256	0.0039	1.980	0.0	Pass
GEM Drum # 2250	0.0138	0.263	0.0026	1.890	0.0	Pass

Student t-test

Number of samples = n = 5

Mean = $\bar{x} = \sum x_i / n$

Variance = $s^2 = \sum(x_i - \bar{x})^2 / (n-1)$

Degrees of freedom for n observations = n-1 = 4

From standard t-tables, the factor "z" for 95% confidence limit ($t_{0.95}$ or $\alpha_{0.05}$) for 4 degrees of freedom is 2.13.

Upper acceptance limit for 95% confidence for a 1-tailed t-test, at 4 degrees of freedom is:

$$\text{Acceptance limit} - (s \times 2.13)/n^{1/2}$$

Table 2. TCLP means, variances, and upper acceptance limits for 95% confidence.

Element	mean ($\bar{x}$)	Variance (s^2)	s	Acceptance limit (mg/L)	Upper acceptance limit for 95% confidence
Chromium	0.0142	1.50 E-7	0.0004	0.86	0.8596
Nickel	0.2630	2.15 E-5	0.0046	5.0	4.9956
Lead	0.0053	1.52 E-5	0.0039	0.37	0.3663
Uranium	1.9200	0.005	0.0707	4.0	3.9326

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SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

: GTSD00196 Report Date: October 29, 1998

Sample ID	: VTF-1356 #2242
Lab ID	: 9810738-11
Matrix	: TCLP
Date Collected	: 09/30/98
Date Received	: 10/21/98
Priority	: Routine
Collector	: Client

·ameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
als Analysis											
·omium	J	13.9	2.99	15.0	ug/l	5.0	JSS	10/28/98	1737	134366	1
kel		269	3.93	3.93	ug/l	5.0					
.d		12.1	1.55	1.55	ug/l	5.0					
.nium		2010	0.126	1.00	ug/l	5.0					
eral Chemistry											
·ogen, Nitrate	U	ND	0.0254	0.100	mg/l	2.0	JLG	10/26/98	1053	134314	2

following prep procedures were performed:

' Mass Spec	FGD	10/28/98	1100	134366 3
LP Prep for Metals	JL	10/22/98	1550	134267 4

= Method	Method-Description
	EPA 6020
	EPA 300.0
	EPA 3005
	EPA 1311

s:
qualifiers in this report are defined as follows:
ndicates that the analyte was not detected at a concentration greater than the detection limit.
icates presence of analyte at a concentration less than the reporting limit (RL) and greater than the detection limit (DL).
licates that the analyte was not detected at a concentration greater than the detection limit.
icates that a quality control analyte recovery is outside of specified acceptance criteria.

9810738-11

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FL	E87156/87294	E87472/87458
NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

cc: GTSD00196 Report Date: October 29, 1998

Sample ID : VTF-1356 #2242

M = Method	Method-Description

This data report has been prepared and reviewed in accordance with General Engineering Laboratories standard operating procedures. Please direct any questions to your Project Manager, Jack Spitz at (843) 769-7390.

Reviewed By

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NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

: GTSD00196 Report Date: October 29, 1998

Sample ID	: VTF-1356 #2242
Lab ID	: 9810738-12
Matrix	: Misc.
Date Collected	: 09/30/98
Date Received	: 10/21/98
Priority	: Routine
Collector	: Client

ameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
ral Chemistry											
t Filter Test		Pass.					JEN	10/27/98	1400	134582	1

Method	Method-Description
	EPA 9095

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NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

cc: GTSD00196

Report Date: October 29, 1998

Sample ID	: VTF-1351 #2244
Lab ID	: 9810738-13
Matrix	: TCLP
Date Collected	: 09/29/98
Date Received	: 10/21/98
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Metals Analysis											
Chromium	J	14.5	2.99	15.0	ug/l	5.0	JSS	10/28/98	1802	134366	1
Nickel		264	3.93	3.93	ug/l	5.0					
Lead		3.23	1.55	1.55	ug/l	5.0					
Uranium		1850	0.126	1.00	ug/l	5.0					
General Chemistry											
Nitrogen, Nitrate	U	ND	0.0254	0.100	mg/l	2.0	JLG	10/26/98	1134	134314	2

The following prep procedures were performed:

ICP Mass Spec	FGD	10/28/98	1100	134366 3
TCLP Prep for Metals	JL	10/22/98	1550	134267 4

M = Method	Method-Description
M 1	EPA 6020
M 2	EPA 300.0
M 3	EPA 3005
M 4	EPA 1311

Notes:
The qualifiers in this report are defined as follows:
ND indicates that the analyte was not detected at a concentration greater than the detection limit.
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U indicates that the analyte was not detected at a concentration greater than the detection limit.
* indicates that a quality control analyte recovery is outside of specified acceptance criteria.

9810738-13

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FL	E87156/87294	E87472/87458
NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

: GTSD00196 Report Date: October 29, 1998

Sample ID : VTF-1351 #2244

: Method **Method-Description**

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9810738 13

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NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

cc: GTSD00196

Report Date: October 29, 1998

Sample ID	: VTF-1351 #2244
Lab ID	: 9810738-14
Matrix	: Misc.
Date Collected	: 09/29/98
Date Received	: 10/21/98
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
General Chemistry											
Paint Filter Test		Pass.					JEN	10/27/98	1400	134582	1

M = Method	Method-Description
M 1	EPA 9095

Notes:
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U indicates that the analyte was not detected at a concentration greater than the detection limit.
* indicates that a quality control analyte recovery is outside of specified acceptance criteria.

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FL	E87156/87294	E87472/87458
NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

GTSD00196 Report Date: October 29, 1998

Sample ID	: VTF-1352 #2246
Lab ID	: 9810738-15
Matrix	: TCLP
Date Collected	: 09/30/98
Date Received	: 10/21/98
Priority	: Routine
Collector	: Client

ımeter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
ls Analysis											
›mium	J	14.7	2.99	15.0	ug/l	5.0	JSS	10/28/98	1809	134366	1
:el		263	3.93	3.93	ug/l	5.0					
l		4.49	1.55	1.55	ug/l	5.0					
ıium		1870	0.126	1.00	ug/l	5.0					
ral Chemistry											
›gen, Nitrate	U	ND	0.0254	0.100	mg/l	2.0	JLG	10/26/98	1148	134314	2

ollowing prep procedures were performed:

Mass Spec	FGD	10/28/98	1100	134366 3
P Prep for Metals	JL	10/22/98	1550	134267 4

Method	Method-Description
	EPA 6020
	EPA 300.0
	EPA 3005
	EPA 1311

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FL	E87156/87294	E87472/87458
NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

cc: GTSD00196 Report Date: October 29, 1998

Sample ID : VTF 1352 #2246

M = Method	Method-Description

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NC	233	
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TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

: GTSD00196 Report Date: October 29, 1998

Sample ID	: VTF-1352 #2246
Lab ID	: 9810738-16
Matrix	: Misc.
Date Collected	: 09/30/98
Date Received	: 10/21/98
Priority	: Routine
Collector	: Client

ameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
ral Chemistry											
t Filter Test		Pass.					JEN	10/27/98	1400	134582	1

Method	Method-Description
	EPA 9095

:

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FL	E87156/87294	E87472/87458
NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

cc: GTSD00196

Report Date: October 29, 1998

Sample ID	: VTF-1353 #2248
Lab ID	: 9810738-17
Matrix	: TCLP
Date Collected	: 09/30/98
Date Received	: 10/21/98
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Metals Analysis											
Chromium	J	14.1	2.99	15.0	ug/l	5.0	JSS	10/28/98	1816	134366	1
Nickel		256	3.93	3.93	ug/l	5.0					
Lead		3.91	1.55	1.55	ug/l	5.0					
Uranium		1980	0.126	1.00	ug/l	5.0					
General Chemistry											
Nitrogen, Nitrate	U	ND	0.0254	0.100	mg/l	2.0	JLG	10/26/98	1202	134314	2

The following prep procedures were performed:

ICP Mass Spec	FGD	10/28/98	1100	134366	3
TCLP Prep for Metals	JL	10/22/98	1550	134267	4

M = Method	Method-Description
M 1	EPA 6020
M 2	EPA 300.0
M 3	EPA 3005
M 4	EPA 1311

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9810738-17

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NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

: GTSD00196 Report Date: October 29, 1998 Page 2 of 2

Sample ID : VTF-1353 #2248

= Method	Method-Description

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questions to your Project Manager, Jack Spitz at (843) 769-7390.

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NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

cc: GTSD00196

Report Date: October 29, 1998

Sample ID	: VTF-1353 #2248
Lab ID	: 9810738-18
Matrix	: Misc.
Date Collected	: 09/30/98
Date Received	: 10/21/98
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
General Chemistry											
Paint Filter Test		Pass.					JEN	10/27/98	1400	134582	1

M = Method	Method-Description
M 1	EPA 9095

Notes:
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in accordance with General Engineering Laboratories
standard operating procedures. Please direct
any questions to your Project Manager, Jack Spitz at (843) 769-7390.

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9810738-18

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NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

GTSD00196 Report Date: October 29, 1998

Sample ID	: VTF-1354 #2250
Lab ID	: 9810738-19
Matrix	: TCLP
Date Collected	: 09/30/98
Date Received	: 10/21/98
Priority	: Routine
Collector	: Client

ımeter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
ls Analysis											
ɔmium	J	13.8	2.99	15.0	ug/l	5.0	JSS	10/28/98	1824	134366	1
:el		263	3.93	3.93	ug/l	5.0					
l		2.56	1.55	1.55	ug/l	5.0					
ıium		1890	0.126	1.00	ug/l	5.0					
ral Chemistry											
ɔgen, Nitrate	U	ND	0.0254	0.100	mg/l	2.0	JLG	10/26/98	1216	134314	2

ollowing prep procedures were performed:

Mass Spec	FGD	10/28/98	1100	134366 3
P Prep for Metals	JL	10/22/98	1550	134267 4

Method	Method-Description
	EPA 6020
	EPA 300.0
	EPA 3005
	EPA 1311

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9810738-19

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SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

cc: GTSD00196 Report Date: October 29, 1998

Sample ID : VTF-1354 #2250

M = Method **Method-Description**

This data report has been prepared and reviewed in accordance with General Engineering Laboratories standard operating procedures. Please direct any questions to your Project Manager, Jack Spitz at (843) 769-7390.

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NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

GTSD00196 Report Date: October 29, 1998 Page 1 of 1

Sample ID	: VTF-1354 #2250
Lab ID	: 9810738-20
Matrix	: Misc.
Date Collected	: 09/30/98
Date Received	: 10/21/98
Priority	: Routine
Collector	: Client

ımeter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
ral Chemistry											
t Filter Test		Pass.					JEN	10/27/98	1400	134582	1

Method	Method-Description
	EPA 9095

:

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9810738-20

M-Area Batch #33 Glass TCLP Samples RM-98-35

SHIPMENT DESTINED TO	SAMPLE CONTAINER IDENTIFICATION		DATE/TIME OF PACKAGING		SAMPLE NET WEIGHT	SHIPPING CONTAINER/ CONTAINER GROSS WEIGHT	SEAL # (IF APPLICABLE)
General Engineering Laboratories 2040 Savage Rd. Chasn. SC 29414	Sample#	Drum#			Grams	Grams	N/A
-11 -12	VTF-1356	2242	09/30/98	0430	467	572	
-13 -14	VTF-1351	2244	09/29/98	2130	636	741	
-15 -16	VTF-1352	2246	09/30/98	0230	689	794	
-17 -18	VTF-1353	2248	09/30/98	0700	275	307	
-19 -20	VTF-1354	2250	09/30/98	0904	354	377	
	Shipping Container		N/A		6 lbs	11 lbs	

Comments: Shipping Number SRS - ~~16448~~ MLS 10/16/98
16449

INFORMATION ONLY

Relinquished by:	Date:	Time:	Received by:	Relinqished by:	Date:	Time:	Received by:
			10/29/98				
Relinquished by:	Date:	Time:	Received by:	Relinqished by:	Date:	Time:	Received by:

\...\RCO\Shipping Forms\...

DURATEK
10100 Old Columbia Road
Columbia, Maryland 21046
410/312-5100 Fax 410/290-9070

L-98-078

October 15, 1998

Mr. Dan Bills
Subcontract Technical Representative
Westinghouse Savannah River Company
Building 730-M
Aiken, SC 29802

Final Wasteform Treatment Standards and Acceptance Criteria

Dear Mr. Bills:

GTS Duratek has completed sampling and analysis of the final wasteform, Batch #32, drums 2184, 2186, 2188, 2190, and 2192. The results of the analysis, including the analysis technique, is attached for your review. The analysis was performed by General Engineering Laboratories, a State of South Carolina certified lab, and verified by Mr. Innocent Joseph, Manager of Technology, GTS Duratek.

Results of the analysis indicate Batch #32 is within the contractual specifications. A total of 41 drums of glass were produced for Batch #32. Should you have any questions, please contact Innocent Joseph or myself.

Sincerely,

GTS DURATEK

Daniel Macias
Director of Operations

DM/mlb
attachment

cc: S. Campbell
C. Coker

DURATEK
10100 Old Columbia Road
Columbia, Maryland 21046
410/312-5100 Fax 410/290-9070

October 9, 1998

Mr. Dan Macias
Operations Manger
Vendor Treatment Facility (M-area)
GTS Duratek
WSRC/USDOE Savannah River Site
Aiken, SC 29801

Dear Mr. Macias:

Please find enclosed the results of the "TCLP" and 'Paint Filter Test" on glass gems from drums 2184, 2186, 2188, 2190, and 2192. The tests were performed according to methods specified in the "Sampling Plan" for GTS Duratek's Vendor Treatment Facility at the Savannah River site. 1-tailed t-tests were performed on the TCLP data, and the upper acceptance limits for 95% confidence were calculated. The TCLP values are well below the upper acceptance limits for 95% confidence. All of the samples passed the "Paint Filter Test." The samples from Batch # 32 have therefore met all of the acceptance criteria for the glass product.

The calculations for sample means, variances, upper acceptance limits for 95% confidence, data sheets from General Engineering Laboratories, and a sample chain of custody record are enclosed. If you have any questions, please contact me at (410) 312-5120.

Sincerely

Innocent Joseph

Innocent Joseph
Manager, Technology
GTS Duratek

cc: J. Pope
B. Bowan
G. Hildebrandt
C. Coker

The glass gems from batch 32 at the GTS Duratek M-area facility, were subjected to "paint filter test" for free water, and "TCLP" for leaching characteristics at General Engineering Laboratories, a South Carolina licensed laboratory. The "paint filter test" and the "TCLP" were done according to EPA procedures 9095 and 1311, respectively. Please find enclosed the results for glass samples from drums 2184 to 2192. The results of the tests are summarized below. 1-tailed t-tests were performed, and the upper limits for 95% confidence were calculated.

The TCLP values are below the acceptance limit for 95% confidence.

Table 1. Summary of TCLP results

Sample ID	Chromium (mg/L)	Nickel (mg/L)	Lead (mg/L)	Uranium (mg/L)	Nitrate (as N)	Paint filter test
GEM Drum # 2184	0.0107	0.360	0.0048	1.740	0.0	Pass
GEM Drum # 2186	0.0108	0.367	0.0056	1.730	0.0	Pass
GEM Drum # 2188	0.0100	0.360	0.0040	1.670	0.0	Pass
GEM Drum # 2190	0.0098	0.353	0.0093	1.690	0.0	Pass
GEM Drum # 2192	0.0110	0.372	0.0047	1.710	0.0	Pass

Student t-test

Number of samples = n = 5

Mean = $\bar{x} = \sum x_i / n$

Variance = $s^2 = \sum(x_i - \bar{x})^2 / (n-1)$

Degrees of freedom for n observations = n-1 = 4

From standard t-tables, the factor "z" for 95% confidence limit ($t_{0.95}$ or $\alpha_{0.05}$) for 4 degrees of freedom is 2.13.

Upper acceptance limit for 95% confidence for a 1-tailed t-test, at 4 degrees of freedom is:

$$\text{Acceptance limit} - (s \times 2.13)/n^{1/2}$$

Table 2. TCLP means, variances, and upper acceptance limits for 95% confidence.

Element	mean ($\bar{x}$)	Variance (s^2)	s	Acceptance limit (mg/L)	Upper acceptance limit for 95% confidence
Chromium	0.0105	2.78 E-7	0.0005	0.86	0.8595
Nickel	0.3624	5.33 E-5	0.0073	5.0	4.9930
Lead	0.0057	4.31 E-6	0.0021	0.37	0.3680
Uranium	1.7080	0.00082	0.0286	4.0	3.9727

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NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

: GTSD00196 Report Date: October 08, 1998

Sample ID	: VTF-1320
Lab ID	: 9809938-01
Matrix	: TCLP
Date Collected	: 09/20/98
Date Received	: 09/29/98
Priority	: Routine
Collector	: Client

ameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
als Analysis											
romium	J	10.7	2.99	15.0	ug/l	5.0	JSS	10/07/98	2009	132722	1
kel		360	3.93	3.93	ug/l	5.0					
d		4.80	1.55	1.55	ug/l	5.0					
nium		1740	0.126	1.00	ug/l	5.0					
eral Chemistry											
rogen, Nitrate	U	ND	0.0254	0.100	mg/l	2.0	JLG	10/02/98	1359	132476	2

following prep procedures were performed:

P Mass Spec	AJM	10/02/98	1700	132722 3
LP Prep for Metals	JL	10/01/98	1600	132518 4

= Method	Method-Description
1	EPA 6020
2	EPA 300.0
3	EPA 3005
4	EPA 1311

es:
qualifiers in this report are defined as follows:
indicates that the analyte was not detected at a concentration greater than the detection limit.
dicates presence of analyte at a concentration less than the reporting limit (RL) and greater than the detection limit (DL).
ndicates that the analyte was not detected at a concentration greater than the detection limit.
ndicates that a quality control analyte recovery is outside of specified acceptance criteria.

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9809938 01

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NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

cc: GTSD00196 Report Date: October 08, 1998

Sample ID : VTF-1320

M = Method **Method-Description**

This data report has been prepared and reviewed in accordance with General Engineering Laboratories standard operating procedures. Please direct any questions to your Project Manager, Jack Spitz at (803) 556-8171.

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NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

:: GTSD00196 Report Date: October 08, 1998 Page 1 of 1

Sample ID	: VTF-1320
Lab ID	: 9809946-01
Matrix	: Misc.
Date Collected	: 09/20/98
Date Received	: 09/30/98
Priority	: Routine
Collector	: Client

rameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
eral Chemistry											
nt Filter Test		Pass					BJR	10/01/98	1800	132547	1

= Method	Method-Description
1	EPA 9095

:s:
qualifiers in this report are defined as follows:
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NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

cc: GTSD00196 Report Date: October 08, 1998

Sample ID	: VTF-1321
Lab ID	: 9809938-02
Matrix	: TCLP
Date Collected	: 09/21/98
Date Received	: 09/29/98
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Metals Analysis											
Chromium	J	10.8	2.99	15.0	ug/l	5.0	JSS	10/07/98	2015	132722	1
Nickel		367	3.93	3.93	ug/l	5.0					
Lead		5.55	1.55	1.55	ug/l	5.0					
Uranium		1730	0.126	1.00	ug/l	5.0					
General Chemistry											
Nitrogen, Nitrate	U	ND	0.0254	0.100	mg/l	2.0	JLG	10/02/98	1439	132476	2

The following prep procedures were performed:

ICP Mass Spec	AJM	10/02/98	1700	132722 3
TCLP Prep for Metals	JL	10/01/98	1600	132518 4

M = Method	Method-Description
M 1	EPA 6020
M 2	EPA 300.0
M 3	EPA 3005
M 4	EPA 1311

Notes:
The qualifiers in this report are defined as follows:
ND indicates that the analyte was not detected at a concentration greater than the detection limit.
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U indicates that the analyte was not detected at a concentration greater than the detection limit.
* indicates that a quality control analyte recovery is outside of specified acceptance criteria.

9809938-02

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FL	E87156/87294	E87472/87458
NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

GTSD00196 Report Date: October 08, 1998

Sample ID : VTF-1321

Method	Method-Description

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ard operating procedures. Please direct
uestions to your Project Manager, Jack Spitz at (803) 556-8171.

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0800038.02

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STATE	GEL	EPI
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NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

cc: GTSD00196 Report Date: October 08, 1998 Page 1 of 1

Sample ID	: VTF-1321
Lab ID	: 9809946-02
Matrix	: Misc.
Date Collected	: 09/21/98
Date Received	: 09/30/98
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
General Chemistry											
Paint Filter Test		Pass					BJR	10/01/98	1800	132547	1

M = Method	Method-Description
M 1	EPA 9095

Notes:
The qualifiers in this report are defined as follows:
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U indicates that the analyte was not detected at a concentration greater than the detection limit.
* indicates that a quality control analyte recovery is outside of specified acceptance criteria.

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NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

: GTSD00196 Report Date: October 08, 1998

Sample ID	: VTF-1322
Lab ID	: 9809938-03
Matrix	: TCLP
Date Collected	: 09/21/98
Date Received	: 09/29/98
Priority	: Routine
Collector	: Client

ameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
ıls Analysis											
omium	J	10.0	2.99	15.0	ug/l	5.0	JSS	10/07/98	2021	132722	1
kel		360	3.93	3.93	ug/l	5.0					
d		4.00	1.55	1.55	ug/l	5.0					
nium		1670	0.126	1.00	ug/l	5.0					
ɜral Chemistry											
ʻogen, Nitrate	U	ND	0.0254	0.100	mg/l	2.0	JLG	10/02/98	1452	132476	2

following prep procedures were performed:

Mass Spec	AJM	10/02/98	1700	132722	3
₋P Prep for Metals	JL	10/01/98	1600	132518	4

: Method	Method-Description
	EPA 6020
	EPA 300.0
	EPA 3005
	EPA 1311

s:
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icates that a quality control analyte recovery is outside of specified acceptance criteria.

9809938-03

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STATE	GEL	EPI
FL	E87156/87294	E87472/87458
NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

cc: GTSD00196 Report Date: October 08, 1998

Sample ID : VTF-1322

M = Method	Method-Description

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TN	02934	02934

Client: GTS Duratek
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Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

GTSD00196 Report Date: October 08, 1998 Page 1 of 1

Sample ID	: VTF-1322
Lab ID	: 9809946-03
Matrix	: Misc.
Date Collected	: 09/21/98
Date Received	: 09/30/98
Priority	: Routine
Collector	: Client

ameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
ral Chemistry											
it Filter Test		Pass					BJR	10/01/98	1800	132547	1

: Method	Method-Description
	EPA 9095

s:
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SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

cc: GTSD00196 Report Date: October 08, 1998

Sample ID	: VTF-1323
Lab ID	: 9809938-04
Matrix	: TCLP
Date Collected	: 09/21/98
Date Received	: 09/29/98
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Metals Analysis											
Chromium	J	9.80	2.99	15.0	ug/l	5.0	JSS	10/07/98	2027	132722	1
Nickel		353	3.93	3.93	ug/l	5.0					
Lead		9.25	1.55	1.55	ug/l	5.0					
Uranium		1690	0.126	1.00	ug/l	5.0					
General Chemistry											
Nitrogen, Nitrate	U	ND	0.0254	0.100	mg/l	2.0	JLG	10/02/98	1505	132476	2

The following prep procedures were performed:

ICP Mass Spec	AJM	10/02/98	1700	132722 3
TCLP Prep for Metals	JL	10/01/98	1600	132518 4

M = Method	Method-Description
M 1	EPA 6020
M 2	EPA 300.0
M 3	EPA 3005
M 4	EPA 1311

Notes:
The qualifiers in this report are defined as follows:
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* indicates that a quality control analyte recovery is outside of specified acceptance criteria.

9809938-04

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STATE	GEL	EPI
FL	E87156/87294	E87472/87458
NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

GTSD00196 Report Date: October 08, 1998

Sample ID : VTF-1323

Method	Method-Description

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uestions to your Project Manager, Jack Spitz at (803) 556-8171.

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STATE	GEL	EPI
FL	E87156/87294	E87472/87458
NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

cc: GTSD00196 Report Date: October 08, 1998

Sample ID	: VTF-1323
Lab ID	: 9809946-04
Matrix	: Misc.
Date Collected	: 09/21/98
Date Received	: 09/30/98
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
General Chemistry											
Paint Filter Test		Pass					BJR	10/01/98	1800	132547	1

M = Method	Method-Description
M 1	EPA 9095

Notes:
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NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

GTSD00196 Report Date: October 08, 1998

Sample ID	: VTF-1324
Lab ID	: 9809938-05
Matrix	: TCLP
Date Collected	: 09/22/98
Date Received	: 09/29/98
Priority	: Routine
Collector	: Client

ameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
ıls Analysis											
ɔmium	J	11.0	2.99	15.0	ug/l	5.0	JSS	10/07/98	2033	132722	1
‹el		372	3.93	3.93	ug/l	5.0					
ɨ		4.74	1.55	1.55	ug/l	5.0					
ıium		1710	0.126	1.00	ug/l	5.0					
ɨral Chemistry											
ogen, Nitrate	U	ND	0.0254	0.100	mg/l	2.0	JLG	10/02/98	1519	132476	2

following prep procedures were performed:

Mass Spec	AJM	10/02/98	1700	132722 3
₋P Prep for Metals	JL	10/01/98	1600	132518 4

: Method	Method-Description
	EPA 6020
	EPA 300.0
	EPA 3005
	EPA 1311

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NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

cc: GTSD00196 Report Date: October 08, 1998

Sample ID : VTF-1324

M = Method	Method-Description

This data report has been prepared and reviewed in accordance with General Engineering Laboratories standard operating procedures. Please direct any questions to your Project Manager, Jack Spitz at (803) 556-8171.

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SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

: GTSD00196 Report Date: October 08, 1998 Page 1 of 1

Sample ID	: VTF-1324
Lab ID	: 9809946-05
Matrix	: Misc.
Date Collected	: 09/22/98
Date Received	: 09/30/98
Priority	: Routine
Collector	: Client

ameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
eral Chemistry											
nt Filter Test		Pass					BJR	10/01/98	1800	132547	1

= Method	Method-Description
1	EPA 9095

s:
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questions to your Project Manager, Jack Spitz at (803) 556-8171.

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GTS DURATEK SHIPPING MANIFEST

980774P

M-Area Batch #32 Glass TCLP Samples RM-98-33

9809938 90 CCL 31771

SHIPMENT DESTINED TO	SAMPLE CONTAINER IDENTIFICATION		DATE/TIME OF PACKAGING		SAMPLE NET WEIGHT	SHIPPING CONTAINER/ CONTAINER GROSS WEIGHT	SEAL # (IF APPLICABLE)
General Engineering Laboratories 2040 Savage Rd. Chasn. SC 29414	Sample#	Drum#			Grams	Grams	N/A
	VTF-1320	2184	09/20/98	2300	209	241	
	VTF-1321	2186	09/21/98	0500	230	262	
	VTF-1322	2188	09/21/98	2045	315	347	
	VTF-1323	2190	09/21/98	2245	213	245	
	VTF-1324	2192	09/22/98	0500	267	299	
	Shipping Container		N/A		4 lbs	8 lbs	

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Comments: Shipping Number

INFORMATION ONLY

Relinquished by:	Date:	Time:	Received by:	Relinquished by:	Date:	Time:	Received by:
	9/28	0800					
Relinquished by:	Date:	Time:	Received by:	Relinquished by:	Date:	Time:	Received by:

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DURATEK

10100 Old Columbia Road
Columbia, Maryland 21046
410/312-5100 Fax 410/290-9070

L-98-077

October 15, 1998

Mr. Dan Bills
Subcontract Technical Representative
Westinghouse Savannah River Company
Building 730-M
Aiken, SC 29802

Final Wasteform Treatment Standards and Acceptance Criteria

Dear Mr. Bills:

GTS Duratek has completed sampling and analysis of the final wasteform, Batch #31, drums 2142, 2144, 2146, 2148, and 2150. The results of the analysis, including the analysis technique, is attached for your review. The analysis was performed by General Engineering Laboratories, a State of South Carolina certified lab, and verified by Mr. Innocent Joseph, Manager of Technology, GTS Duratek.

Results of the analysis indicate Batch #31 is within the contractual specifications. A total of 54 drums of glass were produced for Batch #31. Should you have any questions, please contact Innocent Joseph or myself.

Sincerely,

GTS DURATEK

Daniel Macias
Director of Operations

DM/mlb
attachment

cc: S. Campbell
C. Coker

DURATEK

10100 Old Columbia Road
Columbia, Maryland 21046
410/312-5100 Fax 410/290-9070

September 28, 1998

Mr. Dan Macias
Operations Manger
Vendor Treatment Facility (M-area)
GTS Duratek
WSRC/USDOE Savannah River Site
Aiken, SC 29801

Dear Mr. Macias:

Please find enclosed the results of the "TCLP" and 'Paint Filter Test" on glass gems from drums 2142, 2144, 2146, 2148, and 2150. The tests were performed according to methods specified in the "Sampling Plan" for GTS Duratek's Vendor Treatment Facility at the Savannah River site. 1-tailed t-tests were performed on the TCLP data, and the upper acceptance limits for 95% confidence were calculated. The TCLP values are well below the upper acceptance limits for 95% confidence. All of the samples passed the "Paint Filter Test." The samples from Batch # 31 have therefore met all of the acceptance criteria for the glass product.

The calculations for sample means, variances, upper acceptance limits for 95% confidence, data sheets from General Engineering Laboratories, and a sample chain of custody record are enclosed. If you have any questions, please contact me at (410) 312-5120.

Sincerely

Innocent Joseph

Innocent Joseph
Manager, Technology
GTS Duratek

cc: J. Pope
B. Bowan
G. Hildebrandt
C. Coker

The glass gems from batch 31, produced at the GTS Duratek M-area facility, were subjected to "paint filter test" for free water, and "TCLP" for leaching characteristics at General Engineering Laboratories, a South Carolina licensed laboratory. The "paint filter test" and the "TCLP" were done according to EPA procedures 9095 and 1311, respectively. Please find enclosed the results for glass samples from drums 2142 to 2150. The results of the tests are summarized below. 1-tailed t-tests were performed, and the upper limits for 95% confidence were calculated.

The TCLP values are below the acceptance limit for 95% confidence.

Table 1. Summary of TCLP results

Sample ID	Chromium (mg/L)	Nickel (mg/L)	Lead (mg/L)	Uranium (mg/L)	Nitrate (as N)	Paint filter test
GEM Drum # 2142	< 0.00299	0.478	0.00379	1.990	0.0	Pass
GEM Drum # 2144	< 0.00299	0.431	< 0.00155	1.860	0.0	Pass
GEM Drum # 2146	< 0.00299	0.445	< 0.00155	1.840	0.0	Pass
GEM Drum # 2148	< 0.00299	0.400	< 0.00155	1.770	0.0	Pass
GEM Drum # 2150	< 0.00299	0.463	< 0.00155	1.910	0.0	Pass

Student t-test

Number of samples = n = 5

Mean = $\bar{x} = \sum x_i / n$

Variance = $s^2 = \sum (x_i - \bar{x})^2 / (n-1)$

Degrees of freedom for n observations = n-1 = 4

From standard t-tables, the factor "z" for 95% confidence limit ($t_{0.95}$ or $\alpha_{0.05}$) for 4 degrees of freedom is 2.13.

Upper acceptance limit for 95% confidence for a 1-tailed t-test, at 4 degrees of freedom is:

$$\text{Acceptance limit} - (s \times 2.13)/n^{1/2}$$

Table 2. TCLP means, variances, and upper acceptance limits for 95% confidence.

Element	mean ($\bar{x}$)	Variance (s^2)	s	Acceptance limit (mg/L)	Upper acceptance limit for 95% confidence
Chromium	<0.00299	0	0	0.86	0.86
Nickel	0.4434	0.00091	0.0301	5.0	4.9713
Lead	0.0008	2.87 E-6	0.0017	0.37	0.3684
Uranium	1.8740	0.00673	0.0820	4.0	3.9219

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NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

GTSD00196 Report Date: September 25, 1998

Sample ID	: VTF-1293 #2142
Lab ID	: 9809622-01
Matrix	: TCLP
Date Collected	: 09/13/98
Date Received	: 09/18/98
Priority	: Routine
Collector	: Client

ımeter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
ls Analysis											
ımium	U	ND	2.99	15.0	ug/l	5.0	JSS	09/24/98	1801	131923	1
el		478	3.93	3.93	ug/l	5.0					
		3.79	1.55	1.55	ug/l	5.0					
ium		1990	0.126	1.00	ug/l	5.0					
ral Chemistry											
ıgen, Nitrate	U	ND	0.0254	0.100	mg/l	2.0	JLG	09/23/98	1542	131765	2

ollowing prep procedures were performed:

Mass Spec	FGD	09/24/98	1100	131923 3
P Prep for Metals	JL	09/22/98	1645	131655 4

Method	Method-Description
	EPA 6020
	EPA 300.0
	EPA 3005
	EPA 1311

ıalifiers in this report are defined as follows:
dicates that the analyte was not detected at a concentration greater than the detection limit.
ates presence of analyte at a concentration less than the reporting limit (RL) and greater than the detection limit (DL).
cates that the analyte was not detected at a concentration greater than the detection limit.
ates that a quality control analyte recovery is outside of specified acceptance criteria.

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9809622-01

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NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

cc: GTSD00196 Report Date: September 25, 1998

Sample ID : VTF-1293 #2142

M = Method **Method-Description**

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TN	02934	02934

Client: GTS Duratek
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Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

:: GTSD00196 Report Date: September 25, 1998 Page 1 of 1

Sample ID	: VTF-1293 #2142
Lab ID	: 9809622-02
Matrix	: Misc.
Date Collected	: 09/13/98
Date Received	: 09/18/98
Priority	: Routine
Collector	: Client

·ameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
eral Chemistry											
nt Filter Test		Pass.					JEN	09/24/98	1000	131966	1

= Method	Method-Description
	EPA 9095

s:
qualifiers in this report are defined as follows:
ndicates that the analyte was not detected at a concentration greater than the detection limit.
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icates that a quality control analyte recovery is outside of specified acceptance criteria.

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uestions to your Project Manager, Jack Spitz at (803) 556-8171.

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NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

cc: GTSD00196 Report Date: September 25, 1998

Sample ID	: VTF-1294 #2144
Lab ID	: 9809622-03
Matrix	: TCLP
Date Collected	: 09/14/98
Date Received	: 09/18/98
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Metals Analysis											
Chromium	U	ND	2.99	15.0	ug/l	5.0	JSS	09/24/98	1807	131923	1
Nickel		431	3.93	3.93	ug/l	5.0					
Lead	U	ND	1.55	1.55	ug/l	5.0					
Uranium		1860	0.126	1.00	ug/l	5.0					
General Chemistry											
Nitrogen, Nitrate	U	ND	0.0254	0.100	mg/l	2.0	JLG	09/23/98	1556	131765	2

The following prep procedures were performed:

ICP Mass Spec	FGD	09/24/98	1100	131923	3
TCLP Prep for Metals	JL	09/22/98	1645	131655	4

M = Method	Method-Description
M 1	EPA 6020
M 2	EPA 300.0
M 3	EPA 3005
M 4	EPA 1311

Notes:
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ND indicates that the analyte was not detected at a concentration greater than the detection limit.
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U indicates that the analyte was not detected at a concentration greater than the detection limit.
* indicates that a quality control analyte recovery is outside of specified acceptance criteria.

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NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

:: GTSD00196 Report Date: September 25, 1998 Page 2 of 2

Sample ID : VTF-1294 #2144

= Method **Method-Description**

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TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

cc: GTSD00196

Report Date: September 25, 1998

Sample ID	: VTF-1294 #2144
Lab ID	: 9809622-04
Matrix	: Misc.
Date Collected	: 09/14/98
Date Received	: 09/18/98
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
General Chemistry											
Paint Filter Test		Pass.					JEN	09/24/98	1000	131966	1

M = Method	Method-Description
M 1	EPA 9095

Notes:
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U indicates that the analyte was not detected at a concentration greater than the detection limit.
* indicates that a quality control analyte recovery is outside of specified acceptance criteria.

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SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

GTSD00196 Report Date: September 25, 1998

Sample ID	: VTF-1295 #2146
Lab ID	: 9809622-05
Matrix	: TCLP
Date Collected	: 09/14/98
Date Received	: 09/18/98
Priority	: Routine
Collector	: Client

ımeter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
ls Analysis											
›mium	U	ND	2.99	15.0	ug/l	5.0	JSS	09/24/98	1813	131923	1
:el		445	3.93	3.93	ug/l	5.0					
l	U	ND	1.55	1.55	ug/l	5.0					
ıium		1840	0.126	1.00	ug/l	5.0					
ral Chemistry											
›gen, Nitrate	U	ND	0.0254	0.100	mg/l	2.0	JLG	09/23/98	1609	131765	2

ollowing prep procedures were performed:

Mass Spec	FGD	09/24/98	1100	131923	3
P Prep for Metals	JL	09/22/98	1645	131655	4

Method	Method-Description
	EPA 6020
	EPA 300.0
	EPA 3005
	EPA 1311

:

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SC	10120	10582
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Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

cc: GTSD00196 Report Date: September 25, 1998

Sample ID : VTF-1295 #2146

M = Method	Method-Description

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Contact: Mr. Innocent Joseph

GTSD00196 Report Date: September 25, 1998 Page 1 of 1

Sample ID	: VTF-1295 #2146
Lab ID	: 9809622-06
Matrix	: Misc.
Date Collected	: 09/14/98
Date Received	: 09/18/98
Priority	: Routine
Collector	: Client

ameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
ral Chemistry											
t Filter Test		Pass.					JEN	09/24/98	1000	131966	1

: Method	Method-Description
	EPA 9095

s:
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NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

cc: GTSD00196

Report Date: September 25, 1998

Sample ID	: VTF-1296 #2148
Lab ID	: 9809622-07
Matrix	: TCLP
Date Collected	: 09/14/98
Date Received	: 09/18/98
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Metals Analysis											
Chromium	U	ND	2.99	15.0	ug/l	5.0	JSS	09/24/98	1819	131923	1
Nickel		400	3.93	3.93	ug/l	5.0					
Lead	U	ND	1.55	1.55	ug/l	5.0					
Uranium		1770	0.126	1.00	ug/l	5.0					
General Chemistry											
Nitrogen, Nitrate	U	ND	0.0254	0.100	mg/l	2.0	JLG	09/23/98	1623	131765	2

The following prep procedures were performed:

ICP Mass Spec				
TCLP Prep for Metals	FGD	09/24/98	1100	131923 3
	JL	09/22/98	1645	131655 4

M = Method	Method-Description
M 1	EPA 6020
M 2	EPA 300.0
M 3	EPA 3005
M 4	EPA 1311

Notes:
The qualifiers in this report are defined as follows:
ND indicates that the analyte was not detected at a concentration greater than the detection limit.
J indicates presence of analyte at a concentration less than the reporting limit (RL) and greater than the detection limit (DL).
U indicates that the analyte was not detected at a concentration greater than the detection limit.
* indicates that a quality control analyte recovery is outside of specified acceptance criteria.

9809622-07

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STATE	GEL	EPI
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NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

GTSD00196 Report Date: September 25, 1998

Sample ID : VTF-1296 #2148

Method	Method-Description

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NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

cc: GTSD00196

Report Date: September 25, 1998

Sample ID	: VTF-1296 #2148
Lab ID	: 9809622-08
Matrix	: Misc.
Date Collected	: 09/14/98
Date Received	: 09/18/98
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
General Chemistry											
Paint Filter Test		Pass.					JEN	09/24/98	1000	131966	1

M = Method	Method-Description
M 1	EPA 9095

Notes:
The qualifiers in this report are defined as follows:
ND indicates that the analyte was not detected at a concentration greater than the detection limit.
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SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

GTSD00196 Report Date: September 25, 1998

Sample ID	: VTF-1297 #2150
Lab ID	: 9809622-09
Matrix	: TCLP
Date Collected	: 09/14/98
Date Received	: 09/18/98
Priority	: Routine
Collector	: Client

ameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
ls Analysis											
omium	U	ND	2.99	15.0	ug/l	5.0	JSS	09/24/98	1825	131923	1
cel		463	3.93	3.93	ug/l	5.0					
d	U	ND	1.55	1.55	ug/l	5.0					
nium		1910	0.126	1.00	ug/l	5.0					
ral Chemistry											
ogen, Nitrate	U	ND	0.0254	0.100	mg/l	2.0	JLG	09/23/98	1734	131765	2

following prep procedures were performed:

Mass Spec	FGD	09/24/98	1100	131923 3
LP Prep for Metals	JL	09/22/98	1645	131655 4

: Method	Method-Description
	EPA 6020
	EPA 300.0
	EPA 3005
	EPA 1311

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NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

cc: GTSD00196 Report Date: September 25, 1998

Sample ID : VTF-1297 #2150

M = Method	Method-Description

This data report has been prepared and reviewed in accordance with General Engineering Laboratories standard operating procedures. Please direct any questions to your Project Manager, Jack Spitz at (803) 556-8171.

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NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

GTSD00196 Report Date: September 25, 1998 Page 1 of 1

Sample ID	: VTF-1297 #2150
Lab ID	: 9809622-10
Matrix	: Misc.
Date Collected	: 09/14/98
Date Received	: 09/18/98
Priority	: Routine
Collector	: Client

ımeter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
ral Chemistry											
t Filter Test		Pass.					JEN	09/24/98	1000	131966	1

Method	Method-Description
	EPA 9095

:

ualifiers in this report are defined as follows:
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data report has been prepared and reviewed
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ard operating procedures. Please direct
uestions to your Project Manager, Jack Spitz at (803) 556-8171.

ewed By

9809622-10

Q#31771

M-Area Batch #31 Glass TCLP Samples RM-98-32

9809622%

SHIPMENT DESTINED TO	SAMPLE CONTAINER IDENTIFICATION		DATE/TIME OF PACKAGING		SAMPLE NET WEIGHT	SHIPPING CONTAINER/ CONTAINER GROSS WEIGHT	SEAL # (IF APPLICABLE)
General Engineering Laboratories	Sample#	Drum#			Grams	Grams	N/A
2040 Savage Rd. Chasn. SC 29414	VTF-1293	2142	09/13/98	2130	313	345	
	VTF-1294	2144	09/14/98	0200	318	350	
	VTF-1295	2146	09/14/98	0735	234	266	
	VTF-1296	2148	09/14/98	1320	234	266	
	VTF-1297	2150	09/14/98	1900	232	264	
	Shipping Container		N/A		4 lbs	8 lbs	

Comments: Shipping Number SRS-16400

INFORMATION ONLY

Relinquished by:	Date:	Time:	Received by:	Relinqished by:	Date:	Time:	Received by:
[signature]	9/17	1240	[signature]				
Relinquished by:	Date:	Time:	Received by:	Relinqished by:	Date:	Time:	Received by:

C:\...\RCO\Shipping Forms\...

DURATEK

10100 Old Columbia Road
Columbia, Maryland 21046
410/312-5100 Fax 410/290-9070

L-98-076

October 15, 1998

Mr. Dan Bills
Subcontract Technical Representative
Westinghouse Savannah River Company
Building 730-M
Aiken, SC 29802

Final Wasteform Treatment Standards and Acceptance Criteria

Dear Mr. Bills:

GTS Duratek has completed sampling and analysis of the final wasteform, Batch #30, drums 2082, 2084, 2086, 2088, and 2090. The results of the analysis, including the analysis technique, is attached for your review. The analysis was performed by General Engineering Laboratories, a State of South Carolina certified lab, and verified by Mr. Innocent Joseph, Manager of Technology, GTS Duratek.

Results of the analysis indicate Batch #30 is within the contractual specifications. GTS Duratek will invoice directly through accounts payable (Brenda Bell, Bldg. 730-4B). A total of 72 drums of glass were produced for Batch #30. Should you have any questions, please contact Innocent Joseph or myself.

Sincerely,

GTS DURATEK

Daniel Macias
Director of Operations

DM/mlb
attachment

cc: S. Campbell
C. Coker

DURATEK
10100 Old Columbia Road
Columbia, Maryland 21046
410/312-5100 Fax 410/290-9070

September 28, 1998

Mr. Dan Macias
Operations Manger
Vendor Treatment Facility (M-area)
GTS Duratek
WSRC/USDOE Savannah River Site
Aiken, SC 29801

Dear Mr. Macias:

Please find enclosed the results of the "TCLP" and 'Paint Filter Test" on glass gems from drums 2082, 2084, 2086, 2088, and 2090. The tests were performed according to methods specified in the "Sampling Plan" for GTS Duratek's Vendor Treatment Facility at the Savannah River site. 1-tailed t-tests were performed on the TCLP data, and the upper acceptance limits for 95% confidence were calculated. The TCLP values are well below the upper acceptance limits for 95% confidence. All of the samples passed the "Paint Filter Test." The samples from Batch # 30 have therefore met all of the acceptance criteria for the glass product.

The calculations for sample means, variances, upper acceptance limits for 95% confidence, data sheets from General Engineering Laboratories, and a sample chain of custody record are enclosed. If you have any questions, please contact me at (410) 312-5120.

Sincerely

Innocent Joseph

Innocent Joseph
Manager, Technology
GTS Duratek

cc: J. Pope
B. Bowan
G. Hildebrandt
C. Coker

The glass gems from batch 30, produced at the GTS Duratek M-area facility, were subjected to "paint filter test" for free water, and "TCLP" for leaching characteristics at General Engineering Laboratories, a South Carolina licensed laboratory. The "paint filter test" and the "TCLP" were done according to EPA procedures 9095 and 1311, respectively. Please find enclosed the results for glass samples from drums 2082 to 2090. The results of the tests are summarized below. 1-tailed t-tests were performed, and the upper limits for 95% confidence were calculated.

The TCLP values are below the acceptance limit for 95% confidence.

Table 1. Summary of TCLP results

Sample ID	Chromium (mg/L)	Nickel (mg/L)	Lead (mg/L)	Uranium (mg/L)	Nitrate (as N)	Paint filter test
GEM Drum # 2082	< 0.00299	0.574	0.00185	1.750	0.0	Pass
GEM Drum # 2084	< 0.00299	0.497	< 0.00155	1.540	0.0	Pass
GEM Drum # 2086	< 0.00299	0.590	0.00403	1.820	0.0	Pass
GEM Drum # 2088	< 0.00299	0.593	< 0.00155	1.770	0.0	Pass
GEM Drum # 2090	< 0.00299	0.521	0.00286	1.670	0.0	Pass

Student t-test

Number of samples = n = 5

Mean = $\bar{x} = \sum x_i / n$

Variance = $s^2 = \sum(x_i - \bar{x})^2 / (n-1)$

Degrees of freedom for n observations = n-1 = 4

From standard t-tables, the factor "z" for 95% confidence limit ($t_{0.95}$ or $\alpha_{0.05}$) for 4 degrees of freedom is 2.13.

Upper acceptance limit for 95% confidence for a 1-tailed t-test, at 4 degrees of freedom is:

$$\text{Acceptance limit} - (s \times 2.13)/n^{1/2}$$

Table 2. TCLP means, variances, and upper acceptance limits for 95% confidence.

Element	mean ($\bar{x}$)	Variance (s^2)	s	Acceptance limit (mg/L)	Upper acceptance limit for 95% confidence
Chromium	<0.00299	0	0	0.86	0.86
Nickel	0.5550	0.00189	0.0434	5.0	4.9586
Lead	0.0017	3.14 E-6	0.0018	0.37	0.3683
Uranium	1.7100	0.01195	0.1093	4.0	3.8959

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NC	233	
SC	10120	10582
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Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

c: GTSD00196 Report Date: September 25, 1998

Sample ID	: VTF-1257 #2082
Lab ID	: 9809621-01
Matrix	: TCLP
Date Collected	: 09/05/98
Date Received	: 09/18/98
Priority	: Routine
Collector	: Client

rameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
tals Analysis											
romium	U	ND	2.99	15.0	ug/l	5.0	JSS	09/24/98	1705	131923	1
ckel		574	3.93	3.93	ug/l	5.0					
ad		1.85	1.55	1.55	ug/l	5.0					
anium		1750	0.126	1.00	ug/l	5.0					
neral Chemistry											
trogen, Nitrate	U	ND	0.0254	0.100	mg/l	2.0	JLG	09/23/98	1748	131765	2

e following prep procedures were performed:

P Mass Spec	FGD	09/24/98	1100	131923 3
CLP Prep for Metals	JL	09/22/98	1645	131655 4

= Method	Method-Description
1	EPA 6020
2	EPA 300.0
3	EPA 3005
4	EPA 1311

tes:
e qualifiers in this report are defined as follows:
) indicates that the analyte was not detected at a concentration greater than the detection limit.
idicates presence of analyte at a concentration less than the reporting limit (RL) and greater than the detection limit (DL).
ndicates that the analyte was not detected at a concentration greater than the detection limit.
idicates that a quality control analyte recovery is outside of specified acceptance criteria.

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NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

cc: GTSD00196 Report Date: September 25, 1998

Sample ID : VTF-1257 #2082

M = Method	Method-Description

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Reviewed By

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SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

cc: GTSD00196 Report Date: September 25, 1998 Page 1 of 1

Sample ID	: VTF-1257 #2082
Lab ID	: 9809621-02
Matrix	: Misc.
Date Collected	: 09/05/98
Date Received	: 09/18/98
Priority	: Routine
Collector	: Client

arameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
neral Chemistry											
aint Filter Test		Pass.					JEN	09/24/98	1000	131966	1

I = Method	Method-Description
I 1	EPA 9095

tes:
e qualifiers in this report are defined as follows:
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indicates that the analyte was not detected at a concentration greater than the detection limit.
ndicates that a quality control analyte recovery is outside of specified acceptance criteria.

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SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

cc: GTSD00196 Report Date: September 25, 1998

Sample ID	: VTF-1258 #2084
Lab ID	: 9809621-03
Matrix	: TCLP
Date Collected	: 09/06/98
Date Received	: 09/18/98
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Metals Analysis											
Chromium	U	ND	2.99	15.0	ug/l	5.0	JSS	09/24/98	1711	131923	1
Nickel		497	3.93	3.93	ug/l	5.0					
Lead	U	ND	1.55	1.55	ug/l	5.0					
Uranium		1540	0.126	1.00	ug/l	5.0					
General Chemistry											
Nitrogen, Nitrate	U	ND	0.0254	0.100	mg/l	2.0	JLG	09/23/98	1829	131765	2

The following prep procedures were performed:

ICP Mass Spec	FGD	09/24/98	1100	131923 3
TCLP Prep for Metals	JL	09/22/98	1645	131655 4

M = Method	Method-Description
M 1	EPA 6020
M 2	EPA 300.0
M 3	EPA 3005
M 4	EPA 1311

Notes:
The qualifiers in this report are defined as follows:
ND indicates that the analyte was not detected at a concentration greater than the detection limit.
J indicates presence of analyte at a concentration less than the reporting limit (RL) and greater than the detection limit (DL).
U indicates that the analyte was not detected at a concentration greater than the detection limit.
* indicates that a quality control analyte recovery is outside of specified acceptance criteria.

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NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

cc: GTSD00196 Report Date: September 25, 1998

Sample ID : VTF-1258 #2084

I = Method	Method-Description

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NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

cc: GTSD00196

Report Date: September 25, 1998

Sample ID	: VTF-1258 #2084
Lab ID	: 9809621-04
Matrix	: Misc.
Date Collected	: 09/06/98
Date Received	: 09/18/98
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
General Chemistry											
Paint Filter Test		Pass.					JEN	09/24/98	1000	131966	1

M = Method	Method-Description
M 1	EPA 9095

Notes:
The qualifiers in this report are defined as follows:
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J indicates presence of analyte at a concentration less than the reporting limit (RL) and greater than the detection limit (DL).
U indicates that the analyte was not detected at a concentration greater than the detection limit.
* indicates that a quality control analyte recovery is outside of specified acceptance criteria.

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SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

c: GTSD00196 Report Date: September 25, 1998

Sample ID	: VTF-1259 #2086
Lab ID	: 9809621-05
Matrix	: TCLP
Date Collected	: 09/06/98
Date Received	: 09/18/98
Priority	: Routine
Collector	: Client

rameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
tals Analysis											
romium	U	ND	2.99	15.0	ug/l	5.0	JSS	09/24/98	1717	131923	1
ckel		590	3.93	3.93	ug/l	5.0					
ad		4.03	1.55	1.55	ug/l	5.0					
anium		1820	0.126	1.00	ug/l	5.0					
ieral Chemistry											
trogen, Nitrate	U	ND	0.0254	0.100	mg/l	2.0	JLG	09/23/98	1843	131765	2

following prep procedures were performed:

P Mass Spec	FGD	09/24/98	1100	131923 3
LP Prep for Metals	JL	09/22/98	1645	131655 4

= Method	Method-Description
1	EPA 6020
2	EPA 300.0
3	EPA 3005
4	EPA 1311

es:
qualifiers in this report are defined as follows:
indicates that the analyte was not detected at a concentration greater than the detection limit.
licates presence of analyte at a concentration less than the reporting limit (RL) and greater than the detection limit (DL).
dicates that the analyte was not detected at a concentration greater than the detection limit.
licates that a quality control analyte recovery is outside of specified acceptance criteria.

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SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

cc: GTSD00196 Report Date: September 25, 1998

Sample ID : VTF-1259 #2086

M = Method	Method-Description

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Client: GTS Duratek
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Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

:c: GTSD00196 Report Date: September 25, 1998

Sample ID	: VTF-1259 #2086
Lab ID	: 9809621-06
Matrix	: Misc.
Date Collected	: 09/06/98
Date Received	: 09/18/98
Priority	: Routine
Collector	: Client

ırameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
neral Chemistry											
ıint Filter Test		Pass.					JEN	09/24/98	1000	131966	1

= Method	Method-Description
1	EPA 9095

tes:
: qualifiers in this report are defined as follows:
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TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

cc: GTSD00196 Report Date: September 25, 1998

Sample ID	: VTF-1260 #2088
Lab ID	: 9809621-07
Matrix	: TCLP
Date Collected	: 09/06/98
Date Received	: 09/18/98
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Metals Analysis											
Chromium	U	ND	2.99	15.0	ug/l	5.0	JSS	09/24/98	1723	131923	1
Nickel		593	3.93	3.93	ug/l	5.0					
Lead	U	ND	1.55	1.55	ug/l	5.0					
Uranium		1770	0.126	1.00	ug/l	5.0					
General Chemistry											
Nitrogen, Nitrate	U	ND	0.0254	0.100	mg/l	2.0	JLG	09/23/98	1856	131765	2

The following prep procedures were performed:

ICP Mass Spec	FGD	09/24/98	1100	131923	3
TCLP Prep for Metals	JL	09/22/98	1645	131655	4

M = Method	Method-Description
M 1	EPA 6020
M 2	EPA 300.0
M 3	EPA 3005
M 4	EPA 1311

Notes:
The qualifiers in this report are defined as follows:
ND indicates that the analyte was not detected at a concentration greater than the detection limit.
J indicates presence of analyte at a concentration less than the reporting limit (RL) and greater than the detection limit (DL).
U indicates that the analyte was not detected at a concentration greater than the detection limit.
* indicates that a quality control analyte recovery is outside of specified acceptance criteria.

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NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

c: GTSD00196 Report Date: September 25, 1998

Sample ID : VTF-1260 #2088

= Method	Method-Description

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SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

cc: GTSD00196 Report Date: September 25, 1998

Sample ID	: VTF-1260 #2088
Lab ID	: 9809621-08
Matrix	: Misc.
Date Collected	: 09/06/98
Date Received	: 09/18/98
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
General Chemistry											
Paint Filter Test		Pass.					JEN	09/24/98	1000	131966	1

M = Method	Method-Description
M 1	EPA 9095

Notes:
The qualifiers in this report are defined as follows:
ND indicates that the analyte was not detected at a concentration greater than the detection limit.
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Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

c: GTSD00196 Report Date: September 25, 1998

Sample ID	: VTF-1261 #2090
Lab ID	: 9809621-09
Matrix	: TCLP
Date Collected	: 09/07/98
Date Received	: 09/18/98
Priority	: Routine
Collector	: Client

rameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
tals Analysis											
romium	U	ND	2.99	15.0	ug/l	5.0	JSS	09/24/98	1729	131923	1
ckel		521	3.93	3.93	ug/l	5.0					
ad		2.86	1.55	1.55	ug/l	5.0					
anium		1670	0.126	1.00	ug/l	5.0					
neral Chemistry											
trogen, Nitrate	U	ND	0.0254	0.100	mg/l	2.0	JLG	09/23/98	1910	131765	2

following prep procedures were performed:

P Mass Spec	FGD	09/24/98	1100	131923 3
LP Prep for Metals	JL	09/22/98	1645	131655 4

= Method	Method-Description
1	EPA 6020
2	EPA 300.0
3	EPA 3005
4	EPA 1311

es:
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SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

cc: GTSD00196 Report Date: September 25, 1998

Sample ID : VTF-1261 #2090

M = Method	Method-Description

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NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

cc: GTSD00196 Report Date: September 25, 1998

Sample ID	: VTF-1261 #2090
Lab ID	: 9809621-10
Matrix	: Misc.
Date Collected	: 09/07/98
Date Received	: 09/18/98
Priority	: Routine
Collector	: Client

arameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
neral Chemistry											
aint Filter Test		Pass.					JEN	09/24/98	1000	131966	1

I = Method	Method-Description
I 1	EPA 9095

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9809621-10

JGJ

GTS DURATEK SHIPPING MANIFEST

Q#31771

M-Area Batch #30 Glass TCLP Samples RM-98-31

980962P6

SHIPMENT DESTINED TO	SAMPLE CONTAINER IDENTIFICATION		DATE/TIME OF PACKAGING		SAMPLE NET WEIGHT	SHIPPING CONTAINER/ CONTAINER GROSS WEIGHT	SEAL # (IF APPLICABLE)
General Engineering Laboratories	Sample#	Drum#			Grams	Grams	N/A
2040 Savage Rd. Chasn. SC 29414	VTF-1257	2082	09/05/98	2300	186	218	
	VTF-1258	2084	09/06/98	0730	217	249	
	VTF-1259	2086	09/06/98	1500	216	248	
	VTF-1260	2088	09/06/98	2215	228	260	
	VTF-1261	2090	09/07/98	0515	206	238	
	Shipping Container		N/A		2 lbs	8 lbs	

Comments: Shipping Number

SRS-16395

FORMATION ONLY

Relinquished by:	Date:	Time:	Received by:	Relinquished by:	Date:	Time:	Received by:
[signature]	9/17	1240	[signature]				
Relinquished by:	Date:	Time:	Received by:	Relinquished by:	Date:	Time:	Received by:

C:\...\R.C

DURATEK
10100 Old Columbia Road
Columbia, Maryland 21046
410/312-5100 Fax 410/290-9070

L-98-070

September 15, 1998

Mr. Dan Bills
Subcontract Technical Representative
Westinghouse Savannah River Company
Building 730-M
Aiken, SC 29802

Final Wasteform Treatment Standards and Acceptance Criteria

Dear Mr. Bills:

GTS Duratek has completed sampling and analysis of the final wasteform, Batch #29, drums 2016, 2018, 2020, 2022, and 2024. The results of the analysis, including the analysis technique, is attached for your review. The analysis was performed by General Engineering Laboratories, a State of South Carolina certified lab, and verified by Mr. Innocent Joseph, Manager of Technology, GTS Duratek.

Results of the analysis indicate Batch #29 is within the contractual specifications. GTS Duratek will invoice directly through accounts payable (Brenda Bell, Bldg. 730-4B). A total of 85 drums of glass were produced for Batch #29. Should you have any questions, please contact Innocent Joseph or myself.

Sincerely,

GTS DURATEK

Daniel Macias
Director of Operations

DM/mlb
attachment

cc: S. Campbell
C. Coker

DURATEK

10100 Old Columbia Road
Columbia, Maryland 21046
410/312-5100 Fax 410/290-9070

September 14, 1998

Mr. Dan Macias
Operations Manger
Vendor Treatment Facility (M-area)
GTS Duratek
WSRC/USDOE Savannah River Site
Aiken, SC 29801

Dear Mr. Macias:

Please find enclosed the results of the "TCLP" and 'Paint Filter Test" on glass gems from drums 2016, 2018, 2020, 2022, and 2024. The tests were performed according to methods specified in the "Sampling Plan" for GTS Duratek's Vendor Treatment Facility at the Savannah River site. 1-tailed t-tests were performed on the TCLP data, and the upper acceptance limits for 95% confidence were calculated. The TCLP values are well below the upper acceptance limits for 95% confidence. All of the samples passed the "Paint Filter Test." The samples from Batch # 29 have therefore met all of the acceptance criteria for the glass product.

The calculations for sample means, variances, upper acceptance limits for 95% confidence, data sheets from General Engineering Laboratories, and a sample chain of custody record are enclosed. If you have any questions, please contact me at (410) 312-5120.

Sincerely

Innocent Joseph

Innocent Joseph
Manager, Technology
GTS Duratek

cc: J. Pope
B. Bowan
G. Hildebrandt
C. Coker

The glass gems from batch 29, produced at the GTS Duratek M-area facility, were subjected to "paint filter test" for free water, and "TCLP" for leaching characteristics at General Engineering Laboratories, a South Carolina licensed laboratory. The "paint filter test" and the "TCLP" were done according to EPA procedures 9095 and 1311, respectively. Please find enclosed the results for glass samples from drums 2016 to 2024. The results of the tests are summarized below. 1-tailed t-tests were performed, and the upper limits for 95% confidence were calculated.

The TCLP values are below the acceptance limit for 95% confidence.

Table 1. Summary of TCLP results

Sample ID	Chromium (mg/L)	Nickel (mg/L)	Lead (mg/L)	Uranium (mg/L)	Nitrate (as N)	Paint filter test
GEM Drum # 2016	0.0067	0.543	0.0039	1.580	0.0	Pass
GEM Drum # 2018	0.0067	0.524	0.0038	1.460	0.0	Pass
GEM Drum # 2020	0.0055	0.429	0.0033	1.210	0.0	Pass
GEM Drum # 2022	0.0063	0.432	0.0034	1.230	0.0	Pass
GEM Drum # 2024	0.0068	0.578	0.0056	1.630	0.0	Pass

Student t-test

Number of samples = n = 5

Mean = $\bar{x} = \sum x_i / n$

Variance = $s^2 = \sum(x_i - \bar{x})^2 / (n-1)$

Degrees of freedom for n observations = n-1 = 4

From standard t-tables, the factor "z" for 95% confidence limit ($t_{0.95}$ or $\alpha_{0.05}$) for 4 degrees of freedom is 2.13.

Upper acceptance limit for 95% confidence for a 1-tailed t-test, at 4 degrees of freedom is:

$$\text{Acceptance limit} - (s \times 2.13)/n^{1/2}$$

Table 2. TCLP means, variances, and upper acceptance limits for 95% confidence.

Element	mean ($\bar{x}$)	Variance (s^2)	s	Acceptance limit (mg/L)	Upper acceptance limit for 95% confidence
Chromium	0.0064	2.98 E-7	0.0005	0.86	0.8595
Nickel	0.5012	0.00454	0.0674	5.0	4.9358
Lead	0.0040	8.74 E-7	0.0009	0.37	0.3691
Uranium	1.4220	0.03787	0.1946	4.0	3.8146

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TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

GTSD00196 Report Date: September 11, 1998

Sample ID	: VTF-1218 DRUM#2016
Lab ID	: 9809205-01
Matrix	: TCLP
Date Collected	: 08/27/98
Date Received	: 09/04/98
Priority	: Routine
Collector	: Client

neter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Analysis											
nium	J	6.68	2.99	15.0	ug/l	5.0	JSS	09/10/98	2009	130862	1
l		543	3.93	3.93	ug/l	5.0					
		3.88	1.55	1.55	ug/l	5.0					
um		1580	0.126	1.00	ug/l	5.0					
al Chemistry											
gen, Nitrate	U	ND	0.0254	0.100	mg/l	2.0	JLG	09/09/98	1809	130697	2

llowing prep procedures were performed:

lass Spec	AJM	09/10/98	1000	130862 3
Prep for Metals	JL	09/08/98	2010	130707 4

Method	Method-Description
	EPA 6020
	EPA 300.0
	EPA 3005
	EPA 1311

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ates that a quality control analyte recovery is outside of specified acceptance criteria.

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TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

cc: GTSD00196 Report Date: September 11, 1998

Sample ID : VTF-1218 DRUM#2016

M = Method	Method-Description

This data report has been prepared and reviewed in accordance with General Engineering Laboratories standard operating procedures. Please direct any questions to your Project Manager, Jack Spitz at (803) 556-8171.

Reviewed By

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Client: GTS Duratek
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Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

GTSD00196 Report Date: September 11, 1998 Page 1 of 1

Sample ID	: VTF-1218 DRUM#2016
Lab ID	: 9809205-02
Matrix	: Misc.
Date Collected	: 08/27/98
Date Received	: 09/04/98
Priority	: Routine
Collector	: Client

ımeter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
ral Chemistry											
t Filter Test		Pass-Glass rocks					BJB	09/09/98	1300	130821	1

Method	Method-Description
	EPA 9095

:
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Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

cc: GTSD00196 Report Date: September 11, 1998

Sample ID	: VTF-1219 DRUM#2018
Lab ID	: 9809205-03
Matrix	: TCLP
Date Collected	: 08/27/98
Date Received	: 09/04/98
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Metals Analysis											
Chromium	J	6.73	2.99	15.0	ug/l	5.0	JSS	09/10/98	2015	130862	1
Nickel		524	3.93	3.93	ug/l	5.0					
Lead		3.81	1.55	1.55	ug/l	5.0					
Uranium		1460	0.126	1.00	ug/l	5.0					
General Chemistry											
Nitrogen, Nitrate	U	ND	0.0254	0.100	mg/l	2.0	JLG	09/09/98	1944	130697	2

The following prep procedures were performed:

ICP Mass Spec	AJM	09/10/98	1000	130862	3
TCLP Prep for Metals	JL	09/08/98	2010	130707	4

M = Method	Method-Description
M 1	EPA 6020
M 2	EPA 300.0
M 3	EPA 3005
M 4	EPA 1311

Notes:
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9809205-03

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SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

GTSD00196 Report Date: September 11, 1998

Sample ID : VTF-1219 DRUM#2018

Method	Method-Description

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SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

cc: GTSD00196 Report Date: September 11, 1998

Sample ID	: VTF-1219 DRUM#2018
Lab ID	: 9809205-04
Matrix	: Misc.
Date Collected	: 08/27/98
Date Received	: 09/04/98
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
General Chemistry											
Paint Filter Test		Pass-Glass rocks					BJB	09/09/98	1300	130821	1

M = Method	Method-Description
M 1	EPA 9095

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* indicates that a quality control analyte recovery is outside of specified acceptance criteria.

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9809205-04

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Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

GTSD00196 Report Date: September 11, 1998

Sample ID	: VTF-1220 DRUM#2020
Lab ID	: 9809205-05
Matrix	: TCLP
Date Collected	: 08/27/98
Date Received	: 09/04/98
Priority	: Routine
Collector	: Client

meter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
s Analysis											
mium	J	5.48	2.99	15.0	ug/l	5.0	JSS	09/10/98	2020	130862	1
el		429	3.93	3.93	ug/l	5.0					
		3.26	1.55	1.55	ug/l	5.0					
ium		1210	0.126	1.00	ug/l	5.0					
al Chemistry											
gen, Nitrate	U	ND	0.0254	0.100	mg/l	2.0	JLG	09/09/98	1958	130697	2

llowing prep procedures were performed:

Mass Spec	AJM	09/10/98	1000	130862 3
Prep for Metals	JL	09/08/98	2010	130707 4

Method	Method-Description
	EPA 6020
	EPA 300.0
	EPA 3005
	EPA 1311

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ates that a quality control analyte recovery is outside of specified acceptance criteria.

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TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

cc: GTSD00196 Report Date: September 11, 1998

Sample ID : VTF-1220 DRUM#2020

M = Method	Method-Description

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SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

;TSD00196 Report Date: September 11, 1998 Page 1 of 1

Sample ID	: VTF-1220 DRUM#2020
Lab ID	: 9809205-06
Matrix	: Misc.
Date Collected	: 08/27/98
Date Received	: 09/04/98
Priority	: Routine
Collector	: Client

neter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
al Chemistry											
Filter Test		Pass-Glass rocks					BJB	09/09/98	1300	130821	1

Method	Method-Description
	EPA 9095

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SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

cc: GTSD00196 Report Date: September 11, 1998

Sample ID	: VTF-1221 DRUM#2022
Lab ID	: 9809205-07
Matrix	: TCLP
Date Collected	: 08/28/98
Date Received	: 09/04/98
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Metals Analysis											
Chromium	J	6.33	2.99	15.0	ug/l	5.0	JSS	09/10/98	2026	130862	1
Nickel		432	3.93	3.93	ug/l	5.0					
Lead		3.42	1.55	1.55	ug/l	5.0					
Uranium		1230	0.126	1.00	ug/l	5.0					
General Chemistry											
Nitrogen, Nitrate	U	ND	0.0254	0.100	mg/l	2.0	JLG	09/09/98	1822	130697	2

The following prep procedures were performed:

ICP Mass Spec	AJM	09/10/98	1000	130862	3
TCLP Prep for Metals	JL	09/08/98	2010	130707	4

M = Method	Method-Description
M 1	EPA 6020
M 2	EPA 300.0
M 3	EPA 3005
M 4	EPA 1311

Notes:
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NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr Innocent Joseph

TSD00196 Report Date: September 11, 1998 Page 2 of 2

Sample ID : VTF-1221 DRUM#2022

Method	Method-Description

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NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

cc: GTSD00196

Report Date: September 11, 1998

Sample ID	: VTF-1221 DRUM#2022
Lab ID	: 9809205-08
Matrix	: Misc.
Date Collected	: 08/28/98
Date Received	: 09/04/98
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
General Chemistry											
Paint Filter Test		Pass-Glass rocks					BJB	09/09/98	1300	130821	1

M = Method	Method-Description
M 1	EPA 9095

Notes:
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9809205-08

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SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

TSD00196 Report Date: September 11, 1998 Page 1 of 2

Sample ID	: VTF-1222 DRUM#2024
Lab ID	: 9809205-09
Matrix	: TCLP
Date Collected	: 08/28/98
Date Received	: 09/04/98
Priority	: Routine
Collector	: Client

neter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Analysis											
nium	J	6.79	2.99	15.0	ug/l	5.0	JSS	09/10/98	2035	130862	1
l		578	3.93	3.93	ug/l	5.0					
		5.60	1.55	1.55	ug/l	5.0					
um		1630	0.126	1.00	ug/l	5.0					
al Chemistry											
gen, Nitrate	U	ND	0.0254	0.100	mg/l	2.0	JLG	09/09/98	1836	130697	2

llowing prep procedures were performed:

Mass Spec	AJM	09/10/98	1000	130862 3
Prep for Metals	JL	09/08/98	2010	130707 4

Method	Method-Description
	EPA 6020
	EPA 300.0
	EPA 3005
	EPA 1311

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NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

cc: GTSD00196

Report Date: September 11, 1998

Sample ID : VTF-1222 DRUM#2024

M = Method **Method-Description**

This data report has been prepared and reviewed in accordance with General Engineering Laboratories standard operating procedures. Please direct any questions to your Project Manager, Jack Spitz at (803) 556-8171.

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FL	E87156/87294	E87472/87458
NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
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Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

GTSD00196 Report Date: September 11, 1998 Page 1 of 1

Sample ID	: VTF-1222 DRUM#2024
Lab ID	: 9809205-10
Matrix	: Misc.
Date Collected	: 08/28/98
Date Received	: 09/04/98
Priority	: Routine
Collector	: Client

meter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
al Chemistry											
Filter Test		Pass-Glass rocks					BJB	09/09/98	1300	130821	1

Method	Method-Description
	EPA 9095

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rd operating procedures. Please direct
ıestions to your Project Manager, Jack Spitz at (803) 556-8171.

ved By

GTS DURATEK SHIPPING MANIFEST

M-Area Batch #29 Glass TCLP Samples RM-98-39 8092051.

SHIPMENT DESTINED TO	SAMPLE CONTAINER IDENTIFICATION		DATE/TIME OF PACKAGING		SAMPLE NET WEIGHT	SHIPPING CONTAINER/ CONTAINER GROSS WEIGHT	SEAL # (IF APPLICABLE)
	Sample#	Drum#			Grams	Grams	N/A
General Engineering Laboratories 01 02	VTF-1218	2016	08/27/98	1400	221	253	
03 04	VTF-1219	2018	08/27/98	1920	255	255	
2040 Savage Rd. 05 06 Chasn. SC 29414	VTF-1220	2020	08/27/98	2330	289	321	
07 08	VTF-1221	2022	08/28/98	1330	219	251	
09 10	VTF-1222	2024	08/28/98	1820	181	213	
	Shipping Container		N/A		5 lbs	9 lbs	

INFORMATION ONLY

Comments: Shipping Number
SRS-16376

Relinquished by:	Date:	Time:	Received by:	Relinqished by:	Date:	Time:	Received by:
			Shawn 9/4/98				
Relinquished by:	Date:	Time:	Received by:	Relinqished by:	Date:	Time:	Received by:

CA.ARC

WSRC-TR-96-0244, Rev. 2; APPENDIX L, Page 324 of 694

DURATEK
10100 Old Columbia Road
Columbia, Maryland 21046
410/312-5100 Fax 410/290-9070

L-98-069

September 15, 1998

Mr. Dan Bills
Subcontract Technical Representative
Westinghouse Savannah River Company
Building 730-M
Aiken, SC 29802

Final Wasteform Treatment Standards and Acceptance Criteria

Dear Mr. Bills:

GTS Duratek has completed sampling and analysis of the final wasteform, Batch #28, drums 1932, 1934, 1936, 1938, and 1940. The results of the analysis, including the analysis technique, is attached for your review. The analysis was performed by General Engineering Laboratories, a State of South Carolina certified lab, and verified by Mr. Innocent Joseph, Manager of Technology, GTS Duratek.

Results of the analysis indicate Batch #28 is within the contractual specifications. GTS Duratek will invoice directly through accounts payable (Brenda Bell, Bldg. 730-4B). A total of 82 drums of glass were produced for Batch #28. Should you have any questions, please contact Innocent Joseph or myself.

Sincerely,

GTS DURATEK

Daniel Macias
Director of Operations

DM/mlb
attachment

cc: S. Campbell
C. Coker

DURATEK
10100 Old Columbia Road
Columbia, Maryland 21046
410/312-5100 Fax 410/290-9070

September 14, 1998

Mr. Dan Macias
Operations Manger
Vendor Treatment Facility (M-area)
GTS Duratek
WSRC/USDOE Savannah River Site
Aiken, SC 29801

Dear Mr. Macias:

Please find enclosed the results of the "TCLP" and 'Paint Filter Test" on glass gems from drums 1932, 1934, 1936, 1938, and 1940. The tests were performed according to methods specified in the "Sampling Plan" for GTS Duratek's Vendor Treatment Facility at the Savannah River site. 1-tailed t-tests were performed on the TCLP data, and the upper acceptance limits for 95% confidence were calculated. The TCLP values are well below the upper acceptance limits for 95% confidence. All of the samples passed the "Paint Filter Test." The samples from Batch # 28 have therefore met all of the acceptance criteria for the glass product.

The calculations for sample means, variances, upper acceptance limits for 95% confidence, data sheets from General Engineering Laboratories, and a sample chain of custody record are enclosed. If you have any questions, please contact me at (410) 312-5120.

Sincerely

Innocent Joseph

Innocent Joseph
Manager, Technology
GTS Duratek

cc: J. Pope
B. Bowan
G. Hildebrandt
C. Coker

The glass gems from batch 28, produced at the GTS Duratek M-area facility, were subjected to "paint filter test" for free water, and "TCLP" for leaching characteristics at General Engineering Laboratories, a South Carolina licensed laboratory. The "paint filter test" and the "TCLP" were done according to EPA procedures 9095 and 1311, respectively. Please find enclosed the results for glass samples from drums 1932 to 1940. The results of the tests are summarized below. 1-tailed t-tests were performed, and the upper limits for 95% confidence were calculated.

The TCLP values are below the acceptance limit for 95% confidence.

Table 1. Summary of TCLP results

Sample ID	Chromium (mg/L)	Nickel (mg/L)	Lead (mg/L)	Uranium (mg/L)	Nitrate (as N)	Paint filter test
GEM Drum # 1932	0.0064	0.483	0.0048	1.430	0.0	Pass
GEM Drum # 1934	0.0054	0.399	0.0029	1.160	0.0	Pass
GEM Drum # 1936	0.0045	0.381	0.0026	1.110	0.0	Pass
GEM Drum # 1938	0.0054	0.334	0.0036	1.000	0.0	Pass
GEM Drum # 1940	0.0055	0.331	0.0036	1.000	0.0	Pass

Student t-test

Number of samples = n = 5

Mean = $\bar{x} = \sum x_i / n$

Variance = $s^2 = \sum(x_i - \bar{x})^2 / (n-1)$

Degrees of freedom for n observations = n-1 = 4

From standard t-tables, the factor "z" for 95% confidence limit ($t_{0.95}$ or $\alpha_{0.05}$) for 4 degrees of freedom is 2.13.

Upper acceptance limit for 95% confidence for a 1-tailed t-test, at 4 degrees of freedom is:

$$\text{Acceptance limit} - (s \times 2.13)/n^{1/2}$$

Table 2. TCLP means, variances, and upper acceptance limits for 95% confidence.

Element	mean ($\bar{x}$)	Variance (s^2)	s	Acceptance limit (mg/L)	Upper acceptance limit for 95% confidence
Chromium	0.0054	4.71 E-7	0.0007	0.86	0.8593
Nickel	0.3856	0.00383	0.0619	5.0	4.9410
Lead	0.0035	6.85 E-7	0.0008	0.37	0.3692
Uranium	1.1400	0.03115	0.1765	4.0	3.8319

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NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

GTSD00196 Report Date: September 11, 1998

Sample ID	: VTF-1171 DRUM#1932
Lab ID	: 9809198-01
Matrix	: TCLP
Date Collected	: 08/19/98
Date Received	: 09/04/98
Priority	: Routine
Collector	: Client

meter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
s Analysis											
mium	J	6.39	2.99	15.0	ug/l	5.0	JSS	09/10/98	1916	130862	1
el		483	3.93	3.93	ug/l	5.0					
		4.76	1.55	1.55	ug/l	5.0					
ium		1430	0.126	1.00	ug/l	5.0					
al Chemistry											
gen, Nitrate	U	ND	0.0254	0.100	mg/l	2.0	JLG	09/09/98	1700	130697	2

llowing prep procedures were performed:

Mass Spec	AJM	09/10/98	1000	130862 3
Prep for Metals	JL	09/08/98	2010	130707 4

Method	Method-Description
	EPA 6020
	EPA 300.0
	EPA 3005
	EPA 1311

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cates that the analyte was not detected at a concentration greater than the detection limit.
ates that a quality control analyte recovery is outside of specified acceptance criteria.

9809198-01

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Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

cc: GTSD00196 Report Date: September 11, 1998

Sample ID : VTF-1171 DRUM#1932

M = Method	Method-Description

This data report has been prepared and reviewed in accordance with General Engineering Laboratories standard operating procedures. Please direct any questions to your Project Manager, Jack Spitz at (803) 556-8171.

Reviewed By

P O Box 30712 • Charleston, SC 29417 • 2040 Savage Road • 29414
(803) 556-8171 • Fax (803) 766-1178

9809198-01

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SC	10120	10582
TN	02934	02934

Client: GTS Duratek
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Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

GTSD00196 Report Date: September 11, 1998 Page 1 of 1

Sample ID	: VTF-1171 DRUM#1932
Lab ID	: 9809198-02
Matrix	: Misc.
Date Collected	: 08/19/98
Date Received	: 09/04/98
Priority	: Routine
Collector	: Client

ımeter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
ral Chemistry											
t Filter Test		Pass-Glass rocks					BJB	09/09/98	1300	130821	1

Method	Method-Description
	EPA 9095

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Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

cc: GTSD00196 Report Date: September 11, 1998

Sample ID	: VTF-1172 DRUM#1934
Lab ID	: 9809198-03
Matrix	: TCLP
Date Collected	: 08/19/98
Date Received	: 09/04/98
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Metals Analysis											
Chromium	J	5.40	2.99	15.0	ug/l	5.0	JSS	09/10/98	1922	130862	1
Nickel		399	3.93	3.93	ug/l	5.0					
Lead		2.88	1.55	1.55	ug/l	5.0					
Uranium		1160	0.126	1.00	ug/l	5.0					
General Chemistry											
Nitrogen, Nitrate	U	ND	0.0254	0.100	mg/l	2.0	JLG	09/09/98	1917	130697	2

The following prep procedures were performed:

ICP Mass Spec	AJM	09/10/98	1000	130862	3
TCLP Prep for Metals	JL	09/08/98	2010	130707	4

M = Method	Method-Description
M 1	EPA 6020
M 2	EPA 300.0
M 3	EPA 3005
M 4	EPA 1311

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9809198-03

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SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

GTSD00196 Report Date: September 11, 1998

Sample ID : VTF-1172 DRUM#1934

Method	Method-Description

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NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

cc: GTSD00196 Report Date: September 11, 1998

Sample ID	: VTF-1172 DRUM#1934
Lab ID	: 9809198-04
Matrix	: Misc.
Date Collected	: 08/19/98
Date Received	: 09/04/98
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
General Chemistry											
Paint Filter Test		Pass-Glass rocks					BJB	09/09/98	1300	130821	1

M = Method	Method-Description
M 1	EPA 9095

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* indicates that a quality control analyte recovery is outside of specified acceptance criteria.

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SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

GTSD00196 Report Date: September 11, 1998

Sample ID	: VTF-1173 DRUM#1936
Lab ID	: 9809198-05
Matrix	: TCLP
Date Collected	: 08/19/98
Date Received	: 09/04/98
Priority	: Routine
Collector	: Client

ımeter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
ls Analysis											
ımium	J	4.45	2.99	15.0	ug/l	5.0	JSS	09/10/98	1929	130862	1
el		381	3.93	3.93	ug/l	5.0					
		2.64	1.55	1.55	ug/l	5.0					
ium		1110	0.126	1.00	ug/l	5.0					
ral Chemistry											
ɔgen, Nitrate	U	ND	0.0254	0.100	mg/l	2.0	JLG	09/09/98	1931	130697	2

ollowing prep procedures were performed:

Mass Spec	AJM	09/10/98	1000	130862 3
P Prep for Metals	JL	09/08/98	2010	130707 4

Method	Method-Description
	EPA 6020
	EPA 300.0
	EPA 3005
	EPA 1311

:

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9809198-05

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NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

cc: GTSD00196 Report Date: September 11, 1998

Sample ID : VTF-1173 DRUM#1936

M = Method **Method-Description**

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SC	10120	10582
TN	02934	02934

Client: GTS Duratek
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Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

GTSD00196 Report Date: September 11, 1998 Page 1 of 1

Sample ID	: VTF-1173 DRUM#1936
Lab ID	: 9809198-06
Matrix	: Misc.
Date Collected	: 08/19/98
Date Received	: 09/04/98
Priority	: Routine
Collector	: Client

ımeter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
ral Chemistry											
: Filter Test		Pass-Glass rocks					BJB	09/09/98	1300	130821	1

Method	Method-Description
	EPA 9095

:
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FL	E87156/87294	E87472/87458
NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

cc: GTSD00196 Report Date: September 11, 1998

Sample ID	: VTF-1174 DRUM#1938
Lab ID	: 9809198-07
Matrix	: TCLP
Date Collected	: 08/20/98
Date Received	: 09/04/98
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Metals Analysis											
Chromium	J	5.42	2.99	15.0	ug/l	5.0	JSS	09/10/98	1935	130862	1
Nickel		334	3.93	3.93	ug/l	5.0					
Lead		3.63	1.55	1.55	ug/l	5.0					
Uranium		1000	0.126	1.00	ug/l	5.0					
General Chemistry											
Nitrogen, Nitrate	U	ND	0.0254	0.100	mg/l	2.0	JLG	09/09/98	1741	130697	2

The following prep procedures were performed:

ICP Mass Spec	AJM	09/10/98	1000	130862	3
TCLP Prep for Metals	JL	09/08/98	2010	130707	4

M = Method	Method-Description
M 1	EPA 6020
M 2	EPA 300.0
M 3	EPA 3005
M 4	EPA 1311

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9809198-07

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STATE	GEL	EPI
FL	E87156/87294	E87472/87458
NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

GTSD00196 Report Date: September 11, 1998

Sample ID : VTF-1174 DRUM#1938

Method	Method-Description

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STATE	GEL	EPI
FL	E87156/87294	E87472/87458
NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

cc: GTSD00196 Report Date: September 11, 1998

Sample ID	: VTF-1174 DRUM#1938
Lab ID	: 9809198-08
Matrix	: Misc.
Date Collected	: 08/20/98
Date Received	: 09/04/98
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
General Chemistry											
Paint Filter Test		Pass-Glass rocks					BJB	09/09/98	1300	130821	1

M = Method	Method-Description
M 1	EPA 9095

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SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

GTSD00196 Report Date: September 11, 1998

Sample ID	: VTF-1175 DRUM#1940
Lab ID	: 9809198-09
Matrix	: TCLP
Date Collected	: 08/20/98
Date Received	: 09/04/98
Priority	: Routine
Collector	: Client

meter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
s Analysis											
mium	J	5.47	2.99	15.0	ug/l	5.0	JSS	09/10/98	1941	130862	1
el		331	3.93	3.93	ug/l	5.0					
		3.61	1.55	1.55	ug/l	5.0					
ium		1000	0.126	1.00	ug/l	5.0					
al Chemistry											
gen, Nitrate	U	ND	0.0254	0.100	mg/l	2.0	JLG	09/09/98	1755	130697	2

llowing prep procedures were performed:

Mass Spec	AJM	09/10/98	1000	130862 3
Prep for Metals	JL	09/08/98	2010	130707 4

Method	Method-Description
	EPA 6020
	EPA 300.0
	EPA 3005
	EPA 1311

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TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

cc: GTSD00196 Report Date: September 11, 1998

Sample ID : VTF-1175 DRUM#1940

M = Method **Method-Description**

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NC	233	
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TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

: GTSD00196 Report Date: September 11, 1998 Page 1 of 1

Sample ID	: VTF-1175 DRUM#1940
Lab ID	: 9809198-10
Matrix	: Misc.
Date Collected	: 08/20/98
Date Received	: 09/04/98
Priority	: Routine
Collector	: Client

ameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
:ral Chemistry											
ıt Filter Te		Pass-Glass rocks, A little fine dust					BJB	09/09/98	1300	130821	1

: Method	Method-Description
	EPA 9095

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:wed By

M-Area Batch #28 Glass TCLP Samples RM-98-29

8/09/98

SHIPMENT DESTINED TO	SAMPLE CONTAINER IDENTIFICATION		DATE/TIME OF PACKAGING		SAMPLE NET WEIGHT	SHIPPING CONTAINER/ CONTAINER GROSS WEIGHT	SEAL # (IF APPLICABLE)
General Engineering Laboratories //	Sample#	Drum#			Grams	Grams	N/A
2040 Savage Rd. Chasn. SC 29414	VTF-1171	1932	08/19/98	0830	245	277	
	VTF-1172	1934	08/19/98	1330	220	252	
	VTF-1173	1936	08/19/98	1730	257	289	
	VTF-1174	1938	08/20/98	0000	272	304	
	VTF-1175	1940	08/20/98	0840	271	303	
	Shipping Container		N/A		4 lbs	8 lbs	

Comments: Shipping Number SRS-16363

INFORMATION ONLY

Relinquished by:	Date:	Time:	Received by:	Relinquished by:	Date:	Time:	Received by:
[signature]	8/20/98	1440	[signature]	[signature]	8/20/98		
Relinquished by:	Date:	Time:	Received by:	Relinquished by:	Date:	Time:	Received by:

C:\...\RCO\Shipping Forms\...

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DURATEK

10100 Old Columbia Road
Columbia, Maryland 21046
410/312-5100 Fax 410/290-9070

L-98-066

August 25, 1998

Mr. Dan Bills
Subcontract Technical Representative
Westinghouse Savannah River Company
Building 730-M
Aiken, SC 29802

Final Wasteform Treatment Standards and Acceptance Criteria

Dear Mr. Bills:

GTS Duratek has completed sampling and analysis of the final wasteform, Batch #26, drums 1772, 1774, 1776, 1778, and 1780. The results of the analysis, including the analysis technique, is attached for your review. The analysis was performed by General Engineering Laboratories, a State of South Carolina certified lab, and verified by Mr. Innocent Joseph, Manager of Technology, GTS Duratek.

Results of the analysis indicate Batch #26 is within the contractual specifications. GTS Duratek will invoice directly through accounts payable (Brenda Bell, Bldg. 730-4B). A total of 54 drums of glass were produced for Batch #26. Should you have any questions, please contact Innocent Joseph or myself.

Sincerely,

GTS DURATEK

Daniel Macias
Director of Operations

DM/mlb
attachment

cc: S. Campbell
C. Coker

DURATEK
10100 Old Columbia Road
Columbia, Maryland 21046
410/312-5100 Fax 410/290-9070

August 24, 1998

Mr. Dan Macias
Operations Manger
Vendor Treatment Facility (M-area)
GTS Duratek
WSRC/USDOE Savannah River Site
Aiken, SC 29801

Dear Mr. Macias:

Please find enclosed the results of the "TCLP" and 'Paint Filter Test" on glass gems from drums 1772, 1774, 1776, 1778, and 1780. The tests were performed according to methods specified in the "Sampling Plan" for GTS Duratek's Vendor Treatment Facility at the Savannah River site. 1-tailed t-tests were performed on the TCLP data, and the upper acceptance limits for 95% confidence were calculated. The TCLP values are well below the upper acceptance limits for 95% confidence. All of the samples passed the "Paint Filter Test." The samples from Batch # 26 have therefore met all of the acceptance criteria for the glass product.

The calculations for sample means, variances, upper acceptance limits for 95% confidence, data sheets from General Engineering Laboratories, and a sample chain of custody record are enclosed. If you have any questions, please contact me at (410) 312-5120.

Sincerely

Innocent Joseph

Innocent Joseph
Manager, Technology
GTS Duratek

cc: J. Pope
B. Bowan
G. Hildebrandt
C. Coker

The glass gems from batch 26, produced at the GTS Duratek M-area facility, were subjected to "paint filter test" for free water, and "TCLP" for leaching characteristics at General Engineering Laboratories, a South Carolina licensed laboratory. The "paint filter test" and the "TCLP" were done according to EPA procedures 9095 and 1311, respectively. Please find enclosed the results for glass samples from drums 1772 to 1780. The results of the tests are summarized below. 1-tailed t-tests were performed, and the upper limits for 95% confidence were calculated.

The TCLP values are below the acceptance limit for 95% confidence.

Table 1. Summary of TCLP results

Sample ID	Chromium (mg/L)	Nickel (mg/L)	Lead (mg/L)	Uranium (mg/L)	Nitrate (as N)	Paint filter test
GEM Drum # 1772	0.0069	0.386	0.0053	1.290	0.0	Pass
GEM Drum # 1774	0.0067	0.444	0.0040	1.470	0.0	Pass
GEM Drum # 1776	0.0013	0.077	0.0011	0.256	0.0	Pass
GEM Drum # 1778	0.0063	0.447	0.0040	1.460	0.0	Pass
GEM Drum # 1780	0.0062	0.393	0.0044	1.350	0.0	Pass

<u>Student t-test</u>

Number of samples = n = 5

Mean = $\bar{x} = \sum x_i / n$

Variance = $s^2 = \sum(x_i - \bar{x})^2 / (n-1)$

Degrees of freedom for n observations = n-1 = 4

From standard t-tables, the factor "z" for 95% confidence limit ($t_{0.95}$ or $\alpha_{0.05}$) for 4 degrees of freedom is 2.13.

Upper acceptance limit for 95% confidence for a 1-tailed t-test, at 4 degrees of freedom is:

$$\text{Acceptance limit} - (s \times 2.13)/n^{1/2}$$

Table 2. TCLP means, variances, and upper acceptance limits for 95% confidence.

Element	mean ($\bar{x}$)	Variance (s^2)	s	Acceptance limit (mg/L)	Upper acceptance limit for 95% confidence
Chromium	0.0055	5.51 E-6	0.0023	0.86	0.8578
Nickel	0.3494	0.0240	0.1549	5.0	4.8525
Lead	0.0038	2.49 E-6	0.0016	0.37	0.3685
Uranium	1.1652	0.2640	0.5139	4.0	3.5105

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NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

GTSD00196 Report Date: August 21, 1998

Sample ID	: VTF-1075 DRUM#1772
Lab ID	: 9808500-01
Matrix	: TCLP
Date Collected	: 08/02/98
Date Received	: 08/14/98
Priority	: Routine
Collector	: Client

ameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
ls Analysis											
omium	J	6.93	1.95	15.0	ug/l	5.0	AME	08/20/98	1512	129127	1
cel		386	0.210	2.00	ug/l	5.0					
d		5.29	0.130	1.00	ug/l	5.0					
ium		1290	0.120	1.00	ug/l	5.0					
ral Chemistry											
ogen, Nitrate	U	ND	0.100	0.250	mg/l	5.0	JLG	08/18/98	1700	128899	2

ollowing prep procedures were performed:

Mass Spec	FGD	08/20/98	1030	129127 3
P Prep for Metals	JL	08/17/98	1935	128866 4

Method	Method-Description
	EPA 6020
	EPA 300.0
	EPA 3005
	EPA 1311

:

ualifiers in this report are defined as follows:

ndicates that the analyte was not detected at a concentration greater than the detection limit.

cates presence of analyte at a concentration less than the reporting limit (RL) and greater than the detection limit (DL).

licates that the analyte was not detected at a concentration greater than the detection limit.

icates that a quality control analyte recovery is outside of specified acceptance criteria.

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NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

cc: GTSD00196 Report Date: August 21, 1998

Sample ID : VTF-1075 DRUM#1772

M = Method	Method-Description

This data report has been prepared and reviewed in accordance with General Engineering Laboratories standard operating procedures. Please direct any questions to your Project Manager, Jack Spitz at (803) 556-8171.

Reviewed By

P O Box 30712 • Charleston, SC 29417 • 2040 Savage Road • 29414
(803) 556-8171 • Fax (803) 766-1178

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FL	E87156/87294	E87472/87458
NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

GTSD00196 Report Date: August 21, 1998 Page 1 of 1

Sample ID	: VTF-1075 DRUM#1772
Lab ID	: 9808500-06
Matrix	: Misc.
Date Collected	: 08/02/98
Date Received	: 08/14/98
Priority	: Routine
Collector	: Client

meter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
ral Chemistry											
Filter Test		Pass.					JEN	08/20/98	1030	129231	1

Method	Method-Description
	EPA 9095

ualifiers in this report are defined as follows:
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ata report has been prepared and reviewed
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rd operating procedures. Please direct
estions to your Project Manager, Jack Spitz at (803) 556-8171.

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SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

cc: GTSD00196

Report Date: August 21, 1998

Sample ID	: VTF-1076 DRUM#1774
Lab ID	: 9808500-02
Matrix	: TCLP
Date Collected	: 08/02/98
Date Received	: 08/14/98
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Metals Analysis											
Chromium	J	6.70	1.95	15.0	ug/l	5.0	AME	08/20/98	1518	129127	1
Nickel		444	0.210	2.00	ug/l	5.0					
Lead		4.04	0.130	1.00	ug/l	5.0					
Uranium		1470	0.120	1.00	ug/l	5.0					
General Chemistry											
Nitrogen, Nitrate	U	ND	0.100	0.250	mg/l	5.0	JLG	08/18/98	1742	128899	2

The following prep procedures were performed:

ICP Mass Spec	FGD	08/20/98	1030	129127 3
TCLP Prep for Metals	JL	08/17/98	1935	128866 4

M = Method	Method-Description
M 1	EPA 6020
M 2	EPA 300.0
M 3	EPA 3005
M 4	EPA 1311

Notes:
The qualifiers in this report are defined as follows:
ND indicates that the analyte was not detected at a concentration greater than the detection limit.
J indicates presence of analyte at a concentration less than the reporting limit (RL) and greater than the detection limit (DL).
U indicates that the analyte was not detected at a concentration greater than the detection limit.
* indicates that a quality control analyte recovery is outside of specified acceptance criteria.

9808500-02

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FL	E87156/87294	E87472/87458
NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

GTSD00196 Report Date: August 21, 1998

Sample ID : VTF-1076 DRUM#1774

Method	Method-Description

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uestions to your Project Manager, Jack Spitz at (803) 556-8171.

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STATE	GEL	EPI
FL	E87156/87294	E87472/87458
NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

cc: GTSD00196 Report Date: August 21, 1998

Sample ID	: VTF-1076 DRUM#1774
Lab ID	: 9808500-07
Matrix	: Misc.
Date Collected	: 08/02/98
Date Received	: 08/14/98
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
General Chemistry											
Paint Filter Test		Pass.					JEN	08/20/98	1030	129231	1

M = Method	Method-Description
M 1	EPA 9095

Notes:
The qualifiers in this report are defined as follows:
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J indicates presence of analyte at a concentration less than the reporting limit (RL) and greater than the detection limit (DL).
U indicates that the analyte was not detected at a concentration greater than the detection limit.
* indicates that a quality control analyte recovery is outside of specified acceptance criteria.

This data report has been prepared and reviewed in accordance with General Engineering Laboratories standard operating procedures. Please direct any questions to your Project Manager, Jack Spitz at (803) 556-8171.

Reviewed By

9808500-07

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NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

GTSD00196 Report Date: August 21, 1998

Sample ID	: VTF-1077 DRUM#1776
Lab ID	: 9808500-03
Matrix	: TCLP
Date Collected	: 08/03/98
Date Received	: 08/14/98
Priority	: Routine
Collector	: Client

ımeter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
ls Analysis											
›mium	J	1.33	0.390	3.00	ug/l	1.0	AME	08/20/98	1524	129127	1
:el		77.0	0.0420	0.400	ug/l	1.0					
l		1.10	0.0260	0.200	ug/l	1.0					
ıium		256	0.0240	0.200	ug/l	1.0					
ral Chemistry											
›gen, Nitrate	U	ND	0.100	0.250	mg/l	5.0	JLG	08/18/98	1755	128899	2

ollowing prep procedures were performed:

Mass Spec	FGD	08/20/98	1030	129127 3
P Prep for Metals	JL	08/17/98	1935	128866 4

Method	Method-Description
	EPA 6020
	EPA 300.0
	EPA 3005
	EPA 1311

:

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cates that the analyte was not detected at a concentration greater than the detection limit.
:ates that a quality control analyte recovery is outside of specified acceptance criteria.

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SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

cc: GTSD00196 Report Date: August 21, 1998

Sample ID : VTF-1077 DRUM#1776

M = Method	Method-Description

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NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

GTSD00196 Report Date: August 21, 1998 Page 1 of 1

Sample ID	: VTF-1077 DRUM#1776
Lab ID	: 9808500-08
Matrix	: Misc.
Date Collected	: 08/03/98
Date Received	: 08/14/98
Priority	: Routine
Collector	: Client

meter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
:al Chemistry											
Filter Test		Pass.					JEN	08/20/98	1030	129231	1

Method	Method-Description
	EPA 9095

ıalifiers in this report are defined as follows:
dicates that the analyte was not detected at a concentration greater than the detection limit.
:ates presence of analyte at a concentration less than the reporting limit (RL) and greater than the detection limit (DL).
cates that the analyte was not detected at a concentration greater than the detection limit.
:ates that a quality control analyte recovery is outside of specified acceptance criteria.

ata report has been prepared and reviewed
ɔrdance with General Engineering Laboratories
rd operating procedures. Please direct
ıestions to your Project Manager, Jack Spitz at (803) 556-8171.

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NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

cc: GTSD00196

Report Date: August 21, 1998

Sample ID	: VTF-1078 DRUM#1778
Lab ID	: 9808500-04
Matrix	: TCLP
Date Collected	: 08/03/98
Date Received	: 08/14/98
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Metals Analysis											
Chromium	J	6.30	1.95	15.0	ug/l	5.0	AME	08/20/98	1529	129127	1
Nickel		447	0.210	2.00	ug/l	5.0					
Lead		3.96	0.130	1.00	ug/l	5.0					
Uranium		1460	0.120	1.00	ug/l	5.0					
General Chemistry											
Nitrogen, Nitrate	U	ND	0.100	0.250	mg/l	5.0	JLG	08/18/98	1809	128899	2

The following prep procedures were performed:

ICP Mass Spec	FGD	08/20/98	1030	129127	3
TCLP Prep for Metals	JL	08/17/98	1935	128866	4

M = Method	Method-Description
M 1	EPA 6020
M 2	EPA 300.0
M 3	EPA 3005
M 4	EPA 1311

Notes:
The qualifiers in this report are defined as follows:
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J indicates presence of analyte at a concentration less than the reporting limit (RL) and greater than the detection limit (DL).
U indicates that the analyte was not detected at a concentration greater than the detection limit.
* indicates that a quality control analyte recovery is outside of specified acceptance criteria.

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9808500-04

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STATE	GEL	EPI
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NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

GTSD00196 Report Date: August 21, 1998

Sample ID : VTF-1078 DRUM#1778

Method	Method-Description

ata report has been prepared and reviewed
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rd operating procedures. Please direct
iestions to your Project Manager, Jack Spitz at (803) 556-8171.

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STATE	GEL	EPI
FL	E87156/87294	E87472/87458
NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

cc: GTSD00196

Report Date: August 21, 1998

Sample ID	: VTF-1078 DRUM#1778
Lab ID	: 9808500-09
Matrix	: Misc.
Date Collected	: 08/03/98
Date Received	: 08/14/98
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
General Chemistry											
Paint Filter Test		Pass.					JEN	08/20/98	1030	129231	1

M = Method	Method-Description
M 1	EPA 9095

Notes:
The qualifiers in this report are defined as follows:
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* indicates that a quality control analyte recovery is outside of specified acceptance criteria.

This data report has been prepared and reviewed in accordance with General Engineering Laboratories standard operating procedures. Please direct any questions to your Project Manager, Jack Spitz at (803) 556-8171.

Reviewed By

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SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

GTSD00196 Report Date: August 21, 1998

Sample ID	: VTF-1079 DRUM#1780
Lab ID	: 9808500-05
Matrix	: TCLP
Date Collected	: 08/03/98
Date Received	: 08/14/98
Priority	: Routine
Collector	: Client

meter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
s Analysis											
mium	J	6.22	1.95	15.0	ug/l	5.0	AME	08/20/98	1557	129127	1
el		393	0.210	2.00	ug/l	5.0					
		4.41	0.130	1.00	ug/l	5.0					
ium		1350	0.120	1.00	ug/l	5.0					
al Chemistry											
gen, Nitrate	U	ND	0.100	0.250	mg/l	5.0	JLG	08/18/98	1823	128899	2

llowing prep procedures were performed:

Mass Spec	FGD	08/20/98	1030	129127 3
Prep for Metals	JL	08/17/98	1935	128866 4

Method	Method-Description
	EPA 6020
	EPA 300.0
	EPA 3005
	EPA 1311

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FL	E87156/87294	E87472/87458
NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

cc: GTSD00196

Report Date: August 21, 1998

Sample ID : VTF-1079 DRUM#1780

M = Method **Method-Description**

This data report has been prepared and reviewed in accordance with General Engineering Laboratories standard operating procedures. Please direct any questions to your Project Manager, Jack Spitz at (803) 556-8171.

Reviewed By

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STATE	GEL	EPI
FL	E87156/87294	E87472/87458
NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

GTSD00196 Report Date: August 21, 1998

Sample ID	: VTF-1079 DRUM#1780
Lab ID	: 9808500-10
Matrix	: Misc.
Date Collected	: 08/03/98
Date Received	: 08/14/98
Priority	: Routine
Collector	: Client

meter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
al Chemistry											
Filter Test		Pass.					JEN	08/20/98	1030	129231	1

Method	Method-Description
	EPA 9095

alifiers in this report are defined as follows:
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ates presence of analyte at a concentration less than the reporting limit (RL) and greater than the detection limit (DL).
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ates that a quality control analyte recovery is outside of specified acceptance criteria.

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d operating procedures. Please direct
estions to your Project Manager, Jack Spitz at (803) 556-8171.

ved By

9808500-10

Blank

DURATEK
10100 Old Columbia Road
Columbia, Maryland 21046
410/312-5100 Fax 410/290-9070

L-98-068

September 3, 1998

Mr. Dan Bills
Subcontract Technical Representative
Westinghouse Savannah River Company
Building 730-M
Aiken, SC 29802

Final Wasteform Treatment Standards and Acceptance Criteria

Dear Mr. Bills:

GTS Duratek has completed sampling and analysis of the final wasteform, Batch #27, drums 1850, 1852, 1854, 1856, and 1858. The results of the analysis, including the analysis technique, is attached for your review. The analysis was performed by General Engineering Laboratories, a State of South Carolina certified lab, and verified by Mr. Innocent Joseph, Manager of Technology, GTS Duratek.

Results of the analysis indicate Batch #27 is within the contractual specifications. GTS Duratek will invoice directly through accounts payable (Brenda Bell, Bldg. 730-4B). A total of 77 drums of glass were produced for Batch #27. Should you have any questions, please contact Innocent Joseph or myself.

Sincerely,

GTS DURATEK

Daniel Macias
Director of Operations

DM/mlb
attachment

cc: S. Campbell
C. Coker

DURATEK

10100 Old Columbia Road
Columbia, Maryland 21046
410/312-5100 Fax 410/290-9070

September 2, 1998

Mr. Dan Macias
Operations Manger
Vendor Treatment Facility (M-area)
GTS Duratek
WSRC/USDOE Savannah River Site
Aiken, SC 29801

Dear Mr. Macias:

Please find enclosed the results of the "TCLP" and 'Paint Filter Test" on glass gems from drums 1850, 1852, 1854, 1856, and 1858. The tests were performed according to methods specified in the "Sampling Plan" for GTS Duratek's Vendor Treatment Facility at the Savannah River site. 1-tailed t-tests were performed on the TCLP data, and the upper acceptance limits for 95% confidence were calculated. The TCLP values are well below the upper acceptance limits for 95% confidence. All of the samples passed the "Paint Filter Test." The samples from Batch # 27 have therefore met all of the acceptance criteria for the glass product.

The calculations for sample means, variances, upper acceptance limits for 95% confidence, data sheets from General Engineering Laboratories, and a sample chain of custody record are enclosed. If you have any questions, please contact me at (410) 312-5120.

Sincerely

Innocent Joseph

Innocent Joseph
Manager, Technology
GTS Duratek

cc: J. Pope
B. Bowan
G. Hildebrandt
C. Coker

The glass gems from batch 27, produced at the GTS Duratek M-area facility, were subjected to "paint filter test" for free water, and "TCLP" for leaching characteristics at General Engineering Laboratories, a South Carolina licensed laboratory. The "paint filter test" and the "TCLP" were done according to EPA procedures 9095 and 1311, respectively. Please find enclosed the results for glass samples from drums 1850 to 1858. The results of the tests are summarized below. 1-tailed t-tests were performed, and the upper limits for 95% confidence were calculated.

The TCLP values are below the acceptance limit for 95% confidence.

Table 1. Summary of TCLP results

Sample ID	Chromium (mg/L)	Nickel (mg/L)	Lead (mg/L)	Uranium (mg/L)	Nitrate (as N)	Paint filter test
GEM Drum # 1850	<0.00299	0.365	0.0025	1.180	0.0	Pass
GEM Drum # 1852	<0.00299	0.382	0.0051	1.240	0.0	Pass
GEM Drum # 1854	0.0032	0.401	0.0025	1.280	0.0	Pass
GEM Drum # 1856	0.0032	0.453	0.0029	1.380	0.0	Pass
GEM Drum # 1858	0.0033	0.409	0.0027	1.280	0.0	Pass

Student t-test

Number of samples = n = 5

Mean = $\bar{x} = \sum x_i / n$

Variance = $s^2 = \sum(x_i - \bar{x})^2 / (n-1)$

Degrees of freedom for n observations = n-1 = 4

From standard t-tables, the factor "z" for 95% confidence limit ($t_{0.95}$ or $\alpha_{0.05}$) for 4 degrees of freedom is 2.13.

Upper acceptance limit for 95% confidence for a 1-tailed t-test, at 4 degrees of freedom is:

$$\text{Acceptance limit} - (s \times 2.13)/n^{1/2}$$

Table 2. TCLP means, variances, and upper acceptance limits for 95% confidence.

Element	mean ($\bar{x}$)	Variance (s^2)	s	Acceptance limit (mg/L)	Upper acceptance limit for 95% confidence
Chromium	0.0019	3.10 E-6	0.0018	0.86	0.8583
Nickel	0.4020	0.0011	0.0332	5.0	4.9683
Lead	0.0031	1.25 E-6	0.0011	0.37	0.3689
Uranium	1.2720	0.0053	0.0729	4.0	3.9305

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SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact. Mr. Innocent Joseph

GTSD00196 Report Date: September 01, 1998

Sample ID	: VTF-1127 DRUM#1850
Lab ID	: 9808879-01
Matrix	: TCLP
Date Collected	: 08/11/98
Date Received	: 08/25/98
Priority	: Routine
Collector	: Client

meter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
s Analysis											
mium	U	ND	2.99	15.0	ug/l	5.0	JSS	08/31/98	1801	129789	1
el		365	3.93	3.93	ug/l	5.0					
		2.46	1.55	1.55	ug/l	5.0					
ium		1180	0.126	1.00	ug/l	5.0					
ral Chemistry											
gen, Nitrate	U	ND	0.0635	0.250	mg/l	5.0	JLG	08/27/98	2350	129781	2

llowing prep procedures were performed:

Mass Spec	FGD	08/28/98	1430	129789 3
P Prep for Metals	JL	08/26/98	1450	129628 4

Method	Method-Description
	EPA 6020
	EPA 300.0
	EPA 3005
	EPA 1311

:

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cates presence of analyte at a concentration less than the reporting limit (RL) and greater than the detection limit (DL).
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NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

cc: GTSD00196 Report Date: September 01, 1998

Sample ID : VTF-1127 DRUM#1850

M = Method	Method-Description

This data report has been prepared and reviewed in accordance with General Engineering Laboratories standard operating procedures. Please direct any questions to your Project Manager, Jack Spitz at (803) 556-8171.

Reviewed By

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SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

GTSD00196 Report Date: September 01, 1998 Page 1 of 1

Sample ID	: VTF-1127 DRUM#1850
Lab ID	: 9808879-06
Matrix	: Misc.
Date Collected	: 08/11/98
Date Received	: 08/25/98
Priority	: Routine
Collector	: Client

ımeter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
ral Chemistry											
: Filter Test		Pass.					JEN	09/01/98	1330	130228	1

Method	Method-Description
	EPA 9095

:

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SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

cc: GTSD00196 Report Date: September 01, 1998

Sample ID	: VTF-1128 DRUM#1852
Lab ID	: 9808879-02
Matrix	: TCLP
Date Collected	: 08/11/98
Date Received	: 08/25/98
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Metals Analysis											
Chromium	U	ND	2.99	15.0	ug/l	5.0	JSS	08/31/98	1806	129789	1
Nickel		382	3.93	3.93	ug/l	5.0					
Lead		5.10	1.55	1.55	ug/l	5.0					
Uranium		1240	0.126	1.00	ug/l	5.0					
General Chemistry											
Nitrogen, Nitrate	U	ND	0.0635	0.250	mg/l	5.0	JLG	08/28/98	0032	129781	2

The following prep procedures were performed:

ICP Mass Spec	FGD	08/28/98	1430	129789 3
TCLP Prep for Metals	JL	08/26/98	1450	129628 4

M = Method	Method-Description
M 1	EPA 6020
M 2	EPA 300.0
M 3	EPA 3005
M 4	EPA 1311

Notes:
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STATE	GEL	EPI
FL	E87156/87294	E87472/87458
NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

GTSD00196 Report Date: September 01, 1998

Sample ID : VTF-1128 DRUM#1852

Method	Method-Description

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STATE	GEL	EPI
FL	E87156/87294	E87472/87458
NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

cc: GTSD00196

Report Date: September 01, 1998

Sample ID	: VTF-1128 DRUM#1852
Lab ID	: 9808879-07
Matrix	: Misc.
Date Collected	: 08/11/98
Date Received	: 08/25/98
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
General Chemistry											
Paint Filter Test		Pass.					JEN	09/01/98	1330	130228	1

M = Method	Method-Description
M 1	EPA 9095

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NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

: GTSD00196 Report Date: September 01, 1998

Sample ID	: VTF-1129 DRUM#1854
Lab ID	: 9808879-03
Matrix	: TCLP
Date Collected	: 08/12/98
Date Received	: 08/25/98
Priority	: Routine
Collector	: Client

ameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
ıls Analysis											
omium	J	3.17	2.99	15.0	ug/l	5.0	JSS	08/31/98	1812	129789	1
kel		401	3.93	3.93	ug/l	5.0					
d		2.47	1.55	1.55	ug/l	5.0					
nium		1280	0.126	1.00	ug/l	5.0					
:ral Chemistry											
ogen, Nitrate	U	ND	0.0635	0.250	mg/l	5.0	JLG	08/28/98	0045	129781	2

following prep procedures were performed:

Mass Spec	FGD	08/28/98	1430	129789 3
.P Prep for Metals	JL	08/26/98	1450	129628 4

: Method	Method-Description
	EPA 6020
	EPA 300.0
	EPA 3005
	EPA 1311

:

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STATE	GEL	EPI
FL	E87156/87294	E87472/87458
NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

cc: GTSD00196 Report Date: September 01, 1998

Sample ID : VTF-1129 DRUM#1854

M = Method	Method-Description

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STATE	GEL	EPI
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SC	10120	10582
TN	02934	02934

Client: GTS Duratek
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Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

GTSD00196 Report Date: September 01, 1998 Page 1 of 1

Sample ID	: VTF-1129 DRUM#1854
Lab ID	: 9808879-08
Matrix	: Misc.
Date Collected	: 08/12/98
Date Received	: 08/25/98
Priority	: Routine
Collector	: Client

ımeter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
ral Chemistry											
t Filter Test		Pass.					JEN	09/01/98	1330	130228	1

Method	Method-Description
	EPA 9095

:
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NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

cc: GTSD00196 Report Date: September 01, 1998

Sample ID	: VTF-1130 DRUM#1856
Lab ID	: 9808879-04
Matrix	: TCLP
Date Collected	: 08/12/98
Date Received	: 08/25/98
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Metals Analysis											
Chromium	J	3.20	2.99	15.0	ug/l	5.0	JSS	08/31/98	1817	129789	1
Nickel		453	3.93	3.93	ug/l	5.0					
Lead		2.88	1.55	1.55	ug/l	5.0					
Uranium		1380	0.126	1.00	ug/l	5.0					
General Chemistry											
Nitrogen, Nitrate	U	ND	0.0635	0.250	mg/l	5.0	JLG	08/28/98	0059	129781	2

The following prep procedures were performed:

ICP Mass Spec	FGD	08/28/98	1430	129789 3
TCLP Prep for Metals	JL	08/26/98	1450	129628 4

M = Method	Method-Description
M 1	EPA 6020
M 2	EPA 300.0
M 3	EPA 3005
M 4	EPA 1311

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STATE	GEL	EPI
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NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

GTSD00196 Report Date: September 01, 1998

Sample ID : VTF-1130 DRUM#1856

Method	Method-Description

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NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

cc: GTSD00196

Report Date: September 01, 1998

Sample ID	: VTF-1130 DRUM#1856
Lab ID	: 9808879-09
Matrix	: Misc.
Date Collected	: 08/12/98
Date Received	: 08/25/98
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
General Chemistry											
Paint Filter Test		Pass.					JEN	09/01/98	1330	130228	1

M = Method	Method-Description
M 1	EPA 9095

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NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

GTSD00196 Report Date: September 01, 1998

Sample ID	: VTF-1131 DRUM#1858
Lab ID	: 9808879-05
Matrix	: TCLP
Date Collected	: 08/12/98
Date Received	: 08/25/98
Priority	: Routine
Collector	: Client

ımeter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
ls Analysis											
ımium	J	3.27	2.99	15.0	ug/l	5.0	JSS	08/31/98	1823	129789	1
el		409	3.93	3.93	ug/l	5.0					
l		2.73	1.55	1.55	ug/l	5.0					
ium		1280	0.126	1.00	ug/l	5.0					
ral Chemistry											
›gen, Nitrate	U	ND	0.0635	0.250	mg/l	5.0	JLG	08/28/98	0113	129781	2

ollowing prep procedures were performed:

Mass Spec	FGD	08/28/98	1430	129789 3
P Prep for Metals	JL	08/26/98	1450	129628 4

Method	Method-Description
	EPA 6020
	EPA 300.0
	EPA 3005
	EPA 1311

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STATE	GEL	EPI
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NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

cc: GTSD00196

Report Date: September 01, 1998

Sample ID : VTF-1131 DRUM#1858

M = Method	Method-Description

This data report has been prepared and reviewed in accordance with General Engineering Laboratories standard operating procedures. Please direct any questions to your Project Manager, Jack Spitz at (803) 556-8171.

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STATE	GEL	EPI
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NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
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Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

GTSD00196 Report Date: September 01, 1998 Page 1 of 1

Sample ID	: VTF-1131 DRUM#1858
Lab ID	: 9808879-10
Matrix	: Misc.
Date Collected	: 08/12/98
Date Received	: 08/25/98
Priority	: Routine
Collector	: Client

ımeter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
ral Chemistry											
t Filter Test		Pass.					JEN	09/01/98	1330	130228	1

Method	Method-Description
	EPA 9095

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9808879-10

GTS DURATEK SHIPPING MANIFEST

M-Area Batch #27 Glass TCLP Samples RM-98-28

98088-79%

SHIPMENT DESTINED TO	SAMPLE CONTAINER IDENTIFICATION		DATE/TIME OF PACKAGING		SAMPLE NET WEIGHT	SHIPPING CONTAINER/ CONTAINER GROSS WEIGHT	SEAL # (IF APPLICABLE)
General Engineering Laboratories 2040 Savage Rd. Chasn. SC 29414	Sample#	Drum#			Grams	Grams	N/A
	VTF-1127	1850	08/11/98	0530	299	330	
	VTF-1128	1852	08/11/98	2100	332	364	
	VTF-1129	1854	08/12/98	1145	269	300	
	VTF-1130	1856	08/12/98	1706	247	279	
	VTF-1131	1858	08/12/98	2140	213	245	
	Shipping Container		N/A		5 lbs	9 lbs	

VTF 1100 = 1850 − 27 = 1823

Comments: Shipping Number SRS-16346

INFORMATION ONLY

Relinquished by:	Date:	Time:	Received by:	Relinqished by:	Date:	Time:	Received by:
[signature]	8/24	0800	[signature] 8/24/98				
Relinquished by:	Date:	Time:	Received by:	Relinqished by:	Date:	Time:	Received by:

C:\...\RCO\Shi

DURATEK
10100 Old Columbia Road
Columbia, Maryland 21046
410/312-5100 Fax 410/290-9070

L-98-064

August 18, 1998

Mr. Dan Bills
Subcontract Technical Representative
Westinghouse Savannah River Company
Building 730-M
Aiken, SC 29802

Final Wasteform Treatment Standards and Acceptance Criteria

Dear Mr. Bills:

GTS Duratek has completed sampling and analysis of the final wasteform, Batch #25, drums 1718, 1720, 1722, 1724, and 1726. The results of the analysis, including the analysis technique, is attached for your review. The analysis was performed by General Engineering Laboratories, a State of South Carolina certified lab, and verified by Mr. Innocent Joseph, Manager of Technology, GTS Duratek.

Results of the analysis indicate Batch #25 is within the contractual specifications. GTS Duratek will invoice directly through accounts payable (Brenda Bell, Bldg. 730-4B). A total of 53 drums of glass were produced for Batch #25. Should you have any questions, please contact Innocent Joseph or myself.

Sincerely,

GTS DURATEK

Daniel Macias
Director of Operations

DM/mlb
attachment

cc: S. Campbell
C. Coker

DURATEK

10100 Old Columbia Road
Columbia, Maryland 21046
410/312-5100 Fax 410/290-9070

August 17, 1998

Mr. Dan Macias
Operations Manger
Vendor Treatment Facility (M-area)
GTS Duratek
WSRC/USDOE Savannah River Site
Aiken, SC 29801

Dear Mr. Macias:

Please find enclosed the results of the "TCLP" and 'Paint Filter Test" on glass gems from drums 1718, 1720, 1722, 1724, and 1726. The tests were performed according to methods specified in the "Sampling Plan" for GTS Duratek's Vendor Treatment Facility at the Savannah River site. 1-tailed t-tests were performed on the TCLP data, and the upper acceptance limits for 95% confidence were calculated. The TCLP values are well below the upper acceptance limits for 95% confidence. All of the samples passed the "Paint Filter Test." The samples from Batch # 25 have therefore met all of the acceptance criteria for the glass product.

The calculations for sample means, variances, upper acceptance limits for 95% confidence, data sheets from General Engineering Laboratories, and a sample chain of custody record are enclosed. If you have any questions, please contact me at (410) 312-5120.

Sincerely

Innocent Joseph

Innocent Joseph
Manager, Technology
GTS Duratek

cc: J. Pope
B. Bowan
G. Hildebrandt
C. Coker

The glass gems from batch 25, produced at the GTS Duratek M-area facility, were subjected to "paint filter test" for free water, and "TCLP" for leaching characteristics at General Engineering Laboratories, a South Carolina licensed laboratory. The "paint filter test" and the "TCLP" were done according to EPA procedures 9095 and 1311, respectively. Please find enclosed the results for glass samples from drums 1718 to 1726. The results of the tests are summarized below. 1-tailed t-tests were performed, and the upper limits for 95% confidence were calculated.

The TCLP values are below the acceptance limit for 95% confidence.

Table 1. Summary of TCLP results

Sample ID	Chromium (mg/L)	Nickel (mg/L)	Lead (mg/L)	Uranium (mg/L)	Nitrate (as N)	Paint filter test
GEM Drum # 1718	0.00432	0.465	< 0.00339	1.140	0.0	Pass
GEM Drum # 1720	< 0.00365	0.513	< 0.00339	1.250	0.0	Pass
GEM Drum # 1722	< 0.00365	0.443	< 0.00339	1.110	0.0	Pass
GEM Drum # 1724	< 0.00365	0.464	< 0.00339	1.160	0.0	Pass
GEM Drum # 1726	< 0.00365	0.450	< 0.00339	1.140	0.0	Pass

Student t-test

Number of samples = n = 5

Mean = $\bar{x} = \sum x_i / n$

Variance = $s^2 = \sum (x_i - \bar{x})^2 / (n-1)$

Degrees of freedom for n observations = n-1 = 4

From standard t-tables, the factor "z" for 95% confidence limit ($t_{0.95}$ or $\alpha_{0.05}$) for 4 degrees of freedom is 2.13.

Upper acceptance limit for 95% confidence for a 1-tailed t-test, at 4 degrees of freedom is:

$$\text{Acceptance limit} - (s \times 2.13)/n^{1/2}$$

Table 2. TCLP means, variances, and upper acceptance limits for 95% confidence.

Element	mean ($\bar{x}$)	Variance (s^2)	s	Acceptance limit (mg/L)	Upper acceptance limit for 95% confidence
Chromium	0.0009	3.73 E-6	0.0019	0.86	0.8582
Nickel	0.467	0.00075	0.0274	5.0	4.9739
Lead	0.0	0.0	0.0	0.37	0.37
Uranium	1.160	0.00285	0.0534	4.0	3.9491

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TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

GTSD00196 Report Date: August 13, 1998

Sample ID	: VTF-1042 DRUM#1718
Lab ID	: 9808130-01
Matrix	: TCLP
Date Collected	: 07/25/98
Date Received	: 08/05/98
Priority	: Routine
Collector	: Client

ımeter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
ls Analysis											
ɔmium	J	4.32	3.65	25.0	ug/l	5.0	CRB	08/13/98	0536	128626	1
:el		465	11.4	25.0	ug/l	5.0					
ı	U	ND	3.39	25.0	ug/l	5.0					
ıium		1140	59.5	250	ug/l	5.0					
ral Chemistry											
ɔgen, Nitrate	U	ND	0.100	0.250	mg/l	5.0	JLG	08/07/98	1443	128041	2
ollowing prep procedures were performed:											
.P Prep for Metals							JL	08/06/98	1600	128022	3

Method	Method-Description
	EPA 6010A
	EPA 300.0
	EPA 1311

:

ualifiers in this report are defined as follows:

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cates presence of analyte at a concentration less than the reporting limit (RL) and greater than the detection limit (DL).

icates that the analyte was not detected at a concentration greater than the detection limit.

cates that a quality control analyte recovery is outside of specified acceptance criteria.

9808130-01

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TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

cc: GTSD00196 Report Date: August 13, 1998

Sample ID : VTF-1042 DRUM#1718

M = Method	Method-Description

This data report has been prepared and reviewed in accordance with General Engineering Laboratories standard operating procedures. Please direct any questions to your Project Manager, Jack Spitz at (803) 556-8171.

Reviewed By

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TN	02934	02934

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Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

GTSD00196 Report Date: August 13, 1998 Page 1 of 1

Sample ID	: VTF-1042 DRUM#1718
Lab ID	: 9808130-06
Matrix	: Misc.
Date Collected	: 07/25/98
Date Received	: 08/05/98
Priority	: Routine
Collector	: Client

ameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
ral Chemistry											
t Filter Test		Pass.					JEN	08/11/98	1500	128377	1

Method	Method-Description
	EPA 9095

:

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SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

cc: GTSD00196

Report Date: August 13, 1998

Sample ID	: VTF-1043 DRUM#1720
Lab ID	: 9808130-02
Matrix	: TCLP
Date Collected	: 07/25/98
Date Received	: 08/05/98
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Metals Analysis											
Chromium	U	ND	3.65	25.0	ug/l	5.0	CRB	08/13/98	0542	128626	1
Nickel		513	11.4	25.0	ug/l	5.0					
Lead	U	ND	3.39	25.0	ug/l	5.0					
Uranium		1250	59.5	250	ug/l	5.0					
General Chemistry											
Nitrogen, Nitrate	U	ND	0.100	0.250	mg/l	5.0	JLG	08/07/98	1553	128041	2

The following prep procedures were performed:

TCLP Prep for Metals							JL	08/06/98	1600	128022	3

M = Method	Method-Description
M 1	EPA 6010A
M 2	EPA 300.0
M 3	EPA 1311

Notes:
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Client: GTS Duratek
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Contact: Mr. Innocent Joseph

GTSD00196 Report Date: August 13, 1998 Page 2 of 2

Sample ID : VTF-1043 DRUM#1720

Method	Method-Description

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SC	10120	10582
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Contact: Mr. Innocent Joseph

cc: GTSD00196 Report Date: August 13, 1998 Page 1 of 1

Sample ID	: VTF-1043 DRUM#1720
Lab ID	: 9808130-07
Matrix	: Misc.
Date Collected	: 07/25/98
Date Received	: 08/05/98
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
General Chemistry											
Paint Filter Test		Pass.					JEN	08/11/98	1500	128377	1

M = Method	Method-Description
M 1	EPA 9095

Notes:
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* indicates that a quality control analyte recovery is outside of specified acceptance criteria.

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SC	10120	10582
TN	02934	02934

Client: GTS Duratek
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Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

GTSD00196 Report Date: August 13, 1998

Sample ID	: VTF-1044 DRUM#1722
Lab ID	: 9808130-03
Matrix	: TCLP
Date Collected	: 07/26/98
Date Received	: 08/05/98
Priority	: Routine
Collector	: Client

ameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
ls Analysis											
omium	U	ND	3.65	25.0	ug/l	5.0	CRB	08/13/98	0548	128626	1
el		443	11.4	25.0	ug/l	5.0					
l	U	ND	3.39	25.0	ug/l	5.0					
ium		1110	59.5	250	ug/l	5.0					
ral Chemistry											
ogen, Nitrate	U	ND	0.100	0.250	mg/l	5.0	JLG	08/07/98	1607	128041	2

ollowing prep procedures were performed:

P Prep for Metals							JL	08/06/98	1600	128022	3

Method	Method-Description
	EPA 6010A
	EPA 300.0
	EPA 1311

s:
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NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

cc: GTSD00196 Report Date: August 13, 1998

Sample ID : VTF-1044 DRUM#1722

M = Method	Method-Description

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TN	02934	02934

Client: GTS Duratek
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Contact: Mr. Innocent Joseph

GTSD00196 Report Date: August 13, 1998 Page 1 of 1

Sample ID	: VTF-1044 DRUM#1722
Lab ID	: 9808130-08
Matrix	: Misc.
Date Collected	: 07/26/98
Date Received	: 08/05/98
Priority	: Routine
Collector	: Client

ımeter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
ral Chemistry											
t Filter Test		Pass.					JEN	08/11/98	1500	128377	1

Method	Method-Description
	EPA 9095

:

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TN	02934	02934

Client: GTS Duratek
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Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

cc: GTSD00196 Report Date: August 13, 1998

Sample ID	: VTF-1045 DRUM#1724
Lab ID	: 9808130-04
Matrix	: TCLP
Date Collected	: 07/26/98
Date Received	: 08/05/98
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Metals Analysis											
Chromium	U	ND	3.65	25.0	ug/l	5.0	CRB	08/13/98	0554	128626	1
Nickel		464	11.4	25.0	ug/l	5.0					
Lead	U	ND	3.39	25.0	ug/l	5.0					
Uranium		1160	59.5	250	ug/l	5.0					
General Chemistry											
Nitrogen, Nitrate	U	ND	0.100	0.250	mg/l	5.0	JLG	08/07/98	1621	128041	2

The following prep procedures were performed:

TCLP Prep for Metals							JL	08/06/98	1600	128022	3

M = Method	Method-Description
M 1	EPA 6010A
M 2	EPA 300.0
M 3	EPA 1311

Notes:
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NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

GTSD00196 Report Date: August 13, 1998 Page 2 of 2

Sample ID : VTF-1045 DRUM#1724

Method	Method-Description

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SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

cc: GTSD00196 Report Date: August 13, 1998

Sample ID	: VTF-1045 DRUM#1724
Lab ID	: 9808130-09
Matrix	: Misc.
Date Collected	: 07/26/98
Date Received	: 08/05/98
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
General Chemistry											
Paint Filter Test		Pass.					JEN	08/11/98	1500	128377	1

M = Method	Method-Description
M 1	EPA 9095

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SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

GTSD00196 Report Date: August 13, 1998

Sample ID	: VTF-1046 DRUM#1726
Lab ID	: 9808130-05
Matrix	: TCLP
Date Collected	: 07/26/98
Date Received	: 08/05/98
Priority	: Routine
Collector	: Client

ımeter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
ls Analysis											
ımium	U	ND	3.65	25.0	ug/l	5.0	CRB	08/13/98	0615	128626	1
el		450	11.4	25.0	ug/l	5.0					
l	U	ND	3.39	25.0	ug/l	5.0					
ium		1140	59.5	250	ug/l	5.0					
ral Chemistry											
ɔgen, Nitrate	U	ND	0.100	0.250	mg/l	5.0	JLG	08/07/98	1635	128041	2

ollowing prep procedures were performed:

P Prep for Metals							JL	08/06/98	1600	128022	3

Method	Method-Description
	EPA 6010A
	EPA 300.0
	EPA 1311

:

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STATE	GEL	EPI
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NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

cc: GTSD00196 Report Date: August 13, 1998

Sample ID : VTF-1046 DRUM#1726

M = Method	Method-Description

This data report has been prepared and reviewed in accordance with General Engineering Laboratories standard operating procedures. Please direct any questions to your Project Manager, Jack Spitz at (803) 556-8171.

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SC	10120	10582
TN	02934	02934

Client: GTS Duratek
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Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

GTSD00196 Report Date: August 13, 1998 Page 1 of 1

Sample ID	: VTF-1046 DRUM#1726
Lab ID	: 9808130-10
Matrix	: Misc.
Date Collected	: 07/26/98
Date Received	: 08/05/98
Priority	: Routine
Collector	: Client

meter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
al Chemistry											
Filter Test		Pass.					JEN	08/11/98	1500	128377	1

Method	Method-Description
	EPA 9095

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2

3177

M-Area Batch #25 Glass TCLP Samples RM-98-25

9808130%

SHIPMENT DESTINED TO	SAMPLE CONTAINER IDENTIFICATION		DATE/TIME OF PACKAGING		SAMPLE NET WEIGHT	SHIPPING CONTAINER/ CONTAINER GROSS WEIGHT	SEAL # (IF APPLICABLE)
General Engineering Laboratories 2040 Savage Rd. Chasn. SC 29414	Sample#	Drum#			Grams	Grams	N/A
01 06	VTF-1042	1718	07/25/98	1240	308	340	
02 07	VTF-1043	1720	07/25/98	2200	252	284	
03 08	VTF-1044	1722	07/26/98	0500	244	276	
04 09	VTF-1045	1724	07/26/98	0900	388	420	
05 10	VTF-1046	1726	07/26/98	1500	303	335	
	Shipping Container		N/A		3 lbs	8 lbs	

1065 = Drum ~~1745~~ ~ 1780
−1046
+19

INFORMATION ONLY

Δ
1726
1046
680

Comments: Shipping Number SRS-16284

1065 + 680 = 1745

Relinquished by:	Date:	Time:	Received by:	Relinquished by	Date:	Time:	Received by:
M. [signature]	8/3/98	0815	[signature]				
Relinquished by	Date:	Time:	Received by:	Relinquished by	Date:	Time:	Received by:
			[signature] SIGN FOR PETE WILBER	8/3/98			

SRCO Shipping Forms

DURATEK
10100 Old Columbia Road
Columbia, Maryland 21046
410/312-5100 Fax 410/290-9070

L-98-063

August 6, 1998

Mr. Dan Bills
Subcontract Technical Representative
Westinghouse Savannah River Company
Building 730-M
Aiken, SC 29802

Final Wasteform Treatment Standards and Acceptance Criteria

Dear Mr. Bills:

GTS Duratek has completed sampling and analysis of the final wasteform, Batch #24, drums 1666, 1668, 1670, 1672, and 1674. The results of the analysis, including the analysis technique, is attached for your review. The analysis was performed by General Engineering Laboratories, a State of South Carolina certified lab, and verified by Mr. Innocent Joseph, Manager of Technology, GTS Duratek.

Results of the analysis indicate Batch #24 is within the contractual specifications. GTS Duratek will invoice directly through accounts payable (Brenda Bell, Bldg. 730-4B). A total of 68 drums of glass were produced for Batch #24. Should you have any questions, please contact Innocent Joseph or myself.

Sincerely,

GTS DURATEK

Daniel Macias
Director of Operations

DM/mlb
attachment

cc: S. Campbell
C. Coker

DURATEK

10100 Old Columbia Road
Columbia, Maryland 21046
410/312-5100 Fax 410/290-9070

August 5, 1998

Mr. Dan Macias
Operations Manger
Vendor Treatment Facility (M-area)
GTS Duratek
WSRC/USDOE Savannah River Site
Aiken, SC 29801

Dear Mr. Macias:

Please find enclosed the results of the "TCLP" and 'Paint Filter Test" on glass gems from drums 1666, 1668, 1670, 1672, and 1674. The tests were performed according to methods specified in the "Sampling Plan" for GTS Duratek's Vendor Treatment Facility at the Savannah River site. 1-tailed t-tests were performed on the TCLP data, and the upper acceptance limits for 95% confidence were calculated. The TCLP values are well below the upper acceptance limits for 95% confidence. All of the samples passed the "Paint Filter Test." The samples from Batch # 24 have therefore met all of the acceptance criteria for the glass product.

The calculations for sample means, variances, upper acceptance limits for 95% confidence, data sheets from General Engineering Laboratories, and a sample chain of custody record are enclosed. If you have any questions, please contact me at (410) 312-5120.

Sincerely

Innocent Joseph

Innocent Joseph
Manager, Technology
GTS Duratek

cc: P. Deltete
J. Pope
B. Bowan
G. Hildebrandt
C. Coker

The glass gems from batch 24, produced at the GTS Duratek M-area facility, were subjected to "paint filter test" for free water, and "TCLP" for leaching characteristics at General Engineering Laboratories, a South Carolina licensed laboratory. The "paint filter test" and the "TCLP" were done according to EPA procedures 9095 and 1311, respectively. Please find enclosed the results for glass samples from drums 1666 to 1674. The results of the tests are summarized below. 1-tailed t-tests were performed, and the upper limits for 95% confidence were calculated.

The TCLP values are below the acceptance limit for 95% confidence.

Table 1. Summary of TCLP results

Sample ID	Chromium (mg/L)	Nickel (mg/L)	Lead (mg/L)	Uranium (mg/L)	Nitrate (as N)	Paint filter test
GEM Drum # 1666	0.0040	0.656	0.0065	1.400	0.0	Pass
GEM Drum # 1668	0.0027	0.630	0.0075	1.380	0.0	Pass
GEM Drum # 1670	0.0046	0.636	0.0067	1.350	0.0	Pass
GEM Drum # 1672	0.0042	0.547	0.0057	1.260	0.0	Pass
GEM Drum # 1674	0.0035	0.731	0.0063	1.490	0.0	Pass

Student t-test

Number of samples = n = 5

Mean = $\bar{x} = \sum x_i / n$

Variance = $s^2 = \sum(x_i - \bar{x})^2 / (n-1)$

Degrees of freedom for n observations = n-1 = 4

From standard t-tables, the factor "z" for 95% confidence limit ($t_{0.95}$ or $\alpha_{0.05}$) for 4 degrees of freedom is 2.13.

Upper acceptance limit for 95% confidence for a 1-tailed t-test, at 4 degrees of freedom is:

$$\text{Acceptance limit} - (s \times 2.13)/n^{1/2}$$

Table 2. TCLP means, variances, and upper acceptance limits for 95% confidence.

Element	mean ($\bar{x}$)	Variance (s^2)	s	Acceptance limit (mg/L)	Upper acceptance limit for 95% confidence
Chromium	0.0038	5.52 E-7	0.0007	0.86	0.8593
Nickel	0.6400	0.00433	0.0658	5.0	4.9374
Lead	0.0066	4.32 E-7	0.0007	0.37	0.3694
Uranium	1.3760	0.00693	0.0832	4.0	3.9207

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NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

GTSD00196 Report Date: August 04, 1998

Sample ID	: VTF-1005 DRUM#1666
Lab ID	: 9807936-01
Matrix	: TCLP
Date Collected	: 07/18/98
Date Received	: 07/28/98
Priority	: Routine
Collector	: Client

meter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
s Analysis											
mium	J	3.99	1.95	15.0	ug/l	5.0	AME	08/01/98	0019	127505	1
el		656	0.210	2.00	ug/l	5.0					
		6.53	0.130	1.00	ug/l	5.0					
ium		1400	0.120	1.00	ug/l	5.0					
al Chemistry											
gen, Nitrate	U	ND	0.100	0.250	mg/l	5.0	JLG	07/30/98	1221	127414	2

llowing prep procedures were performed:

Mass Spec	FGD	07/30/98	1700	127505 3
P Prep for Metals	JL	07/29/98	1445	127321 4

Method	Method-Description
	EPA 6020
	EPA 300.0
	EPA 3005
	EPA 1311

alifiers in this report are defined as follows:
dicates that the analyte was not detected at a concentration greater than the detection limit.
ates presence of analyte at a concentration less than the reporting limit (RL) and greater than the detection limit (DL).
cates that the analyte was not detected at a concentration greater than the detection limit.
ates that a quality control analyte recovery is outside of specified acceptance criteria.

9807936-01

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FL	E87156/87294	E87472/87458
NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

cc: GTSD00196 Report Date: August 04, 1998

Sample ID : VTF-1005 DRUM#1666

M = Method	Method-Description

This data report has been prepared and reviewed in accordance with General Engineering Laboratories standard operating procedures. Please direct any questions to your Project Manager, Jack Spitz at (803) 556-8171.

Reviewed By

P O Box 30712 • Charleston, SC 29417 • 2040 Savage Road • 29414

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9807936-01

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NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

GTSD00196 Report Date: August 04, 1998 Page 1 of 1

Sample ID	: VTF-1005 DRUM#1666
Lab ID	: 9807936-06
Matrix	: Misc.
Date Collected	: 07/18/98
Date Received	: 07/28/98
Priority	: Routine
Collector	: Client

ımeter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
ral Chemistry											
t Filter Test		Passed					BJR	08/04/98	1145	127811	1

Method	Method-Description
	EPA 9095

:
ualifiers in this report are defined as follows:
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icates that the analyte was not detected at a concentration greater than the detection limit.
cates that a quality control analyte recovery is outside of specified acceptance criteria.

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ırd operating procedures. Please direct
ıestions to your Project Manager, Jack Spitz at (803) 556-8171.

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FL	E87156/87294	E87472/87458
NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

cc: GTSD00196 Report Date: August 04, 1998

Sample ID	: VTF-1006 DRUM#1668
Lab ID	: 9807936-02
Matrix	: TCLP
Date Collected	: 07/18/98
Date Received	: 07/28/98
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Metals Analysis											
Chromium	J	2.66	1.95	15.0	ug/l	5.0	AME	08/01/98	0026	127505	1
Nickel		630	0.210	2.00	ug/l	5.0					
Lead		7.54	0.130	1.00	ug/l	5.0					
Uranium		1380	0.120	1.00	ug/l	5.0					
General Chemistry											
Nitrogen, Nitrate	U	ND	0.100	0.250	mg/l	5.0	JLG	07/30/98	1304	127414	2

The following prep procedures were performed:

ICP Mass Spec	FGD	07/30/98	1700	127505	3
TCLP Prep for Metals	JL	07/29/98	1445	127321	4

M = Method	Method-Description
M 1	EPA 6020
M 2	EPA 300.0
M 3	EPA 3005
M 4	EPA 1311

Notes:
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U indicates that the analyte was not detected at a concentration greater than the detection limit.
* indicates that a quality control analyte recovery is outside of specified acceptance criteria.

9807936-02

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NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

GTSD00196 Report Date: August 04, 1998 Page 2 of 2

Sample ID : VTF-1006 DRUM#1668

Method	Method-Description

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STATE	GEL	EPI
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NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

cc: GTSD00196 Report Date: August 04, 1998

Sample ID	: VTF-1006 DRUM#1668
Lab ID	: 9807936-07
Matrix	: Misc.
Date Collected	: 07/18/98
Date Received	: 07/28/98
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
General Chemistry											
Paint Filter Test		Passed					BJR	08/04/98	1145	127811	1

M = Method	Method-Description
M 1	EPA 9095

Notes:
The qualifiers in this report are defined as follows:
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U indicates that the analyte was not detected at a concentration greater than the detection limit.
* indicates that a quality control analyte recovery is outside of specified acceptance criteria.

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NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

GTSD00196 Report Date: August 04, 1998

Sample ID	: VTF-1007 DRUM#1670
Lab ID	: 9807936-03
Matrix	: TCLP
Date Collected	: 07/19/98
Date Received	: 07/28/98
Priority	: Routine
Collector	: Client

ımeter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
ls Analysis											
ımium	J	4.61	1.95	15.0	ug/l	5.0	AME	08/01/98	0033	127505	1
:el		636	0.210	2.00	ug/l	5.0					
l		6.70	0.130	1.00	ug/l	5.0					
ıium		1350	0.120	1.00	ug/l	5.0					
ral Chemistry											
)gen, Nitrate	U	ND	0.100	0.250	mg/l	5.0	JLG	07/30/98	1318	127414	2

ollowing prep procedures were performed:

Mass Spec	FGD	07/30/98	1700	127505 3
P Prep for Metals	JL	07/29/98	1445	127321 4

Method	Method-Description
	EPA 6020
	EPA 300.0
	EPA 3005
	EPA 1311

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cates that the analyte was not detected at a concentration greater than the detection limit.
:ates that a quality control analyte recovery is outside of specified acceptance criteria.

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STATE	GEL	EPI
FL	E87156/87294	E87472/87458
NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

cc: GTSD00196 Report Date: August 04, 1998

Sample ID : VTF-1007 DRUM#1670

M = Method	Method-Description

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STATE	GEL	EPI
FL	E87156/87294	E87472/87458
NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

GTSD00196 Report Date: August 04, 1998 Page 1 of 1

Sample ID	: VTF-1007 DRUM#1670
Lab ID	: 9807936-08
Matrix	: Misc.
Date Collected	: 07/19/98
Date Received	: 07/28/98
Priority	: Routine
Collector	: Client

ameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
ral Chemistry											
t Filter Test		Passed					BJR	08/04/98	1145	127811	1

Method	Method-Description
	EPA 9095

:
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STATE	GEL	EPI
FL	E87156/87294	E87472/87458
NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

cc: GTSD00196 Report Date: August 04, 1998

Sample ID	: VTF-1008 DRUM#1672
Lab ID	: 9807936-04
Matrix	: TCLP
Date Collected	: 07/19/98
Date Received	: 07/28/98
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Metals Analysis											
Chromium	J	4.17	1.95	15.0	ug/l	5.0	AME	08/01/98	0040	127505	1
Nickel		547	0.210	2.00	ug/l	5.0					
Lead		5.73	0.130	1.00	ug/l	5.0					
Uranium		1260	0.120	1.00	ug/l	5.0					
General Chemistry											
Nitrogen, Nitrate	U	ND	0.100	0.250	mg/l	5.0	JLG	07/30/98	1332	127414	2

The following prep procedures were performed:

ICP Mass Spec	FGD	07/30/98	1700	127505 3
TCLP Prep for Metals	JL	07/29/98	1445	127321 4

M = Method	Method-Description
M 1	EPA 6020
M 2	EPA 300.0
M 3	EPA 3005
M 4	EPA 1311

Notes:
The qualifiers in this report are defined as follows:
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J indicates presence of analyte at a concentration less than the reporting limit (RL) and greater than the detection limit (DL).
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* indicates that a quality control analyte recovery is outside of specified acceptance criteria.

9807936-04

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STATE	GEL	EPI
FL	E87156/87294	E87472/87458
NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

GTSD00196 Report Date: August 04, 1998

Sample ID : VTF-1008 DRUM#1672

Method	Method-Description

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9807936-04

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STATE	GEL	EPI
FL	E87156/87294	E87472/87458
NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

cc: GTSD00196 Report Date: August 04, 1998 Page 1 of 1

Sample ID	: VTF-1008 DRUM#1672
Lab ID	: 9807936-09
Matrix	: Misc.
Date Collected	: 07/19/98
Date Received	: 07/28/98
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
General Chemistry											
Paint Filter Test		Passed					BJR	08/04/98	1145	127811	1

M = Method	Method-Description
M 1	EPA 9095

Notes:
The qualifiers in this report are defined as follows:
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* indicates that a quality control analyte recovery is outside of specified acceptance criteria.

This data report has been prepared and reviewed
in accordance with General Engineering Laboratories
standard operating procedures. Please direct
any questions to your Project Manager, Jack Spitz at (803) 556-8171.

Reviewed By

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9807936-09

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FL	E87156/87294	E87472/87458
NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

: GTSD00196 Report Date: August 04, 1998

Sample ID	: VTF-1009 DRUM#1674
Lab ID	: 9807936-05
Matrix	: TCLP
Date Collected	: 07/19/98
Date Received	: 07/28/98
Priority	: Routine
Collector	: Client

ameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
ls Analysis											
omium	J	3.52	1.95	15.0	ug/l	5.0	AME	08/01/98	0047	127505	1
cel		731	0.210	2.00	ug/l	5.0					
l		6.32	0.130	1.00	ug/l	5.0					
ium		1490	0.120	1.00	ug/l	5.0					
ral Chemistry											
ogen, Nitrate	U	ND	0.100	0.250	mg/l	5.0	JLG	07/30/98	1347	127414	2

ollowing prep procedures were performed:

Mass Spec	FGD	07/30/98	1700	127505 3
P Prep for Metals	JL	07/29/98	1445	127321 4

Method	Method-Description
	EPA 6020
	EPA 300.0
	EPA 3005
	EPA 1311

:

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icates that the analyte was not detected at a concentration greater than the detection limit.
cates that a quality control analyte recovery is outside of specified acceptance criteria.

9807936-05

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NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

cc: GTSD00196 Report Date: August 04, 1998

Sample ID : VTF-1009 DRUM#1674

M = Method	Method-Description

This data report has been prepared and reviewed in accordance with General Engineering Laboratories standard operating procedures. Please direct any questions to your Project Manager, Jack Spitz at (803) 556-8171.

Reviewed By

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9807936-05

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STATE	GEL	EPI
FL	E87156/87294	E87472/87458
NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

GTSD00196 Report Date: August 04, 1998 Page 1 of 1

Sample ID	: VTF-1009 DRUM#1674
Lab ID	: 9807936-10
Matrix	: Misc.
Date Collected	: 07/19/98
Date Received	: 07/28/98
Priority	: Routine
Collector	: Client

meter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
ral Chemistry											
Filter Test		Passed					BJR	08/04/98	1145	127811	1

Method	Method-Description
	EPA 9095

ıalifiers in this report are defined as follows:
dicates that the analyte was not detected at a concentration greater than the detection limit.
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ordance with General Engineering Laboratories
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9807936-10

M-Area Batch #24 Glass TCLP Samples RM-98-24

9807936%

SHIPMENT DESTINED TO	SAMPLE CONTAINER IDENTIFICATION		DATE/TIME OF PACKAGING		SAMPLE NET WEIGHT	SHIPPING CONTAINER/ CONTAINER GROSS WEIGHT	SEAL # (IF APPLICABLE
General Engineering Laboratories 2040 Savage Rd. Chasn. SC 29414	Sample#	Drum#			Grams	Grams	N/A
	VTF-1005	1666	07/18/98	1015	190	222	
	VTF-1006	1668	07/18/98	1730	298	330	
	VTF-1007	1670	07/19/98	0015	302	334	
	VTF-1008	1672	07/19/98	0800	250	282	
	VTF-1009	1674	07/19/98	1600	210	242	
	989 -16 = 1450						
	Shipping Container		N/A		3 lbs	8 lbs	

Comments: Shipping Number

SRS-16277

INFORMATION ONLY

Relinquished by:	Date:	Time:	Received by:	Relinquished by	Date:	Time:	Received by:
	7/20/98						
Relinquished by:	Date:	Time:	Received by:	Relinquished by	Date:	Time:	Received by:

C:\...\RCO\Shipping Forms\...

WSRC-TR-96-0244, Rev. 2; APPENDIX L, Page 424 of 694

DURATEK
10100 Old Columbia Road
Columbia, Maryland 21046
410/312-5100 Fax 410/290-9070

L-98-061

August 3, 1998

Mr. Dan Bills
Subcontract Technical Representative
Westinghouse Savannah River Company
Building 730-M
Aiken, SC 29802

Final Wasteform Treatment Standards and Acceptance Criteria

Dear Mr. Bills:

GTS Duratek has completed sampling and analysis of the final wasteform, Batch #23, drums 1598, 1600, 1602, 1604 and 1606. The results of the analysis, including the analysis technique, is attached for your review. The analysis was performed by General Engineering Laboratories, a State of South Carolina certified lab, and verified by Mr. Innocent Joseph, Manager of Technology, GTS Duratek.

Results of the analysis indicate Batch #23 is within the contractual specifications. GTS Duratek will invoice directly through accounts payable (Brenda Bell, Bldg. 730-4B). A total of 93 drums of glass were produced for Batch #23. Should you have any questions, please contact Innocent Joseph or myself.

Sincerely,

GTS DURATEK

Daniel Macias
Director of Operations

DM/mlb
attachment

cc: S. Campbell
C. Coker

DURATEK

10100 Old Columbia Road
Columbia, Maryland 21046
410/312-5100 Fax 410/290-9070

July 29, 1998

Mr. Dan Macias
Operations Manger
Vendor Treatment Facility (M-area)
GTS Duratek
WSRC/USDOE Savannah River Site
Aiken, SC 29801

Dear Mr. Macias:

Please find enclosed the results of the "TCLP" and 'Paint Filter Test" on glass gems from drums 1598, 1600, 1602, 1604, and 1606. The tests were performed according to methods specified in the "Sampling Plan" for GTS Duratek's Vendor Treatment Facility at the Savannah River site. 1-tailed t-tests were performed on the TCLP data, and the upper acceptance limits for 95% confidence were calculated. The TCLP values are well below the upper acceptance limits for 95% confidence. All of the samples passed the "Paint Filter Test." The samples from Batch # 23 have therefore met all of the acceptance criteria for the glass product.

The calculations for sample means, variances, upper acceptance limits for 95% confidence, data sheets from General Engineering Laboratories, and a sample chain of custody record are enclosed. If you have any questions, please contact me at (410) 312-5120.

Sincerely

Innocent Joseph

Innocent Joseph
Manager, Technology
GTS Duratek

cc: P. Deltete
J. Pope
B. Bowan
G. Hildebrandt
C. Coker

The glass gems from batch 23, produced at the GTS Duratek M-area facility, were subjected to "paint filter test" for free water, and "TCLP" for leaching characteristics at General Engineering Laboratories, a South Carolina licensed laboratory. The "paint filter test" and the "TCLP" were done according to EPA procedures 9095 and 1311, respectively. Please find enclosed the results for glass samples from drums 1598 to 1606. The results of the tests are summarized below. 1-tailed t-tests were performed, and the upper limits for 95% confidence were calculated.

The TCLP values are below the acceptance limit for 95% confidence.

Table 1. Summary of TCLP results

Sample ID	Chromium (mg/L)	Nickel (mg/L)	Lead (mg/L)	Uranium (mg/L)	Nitrate (as N)	Paint filter test
GEM Drum # 1598	0.0089	0.476	0.0058	1.030	0.0	Pass
GEM Drum # 1600	0.0094	0.481	0.0056	1.050	0.0	Pass
GEM Drum # 1602	0.0098	0.451	0.0062	1.010	0.0	Pass
GEM Drum # 1604	0.0094	0.435	0.0053	0.952	0.0	Pass
GEM Drum # 1606	0.0092	0.458	0.0055	0.988	0.0	Pass

Student t-test

Number of samples = n = 5

Mean = $\bar{x} = \sum x_i / n$

Variance = $s^2 = \sum(x_i - \bar{x})^2 / (n-1)$

Degrees of freedom for n observations = n-1 = 4

From standard t-tables, the factor "z" for 95% confidence limit ($t_{0.95}$ or $\alpha_{0.05}$) for 4 degrees of freedom is 2.13.

Upper acceptance limit for 95% confidence for a 1-tailed t-test, at 4 degrees of freedom is:

$$\text{Acceptance limit} - (s \times 2.13)/n^{1/2}$$

Table 2. TCLP means, variances, and upper acceptance limits for 95% confidence.

Element	mean ($\bar{x}$)	Variance (s^2)	s	Acceptance limit (mg/L)	Upper acceptance limit for 95% confidence
Chromium	0.0093	1.09 E-7	0.0003	0.86	0.8597
Nickel	0.4602	0.00035	0.0188	5.0	4.9821
Lead	0.0056	1.12 E-7	0.0003	0.37	0.3697
Uranium	1.0060	0.00144	0.0380	4.0	3.9638

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STATE	GEL	EPI
FL	E87156/87294	E87472/87458
NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

: GTSD00196 Report Date: July 27, 1998

Sample ID	: VTF-958 DRUM#1598
Lab ID	: 9807671-01
Matrix	: TCLP
Date Collected	: 07/12/98
Date Received	: 07/21/98
Priority	: Routine
Collector	: Client

ameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
ls Analysis											
omium	J	8.86	1.95	15.0	ug/l	5.0	JSS	07/24/98	2101	126906	1
kel		476	0.210	2.00	ug/l	5.0					
d		5.75	0.130	1.00	ug/l	5.0					
nium		1030	0.120	1.00	ug/l	5.0					
eral Chemistry											
ogen, Nitrate	U	ND	0.100	0.250	mg/l	5.0	JLG	07/24/98	1719	126813	2

following prep procedures were performed:

Mass Spec	FGD	07/24/98	1430	126906	3
P Prep for Metals	JL	07/22/98	1945	126761	4

: Method	Method-Description
	EPA 6020
	EPA 300.0
	EPA 3005
	EPA 1311

:

ualifiers in this report are defined as follows:

ndicates that the analyte was not detected at a concentration greater than the detection limit.

cates presence of analyte at a concentration less than the reporting limit (RL) and greater than the detection limit (DL).

icates that the analyte was not detected at a concentration greater than the detection limit.

cates that a quality control analyte recovery is outside of specified acceptance criteria.

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STATE	GEL	EPI
FL	E87156/87294	E87472/87458
NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

cc: GTSD00196 Report Date: July 27, 1998

Sample ID : VTF-958 DRUM#1598

M = Method	Method-Description

This data report has been prepared and reviewed in accordance with General Engineering Laboratories standard operating procedures. Please direct any questions to your Project Manager, Jack Spitz at (803) 556-8171.

Reviewed By

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9807671-01

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STATE	GEL	EPI
FL	E87156/87294	E87472/87458
NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

: GTSD00196 Report Date: July 29, 1998 Page 1 of 1

Sample ID : VTF-958 DRUM#1598
Lab ID : 9807671-06
Matrix : Misc.
Date Collected : 07/12/98
Date Received : 07/21/98
Priority : Routine
Collector : Client

rameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
ieral Chemistry											
int Filter Test		Pass.					JEN	07/27/98	1600	127365	1

= Method	Method-Description
1	EPA 9095

es:
qualifiers in this report are defined as follows:
indicates that the analyte was not detected at a concentration greater than the detection limit.
dicates presence of analyte at a concentration less than the reporting limit (RL) and greater than the detection limit (DL).
dicates that the analyte was not detected at a concentration greater than the detection limit.
dicates that a quality control analyte recovery is outside of specified acceptance criteria.

data report has been prepared and reviewed
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dard operating procedures. Please direct
questions to your Project Manager, Jack Spitz at (803) 556-8171.

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STATE	GEL	EPI
FL	E87156/87294	E87472/87458
NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

cc: GTSD00196

Report Date: July 27, 1998

Sample ID	: VTF-959 DRUM#1600
Lab ID	: 9807671-02
Matrix	: TCLP
Date Collected	: 07/12/98
Date Received	: 07/21/98
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Metals Analysis											
Chromium	J	9.38	1.95	15.0	ug/l	5.0	JSS	07/24/98	2107	126906	1
Nickel		481	0.210	2.00	ug/l	5.0					
Lead		5.58	0.130	1.00	ug/l	5.0					
Uranium		1050	0.120	1.00	ug/l	5.0					
General Chemistry											
Nitrogen, Nitrate	U	ND	0.100	0.250	mg/l	5.0	JLG	07/24/98	1801	126813	2

The following prep procedures were performed:

ICP Mass Spec	FGD	07/24/98	1430	126906	3
TCLP Prep for Metals	JL	07/22/98	1945	126761	4

M = Method	Method-Description
M 1	EPA 6020
M 2	EPA 300.0
M 3	EPA 3005
M 4	EPA 1311

Notes:
The qualifiers in this report are defined as follows:
ND indicates that the analyte was not detected at a concentration greater than the detection limit.
J indicates presence of analyte at a concentration less than the reporting limit (RL) and greater than the detection limit (DL).
U indicates that the analyte was not detected at a concentration greater than the detection limit.
* indicates that a quality control analyte recovery is outside of specified acceptance criteria.

9807671-02

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NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

: GTSD00196 Report Date: July 27, 1998

Sample ID : VTF-959 DRUM#1600

: Method	Method-Description

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STATE	GEL	EPI
FL	E87156/87294	E87472/87458
NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

cc: GTSD00196 Report Date: July 27, 1998

Sample ID	: VTF-959 DRUM#1600
Lab ID	: 9807671-07
Matrix	: Misc.
Date Collected	: 07/12/98
Date Received	: 07/21/98
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
General Chemistry											
Paint Filter Test		Pass.					JEN	07/27/98	1600	127181	1

M = Method	Method-Description
M 1	EPA 9095

Notes:
The qualifiers in this report are defined as follows:
ND indicates that the analyte was not detected at a concentration greater than the detection limit.
J indicates presence of analyte at a concentration less than the reporting limit (RL) and greater than the detection limit (DL).
U indicates that the analyte was not detected at a concentration greater than the detection limit.
* indicates that a quality control analyte recovery is outside of specified acceptance criteria.

This data report has been prepared and reviewed in accordance with General Engineering Laboratories standard operating procedures. Please direct any questions to your Project Manager, Jack Spitz at (803) 556-8171.

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9807671-07

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FL	E87156/87294	E87472/87458
NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

: GTSD00196 Report Date: July 27, 1998

Sample ID	: VTF-960 DRUM#1602
Lab ID	: 9807671-03
Matrix	: TCLP
Date Collected	: 07/12/98
Date Received	: 07/21/98
Priority	: Routine
Collector	: Client

ameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
ls Analysis											
omium	J	9.78	1.95	15.0	ug/l	5.0	JSS	07/24/98	2113	126906	1
cel		451	0.210	2.00	ug/l	5.0					
d		6.15	0.130	1.00	ug/l	5.0					
ium		1010	0.120	1.00	ug/l	5.0					
ral Chemistry											
ogen, Nitrate	U	ND	0.100	0.250	mg/l	5.0	JLG	07/24/98	1815	126813	2

ollowing prep procedures were performed:

Mass Spec				
P Prep for Metals	FGD	07/24/98	1430	126906 3
	JL	07/22/98	1945	126761 4

Method	Method-Description
	EPA 6020
	EPA 300.0
	EPA 3005
	EPA 1311

:

ualifiers in this report are defined as follows:
ıdicates that the analyte was not detected at a concentration greater than the detection limit.
:ates presence of analyte at a concentration less than the reporting limit (RL) and greater than the detection limit (DL).
icates that the analyte was not detected at a concentration greater than the detection limit.
cates that a quality control analyte recovery is outside of specified acceptance criteria.

9807671-03

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STATE	GEL	EPI
FL	E87156/87294	E87472/87458
NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

cc: GTSD00196 Report Date: July 27, 1998

Sample ID : VTF-960 DRUM#1602

M = Method	Method-Description

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STATE	GEL	EPI
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NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

: GTSD00196 Report Date: July 27, 1998 Page 1 of 1

Sample ID	: VTF-960 DRUM#1602
Lab ID	: 9807671-08
Matrix	: Misc.
Date Collected	: 07/12/98
Date Received	: 07/21/98
Priority	: Routine
Collector	: Client

·ameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
eral Chemistry											
nt Filter Test		Pass.					JEN	07/27/98	1600	127181	1

= Method	Method-Description
	EPA 9095

s:
qualifiers in this report are defined as follows:
ndicates that the analyte was not detected at a concentration greater than the detection limit.
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dicates that the analyte was not detected at a concentration greater than the detection limit.
licates that a quality control analyte recovery is outside of specified acceptance criteria.

data report has been prepared and reviewed
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questions to your Project Manager, Jack Spitz at (803) 556-8171.

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9807671-08

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STATE	GEL	EPI
FL	E87156/87294	E87472/87458
NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

cc: GTSD00196 Report Date: July 27, 1998

Sample ID	: VTF-961 DRUM#1604
Lab ID	: 9807671-04
Matrix	: TCLP
Date Collected	: 07/12/98
Date Received	: 07/21/98
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Metals Analysis											
Chromium	J	9.37	1.95	15.0	ug/l	5.0	JSS	07/24/98	2118	126906	1
Nickel		435	0.210	2.00	ug/l	5.0					
Lead		5.26	0.130	1.00	ug/l	5.0					
Uranium		952	0.120	1.00	ug/l	5.0					
General Chemistry											
Nitrogen, Nitrate	U	ND	0.100	0.250	mg/l	5.0	JLG	07/24/98	1857	126813	2

The following prep procedures were performed:

ICP Mass Spec	FGD	07/24/98	1430	126906 3
TCLP Prep for Metals	JL	07/22/98	1945	126761 4

M = Method	Method-Description
M 1	EPA 6020
M 2	EPA 300.0
M 3	EPA 3005
M 4	EPA 1311

Notes:
The qualifiers in this report are defined as follows:
ND indicates that the analyte was not detected at a concentration greater than the detection limit.
J indicates presence of analyte at a concentration less than the reporting limit (RL) and greater than the detection limit (DL).
U indicates that the analyte was not detected at a concentration greater than the detection limit.
* indicates that a quality control analyte recovery is outside of specified acceptance criteria.

9807671-04

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STATE	GEL	EPI
FL	E87156/87294	E87472/87458
NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

GTSD00196 Report Date: July 27, 1998

Sample ID : VTF-961 DRUM#1604

Method	Method-Description

lata report has been prepared and reviewed
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uestions to your Project Manager, Jack Spitz at (803) 556-8171.

Pettigrew
:wed By

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Laboratory Certifications

STATE	GEL	EPI
FL	E87156/87294	E87472/87458
NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

cc: GTSD00196 Report Date: July 27, 1998 Page 1 of 1

Sample ID	: VTF-961 DRUM#1604
Lab ID	: 9807671-09
Matrix	: Misc.
Date Collected	: 07/12/98
Date Received	: 07/21/98
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
General Chemistry											
Paint Filter Test		Pass.					JEN	07/27/98	1600	127181	1

M = Method	Method-Description
M 1	EPA 9095

Notes:
The qualifiers in this report are defined as follows:
ND indicates that the analyte was not detected at a concentration greater than the detection limit.
J indicates presence of analyte at a concentration less than the reporting limit (RL) and greater than the detection limit (DL).
U indicates that the analyte was not detected at a concentration greater than the detection limit.
* indicates that a quality control analyte recovery is outside of specified acceptance criteria.

This data report has been prepared and reviewed in accordance with General Engineering Laboratories standard operating procedures. Please direct any questions to your Project Manager, Jack Spitz at (803) 556-8171.

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9807671-09

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Laboratory Certifications

STATE	GEL	EPI
FL	E87156/87294	E87472/87458
NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

: GTSD00196 Report Date: July 27, 1998

Sample ID	: VTF-962 DRUM#1606
Lab ID	: 9807671-05
Matrix	: TCLP
Date Collected	: 07/12/98
Date Received	: 07/21/98
Priority	: Routine
Collector	: Client

ameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
ls Analysis											
omium	J	9.24	1.95	15.0	ug/l	5.0	JSS	07/24/98	2124	126906	1
kel		458	0.210	2.00	ug/l	5.0					
d		5.47	0.130	1.00	ug/l	5.0					
nium		988	0.120	1.00	ug/l	5.0					
eral Chemistry											
ogen, Nitrate	U	ND	0.100	0.250	mg/l	5.0	JLG	07/24/98	1911	126813	2

following prep procedures were performed:

Mass Spec	FGD	07/24/98	1430	126906	3
LP Prep for Metals	JL	07/22/98	1945	126761	4

Method	Method-Description
	EPA 6020
	EPA 300.0
	EPA 3005
	EPA 1311

s:
ualifiers in this report are defined as follows:
ndicates that the analyte was not detected at a concentration greater than the detection limit.
icates presence of analyte at a concentration less than the reporting limit (RL) and greater than the detection limit (DL).
licates that the analyte was not detected at a concentration greater than the detection limit.
icates that a quality control analyte recovery is outside of specified acceptance criteria.

9807671-05

GENERAL ENGINEERING LABORATORIES

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Laboratory Certifications

STATE	GEL	EPI
FL	E87156/87294	E87472/87458
NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

cc: GTSD00196 Report Date: July 27, 1998

Sample ID : VTF-962 DRUM#1606

M = Method	Method-Description

This data report has been prepared and reviewed in accordance with General Engineering Laboratories standard operating procedures. Please direct any questions to your Project Manager, Jack Spitz at (803) 556-8171.

Reviewed By

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9807671-05

ENERAL ENGINEERING TORIES, INC.

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Laboratory Certifications

STATE	GEL	EPI
FL	E87156/87294	E87472/87458
NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

GTSD00196 Report Date: July 27, 1998 Page 1 of 1

Sample ID	: VTF-962 DRUM#1606
Lab ID	: 9807671-10
Matrix	: Misc.
Date Collected	: 07/12/98
Date Received	: 07/21/98
Priority	: Routine
Collector	: Client

meter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
al Chemistry											
Filter Test		Pass.					JEN	07/27/98	1600	127181	1

Method	Method-Description
	EPA 9095

ualifiers in this report are defined as follows:
dicates that the analyte was not detected at a concentration greater than the detection limit.
ates presence of analyte at a concentration less than the reporting limit (RL) and greater than the detection limit (DL).
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ata report has been prepared and reviewed
ordance with General Engineering Laboratories
rd operating procedures. Please direct
uestions to your Project Manager, Jack Spitz at (803) 556-8171.

wed By

9807671-10

GTSD 001

GTS DURATEK SHIPPING MANIFEST

M-Area Batch #23 Glass TCLP Samples RM-98-23

980767 1%

317 11

SHIPMENT DESTINED TO	SAMPLE CONTAINER IDENTIFICATION		DATE/TIME OF PACKAGING		SAMPLE NET WEIGHT	SHIPPING CONTAINER/ CONTAINER GROSS WEIGHT	SEAL # (IF APPLICABLE
General Engineering Laboratories 2040 Savage Rd. Chasn. SC 29414	Sample#	Drum#			Grams	Grams	N/A
	VTF-958	1598	07/12/98	0615	168	187	
	VTF-959	1600	07/12/98	1000	214	382	
	VTF-960	1602	07/12/98	1430	216	366	
	VTF-961	1604	07/12/98	1600	223	395	
	VTF-962	1606	07/12/98	1830	211	314	
	989	1683 (+27)					
	Shipping Container		N/A		3.5 lbs	8.5 lbs	

Comments: Shipping Number SRS-16251

INFORMATION ONLY

Relinquished by:	Date:	Time:	Received by:	Relinqished by:	Date:	Time:	Received by:
M. S L	7/20/98	1300					
Relinquished by:	Date:	Time:	Received by:	Relinqished by:	Date:	Time:	Received by:
			D Reeves		7/21/98		

C:\...\RCO\Sh

DURATEK
10100 Old Columbia Road
Columbia, Maryland 21046
410/312-5100 Fax 410/290-9070

L-98-058

July 24, 1998

Mr. Dan Bills
Subcontract Technical Representative
Westinghouse Savannah River Company
Building 730-M
Aiken, SC 29802

Final Wasteform Treatment Standards and Acceptance Criteria

Dear Mr. Bills:

GTS Duratek has completed sampling and analysis of the final wasteform, Batch #22, drums 1504, 1506, 1508, 1510 and 1512. The results of the analysis, including the analysis technique, is attached for your review. The analysis was performed by General Engineering Laboratories, a State of South Carolina certified lab, and verified by Mr. Innocent Joseph, Manager of Technology, GTS Duratek.

Results of the analysis indicate Batch #22 is within the contractual specifications. GTS Duratek will invoice directly through accounts payable (Brenda Bell, Bldg. 730-4B). A total of 78 drums of glass were produced for Batch #22. Should you have any questions, please contact Innocent Joseph or myself.

Sincerely,

GTS DURATEK

Daniel Macias
Director of Operations

DM/mlb
attachment

cc: S. Campbell
C. Coker

10100 Old Columbia Road
Columbia, Maryland 21046
410/312-5100 Fax 410/290-9070

July 20, 1998

Mr. Dan Macias
Operations Manger
Vendor Treatment Facility (M-area)
GTS Duratek
WSRC/USDOE Savannah River Site
Aiken, SC 29801

Dear Mr. Macias:

Please find enclosed the results of the "TCLP" and 'Paint Filter Test" on glass gems from drums 1504, 1506, 1508, 1510, and 1512. The tests were performed according to methods specified in the "Sampling Plan" for GTS Duratek's Vendor Treatment Facility at the Savannah River site. 1-tailed t-tests were performed on the TCLP data, and the upper acceptance limits for 95% confidence were calculated. The TCLP values are well below the upper acceptance limits for 95% confidence. All of the samples passed the "Paint Filter Test." The samples from Batch # 22 have therefore met all of the acceptance criteria for the glass product.

The calculations for sample means, variances, upper acceptance limits for 95% confidence, data sheets from General Engineering Laboratories, and a sample chain of custody record are enclosed. If you have any questions, please contact me at (410) 312-5120.

Sincerely

Innocent Joseph

Innocent Joseph
Manager, Technology
GTS Duratek

cc: P. Deltete
J. Pope
B. Bowan
G. Hildebrandt
C. Coker

The glass gems from batch 22, produced at the GTS Duratek M-area facility, were subjected to "paint filter test" for free water, and "TCLP" for leaching characteristics at General Engineering Laboratories, a South Carolina licensed laboratory. The "paint filter test" and the "TCLP" were done according to EPA procedures 9095 and 1311, respectively. Please find enclosed the results for glass samples from drums 1504 to 1512. The results of the tests are summarized below. 1-tailed t-tests were performed, and the upper limits for 95% confidence were calculated.

The TCLP values are below the acceptance limit for 95% confidence.

Table 1. Summary of TCLP results

Sample ID	Chromium (mg/L)	Nickel (mg/L)	Lead (mg/L)	Uranium (mg/L)	Nitrate (as N)	Paint filter test
GEM Drum # 1504	0.0108	0.398	0.0069	1.090	0.0	Pass
GEM Drum # 1506	0.0126	0.445	0.0089	1.190	0.0	Pass
GEM Drum # 1508	0.0106	0.408	0.0135	1.110	0.0	Pass
GEM Drum # 1510	0.0103	0.437	0.0061	1.150	0.0	Pass
GEM Drum # 1512	0.0103	0.463	0.0082	1.240	0.0	Pass

Student t-test

Number of samples = n = 5

Mean = $\bar{x} = \sum x_i / n$

Variance = $s^2 = \sum(x_i - \bar{x})^2 / (n-1)$

Degrees of freedom for n observations = n-1 = 4

From standard t-tables, the factor "z" for 95% confidence limit ($t_{0.95}$ or $\alpha_{0.05}$) for 4 degrees of freedom is 2.13.

Upper acceptance limit for 95% confidence for a 1-tailed t-test, at 4 degrees of freedom is:

$$\text{Acceptance limit} - (s \times 2.13)/n^{1/2}$$

Table 2. TCLP means, variances, and upper acceptance limits for 95% confidence.

Element	mean ($\bar{x}$)	Variance (s^2)	s	Acceptance limit (mg/L)	Upper acceptance limit for 95% confidence
Chromium	0.0109	9.27 E-7	0.0010	0.86	0.8591
Nickel	0.4302	0.00072	0.0268	5.0	4.9745
Lead	0.0087	8.28 E-6	0.0029	0.37	0.3673
Uranium	1.1560	0.00368	0.0607	4.0	3.9422

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NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

GTSD00196 Report Date: July 17, 1998

Sample ID	: VTF-902 DRUM#1504
Lab ID	: 9807336-01
Matrix	: TCLP
Date Collected	: 07/01/98
Date Received	: 07/09/98
Priority	: Routine
Collector	: Client

meter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
s Analysis											
mium	J	10.8	1.95	15.0	ug/l	5.0	AME	07/16/98	1614	126255	1
el		398	0.210	2.00	ug/l	5.0					
		6.93	0.130	1.00	ug/l	5.0					
ium		1090	0.120	1.00	ug/l	5.0					
ral Chemistry											
gen, Nitrate	U	ND	0.200	0.500	mg/l	10.	JLG	07/16/98	0851	126182	2

llowing prep procedures were performed:

Mass Spec	FGD	07/16/98	1030	126255 3
P Prep for Metals	JL	07/14/98	1650	126092 4

Method	Method-Description
	EPA 6020
	EPA 300.0
	EPA 3005
	EPA 1311

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cates that the analyte was not detected at a concentration greater than the detection limit.
ates that a quality control analyte recovery is outside of specified acceptance criteria.

9807336-01

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STATE	GEL	EPI
FL	E87156/87294	E87472/87458
NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

cc: GTSD00196 Report Date: July 17, 1998

Sample ID : VTF-902 DRUM#1504

M = Method **Method-Description**

This data report has been prepared and reviewed in accordance with General Engineering Laboratories standard operating procedures. Please direct any questions to your Project Manager, Jack Spitz at (803) 556-8171.

Reviewed By

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NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

GTSD00196 Report Date: July 17, 1998

Sample ID	: VTF-902 DRUM#1504
Lab ID	: 9807336-06
Matrix	: Misc.
Date Collected	: 07/01/98
Date Received	: 07/09/98
Priority	: Routine
Collector	: Client

meter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
:al Chemistry											
Filter Test		PASS					BJB	07/15/98	1530	126087	1

Method	Method-Description
	EPA 9095

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NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

cc: GTSD00196 Report Date: July 17, 1998

Sample ID	: VTF-903 DRUM#1506
Lab ID	: 9807336-02
Matrix	: TCLP
Date Collected	: 07/01/98
Date Received	: 07/09/98
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Metals Analysis											
Chromium	J	12.6	1.95	15.0	ug/l	5.0	AME	07/16/98	1620	126255	1
Nickel		445	0.210	2.00	ug/l	5.0					
Lead		8.94	0.130	1.00	ug/l	5.0					
Uranium		1190	0.120	1.00	ug/l	5.0					
General Chemistry											
Nitrogen, Nitrate	U	ND	0.200	0.500	mg/l	10.	JLG	07/16/98	0924	126182	2

The following prep procedures were performed:

ICP Mass Spec	FGD	07/16/98	1030	126255 3
TCLP Prep for Metals	JL	07/14/98	1650	126092 4

M = Method	Method-Description
M 1	EPA 6020
M 2	EPA 300.0
M 3	EPA 3005
M 4	EPA 1311

Notes:
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U indicates that the analyte was not detected at a concentration greater than the detection limit.
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9807336-02

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SC	10120	10582
TN	02934	02934

Client: GTS Duratek
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Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

GTSD00196 Report Date: July 17, 1998 Page 2 of 2

Sample ID : VTF-903 DRUM#1506

Method	Method-Description

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NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

cc: GTSD00196 Report Date: July 17, 1998

Sample ID	: VTF-903 DRUM#1506
Lab ID	: 9807336-07
Matrix	: Misc.
Date Collected	: 07/01/98
Date Received	: 07/09/98
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
General Chemistry											
Paint Filter Test		PASS					BJB	07/15/98	1530	126087	1

M = Method	Method-Description
M 1	EPA 9095

Notes:
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9807336-07

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NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

GTSD00196 Report Date: July 17, 1998

Sample ID	: VTF-904 DRUM#1508
Lab ID	: 9807336-03
Matrix	: TCLP
Date Collected	: 07/01/98
Date Received	: 07/09/98
Priority	: Routine
Collector	: Client

meter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
s Analysis											
mium	J	10.6	1.95	15.0	ug/l	5.0	AME	07/16/98	1625	126255	1
el		408	0.210	2.00	ug/l	5.0					
		13.5	0.130	1.00	ug/l	5.0					
ium		1110	0.120	1.00	ug/l	5.0					
ral Chemistry											
gen, Nitrate	U	ND	0.200	0.500	mg/l	10.	JLG	07/16/98	0935	126182	2

llowing prep procedures were performed:

Mass Spec	FGD	07/16/98	1030	126255 3
P Prep for Metals	JL	07/14/98	1650	126092 4

Method	Method-Description
	EPA 6020
	EPA 300.0
	EPA 3005
	EPA 1311

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9807336-03

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STATE	GEL	EPI
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NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

cc: GTSD00196 Report Date: July 17, 1998

Sample ID : VTF-904 DRUM#1508

M = Method	Method-Description

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NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

GTSD00196 Report Date: July 17, 1998

Sample ID	: VTF-904 DRUM#1508
Lab ID	: 9807336-08
Matrix	: Misc.
Date Collected	: 07/01/98
Date Received	: 07/09/98
Priority	: Routine
Collector	: Client

meter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
:al Chemistry											
Filter Test		PASS					BJB	07/15/98	1530	126087	1

Method	Method-Description
	EPA 9095

:

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FL	E87156/87294	E87472/87458
NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

cc: GTSD00196 Report Date: July 17, 1998

Sample ID	: VTF-905 DRUM#1510
Lab ID	: 9807336-04
Matrix	: TCLP
Date Collected	: 07/01/98
Date Received	: 07/09/98
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Metals Analysis											
Chromium	J	10.3	1.95	15.0	ug/l	5.0	AME	07/16/98	1631	126255	1
Nickel		437	0.210	2.00	ug/l	5.0					
Lead		6.12	0.130	1.00	ug/l	5.0					
Uranium		1150	0.120	1.00	ug/l	5.0					
General Chemistry											
Nitrogen, Nitrate	U	ND	0.200	0.500	mg/l	10.	JLG	07/16/98	0946	126182	2

The following prep procedures were performed:

ICP Mass Spec	FGD	07/16/98	1030	126255 3
TCLP Prep for Metals	JL	07/14/98	1650	126092 4

M = Method	Method-Description
M 1	EPA 6020
M 2	EPA 300.0
M 3	EPA 3005
M 4	EPA 1311

Notes:
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* indicates that a quality control analyte recovery is outside of specified acceptance criteria.

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STATE	GEL	EPI
FL	E87156/87294	E87472/87458
NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

GTSD00196 Report Date: July 17, 1998

Sample ID : VTF-905 DRUM#1510

Method	Method-Description

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9807336-04

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STATE	GEL	EPI
FL	E87156/87294	E87472/87458
NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

cc: GTSD00196 Report Date: July 17, 1998

Sample ID	: VTF-905 DRUM#1510
Lab ID	: 9807336-09
Matrix	: Misc.
Date Collected	: 07/01/98
Date Received	: 07/09/98
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
General Chemistry											
Paint Filter Test		PASS					BJB	07/15/98	1530	126087	1

M = Method	Method-Description
M 1	EPA 9095

Notes:
The qualifiers in this report are defined as follows:
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NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

GTSD00196 Report Date: July 17, 1998

Sample ID	: VTF-906 DRUM#1512
Lab ID	: 9807336-05
Matrix	: TCLP
Date Collected	: 07/01/98
Date Received	: 07/09/98
Priority	: Routine
Collector	: Client

neter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Analysis											
nium	J	10.3	1.95	15.0	ug/l	5.0	AME	07/16/98	1648	126255	1
l		463	0.210	2.00	ug/l	5.0					
		8.20	0.130	1.00	ug/l	5.0					
um		1240	0.120	1.00	ug/l	5.0					
al Chemistry											
gen, Nitrate	U	ND	0.200	0.500	mg/l	10.	JLG	07/16/98	0957	126182	2

llowing prep procedures were performed:

lass Spec	FGD	07/16/98	1030	126255 3
Prep for Metals	JL	07/14/98	1650	126092 4

Method	Method-Description
	EPA 6020
	EPA 300.0
	EPA 3005
	EPA 1311

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9807336-05

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STATE	GEL	EPI
FL	E87156/87294	E87472/87458
NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

cc: GTSD00196 Report Date: July 17, 1998

Sample ID : VTF-906 DRUM#1512

M = Method	Method-Description

This data report has been prepared and reviewed in accordance with General Engineering Laboratories standard operating procedures. Please direct any questions to your Project Manager, Jack Spitz at (803) 556-8171.

Reviewed By

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STATE	GEL	EPI
FL	E87156/87294	E87472/87458
NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

GTSD00196 Report Date: July 17, 1998 Page 1 of 1

Sample ID	: VTF-906 DRUM#1512
Lab ID	: 9807336-10
Matrix	: Misc.
Date Collected	: 07/01/98
Date Received	: 07/09/98
Priority	: Routine
Collector	: Client

neter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
al Chemistry											
Filter Test		PASS					BJB	07/15/98	1530	126087	1

Method	Method-Description
	EPA 9095

alifiers in this report are defined as follows:
licates that the analyte was not detected at a concentration greater than the detection limit.
ates presence of analyte at a concentration less than the reporting limit (RL) and greater than the detection limit (DL).
:ates that the analyte was not detected at a concentration greater than the detection limit.
ates that a quality control analyte recovery is outside of specified acceptance criteria.

ta report has been prepared and reviewed
rdance with General Engineering Laboratories
d operating procedures. Please direct
stions to your Project Manager, Jack Spitz at (803) 556-8171.

ed By

9807336-10

662

Q31791

M-Area Batch #22 Glass TCLP Samples RM-98-22

9807336

SHIPMENT DESTINED TO	SAMPLE CONTAINER IDENTIFICATION		DATE/TIME OF PACKAGING		SAMPLE NET WEIGHT	SHIPPING CONTAINER/ CONTAINER GROSS WEIGHT	SEAL # (IF APPLICABLE)
General Engineering Laboratories	Sample#	Drum#			Grams	Grams	N/A
	VTF-902	1504	07/01/98	1530	155	187	
2040 Savage Rd.	VTF-903	1506	07/01/98	1730	350	382	
Chasn. SC 29414	VTF-904	1508	07/01/98	1900	334	366	
	VTF-905	1510	07/01/98	2030	363	395	
	VTF-906	1512	07/01/98	2235	282	314	
	Shipping Container		N/A		4 lbs	8 lbs	

INFORMATION ONLY

Comments: Shipping Number

STS-16241

Relinquished by:	Date:	Time:	Received by:	Relinqished by:	Date:	Time:	Received by:
[signature]	7/9/98	0845	[signature] 7/9/98				
Relinquished by:	Date:	Time:	Received by:	Relinqished by:	Date:	Time:	Received by:

C:\...\RCO\Slipping For

DURATEK

10100 Old Columbia Road
Columbia, Maryland 21046
410/312-5100 Fax 410/290-9070

L-98-057

July 16, 1998

Mr. Dan Bills
Subcontract Technical Representative
Westinghouse Savannah River Company
Building 730-M
Aiken, SC 29802

Final Wasteform Treatment Standards and Acceptance Criteria

Dear Mr. Bills:

GTS Duratek has completed sampling and analysis of the final wasteform, Batch #21, drums 1426, 1428, 1430, 1432 and 1434. The results of the analysis, including the analysis technique, is attached for your review. The analysis was performed by General Engineering Laboratories, a State of South Carolina certified lab, and verified by Mr. Innocent Joseph, Manager of Technology, GTS Duratek.

Results of the analysis indicate Batch #21 is within the contractual specifications. GTS Duratek will invoice directly through accounts payable (Brenda Bell, Bldg. 730-4B). A total of 93 drums of glass were produced for Batch #21. Should you have any questions, please contact Innocent Joseph or myself.

Sincerely,

GTS DURATEK

Daniel Macias
Director of Operations

DM/mlb
attachment

cc: S. Campbell
C. Coker

DURATEK

10100 Old Columbia Road
Columbia, Maryland 21046
410/312-5100 Fax 410/290-9070

July 14, 1998

Mr. Dan Macias
Operations Manger
Vendor Treatment Facility (M-area)
GTS Duratek
WSRC/USDOE Savannah River Site
Aiken, SC 29801

Dear Mr. Macias:

Please find enclosed the results of the "TCLP" and 'Paint Filter Test" on glass gems from drums 1426, 1428, 1430, 1432, and 1434. The tests were performed according to methods specified in the "Sampling Plan" for GTS Duratek's Vendor Treatment Facility at the Savannah River site. 1-tailed t-tests were performed on the TCLP data, and the upper acceptance limits for 95% confidence were calculated. The TCLP values are well below the upper acceptance limits for 95% confidence. All of the samples passed the "Paint Filter Test." The samples from Batch # 21 have therefore met all of the acceptance criteria for the glass product.

The calculations for sample means, variances, upper acceptance limits for 95% confidence, data sheets from General Engineering Laboratories, and a sample chain of custody record are enclosed. If you have any questions, please contact me at (410) 312-5120.

Sincerely

Innocent Joseph

Innocent Joseph
Manager, Technology
GTS Duratek

cc: P. Deltete
J. Pope
B. Bowan
G. Hildebrandt
C. Coker

The glass gems from batch 21, produced at the GTS Duratek M-area facility, were subjected to "paint filter test" for free water, and "TCLP" for leaching characteristics at General Engineering Laboratories, a South Carolina licensed laboratory. The "paint filter test" and the "TCLP" were done according to EPA procedures 9095 and 1311, respectively. Please find enclosed the results for glass samples from drums 1426 to 1434. The results of the tests are summarized below. 1-tailed t-tests were performed, and the upper limits for 95% confidence were calculated.

The TCLP values are below the acceptance limit for 95% confidence.

Table 1. Summary of TCLP results

Sample ID	Chromium (mg/L)	Nickel (mg/L)	Lead (mg/L)	Uranium (mg/L)	Nitrate (as N)	Paint filter test
GEM Drum # 1426	0.0046	0.417	0.0052	1.160	0.0	Pass
GEM Drum # 1428	0.0039	0.367	0.0047	1.040	0.0	Pass
GEM Drum # 1430	0.0036	0.377	0.0046	1.070	0.0	Pass
GEM Drum # 1432	0.0039	0.330	0.0046	0.967	0.0	Pass
GEM Drum # 1434	0.0041	0.412	0.1220	1.120	0.0	Pass

Student t-test

Number of samples = n = 5

Mean = $\bar{x} = \sum x_i / n$

Variance = $s^2 = \sum(x_i - \bar{x})^2 / (n-1)$

Degrees of freedom for n observations = n-1 = 4

From standard t-tables, the factor "z" for 95% confidence limit ($t_{0.95}$ or $\alpha_{0.05}$) for 4 degrees of freedom is 2.13.

Upper acceptance limit for 95% confidence for a 1-tailed t-test, at 4 degrees of freedom is:

$$\text{Acceptance limit} - (s \times 2.13)/n^{1/2}$$

Table 2. TCLP means, variances, and upper acceptance limits for 95% confidence.

Element	mean ($\bar{x}$)	Variance (s^2)	s	Acceptance limit (mg/L)	Upper acceptance limit for 95% confidence
Chromium	0.0040	1.42 E-7	0.0004	0.86	0.8596
Nickel	0.3806	0.00127	0.0356	5.0	4.9661
Lead	0.0282	0.00275	0.0524	0.37	0.3201
Uranium	1.0714	0.00553	0.0743	4.0	3.9292

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FL	E87156/87294	E87472/87458
NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

GTSD00196 Report Date: July 13, 1998

Sample ID	: VTF-862 DRUM#1426
Lab ID	: 9807041-01
Matrix	: TCLP
Date Collected	: 06/24/98
Date Received	: 07/01/98
Priority	: Routine
Collector	: Client

ımeter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
ls Analysis											
ımium	J	4.60	1.95	15.0	ug/l	5.0	AME	07/10/98	1443	125618	1
:el		417	0.210	2.00	ug/l	5.0					
l		5.16	0.130	1.00	ug/l	5.0					
ıium		1160	0.120	1.00	ug/l	5.0					
ral Chemistry											
›gen, Nitrate	U	ND	0.200	0.500	mg/l	10.	JLG	07/08/98	1217	125295	2

ollowing prep procedures were performed:

Mass Spec	FGD	07/09/98	1230	125618 3
P Prep for Metals	JL	07/06/98	1705	125206 4

Method	Method-Description
	EPA 6020
	EPA 300.0
	EPA 3005
	EPA 1311

:

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:ates presence of analyte at a concentration less than the reporting limit (RL) and greater than the detection limit (DL).

icates that the analyte was not detected at a concentration greater than the detection limit.

cates that a quality control analyte recovery is outside of specified acceptance criteria.

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FL	E87156/87294	E87472/87458
NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

cc: GTSD00196 Report Date: July 13, 1998

Sample ID : VTF-862 DRUM#1426

M = Method	Method-Description

This data report has been prepared and reviewed in accordance with General Engineering Laboratories standard operating procedures. Please direct any questions to your Project Manager, Jack Spitz at (803) 556-8171.

Reviewed By

P O Box 30712 • Charleston, SC 29417 • 2040 Savage Road • 29414

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9807041-01

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NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

GTSD00196 Report Date: July 13, 1998 Page 1 of 1

Sample ID	: VTF-862 DRUM#1426
Lab ID	: 9807041-06
Matrix	: Misc.
Date Collected	: 06/24/98
Date Received	: 07/01/98
Priority	: Routine
Collector	: Client

ameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
eral Chemistry											
it Filter Test		Pass.					JEN	07/07/98	1145	125518	1

: Method	Method-Description
	EPA 9095

s:
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STATE	GEL	EPI
FL	E87156/87294	E87472/87458
NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

cc: GTSD00196 Report Date: July 13, 1998

Sample ID	: VTF-863 DRUM#1428
Lab ID	: 9807041-02
Matrix	: TCLP
Date Collected	: 06/24/98
Date Received	: 07/01/98
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Metals Analysis											
Chromium	J	3.85	1.95	15.0	ug/l	5.0	AME	07/10/98	1448	125618	1
Nickel		367	0.210	2.00	ug/l	5.0					
Lead		4.68	0.130	1.00	ug/l	5.0					
Uranium		1040	0.120	1.00	ug/l	5.0					
General Chemistry											
Nitrogen, Nitrate	U	ND	0.200	0.500	mg/l	10.	JLG	07/08/98	1504	125295	2

The following prep procedures were performed:

ICP Mass Spec	FGD	07/09/98	1230	125618 3
TCLP Prep for Metals	JL	07/06/98	1705	125206 4

M = Method	Method-Description
M 1	EPA 6020
M 2	EPA 300.0
M 3	EPA 3005
M 4	EPA 1311

Notes:
The qualifiers in this report are defined as follows:
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NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

GTSD00196 Report Date: July 13, 1998

Sample ID : VTF-863 DRUM#1428

Method	Method-Description

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uestions to your Project Manager, Jack Spitz at (803) 556-8171.

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NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

cc: GTSD00196 Report Date: July 13, 1998 Page 1 of 1

Sample ID	: VTF-863 DRUM#1428
Lab ID	: 9807041-07
Matrix	: Misc.
Date Collected	: 06/24/98
Date Received	: 07/01/98
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
General Chemistry											
Paint Filter Test		Pass.					JEN	07/07/98	1145	125518	1

M = Method	Method-Description
M 1	EPA 9095

Notes:
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* indicates that a quality control analyte recovery is outside of specified acceptance criteria.

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9807041-07

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STATE	GEL	EPI
FL	E87156/87294	E87472/87458
NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

GTSD00196 Report Date: July 13, 1998

Sample ID	: VTF-864 DRUM#1430
Lab ID	: 9807041-03
Matrix	: TCLP
Date Collected	: 06/24/98
Date Received	: 07/01/98
Priority	: Routine
Collector	: Client

meter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
s Analysis											
mium	J	3.58	1.95	15.0	ug/l	5.0	AME	07/10/98	1454	125618	1
el		377	0.210	2.00	ug/l	5.0					
		4.59	0.130	1.00	ug/l	5.0					
ium		1070	0.120	1.00	ug/l	5.0					
ral Chemistry											
gen, Nitrate	U	ND	0.200	0.500	mg/l	10.	JLG	07/08/98	1251	125295	2

ollowing prep procedures were performed:

Mass Spec	FGD	07/09/98	1230	125618 3
P Prep for Metals	JL	07/06/98	1705	125206 4

Method	Method-Description
	EPA 6020
	EPA 300.0
	EPA 3005
	EPA 1311

:

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9807041-03

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STATE	GEL	EPI
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NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

cc: GTSD00196 Report Date: July 13, 1998

Sample ID : VTF-864 DRUM#1430

M = Method **Method-Description**

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SC	10120	10582
TN	02934	02934

Client: GTS Duratek
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Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

GTSD00196 Report Date: July 13, 1998 Page 1 of 1

Sample ID	: VTF-864 DRUM#1430
Lab ID	: 9807041-08
Matrix	: Misc.
Date Collected	: 06/24/98
Date Received	: 07/01/98
Priority	: Routine
Collector	: Client

ımeter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
ral Chemistry											
t Filter Test		Pass.					JEN	07/07/98	1145	125518	1

Method	Method-Description
	EPA 9095

:

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STATE	GEL	EPI
FL	E87156/87294	E87472/87458
NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

cc: GTSD00196 Report Date: July 13, 1998

Sample ID	: VTF-865 DRUM#1432
Lab ID	: 9807041-04
Matrix	: TCLP
Date Collected	: 06/25/98
Date Received	: 07/01/98
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Metals Analysis											
Chromium	J	3.93	1.95	15.0	ug/l	5.0	AME	07/10/98	1500	125618	1
Nickel		330	0.210	2.00	ug/l	5.0					
Lead		4.59	0.130	1.00	ug/l	5.0					
Uranium		967	0.120	1.00	ug/l	5.0					
General Chemistry											
Nitrogen, Nitrate	U	ND	0.200	0.500	mg/l	10.	JLG	07/08/98	1346	125295	2

The following prep procedures were performed:

ICP Mass Spec	FGD	07/09/98	1230	125618 3
TCLP Prep for Metals	JL	07/06/98	1705	125206 4

M = Method	Method-Description
M 1	EPA 6020
M 2	EPA 300.0
M 3	EPA 3005
M 4	EPA 1311

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STATE	GEL	EPI
FL	E87156/87294	E87472/87458
NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

GTSD00196 Report Date: July 13, 1998 Page 2 of 2

Sample ID : VTF-865 DRUM#1432

Method	Method-Description

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Laboratory Certifications

STATE	GEL	EPI
FL	E87156/87294	E87472/87458
NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

cc: GTSD00196 Report Date: July 13, 1998

Sample ID	: VTF-865 DRUM#1432
Lab ID	: 9807041-09
Matrix	: Misc.
Date Collected	: 06/25/98
Date Received	: 07/01/98
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
General Chemistry											
Paint Filter Test		Pass.					JEN	07/07/98	1145	125518	1

M = Method	Method-Description
M 1	EPA 9095

Notes:
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Reviewed By

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9807041-09

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STATE	GEL	EPI
FL	E87156/87294	E87472/87458
NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

GTSD00196 Report Date: July 13, 1998

Sample ID	: VTF-866 DRUM#1434
Lab ID	: 9807041-05
Matrix	: TCLP
Date Collected	: 06/25/98
Date Received	: 07/01/98
Priority	: Routine
Collector	: Client

neter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
s Analysis											
nium	J	4.06	1.95	15.0	ug/l	5.0	AME	07/10/98	1517	125618	1
l		412	0.210	2.00	ug/l	5.0					
		122	0.130	1.00	ug/l	5.0					
um		1120	0.120	1.00	ug/l	5.0					
al Chemistry											
gen, Nitrate	U	ND	0.200	0.500	mg/l	10.	JLG	07/08/98	1357	125295	2

llowing prep procedures were performed:

Mass Spec	FGD	07/09/98	1230	125618 3
Prep for Metals	JL	07/06/98	1705	125206 4

Method	Method-Description
	EPA 6020
	EPA 300.0
	EPA 3005
	EPA 1311

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STATE	GEL	EPI
FL	E87156/87294	E87472/87458
NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

cc: GTSD00196 Report Date: July 13, 1998

Sample ID : VTF-866 DRUM#1434

M = Method	Method-Description

This data report has been prepared and reviewed in accordance with General Engineering Laboratories standard operating procedures. Please direct any questions to your Project Manager, Jack Spitz at (803) 556-8171.

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STATE	GEL	EPI
FL	E87156/87294	E87472/87458
NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

GTSD00196 Report Date: July 13, 1998 Page 1 of 1

Sample ID	: VTF-866 DRUM#1434
Lab ID	: 9807041-10
Matrix	: Misc.
Date Collected	: 06/25/98
Date Received	: 07/01/98
Priority	: Routine
Collector	: Client

ımeter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
ral Chemistry											
t Filter Test		Pass.					JEN	07/07/98	1145	125518	1

Method	Method-Description
	EPA 9095

:

ualifiers in this report are defined as follows:
ıdicates that the analyte was not detected at a concentration greater than the detection limit.
cates presence of analyte at a concentration less than the reporting limit (RL) and greater than the detection limit (DL).
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ard operating procedures. Please direct
uestions to your Project Manager, Jack Spitz at (803) 556-8171.

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GTS DURATEK SHIPPING MANIFEST

Q#31771

M-Area Batch #21 Glass TCLP Samples RM-98-21

9807441/0

SHIPMENT DESTINED TO	SAMPLE CONTAINER IDENTIFICATION		DATE/TIME OF PACKAGING		SAMPLE NET WEIGHT	SHIPPING CONTAINER/ CONTAINER GROSS WEIGHT	SEAL # (IF APPLICABLE
General Engineering Laboratories 2040 Savage Rd. Chasn. SC 29414	Sample#	Drum#			Grams	Grams	N/A
	VTF-862	1426	06/24/98	0930	147	179	
	VTF-863	1428	06/24/98	1615	207	239	
	VTF-864	1430	06/24/98	2300	141	173	
	VTF-865	1432	06/25/98	0200	209	241	
	VTF-866	1434	06/25/98	0530	130	162	
					INFORMATION ONLY		
	Shipping Container		N/A		4 lbs	7 lbs	

Comments: Shipping Number

Relinquished by:	Date:	Time:	Received by:	Relinqished by:	Date:	Time:	Received by:
	7/1/98	0850	Francis				
Relinquished by:	Date:	Time:	Received by:	Relinqished by:	Date:	Time:	Received by:

C:\..\RCO\Ship... Form\

DURATEK

10100 Old Columbia Road
Columbia, Maryland 21046
410/312-5100 Fax 410/290-9070

L-98-055

July 8, 1998

Mr. Dan Bills
Subcontract Technical Representative
Westinghouse Savannah River Company
Building 730-M
Aiken, SC 29802

Final Wasteform Treatment Standards and Acceptance Criteria

Dear Mr. Bills:

GTS Duratek has completed sampling and analysis of the final wasteform, Batch #20, drums 1334, 1336, 1338, 1340 and 1342. The results of the analysis, including the analysis technique, is attached for your review. The analysis was performed by General Engineering Laboratories, a State of South Carolina certified lab, and verified by Mr. Innocent Joseph, Manager of Technology, GTS Duratek.

Results of the analysis indicate Batch #20 is within the contractual specifications. GTS Duratek will invoice directly through accounts payable (Brenda Bell, Bldg. 730-4B). A total of 60 drums of glass were produced for Batch #20. Should you have any questions, please contact Innocent Joseph or myself.

Sincerely,

GTS DURATEK

Daniel Macias
Director of Operations

DM/mlb
attachment

cc: S. Campbell
C. Coker

DURATEK

10100 Old Columbia Road
Columbia, Maryland 21046
410/312-5100 Fax 410/290-9070

July 6, 1998

Mr. Dan Macias
Operations Manger
Vendor Treatment Facility (M-area)
GTS Duratek
WSRC/USDOE Savannah River Site
Aiken, SC 29801

Dear Mr. Macias:

Please find enclosed the results of the "TCLP" and 'Paint Filter Test" on glass gems from drums 1334, 1336, 1338, 1340, and 1342. The tests were performed according to methods specified in the "Sampling Plan" for GTS Duratek's Vendor Treatment Facility at the Savannah River site. 1-tailed t-tests were performed on the TCLP data, and the upper acceptance limits for 95% confidence were calculated. The TCLP values are well below the upper acceptance limits for 95% confidence. All of the samples passed the "Paint Filter Test." The samples from Batch # 20 have therefore met all of the acceptance criteria for the glass product.

The calculations for sample means, variances, upper acceptance limits for 95% confidence, data sheets from General Engineering Laboratories, and a sample chain of custody record are enclosed. If you have any questions, please contact me at (410) 312-5120.

Sincerely

Innocent Joseph

Innocent Joseph
Manager, Technology
GTS Duratek

cc: P. Deltete
J. Pope
B. Bowan
G. Hildebrandt
C. Coker

The glass gems from batch 20, produced at the GTS Duratek M-area facility, were subjected to "paint filter test" for free water, and "TCLP" for leaching characteristics at General Engineering Laboratories, a South Carolina licensed laboratory. The "paint filter test" and the "TCLP" were done according to EPA procedures 9095 and 1311, respectively. Please find enclosed the results for glass samples from drums 1334 to 1342. The results of the tests are summarized below. 1-tailed t-tests were performed, and the upper limits for 95% confidence were calculated.

The TCLP values are below the acceptance limit for 95% confidence.

Table 1. Summary of TCLP results

Sample ID	Chromium (mg/L)	Nickel (mg/L)	Lead (mg/L)	Uranium (mg/L)	Nitrate (as N)	Paint filter test
GEM Drum # 1334	0.0045	0.396	0.0062	1.170	0.0	Pass
GEM Drum # 1336	0.0062	0.482	0.0060	1.360	0.0	Pass
GEM Drum # 1338	0.0071	0.451	0.0062	1.250	0.0	Pass
GEM Drum # 1340	0.0077	0.523	0.0086	1.420	0.0	Pass
GEM Drum # 1342	0.0085	0.458	0.0061	1.290	0.0	Pass

Student t-test

Number of samples = n = 5

Mean = $\bar{x} = \sum x_i / n$

Variance = $s^2 = \sum(x_i - \bar{x})^2 / (n-1)$

Degrees of freedom for n observations = n-1 = 4

From standard t-tables, the factor "z" for 95% confidence limit ($t_{0.95}$ or $\alpha_{0.05}$) for 4 degrees of freedom is 2.13.

Upper acceptance limit for 95% confidence for a 1-tailed t-test, at 4 degrees of freedom is:

$$\text{Acceptance limit} - (s \times 2.13)/n^{1/2}$$

Table 2. TCLP means, variances, and upper acceptance limits for 95% confidence.

Element	mean ($\bar{x}$)	Variance (s^2)	s	Acceptance limit (mg/L)	Upper acceptance limit for 95% confidence
Chromium	0.0068	2.32 E-6	0.0015	0.86	0.8585
Nickel	0.4620	0.00215	0.0464	5.0	4.9558
Lead	0.0066	1.22 E-6	0.0011	0.37	0.3689
Uranium	1.2980	0.00937	0.0968	4.0	3.9078

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NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

GTSD00196 Report Date: July 02, 1998

Sample ID	: VTF 812
Lab ID	: 9806762-01
Matrix	: TCLP
Date Collected	: 06/25/98
Date Received	: 06/25/98
Priority	: Routine
Collector	: Client

neter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Analysis											
nium	J	4.51	3.90	30.0	ug/l	10.	JSS	07/01/98	1749	125141	1
l		396	0.420	4.00	ug/l	10.					
		6.16	0.260	2.00	ug/l	10.					
um		1170	0.240	2.00	ug/l	10.					
al Chemistry											
gen, Nitrate	U	ND	0.100	0.250	mg/l	5.0	RWS	06/30/98	1159	125114	2

llowing prep procedures were performed:

lass Spec	FGD	07/01/98	1030	125141 3
Prep for Metals	JL	06/29/98	1515	124998 4

Method	Method-Description
	EPA 6020
	EPA 300.0
	EPA 3005
	EPA 1311

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STATE	GEL	EPI
FL	E87156/87294	E87472/87458
NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

cc: GTSD00196 Report Date: July 02, 1998

Sample ID : VTF 812

M = Method	Method-Description

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TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

GTSD00196 Report Date: July 02, 1998

Sample ID	: VTF 812
Lab ID	: 9806762-06
Matrix	: Misc.
Date Collected	: 06/25/98
Date Received	: 06/25/98
Priority	: Routine
Collector	: Client

meter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
al Chemistry											
Filter Test		pass					BJR	07/01/98	1510	125242	1

Method	Method-Description
	EPA 9095

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NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

cc: GTSD00196 Report Date: July 02, 1998

Sample ID	: VTF 813
Lab ID	: 9806762-02
Matrix	: TCLP
Date Collected	: 06/25/98
Date Received	: 06/25/98
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Metals Analysis											
Chromium	J	6.19	3.90	30.0	ug/l	10.	JSS	07/01/98	1754	125141	1
Nickel		482	0.420	4.00	ug/l	10.					
Lead		5.99	0.260	2.00	ug/l	10.					
Uranium		1360	0.240	2.00	ug/l	10.					
General Chemistry											
Nitrogen, Nitrate	U	ND	0.100	0.250	mg/l	5.0	RWS	06/30/98	1241	125114	2

The following prep procedures were performed:

ICP Mass Spec	FGD	07/01/98	1030	125141 3
TCLP Prep for Metals	JL	06/29/98	1515	124998 4

M = Method	Method-Description
M 1	EPA 6020
M 2	EPA 300.0
M 3	EPA 3005
M 4	EPA 1311

Notes:
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SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

GTSD00196 Report Date: July 02, 1998

Sample ID : VTF 813

Method	Method-Description

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NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

cc: GTSD00196 Report Date: July 02, 1998

Sample ID	: VTF 813
Lab ID	: 9806762-07
Matrix	: Misc.
Date Collected	: 06/25/98
Date Received	: 06/25/98
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
General Chemistry											
Paint Filter Test		pass	-				BJR	07/01/98	1510	125242	1

M = Method	Method-Description
M 1	EPA 9095

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NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

GTSD00196 Report Date: July 02, 1998

Sample ID	: VTF 814
Lab ID	: 9806762-03
Matrix	: TCLP
Date Collected	: 06/25/98
Date Received	: 06/25/98
Priority	: Routine
Collector	: Client

meter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
s Analysis											
mium	J	7.06	3.90	30.0	ug/l	10.	JSS	07/01/98	1800	125141	1
el		451	0.420	4.00	ug/l	10.					
		6.18	0.260	2.00	ug/l	10.					
um		1250	0.240	2.00	ug/l	10.					
al Chemistry											
gen, Nitrate	U	ND	0.100	0.250	mg/l	5 0	RWS	06/30/98	1255	125114	2

llowing prep procedures were performed:

Mass Spec	FGD	07/01/98	1030	125141 3
Prep for Metals	JL	06/29/98	1515	124998 4

Method	Method-Description
	EPA 6020
	EPA 300.0
	EPA 3005
	EPA 1311

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9806762-03

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NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
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Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

cc: GTSD00196 Report Date: July 02, 1998

Sample ID : VTF 814

M = Method	Method-Description

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SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

GTSD00196 Report Date: July 02, 1998 Page 1 of 1

Sample ID	: VTF 814
Lab ID	: 9806762-08
Matrix	. Misc.
Date Collected	: 06/25/98
Date Received	: 06/25/98
Priority	: Routine
Collector	: Client

meter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
·al Chemistry											
Filter Test		pass					BJR	07/01/98	1510	125242	1

Method	Method-Description
	EPA 9095

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STATE	GEL	EPI
FL	E87156/87294	E87472/87458
NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

cc: GTSD00196 Report Date: July 02, 1998

Sample ID	: VTF 815
Lab ID	: 9806762-04
Matrix	: TCLP
Date Collected	: 06/25/98
Date Received	: 06/25/98
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Metals Analysis											
Chromium	J	7.69	3.90	30.0	ug/l	10.	JSS	07/01/98	1806	125141	1
Nickel		523	0.420	4.00	ug/l	10.					
Lead		8.57	0.260	2.00	ug/l	10.					
Uranium		1420	0.240	2.00	ug/l	10.					
General Chemistry											
Nitrogen, Nitrate	U	ND	0.100	0.250	mg/l	5.0	RWS	06/30/98	1309	125114	2

The following prep procedures were performed:

ICP Mass Spec	FGD	07/01/98	1030	125141 3
TCLP Prep for Metals	JL	06/29/98	1515	124998 4

M = Method	Method-Description
M 1	EPA 6020
M 2	EPA 300.0
M 3	EPA 3005
M 4	EPA 1311

Notes:
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NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

GTSD00196 Report Date: July 02, 1998

Sample ID : VTF 815

Method	Method-Description

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NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

cc: GTSD00196 Report Date: July 02, 1998

Sample ID	: VTF 815
Lab ID	: 9806762-09
Matrix	: Misc.
Date Collected	: 06/25/98
Date Received	: 06/25/98
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
General Chemistry											
Paint Filter Test		pass					BJR	07/01/98	1510	125242	1

M = Method	Method-Description
M 1	EPA 9095

Notes:
The qualifiers in this report are defined as follows:
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9806762-09

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STATE	GEL	EPI
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NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

GTSD00196 Report Date: July 02, 1998

Sample ID	: VTF 816
Lab ID	: 9806762-05
Matrix	: TCLP
Date Collected	: 06/25/98
Date Received	: 06/25/98
Priority	: Routine
Collector	: Client

ımeter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
ls Analysis											
›mium	J	8.48	3.90	30.0	ug/l	10.	JSS	07/01/98	1811	125141	1
:el		458	0.420	4.00	ug/l	10.					
l		6.08	0.260	2.00	ug/l	10.					
ıium		1290	0.240	2.00	ug/l	10.					
ral Chemistry											
›gen, Nitrate	U	ND	0.100	0.250	mg/l	5.0	RWS	06/30/98	1323	125114	2
ollowing prep procedures were performed:											
Mass Spec							FGD	07/01/98	1030	125141	3
P Prep for Metals							JL	06/29/98	1515	124998	4

Method	Method-Description
	EPA 6020
	EPA 300.0
	EPA 3005
	EPA 1311

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STATE	GEL	EPI
FL	E87156/87294	E87472/87458
NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

cc: GTSD00196 Report Date: July 02, 1998

Sample ID : VTF 816

M = Method	Method-Description

This data report has been prepared and reviewed in accordance with General Engineering Laboratories standard operating procedures. Please direct any questions to your Project Manager, Jack Spitz at (803) 556-8171.

Reviewed By

P O Box 30712 • Charleston, SC 29417 • 2040 Savage Road • 29414
(803) 556-8171 • Fax (803) 766-1178

ENERAL ENGINEERING
TORIES, INC.

GENERAL ENGINEERING LABORATORIES

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Laboratory Certifications

STATE	GEL	EPI
FL	E87156/87294	E87472/87458
NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

GTSD00196 Report Date: July 02, 1998 Page 1 of 1

Sample ID	: VTF 816
Lab ID	: 9806762-10
Matrix	: Misc.
Date Collected	: 06/25/98
Date Received	: 06/25/98
Priority	: Routine
Collector	: Client

neter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
al Chemistry											
Filter Test		pass					BJR	07/01/98	1510	125242	1

Method	Method-Description
	EPA 9095

alifiers in this report are defined as follows:
licates that the analyte was not detected at a concentration greater than the detection limit.
ates presence of analyte at a concentration less than the reporting limit (RL) and greater than the detection limit (DL).
:ates that the analyte was not detected at a concentration greater than the detection limit.
ates that a quality control analyte recovery is outside of specified acceptance criteria.

ıta report has been prepared and reviewed
rdance with General Engineering Laboratories
d operating procedures. Please direct
estions to your Project Manager, Jack Spitz at (803) 556-8171.

ved By

GTSD001

9906762%

9-31771

M-Area Batch #20 Glass TCLP Samples RM-98-20

SHIPMENT DESTINED TO	SAMPLE CONTAINER IDENTIFICATION		DATE/TIME OF PACKAGING		SAMPLE NET WEIGHT	SHIPPING CONTAINER/ CONTAINER GROSS WEIGHT	SEAL # (IF APPLICABLE)
General Engineering Laboratories 2040 Savage Rd. Chasn. SC 29414	Sample#	Drum#			Grams	Grams	N/A
	VTF-812	1334	06/14/98	1615	201	233	
	VTF-813	1336	06/14/98	2200	158	190	
	VTF-814	1338	06/15/98	0515	292	324	
	VTF-815	1340	06/15/98	0800	270	302	
	VTF-816	1342	06/15/98	1545	289	321	
	Shipping Container		N/A		3 lbs	8 lbs	

INFORMATION ONLY

Comments: Shipping Number

SRS-16220

Post-it® Fax Note 7671	Date 6/24	# of pages ▶ 1
To Innocent	From Martin	
Co./Dept.	Co.	
Phone #	Phone #	
Fax #	Fax #	

Relinquished by:	Date:	Time:	Received by:	Relinquished by:	Date:	Time:	Received by:
Relinquished by:	Date:	Time:	Received by:	Relinquished by:	Date:	Time:	Received by:

\ WCO\Shipping Forms\

DURATEK
10100 Old Columbia Road
Columbia, Maryland 21046
410/312-5100 Fax 410/290-9070

L-98-051

June 29, 1998

Mr. Dan Bills
Subcontract Technical Representative
Westinghouse Savannah River Company
Building 730-M
Aiken, SC 29802

Final Wasteform Treatment Standards and Acceptance Criteria

Dear Mr. Bills:

GTS Duratek has completed sampling and analysis of the final wasteform, Batch #19, drums 1274, 1276, 1278, 1280 and 1282. The results of the analysis, including the analysis technique, is attached for your review. The analysis was performed by General Engineering Laboratories, a State of South Carolina certified lab, and verified by Mr. Innocent Joseph, Manager of Technology, GTS Duratek.

Results of the analysis indicate Batch #19 is within the contractual specifications. GTS Duratek will invoice directly through accounts payable (Brenda Bell, Bldg. 730-4B). A total of 80 drums of glass were produced for Batch #19 Should you have any questions, please contact Innocent Joseph or myself.

Sincerely,

GTS DURATEK

Daniel Macias
Director of Operations

DM/mlb
attachment

cc: S. Campbell
C. Coker

DURATEK

10100 Old Columbia Road
Columbia, Maryland 21046
410/312-5100 Fax 410/290-9070

June 26, 1998

Mr. Dan Macias
Operations Manger
Vendor Treatment Facility (M-area)
GTS Duratek
WSRC/USDOE Savannah River Site
Aiken, SC 29801

Dear Mr. Macias:

Please find enclosed the results of the "TCLP" and 'Paint Filter Test" on glass gems from drums 1274, 1276, 1278, 1280, and 1282. The tests were performed according to methods specified in the "Sampling Plan" for GTS Duratek's Vendor Treatment Facility at the Savannah River site. 1-tailed t-tests were performed on the TCLP data, and the upper acceptance limits for 95% confidence were calculated. The TCLP values are well below the upper acceptance limits for 95% confidence. All of the samples passed the "Paint Filter Test." The samples from Batch # 19 have therefore met all of the acceptance criteria for the glass product.

The calculations for sample means, variances, upper acceptance limits for 95% confidence, data sheets from General Engineering Laboratories, and a sample chain of custody record are enclosed. If you have any questions, please contact me at (410) 312-5120.

Sincerely

Innocent Joseph

Innocent Joseph
Manager, Technology
GTS Duratek

cc: P. Deltete
J. Pope
B. Bowan
G. Hildebrandt
C. Coker

The glass gems from batch 19, produced at the GTS Duratek M-area facility, were subjected to "paint filter test" for free water, and "TCLP" for leaching characteristics at General Engineering Laboratories, a South Carolina licensed laboratory. The "paint filter test" and the "TCLP" were done according to EPA procedures 9095 and 1311, respectively. Please find enclosed the results for glass samples from drums 1274 to 1282. The results of the tests are summarized below. 1-tailed t-tests were performed, and the upper limits for 95% confidence were calculated.

The TCLP values are below the acceptance limit for 95% confidence.

Table 1. Summary of TCLP results

Sample ID	Chromium (mg/L)	Nickel (mg/L)	Lead (mg/L)	Uranium (mg/L)	Nitrate (as N)	Paint filter test
GEM Drum # 1274	< 0.03	0.273	0.0202	0.764	< 0.5	Pass
GEM Drum # 1276	< 0.03	0.300	0.0020	0.828	< 0.5	Pass
GEM Drum # 1278	< 0.03	0.280	0.0020	0.803	< 0.5	Pass
GEM Drum # 1280	< 0.03	0.340	0.0038	0.930	< 0.5	Pass
GEM Drum # 1282	< 0.03	0.250	0.0021	0.745	< 0.5	Pass

Student t-test

Number of samples = n = 5

Mean = $\bar{x} = \sum x_i / n$

Variance = $s^2 = \sum(x_i - \bar{x})^2 / (n-1)$

Degrees of freedom for n observations = n-1 = 4

From standard t-tables, the factor "z" for 95% confidence limit ($t_{0.95}$ or $\alpha_{0.05}$) for 4 degrees of freedom is 2.13.

Upper acceptance limit for 95% confidence for a 1-tailed t-test, at 4 degrees of freedom is:

$$\text{Acceptance limit} - (s \times 2.13)/n^{1/2}$$

Table 2. TCLP means, variances, and upper acceptance limits for 95% confidence.

Element	mean ($\bar{x}$)	Variance (s^2)	s	Acceptance limit (mg/L)	Upper acceptance limit for 95% confidence
Chromium	< 0.03	0.0	0.0	0.86	0.86
Nickel	0.2886	0.00114	0.0338	5.0	4.9678
Lead	0.0060	6.35 E-5	0.0080	0.37	0.3624
Uranium	0.8140	0.00526	0.0725	4.0	3.9309

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Laboratory Certifications

STATE	GEL	EPI
FL	E87156/87294	E87472/87458
NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

GTSD00196 Report Date: June 25, 1998 Page 1 of 1

Sample ID	: VTF-781 1274
Lab ID	: 9806609-01
Matrix	: TCLP
Date Collected	: 06/07/98
Date Received	: 06/19/98
Priority	: Routine
Collector	: Client

meter	Qualifier	Result	Units	Method	Analyst	Date	Time	Batch
s Analysis								
mium	<	30.0	ug/l	EPA 6020	JSS	06/24/98	2143	124731
el		273	ug/l	EPA 6020				
		20.2	ug/l	EPA 6020				
ium		764	ug/l	EPA 6020				
:al Chemistry								
ıgen, Nitrate	<	0.500	mg/l	EPA 300.0	JLG	06/23/98	1344	124583

ollowing prep procedures were performed:

Mass Spec	EPA 3005	FGD	06/24/98	1330	124731
P Prep for Metals	EPA 1311	JL	06/22/98	1510	124586

lata report has been prepared and reviewed
ordance with General Engineering Laboratories
ırd operating procedures. Please direct
uestions to your Project Manager, Jack Spitz at (803) 556-8171.

wed By

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9806609-01

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Laboratory Certifications

STATE	GEL	EPI
FL	E87156/87294	E87472/87458
NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

cc: GTSD00196 Report Date: June 25, 1998 Page 1 of 1

Sample ID	: VTF-781 1274
Lab ID	: 9806609-06
Matrix	: Misc.
Date Collected	: 06/07/98
Date Received	: 06/19/98
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	Units	Method	Analyst	Date	Time	Batch
General Chemistry								
Paint Filter Test		Pass.		EPA 9095	JEN	06/24/98	1115	124768

This data report has been prepared and reviewed in accordance with General Engineering Laboratories standard operating procedures. Please direct any questions to your Project Manager, Jack Spitz at (803) 556-8171.

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9806609-06

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Laboratory Certifications

STATE	GEL	EPI
FL	E87156/87294	E87472/87458
NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

GTSD00196 Report Date: June 25, 1998

Sample ID	: VTF-782 1276
Lab ID	: 9806609-02
Matrix	: TCLP
Date Collected	: 06/07/98
Date Received	: 06/19/98
Priority	: Routine
Collector	: Client

meter	Qualifier	Result	Units	Method	Analyst	Date	Time	Batch
s Analysis								
mium	<	30.0	ug/l	EPA 6020	JSS	06/24/98	2150	124731
el		300	ug/l	EPA 6020				
	<	2.00	ug/l	EPA 6020				
ium		828	ug/l	EPA 6020				
al Chemistry								
gen, Nitrate	<	0.500	mg/l	EPA 300.0	JLG	06/23/98	1417	124583

llowing prep procedures were performed:

Mass Spec	EPA 3005	FGD	06/24/98	1330	124731
P Prep for Metals	EPA 1311	JL	06/22/98	1510	124586

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ordance with General Engineering Laboratories
ırd operating procedures. Please direct
ıestions to your Project Manager, Jack Spitz at (803) 556-8171.

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Laboratory Certifications

STATE	GEL	EPI
FL	E87156/87294	E87472/87458
NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

cc: GTSD00196 Report Date: June 25, 1998

Sample ID	: VTF-782 1276
Lab ID	: 9806609-07
Matrix	: Misc.
Date Collected	: 06/07/98
Date Received	: 06/19/98
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	Units	Method	Analyst	Date	Time	Batch
General Chemistry								
Paint Filter Test		Pass.		EPA 9095	JEN	06/24/98	1115	124768

This data report has been prepared and reviewed in accordance with General Engineering Laboratories standard operating procedures. Please direct any questions to your Project Manager, Jack Spitz at (803) 556-8171.

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STATE	GEL	EPI
FL	E87156/87294	E87472/87458
NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

GTSD00196 Report Date: June 25, 1998 Page 1 of 1

Sample ID	: VTF-783 1278
Lab ID	: 9806609-03
Matrix	: TCLP
Date Collected	: 06/08/98
Date Received	: 06/19/98
Priority	: Routine
Collector	: Client

meter	Qualifier	Result	Units	Method	Analyst	Date	Time	Batch
s Analysis								
mium	<	30.0	ug/l	EPA 6020	JSS	06/24/98	2157	124731
el		280	ug/l	EPA 6020				
		2.04	ug/l	EPA 6020				
ium		803	ug/l	EPA 6020				
ral Chemistry								
)gen, Nitrate	<	0.500	mg/l	EPA 300.0	JLG	06/23/98	1428	124583

ollowing prep procedures were performed:

Mass Spec	EPA 3005	FGD	06/24/98	1330	124731
P Prep for Metals	EPA 1311	JL	06/22/98	1510	124586

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ard operating procedures. Please direct
uestions to your Project Manager, Jack Spitz at (803) 556-8171.

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:wed By

9806609-03

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Laboratory Certifications

STATE	GEL	EPI
FL	E87156/87294	E87472/87458
NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

cc: GTSD00196 Report Date: June 25, 1998 Page 1 of 1

Sample ID	: VTF-782 1278
Lab ID	: 9806609-08
Matrix	: Misc.
Date Collected	: 06/08/98
Date Received	: 06/19/98
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	Units	Method	Analyst	Date	Time	Batch
General Chemistry								
Paint Filter Test		Pass.		EPA 9095	JEN	06/24/98	1115	124768

This data report has been prepared and reviewed in accordance with General Engineering Laboratories standard operating procedures. Please direct any questions to your Project Manager, Jack Spitz at (803) 556-8171.

Reviewed By

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9806609-08

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GENERAL ENGINEERING LABORATORIES

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Laboratory Certifications

STATE	GEL	EPI
FL	E87156/87294	E87472/87458
NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

GTSD00196 Report Date: June 25, 1998 Page 1 of 1

Sample ID	: VTF-784 1280
Lab ID	: 9806609-04
Matrix	: TCLP
Date Collected	: 06/08/98
Date Received	: 06/19/98
Priority	: Routine
Collector	: Client

meter	Qualifier	Result	Units	Method	Analyst	Date	Time	Batch
s Analysis								
mium	<	30.0	ug/l	EPA 6020	JSS	06/24/98	2204	124731
el		340	ug/l	EPA 6020				
		3.77	ug/l	EPA 6020				
ium		930	ug/l	EPA 6020				
al Chemistry								
gen, Nitrate	<	0.500	mg/l	EPA 300.0	JLG	06/23/98	1439	124583

llowing prep procedures were performed:

Mass Spec	EPA 3005	FGD	06/24/98	1330	124731
P Prep for Metals	EPA 1311	JL	06/22/98	1510	124586

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ard operating procedures. Please direct
uestions to your Project Manager, Jack Spitz at (803) 556-8171.

Reviewed By

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(803) 556-8171 • Fax (803) 766-1178

9806609-04

GENERAL ENGINEERING LABORATORIES
Meeting today's needs with a vision for tomorrow.

Laboratory Certifications

STATE	GEL	EPI
FL	E87156/87294	E87472/87458
NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

cc: GTSD00196 Report Date: June 25, 1998

Sample ID	: VTF-784 1280
Lab ID	: 9806609-09
Matrix	: Misc.
Date Collected	: 06/08/98
Date Received	: 06/19/98
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	Units	Method	Analyst	Date	Time	Batch
General Chemistry								
Paint Filter Test		Pass.		EPA 9095	JEN	06/24/98	1115	124768

This data report has been prepared and reviewed in accordance with General Engineering Laboratories standard operating procedures. Please direct any questions to your Project Manager, Jack Spitz at (803) 556-8171.

Reviewed By

GENERAL ENGINEERING LABORATORIES

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Laboratory Certifications

STATE	GEL	EPI
FL	E87156/87294	E87472/87458
NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

GTSD00196 Report Date: June 25, 1998 Page 1 of 1

Sample ID	: VTF-785 1282
Lab ID	: 9806609-05
Matrix	: TCLP
Date Collected	: 06/08/98
Date Received	: 06/19/98
Priority	: Routine
Collector	: Client

meter	Qualifier	Result	Units	Method	Analyst	Date	Time	Batch
s Analysis								
mium	<	30.0	ug/l	EPA 6020	JSS	06/24/98	2212	124731
el		250	ug/l	EPA 6020				
		2.05	ug/l	EPA 6020				
ium		745	ug/l	EPA 6020				
ral Chemistry								
gen, Nitrate	<	0.500	mg/l	EPA 300.0	JLG	06/23/98	1450	124583

ollowing prep procedures were performed:

Mass Spec	EPA 3005	FGD	06/24/98	1330	124731
P Prep for Metals	EPA 1311	JL	06/22/98	1510	124586

lata report has been prepared and reviewed
ordance with General Engineering Laboratories
ard operating procedures. Please direct
uestions to your Project Manager, Jack Spitz at (803) 556-8171.

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wed By

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(803) 556-8171 • Fax (803) 766-1178

9806609-05

GENERAL ENGINEERING LABORATORIES
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Laboratory Certifications

STATE	GEL	EPI
FL	E87156/87294	E87472/87458
NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

cc: GTSD00196 Report Date: June 25, 1998

Sample ID	: VTF-785 1282
Lab ID	: 9806609-10
Matrix	: Misc.
Date Collected	: 06/08/98
Date Received	: 06/19/98
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	Units	Method	Analyst	Date	Time	Batch
General Chemistry								
Paint Filter Test		Pass.		EPA 9095	JEN	06/24/98	1115	124768

This data report has been prepared and reviewed in accordance with General Engineering Laboratories standard operating procedures. Please direct any questions to your Project Manager, Jack Spitz at (803) 556-8171.

Reviewed By

9806609-10

9806609%

GTSD00196

SHIPMENT DESTINED TO	SAMPLE CONTAINER IDENTIFICATION		DATE/TIME OF PACKAGING		SAMPLE NET WEIGHT	SHIPPING CONTAINER/ CONTAINER GROSS WEIGHT	SEAL # (IF APPLICABLE)
General Engineering Laboratories 2040 Savage Rd. Chasn. SC 29414	Sample#	Drum#			Grams	Grams	N/A
	VTF-781	1274	06/07/98	1715	302	334	
	VTF-782	1276	06/07/98	2215	175	207	
	VTF-783	1278	06/08/98	0350	198	220	
	VTF-784	1280	06/08/98	0725	741	844	
	VTF-785	1282	06/08/98	0900	773	876	
	Shipping Container		N/A		5.5 lbs	10.5 lbs	

INFORMATION ONLY

Comments: Shipping Number

Relinquished by	Date	Time:	Received by:	Relinqished by:	Date:	Time:	Received by
			D Franco		6/10/98		
Relinquished by	Date	Time	Received by:	Relinqished by:	Date	Time	Received by

Blank

DURATEK
10100 Old Columbia Road
Columbia, Maryland 21046
410/312-5100 Fax 410/290-9070

L-98-048

June 16, 1998

Mr. Dan Bills
Subcontract Technical Representative
Westinghouse Savannah River Company
Building 730-M
Aiken, SC 29802

Final Wasteform Treatment Standards and Acceptance Criteria

Dear Mr. Bills:

GTS Duratek has completed sampling and analysis of the final wasteform, Batch #18, drums 1194, 1196, 1198, 1200 and 1202. The results of the analysis, including the analysis technique, is attached for your review. The analysis was performed by General Engineering Laboratories, a State of South Carolina certified lab, and verified by Mr. Innocent Joseph, Manager of Technology, GTS Duratek.

Results of the analysis indicate Batch #18 is within the contractual specifications. GTS Duratek will invoice directly through accounts payable (Brenda Bell, Bldg. 730-4B). A total of 90 drums of glass were produced for Batch #18 Should you have any questions, please contact Innocent Joseph or myself.

Sincerely,

GTS DURATEK

Daniel Macias
Director of Operations

DM/mlb
attachment

cc: S. Campbell
C. Coker

10100 Old Columbia Road
Columbia, Maryland 21046
410/312-5100 Fax 410/290-9070

June 11, 1998

Mr. Dan Macias
Operations Manger
Vendor Treatment Facility (M-area)
GTS Duratek
WSRC/USDOE Savannah River Site
Aiken, SC 29801

Dear Mr. Macias:

Please find enclosed the results of the "TCLP" and 'Paint Filter Test" on glass gems from drums 1194, 1196, 1198, 1200, and 1202. The tests were performed according to methods specified in the "Sampling Plan" for GTS Duratek's Vendor Treatment Facility at the Savannah River site. 1-tailed t-tests were performed on the TCLP data, and the upper acceptance limits for 95% confidence were calculated. The TCLP values are well below the upper acceptance limits for 95% confidence. All of the samples passed the "Paint Filter Test." The samples from Batch # 18 have therefore met all of the acceptance criteria for the glass product.

The calculations for sample means, variances, upper acceptance limits for 95% confidence, data sheets from General Engineering Laboratories, and a sample chain of custody record are enclosed. If you have any questions, please contact me at (410) 312-5120.

Sincerely

Innocent Joseph

Innocent Joseph
Manager, Technology
GTS Duratek

cc: P. Deltete
J. Pope
B. Bowan
G. Hildebrandt
C. Coker

The glass gems from batch 18, produced at the GTS Duratek M-area facility, were subjected to "paint filter test" for free water, and "TCLP" for leaching characteristics at General Engineering Laboratories, a South Carolina licensed laboratory. The "paint filter test" and the "TCLP" were done according to EPA procedures 9095 and 1311, respectively. Please find enclosed the results for glass samples from drums 1194 to 1202. The results of the tests are summarized below. 1-tailed t-tests were performed, and the upper limits for 95% confidence were calculated.

The TCLP values are below the acceptance limit for 95% confidence.

Table 1. Summary of TCLP results

Sample ID	Chromium (mg/L)	Nickel (mg/L)	Lead (mg/L)	Uranium (mg/L)	Nitrate (as N)	Paint filter test
GEM Drum # 1194	0.0084	0.188	0.0064	0.793	0.0	Pass
GEM Drum # 1196	0.0061	0.209	0.0044	0.853	0.0	Pass
GEM Drum # 1198	0.0060	0.203	0.0034	0.863	0.0	Pass
GEM Drum # 1200	0.0059	0.194	0.0030	0.824	0.0	Pass
GEM Drum # 1202	0.0056	0.209	0.0030	0.859	0.0	Pass

Student t-test

Number of samples = n = 5

Mean = $\bar{x} = \sum x_i / n$

Variance = $s^2 = \sum(x_i - \bar{x})^2 / (n-1)$

Degrees of freedom for n observations = n-1 = 4

From standard t-tables, the factor "z" for 95% confidence limit ($t_{0.95}$ or $\alpha_{0.05}$) for 4 degrees of freedom is 2.13.

Upper acceptance limit for 95% confidence for a 1-tailed t-test, at 4 degrees of freedom is:

$$\text{Acceptance limit} - (s \times 2.13)/n^{1/2}$$

Table 2. TCLP means, variances, and upper acceptance limits for 95% confidence.

Element	mean ($\bar{x}$)	Variance (s^2)	s	Acceptance limit (mg/L)	Upper acceptance limit for 95% confidence
Chromium	0.0064	1.37 E-6	0.0012	0.86	0.8589
Nickel	0.2006	8.73 E-5	0.0093	5.0	4.9911
Lead	0.0040	2.09 E-6	0.0014	0.37	0.3686
Uranium	0.8384	0.00088	0.0296	4.0	3.9718

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FL	E87156/87294	E87472/87458
NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

GTSD00196 Report Date: June 10, 1998

Sample ID	: VTF-738 1194
Lab ID	: 9806151-01
Matrix	: TCLP
Date Collected	: 05/29/98
Date Received	: 06/04/98
Priority	: Routine
Collector	: Client

meter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
s Analysis											
mium	J	8.44	3.90	30.0	ug/l	10.	JSS	06/09/98	1757	123726	1
el		188	0.420	4.00	ug/l	10.					
		6.42	0.260	2.00	ug/l	10.					
ium		793	0.240	2.00	ug/l	10.					
ral Chemistry											
gen, Nitrate	U	ND	0.200	0.500	mg/l	10.	JLG	06/09/98	0935	123566	2

ollowing prep procedures were performed:

Mass Spec	FGD	06/09/98	1230	123726	3
P Prep for Metals	JL	06/07/98	1720	123649	4

Method	Method-Description
	EPA 6020
	EPA 300.0
	EPA 3005
	EPA 1311

:

ualifiers in this report are defined as follows:
ndicates that the analyte was not detected at a concentration greater than the detection limit.
cates presence of analyte at a concentration less than the reporting limit (RL) and greater than the detection limit (DL).
icates that the analyte was not detected at a concentration greater than the detection limit.
icates that a quality control analyte recovery is outside of specified acceptance criteria.

9806151-01

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FL	E87156/87294	E87472/87458
NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

cc: GTSD00196 Report Date: June 10, 1998

Sample ID : VTF-738 1194

M = Method	Method-Description

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SC	10120	10582
TN	02934	02934

Client: GTS Duratek
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Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

GTSD00196 Report Date: June 10, 1998 Page 1 of 1

Sample ID	: VTF-738 1194
Lab ID	: 9806151-06
Matrix	: Misc.
Date Collected	: 05/29/98
Date Received	: 06/04/98
Priority	: Routine
Collector	: Client

meter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
al Chemistry											
Filter Test		Pass.					JEN	06/10/98	1115	123870	1

Method	Method-Description
	EPA 9095

:

ualifiers in this report are defined as follows:
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9806151-06

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FL	E87156/87294	E87472/87458
NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

cc: GTSD00196 Report Date: June 10, 1998

Sample ID	: VTF-739 1196
Lab ID	: 9806151-02
Matrix	: TCLP
Date Collected	: 05/29/98
Date Received	: 06/04/98
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Metals Analysis											
Chromium	J	6.06	3.90	30.0	ug/l	10.	JSS	06/09/98	1804	123726	1
Nickel		209	0.420	4.00	ug/l	10.					
Lead		4.39	0.260	2.00	ug/l	10.					
Uranium		853	0.240	2.00	ug/l	10.					
General Chemistry											
Nitrogen, Nitrate	U	ND	0.200	0.500	mg/l	10.	JLG	06/09/98	1009	123566	2

The following prep procedures were performed:

ICP Mass Spec	FGD	06/09/98	1230	123726 3
TCLP Prep for Metals	JL	06/07/98	1720	123649 4

M = Method	Method-Description
M 1	EPA 6020
M 2	EPA 300.0
M 3	EPA 3005
M 4	EPA 1311

Notes:
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* indicates that a quality control analyte recovery is outside of specified acceptance criteria.

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NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

GTSD00196 Report Date: June 10, 1998

Sample ID : VTF-739 1196

Method	Method-Description

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NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

cc: GTSD00196

Report Date: June 10, 1998

Sample ID	: VTF-739 1196
Lab ID	: 9806151-07
Matrix	: Misc.
Date Collected	: 05/29/98
Date Received	: 06/04/98
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
General Chemistry											
Paint Filter Test		Pass.					JEN	06/10/98	1115	123870	1

M = Method	Method-Description
M 1	EPA 9095

Notes:
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U indicates that the analyte was not detected at a concentration greater than the detection limit.
* indicates that a quality control analyte recovery is outside of specified acceptance criteria.

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Reviewed By

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9806151-07

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NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

GTSD00196 Report Date: June 10, 1998

Sample ID	: VTF-740 1198
Lab ID	: 9806151-03
Matrix	: TCLP
Date Collected	: 05/29/98
Date Received	: 06/04/98
Priority	: Routine
Collector	: Client

ımeter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
ls Analysis											
ɔmium	J	5.95	3.90	30.0	ug/l	10.	JSS	06/09/98	1813	123726	1
ɛel		203	0.420	4.00	ug/l	10.					
ɨ		3.41	0.260	2.00	ug/l	10.					
ıium		863	0.240	2.00	ug/l	10.					
ɾral Chemistry											
ogen, Nitrate	U	ND	0.200	0.500	mg/l	10.	JLG	06/09/98	1020	123566	2

ollowing prep procedures were performed:

Mass Spec	FGD	06/09/98	1230	123726 3
₋P Prep for Metals	JL	06/07/98	1720	123649 4

: Method	Method-Description
	EPA 6020
	EPA 300.0
	EPA 3005
	EPA 1311

s:
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licates that a quality control analyte recovery is outside of specified acceptance criteria.

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9806151-03

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STATE	GEL	EPI
FL	E87156/87294	E87472/87458
NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

cc: GTSD00196 Report Date: June 10, 1998

Sample ID : VTF-740 1198

M = Method	Method-Description

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NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

GTSD00196 Report Date: June 10, 1998 Page 1 of 1

Sample ID	: VTF-740 1198
Lab ID	: 9806151-08
Matrix	: Misc.
Date Collected	: 05/29/98
Date Received	: 06/04/98
Priority	: Routine
Collector	: Client

meter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
ral Chemistry											
t Filter Test		Pass.					JEN	06/10/98	1115	123870	1

Method	Method-Description
	EPA 9095

:
ualifiers in this report are defined as follows:
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9806151-08

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NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

cc: GTSD00196 Report Date: June 10, 1998

Sample ID	: VTF-741 1200
Lab ID	: 9806151-04
Matrix	: TCLP
Date Collected	: 05/30/98
Date Received	: 06/04/98
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Metals Analysis											
Chromium	J	5.88	3.90	30.0	ug/l	10.	JSS	06/09/98	1821	123726	1
Nickel		194	0.420	4.00	ug/l	10.					
Lead		3.02	0.260	2.00	ug/l	10.					
Uranium		824	0.240	2.00	ug/l	10.					
General Chemistry											
Nitrogen, Nitrate	U	ND	0.200	0.500	mg/l	10.	JLG	06/09/98	1031	123566	2

The following prep procedures were performed:

ICP Mass Spec	FGD	06/09/98	1230	123726 3
TCLP Prep for Metals	JL	06/07/98	1720	123649 4

M = Method	Method-Description
M 1	EPA 6020
M 2	EPA 300.0
M 3	EPA 3005
M 4	EPA 1311

Notes:
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STATE	GEL	EPI
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SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

GTSD00196 Report Date: June 10, 1998 Page 2 of 2

Sample ID : VTF-741 1200

Method	Method-Description

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STATE	GEL	EPI
FL	E87156/87294	E87472/87458
NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

cc: GTSD00196 Report Date: June 10, 1998

Sample ID	: VTF-741 1200
Lab ID	: 9806151-09
Matrix	: Misc.
Date Collected	: 05/30/98
Date Received	: 06/04/98
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
General Chemistry											
Paint Filter Test		Pass.					JEN	06/10/98	1115	123870	1

M = Method	Method-Description
M 1	EPA 9095

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SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

GTSD00196 Report Date: June 10, 1998

Sample ID	: VTF-742 1202
Lab ID	: 9806151-05
Matrix	: TCLP
Date Collected	: 05/30/98
Date Received	: 06/04/98
Priority	: Routine
Collector	: Client

meter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
s Analysis											
mium	J	5.55	3.90	30.0	ug/l	10.	JSS	06/09/98	1828	123726	1
el		209	0.420	4.00	ug/l	10.					
		2.98	0.260	2.00	ug/l	10.					
ium		859	0.240	2.00	ug/l	10.					
ral Chemistry											
›gen, Nitrate	U	ND	0.200	0.500	mg/l	10.	JLG	06/09/98	1042	123566	2

ollowing prep procedures were performed:

Mass Spec	FGD	06/09/98	1230	123726 3
P Prep for Metals	JL	06/07/98	1720	123649 4

Method	Method-Description
	EPA 6020
	EPA 300.0
	EPA 3005
	EPA 1311

:

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9806151-05

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SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

cc: GTSD00196 Report Date: June 10, 1998

Sample ID : VTF-742 1202

M = Method	Method-Description

This data report has been prepared and reviewed in accordance with General Engineering Laboratories standard operating procedures. Please direct any questions to your Project Manager, Jack Spitz at (803) 556-8171.

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NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

GTSD00196 Report Date: June 10, 1998 Page 1 of 1

Sample ID	: VTF-742 1202
Lab ID	: 9806151-10
Matrix	: Misc.
Date Collected	: 05/30/98
Date Received	: 06/04/98
Priority	: Routine
Collector	: Client

meter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
al Chemistry											
Filter Test		Pass.					JEN	06/10/98	1115	123870	1

Method	Method-Description
	EPA 9095

ıalifiers in this report are defined as follows:
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:ates presence of analyte at a concentration less than the reporting limit (RL) and greater than the detection limit (DL).
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ordance with General Engineering Laboratories
ırd operating procedures. Please direct
ıestions to your Project Manager, Jack Spitz at (803) 556-8171.

wed By

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9806151-10

M-Area Batch #18 Glass TCLP Samples RM-98-18

SHIPMENT DESTINED TO	SAMPLE CONTAINER IDENTIFICATION		DATE/TIME OF PACKAGING		SAMPLE NET WEIGHT	SHIPPING CONTAINER/ CONTAINER GROSS WEIGHT	SEAL # (IF APPLICABLE)
General Engineering Laboratories	Sample#	Drum#			Grams	Grams	N/A
2040 Savage Rd. Chasn. SC 29414	VTF-738	1194	05/29/98	0500	276	342	
	VTF-739	1196	05/29/98	0940	491	557	
	VTF-740	1198	05/29/98	1115	276	342	
	VTF-741	1200	05/30/98	0130	428	494	
	VTF-742	1202	05/30/98	0530	332	398	
	Shipping Container		N/A		3.5 lbs	8.5 lbs	

Comments: Shipping Number SRS-16185

INFORMATION ONLY

Relinquished by:	Date:	Time:	Received by:	Relinqished by:	Date:	Time:	Received by:
	6/4/98	1230					
Relinquished by:	Date:	Time:	Received by:	Relinqished by:	Date:	Time:	Received by:
	6/4/98	1545	Donna Francis				

C:\...\RCO\Shipping Forms\

WSRC-TR-96-0244, Rev. 2; APPENDIX L, Page 540 of 694

DURATEK
10100 Old Columbia Road
Columbia, Maryland 21046
410/312-5100 Fax 410/290-9070

L-98-044

June 4, 1998

Mr. Dan Bills
Subcontract Technical Representative
Westinghouse Savannah River Company
Building 730-M
Aiken, SC 29802

Final Wasteform Treatment Standards and Acceptance Criteria

Dear Mr. Bills:

GTS Duratek has completed sampling and analysis of the final wasteform, Batch #17, drums 1104, 1106, 1108, 1110 and 1112. The results of the analysis, including the analysis technique, is attached for your review. The analysis was performed by General Engineering Laboratories, a State of South Carolina certified lab, and verified by Mr. Innocent Joseph, Manager of Technology, GTS Duratek.

Results of the analysis indicate Batch #17 is within the contractual specifications. GTS Duratek will invoice directly through accounts payable (Brenda Bell, Bldg. 730-4B). A total of 80 drums of glass were produced for Batch #17. Should you have any questions, please contact Innocent Joseph or myself.

Sincerely,

GTS DURATEK

Daniel Macias
Director of Operations

DM/mlb
attachment

cc: S. Campbell
C. Coker

DURATEK
10100 Old Columbia Road
Columbia, Maryland 21046
410/312-5100 Fax 410/290-9070

June 2, 1998

Mr. Dan Macias
Operations Manger
Vendor Treatment Facility (M-area)
GTS Duratek
WSRC/USDOE Savannah River Site
Aiken, SC 29801

Dear Mr. Macias:

Please find enclosed the results of the "TCLP" and 'Paint Filter Test" on glass gems from drums 1104, 1106, 1108, 1110, and 1112. The tests were performed according to methods specified in the "Sampling Plan" for GTS Duratek's Vendor Treatment Facility at the Savannah River site. 1-tailed t-tests were performed on the TCLP data, and the upper acceptance limits for 95% confidence were calculated. The TCLP values are well below the upper acceptance limits for 95% confidence. All of the samples passed the "Paint Filter Test." The samples from Batch # 17 have therefore met all of the acceptance criteria for the glass product.

The calculations for sample means, variances, upper acceptance limits for 95% confidence, data sheets from General Engineering Laboratories, and a sample chain of custody record are enclosed. If you have any questions, please contact me at (410) 312-5120.

Sincerely

Innocent Joseph

Innocent Joseph
Manager, Technology
GTS Duratek

cc: P. Deltete
J. Pope
B. Bowan
G. Hildebrandt
C. Coker

The glass gems from batch 17, produced at the GTS Duratek M-area facility, were subjected to "paint filter test" for free water, and "TCLP" for leaching characteristics at General Engineering Laboratories, a South Carolina licensed laboratory. The "paint filter test" and the "TCLP" were done according to EPA procedures 9095 and 1311, respectively. Please find enclosed the results for glass samples from drums 1104 to 1112. The results of the tests are summarized below. 1-tailed t-tests were performed, and the upper limits for 95% confidence were calculated.

The TCLP values are below the acceptance limit for 95% confidence.

Table 1. Summary of TCLP results

Sample ID	Chromium (mg/L)	Nickel (mg/L)	Lead (mg/L)	Uranium (mg/L)	Nitrate (as N)	Paint filter test
GEM Drum # 1104	0.0280	0.163	0.0052	0.669	0.0	Pass
GEM Drum # 1106	0.0336	0.161	0.0065	0.673	0.0	Pass
GEM Drum # 1108	0.0380	0.166	0.0272	0.673	2.09	Pass
GEM Drum # 1110	0.0361	0.169	0.0062	0.689	1.79	Pass
GEM Drum # 1112	0.0341	0.165	0.0045	0.668	0.0	Pass

Student t-test

Number of samples = n = 5

Mean = $\bar{x} = \sum x_i / n$

Variance = $s^2 = \sum (x_i - \bar{x})^2 / (n-1)$

Degrees of freedom for n observations = n-1 = 4

From standard t-tables, the factor "z" for 95% confidence limit ($t_{0.95}$ or $\alpha_{0.05}$) for 4 degrees of freedom is 2.13.

Upper acceptance limit for 95% confidence for a 1-tailed t-test, at 4 degrees of freedom is:

$$\text{Acceptance limit} - (s \times 2.13)/n^{1/2}$$

Table 2. TCLP means, variances, and upper acceptance limits for 95% confidence.

Element	mean ($\bar{x}$)	Variance (s^2)	s	Acceptance limit (mg/L)	Upper acceptance limit for 95% confidence
Chromium	0.0340	1.41 E-5	0.0038	0.86	0.8564
Nickel	0.1648	9.20 E-6	0.0030	5.0	4.9971
Lead	0.0099	9.40 E-5	0.0097	0.37	0.3608
Uranium	0.6744	7.18 E-5	0.0085	4.0	3.9919

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FL	E87156/87294	E87472/87458
NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

TSD00196 Report Date: June 01, 1998

Sample ID	: VTF-687 DRUM 1104
Lab ID	: 9805669-01
Matrix	: TCLP
Date Collected	: 05/16/98
Date Received	: 05/22/98
Priority	: Routine
Collector	: Client

neter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Analysis											
nium	J	28.0	3.90	30.0	ug/l	10.	JSS	05/29/98	2351	122971	1
l		163	0.420	4.00	ug/l	10.					
		5.23	0.260	2.00	ug/l	10.					
um		669	0.240	2.00	ug/l	10.					
al Chemistry											
gen, Nitrate	U	ND	0.200	0.500	mg/l	10.	JLG	05/27/98	1609	122865	2

llowing prep procedures were performed:

Mass Spec	FGD	05/27/98	1500	122971 3
Prep for Metals	JL	05/26/98	1750	122879 4

Method	Method-Description
	EPA 6020
	EPA 300.0
	EPA 3005
	EPA 1311

ıalifiers in this report are defined as follows:
dicates that the analyte was not detected at a concentration greater than the detection limit.
ates presence of analyte at a concentration less than the reporting limit (RL) and greater than the detection limit (DL).
cates that the analyte was not detected at a concentration greater than the detection limit.
ates that a quality control analyte recovery is outside of specified acceptance criteria.

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NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

cc: GTSD00196 Report Date: June 01, 1998

Sample ID : VTF-687 DRUM 1104

M = Method	Method-Description

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Reviewed By

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SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

TSD00196 Report Date: June 01, 1998 Page 1 of 1

Sample ID	: VTF-687 DRUM1104
Lab ID	: 9805669-06
Matrix	: Misc.
Date Collected	: 05/16/98
Date Received	: 05/22/98
Priority	: Routine
Collector	: Client

neter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
il Chemistry											
Filter Test		Pass.					JEN	06/01/98	1430	123245	1

Method	Method-Description
	EPA 9095

alifiers in this report are defined as follows:
licates that the analyte was not detected at a concentration greater than the detection limit.
ates presence of analyte at a concentration less than the reporting limit (RL) and greater than the detection limit (DL).
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NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

cc: GTSD00196

Report Date: June 01, 1998

Sample ID	: VTF-688 DRUM 1106
Lab ID	: 9805669-02
Matrix	: TCLP
Date Collected	: 05/16/98
Date Received	: 05/22/98
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Metals Analysis											
Chromium		33.6	3.90	30.0	ug/l	10.	JSS	05/29/98	2359	122971	1
Nickel		161	0.420	4.00	ug/l	10.					
Lead		6.49	0.260	2.00	ug/l	10.					
Uranium		673	0.240	2.00	ug/l	10.					
General Chemistry											
Nitrogen, Nitrate	U	ND	0.200	0.500	mg/l	10.	JLG	05/27/98	1620	122865	2

The following prep procedures were performed:

ICP Mass Spec	FGD	05/27/98	1500	122971	3
TCLP Prep for Metals	JL	05/26/98	1750	122879	4

M = Method	Method-Description
M 1	EPA 6020
M 2	EPA 300.0
M 3	EPA 3005
M 4	EPA 1311

Notes:
The qualifiers in this report are defined as follows:
ND indicates that the analyte was not detected at a concentration greater than the detection limit.
J indicates presence of analyte at a concentration less than the reporting limit (RL) and greater than the detection limit (DL).
U indicates that the analyte was not detected at a concentration greater than the detection limit.
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NC	233	
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TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

;TSD00196 Report Date: June 01, 1998

Sample ID : VTF-688 DRUM 1106

Method	Method-Description

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NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

cc: GTSD00196

Report Date: June 01, 1998

Sample ID	: VTF-688 DRUM1106
Lab ID	: 9805669-07
Matrix	: Misc.
Date Collected	: 05/16/98
Date Received	: 05/22/98
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
General Chemistry											
Paint Filter Test		Pass.					JEN	06/01/98	1430	123245	1

M = Method	Method-Description
M 1	EPA 9095

Notes:
The qualifiers in this report are defined as follows:
ND indicates that the analyte was not detected at a concentration greater than the detection limit.
J indicates presence of analyte at a concentration less than the reporting limit (RL) and greater than the detection limit (DL).
U indicates that the analyte was not detected at a concentration greater than the detection limit.
* indicates that a quality control analyte recovery is outside of specified acceptance criteria.

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9805669-07

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FL	E87156/87294	E87472/87458
NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

GTSD00196 Report Date: June 01, 1998

Sample ID	: VTF-689 DRUM 1108
Lab ID	: 9805669-03
Matrix	: TCLP
Date Collected	: 05/17/98
Date Received	: 05/22/98
Priority	: Routine
Collector	: Client

meter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
s Analysis											
mium		38.0	3.90	30.0	ug/l	10.	JSS	05/30/98	0006	122971	1
el		166	0.420	4.00	ug/l	10.					
		27.2	0.260	2.00	ug/l	10.					
ium		673	0.240	2.00	ug/l	10.					
ral Chemistry											
›gen, Nitrate		2.09	0.200	0.500	mg/l	10.	JLG	05/27/98	1631	122865	2

ollowing prep procedures were performed:

Mass Spec	FGD	05/27/98	1500	122971 3
P Prep for Metals	JL	05/26/98	1750	122879 4

Method	Method-Description
	EPA 6020
	EPA 300.0
	EPA 3005
	EPA 1311

:

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licates that the analyte was not detected at a concentration greater than the detection limit.
icates that a quality control analyte recovery is outside of specified acceptance criteria.

9805669-03

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NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

cc: GTSD00196 Report Date: June 01, 1998

Sample ID : VTF-689 DRUM 1108

M = Method	Method-Description

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TN	02934	02934

Client: GTS Duratek
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Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

GTSD00196 Report Date: June 01, 1998 Page 1 of 1

Sample ID	: VTF-689 DRUM1108
Lab ID	: 9805669-08
Matrix	: Misc.
Date Collected	: 05/17/98
Date Received	: 05/22/98
Priority	: Routine
Collector	: Client

meter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
al Chemistry											
Filter Test		Pass.					JEN	06/01/98	1430	123245	1

Method	Method-Description
	EPA 9095

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NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

cc: GTSD00196 Report Date: June 01, 1998

Sample ID	: VTF-690 DRUM 1110
Lab ID	: 9805669-04
Matrix	: TCLP
Date Collected	: 05/17/98
Date Received	: 05/22/98
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Metals Analysis											
Chromium		36.1	3.90	30.0	ug/l	10.	JSS	05/30/98	0014	122971	1
Nickel		169	0.420	4.00	ug/l	10.					
Lead		6.19	0.260	2.00	ug/l	10.					
Uranium		689	0.240	2.00	ug/l	10.					
General Chemistry											
Nitrogen, Nitrate	U	ND	0.200	0.500	mg/l	10.	JLG	05/27/98	1642	122865	2

The following prep procedures were performed:

ICP Mass Spec	FGD	05/27/98	1500	122971	3
TCLP Prep for Metals	JL	05/26/98	1750	122879	4

M = Method	Method-Description
M 1	EPA 6020
M 2	EPA 300.0
M 3	EPA 3005
M 4	EPA 1311

Notes:
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9805669-04

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STATE	GEL	EPI
FL	E87156/87294	E87472/87458
NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

TSD00196 Report Date: June 01, 1998

Sample ID : VTF-690 DRUM 1110

Method	Method-Description

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NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

cc: GTSD00196 Report Date: June 01, 1998

Sample ID	: VTF-690 DRUM1110
Lab ID	: 9805669-09
Matrix	: Misc.
Date Collected	: 05/17/98
Date Received	: 05/22/98
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
General Chemistry											
Paint Filter Test		Pass.					JEN	06/01/98	1430	123245	1

M = Method	Method-Description
M 1	EPA 9095

Notes:
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* indicates that a quality control analyte recovery is outside of specified acceptance criteria.

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standard operating procedures. Please direct
any questions to your Project Manager, Jack Spitz at (803) 556-8171.

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STATE	GEL	EPI
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NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

TSD00196 Report Date: June 01, 1998

Sample ID	: VTF-691 DRUM 1112
Lab ID	: 9805669-05
Matrix	: TCLP
Date Collected	: 05/17/98
Date Received	: 05/22/98
Priority	: Routine
Collector	: Client

neter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Analysis											
nium		34.1	3.90	30.0	ug/l	10.	JSS	05/30/98	0021	122971	1
l		165	0.420	4.00	ug/l	10.					
		4.48	0.260	2.00	ug/l	10.					
um		668	0.240	2.00	ug/l	10.					
al Chemistry											
gen, Nitrate	U	ND	0.200	0.500	mg/l	10.	JLG	05/27/98	1653	122865	2

llowing prep procedures were performed:

Mass Spec	FGD	05/27/98	1500	122971 3
Prep for Metals	JL	05/26/98	1750	122879 4

Method	Method-Description
	EPA 6020
	EPA 300.0
	EPA 3005
	EPA 1311

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NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

cc: GTSD00196 Report Date: June 01, 1998

Sample ID : VTF-691 DRUM 1112

M = Method	Method-Description

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SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

GTSD00196 Report Date: June 01, 1998 Page 1 of 1

Sample ID	: VTF-691 DRUM1112
Lab ID	: 9805669-10
Matrix	: Misc.
Date Collected	: 05/17/98
Date Received	: 05/22/98
Priority	: Routine
Collector	: Client

meter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
al Chemistry											
Filter Test		Pass.					JEN	06/01/98	1430	123245	1

Method	Method-Description
	EPA 9095

:

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9805669-10

M-Area Batch #17 Glass TCLP Samples RM-98-17

9805669

SHIPMENT DESTINED TO	SAMPLE CONTAINER IDENTIFICATION		DATE/TIME OF PACKAGING		SAMPLE NET WEIGHT	SHIPPING CONTAINER/ CONTAINER GROSS WEIGHT	SEAL # (IF APPLICABLE)
General Engineering Laboratories 2040 Savage Rd. Chasn. SC 29414	Sample#	Drum#			Grams	Grams	N/A
	VTF-687	1104	05/16/98	1830	365	431	-01 06
	VTF-688	1106	05/16/98	2000	236	302	-02 07
	VTF-689	1108	05/17/98	0230	297	363	-03 08
	VTF-690	1110	05/17/98	0500	232	298	-04 09
	VTF-691	1112	05/17/98	0900	336	402	-05 10
	Shipping Container		N/A		4 lbs	9 lbs	

Comments: Shipping Number SRS-16147

INFORMATION ONLY

Relinquished by:	Date:	Time:	Received by:	Relinqished by:	Date:	Time:	Received by
	5/22/98	1000					
Relinquished by:	Date:	Time:	Received by:	Relinqished by:	Date:	Time:	Received by:

S-229813-0

C: WRCO Shipping Forms:

DURATEK
10100 Old Columbia Road
Columbia, Maryland 21046
410/312-5100 Fax 410/290-9070

L-98-043

June 4, 1998

Mr. Dan Bills
Subcontract Technical Representative
Westinghouse Savannah River Company
Building 730-M
Aiken, SC 29802

Final Wasteform Treatment Standards and Acceptance Criteria

Dear Mr. Bills:

GTS Duratek has completed sampling and analysis of the final wasteform, Batch #16, drums 1024, 1026, 1028, 1030 and 1032. The results of the analysis, including the analysis technique, is attached for your review. The analysis was performed by General Engineering Laboratories, a State of South Carolina certified lab, and verified by Mr. Innocent Joseph, Manager of Technology, GTS Duratek.

Results of the analysis indicate Batch #16 is within the contractual specifications. GTS Duratek will invoice directly through accounts payable (Brenda Bell, Bldg. 730-4B). A total of 71 drums of glass were produced for Batch #16. Should you have any questions, please contact Innocent Joseph or myself.

Sincerely,

GTS DURATEK

Daniel Macias
Director of Operations

DM/mlb
attachment

cc: S. Campbell
C. Coker

10100 Old Columbia Road
Columbia, Maryland 21046
410/312-5100 Fax 410/290-9070

June 2, 1998

Mr. Dan Macias
Operations Manger
Vendor Treatment Facility (M-area)
GTS Duratek
WSRC/USDOE Savannah River Site
Aiken, SC 29801

Dear Mr. Macias:

Please find enclosed the results of the "TCLP" and 'Paint Filter Test" on glass gems from drums 1024, 1026, 1028, 1030, and 1032. The tests were performed according to methods specified in the "Sampling Plan" for GTS Duratek's Vendor Treatment Facility at the Savannah River site. 1-tailed t-tests were performed on the TCLP data, and the upper acceptance limits for 95% confidence were calculated. The TCLP values are well below the upper acceptance limits for 95% confidence. All of the samples passed the "Paint Filter Test." The samples from Batch # 16 have therefore met all of the acceptance criteria for the glass product.

The calculations for sample means, variances, upper acceptance limits for 95% confidence, data sheets from General Engineering Laboratories, and a sample chain of custody record are enclosed. If you have any questions, please contact me at (410) 312-5120.

Sincerely

Innocent Joseph

Innocent Joseph
Manager, Technology
GTS Duratek

cc: P. Deltete
J. Pope
B. Bowan
G. Hildebrandt
C. Coker

The glass gems from batch 16, produced at the GTS Duratek M-area facility, were subjected to "paint filter test" for free water, and "TCLP" for leaching characteristics at General Engineering Laboratories, a South Carolina licensed laboratory. The "paint filter test" and the "TCLP" were done according to EPA procedures 9095 and 1311, respectively. Please find enclosed the results for glass samples from drums 1024 to 1032. The results of the tests are summarized below. 1-tailed t-tests were performed, and the upper limits for 95% confidence were calculated.

The TCLP values are below the acceptance limit for 95% confidence.

Table 1. Summary of TCLP results

Sample ID	Chromium (mg/L)	Nickel (mg/L)	Lead (mg/L)	Uranium (mg/L)	Nitrate (as N)	Paint filter test
GEM Drum # 1024	0.0405	0.190	0.0054	0.771	0.0	Pass
GEM Drum # 1026	0.0434	0.200	0.0072	0.796	0.0	Pass
GEM Drum # 1028	0.0513	0.225	0.0109	0.897	2.26	Pass
GEM Drum # 1030	0.0077	0.001	0.0047	0.001	0.0	Pass
GEM Drum # 1032	0.0266	0.229	0.0054	0.927	0.0	Pass

Student t-test

Number of samples = n = 5

Mean = $\bar{x} = \sum x_i / n$

Variance = $s^2 = \sum(x_i - \bar{x})^2 / (n-1)$

Degrees of freedom for n observations = n-1 = 4

From standard t-tables, the factor "z" for 95% confidence limit ($t_{0.95}$ or $\alpha_{0.05}$) for 4 degrees of freedom is 2.13.

Upper acceptance limit for 95% confidence for a 1-tailed t-test, at 4 degrees of freedom is:

$$\text{Acceptance limit} - (s \times 2.13)/n^{1/2}$$

Table 2. TCLP means, variances, and upper acceptance limits for 95% confidence.

Element	mean ($\bar{x}$)	Variance (s^2)	s	Acceptance limit (mg/L)	Upper acceptance limit for 95% confidence
Chromium	0.0339	0.00029	0.0171	0.86	0.8437
Nickel	0.1690	0.00909	0.0953	5.0	4.9092
Lead	0.0067	6.34 E-6	0.0025	0.37	0.3676
Uranium	0.6783	0.14785	0.3845	4.0	3.6337

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NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

ITSD00196 Report Date: June 01, 1998

Sample ID	: VTF-636 DRUM 1024
Lab ID	: 9805670-01
Matrix	: TCLP
Date Collected	: 05/09/98
Date Received	: 05/22/98
Priority	: Routine
Collector	: Client

neter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
; Analysis											
nium		40.5	3.90	30.0	ug/l	10.	JSS	05/30/98	0028	122971	1
:l		190	0.420	4.00	ug/l	10.					
		5.36	0.260	2.00	ug/l	10.					
um		771	0.240	2.00	ug/l	10.					
al Chemistry											
gen, Nitrate	U	ND	0.200	0.500	mg/l	10.	JLG	05/27/98	1704	122865	2

llowing prep procedures were performed:

Mass Spec	FGD	05/27/98	1500	122971 3
? Prep for Metals	JL	05/26/98	1750	122879 4

Method	Method-Description
	EPA 6020
	EPA 300.0
	EPA 3005
	EPA 1311

:

ualifiers in this report are defined as follows:
dicates that the analyte was not detected at a concentration greater than the detection limit.
:ates presence of analyte at a concentration less than the reporting limit (RL) and greater than the detection limit (DL).
icates that the analyte was not detected at a concentration greater than the detection limit.
cates that a quality control analyte recovery is outside of specified acceptance criteria.

9805670-01

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NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

cc: GTSD00196 Report Date: June 01, 1998

Sample ID : VTF-636 DRUM 1024

M = Method	Method-Description

This data report has been prepared and reviewed in accordance with General Engineering Laboratories standard operating procedures. Please direct any questions to your Project Manager, Jack Spitz at (803) 556-8171.

Reviewed By

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9805670-01

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NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

TSD00196 Report Date: June 01, 1998 Page 1 of 1

Sample ID	: VTF-636 DRUM1024
Lab ID	: 9805670-06
Matrix	: Misc.
Date Collected	: 05/09/98
Date Received	: 05/22/98
Priority	: Routine
Collector	: Client

neter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
al Chemistry											
Filter Test		Pass.					JEN	06/01/98	1430	123245	1

Method	Method-Description
	EPA 9095

ıalifiers in this report are defined as follows:
dicates that the analyte was not detected at a concentration greater than the detection limit.
ates presence of analyte at a concentration less than the reporting limit (RL) and greater than the detection limit (DL).
cates that the analyte was not detected at a concentration greater than the detection limit.
:ates that a quality control analyte recovery is outside of specified acceptance criteria.

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NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

cc: GTSD00196

Report Date: June 01, 1998

Sample ID	: VTF-637 DRUM 1026
Lab ID	: 9805670-02
Matrix	: TCLP
Date Collected	: 05/09/98
Date Received	: 05/22/98
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Metals Analysis											
Chromium		43.4	3.90	30.0	ug/l	10.	JSS	05/30/98	0035	122971	1
Nickel		200	0.420	4.00	ug/l	10.					
Lead		7.18	0.260	2.00	ug/l	10.					
Uranium		796	0.240	2.00	ug/l	10.					
General Chemistry											
Nitrogen, Nitrate	U	ND	0.200	0.500	mg/l	10.	JLG	05/27/98	1759	122865	2

The following prep procedures were performed:

ICP Mass Spec	FGD	05/27/98	1500	122971 3
TCLP Prep for Metals	JL	05/26/98	1750	122879 4

M = Method	Method-Description
M 1	EPA 6020
M 2	EPA 300.0
M 3	EPA 3005
M 4	EPA 1311

Notes:
The qualifiers in this report are defined as follows:
ND indicates that the analyte was not detected at a concentration greater than the detection limit.
J indicates presence of analyte at a concentration less than the reporting limit (RL) and greater than the detection limit (DL).
U indicates that the analyte was not detected at a concentration greater than the detection limit.
* indicates that a quality control analyte recovery is outside of specified acceptance criteria.

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NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

GTSD00196 Report Date: June 01, 1998 Page 2 of 2

Sample ID : VTF-637 DRUM 1026

Method	Method-Description

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NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

cc: GTSD00196 Report Date: June 01, 1998

Sample ID	: VTF-637 DRUM1026
Lab ID	: 9805670-07
Matrix	: Misc.
Date Collected	: 05/09/98
Date Received	: 05/22/98
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
General Chemistry											
Paint Filter Test		Pass.					JEN	06/01/98	1430	123245	1

M = Method	Method-Description
M 1	EPA 9095

Notes:
The qualifiers in this report are defined as follows:
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J indicates presence of analyte at a concentration less than the reporting limit (RL) and greater than the detection limit (DL).
U indicates that the analyte was not detected at a concentration greater than the detection limit.
* indicates that a quality control analyte recovery is outside of specified acceptance criteria.

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NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

GTSD00196 Report Date: June 01, 1998

Sample ID	: VTF-638 DRUM 1028
Lab ID	: 9805670-03
Matrix	: TCLP
Date Collected	: 05/10/98
Date Received	: 05/22/98
Priority	: Routine
Collector	: Client

meter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
s Analysis											
nium		51.3	3.90	30.0	ug/l	10.	JSS	05/30/98	0043	122971	1
el		225	0.420	4.00	ug/l	10.					
		10.9	0.260	2.00	ug/l	10.					
ium		897	0.240	2.00	ug/l	10.					
al Chemistry											
gen, Nitrate		2.26	0.200	0.500	mg/l	10.	JLG	05/27/98	1810	122865	2
llowing prep procedures were performed:											
Mass Spec							FGD	05/27/98	1500	122971	3
P Prep for Metals							JL	05/26/98	1750	122879	4

Method	Method-Description
	EPA 6020
	EPA 300.0
	EPA 3005
	EPA 1311

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cates that a quality control analyte recovery is outside of specified acceptance criteria.

9805670-03

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NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

cc: GTSD00196 Report Date: June 01, 1998

Sample ID : VTF-638 DRUM 1028

M = Method	Method-Description

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TN	02934	02934

Client: GTS Duratek
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Contact: Mr. Innocent Joseph

GTSD00196 Report Date: June 01, 1998 Page 1 of 1

Sample ID	: VTF-6381028
Lab ID	: 9805670-08
Matrix	: Misc.
Date Collected	: 05/10/98
Date Received	: 05/22/98
Priority	: Routine
Collector	: Client

neter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
al Chemistry											
Filter Test		Pass.					JEN	06/01/98	1430	123245	1

Method	Method-Description
	EPA 9095

alifiers in this report are defined as follows:
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:ates that the analyte was not detected at a concentration greater than the detection limit.
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SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

cc: GTSD00196

Report Date: June 01, 1998

Sample ID : VTF-639 DRUM 1030
Lab ID : 9805670-04
Matrix : TCLP
Date Collected : 05/10/98
Date Received : 05/22/98
Priority : Routine
Collector : Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Metals Analysis											
Chromium	J	7.72	3.90	30.0	ug/l	10.	JSS	05/29/98	2253	122971	1
Nickel	J	1.04	0.420	4.00	ug/l	10.					
Lead		4.73	0.260	2.00	ug/l	10.					
Uranium	J	0.620	0.240	2.00	ug/l	10.					
General Chemistry											
Nitrogen, Nitrate	U	ND	0.200	0.500	mg/l	10.	JLG	05/27/98	1821	122865	2

The following prep procedures were performed:

ICP Mass Spec	FGD	05/27/98	1500	122971 3
TCLP Prep for Metals	JL	05/26/98	1750	122879 4

M = Method	Method-Description
M 1	EPA 6020
M 2	EPA 300.0
M 3	EPA 3005
M 4	EPA 1311

Notes:
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J indicates presence of analyte at a concentration less than the reporting limit (RL) and greater than the detection limit (DL).
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STATE	GEL	EPI
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NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

GTSD00196 Report Date: June 01, 1998 Page 2 of 2

Sample ID : VTF-639 DRUM 1030

Method	Method-Description

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NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

cc: GTSD00196

Report Date: June 01, 1998

Sample ID	: VTF-639 DRUM1030
Lab ID	: 9805670-09
Matrix	: Misc.
Date Collected	: 05/10/98
Date Received	: 05/22/98
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
General Chemistry											
Paint Filter Test		Pass.					JEN	06/01/98	1430	123245	1

M = Method	Method-Description
M 1	EPA 9095

Notes:
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* indicates that a quality control analyte recovery is outside of specified acceptance criteria.

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NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

TSD00196 Report Date: June 01, 1998

Sample ID	: VTF-640 DRUM 1032
Lab ID	: 9805670-05
Matrix	: TCLP
Date Collected	: 05/10/98
Date Received	: 05/22/98
Priority	: Routine
Collector	: Client

neter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Analysis											
nium	J	26.6	3.90	30.0	ug/l	10.	JSS	05/29/98	2246	122971	1
l		229	0.420	4.00	ug/l	10.					
		5.36	0.260	2.00	ug/l	10.					
um		927	0.240	2.00	ug/l	10.					
al Chemistry											
gen, Nitrate	U	ND	0.200	0.500	mg/l	10.	JLG	05/27/98	1832	122865	2

llowing prep procedures were performed:

Mass Spec	FGD	05/27/98	1500	122971	3
Prep for Metals	JL	05/26/98	1750	122879	4

Method	Method-Description
	EPA 6020
	EPA 300.0
	EPA 3005
	EPA 1311

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NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

cc: GTSD00196

Report Date: June 01, 1998

Sample ID : VTF-640 DRUM 1032

M = Method **Method-Description**

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FL	E87156/87294	E87472/87458
NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

GTSD00196 Report Date: June 01, 1998 Page 1 of 1

Sample ID	: VTF-640 DRUM1032
Lab ID	: 9805670-10
Matrix	: Misc.
Date Collected	: 05/10/98
Date Received	: 05/22/98
Priority	: Routine
Collector	: Client

meter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
al Chemistry											
Filter Test		Pass.					JEN	06/01/98	1430	123245	1

Method	Method-Description
	EPA 9095

ualifiers in this report are defined as follows:
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cates presence of analyte at a concentration less than the reporting limit (RL) and greater than the detection limit (DL).
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9805670-10

1500

9805670

M-Area Batch #16 Glass TCLP Samples RM-98-16

SHIPMENT DESTINED TO	SAMPLE CONTAINER IDENTIFICATION		DATE/TIME OF PACKAGING		SAMPLE NET WEIGHT	SHIPPING CONTAINER/ CONTAINER GROSS WEIGHT	SEAL # (IF APPLICABLE)
General Engineering Laboratories 2040 Savage Rd. Chasn. SC 29414	Sample#	Drum#			Grams	Grams	.1 N/A .2
	VTF-636	1024	05/09/98	1745	167	198	-01 06
	VTF-637	1026	05/09/98	2230	155	186	-02 07
	VTF-638	1028	05/10/98	0200	178	209	-03 08
	VTF-639	1030	05/10/98	0430	360	427	-04 09
	VTF-640	1032	05/10/98	0845	309	340	-05 10
	~~104~~ -32 ~~= 992~~						
	Shipping Container		N/A		3 lbs	9.5 lbs	

Comments: Shipping Number

INFORMATION ONLY

Relinquished by	Date:	Time	Received by	Relinqished by	Date	Time:	Received by
M. [signature]	5/22	1000					
Relinquished by	Date:	Time:	Received by: [signature]	Relinqished by:	Date	Time:	Received by

5-22-98
13.00

C RCO Shipping Forms

DURATEK

10100 Old Columbia Road
Columbia, Maryland 21046
410/312-5100 Fax 410/290-9070

L-98-041

June 2, 1998

Mr. Dan Bills
Subcontract Technical Representative
Westinghouse Savannah River Company
Building 730-M
Aiken, SC 29802

Final Wasteform Treatment Standards and Acceptance Criteria

Dear Mr. Bills:

GTS Duratek has completed sampling and analysis of the final wasteform, Batch #15, drums 952, 954, 956, 958 and 960. The results of the analysis, including the analysis technique, is attached for your review. The analysis was performed by General Engineering Laboratories, a State of South Carolina certified lab, and verified by Mr. Innocent Joseph, Manager of Technology, GTS Duratek.

Results of the analysis indicate Batch #15 is within the contractual specifications. GTS Duratek will invoice directly through accounts payable (Brenda Bell, Bldg. 730-4B). A total of 70 drums of glass were produced for Batch #15. Should you have any questions, please contact Innocent Joseph or myself.

Sincerely,

GTS DURATEK

Daniel Macias
Director of Operations

DM/mlb
attachment

cc: S. Campbell
C. Coker

DURATEK

10100 Old Columbia Road
Columbia, Maryland 21046
410/312-5100 Fax 410/290-9070

May 27, 1998

Mr. Dan Macias
Operations Manger
Vendor Treatment Facility (M-area)
GTS Duratek
WSRC/USDOE Savannah River Site
Aiken, SC 29801

Dear Mr. Macias:

Please find enclosed the results of the "TCLP" and 'Paint Filter Test" on glass gems from drums 952, 954, 956, 958, and 960. The tests were performed according to methods specified in the "Sampling Plan" for GTS Duratek's Vendor Treatment Facility at the Savannah River site. 1-tailed t-tests were performed on the TCLP data, and the upper acceptance limits for 95% confidence were calculated. The TCLP values are well below the upper acceptance limits for 95% confidence. All of the samples passed the "Paint Filter Test." The samples from Batch # 15 have therefore met all of the acceptance criteria for the glass product.

The calculations for sample means, variances, upper acceptance limits for 95% confidence, data sheets from General Engineering Laboratories, and a sample chain of custody record are enclosed. If you have any questions, please contact me at (410) 312-5120.

Sincerely

Innocent Joseph

Innocent Joseph
Manager, Technology
GTS Duratek

cc: P. Deltete
J. Pope
B. Bowan
G. Hildebrandt
C. Coker

The glass gems from batch 15, produced at the GTS Duratek M-area facility, were subjected to "paint filter test" for free water, and "TCLP" for leaching characteristics at General Engineering Laboratories, a South Carolina licensed laboratory. The "paint filter test" and the "TCLP" were done according to EPA procedures 9095 and 1311, respectively. Please find enclosed the results for glass samples from drums 952 to 960. The results of the tests are summarized below. 1-tailed t-tests were performed, and the upper limits for 95% confidence were calculated.

The TCLP values are below the acceptance limit for 95% confidence.

Table 1. Summary of TCLP results

Sample ID	Chromium (mg/L)	Nickel (mg/L)	Lead (mg/L)	Uranium (mg/L)	Nitrate (as N)	Paint filter test
GEM Drum # 952	0.0281	0.308	0.0019	1.120	0.0	Pass
GEM Drum # 954	0.0319	0.440	0.0024	1.870	0.0	Pass
GEM Drum # 956	0.0224	0.256	0.0	0.941	0.0	Pass
GEM Drum # 958	0.0290	0.223	0.0004	0.843	1.79	Pass
GEM Drum # 960	0.0408	0.233	0.0	0.838	0.32	Pass

Student t-test

Number of samples = n = 5

Mean = $\bar{x} = \sum x_i / n$

Variance = $s^2 = \sum(x_i - \bar{x})^2 / (n-1)$

Degrees of freedom for n observations = n-1 = 4

From standard t-tables, the factor "z" for 95% confidence limit ($t_{0.95}$ or $\alpha_{0.05}$) for 4 degrees of freedom is 2.13.

Upper acceptance limit for 95% confidence for a 1-tailed t-test, at 4 degrees of freedom is:

$$\text{Acceptance limit} - (s \times 2.13)/n^{1/2}$$

Table 2. TCLP means, variances, and upper acceptance limits for 95% confidence.

Element	mean ($\bar{x}$)	Variance (s^2)	s	Acceptance limit (mg/L)	Upper acceptance limit for 95% confidence
Chromium	0.0304	4.54 E-5	0.0067	0.86	0.8536
Nickel	0.2920	0.00792	0.0890	5.0	4.9152
Lead	0.0009	1.25 E-6	0.0011	0.37	0.3689
Uranium	1.1224	0.18769	0.4332	4.0	3.5873

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SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

GTSD00196 Report Date: May 26, 1998

Sample ID	: VTF-595 952
Lab ID	: 9805558-01
Matrix	: TCLP
Date Collected	: 05/03/98
Date Received	: 05/19/98
Priority	: Routine
Collector	: Client

meter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
s Analysis											
mium	J	28.1	3.90	30.0	ug/l	10.	JSS	05/22/98	1823	122729	1
el		308	0.420	4.00	ug/l	10.					
	J	1.86	0.260	2.00	ug/l	10.					
ium		1120	0.240	2.00	ug/l	10.					
ral Chemistry											
)gen, Nitrate	U	ND	0.200	0.500	mg/l	10.	JLG	05/21/98	1901	122686	2

ollowing prep procedures were performed:

Mass Spec	FGD	05/21/98	2000	122729 3
P Prep for Metals	JL	05/21/98	1030	122569 4

Method	Method-Description
	EPA 6020
	EPA 300.0
	EPA 3005
	EPA 1311

:

ualifiers in this report are defined as follows:

ndicates that the analyte was not detected at a concentration greater than the detection limit.

cates presence of analyte at a concentration less than the reporting limit (RL) and greater than the detection limit (DL).

licates that the analyte was not detected at a concentration greater than the detection limit.

icates that a quality control analyte recovery is outside of specified acceptance criteria.

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TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

cc: GTSD00196

Report Date: May 26, 1998

Sample ID : VTF-595 952

M = Method	Method-Description

This data report has been prepared and reviewed in accordance with General Engineering Laboratories standard operating procedures. Please direct any questions to your Project Manager, Jack Spitz at (803) 556-8171.

Reviewed By

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9805558-01

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SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

GTSD00196 Report Date: May 26, 1998 Page 1 of 1

Sample ID	: VTF-595 952
Lab ID	: 9805558-06
Matrix	: Misc.
Date Collected	: 05/03/98
Date Received	: 05/19/98
Priority	: Routine
Collector	: Client

meter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
al Chemistry											
Filter Test		PASS					BJB	05/22/98	1545	122785	1

Method	Method-Description
	EPA 9095

ıalifiers in this report are defined as follows:
dicates that the analyte was not detected at a concentration greater than the detection limit.
:ates presence of analyte at a concentration less than the reporting limit (RL) and greater than the detection limit (DL).
cates that the analyte was not detected at a concentration greater than the detection limit.
:ates that a quality control analyte recovery is outside of specified acceptance criteria.

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ırd operating procedures. Please direct
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NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

cc: GTSD00196

Report Date: May 26, 1998

Sample ID	: VTF-596 954
Lab ID	: 9805558-02
Matrix	: TCLP
Date Collected	: 05/03/98
Date Received	: 05/19/98
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Metals Analysis											
Chromium		31.9	3.90	30.0	ug/l	10.	JSS	05/22/98	1831	122729	1
Nickel		440	0.420	4.00	ug/l	10.					
Lead		2.38	0.260	2.00	ug/l	10.					
Uranium		1870	0.240	2.00	ug/l	10.					
General Chemistry											
Nitrogen, Nitrate	U	ND	0.200	0.500	mg/l	10.	JLG	05/21/98	1934	122686	2

The following prep procedures were performed:

ICP Mass Spec	FGD	05/21/98	2000	122729	3
TCLP Prep for Metals	JL	05/21/98	1030	122569	4

M = Method	Method-Description
M 1	EPA 6020
M 2	EPA 300.0
M 3	EPA 3005
M 4	EPA 1311

Notes:
The qualifiers in this report are defined as follows:
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J indicates presence of analyte at a concentration less than the reporting limit (RL) and greater than the detection limit (DL).
U indicates that the analyte was not detected at a concentration greater than the detection limit.
* indicates that a quality control analyte recovery is outside of specified acceptance criteria.

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NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

GTSD00196 Report Date: May 26, 1998 Page 2 of 2

Sample ID : VTF-596 954

Method	Method-Description

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NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

cc: GTSD00196

Report Date: May 26, 1998

Sample ID	: VTF-596 954
Lab ID	: 9805558-07
Matrix	: Misc.
Date Collected	: 05/03/98
Date Received	: 05/19/98
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
General Chemistry											
Paint Filter Test		PASS					BJB	05/22/98	1545	122785	1

M = Method	Method-Description
M 1	EPA 9095

Notes:
The qualifiers in this report are defined as follows:
ND indicates that the analyte was not detected at a concentration greater than the detection limit.
J indicates presence of analyte at a concentration less than the reporting limit (RL) and greater than the detection limit (DL).
U indicates that the analyte was not detected at a concentration greater than the detection limit.
* indicates that a quality control analyte recovery is outside of specified acceptance criteria.

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NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

GTSD00196 Report Date: May 26, 1998

Sample ID	: VTF-597 956
Lab ID	: 9805558-03
Matrix	: TCLP
Date Collected	: 05/03/98
Date Received	: 05/19/98
Priority	: Routine
Collector	: Client

ımeter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
ls Analysis											
ɔmium	J	22.4	3.90	30.0	ug/l	10.	JSS	05/22/98	1838	122729	1
:el		256	0.420	4.00	ug/l	10.					
ı	U	ND	0.260	2.00	ug/l	10.					
ıium		941	0.240	2.00	ug/l	10.					
ral Chemistry											
ɔgen, Nitrate	U	ND	0.200	0.500	mg/l	10.	JLG	05/21/98	1945	122686	2

ollowing prep procedures were performed:

Mass Spec	FGD	05/21/98	2000	122729 3
.P Prep for Metals	JL	05/21/98	1030	122569 4

: Method	Method-Description
	EPA 6020
	EPA 300.0
	EPA 3005
	EPA 1311

s:
ualifiers in this report are defined as follows:
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licates that the analyte was not detected at a concentration greater than the detection limit.
icates that a quality control analyte recovery is outside of specified acceptance criteria.

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NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

cc: GTSD00196

Report Date: May 26, 1998

Sample ID : VTF-597 956

M = Method	Method-Description

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TN	02934	02934

Client: GTS Duratek
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Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

ITSD00196 Report Date: May 26, 1998 Page 1 of 1

Sample ID	: VTF-597 956
Lab ID	: 9805558-08
Matrix	: Misc.
Date Collected	: 05/03/98
Date Received	: 05/19/98
Priority	: Routine
Collector	: Client

neter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
al Chemistry											
Filter Test		PASS					BJB	05/22/98	1545	122785	1

Method	Method-Description
	EPA 9095

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NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

cc: GTSD00196

Report Date: May 26, 1998

Sample ID	: VTF-598 958
Lab ID	: 9805558-04
Matrix	: TCLP
Date Collected	: 05/03/98
Date Received	: 05/19/98
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Metals Analysis											
Chromium	J	29.0	3.90	30.0	ug/l	10.	JSS	05/22/98	1846	122729	1
Nickel		223	0.420	4.00	ug/l	10.					
Lead	J	0.370	0.260	2.00	ug/l	10.					
Uranium		843	0.240	2.00	ug/l	10.					
General Chemistry											
Nitrogen, Nitrate		1.79	0.200	0.500	mg/l	10.	JLG	05/21/98	1956	122686	2

The following prep procedures were performed:

ICP Mass Spec	FGD	05/21/98	2000	122729 3
TCLP Prep for Metals	JL	05/21/98	1030	122569 4

M = Method	Method-Description
M 1	EPA 6020
M 2	EPA 300.0
M 3	EPA 3005
M 4	EPA 1311

Notes:
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J indicates presence of analyte at a concentration less than the reporting limit (RL) and greater than the detection limit (DL).
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SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046

Contact: Mr. Innocent Joseph

ITSD00196 Report Date: May 26, 1998 Page 2 of 2

Sample ID : VTF-598 958

Method	Method-Description

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NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

cc: GTSD00196

Report Date: May 26, 1998

Sample ID	: VTF-598 958
Lab ID	: 9805558-09
Matrix	: Misc.
Date Collected	: 05/03/98
Date Received	: 05/19/98
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
General Chemistry											
Paint Filter Test		PASS					BJB	05/22/98	1545	122785	1

M = Method	Method-Description
M 1	EPA 9095

Notes:
The qualifiers in this report are defined as follows:
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9805558-09

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SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

GTSD00196 Report Date: May 26, 1998 Page 1 of 2

Sample ID	: VTF-599 960
Lab ID	: 9805558-05
Matrix	: TCLP
Date Collected	: 05/03/98
Date Received	: 05/19/98
Priority	: Routine
Collector	: Client

neter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Analysis											
nium		40.8	3.90	30.0	ug/l	10.	JSS	05/22/98	1933	122729	1
l		233	0.420	4.00	ug/l	10.					
	U	ND	0.260	2.00	ug/l	10.					
um		838	0.240	2.00	ug/l	10.					
al Chemistry											
gen, Nitrate	J	0.320	0.200	0.500	mg/l	10.	JLG	05/21/98	2006	122686	2

llowing prep procedures were performed:

Mass Spec	FGD	05/21/98	2000	122729 3
Prep for Metals	JL	05/21/98	1030	122569 4

Method	Method-Description
	EPA 6020
	EPA 300.0
	EPA 3005
	EPA 1311

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TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

cc: GTSD00196 Report Date: May 26, 1998

Sample ID : VTF-599 960

M = Method	Method-Description

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NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

GTSD00196 Report Date: May 26, 1998 Page 1 of 1

Sample ID	: VTF-599 960
Lab ID	: 9805558-10
Matrix	: Misc.
Date Collected	: 05/03/98
Date Received	: 05/19/98
Priority	: Routine
Collector	: Client

ımeter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
ral Chemistry											
t Filter Test		PASS					BJB	05/22/98	1545	122785	1

Method	Method-Description
	EPA 9095

:
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9805558-10

M-Area Batch #15 Glass TCLP Samples RM-98-12

SHIPMENT DESTINED TO	SAMPLE CONTAINER IDENTIFICATION		DATE/TIME OF PACKAGING		SAMPLE NET WEIGHT	SHIPPING CONTAINER/ CONTAINER GROSS WEIGHT	SEAL # (IF APPLICABLE)
General Engineering Laboratories 2040 Savage Rd. Chasn. SC 29414	Sample#	Drum#			Grams	Grams	N/A
	VTF-595	952	05/03/98	0100	238.4	273	
	VTF-596	954	05/03/98	0720	301.4	336	
	VTF-597	956	05/03/98	0853	306.4	341	
	VTF-598	958	05/03/98	1430	255.4	290	
	VTF-599	960	05/03/98	1622	241.4	276	
	Shipping Container		N/A		3 lbs	8 lbs	

604 + 5 = 965

Comments: Shipping Number SRS-16140

INFORMATION ONLY

Relinquished by:	Date:	Time:	Received by:	Relinquished by:	Date:	Time:	Received by:
S Johnson	5/14/98	1345	Dionne Francis		5/19/98		
Relinquished by:	Date:	Time:	Received by:	Relinquished by:	Date:	Time:	Received by:

\\RCO\Shipping Forms\

DURATEK
10100 Old Columbia Road
Columbia, Maryland 21046
410/312-5100 Fax 410/290-9070

L-98-040

May 27, 1998

Mr. Dan Bills
Subcontract Technical Representative
Westinghouse Savannah River Company
Building 730-M
Aiken, SC 29802

Final Wasteform Treatment Standards and Acceptance Criteria

Dear Mr. Bills:

GTS Duratek has completed sampling and analysis of the final wasteform, Batch #14, drums 882, 884, 886, 888 and 890. The results of the analysis, including the analysis technique, is attached for your review. The analysis was performed by General Engineering Laboratories, a State of South Carolina certified lab, and verified by Mr. Innocent Joseph, Manager of Technology, GTS Duratek.

Results of the analysis indicate Batch #14 is within the contractual specifications. GTS Duratek will invoice directly through accounts payable (Brenda Bell, Bldg. 730-4B). A total of 85 drums of glass were produced for Batch #14. Should you have any questions, please contact Innocent Joseph or myself.

Sincerely,

GTS DURATEK

Daniel Macias
Director of Operations

DM/mlb
attachment

cc: S. Campbell
C. Coker

DURATEK
10100 Old Columbia Road
Columbia, Maryland 21046
410/312-5100 Fax 410/290-9070

May 26, 1998

Mr. Dan Macias
Operations Manger
Vendor Treatment Facility (M-area)
GTS Duratek
WSRC/USDOE Savannah River Site
Aiken, SC 29801

Dear Mr. Macias:

Please find enclosed the results of the "TCLP" and 'Paint Filter Test" on glass gems from drums 882, 884, 886, 888, and 890. The tests were performed according to methods specified in the "Sampling Plan" for GTS Duratek's Vendor Treatment Facility at the Savannah River site. 1-tailed t-tests were performed on the TCLP data, and the upper acceptance limits for 95% confidence were calculated. The TCLP values are well below the upper acceptance limits for 95% confidence. All of the samples passed the "Paint Filter Test." The samples from Batch # 14 have therefore met all of the acceptance criteria for the glass product.

The calculations for sample means, variances, upper acceptance limits for 95% confidence, data sheets from General Engineering Laboratories, and a sample chain of custody record are enclosed. If you have any questions, please contact me at (410) 312-5120.

Sincerely
Innocent Joseph
Innocent Joseph
Manager, Technology
GTS Duratek

cc: P. Deltete
J. Pope
B. Bowan
G. Hildebrandt
C. Coker

The glass gems from batch 14, produced at the GTS Duratek M-area facility, were subjected to "paint filter test" for free water, and "TCLP" for leaching characteristics at General Engineering Laboratories, a South Carolina licensed laboratory. The "paint filter test" and the "TCLP" were done according to EPA procedures 9095 and 1311, respectively. Please find enclosed the results for glass samples from drums 882 to 890. The results of the tests are summarized below. 1-tailed t-tests were performed, and the upper limits for 95% confidence were calculated.

The TCLP values are below the acceptance limit for 95% confidence.

Table 1. Summary of TCLP results

Sample ID	Chromium (mg/L)	Nickel (mg/L)	Lead (mg/L)	Uranium (mg/L)	Nitrate (as N)	Paint filter test
GEM Drum # 882	0.0090	0.273	0.0071	1.090	0.0	Pass
GEM Drum # 884	0.0102	0.264	0.0067	1.070	0.0	Pass
GEM Drum # 886	0.0093	0.249	0.0	0.973	0.0	Pass
GEM Drum # 888	0.0098	0.312	0.0	1.230	0.0	Pass
GEM Drum # 890	0.0064	0.259	0.0	0.980	0.0	Pass

Student t-test

Number of samples = n = 5

Mean = $\bar{x} = \sum x_i / n$

Variance = $s^2 = \sum(x_i - \bar{x})^2 / (n-1)$

Degrees of freedom for n observations = n-1 = 4

From standard t-tables, the factor "z" for 95% confidence limit ($t_{0.95}$ or $\alpha_{0.05}$) for 4 degrees of freedom is 2.13.

Upper acceptance limit for 95% confidence for a 1-tailed t-test, at 4 degrees of freedom is:

$$\text{Acceptance limit} = (s \times 2.13)/n^{1/2}$$

Table 2. TCLP means, variances, and upper acceptance limits for 95% confidence.

Element	mean ($\bar{x}$)	Variance (s^2)	s	Acceptance limit (mg/L)	Upper acceptance limit for 95% confidence
Chromium	0.0089	2.20 E-6	0.0015	0.86	0.8586
Nickel	0.2714	0.00059	0.0243	5.0	4.9769
Lead	0.0028	1.42 E-5	0.0036	0.37	0.3664
Uranium	1.0686	0.01088	0.1043	4.0	3.9007

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SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

GTSD00196 Report Date: May 22, 1998

Sample ID	: VTF-551 882
Lab ID	: 9805508-01
Matrix	: TCLP
Date Collected	: 04/24/98
Date Received	: 05/18/98
Priority	: Routine
Collector	: Client

ımeter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
ls Analysis											
›mium	J	8.98	3.90	30.0	ug/l	10.	JSS	05/21/98	1808	122606	1
:el		273	0.420	4.00	ug/l	10.					
l		7.09	0.260	2.00	ug/l	10.					
ıium		1090	0.240	2.00	ug/l	10.					
ral Chemistry											
›gen, Nitrate	U	ND	0.200	0.500	mg/l	10.	JLG	05/21/98	1310	122504	2

ollowing prep procedures were performed:

Mass Spec	FGD	05/21/98	1030	122606 3
.P Prep for Metals	JL	05/19/98	1925	122501 4

: Method	Method-Description
	EPA 6020
	EPA 300.0
	EPA 3005
	EPA 1311

s:
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licates that the analyte was not detected at a concentration greater than the detection limit.
icates that a quality control analyte recovery is outside of specified acceptance criteria.

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9805508-01

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FL	E87156/87294	E87472/87458
NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

cc: GTSD00196 Report Date: May 22, 1998

Sample ID : VTF-551 882

M = Method	Method-Description

This data report has been prepared and reviewed in accordance with General Engineering Laboratories standard operating procedures. Please direct any questions to your Project Manager, Jack Spitz at (803) 556-8171.

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NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

GTSD00196 Report Date: May 22, 1998 Page 1 of 1

Sample ID	: VTF-551 882
Lab ID	: 9805508-06
Matrix	: Misc.
Date Collected	: 04/25/98
Date Received	: 05/18/98
Priority	: Routine
Collector	: Client

ımeter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
ral Chemistry											
t Filter Test		Pass.					JEN	05/20/98	1130	122565	1

Method	Method-Description
	EPA 9095

ı:
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FL	E87156/87294	E87472/87458
NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

cc: GTSD00196

Report Date: May 22, 1998

Sample ID	: VTF-552 884
Lab ID	: 9805508-02
Matrix	: TCLP
Date Collected	: 04/24/98
Date Received	: 05/18/98
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Metals Analysis											
Chromium	J	10.2	3.90	30.0	ug/l	10.	JSS	05/21/98	1820	122606	1
Nickel		264	0.420	4.00	ug/l	10.					
Lead		6.66	0.260	2.00	ug/l	10.					
Uranium		1070	0.240	2.00	ug/l	10.					
General Chemistry											
Nitrogen, Nitrate	U	ND	0.200	0.500	mg/l	10.	JLG	05/21/98	1343	122504	2

The following prep procedures were performed:

ICP Mass Spec	FGD	05/21/98	1030	122606 3
TCLP Prep for Metals	JL	05/19/98	1925	122501 4

M = Method	Method-Description
M 1	EPA 6020
M 2	EPA 300.0
M 3	EPA 3005
M 4	EPA 1311

Notes:
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J indicates presence of analyte at a concentration less than the reporting limit (RL) and greater than the detection limit (DL).
U indicates that the analyte was not detected at a concentration greater than the detection limit.
* indicates that a quality control analyte recovery is outside of specified acceptance criteria.

9805508-02

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STATE	GEL	EPI
FL	E87156/87294	E87472/87458
NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

GTSD00196 Report Date: May 22, 1998 Page 2 of 2

Sample ID : VTF-552 884

Method	Method-Description

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NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

cc: GTSD00196

Report Date: May 22, 1998

Sample ID	: VTF-552 884
Lab ID	: 9805508-07
Matrix	: Misc.
Date Collected	: 04/24/98
Date Received	: 05/18/98
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
General Chemistry											
Paint Filter Test		Pass.					JEN	05/20/98	1130	122565	1

M = Method	Method-Description
M 1	EPA 9095

Notes:
The qualifiers in this report are defined as follows:
ND indicates that the analyte was not detected at a concentration greater than the detection limit.
J indicates presence of analyte at a concentration less than the reporting limit (RL) and greater than the detection limit (DL).
U indicates that the analyte was not detected at a concentration greater than the detection limit.
* indicates that a quality control analyte recovery is outside of specified acceptance criteria.

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NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

GTSD00196 Report Date: May 22, 1998

Sample ID	: VTF-553 886
Lab ID	: 9805508-03
Matrix	: TCLP
Date Collected	: 04/25/98
Date Received	: 05/18/98
Priority	: Routine
Collector	: Client

meter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
s Analysis											
mium	J	9.30	3.90	30.0	ug/l	10.	JSS	05/21/98	1856	122606	1
el		249	0.420	4.00	ug/l	10.					
	U	ND	0.260	2.00	ug/l	10.					
ium		973	0.240	2.00	ug/l	10.					
al Chemistry											
gen, Nitrate	U	ND	0.200	0.500	mg/l	10.	JLG	05/21/98	1354	122504	2

llowing prep procedures were performed:

Mass Spec	FGD	05/21/98	1030	122606 3
P Prep for Metals	JL	05/19/98	1925	122501 4

Method	Method-Description
	EPA 6020
	EPA 300.0
	EPA 3005
	EPA 1311

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NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

cc: GTSD00196 Report Date: May 22, 1998

Sample ID : VTF-553 886

M = Method	Method-Description

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NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

GTSD00196 Report Date: May 22, 1998 Page 1 of 1

Sample ID	: VTF-553 886
Lab ID	: 9805508-08
Matrix	: Misc.
Date Collected	: 04/25/98
Date Received	: 05/18/98
Priority	: Routine
Collector	: Client

meter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
ral Chemistry											
: Filter Test		Pass.					JEN	05/20/98	1130	122565	1

Method	Method-Description
	EPA 9095

:
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STATE	CCL	EPA
FL	E87156/87294	E87472/87458
NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

cc: GTSD00196

Report Date: May 22, 1998

Sample ID	: VTF-554 888
Lab ID	: 9805508-04
Matrix	: TCLP
Date Collected	: 04/25/98
Date Received	: 05/18/98
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Metals Analysis											
Chromium	J	9.77	3.90	30.0	ug/l	10.	JSS	05/21/98	1904	122606	1
Nickel		312	0.420	4.00	ug/l	10.					
Lead	U	ND	0.260	2.00	ug/l	10.					
Uranium		1230	0.240	2.00	ug/l	10.					
General Chemistry											
Nitrogen, Nitrate	U	ND	0.200	0.500	mg/l	10.	JLG	05/21/98	1405	122504	2

The following prep procedures were performed:

ICP Mass Spec	FGD	05/21/98	1030	122606	3
TCLP Prep for Metals	JL	05/19/98	1925	122501	4

M = Method	Method-Description
M 1	EPA 6020
M 2	EPA 300.0
M 3	EPA 3005
M 4	EPA 1311

Notes:
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U indicates that the analyte was not detected at a concentration greater than the detection limit.
* indicates that a quality control analyte recovery is outside of specified acceptance criteria.

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STATE	GEL	EPI
FL	E87156/87294	E87472/87458
NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

GTSD00196 Report Date: May 22, 1998

Sample ID : VTF-554 888

Method	Method-Description

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STATE	GEL	EPA
FL	E87156/87294	E87472/87458
NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

cc: GTSD00196

Report Date: May 22, 1998

Sample ID	: VTF-554 888
Lab ID	: 9805508-09
Matrix	: Misc.
Date Collected	: 04/25/98
Date Received	: 05/18/98
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
General Chemistry											
Paint Filter Test		Pass.					JEN	05/20/98	1130	122565	1

M = Method	Method-Description
M 1	EPA 9095

Notes:
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ND indicates that the analyte was not detected at a concentration greater than the detection limit.
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* indicates that a quality control analyte recovery is outside of specified acceptance criteria.

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NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

GTSD00196 Report Date: May 22, 1998

Sample ID	: VTF-555 890
Lab ID	: 9805508-05
Matrix	: TCLP
Date Collected	: 04/25/98
Date Received	: 05/18/98
Priority	: Routine
Collector	: Client

ımeter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
ls Analysis											
ımium	J	6.38	3.90	30.0	ug/l	10.	JSS	05/21/98	1922	122606	1
el		259	0.420	4.00	ug/l	10.					
l	U	ND	0.260	2.00	ug/l	10.					
ium		980	0.240	2.00	ug/l	10.					
ral Chemistry											
›gen, Nitrate	U	ND	0.200	0.500	mg/l	10.	JLG	05/21/98	1416	122504	2

ollowing prep procedures were performed:

Mass Spec	FGD	05/21/98	1030	122606 3
P Prep for Metals	JL	05/19/98	1925	122501 4

Method	Method-Description
	EPA 6020
	EPA 300.0
	EPA 3005
	EPA 1311

:

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STATE	GEL	EPI
FL	E87156/87294	E87472/87458
NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

cc: GTSD00196

Report Date: May 22, 1998

Sample ID : VTF-555 890

M = Method	Method-Description

This data report has been prepared and reviewed in accordance with General Engineering Laboratories standard operating procedures. Please direct any questions to your Project Manager, Jack Spitz at (803) 556-8171.

Reviewed By

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STATE	GEL	EPI
FL	E87156/87294	E87472/87458
NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

TSD00196 Report Date: May 22, 1998 Page 1 of 1

Sample ID	: VTF-555 890
Lab ID	: 9805508-10
Matrix	: Misc.
Date Collected	: 04/25/98
Date Received	: 05/18/98
Priority	: Routine
Collector	: Client

neter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
al Chemistry											
Filter Test		Pass.					JEN	05/20/98	1130	122565	1

Method	Method-Description
	EPA 9095

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ordance with General Engineering Laboratories
rd operating procedures. Please direct
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9805508-10

675

M-Area Batch #14 Glass TCLP Samples RM-98-11

9808308

SHIPMENT DESTINED TO	SAMPLE CONTAINER IDENTIFICATION		DATE/TIME OF PACKAGING		SAMPLE NET WEIGHT	SHIPPING CONTAINER/ CONTAINER GROSS WEIGHT	SEAL # (IF APPLICABLE)
General Engineering Laboratories 2040 Savage Rd. Chasn. SC 29414	Sample#	Drum#			Grams	Grams	N/A
	VTF-551	882	04/24/98	0900	228	259	
	VTF-552	884	04/24/98	1700	200	231	
	VTF-553	886	04/25/98	0000	218	249	
	VTF-554	888	04/25/98	0630	155	186	
	VTF-555	890	04/25/98	0630	126	157	
	Shipping Container		N/A		3 lbs	8 lbs	

Comments: Shipping Number SRS-16127

Relinquished by:	Date:	Time:	Received by:	Relinqished by:	Date:	Time:	Received by:
[signature]	5/6/98	1320	[signature]				
Relinquished by:	Date:	Time:	Received by:	Relinqished by:	Date:	Time:	Received by:

C:\...\RCO\Shipping ...

WSRC-TR-96-0244, Rev. 2; APPENDIX L, Page 620 of 694

DURATEK
10100 Old Columbia Road
Columbia, Maryland 21046
410/312-5100 Fax 410/290-9070

L-98-036

May 11, 1998

Mr. Dan Bills
Subcontract Technical Representative
Westinghouse Savannah River Company
Building 730-M
Aiken, SC 29802

Final Wasteform Treatment Standards and Acceptance Criteria

Dear Mr. Bills:

GTS Duratek has completed sampling and analysis of the final wasteform, Batch #13, drums 798, 800, 802, 804, and 806. The results of the analysis, including the analysis technique, is attached for your review. The analysis was performed by General Engineering Laboratories, a State of South Carolina certified lab, and verified by Mr. Innocent Joseph, Manager of Technology, GTS Duratek.

Results of the analysis indicate Batch #13 is within the contractual specifications. GTS Duratek will invoice directly through accounts payable (Brenda Bell, Bldg. 730-4B). A total of 89 drums of glass were produced for Batch #13. Should you have any questions, please contact Innocent Joseph or myself.

Sincerely,

GTS DURATEK

Daniel Macias
Director of Operations

DM/mlb
attachment

cc: S. Campbell
C. Coker

DURATEK

10100 Old Columbia Road
Columbia, Maryland 21046
410/312-5100 Fax 410/290-9070

May 7, 1998

Mr. Dan Macias
Operations Manger
Vendor Treatment Facility (M-area)
GTS Duratek
WSRC/USDOE Savannah River Site
Aiken, SC 29801

Dear Mr. Macias:

Please find enclosed the results of the "TCLP" and 'Paint Filter Test" on glass gems from drums 798, 800, 802, 804, and 806. The tests were performed according to methods specified in the "Sampling Plan" for GTS Duratek's Vendor Treatment Facility at the Savannah River site. 1-tailed t-tests were performed on the TCLP data, and the upper acceptance limits for 95% confidence were calculated. The TCLP values are well below the upper acceptance limits for 95% confidence. All of the samples passed the "Paint Filter Test." The samples from Batch # 13 have therefore met all of the acceptance criteria for the glass product.

The calculations for sample means, variances, upper acceptance limits for 95% confidence, data sheets from General Engineering Laboratories, and a sample chain of custody record are enclosed. If you have any questions, please contact me at (410) 312-5120.

Sincerely
Innocent Joseph

Innocent Joseph
Manager, Technology
GTS Duratek

cc: P. Deltete
J. Pope
B. Bowan
G. Hildebrandt
C. Coker

The glass gems from batch 13, produced at the GTS Duratek M-area facility, were subjected to "paint filter test" for free water, and "TCLP" for leaching characteristics at General Engineering Laboratories, a South Carolina licensed laboratory. The "paint filter test" and the "TCLP" were done according to EPA procedures 9095 and 1311, respectively. Please find enclosed the results for glass samples from drums 798 to 806. The results of the tests are summarized below. 1-tailed t-tests were performed, and the upper limits for 95% confidence were calculated.

The TCLP values are below the acceptance limit for 95% confidence.

Table 1. Summary of TCLP results

Sample ID	Chromium (mg/L)	Nickel (mg/L)	Lead (mg/L)	Uranium (mg/L)	Nitrate (as N)	Paint filter test
GEM Drum # 798	0.0215	0.245	0.0020	0.887	0.0	Pass
GEM Drum # 800	0.0149	0.182	0.0017	0.734	0.0	Pass
GEM Drum # 802	0.0131	0.180	0.0019	0.750	0.0	Pass
GEM Drum # 804	0.0155	0.246	0.0023	0.969	0.0	Pass
GEM Drum # 806	0.0142	0.213	0.0024	0.799	0.0	Pass

Student t-test

Number of samples = n = 5

Mean = $\bar{x} = \sum x_i / n$

Variance = $s^2 = \sum (x_i - \bar{x})^2 / (n-1)$

Degrees of freedom for n observations = n-1 = 4

From standard t-tables, the factor "z" for 95% confidence limit ($t_{0.95}$ or $\alpha_{0.05}$) for 4 degrees of freedom is 2.13.

Upper acceptance limit for 95% confidence for a 1-tailed t-test, at 4 degrees of freedom is:

$$\text{Acceptance limit} - (s \times 2.13)/n^{1/2}$$

Table 2. TCLP means, variances, and upper acceptance limits for 95% confidence.

Element	mean ($\bar{x}$)	Variance (s^2)	s	Acceptance limit (mg/L)	Upper acceptance limit for 95% confidence
Chromium	0.0158	1.08 E-5	0.0033	0.86	0.8569
Nickel	0.2132	0.00104	0.0323	5.0	4.9693
Lead	0.0020	7.79 E-8	0.0003	0.37	0.3697
Uranium	0.8278	0.00978	0.0989	4.0	3.9058

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NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

GTSD00196 Report Date: May 06, 1998

Sample ID	: VTF-498 (798)
Lab ID	: 9804805-01
Matrix	: TCLP
Date Collected	: 04/11/98
Date Received	: 04/29/98
Priority	: Routine
Collector	: Client

meter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
s Analysis											
mium		21.5	1.95	15.0	ug/l	5.0	JSS	05/04/98	1808	121388	1
el		245	0.210	2.00	ug/l	5.0					
		1.97	0.130	1.00	ug/l	5.0					
ium		887	0.120	1.00	ug/l	5.0					
:al Chemistry											
ıgen, Nitrate	U	ND	0.0200	0.0500	mg/l	1.0	RWS	05/04/98	1722	121276	2

ollowing prep procedures were performed:

Mass Spec	FGD	05/04/98	1100	121388 3
P Prep for Metals	JL	05/02/98	2335	121377 4

Method	Method-Description
	EPA 6020
	EPA 300.0
	EPA 3005
	EPA 1311

:

ualifiers in this report are defined as follows:
dicates that the analyte was not detected at a concentration greater than the detection limit.
:ates presence of analyte at a concentration less than the reporting limit (RL) and greater than the detection limit (DL).
icates that the analyte was not detected at a concentration greater than the detection limit.
:ates that a quality control analyte recovery is outside of specified acceptance criteria.

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FL	E87156/87294	E87472/87458
NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

cc: GTSD00196 Report Date: May 06, 1998

Sample ID : VTF-498 (798)

M = Method	Method-Description

This data report has been prepared and reviewed in accordance with General Engineering Laboratories standard operating procedures. Please direct any questions to your Project Manager, Jack Spitz at (803) 556-8171.

Reviewed By

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9804805-01

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NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

GTSD00196 Report Date: May 06, 1998 Page 1 of 1

Sample ID	: VTF-498 (798)
Lab ID	: 9804805-06
Matrix	: Misc.
Date Collected	: 04/11/98
Date Received	: 04/29/98
Priority	: Routine
Collector	: Client

meter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
ral Chemistry											
: Filter Test		PASS					JEN	05/06/98	0930	121589	1

Method	Method-Description
	EPA 9095

:

ualifiers in this report are defined as follows:
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icates that the analyte was not detected at a concentration greater than the detection limit.
cates that a quality control analyte recovery is outside of specified acceptance criteria.

lata report has been prepared and reviewed
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ard operating procedures. Please direct
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FL	E87156/87294	E87472/87458
NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

cc: GTSD00196 Report Date: May 06, 1998

Sample ID	: VTF-499 (800)
Lab ID	: 9804805-02
Matrix	: TCLP
Date Collected	: 04/11/98
Date Received	: 04/29/98
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Metals Analysis											
Chromium	J	14.9	1.95	15.0	ug/l	5.0	JSS	05/04/98	1815	121388	1
Nickel		182	0.210	2.00	ug/l	5.0					
Lead		1.74	0.130	1.00	ug/l	5.0					
Uranium		734	0.120	1.00	ug/l	5.0					
General Chemistry											
Nitrogen, Nitrate	U	ND	0.0200	0.0500	mg/l	1.0	RWS	05/04/98	1733	121276	2

The following prep procedures were performed:

ICP Mass Spec	FGD	05/04/98	1100	121388 3
TCLP Prep for Metals	JL	05/02/98	2335	121377 4

M = Method	Method-Description
M 1	EPA 6020
M 2	EPA 300.0
M 3	EPA 3005
M 4	EPA 1311

Notes:
The qualifiers in this report are defined as follows:
ND indicates that the analyte was not detected at a concentration greater than the detection limit.
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U indicates that the analyte was not detected at a concentration greater than the detection limit.
* indicates that a quality control analyte recovery is outside of specified acceptance criteria.

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Client: GTS Duratek
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Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

GTSD00196 Report Date: May 06, 1998 Page 2 of 2

Sample ID : VTF-499 (800)

Method	Method-Description

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NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046

Contact: Mr. Innocent Joseph

c: GTSD00196 Report Date: May 06, 1998

Sample ID	: VTF-499 (800)
Lab ID	: 9804805-07
Matrix	: Misc.
Date Collected	: 04/11/98
Date Received	: 04/29/98
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
General Chemistry											
Paint Filter Test		PASS					JEN	05/06/98	0930	121589	1

M = Method	Method-Description
M 1	EPA 9095

Notes:
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NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

GTSD00196 Report Date: May 06, 1998

Sample ID	: VTF-500 (802)
Lab ID	: 9804805-03
Matrix	: TCLP
Date Collected	: 04/12/98
Date Received	: 04/29/98
Priority	: Routine
Collector	: Client

ımeter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
ls Analysis											
ɔmium	J	13.1	1.95	15.0	ug/l	5.0	JSS	05/04/98	1823	121388	1
:el		180	0.210	2.00	ug/l	5.0					
ı		1.85	0.130	1.00	ug/l	5.0					
ıium		750	0.120	1.00	ug/l	5.0					
ral Chemistry											
ɔgen, Nitrate	U	ND	0.0200	0.0500	mg/l	1.0	RWS	05/04/98	1744	121276	2

ollowing prep procedures were performed:

Mass Spec	FGD	05/04/98	1100	121388 3
P Prep for Metals	JL	05/02/98	2335	121377 4

Method	Method-Description
	EPA 6020
	EPA 300.0
	EPA 3005
	EPA 1311

s:

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NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

cc: GTSD00196 Report Date: May 06, 1998

Sample ID : VTF-500 (802)

M = Method	Method-Description

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NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

GTSD00196 Report Date: May 06, 1998 Page 1 of 1

Sample ID	: VTF-500 (802)
Lab ID	: 9804805-08
Matrix	: Misc.
Date Collected	: 04/12/98
Date Received	: 04/29/98
Priority	: Routine
Collector	: Client

ameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
ral Chemistry											
t Filter Test		PASS					JEN	05/06/98	0930	121589	1

Method	Method-Description
	EPA 9095

s:
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data report has been prepared and reviewed
cordance with General Engineering Laboratories
lard operating procedures. Please direct
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NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

cc: GTSD00196 Report Date: May 06, 1998

Sample ID	: VTF-501 (804)
Lab ID	: 9804805-04
Matrix	: TCLP
Date Collected	: 04/12/98
Date Received	: 04/29/98
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Metals Analysis											
Chromium		15.5	1.95	15.0	ug/l	5.0	JSS	05/04/98	1830	121388	1
Nickel		246	0.210	2.00	ug/l	5.0					
Lead		2.32	0.130	1.00	ug/l	5.0					
Uranium		969	0.120	1.00	ug/l	5.0					
General Chemistry											
Nitrogen, Nitrate	U	ND	0.0200	0.0500	mg/l	1.0	RWS	05/04/98	1755	121276	2

The following prep procedures were performed:

ICP Mass Spec	FGD	05/04/98	1100	121388	3
TCLP Prep for Metals	JL	05/02/98	2335	121377	4

M = Method	Method-Description
M 1	EPA 6020
M 2	EPA 300.0
M 3	EPA 3005
M 4	EPA 1311

Notes:
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U indicates that the analyte was not detected at a concentration greater than the detection limit.
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9804805-04

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STATE	GEL	EPI
FL	E87156/87294	E87472/87458
NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

GTSD00196 Report Date: May 06, 1998 Page 2 of 2

Sample ID : VTF-501 (804)

Method	Method-Description

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iestions to your Project Manager, Jack Spitz at (803) 556-8171.

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STATE	GEL	EPI
FL	E87156/87294	E87472/87458
NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

cc: GTSD00196 Report Date: May 06, 1998 Page 1 of 1

Sample ID	: VTF-501 (804)
Lab ID	: 9804805-09
Matrix	: Misc.
Date Collected	: 04/12/98
Date Received	: 04/29/98
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
General Chemistry											
Paint Filter Test		PASS					JEN	05/06/98	0930	121589	1

M = Method	Method-Description
M 1	EPA 9095

Notes:
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standard operating procedures. Please direct
any questions to your Project Manager, Jack Spitz at (803) 556-8171.

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NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

GTSD00196 Report Date: May 06, 1998

Sample ID	: VTF-502 (806)
Lab ID	: 9804805-05
Matrix	: TCLP
Date Collected	: 04/12/98
Date Received	: 04/29/98
Priority	: Routine
Collector	: Client

meter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
s Analysis											
mium	J	14.2	1.95	15.0	ug/l	5.0	JSS	05/04/98	1801	121388	1
el		213	0.210	2.00	ug/l	5.0					
		2.36	0.130	1.00	ug/l	5.0					
ium		799	0.120	1.00	ug/l	5.0					
ral Chemistry											
gen, Nitrate	U	ND	0.0200	0.0500	mg/l	1.0	RWS	05/04/98	1806	121276	2

ollowing prep procedures were performed:

Mass Spec	FGD	05/04/98	1100	121388 3
P Prep for Metals	JL	05/02/98	2335	121377 4

Method	Method-Description
	EPA 6020
	EPA 300.0
	EPA 3005
	EPA 1311

:

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STATE	GEL	EPI
FL	E87156/87294	E87472/87458
NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

cc: GTSD00196 Report Date: May 06, 1998

Sample ID : VTF-502 (806)

M = Method	Method-Description

This data report has been prepared and reviewed in accordance with General Engineering Laboratories standard operating procedures. Please direct any questions to your Project Manager, Jack Spitz at (803) 556-8171.

Reviewed By

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STATE	GEL	EPI
FL	E87156/87294	E87472/87458
NC	233	
SC	10120	10582
TN	02934	02934

Client: GTS Duratek
10100 Old Columbia Rd.
Columbia, Maryland 21046
Contact: Mr. Innocent Joseph

GTSD00196 Report Date: May 06, 1998 Page 1 of 1

Sample ID	: VTF-502 (806)
Lab ID	: 9804805-10
Matrix	: Misc.
Date Collected	: 04/12/98
Date Received	: 04/29/98
Priority	: Routine
Collector	: Client

ımeter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
ral Chemistry											
t Filter Test		PASS					JEN	05/06/98	0930	121589	1

Method	Method-Description
	EPA 9095

ualifiers in this report are defined as follows:
ıdicates that the analyte was not detected at a concentration greater than the detection limit.
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ard operating procedures. Please direct
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9804805-10

GTSD00196

GTS DURATEK SHIPPING MANIFEST

3771

M-Area Batch #13 Glass TCLP Samples RM-98-10

9804805

SHIPMENT DESTINED TO	SAMPLE CONTAINER IDENTIFICATION		DATE/TIME OF PACKAGING	SAMPLE NET WEIGHT	SHIPPING CONTAINER/ CONTAINER GROSS WEIGHT	SEAL # (IF APPLICABLE)
General Engineering Laboratories 2040 Savage Rd. Chasn. SC 29414	Sample#	Drum#		Grams	Grams	N/A
	VTF-498	798	04/11/98 1600	255	286	
	VTF-499	800	04/11/98 2230	182	213	
	VTF-500	802	04/12/98 0200	154	185	
	VTF-501	804	04/12/98 0830	205	236	
	VTF-502	806	04/12/98 1430	292	323	
	Shipping Container		N/A	4 lbs	9 lbs	

Comments: Shipping Number

INFORMATION ONLY

Relinquished by:	Date:	Time:	Received by:	Relinqished by:	Date:	Time:	Received by:
	4/27/98	1045	Dionne Francis		4/29/98		
Relinquished by:	Date:	Time:	Received by:	Relinqished by:	Date:	Time:	Received by:

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WSRC-TR-96-0244, Rev. 2; APPENDIX L, Page 640 of 694

DURATEK

10100 Old Columbia Road
Columbia, Maryland 21046
410/312-5100 Fax 410/290-9070

L-98-032

April 23, 1998

Mr. Dan Bills
Subcontract Technical Representative
Westinghouse Savannah River Company
Building 730-M
Aiken, SC 29802

Final Wasteform Treatment Standards and Acceptance Criteria

Dear Mr. Bills:

GTS Duratek has completed sampling and analysis of the final wasteform, Batch #12, drums 708, 710, 712, 714, and 716. The results of the analysis, including the analysis technique, is attached for your review. The analysis was performed by General Engineering Laboratories, a State of South Carolina certified lab, and verified by Mr. Innocent Joseph, Manager of Technology, GTS Duratek.

Results of the analysis indicate Batch #12 is within the contractual specifications. GTS Duratek will invoice directly through accounts payable (Brenda Bell, Bldg. 730-4B). A total of 85 drums of glass were produced for Batch #12. Should you have any questions, please contact Innocent Joseph or myself.

Sincerely,

GTS DURATEK

Daniel Macias
Director of Operations

DM/mlb
attachment

cc: S. Campbell
C. Coker

DURATEK

10100 Old Columbia Road
Columbia, Maryland 21046
410/312-5100 Fax 410/290-9070

April 22, 1998

Mr. Dan Macias
Operations Manger
Vendor Treatment Facility (M-area)
GTS Duratek
WSRC/USDOE Savannah River Site
Aiken, SC 29801

Dear Mr. Macias:

Please find enclosed the results of the "TCLP" and 'Paint Filter Test" on glass gems from drums 708, 710, 712, 714, and 716. The tests were performed according to methods specified in the "Sampling Plan" for GTS Duratek's Vendor Treatment Facility at the Savannah River site. 1-tailed t-tests were performed on the TCLP data, and the upper acceptance limits for 95% confidence were calculated. The TCLP values are well below the upper acceptance limits for 95% confidence. All of the samples passed the "Paint Filter Test." The samples from Batch # 12 have therefore met all of the acceptance criteria for the glass product.

The calculations for sample means, variances, upper acceptance limits for 95% confidence, data sheets from General Engineering Laboratories, and a sample chain of custody record are enclosed. If you have any questions, please contact me at (410) 312-5120.

Sincerely

Innocent Joseph

Innocent Joseph
Manager, Technology
GTS Duratek

cc: P. Deltete
J. Pope
B. Bowan
G. Hildebrandt
C. Coker

The glass gems from batch 12, produced at the GTS Duratek M-area facility, were subjected to "paint filter test" for free water, and "TCLP" for leaching characteristics at General Engineering Laboratories, a South Carolina licensed laboratory. The "paint filter test" and the "TCLP" were done according to EPA procedures 9095 and 1311, respectively. Please find enclosed the results for glass samples from drums 708 to 716. The results of the tests are summarized below. 1-tailed t-tests were performed, and the upper limits for 95% confidence were calculated.

The TCLP values are below the acceptance limit for 95% confidence.

Table 1. Summary of TCLP results

Sample ID	Chromium (mg/L)	Nickel (mg/L)	Lead (mg/L)	Uranium (mg/L)	Nitrate (as N)	Paint filter test
GEM Drum # 708	0.0342	0.171	0.0020	0.973	0.0	Pass
GEM Drum # 710	0.0136	0.160	0.0024	0.941	0.0	Pass
GEM Drum # 712	0.0206	0.146	0.0019	0.852	0.0	Pass
GEM Drum # 714	0.0307	0.187	0.0021	0.974	0.0	Pass
GEM Drum # 716	0.0335	0.179	0.0021	0.924	0.0	Pass

Student t-test

Number of samples = n = 5

Mean = $\bar{x} = \sum x_i / n$

Variance = $s^2 = \sum (x_i - \bar{x})^2 / (n-1)$

Degrees of freedom for n observations = n-1 = 4

From standard t-tables, the factor "z" for 95% confidence limit ($t_{0.95}$ or $\alpha_{0.05}$) for 4 degrees of freedom is 2.13.

Upper acceptance limit for 95% confidence for a 1-tailed t-test, at 4 degrees of freedom is:

$$\text{Acceptance limit} - (s \times 2.13)/n^{1/2}$$

Table 2. TCLP means, variances, and upper acceptance limits for 95% confidence.

Element	mean ($\bar{x}$)	Variance (s^2)	s	Acceptance limit (mg/L)	Upper acceptance limit for 95% confidence
Chromium	0.0265	8.18 E-5	0.0090	0.86	0.8514
Nickel	0.1686	0.00026	0.0161	5.0	4.9847
Lead	0.0021	4.12 E-8	0.0002	0.37	0.3698
Uranium	0.9328	0.00250	0.0500	4.0	3.9524

GTSD

SHIPMENT DESTINED TO	SAMPLE CONTAINER IDENTIFICATION		DATE/TIME OF PACKAGING		SAMPLE NET WEIGHT	SHIPPING CONTAINER/ CONTAINER GROSS WEIGHT	SEAL # (IF APPLICABLE)
General Engineering Laboratories 2040 Savage Rd. Chasn. SC 29414	Sample#	Drum#			Grams	Grams	N/A
	VTF-431	708	03/29/98	2000	279.6	313	
	VTF-432	710	03/30/98	0130	264.6	298	
	VTF-433	712	03/30/98	0330	281.6	315	
	VTF-438	714	03/30/98	1400	156.6	190	
	VTF-450	716	04/01/98	1100	190.6	224	
	VTF 442 = 715						
	Shipping Container		N/A		4 lbs	8 lbs	

g-31771

Comments: Shipping Number
SRS-16066

INFORMATION ONLY

Relinquished by:	Date:	Time:	Received by:	Relinqished by:	Date:	Time:	Received by:
M. Saunders	4/6/98	1420	D. Francis		4/8/98		
Relinquished by:	Date:	Time:	Received by:	Relinqished by:	Date:	Time:	Received by:

...\RCO\Shipping Forms\...

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DURATEK

10100 Old Columbia Road
Columbia, Maryland 21046
410/312-5100 Fax 410/290-9070

April 13, 1998

Mr. Dan Macias
Operations Manger
Vendor Treatment Facility (M-area)
GTS Duratek
WSRC/USDOE Savannah River Site
Aiken, SC 29801

Dear Mr. Macias:

Please find enclosed the results of the "TCLP" and 'Paint Filter Test" on glass gems from drums 624, 626, 628, 630, and 632. The tests were performed according to methods specified in the "Sampling Plan" for GTS Duratek's Vendor Treatment Facility at the Savannah River site. 1-tailed t-tests were performed on the TCLP data, and the upper acceptance limits for 95% confidence were calculated. The TCLP values are well below the upper acceptance limits for 95% confidence. All of the samples passed the "Paint Filter Test." The samples from Batch # 11 have therefore met all of the acceptance criteria for the glass product.

The calculations for sample means, variances, upper acceptance limits for 95% confidence, data sheets from General Engineering Laboratories, and a sample chain of custody record are enclosed. If you have any questions, please contact me at (410) 312-5120.

Sincerely

Innocent Joseph

Innocent Joseph
Manager, Technology
GTS Duratek

cc: P. Deltete
J. Pope
B. Bowan
G. Hildebrandt
C. Coker

The eleventh batch of glass gems produced at the GTS Duratek M-area facility were subjected to "paint filter test" for free water, and "TCLP" for leaching characteristics at General Engineering Laboratories, a South Carolina licensed laboratory. The "paint filter test" and the "TCLP" were done according to EPA procedures 9095 and 1311, respectively. Please find enclosed the results for glass samples from drums 624 to 632. The results of the tests are summarized below. 1-tailed t-tests were performed, and the upper limits for 95% confidence were calculated.

The TCLP values are below the acceptance limit for 95% confidence.

Table 1. Summary of TCLP results

Sample ID	Chromium (mg/L)	Nickel (mg/L)	Lead (mg/L)	Uranium (mg/L)	Nitrate (as N)	Paint filter test
GEM Drum # 624	0.0079	0.167	0.0020	1.140	0.0	Pass
GEM Drum # 626	0.0140	0.166	0.0021	1.120	0.0	Pass
GEM Drum # 628	0.0244	0.148	0.0021	0.998	0.0	Pass
GEM Drum # 630	0.0227	0.141	0.0026	0.967	0.0	Pass
GEM Drum # 632	0.0385	0.140	0.0020	0.973	0.0	Pass

Student t-test

Number of samples = n = 5

Mean = $\bar{x} = \sum x_i / n$

Variance = $s^2 = \sum(x_i - \bar{x})^2 / (n-1)$

Degrees of freedom for n observations = n-1 = 4

From standard t-tables, the factor "z" for 95% confidence limit ($t_{0.95}$ or $\alpha_{0.05}$) for 4 degrees of freedom is 2.13.

Upper acceptance limit for 95% confidence for a 1-tailed t-test, at 4 degrees of freedom is:

$$\text{Acceptance limit} - (s \times 2.13)/n^{1/2}$$

Table 2. TCLP means, variances, and upper acceptance limits for 95% confidence.

Element	mean ($\bar{x}$)	Variance (s^2)	s	Acceptance limit (mg/L)	Upper acceptance limit for 95% confidence
Chromium	0.0215	0.00014	0.0116	0.86	0.8489
Nickel	0.1524	0.00018	0.0132	5.0	4.9874
Lead	0.0022	7.18 E-8	0.0003	0.37	0.3697
Uranium	1.0396	0.00700	0.0836	4.0	3.9203

TSV

M-Area Batch #11 Glass TCLP Samples RM-98-07

SHIPMENT DESTINED TO	SAMPLE CONTAINER IDENTIFICATION		DATE/TIME OF PACKAGING	SAMPLE NET WEIGHT	SHIPPING CONTAINER/ CONTAINER GROSS WEIGHT	SEAL # (IF APPLICABLE)
General Engineering Laboratories 2040 Savage Rd. Chasn. SC 29414	Sample#	Drum#		Grams	Grams	N/A
	VTF-369	624	03/20/98 2100	231	264	
	VTF-370	626	03/21/98 1640	215	248	
	VTF-371	628	03/21/98 1640	123	156	
	VTF-372	630	03/21/98 1740	83	116	
	VTF-376	632	03/22/98 0200	355	388	
	Shipping Container		N/A	2.5 lbs	7.5 lbs	

VTF 369 ≈ 6407

Comments: Shipping Number

INFORMATION ONLY

Relinquished by:	Date:	Time:	Received by:	Relinqished by:	Date:	Time:	Received by:
M. Spurlock	3/27/98	1515					
Relinquished by:	Date:	Time:	Received by:	Relinqished by:	Date:	Time:	Received by:

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DURATEK

10100 Old Columbia Road
Columbia, Maryland 21046
410/312-5100 Fax 410/290-9070

L-98-024

April 1, 1998

Mr. Dan Bills
Subcontract Technical Representative
Westinghouse Savannah River Company
Building 730-M
Aiken, SC 29802

Final Wasteform Treatment Standards and Acceptance Criteria

Dear Mr. Bills:

GTS Duratek has completed sampling and analysis of the final wasteform, Batch #10, drums 562, 564, 566, 568, and 570. The results of the analysis, including the analysis technique, is attached for your review. The analysis was performed by General Engineering Laboratories, a State of South Carolina certified lab, and verified by Mr. Innocent Joseph, Manager of Technology, GTS Duratek.

Results of the analysis indicate Batch #10 is within the contractual specifications. GTS Duratek will invoice directly through accounts payable (Brenda Bell, Bldg. 730-4B). A total of 70 drums of glass were produced for Batch #10. Should you have any questions, please contact Innocent Joseph or myself.

Sincerely,

GTS DURATEK

Daniel Macias
Director of Operations

DM/mlb
attachment

cc: S. Campbell
C. Coker

DURATEK

10100 Old Columbia Road
Columbia, Maryland 21046
410/312-5100 Fax 410/290-9070

March 31, 1998

Mr. Dan Macias
Operations Manger
Vendor Treatment Facility (M-area)
GTS Duratek
WSRC/USDOE Savannah River Site
Aiken, SC 29801

Dear Mr. Macias:

Please find enclosed the results of the "TCLP" and 'Paint Filter Test" on glass gems from drums 562, 564, 566, 568, and 570. The tests were performed according to methods specified in the "Sampling Plan" for GTS Duratek's Vendor Treatment Facility at the Savannah River site. 1-tailed t-tests were performed on the TCLP data, and the upper acceptance limits for 95% confidence were calculated. The TCLP values are well below the upper acceptance limits for 95% confidence. All of the samples passed the "Paint Filter Test." The samples from Batch # 10 have therefore met all of the acceptance criteria for the glass product.

The calculations for sample means, variances, upper acceptance limits for 95% confidence, data sheets from General Engineering Laboratories, and a sample chain of custody record are enclosed. If you have any questions, please contact me at (410) 312-5120.

Sincerely

Innocent Joseph

Innocent Joseph
Manager, Technology
GTS Duratek

cc: P. Deltete
J. Pope
B. Bowan
G. Hildebrandt
C. Coker

The tenth batch of glass gems produced at the GTS Duratek M-area facility were subjected to "paint filter test" for free water, and "TCLP" for leaching characteristics at General Engineering Laboratories, a South Carolina licensed laboratory. The "paint filter test" and the "TCLP" were done according to EPA procedures 9095 and 1311, respectively. Please find enclosed the results for glass samples from drums 562 to 570. The results of the tests are summarized below. 1-tailed t-tests were performed, and the upper limits for 95% confidence were calculated.

The TCLP values are below the acceptance limit for 95% confidence.

Table 1. Summary of TCLP results

Sample ID	Chromium (mg/L)	Nickel (mg/L)	Lead (mg/L)	Uranium (mg/L)	Nitrate (as N)	Paint filter test
GEM Drum # 562	0.1700	0.163	0.00473	1.070	0.0	Pass
GEM Drum # 564	0.0750	0.141	0.00255	0.908	0.0	Pass
GEM Drum # 566	0.0512	0.152	0.00278	0.995	0.0	Pass
GEM Drum # 568	0.2510	0.139	0.00	0.864	0.0	Pass
GEM Drum # 570	0.0749	0.160	0.00186	1.040	0.0	Pass

Student t-test

Number of samples = n = 5

Mean = $\bar{x} = \sum x_i / n$

Variance = $s^2 = \sum(x_i - \bar{x})^2 / (n-1)$

Degrees of freedom for n observations = n-1 = 4

From standard t-tables, the factor "z" for 95% confidence limit ($t_{0.95}$ or $\alpha_{0.05}$) for 4 degrees of freedom is 2.13.

Upper acceptance limit for 95% confidence for a 1-tailed t-test, at 4 degrees of freedom is:

Acceptance limit - $(s \times 2.13)/n^{1/2}$

Table 2. TCLP means, variances, and upper acceptance limits for 95% confidence.

Element	mean ($\bar{x}$)	Variance (s^2)	s	Acceptance limit (mg/L)	Upper acceptance limit for 95% confidence
Chromium	0.1244	0.00709	0.0842	0.86	0.7798
Nickel	0.1510	0.00012	0.0108	5.0	4.9897
Lead	0.0024	2.91 E-6	0.0017	0.37	0.3684
Uranium	0.9754	0.00762	0.0873	4.0	3.9169

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h Carolina 29...
P.O. Box 30712
Charleston, South Carolina 29...
(803) 556-8171

CHAIN OF CUSTODY RECORD

9803580

Page 1 of 1

Client Name/Facility Name: CTS Dunalek

Collected by/Company: Same

Use F or P in the boxes to indicate whe... sample was filtered and/or preserve...

SAMPLE ANALYSIS REQUIRED (x) - use remarks area to specify specific compounds or methods

	SAMPLE ID	DATE	TIME	WELL	SOIL	COMP	GRAB	# OF CONTAINERS	pH, conductivity	TOC/DOC	TOX	Chloride, Fluoride, Sulfide	Nitrite/Nitrate	VOC - Specify Method required	Metals - specify	Pesticide	Herbicide	Total Phenol	Acid Extractables	B/N Extractables	PCB's	Cyanide	Coliform - specify type	Pb/Cr		Remarks
01	VTF 319	3/23/98	1600				V	1					/		/									/		568
02	VTF 320	3/23/98	1600				X	1					/		/									/		570
03	VTF 317	3/23/98	1600				X	1					/		/									/		564
04	V. 318	3/23/98	1600				X	1					/		/									/		566
05	VTF 316	3/23/98	1600				X	1					/		/									/		562

Relinquished by:	Date:	Time:	Received by:	Relinquished by:	Date:	Time:	Received by:

Relinquished by:	Date:	Time:	Received by lab by:	Date:	Time:	Remarks:
			[signature]	3-23-98	1580	

White = sample collector Yellow = file Pink = with report

MAR. -31 98(TUE) 14:40 GEN. ENGINEERING TEL:803-852-5812 P. 002

Blank

DURATEK
10100 Old Columbia Road
Columbia, Maryland 21046
410/312-5100 Fax 410/290-9070

L-98-022

March 26, 1998

Mr. Dan Bills
Subcontract Technical Representative
Westinghouse Savannah River Company
Building 730-M
Aiken, SC 29802

Final Wasteform Treatment Standards and Acceptance Criteria

Dear Mr. Bills:

GTS Duratek has completed sampling and analysis of the final wasteform, Batch #9, drums 492, 494, 496, 498, and 500. The results of the analysis, including the analysis technique, is attached for your review. The analysis was performed by General Engineering Laboratories, a State of South Carolina certified lab, and verified by Mr. Innocent Joseph, Manager of Technology, GTS Duratek.

Results of the analysis indicate Batch #9 is within the contractual specifications. GTS Duratek will invoice directly through accounts payable (Brenda Bell, Bldg. 730-4B). A total of 82 drums of glass were produced for Batch #9. Should you have any questions, please contact Innocent Joseph or myself.

Sincerely,

GTS DURATEK

Daniel Macias
Director of Operations

DM/mlb
attachment

cc: S. Campbell
C. Coker

DURATEK
10100 Old Columbia Road
Columbia, Maryland 21046
410/312-5100 Fax 410/290-9070

March 25, 1998

Mr. Dan Macias
Operations Manger
Vendor Treatment Facility (M-area)
GTS Duratek
WSRC/USDOE Savannah River Site
Aiken, SC 29801

Dear Mr. Macias:

Please find enclosed the results of the "TCLP" and 'Paint Filter Test" on glass gems from drums 492, 494, 496, 498, and 500. The tests were performed according to methods specified in the "Sampling Plan" for GTS Duratek's Vendor Treatment Facility at the Savannah River site. 1-tailed t-tests were performed on the TCLP data, and the upper acceptance limits for 95% confidence were calculated. The TCLP values are well below the upper acceptance limits for 95% confidence. All of the samples passed the "Paint Filter Test." The samples from Batch # 9 have therefore met all of the acceptance criteria for the glass product.

The calculations for sample means, variances, upper acceptance limits for 95% confidence, data sheets from General Engineering Laboratories, and a sample chain of custody record are enclosed. If you have any questions, please contact me at (410) 312-5120.

Sincerely
Innocent Joseph
Innocent Joseph
Manager, Technology
GTS Duratek

cc: P. Deltete
J. Pope
B. Bowan
G. Hildebrandt
C. Coker

The ninth batch of glass gems produced at the GTS Duratek M-area facility were subjected to "paint filter test" for free water, and "TCLP" for leaching characteristics at General Engineering Laboratories, a South Carolina licensed laboratory. The "paint filter test" and the "TCLP" were done according to EPA procedures 9095 and 1311, respectively. Please find enclosed the results for glass samples from drums 492 to 500. The results of the tests are summarized below. 1-tailed t-tests were performed, and the upper limits for 95% confidence were calculated.

The TCLP values are below the acceptance limit for 95% confidence.

Table 1. Summary of TCLP results

Sample ID	Chromium (mg/L)	Nickel (mg/L)	Lead (mg/L)	Uranium (mg/L)	Nitrate (as N)	Paint filter test
GEM Drum # 492	0.0122	0.130	0.00262	0.878	0.197	Pass
GEM Drum # 494	0.0354	0.153	0.00338	0.919	0.040	Pass
GEM Drum # 496	0.0697	0.151	0.00276	0.782	0.0	Pass
GEM Drum # 498	0.0333	0.121	0.00251	0.732	0.0	Pass
GEM Drum # 500	0.2550	0.269	0.00295	0.745	0.0	Pass

Student t-test

Number of samples = n = 5

Mean = $\bar{x} = \sum x_i / n$

Variance = $s^2 = \sum(x_i - \bar{x})^2 / (n-1)$

Degrees of freedom for n observations = n-1 = 4

From standard t-tables, the factor "z" for 95% confidence limit ($t_{0.95}$ or $\alpha_{0.05}$) for 4 degrees of freedom is 2.13.

Upper acceptance limit for 95% confidence for a 1-tailed t-test, at 4 degrees of freedom is:

Acceptance limit $(\bar{x} + 2.13)/\sqrt{n}$

Table 2. TCLP means, variances, and upper acceptance limits for 95% confidence.

Element	mean ($\bar{x}$)	Variance (s^2)	s	Acceptance limit (mg/L)	Upper acceptance limit for 95% confidence
Chromium	0.08112	0.00987	0.0994	0.86	0.7654
Nickel	0.1648	0.00358	0.0598	5.0	4.9430
Lead	0.00284	1.17 E-7	0.0003	0.37	0.3697
Uranium	0.8112	0.00690	0.0831	4.0	3.9209

Batch #9 Glass TCLP Samples RM-98-05

SHIPMENT DESTINED TO	SAMPLE CONTAINER IDENTIFICATION		DATE/TIME OF PACKAGING		SAMPLE NET WEIGHT	SHIPPING CONTAINER/ CONTAINER GROSS WEIGHT	SEAL # (IF APPLICABLE)
General Engineering Laboratories 1040 Savage Rd. Chasn. SC 29414	Sample#	Drum#			Grams	Grams	N/A
	VTF-238	492	03/05/98	1130	649	739	
	VTF-241	494	03/05/98	1810	235.6	269	
	VTF-248	496	03/06/98	2000	440	508	
	VTF-249	498	03/06/98	2200	542	610	
	VTF-251	500	03/06/98	1400	80.6	114	
	Shipping Container		N/A		2374	4723	

INFORMATION ONLY

ments: Shipping Number SRS-16013

Shipping Forms\...

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DURATEK

10100 Old Columbia Road
Columbia, Maryland 21046
410/312-5100 Fax 410/290-9070

March 20, 1998

Mr. Dan Macias
Operations Manger
Vendor Treatment Facility (M-area)
GTS Duratek
WSRC/USDOE Savannah River Site
Aiken, SC 29801

Dear Mr. Macias:

Please find enclosed the results of the "TCLP" and 'Paint Filter Test" on glass gems from drums 410, 412, 414, 416, and 418. The tests were performed according to methods specified in the "Sampling Plan" for GTS Duratek's Vendor Treatment Facility at the Savannah River site. 1-tailed t-tests were performed on the TCLP data, and the upper acceptance limits for 95% confidence were calculated. The TCLP values are well below the upper acceptance limits for 95% confidence. All of the samples passed the "Paint Filter Test." The samples from Batch #8 have therefore met all of the acceptance criteria for the glass product.

The calculations for sample means, variances, upper acceptance limits for 95% confidence, data sheets from General Engineering Laboratories, and a sample chain of custody record are enclosed. If you have any questions, please contact me at (410) 312-5120.

Sincerely

Innocent Joseph

Innocent Joseph
Manager, Technology
GTS Duratek

cc: P. Deltete
J. Pope
B. Bowan
G. Hildebrandt
C. Coker

The third batch of glass gems produced at the GTS Duratek M-area facility were subjected to "paint filter test" for free water, and "TCLP" for leaching characteristics at General Engineering Laboratories, a South Carolina licensed laboratory. The "paint filter test" and the "TCLP" were done according to EPA procedures 9095 and 1311, respectively. Please find enclosed the results for glass samples from drums 410 to 418. The results of the tests are summarized below. 1-tailed t-tests were performed, and the upper limits for 95% confidence were calculated.

The TCLP values are below the acceptance limit for 95% confidence.

Table 1. Summary of TCLP results

Sample ID	Chromium (mg/L)	Nickel (mg/L)	Lead (mg/L)	Uranium (mg/L)	Nitrate (as N)	Paint filter test
GEM Drum # 410	0.00711	0.152	0.00129	1.050	0.0	Pass
GEM Drum # 412	0.00936	0.175	0.00148	1.200	0.0	Pass
GEM Drum # 414	0.0609	0.201	0.0567	1.250	0.0	Pass
GEM Drum # 416	0.00968	0.195	0.00445	1.320	0.0	Pass
GEM Drum # 418	0.00872	0.179	0.00226	1.210	0.0	Pass

Student t-test

Number of samples = n = 5

Mean = $\bar{x} = \sum x_i / n$

Variance = $s^2 = \sum (x_i - \bar{x})^2 / (n-1)$

Degrees of freedom for n observations = n-1 = 4

From standard t-tables, the factor "z" for 95% confidence limit ($t_{0.95}$ or $\alpha_{0.05}$) for 4 degrees of freedom is 2.13.

Upper acceptance limit for 95% confidence for a 1-tailed t-test, at 4 degrees of freedom is:

Acceptance limit - $(s \times 2.13)/n^{1/2}$

Table 2. TCLP means, variances, and upper acceptance limits for 95% confidence.

Element	mean ($\bar{x}$)	Variance (s^2)	s	Acceptance limit (mg/L)	Upper acceptance limit for 95% confidence
Chromium	0.0192	0.00055	0.0234	0.86	0.8378
Nickel	0.1804	0.00037	0.0192	5.0	4.9817
Lead	0.0132	0.00059	0.0243	0.37	0.3468
Uranium	1.206	0.00983	0.0991	4.0	3.9056

Charleston, South Carolina [illegible]07
P.O. Box 30712
Charleston, South Carolina 29417
(803) 556-8171

CHAIN OF CUSTODY RECORD

9803285

Page 1 of 1

Client Name/Facility Name: ETS Duratek

Collected by/Company:

SAMPLE ID	DATE	TIME	WELL	SOIL	COMP	GRAB	# OF CONTAINERS
VTF178	2/23	1201					
VTF186	2/23	2318					
VTF175	2/23	0036					
VTF176	2/23	0601					
VTF177	2/23	0601					

SAMPLE ANALYSIS REQUIRED (x) - use remarks area to specify specific compounds or methods

pH, conductivity	TOC/DOC	TOX	Chloride, Fluoride, Sulfide	Nitrite/Nitrate	VOC - Specify Method required	METALS - specify	Pesticide	Herbicide	Total Phenol	Acid Extractables	B/N Extractables	PCB's	Cyanide	Coliform - specify type

Use F or P in the boxes to indicate whether sample was filtered and/or preserved

21268

Remarks
416
418
410
412
414
Use .4+.5 on all samples listed above

Relinquished by:	Date:	Time:	Received by:	Relinquished by:	Date:	Time:	Received by:

Relinquished by:	Date:	Time:	Received by lab by:	Date:	Time:	Remarks:
			Donnie Lance	3/12/98		

White = sample collector Yellow = file Pink = with report

DURATEK
10100 Old Columbia Road
Columbia, Maryland 21046
410/312-5100 Fax 410/290-9070

L-98-018

March 23, 1998

Mr. Dan Bills
Subcontract Technical Representative
Westinghouse Savannah River Company
Building 730-M
Aiken, SC 29802

Final Wasteform Treatment Standards and Acceptance Criteria

Dear Mr. Bills:

GTS Duratek has completed sampling and analysis of the final wasteform, Batch #7, drums 360, 362, 364, 366, 368, and Batch #8, drums 410, 412, 414, 416, and 418. The results of the analysis, including the analysis technique, is attached for your review. The analysis was performed by General Engineering Laboratories, a State of South Carolina certified lab, and verified by Mr. Innocent Joseph, Manager of Technology, GTS Duratek.

Results of the analysis indicate Batch #7 and Batch #8 are within the contractual specifications. GTS Duratek will invoice directly through procurement (Sharon Campbell). A total of 102 drums of glass were produced for Batch #7 and Batch #8. Analysis results for Batch #6 and Batch #9 should be received by 3/26/98. Should you have any questions, please contact Innocent Joseph or myself.

Sincerely,

GTS DURATEK

Daniel Macias
Director of Operations

DM/mlb
attachment

cc: S. Campbell
C. Coker

DURATEK

10100 Old Columbia Road
Columbia, Maryland 21046
410/312-5100 Fax 410/290-9070

March 20, 1998

Mr. Dan Macias
Operations Manger
Vendor Treatment Facility (M-area)
GTS Duratek
WSRC/USDOE Savannah River Site
Aiken, SC 29801

Dear Mr. Macias:

Please find enclosed the results of the "TCLP" and 'Paint Filter Test" on glass gems from drums 360, 362, 364, 366, and 368. The tests were performed according to methods specified in the "Sampling Plan" for GTS Duratek's Vendor Treatment Facility at the Savannah River site. 1-tailed t-tests were performed on the TCLP data, and the upper acceptance limits for 95% confidence were calculated. The TCLP values are well below the upper acceptance limits for 95% confidence. All of the samples passed the "Paint Filter Test." The samples from Batch # 7 have therefore met all of the acceptance criteria for the glass product.

The calculations for sample means, variances, upper acceptance limits for 95% confidence, data sheets from General Engineering Laboratories, and a sample chain of custody record are enclosed. If you have any questions, please contact me at (410) 312-5120.

Sincerely

Innocent Joseph

Innocent Joseph
Manager, Technology
GTS Duratek

cc: P. Deltete
J. Pope
B. Bowan
G. Hildebrandt
C. Coker

The seventh batch of glass gems produced at the GTS Duratek M-area facility were subjected to "paint filter test" for free water, and "TCLP" for leaching characteristics at General Engineering Laboratories, a South Carolina licensed laboratory. The "paint filter test" and the "TCLP" were done according to EPA procedures 9095 and 1311, respectively. Please find enclosed the results for glass samples from drums 360 to 368. The results of the tests are summarized below. 1-tailed t-tests were performed, and the upper limits for 95% confidence were calculated.

The TCLP values are below the acceptance limit for 95% confidence.

Table 1. Summary of TCLP results

Sample ID	Chromium (mg/L)	Nickel (mg/L)	Lead (mg/L)	Uranium (mg/L)	Nitrate (as N)	Paint filter test
GEM Drum # 360	0.00819	0.195	0.00129	1.170	0.0	Pass
GEM Drum # 362	0.0134	0.222	0.00153	1.410	0.0	Pass
GEM Drum # 364	0.0139	0.246	0.00162	1.550	0.0	Pass
GEM Drum # 366	0.0114	0.202	0.00150	1.310	0.0	Pass
GEM Drum # 368	0.0124	0.235	0.00158	1.460	0.0	Pass

Student t-test

Number of samples = n = 5

Mean = $\bar{x} = \sum x_i / n$

Variance = $s^2 = \sum (x_i - \bar{x})^2 / (n-1)$

Degrees of freedom for n observations = n-1 = 4

From standard t-tables, the factor "z" for 95% confidence limit ($t_{0.95}$ or $\alpha_{0.05}$) for 4 degrees of freedom is 2.13.

Upper acceptance limit for 95% confidence for a 1-tailed t-test, at 4 degrees of freedom is:

Acceptance limit - $(s \times 2.13)/n^{1/2}$

Table 2. TCLP means, variances, and upper acceptance limits for 95% confidence.

Element	mean ($\bar{x}$)	Variance (s^2)	s	Acceptance limit (mg/L)	Upper acceptance limit for 95% confidence
Chromium	0.0119	5.13 E-6	0.00226	0.86	0.858
Nickel	0.220	0.00046	0.02153	5.0	4.979
Lead	0.0015	1.64 E-8	0.00013	0.37	0.3699
Uranium	1.380	0.0213	0.14595	4.0	3.861

4.5/8

CHAIN OF CUSTODY

98032886

Page 1 of 1

(803) 556-8171

Client Name/Facility Name: GTSD

Collected by/Company:

Use F or P in the boxes to indicate whether sample was filtered and/or preserved

21268

SAMPLE ANALYSIS REQUIRED (x) - use remarks area to specify specific compounds or methods

SAMPLE ID	DATE	TIME	WELL	SOIL	COMP	GRAB	# OF CONTAINERS	pH, conductivity	TOC/DOC	TOX	Chloride, Fluoride, Sulfide	Nitrite/Nitrate	VOC - Specify Method required	METALS - specify	Pesticide	Herbicide	Total Phenol	Acid Extractables	B/N Extractables	PCB's	Cyanide	Coliform - specify type	Remarks
VTF149	2-16	2350																					# 360
VTF153	2-17	2105																					368
VTF151	2-17	1000																					364
VTF152	2-17	2105																					366
VTF150	2-17	0430																					362

Relinquished by:	Date:	Time:	Received by:	Relinquished by:	Date:	Time:	Received by:

Relinquished by:	Date:	Time:	Received by lab by:	Date:	Time:	Remarks:
			Donie Francis	3/12/98		

White = sample collector Yellow = file Pink = with report

DURATEK
10100 Old Columbia Road
Columbia, Maryland 21046
410/312-5100 Fax 410/290-9070

L-98-022

March 25, 1998

Mr. Dan Bills
Subcontract Technical Representative
Westinghouse Savannah River Company
Building 730-M
Aiken, SC 29802

Final Wasteform Treatment Standards and Acceptance Criteria

Dear Mr. Bills:

GTS Duratek has completed sampling and analysis of the final wasteform, Batch #6, drums 308, 310, 312, 314, and 316. The results of the analysis, including the analysis technique, is attached for your review. The analysis was performed by General Engineering Laboratories, a State of South Carolina certified lab, and verified by Mr. Innocent Joseph, Manager of Technology, GTS Duratek.

Results of the analysis indicate Batch #6 is within the contractual specifications. GTS Duratek will invoice directly through accounts payable (Brenda Bell, Bldg. 730-4B). A total of 72 drums of glass were produced for Batch #6. Should you have any questions, please contact Innocent Joseph or myself.

Sincerely,

GTS DURATEK

Daniel Macias
Director of Operations

DM/mlb
attachment

cc: S. Campbell
C. Coker

DURATEK

10100 Old Columbia Road
Columbia, Maryland 21046
410/312-5100 Fax 410/290-9070

March 24, 1998

Mr. Dan Macias
Operations Manger
Vendor Treatment Facility (M-area)
GTS Duratek
WSRC/USDOE Savannah River Site
Aiken, SC 29801

Dear Mr. Macias:

Please find enclosed the results of the "TCLP" and 'Paint Filter Test" on glass gems from drums 308, 310, 312, 314, and 316. The tests were performed according to methods specified in the "Sampling Plan" for GTS Duratek's Vendor Treatment Facility at the Savannah River site. 1-tailed t-tests were performed on the TCLP data, and the upper acceptance limits for 95% confidence were calculated. The TCLP values are well below the upper acceptance limits for 95% confidence. All of the samples passed the "Paint Filter Test." The samples from Batch # 6 have therefore met all of the acceptance criteria for the glass product.

The calculations for sample means, variances, upper acceptance limits for 95% confidence, data sheets from General Engineering Laboratories, and a sample chain of custody record are enclosed. If you have any questions, please contact me at (410) 312-5120.

Sincerely

Innocent Joseph

Innocent Joseph
Manager, Technology
GTS Duratek

cc: P. Deltete
J. Pope
B. Bowan
G. Hildebrandt
C. Coker

The sixth batch of glass gems produced at the GTS Duratek M-area facility were subjected to "paint filter test" for free water, and "TCLP" for leaching characteristics at General Engineering Laboratories, a South Carolina licensed laboratory. The "paint filter test" and the "TCLP" were done according to EPA procedures 9095 and 1311, respectively. Please find enclosed the results for glass samples from drums 308 to 316. The results of the tests are summarized below. 1-tailed t-tests were performed, and the upper limits for 95% confidence were calculated.

The TCLP values are below the acceptance limit for 95% confidence.

Table 1. Summary of TCLP results

Sample ID	Chromium (mg/L)	Nickel (mg/L)	Lead (mg/L)	Uranium (mg/L)	Nitrate (as N)	Paint filter test
GEM Drum # 308	0.0204	0.278	0.00294	1.770	< 0.03	Pass
GEM Drum # 310	0.0201	0.299	0.00352	1.810	0.232	Pass
GEM Drum # 312	0.0193	0.244	0.00283	1.540	< 0.03	Pass
GEM Drum # 314	0.0177	0.280	0.00314	1.760	0.127	Pass
GEM Drum # 316	0.0191	0.182	0.00223	1.280	0.113	Pass

Student t-test

Number of samples = n = 5

Mean = $\bar{x} = \sum x_i / n$

Variance = $s^2 = \sum(x_i - \bar{x})^2 / (n-1)$

Degrees of freedom for n observations = n-1 = 4

From standard t-tables, the factor "z" for 95% confidence limit ($t_{0.95}$ or $\alpha_{0.05}$) for 4 degrees of freedom is 2.13.

Upper acceptance limit for 95% confidence for a 1-tailed t-test, at 4 degrees of freedom is:

Acceptance limit - $(s \times 2.13)/n^{1/2}$

Table 2. TCLP means, variances, and upper acceptance limits for 95% confidence.

Element	mean ($\bar{x}$)	Variance (s^2)	s	Acceptance limit (mg/L)	Upper acceptance limit for 95% confidence
Chromium	0.01932	1.11 E-6	0.0011	0.86	0.8590
Nickel	0.2566	0.00213	0.0462	5.0	4.9560
Lead	0.00293	2.23 E-7	0.0005	0.37	0.3696
Uranium	1.632	0.04987	0.2233	4.0	3.7873

RS-98-213

GTS Duratek Pr (SF)

Surveyor Name (Print): K. DAVIS Signature: K. Davis Date: 2-12-98 Time: 16:30

Location/Component Description: 341-9m / VTF-SAMPLES # 84, 85, 86, 87 & 88

Purpose: Routine N/A Shift / Daily / Weekly / Monthly. RWP # 98-VTF-004

Instrument: Type 3 No. 141562 Cal Due 8-20-98 Type 2929 No. 118419 Cal Due 4-8-98
Type 3 No. 121606 Cal Due 9-15-98 Type RO-20 No. 1351 Cal Due 5-17-98

Legend: □ Denotes Air Sample • Denotes Contact Dose Rate
○ Denotes Smear Location _ Denotes General Area Dose Rate (In MREM/hr)

9802755

SAMPLE # VTF-88 02 07
TARE 70.29g
GROSS 219.78g
NET 149.52g
* 4.4 MRAD/HR B
(1)
DRUM # 316

SAMPLE # VTF-87
GROSS 315.12g
TARE 33.43g
NET 281.69g
* 4.4 MRAD/HR B
(2)
DRUM # 314

03 08 SAMPLE # VTF-86
GROSS 339.54g
TARE 33.43g
NET 306.11g
* 6.4 MRAD/HR B
(3)
DRUM # 312

04 09 SAMPLE # VTF-85
GROSS 202.07g
TARE 33.44g
NET 168.63g
* 5.5 MRAD B
(4)
DRUM # 310

05 10 SAMPLE # VTF-84
GROSS 221.64g
TARE 33.43g
NET 188.21
* 8 MRAD/HR B
(5)
DRUM # 308

N/A

N/A

N/A

N/A

Batch 6

	Beta, Gamma	Alpha
1.	<200	<20
2.	<200	<20
3.	<200	<20
4.	<200	<20
5.	<200	<20
6.		
7.		
8.		
9.		
10.		
11.		
12.		
13.	N	A
14.		
15.		
16.		
17.		
18.		
19.		
20.		
21.		
22.		
23.		
24.		
25.		
26.		
27.		

.1
.2

Comments: All Dose Rates are Contact. All Smear Samples are ND MDA = 1000 DPM/100cm²
All Samples Performed for Shipment. All Smear Dose Rates are ≤ 0.5 MR/HR @ Contact.

RSS Review/Date: 2/13/98 Recvd 2-26-98

Blank

DURATEK
10100 Old Columbia Road
Columbia, Maryland 21046
410/312-5100 Fax 410/290-9070

L-98-005

February 4, 1998

Mr. Dan Bills
Subcontract Technical Representative
Westinghouse Savannah River Company
Building 730-M
Aiken, SC 29802

Final Wasteform Treatment Standards and Acceptance Criteria

Dear Mr. Bills:

GTS Duratek has completed sampling and analysis of the final wasteform, Batch #5, Drums 176, 184, 192, 200, 208, 216, 224, 232 and 240. For this batch, a revised sampling protocol was performed as specified in a letter from Sharon Campbell to Christopher Coker dated November 6, 1997. The results of the analysis, including the analysis technique, is attached for your review. The analysis was performed by General Engineering Laboratories, a State of South Carolina certified lab, and verified by Mr. Innocent Joseph, Manager of Technology, GTS Duratek.

Results of the analysis indicate Batch #5 is within the contractual specifications. GTS Duratek will invoice directly through procurement (Sharon Campbell). A total of 75 drums of glass were produced for Batch #5. Should you have any questions, please contact Innocent Joseph or myself.

Sincerely,

GTS DURATEK

Daniel Macias
Director of Operations

DM/mlb
attachment

cc: S. Campbell

DURATEK

10100 Old Columbia Road
Columbia, Maryland 21046
410/312-5100 Fax 410/290-9070

February 3, 1998

Mr. Dan Macias
Operations Manger
Vendor Treatment Facility (M-area)
GTS Duratek
WSRC/USDOE Savannah River Site
Aiken, SC 29801

Dear Mr. Macias:

Please find enclosed the results of the "TCLP" and 'Paint Filter Test" on glass gems from drums 176, 184, 192, 200, 208, 216, 224, 232, and 240. The tests were performed according to methods specified in the "Sampling Plan" for GTS Duratek's Vendor Treatment Facility at the Savannah River site. For this particular batch, we followed a revised sampling protocol as specified in the letter from Sharon Campbell to Christopher Coker dated November 6, 1997. Every eighth drum was sampled, and TCLP results were averaged for all constituents. The average TCLP values are well below the acceptance limits. All of the samples passed the "Paint Filter Test." The samples from Batch # 5 have therefore met all of the acceptance criteria for the glass product.

Summary of the results, data sheets from General Engineering Laboratories, and a sample chain of custody record are enclosed. If you have any questions, please contact me at (410) 312-5120.

Sincerely

Innocent Joseph

Innocent Joseph
Manager, Technology
GTS Duratek

cc: P. Deltete
B. Bowan
G. Hildebrandt
C. Coker

The fifth batch (first batch after re-start) of glass gems produced at the GTS Duratek M-area facility were subjected to "paint filter test" for free water, and "TCLP" for leaching characteristics at General Engineering Laboratories, a South Carolina licensed laboratory. The "paint filter test" and the "TCLP" were done according to EPA procedures 9095 and 1311, respectively. Please find enclosed the results for glass samples from drums 176 to 240. Analysis was done according to the revised sampling protocol specified in the letter from Sharon Campbell to Christopher Coker dated November 6, 1997. Every eighth drum was sampled, and TCLP results were averaged for all constituents. The results are summarized below.

The average TCLP values are below the acceptance limits.

Table 1. Summary of TCLP results

Sample ID	Chromium (mg/L)	Nickel (mg/L)	Lead (mg/L)	Uranium (mg/L)	Nitrate (as N) (mg/kg)	Paint filter test
GEM Drum # 176	< 0.03	0.319	0.00266	0.847	< 0.05	Pass
GEM Drum # 184	< 0.03	0.210	< 0.00200	0.994	< 0.05	Pass
GEM Drum # 192	< 0.03	0.249	< 0.00200	1.220	< 0.05	Pass
GEM Drum # 200	0.0399	0.279	0.00200	1.400	< 0.05	Pass
GEM Drum # 208	0.0438	0.190	< 0.00200	1.100	< 0.05	Pass
GEM Drum # 216	0.0460	0.175	< 0.00200	1.000	< 0.05	Pass
GEM Drum # 224	0.0419	0.226	< 0.00200	1.310	< 0.05	Pass
GEM Drum # 232	0.0410	0.176	< 0.00200	1.080	< 0.05	Pass
GEM Drum # 240	0.0433	0.252	< 0.00200	1.440	< 0.05	Pass
Average	**0.0384**	**0.231**	**0.0021**	**1.155**	**< 0.05**	**Pass**
Acceptance Limits	***0.86***	***5.0***	***0.37***	***4.0***	***500.0***	***Pass***

GTS DURATEK SHIPPING CHAIN OF CUSTODY

ETSD004196

M-Area Batch #5 Glass TCLP Samples RM-98-01

980585

212608.4 & 212608.

SHIPMENT DESTINED TO	SAMPLE CONTAINER IDENTIFICATION		TIME/DATE OF PACKAGING	SAMPLE NET WEIGHT	SHIPPING CONTAINER/ CONTAINER GROSS WEIGHT	SEAL # (IF APPLICABLE)
General Engineering Laboratories 2040 Savage Rd, Chasn. SC 29414		Drum #		Grams	Grams	N/A
	GTS-3101	176	12/14/97 2035	191	222	
	GTS-3101	184	12/15/97 0630	237	268	
	VTF-4	192	12/20/97 1600	297	328	
	VTF-10	200	12/22/97 2309	252	283	
	VTF-13	208	12/24/97 2230	101	132	
	VTF-15	216	12/26/97 1205	92	123	
	VTF-18	224	12/30/97 1230	289	320	
	VTF-24	232	12/31/97 1850	126	157	
	VTF-26	240	01/02/98 0430	203	234	
	OVERPACK		1/20/98 1200	3.5 lbs	8.5 lbs	

Comments:

INFORMATION ONLY

Relinquished by:		Received by:	DIONNE FRANCIS
Organization:		Organization	GEL
Date:		Date:	1/23/98
Time:		Time:	1500
Relinquished by:		Received by:	
Organization:		Organization	
Date:		Date:	
Time:		Time:	

C:\RCO\FORMS\Shipping Form

FEB.-04'98(WED) 17:45 GEL MRKTNG/ACCT/QUAL TEL:803 769 7376-4028 P.002

DURATEK
8955 Guilford Road, Suite 200
Columbia, Maryland 21046
410/312-5100 Fax 301/621-8211

L-97-076

July 2, 1997

Mr. Dan Bills
Subcontract Technical Representative
Westinghouse Savannah River Company
Building 730-M
Aiken, SC 29802

Final Wasteform Treatment Standards and Acceptance Criteria

Dear Mr. Bills:

GTS Duratek has completed sampling and analysis of the final wasteform, Batch #4, Drums 160, 162, 164, 166 and 168. Testing was performed per GTS Durateks' Sampling Plan in order to meet the contractual requirements of sections 9.1.1.2a and 9.1.1.2b of specification X-SPP-M-00001, Rev. 9. The results of the analysis, including the statistical analysis technique, is attached for your review. The analysis was performed by General Engineering Laboratories, a State of South Carolina certified lab, and verified by Mr. Innocent Joseph, Manager of Technology, GTS Duratek.

Results of the analysis indicate Batch #4 is within the contractual specifications. GTS Duratek will invoice directly through procurement (Sharon Campbell). Additionally, GTS Duratek is submitting a Supplier Deviation Disposition Request for acceptance of the glass in the melter "as-is." Mr. Chris Coker is submitting this request directly to Ms. Sharon Campbell of WSRC Procurement. Drum #168 (the last drum of glass produced) contained glass that was well below the TCLP acceptance limits. Therefore, the glass in the melter met all the acceptance criteria for the glass product. GTS Duratek will invoice for an additional 4458 kg. of glass, the calculated weight of 14" of glass remaining in the melter. Should you have any questions, please contact Innocent Joseph or myself.

3/27/97

Sincerely,

GTS DURATEK

Daniel Macias
Director of Operations

DM/mlb
attachment

cc: S. Campbell

DURATEK

10100 Old Columbia Road
Columbia, Maryland 21046
410/312-5100 Fax 410/290-9070

June 25, 1997

Mr. Dan Macias
Operations Manger
Vendor Treatment Facility (M-area)
GTS Duratek
WSRC/USDOE Savannah River Site
Aiken, SC 29801

Dear Mr. Macias:

Please find enclosed the results of the "TCLP" and 'Paint Filter Test" on glass gems from drums 160, 162, 164, 166, and 168. The tests were performed according to methods specified in the "Sampling Plan" for GTS Duratek's Vendor Treatment Facility at the Savannah River site. 1-tailed t-tests were performed on the TCLP data, and the upper acceptance limits for 95% confidence were calculated. The TCLP values are well below the upper acceptance limits for 95% confidence. All of the samples passed the "Paint Filter Test." The samples from Batch # 4 have therefore met all of the acceptance criteria for the glass product.

As requested by Mr. Dan Bills (ref: letter from Dan Bills to Dan Macias dated 4-17-97) samples from the last drum of glass (drum 168) produced at the VTF were leach tested. As can be seen from the enclosed results, the TCLP values are well below the acceptance limits. The glass in the melter has therefore met all of the acceptance criteria for the glass product. The total weight of glass in the melter is 4458 kg. For calculation of weight, the glass in the melter was assumed to be a monolith with dimensions of 134"×58"×14" and density of 2.5 g/cc.

The calculations for sample means, variances, upper acceptance limits for 95% confidence, and a sample chain of custody record are enclosed. If you have any questions, please contact me at (410) 312-5100 - ext. 338.

Sincerely

Innocent Joseph

Innocent Joseph
Manager, Technology
GTS Duratek

cc: P. Deltete
B. Bowan
G. Hildebrandt
M. Clements
C. Coker

The fourth batch of glass gems produced at the GTS Duratek M-area facility were subjected to "paint filter test" for free water, and "TCLP" for leaching characteristics at General Engineering Laboratories, a South Carolina licensed laboratory.. The "paint filter test" and the "TCLP" were done according to EPA procedures 9095 and 1311, respectively. Please find enclosed the results for glass samples from drums 160 to 168. The TCLP results of glass from drum 168 will be considered representative of the glass left in the melter (ref: letter from Dan Bills to Dan Macias dated 4-17-97). The results of the tests are summarized below. 1-tailed t-tests were performed, and the upper limits for 95% confidence were calculated.

The TCLP values are below the acceptance limit for 95% confidence.

Table 1. Summary of TCLP results

Sample ID	Chromium (mg/L)	Nickel (mg/L)	Lead (mg/L)	Uranium (mg/L)	Nitrate (as N)	Paint filter test
GEM Drum # 160	0.0864	0.195	0.00363	0.670	Not Detected	Pass
GEM Drum # 162	0.0846	0.200	0.00314	0.693	Not Detected	Pass
GEM Drum # 164	0.0760	0.176	0.00308	0.631	Not Detected	Pass
GEM Drum # 166	0.0803	0.182	0.00346	0.584	Not Detected	Pass
GEM Drum # 168	0.0654	0.156	0.00292	0.524	Not Detected	Pass

Student t-test

Number of samples = n = 5

Mean = $\bar{x} = \sum x_i / n$

Variance = $s^2 = \sum(x_i - \bar{x})^2 / (n-1)$

Degrees of freedom for n observations = n-1 = 4

From standard t-tables, the factor "z" for 95% confidence limit ($t_{0.95}$ or $\alpha_{0.05}$) for 4 degrees of freedom is 2.13.

Upper acceptance limit for 95% confidence for a 1-tailed t-test, at 4 degrees of freedom is:

$$\text{Acceptance limit} - (s \times 2.13)/n^{1/2}$$

Table 2. TCLP means, variances, and upper acceptance limits for 95% confidence.

Element	mean ($\bar{x}$)	Variance (s^2)	s	Acceptance limit (mg/L)	Upper acceptance limit for 95% confidence
Chromium	0.0785	7.02 E-5	0.0084	0.86	0.8520
Nickel	0.1818	0.00030	0.0174	5.0	4.9835
Lead	0.0032	8.46 E-8	0.0003	0.37	0.3697
Uranium	0.6204	0.00462	0.0679	1.8	1.7353

Acceptance limit for Uranium

Drums 166 & 168

Assume Glass in melter is similar to last glass removed. (last 2 drums).

t_{95} for $n-1$ = 6.314 where $n=2$

U Ave = $\frac{0.584 + 0.524}{2} = 0.554$

S (std. dev.) = $\sqrt{\frac{\Sigma(x-\bar{x})^2}{n-1}} = \sqrt{\frac{(0.03+0.03)^2}{2-1}} = 0.06$

Upper confidence Level, at 95%

= $t_{95\text{-for } n-1} \times \frac{S}{\sqrt{n}} = 6.314 \times \frac{0.06}{\sqrt{2}} = 6.314 \times \frac{0.06}{1.41}$

= 0.268

Acceptance Limit = 1.80 − 0.27 = 1.53

vs average of 0.55 −

glass poured

JMM

Blank

DURATEK

10100 Old Columbia Road
Columbia, Maryland 21046
410/312-5100 Fax 410/290-9070

L-97-038

April 15, 1997

Mr. Dan Bills
Subcontract Technical Representative
Westinghouse Savannah River Company
Building 730-M
Aiken, SC 29802

Subject: Final Wasteform Treatment Standards and Acceptance Criteria

Dear Mr. Bills:

GTS Duratek has completed sampling and analysis of the final wasteform, Batch #3, Drums 110, 112, 114, 116, and 118. Testing was performed per GTS Durateks' Sampling Plan in order to meet the contractual requirements of sections 9.1.1.2a and 9.1.1.2b of specification X-SPP-M-00001, Rev. 9. The results of the analysis, including the statistical analysis technique, is attached for your review. The analysis was performed by General Engineering Laboratories, a State of South Carolina certified lab, and verified by Mr. Innocent Joseph, Manager of Technology, GTS Duratek.

Results of the analysis indicate Batch #3 is within the contractual specifications. GTS Duratek will invoice directly through procurement (Sharon Campbell). Should you have any questions, please contact Innocent Joseph or myself.

Sincerely,

GTS DURATEK

Daniel Macias
Director of Operations

DM/mlb
attachment

DURATEK
10100 Old Columbia Road
Columbia, Maryland 21046
410/312-5100 Fax 410/290-9070

April 11, 1997

Mr. Dan Macias
Operations Manger
Vendor Treatment Facility (M-area)
GTS Duratek
WSRC/USDOE Savannah River Site
Aiken, SC 29801

Dear Mr. Macias:

Please find enclosed the results of the "TCLP" and 'Paint Filter Test" on glass gems from drums 110, 112, 114, 116, and 118. The tests were performed according to methods specified in the "Sampling Plan" for GTS Duratek's Vendor Treatment Facility at the Savannah River site. 1-tailed t-tests were performed on the TCLP data, and the upper acceptance limits for 95% confidence were calculated. The TCLP values are well below the upper acceptance limits for 95% confidence. All of the samples passed the "Paint Filter Test." The samples from Batch # 3 have therefore met all of the acceptance criteria for the glass product.

The calculations for sample means, variances, upper acceptance limits for 95% confidence, and a sample chain of custody record are enclosed. If you have any questions, please contact me at (410) 312-5100 - ext. 338.

Sincerely

Innocent Joseph

Innocent Joseph
Manager, Technology
GTS Duratek

cc: P. Deltete
B. Bowan
G. Hildebrandt
M. Clements
C. Coker

The third batch of glass gems produced at the GTS Duratek M-area facility were subjected to "paint filter test" for free water, and "TCLP" for leaching characteristics at General Engineering Laboratories, a South Carolina licensed laboratory.. The "paint filter test" and the "TCLP" were done according to EPA procedures 9095 and 1311, respectively. Please find enclosed the results for glass samples from drums 110 to 118. The results of the tests are summarized below. 1-tailed t-tests were performed, and the upper limits for 95% confidence were calculated.

The TCLP values are below the acceptance limit for 95% confidence.

Table 1. Summary of TCLP results

Sample ID	Chromium (mg/L)	Nickel (mg/L)	Lead (mg/L)	Uranium (mg/L)	Nitrate (as N)	Paint filter test
GEM Drum # 110	0.119	0.266	0.00135	0.790	0.0	Pass
GEM Drum # 112	0.131	0.287	0.00173	0.964	0.0	Pass
GEM Drum # 114	0.158	0.356	0.00225	1.040	0.0	Pass
GEM Drum # 116	0.146	0.377	0.00112	1.080	0.0	Pass
GEM Drum # 118	0.132	0.298	0.00145	0.863	0.0	Pass

Student t-test

Number of samples = n = 5

Mean = $\bar{x} = \sum x_i / n$

Variance = $s^2 = \sum(x_i - \bar{x})^2 / (n-1)$

Degrees of freedom for n observations = n-1 = 4

From standard t-tables, the factor "z" for 95% confidence limit ($t_{0.95}$ or $\alpha_{0.05}$) for 4 degrees of freedom is 2.13.

Upper acceptance limit for 95% confidence for a 1-tailed t-test, at 4 degrees of freedom is:

Acceptance limit - $(s \times 2.13)/n^{1/2}$

Table 2. TCLP means, variances, and upper acceptance limits for 95% confidence.

Element	mean ($\bar{x}$)	Variance (s^2)	s	Acceptance limit (mg/L)	Upper acceptance limit for 95% confidence
Chromium	0.137	0.00023	0.015	0.86	0.846
Nickel	0.317	0.00225	0.047	5.0	4.955
Lead	0.0016	1.88 E-7	0.0004	0.37	0.3696
Uranium	0.947	0.01458	0.121	1.8	1.685

a 29414

a 29417

Page____ of ____

9703611

(303) 556-8171

Client Name/Facility Name: GTS Duratek

Collected by/Company: Innocent Joseph

SAMPLE ID	DATE	TIME	WELL	SOIL	COMP	GRAB	# OF CONTAINERS
Gem # 110	2-28-97	0307					
Gem # 112	2-28-97	0307					
Gem # 114	2-28-97	2200					
Gem # 116	3-5-97 2-28-97	1951					
Gem #118	3-1-97	2330					

SAMPLE ANALYSIS REQUIRED (x) - use remarks area to specify specific compounds or methods

pH, conductivity	TOC/DOC	TOX	Chloride, Fluoride, Sulfide	Nitrite/Nitrate	VOC - Specify Method required	METALS - specify	Pesticide	Herbicide	Total Phenol	Acid Extractables	B/N Extractables	PCB's	Cyanide	Coliform - specify type		

Use F or P in the boxes to indicate whether sample was filtered and/or preserved

Q# 21268

Remarks

.1 & .3

Relinquished by:	Date:	Time:	Received by:	Relinquished by:	Date:	Time:	Received by:

Relinquished by:	Date:	Time:	Received by lab by:	Date:	Time:	Remarks:
				3-28-97		

White = sample collector Yellow = file Pink = with report

WSRC-TR-96-0244, Rev. 2; APPENDIX L, Page 693 of 694

DURATEK
10100 Old Columbia Road
Columbia, Maryland 21046
410/312-5100 Fax 410/290-9070

March 6, 1997

Mr. Dan Macias
Operations Manger
Vendor Treatment Facility (M-area)
GTS Duratek
WSRC/USDOE Savannah River Site
Aiken, SC 29801

Dear Mr. Macias:

Please find enclosed the results of the "TCLP" and 'Paint Filter Test" on glass gems from drums 70, 72, 74, 76, and 79. The tests were performed according to methods specified in the "Sampling Plan" for GTS Duratek's Vendor Treatment Facility at the Savannah River site. 1-tailed t-tests were performed on the TCLP data, and the upper acceptance limits for 95% confidence were calculated. The TCLP values are well below the upper acceptance limits for 95% confidence. All of the samples passed the "Paint Filter Test." The samples from Batch # 2 have therefore met all of the acceptance criteria for the glass product.

The calculations for sample means, variances, upper acceptance limits for 95% confidence, and a sample chain of custody record are enclosed. If you have any questions, please contact me at (410) 312-5100 - ext. 338.

Sincerely

Innocent Joseph

Innocent Joseph
Manager, Technology
GTS Duratek

cc: P. Deltete
B. Bowan
G. Hildebrandt
M. Clements

The second batch of glass gems produced at the GTS Duratek M-area facility were subjected to "paint filter test" for free water, and "TCLP" for leaching characteristics at General Engineering Laboratories, a South Carolina licensed laboratory.. The "paint filter test" and the "TCLP" were done according to EPA procedures 9095 and 1311, respectively. Please find enclosed the results for glass samples from drums 70 to 79. The results of the tests are summarized below. 1-tailed t-tests were performed, and the upper limits for 95% confidence were calculated. This analysis was not done for lead because the TCLP results were below the detection limit of the instrument, and orders of magnitude below the acceptance limit.

The TCLP values are well below the acceptance limit for 95% confidence.

Table 1. Summary of TCLP results

Sample ID	Chromium (mg/L)	Nickel (mg/L)	Lead (mg/L)	Uranium (mg/L)	Nitrate (as N)	Paint filter test
GEM Drum # 70	0.132	0.167	Less than detection limit	0.740	Less than detection limit	Pass
GEM Drum # 72	0.151	0.195	Less than detection limit	0.891	Less than detection limit	Pass
GEM Drum # 74	0.160	0.218	Less than detection limit	1.02	Less than detection limit	Pass
GEM Drum # 76	0.140	0.185	Less than detection limit	0.882	Equal to detection limit	Pass
GEM Drum # 79	0.126	0.180	Less than detection limit	0.834	Less than detection limit	Pass

Student t-test

Number of samples = n = 5

Mean = $\bar{x} = \sum x_i / n$

Variance = $s^2 = \sum(x_i - \bar{x})^2 / (n-1)$

Degrees of freedom for n observations = n-1 = 4

From standard t-tables, the factor "z" for 95% confidence limit ($t_{0.95}$ or $\alpha_{0.05}$) for 4 degrees of freedom is 2.13.

Upper acceptance limit for 95% confidence for a 1-tailed t-test, at 4 degrees of freedom is:

$$\text{Acceptance limit} = (s \times 2.13)/n^{1/2}$$

Table 2. TCLP means, variances, and upper acceptance limits for 95% confidence.

Element	mean ($\bar{x}$)	Variance (s^2)	s	Acceptance limit (mg/L)	Upper acceptance limit for 95% confidence
Chromium	0.142	0.00019	0.014	0.86	0.847
Nickel	0.189	0.00037	0.019	5.0	4.982
Uranium	0.873	0.01031	0.102	1.8	1.703

ok ppm

upper confidence ~~acceptance~~ factor limit $= t_{.95} \times \frac{s}{\sqrt{n}} = 2.13 \times \frac{0.102}{\sqrt{5}}$

$= 2.13 \times \frac{0.102}{2.236} = 0.0972$

acceptance upper limit $= 1.800$
$- 0.097$
$= 1.703$

General Engineering Laboratories, Inc
2040 Savage Road
Charleston, South Carolina 29414
P.O. Box 30712
Charleston, South Carolina 29417
(803) 556-8171

Page____ of ____

CHAIN OF CUSTODY RECORD

9702541

Client Name/Facility Name: GTS Duratek - Innocent, Joseph

Collected by/Company: GTSD

SAMPLE ID	DATE	TIME	WELL	SOIL	COMP	GRAB	# OF CONTAINERS	pH, conductivity	TOC/DOC	TOX	Chloride, Fluoride, Sulfide	Nitrite/Nitrate	VOC - Specify Method required	METALS - specify	Pesticide	Herbicide	Total Phenol	Acid Extractables	B/N Extractables	PCB's	Cyanide	Coliform - specify type			Remarks
GemDrum#70	2-4-97	0615																							
GemDrum#79	2-10-97	2215					1																		
GemDrum#72	2-4-97	2302																							
GemDrum#74	2-4-97	2202																							
GemDrum#76	2-6-97	0515																							
GTS-3101-TIII	2-1-97	1418																							
GTS-3101-BH02	1-21-97	1700																							

SAMPLE ANALYSIS REQUIRED (x) - use remarks area to specify specific compounds or methods

Use F or P in the boxes to indicate whether sample was filtered and/or preserved

Q# 21268

Remarks

~~Paint Filter Test~~

TCLP Metals for Ni, Cr, Pb, NO3

Relinquished by:	Date:	Time:	Received by:	Relinquished by:	Date:	Time:	Received by:
Relinquished by:	Date:	Time:	Received by lab by:	Date: 2-26-97	Time:	Remarks:	

White = sample collector Yellow = file Pink = with report

DURATEK
8955 Guilford Road, Suite 200
Columbia, Maryland 21046
410/312-5100 Fax 301/621-8211

L-97-009

February 11, 1997

Mr. Dan Bills
Subcontract Technical Representative
Westinghouse Savannah River Company
Building 730-M
Aiken, SC 29808

Subject: Final Wasteform Treatment Standards and Acceptance Criteria

Dear Mr. Bills:

GTS Duratek has completed sampling and analysis of the final wasteform, Batch #1, Drums 32, 34, 36, 38 and 40. Testing was performed per GTS Durateks' Sampling Plan in order to meet the contractual requirements of sections 9.1.1.2a and 9.1.1.2b of specification X-SPP-M-00001, Rev. 9. The results of the analysis, including the statistical analysis technique, is attached for your review. The analysis was performed by General Engineering Laboratories, a State of South Carolina certified lab, and verified by Mr. Innocent Joseph, Manager of Technology, GTS Duratek.

Results of the analysis indicate Batch #1 is within the contractual specifications. GTS Duratek will invoice directly through procurement (Sharon Campbell). Should you have any questions, please contact Innocent Joseph or myself.

Sincerely,

GTS DURATEK

Daniel Macias
Director of Operations

DM/mlb
attachment

DURATEK

10100 Old Columbia Road
Columbia, Maryland 21046
410/312-5100 Fax 410/290-9070

Mr. Dan Macias
Operations Manger
Vendor Treatment Facility (M-area)
GTS Duratek
WSRC/USDOE Savannah River Site
Aiken, SC

Dear Mr. Macias:

Please find enclosed the results of the "TCLP" and 'Paint Filter Test" on glass gems from drums 32, 34, 36, 38, and 40. The tests were performed according to methods specified in the "Sampling Plan" for GTS Duratek's Vendor Treatment Facility at the Savannah River site. A student t-test was performed on the TCLP data and 95% confidence intervals were calculated. The upper limits of the 95% confidence intervals are well below the limits specified by the acceptance criteria. All of the samples passed the "Paint Filter Test." The samples from Batch # 1 have therefore met all of the acceptance criteria for the glass product.

The calculation for the 95% confidence intervals, and a sample chain of custody record are enclosed. If you have any questions, please contact me at (410) 312-5100 - ext. 338.

Sincerely yours

Innocent Joseph

Innocent Joseph
Manager, Technology
GTS Duratek

cc: P. Deltete
B. Bowan
G. Hildebrandt
M. Clements

The glass gems produced at the GTS Duratek M-area facility were subjected to "paint filter test" for free water and "TCLP" for leaching characteristics at General Engineering Laboratories, a South Carolina licensed laboratory.. The "paint filter test" and the "TCLP" were done according to EPA procedures 9095 and 1311, respectively. Please find enclosed the results for glass samples from drums 32 to 40. The results of the tests are summarized below. Student t-tests were performed and the limits for 95% confidence were calculated.

The 95% confidence limits are well below the limits specified by the acceptance criteria.

Table 1. Summary of TCLP results

Sample ID	Chromium (mg/L)	Nickel (mg/L)	Lead (mg/L)	Uranium (mg/L)	Nitrate (as N)	Paint filter test
GEM Drum # 32	0.394	0.286	0.00189	0.814	Not detected	Pass
GEM Drum # 34	0.409	0.285	0.00186	0.752	Not detected	Pass
GEM Drum # 36	0.452	0.320	0.00170	0.768	Not detected	Pass
GEM Drum # 38	0.427	0.311	0.00134	0.884	Not detected	Pass
GEM Drum # 40	0.571	0.416	0.00172	0.894	Not detected	Pass

Student t-test

Number of samples = N = 5

Mean = $\bar{x} = \sum x_i / N$

Variance = $s^2 = \sum(x_i - \bar{x})^2 / (N-1)$

Degrees of freedom for N observations = N-1 = 4

From standard t-tables, the factor "z" for 95% confidence limits ($t_{0.975}$ or $\alpha_{0.025}$) for 4 degrees of freedom is 2.78.

The 95% confidence limits are therefore $\bar{x} - (2.78 \times s)$ to $\bar{x} + (2.78 \times s)$.

Table 2. 95% confidence limits for the TCLP results

Element	mean ($\bar{x}$)	Variance (s^2)	s	Lower limit (mg/L)	Upper limit (mg/L)	Acceptance limit (mg/L)
Chromium	0.451	0.005	0.071	0.254	0.648	0.86
Nickel	0.324	0.0029	0.054	0.174	0.474	5.0
Lead	0.0017	4.8×10^{-8}	0.00022	0.0011	0.0023	0.37
Uranium	0.822	0.00423	0.065	0.641	1.003	1.8

Cr

Cr; Upper confidence factor = $t(95) \times s/\sqrt{n}$

t statistic, $n-1=4=2.35$

$= 2.35 \times \frac{0.071}{\sqrt{5}} = 0.07$

Acceptance limit = 0.86 − 0.07 = 0.79

mean = 0.45 ; Batch passes, $\Delta = 0.34$

Duratek's calculation is

mean ± t(factor) × $s/\sqrt{2}$ (should have been) they forgot $\sqrt{n}$ term

so Cr 0.45 ± 0.071(2.78) = 0.45 ± 0.197

= 0.253 to 0.647 calculated if done correctly

0.647 < than 0.86; passes. $\Delta \cong 0.22$

Page_____ of _____ 9701765 (803) 556-8171

Client Name/Facility Name	Collected by/Company	SAMPLE ID	DATE	TIME	WELL	SOIL	COMP	GRAB	# OF CONTAINERS	pH, conductivity	TOC/DOC	TOX	Chloride, Fluoride, Sulfide	Nitrite/Nitrate	VOC - Specify Method required	TCLP METALS ~~specify~~	Pesticide	Herbicide	Total Phenol	Acid Extractables	B/N Extractables	PCB's	Cyanide	Coliform - specify type	Remarks
GTSDurotek	Andy Veronee	06 Gem Drum # 38														X									TCLP Metals CR, Ni, U, Pb
		07 GemDrum #40														X									Nitrate
		08 GemDrum #32														X									
		09 Gem Drum #34														X									
		10 Gem Drum #36														X									
		Rad Samples run on TCLP Extract																							

Use F or P in the boxes to indicate whether sample was filtered and/or preserved

Q#21268

SAMPLE ANALYSIS REQUIRED (x) - use remarks area to specify specific compounds or methods

Relinquished by:	Date:	Time:	Received by:	Relinquished by:	Date:	Time:	Received by:

Relinquished by:	Date:	Time:	Received by lab by:	Date:	Time:	Remarks:
				1/24/97	15:20	

White = sample collector Yellow = file Pink = with report

WSRC-TR-96-0244, Rev. 2; APPENDIX L, Extra Pages 9 of 10

Blank

The data in Appendix M is all of the analytical results provided by the analytical laboratory, General Engineering Laboratory, GEL, Charleston, SC. For greater ease in refering to various data submittals, Appendix M has been divided into the following sub-sections:

Appendix M-1;
Case Narrative Reports, QC Summary Reports, Chain of Custody Forms, and Technician Resume`s
M-1, pp.3 through 220

Appendix M-2;
Appendix VIII/IX; GEL Laboratory Analytical Reports on 8 Composite Verification Samples
M-2, pp. 1 through 102

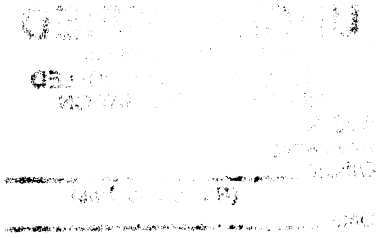
Appendix M-3;
General Engineering Laboratory Results for Batches 44 and Turnover for Chlorinated Dibenzodioxins and Dibenzofurans
M-3, pp.1 through 18

Appendix M-4,
Additional Total Metals, Plus F-001, F-002, F-003, F-004, and F-005 Hazardous Constituents on the 16 Grab Samples (for TCLP)
M-4, pp. 1 through 82

Appendix M-5,
Initial TCLP Results on 16 Grab Samples, plus
Rerun of the TCLP Leachant Solutions for all Metals, Including Nickel
M-5, pp. 1 through 128

Appendix M-6,
Multiple Extraction Procedure Results on 3 TCLP Grab Samples (Sample Nos. 2, 8, and 15)
M-6, pp. 1 through 80

UNCLASSIFIED
DOES NOT CONTAIN
UNCLASSIFIED CONTROLLED
NUCLEAR INFORMATION
ADC &
Reviewing
Official _____
(Name and Title)
Date: 29 March 2001



Appendix M-1

Case Narrative Reports, QC Summary Reports, Chain of Custody Forms, and Technician Resume`s

Environmental Geochemistry Group

EGG-RSG-99191

Date: September 7, 1999

To: Bernard Nora, 735-11A
John Pickett, 730-M

From: Richard S. Groseclose, 735-16A

Job 99191

Attached are the following documents from General Engineering Laboratories for Job 99191 (Delisting project):

1. Case Narrative, dated August 16, 1999, for fifteen (15) solid samples (labeled "TCLP") ("re-logged" samples).

2. Case Narrative, dated August 12, 1999, for twenty-four (24) solid samples (8 Labeled "COMP" and 16 labeled "TCLP").

3. Lab data reports for the following samples:
   COMP 2 (Lab ID 9907679-67)
   COMP 4 (Lab ID 9907679-70)
   COMP 6 (Lab ID 9907679-73)
   With QC Summary Report.

4. Resumes for fourteen (14) GEL laboratory analysts.

If you have any questions, please give me a call at 5-5687.

Reviewed by: R S Groseclose

Richard S. Groseclose, Environmental Geochemistry Group

GENERAL ENGINEERING LABORATORIES
Meeting today's needs with a vision for tomorrow.

CASE NARRATIVE REPORT
for
Westinghouse Savannah River Site
Subcontract No. AB93796N
Job# 99191

August 16, 1999

Laboratory Identification:

General Engineering Laboratories, Inc.

Summary:

Sample receipt

Fifteen solid samples (labeled "TCLP") for Westinghouse Savannah River Site arrived at General Engineering Laboratories, Inc., (GEL) Charleston, South Carolina on July 15, 1999 for analysis. The samples listed below were re-logged for Job# 99191. The samples listed on the chain arrived without any visible signs of tampering. A thirty-day turnaround was requested on the chain.

The samples were stored properly according to SW-846 procedures and GEL Standard Operating Procedures (SOP).

The laboratory re-logged the following samples:

Description	Sample Number
9908434-01	TCLP 1
9908434-02	TCLP 2
9908434-03	TCLP 3
9908434-04	TCLP 4
9908434-05	TCLP 5
9908434-06	TCLP 6
9908434-07	TCLP 7
9908434-08	TCLP 8
9908434-09	TCLP 9
9908434-10	TCLP 9
9908434-11	TCLP 10
9908434-12	TCLP 10
9908434-13	TCLP 11
9908434-14	TCLP 12
9908434-15	TCLP 13
9908434-17	TCLP 15
9908434-18	TCLP 16

Case Narrative

Sample analyses were conducted using methodology as outlined in General Engineering Laboratories (GEL) Standard Operating Procedures. Any technical or administrative problems during analysis, data review, and reduction are written by

analytical fraction in the enclosed narratives. During the time of the reanalysis, the client was informed that the sample for TCLP 14 had been used to run the first set of tests. The lab was told to continue analyzing the other samples due to time constraints. The client was also informed that the metals fractions would have to be re-tumbled for QC due to the extra compounds on the ICP SCAN (39) vs. TCLP Metals. The client stated that the extra compounds were for informational purposes only and not needed for the delisting project. Therefore, no post spike or extra QC would be needed.

Data Package:

The enclosed data package contains the following sections: Case Narrative, Level II Certificate of Analysis, QC Sample Summaries, Chain of Custody, Sample Tracking Report, Nonconformance Reports if applicable & Electronic Data Hardcopy Report.

The Level **II** Certificate of Analysis contains the following headings:

Sample ID:	Sample Identification
Lab ID:	This is the laboratory identification number
Matrix:	Sample matrix
Date Collected:	Date of sample collection
Date Received:	Date of sample receipt by the laboratory
Priority:	Internal status of sample turnaround
Collector:	Party responsible for sample collection.

The detail on the Certificate includes the following:

Parameter:	Analyte or characteristic tested for in the sample
Qualifier:	Qualifier used for data interpretation
Result:	Final result of each parameter.
DL:	Method Detection Limit
RL:	Reporting Limit
Units:	Units of final result
DF:	Dilution factor
Analyst:	Initials of analyst who performed the test
Date:	Date of analysis
Time:	Time of analysis
Batch:	Analytical batch in which the sample was analyzed
Method:	Analytical method used for the analysis of the sample. Identified on the report numerically with a corresponding table.
Surrogate Recovery:	Provided for organic analysis only. Surrogate compound identified.
Test:	Analytical test associated with surrogate compound.
Percent%:	Surrogate percent recovery
Acceptable Limits:	Limits established for surrogate recoveries based upon the method requirements.

The QC Summary Report contains the following headings:

Sample Parameter:	Analyte or characteristic tested for in the QC sample
Type:	Type of QC sample (i.e., blank, dup, LCS, LCS dup, MS, MSD)

Batch:	Analytical batch in which the QC sample was analyzed
NOM:	Nominal concentration of the spiking compound
Sample:	Amount of compound found in the sample associated with the QC sample.
QC:	Amount of compound found in the QC sample.
Units:	Units of final result
RPD%:	Relative percent difference between LCS/LCS dup, MS/MSD, and Sample/Sample duplicate
REC%:	Recovery for the control samples
Range:	Acceptance limits for control samples
Analyst:	Initials of analyst who performed the test
Date:	Date of analysis
Time:	Time of analysis

Types of QC samples that may be found on the QC Summary Report are:

Blank:	Results of the blank analysis for the sample batch
Dup:	Duplicate analysis of sample
LCS:	Lab control sample
LCS dup:	Lab control sample duplicate
MS:	Matrix spike
MSD:	Matrix spike duplicate

The following are definitions of reporting limits used at General Engineering Laboratories:

DL — Detection Limit: The minimum level of an analyte that can be determined (identified not quantified) with 99% confidence. The values are normally achieved by preparing and analyzing seven aliquots of laboratory water spiked 1 to 5 times the estimated MDL, taking the standard deviation and multiplying it against the one-tailed t-statistic at 99%. This computed value is then verified for reasonableness by repeating the study using the concentration found in the initial study, calculating an F-ratio, and computing the final limit. Sample specific preparation and dilution factors are applied to these limits when they are reported.

The detection limit is the minimum concentration of a substance that can be identified, measured, and reported with 99% confidence that the analyte concentration is above zero. It answers the question "Is It Present".

QL — Quantitation Limit: The lowest concentration that can be reliably achieved within specified limits of precision and accuracy during routine laboratory operating conditions. The QL is generally 5 to 10 times the MDL. However, it may be nominally chosen within these guidelines to simplify data reporting. For many analytes the QL analyte concentration is selected as the lowest non-zero standard in the calibration curve. Sample QL's are highly matrix-dependent. Sample specific preparation and dilution factors are applied to these limits when they are reported.

The QL is always ≥ DL

RL — Reporting Limit: Same as the QL except where driven by contract or client specifications. If the sample specific preparation and dilution factors cause the QL to be elevated above the RL, then the QL is used as the RL.

The quantitation limit is the lowest level at which a chemical may be accurately and reproducibly quantitated. It answers the question "HOW MUCH IS PRESENT".

Interpretation of RESULT column on the Certificate of Analysis:

If the final concentration in the sample was found to be above the RL, then the value reported is reported without a flag;

If the final concentration in the sample was found to be below the RL but above the DL, then the value reported is flagged with a "J";

If the final concentration in the sample was found to be below the DL, the value reported is flagged with a "U".

Quality Control Flags

General Engineering Laboratories maintains acceptance criteria for QC samples through use of statistical process control (SPC). The SPC limits are used to qualify data usability. The flagging criteria identified in WSRC AN98 Format does not necessarily coincide with the laboratory SPC criteria. There may be instances where the Electronic Data Deliverable (EDD) has flagged data based on the AN98 criteria and the lab has not identified the data to be outside of established control limits.

Those instances where the QC has not met laboratory SPC established criteria will be noted in the section case narratives that are included in this package.

This data package, to the best of my knowledge, is in compliance with technical and administrative requirements.

Stacy L. Griffin
Project Manager

wsrc00497.99191

GENERAL ENGINEERING LABORATORIES

Meeting today's needs with a vision for tomorrow.

CASE NARRATIVE REPORT
for
Westinghouse Savannah River Site
Subcontract No. AB93796N
Job# 99191

August 12, 1999

Laboratory Identification:

General Engineering Laboratories, Inc.

Summary:

Sample receipt

Twenty-four solid samples (eight samples labeled "COMP" and sixteen samples labeled "TCLP") for Westinghouse Savannah River Site arrived at General Engineering Laboratories, Inc., (GEL) Charleston, South Carolina on July 15, 1999 for analysis. The samples listed on the chain arrived without any visible signs of tampering. A fifty-day turnaround was requested on the chain.

The samples were stored properly according to SW-846 procedures and GEL Standard Operating Procedures (SOP).

The laboratory received the following samples:

Description	Sample Number
9907679-01	COMP-7
9907679-02	COMP-8
9907679-03	TCLP 1
9907679-04	TCLP 1
9907679-05	TCLP 2
9907679-06	TCLP 2
9907679-07	TCLP 2
9907679-08	TCLP 2 (1X)
9907679-09	TCLP 2 (2X)
9907679-10	TCLP 2 (3X)
9907679-11	TCLP 2 (4X)
9907679-12	TCLP 2 (5X)
9907679-13	TCLP 2 (6X)
9907679-14	TCLP 2 (7X)
9907679-15	TCLP 2 (8X)
9907679-16	TCLP 2 (9X)
9907679-17	TCLP 3
9907679-18	TCLP 3
9907679-19	TCLP 4
9907679-20	TCLP 4
9907679-21	TCLP 5
9907679-22	TCLP 5
9907679-23	TCLP 6
9907679-24	TCLP 6

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Case Narrative - Westinghouse Savannah River Site
August 12, 1999
Job No. 99191
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Description	Sample Number
9907679-25	TCLP 7
9907679-26	TCLP 7
9907679-27	TCLP 8
9907679-28	TCLP 8
9907679-29	TCLP 8
9907679-30	TCLP 8 (1X)
9907679-31	TCLP 8 (2X)
9907679-32	TCLP 8 (3X)
9907679-33	TCLP 8 (4X)
9907679-34	TCLP 8 (5X)
9907679-35	TCLP 8 (6X)
9907679-36	TCLP 8 (7X)
9907679-37	TCLP 8 (8X)
9907679-38	TCLP 8 (9X)
9907679-39	TCLP 9
9907679-40	TCLP 9
9907679-41	TCLP 10
9907679-42	TCLP 10
9907679-43	TCLP 11
9907679-44	TCLP 11
9907679-45	TCLP 12
9907679-46	TCLP 12
9907679-47	TCLP 13
9907679-48	TCLP 13
9907679-49	TCLP 14
9907679-50	TCLP 14
9907679-51	TCLP 15
9907679-52	TCLP 15
9907679-53	TCLP 15
9907679-54	TCLP 15 (1X)
9907679-55	TCLP 15 (2X)
9907679-56	TCLP 15 (3X)
9907679-57	TCLP 15 (4X)
9907679-58	TCLP 15 (5X)
9907679-59	TCLP 15 (6X)
9907679-60	TCLP 15 (7X)
9907679-61	TCLP 15 (8X)
9907679-62	TCLP 15 (9X)
9907679-63	TCLP 16
9907679-64	TCLP 16
9907679-65	COMP 1
9907679-66	COMP 2
9907679-67	COMP 2
9907679-68	COMP 3
9907679-69	COMP 4
9907679-70	COMP 4
9907679-71	COMP 5
9907679-72	COMP 6
9907679-73	COMP 6

The QL is always ≥ DL

RL — Reporting Limit: Same as the QL except where driven by contract or client specifications. If the sample specific preparation and dilution factors cause the QL to be elevated above the RL, then the QL is used as the RL.

The quantitation limit is the lowest level at which a chemical may be accurately and reproducibly quantitated. It answers the question "HOW MUCH IS PRESENT".

Interpretation of RESULT column on the Certificate of Analysis:

If the final concentration in the sample was found to be above the RL, then the value reported is reported without a flag;

If the final concentration in the sample was found to be below the RL but above the DL, then the value reported is flagged with a "J";

If the final concentration in the sample was found to be below the DL, the value reported is flagged with a "U".

Quality Control Flags

General Engineering Laboratories maintains acceptance criteria for QC samples through use of statistical process control (SPC). The SPC limits are used to qualify data usability. The flagging criterion identified in WSRC AN98 Format does not necessarily coincide with the laboratory SPC criteria. There may be instances where the Electronic Data Deliverable (EDD) has flagged data based on the AN98 criteria and the lab has not identified the data to be outside of established control limits.

Those instances where the QC has not met laboratory SPC established criteria will be noted in the section case narratives that are included in this package.

This data package, to the best of my knowledge, is in compliance with technical and administrative requirements.

Stacy L. Griffin
Project Manager

Batch:	Analytical batch in which the QC sample was analyzed
NOM:	Nominal concentration of the spiking compound
Sample:	Amount of compound found in the sample associated with the QC sample.
QC:	Amount of compound found in the QC sample.
Units:	Units of final result
RPD%:	Relative percent difference between LCS/LCS dup, MS/MSD, and Sample/Sample duplicate
REC%:	Recovery for the control samples
Range:	Acceptance limits for control samples
Analyst:	Initials of analyst who performed the test
Date:	Date of analysis
Time:	Time of analysis

Types of QC samples that may be found on the QC Summary Report are:

Blank:	Results of the blank analysis for the sample batch
Dup:	Duplicate analysis of sample
LCS:	Lab control sample
LCS dup:	Lab control sample duplicate
MS:	Matrix spike
MSD:	Matrix spike duplicate

The following are definitions of reporting limits used at General Engineering Laboratories:

DL — Detection Limit: The minimum level of an analyte that can be determined (identified not quantified) with 99% confidence. The values are normally achieved by preparing and analyzing seven aliquots of laboratory water spiked 1 to 5 times the estimated MDL, taking the standard deviation and multiplying it against the one-tailed t-statistic at 99%. This computed value is then verified for reasonableness by repeating the study using the concentration found in the initial study, calculating an F-ratio, and computing the final limit. Sample specific preparation and dilution factors are applied to these limits when they are reported.

The detection limit is the minimum concentration of a substance that can be identified, measured, and reported with 99% confidence that the analyte concentration is above zero. It answers the question "Is It Present".

QL — Quantitation Limit: The lowest concentration that can be reliably achieved within specified limits of precision and accuracy during routine laboratory operating conditions. The QL is generally 5 to 10 times the MDL. However, it may be nominally chosen within these guidelines to simplify data reporting. For many analytes the QL analyte concentration is selected as the lowest non-zero standard in the calibration curve. Sample QL's are highly matrix-dependent. Sample specific preparation and dilution factors are applied to these limits when they are reported.

Case Narrative

Sample analyses were conducted using methodology as outlined in General Engineering Laboratories (GEL) Standard Operating Procedures. Any technical or administrative problems during analysis, data review, and reduction are written by analytical fraction in the enclosed narratives.

Data Package:

The enclosed data package contains the following sections: Case Narrative, Level II Certificate of Analysis, QC Sample Summaries, Chain of Custody, Sample Tracking Report, Nonconformance Reports if applicable & Electronic Data Hardcopy Report.

The Level **II** Certificate of Analysis contains the following headings:

Sample ID:	Sample Identification
Lab ID:	This is the laboratory identification number
Matrix:	Sample matrix
Date Collected:	Date of sample collection
Date Received:	Date of sample receipt by the laboratory
Priority:	Internal status of sample turnaround
Collector:	Party responsible for sample collection.

The detail on the Certificate includes the following:

Parameter:	Analyte or characteristic tested for in the sample
Qualifier:	Qualifier used for data interpretation
Result:	Final result of each parameter.
DL:	Method Detection Limit
RL:	Reporting Limit
Units:	Units of final result
DF:	Dilution factor
Analyst:	Initials of analyst who performed the test
Date:	Date of analysis
Time:	Time of analysis
Batch:	Analytical batch in which the sample was analyzed
Method:	Analytical method used for the analysis of the sample. Identified on the report numerically with a corresponding table.
Surrogate Recovery:	Provided for organic analysis only. Surrogate compound identified.
Test:	Analytical test associated with surrogate compound.
Percent%:	Surrogate percent recovery
Acceptable Limits:	Limits established for surrogate recoveries based upon the method requirements.

The QC Summary Report contains the following headings:

Sample Parameter:	Analyte or characteristic tested for in the QC sample
Type:	Type of QC sample (i.e., blank, dup, LCS, LCS dup, MS, MSD)

Environmental Geochemistry Group

EGG-RSG-99191

Date: September 23, 1999

To: Bernard Nora, 735-11A
John Pickett, 730-M

From: Richard S. Groseclose, 735-16A

Job 99191

Attached are the following documents from General Engineering Laboratories for Job 99191 (Delisting project):

1. Case Narrative for SDG-99191E Radiochemistry
2. Case Narrative for Nitrate by Ion Chromatography
3. NCR GEL-AS-RC-1254
4. EDD hard copy.

If you have any questions, please give me a call at 5-5687.

Reviewed by: RS Groseclose

Richard S. Groseclose, Environmental Geochemistry Group

NITRATE BY ION CHROMATOGRAPHY

Analytical Batch Number: 154418

Analytical Method: EPA 300.0

Laboratory Number	Sample Description
9907679-03	TCLP 1
9907679-05	TCLP 2
9907679-17	TCLP 3
9907679-19	TCLP 4
9907679-21	TCLP 5
9907679-23	TCLP 6
9907679-25	TCLP 7
9907679-27	TCLP 8
9907679-39	TCLP 9
9907679-41	TCLP 10
9907679-43	TCLP 11
9907679-45	TCLP 12
9907679-47	TCLP 13
9907679-49	TCLP 14
9907679-51	TCLP 15
9907679-63	TCLP 16
QC632328	Duplicate of 9907679-03
QC632329	Matrix Spike of 9907679-03
QC632330	Duplicate of 9907679-05
QC632331	Matrix Spike of 9907679-05
QC632332	Laboratory Control Sample
QC632333	Blank

Sample Preparation:

All samples were prepared by DI extraction in accordance with EPA method 300.0. Approximately 4 g of sample was weighed out, then 40 mL of DI water was added. Samples were placed on a wrist shaker for approximately 15 minutes to aid in the extraction. The liquid is then poured off and filtered if necessary.

Instrument Calibration:

The instrument used was a Dionex DX300 Ion Chromatography instrument with a Dionex AS9-HC general purpose anion column. Instrument IC-AF was properly calibrated on 07/12/99.

Holding Time

The following samples were accidentally not logged in for nitrate until the 48 hour holding time had almost completely expired. The samples were analyzed as soon as this was realized.

Laboratory Number

9907679-05
9907679-17
9907679-19
9907679-21
9907679-23
9907679-25
9907679-27
9907679-39
9907679-41
9907679-43
9907679-45
9907679-47
9907679-49
9907679-51
9907679-63

Blanks:

No target analytes were detected in the method blank above the required acceptance limit.

Spike Analyses:

The matrix spikes were run on the following Sample Numbers.

9907679-03 and 9907679-05

All analyte recoveries in the matrix spikes were within the required acceptance limits.

Laboratory Control Samples:

All analyte recoveries in the laboratory control sample were within the required acceptance limits.

Sample Duplicates:

All sample duplicate results were within the required acceptance limits.

TOTAL HALOGENS

Analytical Batch Number: 154421

Analytical Method: EPA SW846 9056

Laboratory Number	Sample Description
9907679-03	TCLP 1
9907679-05	TCLP 2
9907679-17	TCLP 3
9907679-19	TCLP 4
9907679-21	TCLP 5
9907679-23	TCLP 6
9907679-25	TCLP 7
9907679-27	TCLP 8
9907679-39	TCLP 9
9907679-41	TCLP 10
9907679-43	TCLP 11
9907679-45	TCLP 12
9907679-47	TCLP 13
9907679-49	TCLP 14
9907679-51	TCLP 15
9907679-63	TCLP 16
QC632338	Duplicate of 9907679-03
QC632340	Matrix Spike of 9907679-03
QC632341	Duplicate of 9907679-05
QC632342	Matrix Spike of 9907679-05
QC632343	Laboratory Control Sample
QC632344	Blank

Sample Preparation:

All samples were prepared by DI extraction in accordance with EPA method 300.0, since there is no mention of an extraction procedure in SW846 9056. Approximately 4 g of sample was weighed out, then 40 mL of DI water was added. Samples were placed on a wrist shaker for approximately 15 minutes to aid in the extraction. The liquid is then poured off and filtered if necessary.

Instrument Calibration:

The instrument used was a Dionex DX300 Ion Chromatography instrument with a Dionex AS9-HC general purpose anion column. Instrument IC-AF was properly calibrated on 07/12/99.

Dilutions:

None of the samples were diluted.

Non Conformance Reports:

The following Nonconformance Report were written for this batch.

GEL-AS-GC-1527

eneral Engineering Laboratories
orm GEL-XXX
Rev. 05/98)

UNCONTROLLED DOCUMENT

1. NCR Report No.: GEL-AS-RC-1201
2. Page 1 of 1
3. Revision No.: 1

COMPANY-WIDE NONCONFORMANCE REPORT

COMPLETE EVERY ITEM

(See Instructions on Reverse Side)

4. Day Yr.: 24 99

5. Division: ☐ Industrial ☐ Federal ☒ Radiochemistry ☐ Bioassay ☐ Other:

6. Type: Material ☐ Process ☒ Product ☐

trument Type: LSC

8. Quality Criteria: ☒ SOP ☐ QAP or QAPJP ☐ Client Contract ☐ Purchase Document ☐ Drawing ☐ Specifications ☐ Others

pplier/Client Name & Code: WSRC00497

10. Test/Method: Tc-99

umerical Reference Identification: (Batch Number, Sample Number, ID number)
155553: QC636909

pecifications and Requirements
onconformance Description:

No.

The MS Recovery failed due to matrix interference.

14. NRG Disposition:

Item No. 1 — Reported results

15. NRG's Printed Name & Signature: Angela Albee — Date: 8/24/99

List NRG Participants: Tim P. Winton 8/24/99

iginator's Printed Name & Signature: Angela Albee — Date: 8/24/99

Management Review ☒ or Management Approval ☐

Please review within 24 hours of receipt.

Review & Disposition Review or Approval:

ality Review: Date

iginator's Director/Group Leader: Date

Corrective Action Request and Approval:

18. CA Requested: Print Name and Sign — Date

19. Corrective Action Approval & Number — Date

Holding Time:

All samples were analyzed within the required holding time.

Blanks:

No target analytes were detected in the method blank above the required acceptance limit.

Spike Analyses:

The matrix spikes were run on the following Sample Numbers.

9907679-03 and 9907679-05

All analyte recoveries in the matrix spikes were within the required acceptance limits.

Laboratory Control Samples:

All analyte recoveries in the laboratory control sample were within the required acceptance limits.

Sample Duplicates:

The sample and duplicate results were less than the PQL; therefore, the RPD is not applicable.

Dilutions:

None of the samples were diluted.

Non Conformance Reports:

The following Nonconformance Report was written for this batch.

GEL-AS-GC-1526

The preceding narratives have been reviewed by:_____ Date:_____

GENERAL ENGINEERING LABORATORIES

- Meeting today's needs with a vision for tomorrow.

CASE NARRATIVE REPORT
for
Westinghouse Savannah River Site
Subcontract No. AB93796N
Job# 99191

Aug 16, 1999

Laboratory Identification:

General Engineering Laboratories, Inc.

Summary:

Sample receipt

Eight solid, and sixteen sludge samples for Westinghouse Savannah River Site arrived at General Engineering Laboratories, Inc., (GEL) Charleston, South Carolina on July 15, 1999 for analysis. The sample listed on the chain arrived without any visible signs of tampering. A thirty day turnaround was requested on the chain.

The sample was stored properly according to SW-846 procedures and GEL Standard Operating Procedures (SOP).

The following sample was received by the laboratory:

Description	Sample Number
9907679-01	COMP-7
9907679-02	COMP-8
9907679-03	TCLP 1
9907679-04	TCLP 1
9907679-05	TCLP 2
9907679-06	TCLP 2
9907679-07	TCLP 2
9907679-08	TCLP 2 (1X)
9907679-09	TCLP 2 (2X)
9907679-10	TCLP 2 (3X)
9907679-11	TCLP 2 (4X)
9907679-12	TCLP 2 (5X)
9907679-13	TCLP 2 (6X)
9907679-14	TCLP 2 (7X)
9907679-15	TCLP 2 (8X)
9907679-16	TCLP 2 (9X)
9907679-17	TCLP 3
9907679-18	TCLP 3

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9907679-19	TCLP 4
9907679-20	TCLP 4
9907679-21	TCLP 5
9907679-22	TCLP 5
9907679-23	TCLP 6
9907679-24	TCLP 6
9907679-25	TCLP 7
9907679-26	TCLP 7
9907679-27	TCLP 8
9907679-28	TCLP 8
9907679-29	TCLP 8
9907679-30	TCLP 8 (1X)
9907679-31	TCLP 8 (2X)
9907679-32	TCLP 8 (3X)
9907679-33	TCLP 8 (4X)
9907679-34	TCLP 8 (5X)
9907679-35	TCLP 8 (6X)
9907679-36	TCLP 8 (7X)
9907679-37	TCLP 8 (8X)
9907679-38	TCLP 8 (9X)
9907679-39	TCLP 9
9907679-40	TCLP 9
9907679-41	TCLP 10
9907679-42	TCLP 10
9907679-43	TCLP 11
9907679-44	TCLP 11
9907679-45	TCLP 12
9907679-46	TCLP 12
9907679-47	TCLP 13
9907679-48	TCLP 13
9907679-49	TCLP 14
9907679-50	TCLP 14
9907679-51	TCLP 15
9907679-52	TCLP 15
9907679-53	TCLP 15
9907679-54	TCLP 15 (1X)
9907679-55	TCLP 15 (2X)
9907679-56	TCLP 15 (3X)
9907679-57	TCLP 15 (4X)
9907679-58	TCLP 15 (5X)
9907679-59	TCLP 15 (6X)
9907679-60	TCLP 15 (7X)
9907679-61	TCLP 15 (8X)

9907679-62	TCLP 15 (9X)
9907679-63	TCLP 16
9907679-64	TCLP 16
9907679-65	COMP 1
9907679-66	COMP 2
9907679-67	COMP 2
9907679-68	COMP 3
9907679-69	COMP 4
9907679-70	COMP 4
9907679-71	COMP 5
9907679-72	COMP 6
9907679-73	COMP 6

Case Narrative

Sample analyses were conducted using methodology as outlined in General Engineering Laboratories (GEL) Standard Operating Procedures. Any technical or administrative problems during analysis, data review, and reduction are written by analytical fraction in the enclosed narratives. Sample IDs TCLP 1 – TCLP 16 were re-logged under the GEL # 9908434. These samples were originally analyzed according to standard laboratory procedure. However, in talking with the client on Aug. 03, 1999, the lab realized that the client wanted all tests run on the TCLP leachate, and not on the raw sample. During the time of the reanalysis, the client was informed that the sample for TCLP 14 had been used to run the first set of tests. The lab was told to continue analyzing the other samples due to time constraints. The client was also informed that the metals fractions would have to be re-tumbled for QC due to the extra compounds on the ICP SCAN (39) vs. TCLP Metals. The client stated that the extra compounds were for informational purposes only and not needed for the delisting project. Therefore, no post spike or extra QC would be needed.

Data Package:

The enclosed data package contains the following sections: Case Narrative, Level II Certificate of Analysis, QC Sample Summaries, Chain of Custody, Sample Tracking Report, Nonconformance Reports if applicable & Electronic Data Hardcopy Report.

The Level **II** Certificate of Analysis contains the following headings:

Sample ID: Sample Identification
Lab ID: This is the laboratory identification number
Matrix: Sample matrix

Date Collected:	Date of sample collection
Date Received:	Date of sample receipt by the laboratory
Priority:	Internal status of sample turnaround
Collector:	Party responsible for sample collection.

The detail on the Certificate includes the following:

Parameter:	Analyte or characteristic tested for in the sample
Qualifier:	Qualifier used for data interpretation
Result:	Final result of each parameter.
DL:	Method Detection Limit
RL:	Reporting Limit
Units:	Units of final result
DF:	Dilution factor
Analyst:	Initials of analyst who performed the test
Date:	Date of analysis
Time:	Time of analysis
Batch:	Analytical batch in which the sample was analyzed
Method:	Analytical method used for the analysis of the sample. Identified on the report numerically with a corresponding table.
Surrogate Recovery:	Provided for organics analysis only. Surrogate compound identified.
Test:	Analytical test associated with surrogate compound.
Percent%:	Surrogate percent recovery
Acceptable Limits:	Limits established for surrogate recoveries based upon the method requirements.

The QC Summary Report contains the following headings:

Sample Parameter:	Analyte or characteristic tested for in the QC sample
Type:	Type of QC sample (i.e., blank, dup, LCS, LCS dup, MS, MSD)
Batch:	Analytical batch in which the QC sample was analyzed
NOM:	Nominal concentration of the spiking compound
Sample:	Amount of compound found in the sample associated with the QC sample.
QC:	Amount of compound found in the QC sample.
Units:	Units of final result
RPD%:	Relative percent difference between LCS/LCS dup, MS/MSD, and Sample/Sample duplicate
REC%:	Recovery for the control samples
Range:	Acceptance limits for control samples
Analyst:	Initials of analyst who performed the test

Date: Date of analysis
Time: Time of analysis

Types of QC samples that may be found on the QC Summary Report are:

Blank: Results of the blank analysis for the sample batch
Dup: Duplicate analysis of sample
LCS: Lab control sample
LCS dup: Lab control sample duplicate
MS: Matrix spike
MSD: Matrix spike duplicate

The following are definitions of reporting limits used at General Engineering Laboratories:

DL — Detection Limit: The minimum level of an analyte that can be determined (identified not quantified) with 99% confidence. The values are normally achieved by preparing and analyzing seven aliquots of laboratory water spiked 1 to 5 times the estimated MDL, taking the standard deviation and multiplying it against the one-tailed t-statistic at 99%. This computed value is then verified for reasonableness by repeating the study using the concentration found in the initial study, calculating an F-ratio, and computing the final limit. Sample specific preparation and dilution factors are applied to these limits when they are reported.

The detection limit is the minimum concentration of a substance that can be identified, measured, and reported with 99% confidence that the analyte concentration is above zero. It answers the question "Is It Present".

QL — Quantitation Limit: The lowest concentration that can be reliably achieved within specified limits of precision and accuracy during routine laboratory operating conditions. The QL is generally 5 to 10 times the MDL. However, it may be nominally chosen within these guidelines to simplify data reporting. For many analytes the QL analyte concentration is selected as the lowest non-zero standard in the calibration curve. Sample QL's are highly matrix-dependent. Sample specific preparation and dilution factors are applied to these limits when they are reported.

The QL is always $\geq$ DL

RL — Reporting Limit: Same as the QL except where driven by contract or client specifications. If the sample specific preparation and dilution factors cause the QL to be elevated above the RL, then the QL is used as the RL.

The quantitation limit is the lowest level at which a chemical may be accurately and reproducibly quantitated. It answers the question "HOW MUCH IS PRESENT".

Interpretation of RESULT column on the Certificate of Analysis:

If the final concentration in the sample was found to be above the RL, then the value reported is reported without a flag;

If the final concentration in the sample was found to be below the RL but above the DL, then the value reported is flagged with a "J";

If the final concentration in the sample was found to be below the DL, the value reported is flagged with a "U".

Quality Control Flags

General Engineering Laboratories maintains acceptance criteria for QC samples through use of statistical process control (SPC). The SPC limits are used to qualify data usability. The flagging criteria identified in WSRC AN98 Format does not necessarily coincide with the laboratory SPC criteria. There may be instances where the Electronic Data Deliverable (EDD) has flagged data based on the AN98 criteria and the lab has not identified the data to be outside of established control limits.

Those instances where the QC has not met laboratory SPC established criteria will be noted in the section case narratives that are included in this package.

This data package, to the best of my knowledge, is in compliance with technical and administrative requirements.

Stacy L. Griffin
Project Manager

wsrc00497.99191

CASE NARRATIVE
WSRC
SDG# 99191M-VOA
Analysis by GC/MS

Sample Analysis:

The following samples were analyzed for Volatile Organic Compounds using the analytical protocol from EPA SW-846 Third Edition, Method 8260B, Revision 2, December 1996:

Laboratory Number	Sample Description
9907679-01	COMP-7
9907679-02	COMP-8
9907679-65	COMP 1
9907679-66	COMP 2
9907679-68	COMP 3
9907679-69	COMP 4
9907679-71	COMP 5
9907679-72	COMP 6
QC631946	VBLK01 (Blank)
QC631947	VBLK01LCS (Laboratory Control Sample)
QC632505	VBLK02 (Blank)
QC632506	VBLK02LCS (Laboratory Control Sample)
QC632792	VBLK03 (Blank)
QC632793	VBLK03LCS (Laboratory Control Sample)
QC632794	COMP 3MS (Matrix Spike)
QC632795	COMP 3MSD (Matrix Spike Duplicate)

System Configuration:

The laboratory utilizes a variety of instrument configurations for volatile analyses. These analyses are accomplished using one or more of the GC and MS couplings, as follows:

GC/MS	Interface	Purge and Trap-Concentrator / Autosampler
5890 Series II / 5970	Jet Separator	Tekmar 2000 / Archon
5890 Series II / 5972	Direct	OI 4560 / Archon
6890 Series / 5973	Direct	Tekmar 3000 / Precept
6890 Series / 5973	Direct	OI 4560 / DPM-16
6890 Series / 5973	Direct	Tekmar 2000 / Archon

Chromatographic Column:

Chromatographic separation of volatile components is accomplished through analysis on one or more of the following columns:

J&W1	DB - 624, 60 m x 0.32 mm, 1.8um (identified by the J&W1 designation)
J&W2:	DB - 624, 75 m x 0.53 mm, 3 um (identified by the J&W2 designation)
Rtx1	Rtx Volatiles, 60 m x 0.53 mm, 1.5 um (identified by the Rtx VOA designation)
J&W3	DB-624, 60 m x 0.25 mm, 1.4 um (identified by the J&W3 designation)

Samples are prepared using Purge and Trap samplers containing the following P & T trap:

VOCARB 3000: Carbopack B/ Carboxen 1000 &1001

Instrument Configuration:

The samples reported in this SDG were analyzed on one or more of the following instrument systems (instrument systems are identified by the instrument ID designations listed below which can be found on the raw data or individual form headers):

Instrument ID	System Configuration	Chromatographic Column	P & T Trap
VOA1	HP5890/HP5970	J&W2	VOCARB 3000
VOA2	HP6890/HP5973	J&W3	VOCARB 3000
VOA4	HP5890/HP5972	Rtx VOA	VOCARB 3000
VOA5	HP5890/HP5972	J&W3	VOCARB 3000
VOA7	HP5890/HP5972	Rtx VOA	VOCARB 3000
VOA8	HP6890/HP5973	J&W3	VOCARB 3000
VOA9	HP6890/HP5973	J&W3	Tenax/Silicagel/ Charcoal

Instrument Calibration:

The instrument was properly calibrated.

Holding Time:

All samples were analyzed within the required holding time.

Surrogates:

Surrogate recoveries in all samples were within the required acceptance limits.

Internal Standards:

Internal Standards in all samples were within the required acceptance limits.

Blanks:

There were no target analytes detected in the method blank above the required reporting limit.

Spike Analyses:

The matrix spikes were analyzed on the following sample number:

GEL ID# 9907679-68 COMP 3

All of the analyte recoveries in the matrix spikes were within the required acceptance limits.

All analytes in the matrix spike set were within the required acceptance limits for relative percent difference.

Laboratory Control Samples:

All analytes in the laboratory control sample were within the required acceptance limits.

Dilutions:

None of the samples were diluted.

Non Conformance Reports:

There were no Nonconformance Reports associated with this SDG.

General Comments:

Data files associated with both the initial calibration and continuing calibration check may have been manually integrated to correct misidentification of peaks by the integration software. Manual integrations are performed because of poor peak shapes exhibited by selective compounds at low concentrations, or as a result of overlapping retention time windows of similar isomeric compounds contained on the extended reporting list. If applicable, peak profiles for the affected compounds are contained in the raw data section.

The preceding narrative has been reviewed by: Charles W Hom Date: 08-02-99

CASE NARRATIVE
WSRC
SDG#99191M

The following samples were analyzed for waste constituents using the analytical protocol from in house GC/FID:

Laboratory Number	Sample Description
9907679-01	COMP-7
9907679-02	COMP-8
9907679-65	COMP-1
9907679-66	COMP-2
9907679-68	COMP-3
9907679-69	COMP-4
9907679-71	COMP-5
9907679-72	COMP-6
QC631534	DBLK01 (Method Blank)
QC631535	DBLK01LCS (Laboratory Control Sample)
QC631536	COMP-7DUP (Sample Dup)

System Configuration:

The laboratory utilizes the following instruments for GC/FID analyses: two Hewlett Packard gas chromatographs consisting of HP 5890 Series II models. One gas chromatograph is configured with dual FID detectors and splitless injections. The other system is equipped with one FID detector with electronic pressure control (EPC) and a Headspace autosampler.

Chromatographic Column:

Chromatographic separation of analytes of interest are accomplished through analysis on one of the following columns:

J&W1: DB-WAX (0.53 mm x 0.5 u x 30 m)
J&W2: DB-624 (0.53 mm x 3.0 u x 30 m)
J&W3: DB-1 (0.53 mm x 1.5 u x 30 m).

Instrument Configuration:

The samples reported in this sample duplicate group (SDG) were analyzed on one or more of the following instrument systems (instrument systems are identified by the instrument ID designations listed below which can be found on the raw data or individual form headers):.

Instrument ID	System Configuration	Chromatographic Column
FIDa	HP 5890 Series II GC/FID	J&W1/J&W3
FID2a	HP 5890 Series II GC/FID	J&W2

Sample Preparation:

All samples were prepared in accordance with accepted procedures.

Instrument Calibration:

The instrument was properly calibrated.

Holding Time:

All samples were analyzed within the required holding time.

Surrogates:

Surrogate are not necessary for analysis.

Blanks:

The method blank met acceptance criteria

Spike Analyses:

Matrix spike/matrix spike duplicate were not analyzed on these samples.

Laboratory Control Samples:

All analytes in the laboratory control sample (LCS) were within the required acceptance limits.

Dilutions:

None of the samples were diluted.

Manual Integrations:

All samples along with the QC were manually integrated to re-define the baseline.

Non Conformance Reports:

Nonconformance Reports were not necessary with this SDG.

The preceding narrative has been reviewed by: K. Mitchell Davis Date: 8/2/99

CASE NARRATIVE
WSRC
SDG 99191M
Analysis by GC/MS

Sample Analysis:

The following samples were analyzed for semivolatile organic compounds using the analytical protocol from EPA SW-846 Third Edition, Method 8270C, Revision 3, December, 1996:

Laboratory Number	Sample Description
9907679-01	COMP-7
9907679-02	COMP-8
9907679-65	COMP 1
9907679-66	COMP 2
9907679-68	COMP 3
9907679-69	COMP 4
9907679-71	COMP 5
9907679-72	COMP 6
QC630746	SBLK01 (Blank)
QC630747	SBLK01LCS (Laboratory Control Sample)
QC630748	COMP-8MS (Matrix Spike)
QC630749	COMP-8MSD (Matrix Spike Duplicate)

System Configuration:

The laboratory utilizes a HP 6890 Series gas chromatograph and a HP 5973 Mass Selective Detector. The configuration is equipped with electronic pressure control. All MS interfaces are capillary direct.

Chromatographic Column:

Chromatographic separation of semivolatile components is accomplished through analysis on one or more of the following columns (all with dimensions of 30 meters x 0.25 mm ID and 0.25 um film except J&WDB-5MS2 which is 20 meters x 0.18 mm ID and 0.18 um film):

J&W:	DB - 5.625 (5%-Phenyl)-methylpolysiloxane (identified by a DB-5.625 designation on quantitation reports and reconstructed ion chromotograms)
J&WDB-5MS	Similar to the J&W DB - 5.625 with low bleed characteristics.
Alltech:	EC-5 (SE-54) 5% Phenyl, 95% Methylpolysiloxane (identified by a EC-5 designation)
HP:	HP-5MS 5% Phenylmethylsiloxane (identified by a HP-5MS

	designation)
Phenomenex:	ZB-5 5% Phenyl Polysiloxane
J&WDB-5MS2	Similar to the J&W DB - 5.625 with low bleed characteristics.

Instrument Configuration:

The samples reported in this SDG were analyzed on one or more of the following instrument systems (instrument systems are identified by the instrument ID designations listed below which can be found on the raw data or individual form headers):

Instrument ID	System Configuration	Chromatographic Column
MSD2	HP6890/HP5973	ZB-5
MSD4	HP6890/HP5973	HP
MSD5	HP6890/HP5973	ZB-5
MSD7	HP6890/HP5973	ZB-5
MSD8	HP6890/HP5973	J&WDB-5MS2

Sample Preparation:

All samples were prepared in accordance with accepted procedures.

Instrument Calibration:

The instrument was properly calibrated.

Holding Time:

All samples were analyzed within the required holding time.

Surrogates:

Surrogate recoveries in all samples were within the required acceptance limits.

Internal Standards:

Internal Standards were not within the required acceptance limits.

Blanks:

There were no target analytes detected in the method blank above the required acceptance limit.

Spike Analyses:

The matrix spikes were analyzed on the following sample number:

9907679-02 (COMP-8)

The matrix spike was not within the required acceptance limits for acenaphthene.

All analytes in the matrix spike duplicate were within the required acceptance limits for relative percent difference:

Laboratory Control Samples:

The laboratory control sample was not within the required acceptance limits for pentachlorophenol.

Dilutions:

None of the samples were diluted.

Nonconformance Reports:

There were no Nonconformance Reports associated with this SDG.

Manual Integrations:

No manual integrations were performed on the standards in the initial calibration or continuing calibration associated with this SDG.

No manual integrations were performed on samples, blanks or quality control samples associated with this SDG.

The preceding narrative has been reviewed by: Herbert M Mabe Date: 7/30/99

CASE NARRATIVE
WSRC
SDG#99191M

The following samples were analyzed for Pesticide using the analytical protocol from EPA SW-846 Third Edition, Method 8081A, Revision 0, September, 1994:

Laboratory Number	Sample Description
9907679-01	COMP-7
9907679-02	COMP-8
9907679-65	COMP 1
9907679-66	COMP 2
9907679-68	COMP 3
9907679-69	COMP 4
9907679-71	COMP 5
9907679-72	COMP 6
QC630927	PBLK01 (Method Blank)
QC630928	PBLK01LCS (Laboratory Control Sample)
QC630929	PBLK01LCSD (Laboratory Control Sample Duplicate)
QC630932	COMP 1MS (Matrix Spike)
QC630933	COMP 1MSD (Matrix Spike Duplicate)

System Configuration:

The laboratory utilizes the following instruments for extractable semivolatile gas chromatograph analyses: one Tracor Model 540 gas chromatograph and five Hewlett Packard gas chromatographs consisting of HP 5890 Series II Plus and the 6890 Series models. All gas chromatographs are configured with dual ECD detectors and splitless injections. The HP systems are equipped with electronic pressure control (EPC).

Chromatographic Column:

Chromatographic separation of analytes of interest are accomplished through analysis on one of the following columns:

J&W1: DB-5 (5%-Phenyl)-methylsiloxane 30 m x 0.53 mm x 1.5 um
DB-608 Durabond stationary phase* 30 m x 0.53 mm x 0.5 um
J&W2: DB-5 (5%-Phenyl)-methylsiloxane 30 m x 0.32 mm x 1.0 um
DB-1701 Durabond stationary phase* 30 m x 0.32 mm x 0.5 um
J&W3: DB-5 (5%-Phenyl)-methylsiloxane 30 m x 0.53 mm x 1.5 um
DB-1701 (14% Cyanopropylphenyl)-methylsiloxane 30 m x 0.53 mm x 0.5 um
J&W4: DB-608 Durabond stationary phase* 30 m x 0.53 mm x 0.5 um
DB-XLB * 30 m x 0.53 mm x 1.5 um
J&W5: DB-XLB * 30 m x 0.25 mm x 0.25 um

DB-17MS (50%-Phenyl)-methylsiloxane 30 m x 0.25 mm x 0.25 um
* Durabond and DB-XLB are trademarks of J & W.

Instrument Configuration:

The samples reported in this Sample Delivery Group (SDG) were analyzed on one or more of the following instrument systems (instrument systems are identified by the instrument ID designations listed below which can be found on the raw data or individual form headers):

Instrument ID	System Configuration	Chromatographic Column
ECD1	HP 6890 Series GC ECD/ECD	J&W3
ECD2	Tracor 540 GC ECD/ECD	J&W1
ECD3	HP 6890 Series GC ECD/ECD	J&W5
ECD4	HP 5890 Series II Plus GC ECD/ECD	J&W5
ECD5	HP6890 Series GC ECD/ECD	J&W5
ECD7	HP6890 Series GC ECD/ECD	J&W5

Sample Preparation:

All samples were prepared in accordance with accepted procedures.

Instrument Calibration:

Target analytes on one analytical column (DB-17MS) failed acceptance criteria with a positive bias. Positive bias is a result of instrument response increasing as the analytical sequence proceeds. Since no target analytes were detected in the samples, the non-compliant %D values have no adverse effects on the data.

Holding Time:

All samples were analyzed within the required holding time.

Surrogates:

Surrogate recoveries in all samples were within the required acceptance limits.

Blanks:

There were no target analytes detected in the method blank above the required acceptance limit.

Spike Analyses:

The matrix spikes (MS) and matrix spike duplicate (MSD) were analyzed on the following sample number:

9907679-65 (COMP 1)

All of the analyte recoveries in the MS and MSD were within the required acceptance limits.

All relative percent differences (RPDs) between the MS and MSD recoveries were within the required acceptance limits.

Laboratory Control Samples:

All analytes in the laboratory control sample (LCS) were within the required acceptance limits.

All analytes in the laboratory control sample duplicate (LCSD) were not within the required acceptance limits for relative percent difference.

Due to random laboratory error, the RPDs for Heptachlor and Aldrin were outside acceptance limits.

Manual Integrations:

Samples and QC analyses required manual integrations to correctly position the baseline as set in the calibration standard injections.

Certain standards required manual integrations to correctly assign analyte peaks and/or proper peak integration as set in the initial calibration.

Copies of manual integration peak profiles are included in the application raw data section of this package.

Dilutions:

None of the samples were diluted.

Non Conformance Reports:

There was no Nonconformance Reports associated with this SDG.

The preceding narrative has been reviewed by: A. Mitchell Owen Date: 8/2/99

CASE NARRATIVE
WSRC
SDG#99191M

The following samples were analyzed for Herbicide using the analytical protocol from EPA SW-846 Third Edition, Method 8151, Revision 0, September 1994:

Laboratory Number	Sample Description
9907679-01	COMP-7
9907679-02	COMP-8
9907679-65	COMP 1
9907679-66	COMP 2
9907679-68	COMP 3
9907679-69	COMP 4
9907679-71	COMP 5
9907679-72	COMP 6
QC630737	HBLK01 (Method Blank)
QC630738	HBLK01LCS (Laboratory Control Sample)
QC630739	COMP-7MS (Matrix Spike)
QC630740	COMP-7MSD (Matrix Spike Duplicate)
QC630945	HBLK01LCSD (Laboratory Control Sample Duplicate)

System Configuration:

The laboratory utilizes the following instruments for extractable semivolatile gas chromatograph analyses: one Tracor Model 540 gas chromatograph and five Hewlett Packard gas chromatographs consisting of HP 5890 Series II Plus and the 6890 Series models. All gas chromatographs are configured with dual ECD detectors and splitless injections. The HP systems are equipped with electronic pressure control (EPC).

Chromatographic Column:

Chromatographic separation of analytes of interest are accomplished through analysis on one of the following columns:

J&W1: DB-5 (5%-Phenyl)-methylsiloxane 30 m x 0.53 mm x 1.5 um
DB-608 Durabond stationary phase* 30 m x 0.53 mm x 0.5 um
J&W2: DB-5 (5%-Phenyl)-methylsiloxane 30 m x 0.32 mm x 1.0 um
DB-1701 Durabond stationary phase* 30 m x 0.32 mm x 0.5 um
J&W3: DB-5 (5%-Phenyl)-methylsiloxane 30 m x 0.53 mm x 1.5 um
DB-1701 (14% Cyanopropylphenyl)-methylsiloxane 30 m x 0.53 mm x 0.5 um
J&W4: DB-608 Durabond stationary phase* 30 m x 0.53 mm x 0.5 um
DB-XLB * 30 m x 0.53 mm x 1.5 um
J&W5: DB-XLB * 30 m x 0.25 mm x 0.25 um
DB-17MS (50%-Phenyl)-methylsiloxane 30 m x 0.25 mm x 0.25 um

* Durabond and DB-XLB are trademarks of J & W.

Instrument Configuration:

The samples reported in this Sample Delivery Group (SDG) were analyzed on one or more of the following instrument systems (instrument systems are identified by the instrument ID designations listed below which can be found on the raw data or individual form headers):

Instrument ID	System Configuration	Chromatographic Column
ECD1	HP 6890 Series GC ECD/ECD	J&W3
ECD2	Tracor 540 GC ECD/ECD	J&W1
ECD3	HP 6890 Series GC ECD/ECD	J&W5
ECD4	HP 5890 Series II Plus GC ECD/ECD	J&W5
ECD5	HP6890 Series GC ECD/ECD	J&W5
ECD7	HP6890 Series GC ECD/ECD	J&W5

Sample Preparation:

All samples were prepared in accordance with accepted procedures.

Instrument Calibration:

The standards bracketing the samples within this SDG failed acceptance criteria with a positive bias. Positive bias for analytical data is a result of instrument response increasing as the analytical sequence proceeds. Since no target analytes were detected in the samples, the non-compliant %D values have no adverse effects on the data.

Holding Time:

All samples were analyzed within the required holding time.

Surrogates:

Surrogate recoveries were within the required acceptance limits.

Blanks:

There were no target analytes detected in the method blank above the required acceptance limit.

Spike Analyses:

The matrix spikes (MS) and matrix spike duplicate (MSD) were analyzed on the following sample number:

9907679-01(COMP-7)

All of the analyte recoveries in the MS and MSD were not within the required acceptance limits. Due to matrix interferences, all analytes recoveries were below acceptance.

All relative percent differences (RPDs) between the MS and MSD recoveries were within the required acceptance limits.

Laboratory Control Samples:

All analytes in the laboratory control sample (LCS) were not within the required acceptance limits.

All analytes in the laboratory control sample duplicate (LCSD) were within the required acceptance limits for relative percent difference.

The recovery for 2,4,5-TP was below acceptance limits in the LCS. However, all recoveries were within acceptance limits in the LCSD.

Dilutions:

All samples and QC final extracts undergo a standard ten fold dilution prior to analyses to eliminate chromatographic artifacts originating in the extraction process.

Non Conformance Reports:

There was a Nonconformance Reports associated with this batch.
NCR #: GEL/AS/OA/3279

Manual Integrations:

Certain standards and QC samples required manual integrations to correctly postition the baseline as set in the calibration standard injections.

Copies of manual integration peak profiles are included in the application raw data section of this package.

The preceding narrative has been reviewed by: A. Mulholland Date: 7/30/99

General Engineering Laboratories
Form GEL-XXX
(Rev. 09/98)

1. NCR Report No.: GEL/AS/OA/13279
2. Page 1 of 1
3. Revision No.: 0

COMPANY-WIDE NONCONFORMANCE REPORT

COMPLETE EVERY ITEM

(See Instructions on Reverse Side)

4. Mo. Day Yr.: 7 | 26 | 99

5. Division: ☑ Industrial ☑ Federal ☐ Radiochemistry ☐ Bioassay ☐ Other

6. Type: Material ☐ Process ☑ Product ☐

7. Instrument Type: ECD 4

8. Quality Criteria: ☑ SOP ☐ QAP or QAPJP ☐ Client Contract ☐ Purchase Document ☐ Drawing ☐ Specifications ☐ Others

9. Supplier/Client Name & Code: WEIS00199, GOSS00296, WSRC00497

10. Test/Method: EPA8151/8151B Herb soil

11. Numerical Reference Identification: (Batch Number, Sample Number, ID number)
154030

12. Specifications and Requirements Nonconformance Description:

Item No.	
1.	LCS recovery failed low.
2	MS MSD for 9907671-01 failed low.
3	MSD (QC 630947) failed low
4.	Surrogate for sample 9907465-01 (GOSS) failed low

Prep by JP

13. Originator's Printed Name & Signature: Jimin Cao — Date: 7/26/99

14. NRG Disposition:

Item No.	
1.	LCSD was within the acceptance limit. LCS failure could be caused by random lab error.
2.	Both MS, MSD of 9907671-01 failed low and RPD pass. Therefore split failure ~~could~~ is due to matrix interference.
3.	MSD split recovery low along with low surrogate recovery. Therefore it is caused random lab error. 4. GOSS has

15. NRG's Printed Name & Signature: Christopher Aker — Date: 07/26/99

List NRG Participants:

Management Review ☑ or Management Approval ☐

Please review within 24 hours of receipt.

R Review & Disposition Review or Approval:

Quality Review: Date

Originator's Director/Group Leader: Date

Corrective Action Request and Approval:

18. CA Requested: Print Name and Sign: Date

19. Corrective Action Approval & Number: Date

Case Narrative for WSRC
SDG 99191M

Metals Analysis by ICP
Mercury Analysis by CVAA

Sample Analysis and Sample Preparation
The following samples were analyzed for lead using ICP Method EPA 6010B and 7471A (CVAA):

Laboratory Identification	Sample Description
9907679-01	COMP-7
9907679-02	COMP-8
9907679-65	COMP 1
9907679-66	COMP 2
9907679-68	COMP 3
9907679-69	COMP 4
9907679-71	COMP 5
9907679-72	COMP 6
QC630247-ICP	Preparation Blank (PBS)
QC630248-ICP	Laboratory Control Sample (LCSS)
QC630252-ICP	COMP 6S-Matrix Spike (MS)
QC630253-ICP	COMP 6MS-Matrix Spike Duplicate (MSD)
QC628773-CVAA	Preparation Blank (PBS)
QC628774-CVAA	Laboratory Control Sample (LCSS)
QC630326-CVAA	COMP-8S-Matrix Spike (MS)
QC630327-CVAA	COMP-8MS-Matrix Spike Duplicate (MSD)

Sample Preparation
All samples were prepared in accordance with the appropriate EPA SW846 procedure.

System Configurations
ICP analysis was performed on a Thermo Jarrell Ash 61E Trace axial-viewing inductively coupled plasma atomic emission spectrometer. The instrument is equipped with a Meinhardt nebulizer, cyclonic spray chamber, and yttrium internal standard. Operating conditions for the Trace ICP were set at a power level of 950 watts. The instrument has a peristaltic pump flow rate of 140 RPM (2.0 mL/min sample uptake rate), argon gas flows of 15 L/min and 0.5 L/min for the torch and auxiliary gases, and a pressure setting of 26 PSI for the nebulizer.

Mercury analysis was performed on a Perkin-Elmer Flow Injection Mercury System (FIMS-400) automated mercury analyzer. The instrument consists of a cold vapor atomic absorption spectrometer set to detect mercury at a wavelength of 254 nm. Sample introduction through the flow injection system is performed via a peristaltic pump at 9 mL/min and nitrogen carrier gas rate of 5 L/min.

Instrument Calibration
The instruments were calibrated according to the manufacturer's specifications and EPA methodology.

Holding Time
The sample analyses were completed within the required holding times.

Blanks
All results were below the required acceptance limits.

Spike and Duplicate Analyses
Sample COMP 6 was designated as the quality control sample for the ICP batch. Sample COMP 8 was designated as the quality control sample for the CVAA batch. The batches included a matrix spike (MS) and a matrix spike duplicate (MSD). The percent recoveries (%R) obtained from the MS analyses are evaluated when the sample concentration is less than four times (4X) the spike concentration added. The relative percent difference (RPD) obtained from the DUP is evaluated when the sample concentration is greater than five times (5X) the contract required detection limit (RL). The qualtiy control criteria were met for all requested analytes in both the matrix spike except antimony, barium, copper, thallium and tin as indicated by the "**" flags. and its duplicate except The relative percent difference (RPD)criteria was met for all analytes except selenium and tin.

Laboratory Control Samples
The laboratory control samples (LCSS) met the recommended QC acceptance criteria for percent recovery (%R) for all elements.

Sample Dilutions
All ICP samples were analyzed at a 2X dilution for lead, tin, and vanadium only. All other analytes were diluted to a 100X. The LCS was diluted a 5X. The dilutions were done in order to eliminate potential matrix interference and/or to bring over-ranged target analytes within linear range of the instrument.

Nonconformance Reports
No Nonconformance Report was associated with this SDG.

General Comments

This Case Narrative has been generated based on Batch Data Reports and QC Summary Reports issued by the analysts.

This case narrative has been reviewed by: _____

Date: 8/2/99

Case Narrative for
WSRC
SDG# 99191M

AMMONIA

Analytical Batch Number: 154212

Analytical Method: EPA 350.1 modified

Laboratory Number	Sample Description
9907679-01	COMP-7
9907679-02	COMP-8
9907679-65	COMP 1
9907679-66	COMP 2
9907679-68	COMP 3
9907679-69	COMP 4
9907679-71	COMP 5
9907679-72	COMP 6
QC631472	Blank
QC631473	Laboratory Control Sample
QC631474	Duplicate of 9907679-66
QC631475	Matrix Spike of 9907679-66

Sample Preparation:

All samples were prepared in accordance with accepted procedures. The procedure quoted is for liquid matrix samples only. It is modified to accommodate solid matrix samples.

Instrument Calibration:

The instrument used was a TRAACS 800 colorimetric autoanalyzer. The instrument was properly calibrated.

Holding Time:

All samples were analyzed within the required holding time.

Blanks:

No target analytes were detected in the method blank above the required acceptance limit.

Spike Analyses:

The matrix spike was run on the following Sample Number.

9907679-66

All analyte recoveries in the matrix spike were within the required acceptance limits.

Laboratory Control Samples:

All analyte recoveries in the laboratory control sample were within the required acceptance limits.

Sample Duplicates:

All sample duplicate results were within the required acceptance limits.

Dilutions:

None of the samples were diluted.

Non Conformance Reports:

The following Nonconformance Reports were written for this batch.

GEL-AS-GC-1529

ION CHROMATOGRAPHY

Analytical Batch Number: 154420

Analytical Method: EPA 300.0

Laboratory Number	Sample Description
9907679-01	COMP-7
9907679-02	COMP-8
9907679-65	COMP 1
9907679-66	COMP 2
9907679-68	COMP 3
9907679-69	COMP 4
9907679-71	COMP 5
9907679-72	COMP 6
QC632334	Duplicate of 9907679-02
QC632335	Matrix Spike of 9907679-02
QC632336	Laboratory Control Sample
QC632337	Blank

Sample Preparation:

All samples were prepared in accordance with accepted procedures.

Instrument Calibration:

The instrument used was a Dionex DX300 Ion Chromatography instrument with a Dionex AS9-HC general purpose anion column. Instrument IC-AF was properly calibrated on 07/12/99.

Holding Time:

All samples were analyzed within the required holding time.

Blanks:

No target analytes were detected in the method blank above the required acceptance limit.

Spike Analyses:

The matrix spike was run on the following Sample Number.

9907679-02

All analyte recoveries in the matrix spike were within the required acceptance limits.

Laboratory Control Samples:

All analyte recoveries in the laboratory control sample were within the required acceptance limits.

Sample Duplicates:

All sample duplicate results were within the required acceptance limits.

Dilutions:

None of the samples were diluted.

Non Conformance Reports:

The following Nonconformance Reports were written for this batch.

GEL-AS-GC-1524

NITROGEN AS NITRATE/NITRITE

Analytical Batch Number: 154795

Analytical Method: EPA 353.1 modified

Laboratory Number	Sample Description
9907679-01	COMP-7
9907679-02	COMP-8
9907679-65	COMP 1
9907679-66	COMP 2
9907679-68	COMP 3
9907679-69	COMP 4
9907679-71	COMP 5
9907679-72	COMP 6
QC633843	Duplicate of 9907679-72
QC633844	Matrix Spike of 9907679-72
QC633845	Blank
QC633846	Laboratory Control Sample

Sample Preparation:

All samples were prepared in accordance with accepted procedures.

Instrument Calibration:

The instrument used was a TRAACS 800 colorimetric autoanalyzer. The instrument was properly calibrated.

Holding Time:

All samples were analyzed within the required holding time.

Blanks:

No target analytes were detected in the method blank above the required acceptance limit.

Spike Analyses:

The matrix spike was run on the following Sample Number.

9907679-72

All analyte recoveries in the matrix spike were within the required acceptance limits.

Laboratory Control Samples:

All analyte recoveries in the laboratory control sample were within the required acceptance limits.

Sample Duplicates:

The sample and duplicate results were less than the PQL; therefore, the RPD is not applicable.

Dilutions:

None of the samples were diluted.

Non Conformance Reports:

There were no Nonconformance Reports associated with this batch.

TOTAL HALOGENS

Analytical Batch Number: 154422

Analytical Method: EPA 9056

Laboratory Number	Sample Description
9907679-01	COMP-7
9907679-02	COMP-8
9907679-65	COMP 1
9907679-66	COMP 2
9907679-68	COMP 3
9907679-69	COMP 4
9907679-71	COMP 5
9907679-72	COMP 6
QC632345	Duplicate of 9907679-02
QC632346	Matrix Spike of 9907679-02
QC632347	Laboratory Control Sample
QC632348	Blank

Sample Preparation:

All samples were prepared by DI extraction in accordance with accepted procedures.

Instrument Calibration:

The instrument used was a Dionex DX300 Ion Chromatography instrument with a Dionex AS9-HC general purpose anion column. Instrument IC-AF was properly calibrated on 07/12/99.

Holding Time:

All samples were analyzed within the required holding time.

Blanks:

No target analytes were detected in the method blank above the required acceptance limit.

Spike Analyses:

The matrix spike was run on the following Sample Number.

9907679-02

All analyte recoveries in the matrix spike were within the required acceptance limits.

Laboratory Control Samples:

The sample values for Cl, Br and F were less than the PQL, so the RPD does not apply.

Dilutions:

None of the samples were diluted.

Non Conformance Reports:

The following Nonconformance Reports were written for this batch.

GEL-AS-GC-1527

TOTAL KJELDAHL NITROGEN

Analytical Batch Number: 154213

Analytical Method: EPA 351.2 modified

Laboratory Number	Sample Description
9907679-01	COMP-7
9907679-02	COMP-8
9907679-65	COMP 1
9907679-66	COMP 2
9907679-68	COMP 3
9907679-69	COMP 4
9907679-71	COMP 5
9907679-72	COMP 6
QC631476	Blank
QC631477	Laboratory Control Sample
QC631478	Duplicate of 9907679-01
QC631479	Matrix Spike of 9907679-01

Sample Preparation:

All samples were prepared in accordance with accepted procedures.

Instrument Calibration:

The instrument was properly calibrated.

Holding Time:

All samples were analyzed within the required holding time.

Blanks:

No target analytes were detected in the method blank above the required acceptance limit.

Spike Analyses:

The matrix spike was run on the following Sample Number.

9907679-01

All analyte recoveries in the matrix spike were within the required acceptance limits.

Laboratory Control Samples:

All analyte recoveries in the laboratory control sample were within the required acceptance limits.

Sample Duplicates:

The sample and duplicate results were less than the PQL; therefore, the RPD is not applicable.

Dilutions:

None of the samples were diluted.

Non Conformance Reports:

There were no Nonconformance Reports associated with this batch.

TOTAL NITROGEN

Analytical Batch Number: 154822

Analytical Method: EPA 351.2/353.1

Laboratory Number	Sample Description
9907679-01	COMP-7
9907679-02	COMP-8
9907679-65	COMP 1
9907679-66	COMP 2
9907679-68	COMP 3
9907679-69	COMP 4
9907679-71	COMP 5
9907679-72	COMP 6

Holding Time:

All samples were analyzed within the required holding time.

Non Conformance Reports:

There were no Nonconformance Reports associated with this batch.

General Comments:

Calculated value: TKN + NO2/NO3

TOTAL PHOSPHORUS

Analytical Batch Number: 154102

Analytical Method: EPA 365.4 modified

Laboratory Number	Sample Description
9907679-01	COMP-7
9907679-02	COMP-8
9907679-65	COMP 1
9907679-66	COMP 2
9907679-68	COMP 3
9907679-69	COMP 4
9907679-71	COMP 5
9907679-72	COMP 6
QC631008	Blank
QC631009	Laboratory Control Sample
QC631010	Duplicate of 9907679-69
QC631011	Matrix Spike of 9907679-69

Sample Preparation:

All samples were prepared in accordance with accepted procedures.

Instrument Calibration:

The instrument used was a TRAACS 800 colorimetric autoanalyzer. The instrument was properly calibrated.

Holding Time:

All samples were analyzed within the required holding time.

Blanks:

No target analytes were detected in the method blank above the required acceptance limit.

Spike Analyses:

The matrix spike was run on the following Sample Number.

9907679-69

The matrix spike recovery was not applicable. The spike concentration was diluted out due to high sample concentration.

Laboratory Control Samples:

All analyte recoveries in the laboratory control sample were within the required acceptance limits.

Sample Duplicates:

All sample duplicate results were within the required acceptance limits.

Dilutions:

The following samples were diluted to bring values within the calibration range.

Laboratory Number	
9907679-01	1:100
9907679-02	1:100
9907679-65	1:100
9907679-66	1:100
9907679-68	1:100
9907679-69	1:100
9907679-71	1:100
9907679-72	1:100
QC631010	1:100
QC631011	1:100

Non Conformance Reports:

There were no Nonconformance Reports associated with this batch.

The above narrative has been reviewed by: [signature] Date: 08/02/99

General Engineering Laboratories
Form GEL-XXX
(Rev. 09/98)

UNCONTROLLED DOCUMENT

1. NCR Report No.: GEL-NC-GC-1529
2. Page 1 of 1
3. Revision No.: —

COMPANY-WIDE NONCONFORMANCE REPORT

COMPLETE EVERY ITEM

(See Instructions on Reverse Side)

Mo.	Day	Yr.	5. Division:	6. Type:
7	27	99	☐ Industrial ☑ Federal ☐ Radiochemistry ☐ Bioassay ☐ Other	Material ☐ Process ☑ Product ☐

Instrument Type: TRAACS 800 Technicon

8. Quality Criteria: ☑ SOP ☐ QAP or QAPJP ☐ Client Contract ☐ Purchase Document ☐ Drawing ☐ Specifications ☐ Others

Supplier/Client Name & Code: WSRC

10. Test/Method: NH_3 - 350.1

. Numerical Reference Identification: (Batch Number, Sample Number, ID number)

B/N 154212/154283

. Specifications and Requirements Nonconformance Description:

Item No.	
1)	Samples were scanned into analyst's custody just before LIMS outage - LIMS lost custody record

14. NRG Disposition:

Item No.	
1)	Data good, Analyst had custody throughout analysis process

RECEIVED JUL 30 1999

15. NRG's Printed Name & Signature: Lewis [signature] Date: 7/27/99

List NRG Participants: Jake Creek / [signature] 07/28/99

. Originator's Printed Name & Signature: Lewis [signature] Date: 7/27/99

Management Review ☐ or Management Approval ☐

Please review within 24 hours of receipt.

010077

CR Review & Disposition Review or Approval:

Corrective Action Request and Approval: FT

. Quality Review: [signature] Date: 7/30/99

18. CA Requested: Print Name and Sign Date

17. Originator's Director/Group Leader: Date

19. Corrective Action Approval & Number Date

CASE NARRATIVE
WSRC
SDG # 99191T-VOA
Analysis by GC/MS

Sample Analysis:

The following samples were analyzed for Volatile Organic Compounds using the analytical protocol from EPA SW-846 Third Edition, Method 8260B, Revision 2, December 1996:

Laboratory Number	Sample Description
9907679-04	TCLP 1
9907679-06	TCLP 2
9907679-18	TCLP 3
9907679-20	TCLP 4
9907679-22	TCLP 5
9907679-24	TCLP 6
9907679-26	TCLP 7
9907679-28	TCLP 8
9907679-40	TCLP 9
9907679-42	TCLP 10
9907679-44	TCLP 11
9907679-46	TCLP 12
9907679-48	TCLP 13
9907679-50	TCLP 14
9907679-52	TCLP 15
9907679-64	TCLP 16
QC633229	VBLK01 (Blank)
QC633230	VBLK01LCS (Laboratory Control Sample)
QC633231	TCLP 9MS (Matrix Spike)
QC633232	TCLP 9MSD (Matrix Spike Duplicate)
QC633233	VBLK01TCLP (TCLP Blank)
QC633234	VBLK02TCLP (TCLPBlank)
QC633235	VBLK03TCLP (TCLPBlank)
QC633659	VBLK02 (Blank)
QC633660	VBLK02LCS (Laboratory Control Sample
QC634543	VBLK03 (Blank)
QC634544	VBLK03LCS (Laboratory Control Sample

System Configuration:

The laboratory utilizes a variety of instrument configurations for volatile analyses. These analyses are accomplished using one or more of the GC and MS couplings, as follows:

GC/MS	Interface	Purge and Trap-Concentrator / Autosampler
5890 Series II / 5970	Jet Separator	Tekmar 2000 / Archon
5890 Series II / 5972	Direct	OI 4560 / Archon
6890 Series / 5973	Direct	Tekmar 3000 / Precept
6890 Series / 5973	Direct	OI 4560 / DPM-16
6890 Series / 5973	Direct	Tekmar 2000 / Archon

Chromatographic Column:

Chromatographic separation of volatile components is accomplished through analysis on one or more of the following columns:

J&W1	DB - 624, 60 m x 0.32 mm, 1.8um (identified by the J&W1 designation)
J&W2:	DB - 624, 75 m x 0.53 mm, 3 um (identified by the J&W2 designation)
Rtx1	Rtx Volatiles, 60 m x 0.53 mm, 1.5 um (identified by the Rtx VOA designation)
J&W3	DB-624, 60 m x 0.25 mm, 1.4 um (identified by the J&W3 designation)

Samples are prepared using Purge and Trap samplers containing the following P & T trap:

VOCARB 3000: Carbopack B/ Carboxen 1000 &1001

Instrument Configuration:

The samples reported in this sample delivery group (SDG) were analyzed on one or more of the following instrument systems (instrument systems are identified by the instrument ID designations listed below which can be found on the raw data or individual form headers):

Instrument ID	System Configuration	Chromatographic Column	P & T Trap
VOA1	HP5890/HP5970	J&W2	VOCARB 3000
VOA2	HP6890/HP5973	J&W3	VOCARB 3000
VOA4	HP5890/HP5972	Rtx VOA	VOCARB 3000
VOA5	HP5890/HP5972	J&W3	VOCARB 3000
VOA7	HP5890/HP5972	Rtx VOA	VOCARB 3000
VOA8	HP6890/HP5973	J&W3	VOCARB 3000
VOA9	HP6890/HP5973	J&W3	Tenax/Silicagel/ Charcoal

Instrument Calibration:

The instrument was properly calibrated.

Holding Time:

All samples were analyzed within the required holding time.

Surrogates:

Surrogate recoveries were within the required acceptance limits except for the following sample:

9907679-42

Reanalysis was not possible due to lack of TCLP extract.

Internal Standards:

Internal Standard areas were within the required acceptance limits except for the following sample:

9907679-42

Reanalysis was not possible due to lack of TCLP extract.

Blanks:

There were no target analytes detected in the method blanks above the required acceptance limit.

Spike Analyses:

The matrix spike (MS) and matrix spike duplicate (MSD) were analyzed on the following sample number:

GEL # 9907679-40 TCLP 9

All of the analyte recoveries in the MS and MSD were within the required acceptance limits.

The relative percent differences (RPDs) between the MS and MSD were within the required acceptance limits.

Laboratory Control Samples:

All analyte recoveries in the laboratory control samples were within the required acceptance limits.

Dilutions:

Due to problems associated with the acidity of the matrix, TCLP volatile extracts are routinely diluted 10 times before analysis. The dilution factor does not increase detection limits above the regulatory limits required by the client.

Non Conformance Reports:

Nonconformance Reports were not necessary for this SDG.

General Comments:

Data files associated with both the initial calibration and continuing calibration check may have been manually integrated to correct misidentification of peaks by the integration software. Manual integrations are performed because of poor peak shapes exhibited by selective compounds at low concentrations, or as a result of overlapping retention time windows of similar isomeric compounds contained on the extended reporting list. If applicable, peak profiles for the affected compounds are contained in the raw data section.

The preceding narrative has been reviewed by: Kelly M. Clemmons Date: 8/10/99

CASE NARRATIVE
WSRC
SDG 99191T
Analysis by GC/MS

Sample Analysis:

The following samples were analyzed for semivolatile organic compounds using the analytical protocol from EPA SW-846 Third Edition, Method 8270C, Revision 3, December, 1996:

Laboratory Number	Sample Description
9907679-04	TCLP 1
9907679-06	TCLP 2
9907679-18	TCLP 3
9907679-20	TCLP 4
9907679-22	TCLP 5
9907679-24	TCLP 6
9907679-26	TCLP 7
9907679-28	TCLP 8
9907679-40	TCLP 9
9907679-42	TCLP 10
9907679-44	TCLP 11
9907679-46	TCLP 12
9907679-48	TCLP 13
9907679-50	TCLP 14
9907679-52	TCLP 15
9907679-64	TCLP 16
QC630902	SBLK01 (Blank)
QC630903	TCLPBLANK (TCLP Blank)
QC630904	SBLK01LCS (Laboratory Control Sample)
QC630905	TCLP 2MS (Matrix Spike)
QC630906	TCLP 2MSD (Matrix Spike Duplicate)

System Configuration:

The laboratory utilizes a HP 6890 Series gas chromatograph and a HP 5973 Mass Selective Detector. The configuration is equipped with electronic pressure control. All MS interfaces are capillary direct.

Chromatographic Column:

Chromatographic separation of semivolatile components is accomplished through analysis on one or more of the following columns (all with dimensions of 30 meters x

0.25 mm ID and 0.25 um film except J&WDB-5MS2 which is 20 meters x 0.18 mm ID and 0.18 um film):

J&W:	DB - 5.625 (5%-Phenyl)-methylpolysiloxane (identified by a DB-5.625 designation on quantitation reports and reconstructed ion chromotograms)
J&WDB-5MS	Similar to the J&W DB - 5.625 with low bleed characteristics.
Alltech:	EC-5 (SE-54) 5% Phenyl, 95% Methylpolysiloxane (identified by a EC-5 designation)
HP:	HP-5MS 5% Phenylmethylsiloxane (identified by a HP-5MS designation)
Phenomenex:	ZB-5 5% Phenyl Polysiloxane
J&WDB-5MS2	Similar to the J&W DB - 5.625 with low bleed characteristics.

Instrument Configuration:

The samples reported in this SDG were analyzed on one or more of the following instrument systems (instrument systems are identified by the instrument ID designations listed below which can be found on the raw data or individual form headers):

Instrument ID	System Configuration	Chromatographic Column
MSD2	HP6890/HP5973	ZB-5
MSD4	HP6890/HP5973	HP
MSD5	HP6890/HP5973	ZB-5
MSD7	HP6890/HP5973	ZB-5
MSD8	HP6890/HP5973	J&WDB-5MS2

Sample Preparation:

All samples were prepared in accordance with accepted procedures.

Instrument Calibration:

The instrument was properly calibrated.

Diphenylamine has now superseded N-Nitroso-diphenylamine as a CCC on Quantitation Reports, Initial Calibration Reports, Calibration Check Standard Reports, etc. Previous versions of EPA Method 8270 (prior to 8270C) listed N-Nitroso-diphenylamine as a CCC. However, as stated in EPA Method 8270C, Revision 3, December, 1996, Section 1.4.5, 'N-Nitroso-diphenylamine decomposes in the gas chromatographic inlet and cannot be separated from Diphenylamine.' Studies of these two compounds, both independent of each other and together, at GEL show that they not only coelute, but also have similar mass spectra.

Holding Time:

All samples were analyzed within the required holding time.

Surrogates:

Surrogate recoveries in all samples were within the required acceptance limits.

Internal Standards:

Internal Standards in all samples were within the required acceptance limits.

Blanks:

There were no target analytes detected in the method blank above the required acceptance limit.

TCLPBLANK is a TCLP Blank that is tumbled and extracted with the batch.

SBLK01 is a method blank and was extracted only.

Spike Analyses:

The matrix spikes were analyzed on the following sample number:

9907679-06 (TCLP 2)

All of the analyte recoveries in the matrix spike were within the required acceptance limits.

All analytes in the matrix spike duplicate were within the required acceptance limits for relative percent difference.

Laboratory Control Samples:

All analytes in the laboratory control sample were within the required acceptance limits.

Dilutions:

None of the samples were diluted.

Nonconformance Reports:

There were no Nonconformance Reports associated with this SDG.

Manual Integrations:

No manual integrations were performed on the standards in the initial calibration or continuing calibration associated with this SDG.
No manual integrations were performed on samples, blanks or quality control samples associated with this SDG.

The preceding narrative has been reviewed by: Erin Haukert Date: 8/3/99

CASE NARRATIVE
WSRC
SDG#99191T

The following samples were analyzed for Pesticides using the analytical protocol from EPA SW-846 Third Edition, Method 8081A, Revision 0, September, 1994:

Laboratory Number	Sample Description
9907679-04	TCLP 1
9907679-06	TCLP 2
9907679-18	TCLP 3
9907679-20	TCLP 4
9907679-22	TCLP 5
9907679-24	TCLP 6
9907679-26	TCLP 7
9907679-28	TCLP 8
9907679-40	TCLP 9
9907679-42	TCLP 10
9907679-44	TCLP 11
9907679-46	TCLP 12
9907679-48	TCLP 13
9907679-50	TCLP 14
9907679-52	TCLP 15
9907679-64	TCLP 16
QC630911	PBLK01 (Method Blank)
QC630912	TBLK01 (TCLP Blank)
QC630914	PBLK01LCS (Laboratory Control Sample)
QC630915	TCLP 1MS (Matrix Spike)
QC630916	TCLP 1MSD (Matrix Spike Duplicate)
QC638270	PBLK02 (Method Blank)
QC638271	PBLK02LCS (Laboratory Control Sample)

System Configuration:

The laboratory utilizes the following instruments for extractable semivolatile gas chromatograph analyses: one Tracor Model 540 gas chromatograph and five Hewlett Packard gas chromatographs consisting of HP 5890 Series II Plus and the 6890 Series models. All gas chromatographs are configured with dual ECD detectors and splitless injections. The HP systems are equipped with electronic pressure control (EPC).

Chromatographic Column:

Chromatographic separation of analytes of interest are accomplished through analysis on one of the following columns:

J&W1: DB-5 (5%-Phenyl)-methylsiloxane 30 m x 0.53 mm x 1.5 um
DB-608 Durabond stationary phase* 30 m x 0.53 mm x 0.5 um
J&W2: DB-5 (5%-Phenyl)-methylsiloxane 30 m x 0.32 mm x 1.0 um
DB-1701 Durabond stationary phase* 30 m x 0.32 mm x 0.5 um
J&W3: DB-5 (5%-Phenyl)-methylsiloxane 30 m x 0.53 mm x 1.5 um
DB-1701 (14% Cyanopropylphenyl)-methylsiloxane 30 m x 0.53 mm x 0.5 um
J&W4: DB-608 Durabond stationary phase* 30 m x 0.53 mm x 0.5 um
DB-XLB * 30 m x 0.53 mm x 1.5 um
J&W5: DB-XLB * 30 m x 0.25 mm x 0.25 um
DB-17MS (50%-Phenyl)-methylsiloxane 30 m x 0.25 mm x 0.25 um
* Durabond and DB-XLB are trademarks of J & W.

Instrument Configuration:

The samples reported in this Sample Delivery Group (SDG) were analyzed on one or more of the following instrument systems (instrument systems are identified by the instrument ID designations listed below which can be found on the raw data or individual form headers):

Instrument ID	System Configuration	Chromatographic Column
ECD1	HP 6890 Series GC ECD/ECD	J&W3
ECD2	Tracor 540 GC ECD/ECD	J&W1
ECD3	HP 6890 Series GC ECD/ECD	J&W5
ECD4	HP 5890 Series II Plus GC ECD/ECD	J&W5
ECD5	HP6890 Series GC ECD/ECD	J&W5
ECD7	HP6890 Series GC ECD/ECD	J&W5

Sample Preparation:

All samples were not prepared in accordance with accepted procedures. Sample 9907679-28 was re-extracted out of holding to investigate low surrogate recovery. The second extraction has been reported.

Instrument Calibration:

The instrument was properly calibrated.

Holding Time:

All samples were analyzed within the required holding time.

Surrogates:

Surrogate recoveries in all samples were within the required acceptance limits.

Blanks:

There were no target analytes detected in the method blank above the required acceptance limit.

Spike Analyses:

The matrix spikes (MS) and matrix spike duplicate (MSD) were analyzed on the following sample number:

9907679-04 (TCLP 1)

All of the analyte recoveries in the MS and MSD were within the required acceptance limits.

All relative percent differences (RPDs) between the MS and MSD recoveries were within the required acceptance limits.

Laboratory Control Samples:

All analytes in the laboratory control sample (LCS) were within the required acceptance limits.

Manual Integrations:

Samples and QC analyses required manual integrations to correctly position the baseline as set in the calibration standard injections.

Certain standards required manual integrations to correctly assign analyte peaks and/or proper peak integration as set in the initial calibration.

Copies of manual integration peak profiles are included in the application raw data section of this package.

Dilutions:

None of the samples were diluted.

Non Conformance Reports:

There was no Nonconformance Reports associated with this SDG.

The preceding narrative has been reviewed by: R. Michelle Davis Date: 8/12/99

CASE NARRATIVE
WSRC
SDG#99191T

The following samples were analyzed for Herbicide using the analytical protocol from EPA SW-846 Third Edition, Method 8151, Revision 0, September 1994:

Laboratory Number	Sample Description
9907679-04	TCLP 1
9907679-06	TCLP 2
9907679-18	TCLP 3
9907679-20	TCLP 4
9907679-22	TCLP 5
9907679-24	TCLP 6
9907679-26	TCLP 7
9907679-28	TCLP 8
9907679-40	TCLP 9
9907679-42	TCLP 10
9907679-44	TCLP 11
9907679-46	TCLP 12
9907679-48	TCLP 13
9907679-50	TCLP 14
9907679-52	TCLP 15
9907679-64	TCLP 16
QC631504	HBLK01 (Method Blank)
QC631505	TBLK02 (TCLP Blank)
QC631506	HBLK01LCS (Laboratory Control Sample)
QC631507	TCLP 12MS (Matrix Spike)
QC631508	TCLP 12MSD (Matrix Spike Duplicate)

System Configuration:

The laboratory utilizes the following instruments for extractable semivolatile gas chromatograph analyses: one Tracor Model 540 gas chromatograph and five Hewlett Packard gas chromatographs consisting of HP 5890 Series II Plus and the 6890 Series models. All gas chromatographs are configured with dual ECD detectors and splitless injections. The HP systems are equipped with electronic pressure control (EPC).

Chromatographic Column:

Chromatographic separation of analytes of interest are accomplished through analysis on one of the following columns:

J&W1: DB-5 (5%-Phenyl)-methylsiloxane 30 m x 0.53 mm x 1.5 um

DB-608 Durabond stationary phase* 30 m x 0.53 mm x 0.5 um
J&W2: DB-5 (5%-Phenyl)-methylsiloxane 30 m x 0.32 mm x 1.0 um
DB-1701 Durabond stationary phase* 30 m x 0.32 mm x 0.5 um
J&W3: DB-5 (5%-Phenyl)-methylsiloxane 30 m x 0.53 mm x 1.5 um
DB-1701 (14% Cyanopropylphenyl)-methylsiloxane 30 m x 0.53 mm x 0.5 um
J&W4: DB-608 Durabond stationary phase* 30 m x 0.53 mm x 0.5 um
DB-XLB * 30 m x 0.53 mm x 1.5 um
J&W5: DB-XLB * 30 m x 0.25 mm x 0.25 um
DB-17MS (50%-Phenyl)-methylsiloxane 30 m x 0.25 mm x 0.25 um
* Durabond and DB-XLB are trademarks of J & W.

Instrument Configuration:

The samples reported in this Sample Delivery Group (SDG) were analyzed on one or more of the following instrument systems (instrument systems are identified by the instrument ID designations listed below which can be found on the raw data or individual form headers):

Instrument ID	System Configuration	Chromatographic Column
ECD1	HP 6890 Series GC ECD/ECD	J&W3
ECD2	Tracor 540 GC ECD/ECD	J&W1
ECD3	HP 6890 Series GC ECD/ECD	J&W5
ECD4	HP 5890 Series II Plus GC ECD/ECD	J&W5
ECD5	HP6890 Series GC ECD/ECD	J&W5
ECD7	HP6890 Series GC ECD/ECD	J&W5

Sample Preparation:

All samples were prepared in accordance with accepted procedures.

Instrument Calibration:

Some target analytes failed acceptance criteria with a positive bias. Positive bias for analytical data is a result of instrument response increasing as the analytical sequence proceeds. Since no target analytes were detected in the samples, the non-compliant %D values have no adverse effects on the data.

Holding Time:

All samples were analyzed within the required holding time.

Surrogates:

Surrogate recoveries in all samples were within the required acceptance limits.

Blanks:

There were no target analytes detected in the method blank above the required acceptance limit.

Spike Analyses:

The matrix spikes (MS) and matrix spike duplicate (MSD) were analyzed on the following sample number:

9907679-46 (TCLP 12)

All of the analyte recoveries in the MS and MSD were within the required acceptance limits.

All relative percent differences (RPDs) between the MS and MSD recoveries were within the required acceptance limits.

Laboratory Control Samples:

All analytes in the laboratory control sample (LCS) were within the required acceptance limits.

Dilutions:

All samples and QC final extracts undergo a standard ten fold dilution prior to analyses to eliminate chromatographic artifacts originating in the extraction process.

Non Conformance Reports:

There was no Nonconformance Reports associated with this SDG.

Manual Integrations:

Certain standards and QC samples required manual integrations to correctly postition the baseline as set in the calibration standard injections.

Copies of manual integration peak profiles are included in the application raw data section of this package.

The preceding narrative has been reviewed by: K. Mitchell Jones Date: 8/12/99

Case Narrative for
WSRC
SDG 99191T
Metals Analysis by ICP
Mercury Analysis by CVAA

Sample Analysis and Sample Preparation

The following samples were analyzed for metals using ICP Method EPA 6010B and for mercury using CVAA Method EPA 7470A:

Laboratory Number	Sample Description
9907679-04	TCLP 1
9907679-06	TCLP 2
9907679-08	TCLP 2 (1X)
9907679-09	TCLP 2 (2X)
9907679-10	TCLP 2 (3X)
9907679-11	TCLP 2 (4X)
9907679-12	TLCP 2 (5X)
9907679-13	TCLP 2 (6X)
9907679-14	TCLP 2 (7X)
9907679-15	TCLP 2 (8X)
9907679-16	TCLP 2 (9X)
9907679-18	TCLP 3
9907679-20	TCLP 4
9907679-22	TCLP 5
9907679-24	TCLP 6
9907679-26	TCLP 7
9907679-28	TCLP 8
9907679-30	TCLP 8 (1X)
9907679-31	TCLP 8 (2X)
9907679-32	TCLP 8 (3X)
9907679-33	TCLP 8 (4X)
9907679-34	TLCP 8 (5X)
9907679-35	TCLP 8 (6X)
9907679-36	TCLP 8 (7X)
9907679-37	TCLP 8 (8X)
9907679-38	TCLP 8 (9X)
9907679-40	TCLP 9
9907679-42	TCLP 10
9907679-44	TCLP 11
9907679-46	TCLP 12
9907679-48	TCLP 13
9907679-50	TCLP 14
9907679-52	TCLP 15
9907679-54	TCLP 15 (1X)
9907679-55	TCLP 15 (2X)

	9907679-56	TCLP 15 (3X)
	9907679-57	TCLP 15 (4X)
	9907679-58	TCLP 15 (5X)
	9907679-59	TCLP 15 (6X)
	9907679-60	TCLP 15 (7X)
	9907679-61	TCLP 15 (8X)
	9907679-62	TCLP 15 (9X)
	9907679-64	TCLP 16
155258	QC635714-ICP	Preparation Blank (PB)
	QC635715-ICP	Preparation Blank #1 (TPB1)
	QC635716-ICP	Preparation Blank #2 (TPB2)
	QC635717-ICP	Laboratory Control Sample (LCS)
	QC635718-ICP	TCLP 15L-Serial Dilution (SD)
	QC635719-ICP	TCLP 15S-Matrix Spike (MS)
	QC635720-ICP	TCLP 15SD-Matrix Spike Duplicate (MSD)
154250	QC631615-ICP	Preparation Blank (PB)
	QC631616-ICP	TCLP Preparation Blank #1(TPB1)
	QC631617-ICP	Laboratory Control Sample (LCS)
	QC631618-ICP	TCLP 16L-Serial Dilution (SD)
	QC631619-ICP	TCLP 16S-Matrix Spike (MS)
	QC631620-ICP	TCLP 16SD-Matrix Spike Duplicate (MSD)
154346	QC632038-ICP	Preparation Blank
	QC632039-ICP	Preparation Blank #1 (TPB1)
	QC633212-ICP	Preparation Blank #2 (TPB2)
	QC633213-ICP	Preparation Blank #3 (TPB3)
	QC633214-ICP	Preparation Blank #4 (TPB4)
	QC632040-ICP	Laboratory Control Sample (LCS)
	QC632041-ICP	TCLP 15 (2X)L-Serial Dilution (SD)
	QC632042-ICP	TCLP 15 (2X)S-Matrix Spike (MS)
	QC632043-ICP	TCLP 15 (2X)SD-Matrix Spike Duplicate (MSD)
154873	QC634158-ICP	Preparation Blank
	QC634159-ICP	TCLP Preparation Blank #1 (TPB1)
	QC631461-ICP	TCLP Preparation Blank #2 (TPB2)
	QC634160-ICP	Laboratory Control Sample (LCS)
	QC634162-ICP	TCLP 15 (7X)L-Serial Dilution (SD)
	QC634163-ICP	TCLP 15 (7X)S-Matrix Spike (MS)
	QC634164-ICP	TCLP 15 (7X)SD-Matrix Spike Duplicate (MSD)
154977	QC634555-ICP	Preparation Blank
	QC634556-ICP	TCLP Preparation Blank #1 (TPB1)
	QC634557-ICP	TCLP Preparation Blank #2 (TPB2)
	QC634558-ICP	TCLP Preparation Blank #3 (TPB3)
	QC634559-ICP	Laboratory Control Sample (LCS)
	QC634560-ICP	TCLP 15 (9X)L-Serial Dilution (SD)
	QC634561-ICP	TCLP 15 (9X)S-Matrix Spike (MS)
	QC634562-ICP	TCLP 15 (9X)SD-Matrix Spike Duplicate (MSD)
155374	QC636156-CVAA	Preparation Blank
	QC636157-CVAA	TCLP Preparation Blank #1 (TPB1)
	QC636158-CVAA	Laboratory Control Sample (LCS)

154343	QC632020-CVAA	Preparation Blank
	QC632021-CVAA	TCLP Preparation Blank #1 (TPB1)
	QC632307-CVAA	Laboratory Control Sample (LCS)
	QC632022-CVAA	TCLP 1S-Matrix Spike (MS)
	QC632023-CVAA	TCLP 1SD-Matrix Spike Duplicate (MSD)
154526	QC632745-CVAA	Preparation Blank
	QC632746-CVAA	TCLP Preparation Blank #1 (TPB1)
	QC632747-CVAA	TCLP Preparation Blank #1 (TPB2)
	QC632748-CVAA	Laboratory Control Sample (LCS)
	QC632753-CVAA	TCLP 15 (3X)S-Matrix Spike (MS)
	QC632754-CVAA	TCLP 15 (3X)SD-Matrix Spike Duplicate (MSD)
	QC633216-CVAA	TCLP Preparation Blank #1 (TPB3)
154871	QC634146-CVAA	Preparation Blank
	QC634147-CVAA	TCLP Preparation Blank #1 (TPB1)
	QC634148-CVAA	TCLP Preparation Blank #1 (TPB2)
	QC634149-CVAA	Laboratory Control Sample (LCS)
	QC634150-CVAA	TCLP 15 (7X)S-Matrix Spike (MS)
	QC634151-CVAA	TCLP 15 (7X)SD-Matrix Spike Duplicate (MSD)
154974	QC634537-CVAA	Preparation Blank
	QC634538-CVAA	TCLP Preparation Blank #1 (TPB1)
	QC634539-CVAA	TCLP Preparation Blank #1 (TPB2)
	QC634540-CVAA	Laboratory Control Sample (LCS)
	QC634541-CVAA	TCLP 15 (9X)S-Matrix Spike (MS)
	QC634542-CVAA	TCLP 15 (9X)SD-Matrix Spike Duplicate (MSD)

System Configurations
ICP analysis was performed on a Thermo Jarrell Ash 61E Trace axial-viewing inductively coupled plasma atomic emission spectrometer. The instrument is equipped with a Meinhardt nebulizer, cyclonic spray chamber, and yttrium internal standard. Operating conditions for the Trace ICP were set at a power level of 950 watts, a peristaltic pump flow rate of 140 RPM (2.0 mL/min sample uptake rate), argon gas flows of 15 L/min and 0.5 L/min for the torch and auxiliary gases, and a nebulizer pressure setting of 26 PSI.

Mercury analysis was performed on a Perkin-Elmer Flow Injection Mercury System (FIMS-400) automated mercury analyzer. The instrument consists of a cold vapor atomic absorption spectrometer set to detect mercury at a wavelength of 254 nm. Sample introduction through the flow injection system is performed via a peristaltic pump at 9 mL/min and nitrogen carrier gas rate of 5 L/min.

Sample Preparation
All samples were prepared in accordance with the appropriate EPA SW846 procedures.

Instrument Calibration
The instruments were calibrated following the manufacturers' specifications.

Holding Time
All samples were analyzed within the required holding times.

Blanks
All quality control criteria were met for the ICP and CVAA preparation blanks.

Spike Analyses
Samples TCLP 16, TCLP 15 (2X), TCLP 15 (7X), and TCLP 15 (9X) were designated as the quality control samples for the ICP batches. Samples TCLP 1, TCLP 15 (3X), TCLP 15 (7X) and TCLP 15 (9X) were designated as the quality control samples for the CVAA batches. Each batch included a matrix spike and a matrix spike duplciate. The MS met the recommended quality control criteria for percent recovery (%R) for all analytes as established by in-house generated statistical process control (SPC) limits. The MS/MSD met the recommended quality control criteria for relative percent difference (RPD%) for all analytes.

Laboratory Control Samples
The laboratory control samples (LCSS) met the quality control acceptance criteria for %R and for all analytes.

Sample Dilutions

All ICP samples were diluted a 10X for all elements in all batches except batch 154346. These samples (TCLP 2 (1X), TCLP 2 (2X), TCLP 2 (3X), TCLP 2 (4X), TCLP 8 (1X), TCLP 8 (2X), TCLP 8 (3X), TCLP 8 (4X), TCLP 15 (1X), TCLP 15 (2X), TCLP 15 (3X), and TCLP 15 (4X)) were diluted a 5X. The CVAA samples were analyzed undiluted. All dilutions were made to bring over-ranged targets within the linear range of the instrument and/or to minimize sodium interference.

Nonconformance Reports
There were no Nonconformance Reports associated with this SDG.

General Comments
This Case Narrative has been reviewed using Batch Data Reports generated by the analysts and QC Summary Reports.

This package has been reviewed by: _____

Date: 8/25/99

CASE NARRATIVE
WSRC
SDG# 99191-VOA
Analysis by GC/MS

Sample Analysis:

The following samples were analyzed for Volatile Organic Compounds using the analytical protocol from EPA SW-846 Third Edition, Method 8260B, Revision 2, December 1996:

Laboratory Number	Sample Description
9907679-03	TCLP 1
9907679-05	TCLP 2
9907679-17	TCLP 3
9907679-19	TCLP 4
9907679-21	TCLP 5
9907679-23	TCLP 6
9907679-25	TCLP 7
9907679-27	TCLP 8
9907679-39	TCLP 9
9907679-41	TCLP 10
9907679-43	TCLP 11
9907679-45	TCLP 12
9907679-47	TCLP 13
9907679-49	TCLP 14
9907679-51	TCLP 15
9907679-63	TCLP 16
QC631946	VBLK01 (Blank)
QC631947	VBLK01LCS (Laboratory Control Sample)
QC631948	TCLP 12MS (Matrix Spike)
QC631949	TCLP 12MSD (Matrix SpikeDuplicate)
QC632309	VBLK02 (Blank)
QC632310	VBLK02LCS (Laboratory Control Sample)
QC632505	VBLK03 (Blank)
QC632506	VBLK03LCS (Laboratory Control Sample)

System Configuration:

The laboratory utilizes a variety of instrument configurations for volatile analyses. These analyses are accomplished using one or more of the GC and MS couplings, as follows:

GC/MS	Interface	Purge and Trap-Concentrator / Autosampler
5890 Series II / 5970	Jet Separator	Tekmar 2000 / Archon
5890 Series II / 5972	Direct	OI 4560 / Archon
6890 Series / 5973	Direct	Tekmar 3000 / Precept
6890 Series / 5973	Direct	OI 4560 / DPM-16
6890 Series / 5973	Direct	Tekmar 2000 / Archon

Chromatographic Column:

Chromatographic separation of volatile components is accomplished through analysis on one or more of the following columns:

J&W1 DB - 624, 60 m x 0.32 mm, 1.8um (identified by the J&W1 designation)
J&W2: DB - 624, 75 m x 0.53 mm, 3 um (identified by the J&W2 designation)
Rtx1 Rtx Volatiles, 60 m x 0.53 mm, 1.5 um (identified by the Rtx VOA designation)
J&W3 DB-624, 60 m x 0.25 mm, 1.4 um (identified by the J&W3 designation)

Samples are prepared using Purge and Trap samplers containing the following P & T trap:

VOCARB 3000: Carbopack B/ Carboxen 1000 &1001

Instrument Configuration:

The samples reported in this SDG were analyzed on one or more of the following instrument systems (instrument systems are identified by the instrument ID designations listed below which can be found on the raw data or individual form headers):

Instrument ID	System Configuration	Chromatographic Column	P & T Trap
VOA1	HP5890/HP5970	J&W2	VOCARB 3000
VOA2	HP6890/HP5973	J&W3	VOCARB 3000
VOA4	HP5890/HP5972	Rtx VOA	VOCARB 3000
VOA5	HP5890/HP5972	J&W3	VOCARB 3000
VOA7	HP5890/HP5972	Rtx VOA	VOCARB 3000
VOA8	HP6890/HP5973	J&W3	VOCARB 3000
VOA9	HP6890/HP5973	J&W3	Tenax/Silicagel/ Charcoal

Instrument Calibration:

The instrument was properly calibrated.

Holding Time:

All samples were analyzed within the required holding time.

Surrogates:

Surrogate recoveries in all samples were within the required acceptance limits.

Internal Standards:

Internal Standard areas in all samples were within the required acceptance limits.

Blanks:

There were no target analytes detected in the method blank above the required acceptance limit.

Spike Analyses:

The matrix spikes were analyzed on the following sample number.

GEL ID# 9907679-45 TCLP 12

All of the analyte recoveries in the matrix spikes were within the required acceptance limits.

All analytes in the matrix spike set were within the required acceptance limits for relative percent difference.

Laboratory Control Samples:

All analytes in the laboratory control sample were within the required acceptance limits.

Dilutions:

None of the samples were diluted.

Non Conformance Reports:

There were no Nonconformance Reports associated with this SDG.

General Comments:

Data files associated with both the initial calibration and continuing calibration check may have been manually integrated to correct misidentification of peaks by the integration software. Manual integrations are performed because of poor peak shapes exhibited by selective compounds at low concentrations, or as a result of overlapping retention time windows of similar isomeric compounds contained on the extended reporting list. If applicable, peak profiles for the affected compounds are contained in the raw data section.

The preceding narrative has been reviewed by: Charles W. Lam Date: 08-10-99

CASE NARRATIVE
WSRC
SDG 99191
Analysis by GC/MS

Sample Analysis:

The following samples were analyzed for semivolatile organic compounds using the analytical protocol from EPA SW-846 Third Edition, Method 8270C, Revision 3, December, 1996:

Laboratory Number	Sample Description
9907679-03	TCLP1
9907679-05	TCLP2
9907679-17	TCLP3
9907679-19	TCLP4
9907679-21	TCLP5
9907679-23	TCLP6
9907679-25	TCLP7
9907679-27	TCLP8
9907679-39	TCLP9
9907679-41	TCLP10
9907679-43	TCLP11
9907679-45	TCLP12
9907679-47	TCLP13
9907679-49	TCLP14
9907679-51	TCLP15
9907679-63	TCLP16
QC630762	SBLK01 (Blank)
QC630763	SBLK01LCS (Laboratory Control Sample)
QC630764	TCLP1MS (Matrix Spike)
QC630765	TCLP1MSD (Matrix Spike Duplicate)

System Configuration:

The laboratory utilizes a HP 6890 Series gas chromatograph and a HP 5973 Mass Selective Detector. The configuration is equipped with electronic pressure control. All MS interfaces are capillary direct.

Chromatographic Column:

Chromatographic separation of semivolatile components is accomplished through analysis on one or more of the following columns (all with dimensions of 30 meters x

0.25 mm ID and 0.25 um film except J&WDB-5MS2 which is 20 meters x 0.18 mm ID and 0.18 um film):

J&W:	DB - 5.625 (5%-Phenyl)-methylpolysiloxane (identified by a DB-5.625 designation on quantitation reports and reconstructed ion chromotograms)
J&WDB-5MS	Similar to the J&W DB - 5.625 with low bleed characteristics.
Alltech:	EC-5 (SE-54) 5% Phenyl, 95% Methylpolysiloxane (identified by a EC-5 designation)
HP:	HP-5MS 5% Phenylmethylsiloxane (identified by a HP-5MS designation)
Phenomenex:	ZB-5 5% Phenyl Polysiloxane
J&WDB-5MS2	Similar to the J&W DB - 5.625 with low bleed characteristics.

Instrument Configuration:

The samples reported in this SDG were analyzed on one or more of the following instrument systems (instrument systems are identified by the instrument ID designations listed below which can be found on the raw data or individual form headers):

Instrument ID	System Configuration	Chromatographic Column
MSD2	HP6890/HP5973	ZB-5
MSD4	HP6890/HP5973	HP
MSD5	HP6890/HP5973	ZB-5
MSD7	HP6890/HP5973	ZB-5
MSD8	HP6890/HP5973	J&WDB-5MS2

Sample Preparation:

All samples were prepared in accordance with accepted procedures.

Instrument Calibration:

The instrument was properly calibrated.

Due to the limited capacity of software to list all the current initial calibration files, a calibration history is inserted in the package prior to the appropriate Form 6.

Diphenylamine has now superseded N-Nitroso-diphenylamine as a CCC on Quantitation Reports, Initial Calibration Reports, Calibration Check Standard Reports, etc. Previous versions of EPA Method 8270 (prior to 8270C) listed N-Nitroso-diphenylamine as a CCC. However, as stated in EPA Method 8270C, Revision 3, December, 1996, Section 1.4.5, 'N-Nitroso-diphenylamine decomposes in the gas chromatographic inlet and cannot be separated from Diphenylamine.' Studies of these two compounds, both independent of each other and together, at GEL show that they not only coelute, but also have similar mass spectra.

Holding Time:

All samples were analyzed within the required holding time.

Surrogates:

Surrogate recoveries in all samples were within the required acceptance limits.

Internal Standards:

Internal Standards in all samples were within the required acceptance limits.

Blanks:

There were no target analytes detected in the method blank above the required acceptance limit.

Spike Analyses:

The matrix spikes were analyzed on the following sample number:

9907679-03 (TCLP1)

All of the analyte recoveries in the matrix spike were within the required acceptance limits.

All analytes in the matrix spike duplicate were within the required acceptance limits for relative percent difference.

Laboratory Control Samples:

All analytes in the laboratory control sample were within the required acceptance limits.

Dilutions:

None of the samples were diluted.

Nonconformance Reports:

There were no Nonconformance Reports associated with this SDG.

Manual Integrations:

No manual integrations were performed on the standards in the initial calibration or continuing calibration associated with this SDG.
No manual integrations were performed on samples, blanks or quality control samples associated with this SDG.

The preceding narrative has been reviewed by: Herbert M Myers Date: 8/05/99

Case Narrative for WSRC
SDG 99191
Metals Analysis by ICP
Mercury Analysis by CVAA

Sample Analysis and Sample Preparation
The following samples were analyzed for metals using ICP Method EPA 6010B and for mercury using CVAA Method EPA 7471A:+

Laboratory Number	Sample Description
9907679-03	TCLP 1
9907679-05	TCLP 2
9907679-17	TCLP 3
9907679-19	TCLP 4
9907679-21	TCLP 5
9907679-23	TCLP 6
9907679-25	TCLP 7
9907679-27	TCLP 8
9907679-39	TCLP 9
9907679-41	TCLP 10
9907679-43	TCLP 11
9907679-45	TCLP 12
9907679-47	TCLP 13
9907679-49	TCLP 14
9907679-51	TCLP 15
9907679-63	TCLP 16
QC630242-ICP	Preparation Blank (PB)
QC630243-ICP	Laboratory Control Sample (LCS)
QC630244-ICP	TCLP 16L-Serial Dilution (SD)
QC630245-ICP	TCLP 16S-Matrix Spike (MS)
QC630246-ICP	TCLP 16SD-Matrix Spike Duplicate (MSD)

System Configurations
ICP analysis was performed on a Thermo Jarrell Ash 61E Trace axial-viewing inductively coupled plasma atomic emission spectrometer. The instrument is equipped with a Meinhardt nebulizer, cyclonic spray chamber, and yttrium internal standard. Operating conditions for the Trace ICP were set at a power level of 950 watts, a peristaltic pump flow rate of 140 RPM (2.0 mL/min sample uptake rate), argon gas flows of 15 L/min and 0.5 L/min for the torch and auxiliary gases, and a nebulizer pressure setting of 26 PSI.

Mercury analysis was performed on a Perkin-Elmer Flow Injection Mercury System (FIMS-400) automated mercury analyzer. The instrument consists of a cold vapor atomic absorption spectrometer set to detect mercury at a wavelength of 254 nm. Sample

introduction through the flow injection system is performed via a peristaltic pump at 9 mL/min and nitrogen carrier gas rate of 5 L/min.

Sample Preparation
All samples were prepared in accordance with the appropriate EPA SW846 procedures.

Instrument Calibration
The instruments were calibrated following the manufacturers' specifications.

Holding Time
All samples were analyzed within the required holding times.

Blanks
All quality control criteria were met for the ICP and CVAA preparation blanks.

Spike Analyses
Sample TCLP 16 was designated as the quality control sample for both the ICP and CVAA batches. The MS met the recommended quality control criteria for percent recovery (%R) for all analytes as established by in-house generated statistical process control (SPC) limits with the exception of antimony. The chemistry of antimony makes it susceptible to hydrolysis, which typically results in poor spike recovery performance in soil matrices. The MSD met the recommended quality control criteria for relative percent difference (RPD) for all analytes except barium and cobalt. Matrix effects and sample heterogeneity contributed to the barium and cobalt RPD failure. The following parameters had matrix spike recoveries that were not applicable due to high analyte levels (greater than four times) relative to the nominal concentrations of the spike: aluminum, calcium, boron, chromium, iron, nickel, magnesium, manganese, sodium, potassium, silicon, titanium, uranium and zinc.

Laboratory Control Samples
The laboratory control samples (LCSS) laboratory control sample duplicate (LCSD ICP only) met the quality control acceptance criteria for %R and %RPD for all analytes.

Sample Dilutions
All ICP samples were diluted a 10X for all elements except boron, sodium, silicon, uranium and zinc which were diluted at 100X. All CVAA samples were analyzed undiluted. All dilutions were made to bring over-ranged targets within the linear range of the instrument and/or to minimize potential mineral interference.

Nonconformance Reports
There were no Nonconformance Reports associated with this SDG.

General Comments

This Case Narrative has been reviewed using Batch Data Reports generated by the analysts and QC Summary Reports.

This package has been reviewed by: _____

Date: 8/10/99

QC Summary Report

Project Description: Hazardous Waste Contract

c: WSRC00497 Lab. Sample ID: 9907679-03 Report Date: August 10, 1999

nple/Parameter	Type	Batch	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Analyst	Date	Time
tals Analysis													
630242	BLANK	153902											
luminum						6320	UGKG				MBL	08/02/99	1657
ntimony						627	UGKG						
rsenic						-278	UGKG						
arium						-6.64	UGKG						
eryllium						-19.4	UGKG						
oron						338	UGKG				MBL	08/03/99	1027
admium						-58.3	UGKG				MBL	08/02/99	1657
alcium						2600	UGKG						
hromium						-50.0	UGKG						
obalt						-68.4	UGKG						
opper						-647	UGKG						
on						881	UGKG						
ead						-480	UGKG						
agnesium						-552	UGKG						
anganese						69.4	UGKG						
olybdenum						-120	UGKG						
ickel						201	UGKG						
otassium						2160	UGKG						
elenium						65.2	UGKG						
licon						8060	UGKG				MBL	08/03/99	1027
lver						-123	UGKG				MBL	08/02/99	1657
odium						6450	UGKG				MBL	08/03/99	1027
rontium						-32.8	UGKG				MBL	08/02/99	1657
allium						525	UGKG						
n						88.7	UGKG						
tanium						-8.22	UGKG						
ranium						1200	UGKG				MBL	08/03/99	1027
anadium						-77.8	UGKG				MBL	08/02/99	1657
nc						1240	UGKG				MBL	08/03/99	1027
530243	LCS	153902											
luminum			6120000			5940000	UGKG		97.1	(75.2 - 126.)	MBL	08/02/99	1703
ntimony			4180			4660	UGKG		112	(75.2 - 199.)			
rsenic			24400			25500	UGKG		104	(84.6 - 133.)			
arium			9810			11900	UGKG		121	(89.7 - 154.)			
eryllium			2290			2440	UGKG		107	(76.9 - 128.)			
oron			2390			1830	UGKG		76.4**	~~(33.3 - 74.7)~~ 43.6 - 156.0	MBL	08/03/99	1033
admium			106000			108000	UGKG		102	(77.5 - 116.)	MBL	08/02/99	1703
alcium			10800000			13400000	UGKG		124	(95.4 - 139.)			

These Limits need to be Changed.

QC Summary Report

Project Description: Hazardous Waste Contract

cc: WSRC00497 Lab. Sample ID: 9907679-03 Report Date: August 10, 1999

Sample/Parameter	Type	Batch	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Analyst	Date	Tim
Chromium			46400			51700	UGKG		111	(73.0 - 150.)	MBL	08/02/99	170
Cobalt			11300			13100	UGKG		116	(88.1 - 142.)			
Copper			53300			60200	UGKG		113	(81.3 - 149.)			
Iron			10100000			12700000	UGKG		125	(68.9 - 243.)			
Lead			129000			133000	UGKG		103	(80.4 - 117.)			
Magnesium			1020000			902000	UGKG		88.4	(72.8 - 109.)			
Manganese			278000			300000	UGKG		108	(83.8 - 152.)			
Molybdenum			45700			52800	UGKG		116	(92.2 - 141.)			
Nickel			40400			46100	UGKG		114	(85.3 - 149.)			
Potassium			181000			205000	UGKG		113	(71.5 - 164.)			
Selenium			52500			50800	UGKG		96.7	(86.6 - 122.)			29.7 - 170.
Silicon			751000			1090000	UGKG		145**	~~(70.0 - 130.)~~	MBL	08/03/99	103
Silver			3140			3180	UGKG		101	(93.2 - 130.)	MBL	08/02/99	170
Sodium			82900			87400	UGKG		105	(62.0 - 133.)	MBL	08/03/99	103
Strontium			35200			37900	UGKG		108	(85.9 - 125.)	MBL	08/02/99	170
Thallium			54400			55700	UGKG		102	(57.8 - 123.)			
Tin			55000			52800	UGKG		96.1	(70.0 - 130.)			
Titanium			39000			51900	UGKG		133	(27.6 - 250.)			5.0 - 50.
Uranium			14300			6800	UGKG		47.5**	~~(5.50 - 26.4)~~	MBL	08/03/99	103
Vanadium			59000			59900	UGKG		102	(78.3 - 124.)	MBL	08/02/99	170
Zinc			598000			587000	UGKG		98.1	(78.1 - 115.)	MBL	08/03/99	103

Notes:
The qualifiers in this report are defined as follows:
J indicates presence of analyte < RL (Report Limit)
U indicates presence of analyte < DL (Detect Limit)

n/a indicates that spike recovery limits do not apply when
sample concentration exceeds spike conc by a factor of 4 or more

Case Narrative for
WSRC
SDG# 99191

AMMONIA

Analytical Batch Number: 154283

Analytical Method: EPA 350.1 modified

Laboratory Number	Sample Description
9907679-03	TCLP 1
9907679-05	TCLP 2
9907679-17	TCLP 3
9907679-19	TCLP 4
9907679-21	TCLP 5
9907679-23	TCLP 6
9907679-25	TCLP 7
9907679-27	TCLP 8
9907679-39	TCLP 9
9907679-41	TCLP 10
9907679-43	TCLP 11
9907679-45	TCLP 12
9907679-47	TCLP 13
9907679-49	TCLP 14
9907679-51	TCLP 15
9907679-63	TCLP 16
QC631770	Duplicate of 9907679-27
QC631771	Matrix Spike of 9907679-27
QC631772	Blank
QC631773	Laboratory Control Sample
QC631774	Duplicate of 9907679-49
QC631775	Matrix Spike of 9907679-49

Sample Preparation:

All samples were prepared in accordance with accepted procedures.

Instrument Calibration:

The instrument used was a TRAACS 800 colorimetric autoanalyzer. The instrument was properly calibrated.

Holding Time:

All samples were analyzed within the required holding time.

Blanks:

No target analytes were detected in the method blank above the required acceptance limit.

Spike Analyses:

The matrix spikes were run on the following Sample Number.

9907679-27 and 9907679-49

All analyte recoveries in the matrix spikes were within the required acceptance limits.

Laboratory Control Samples:

All analyte recoveries in the laboratory control sample were within the required acceptance limits.

Sample Duplicates:

All sample duplicate results were within the required acceptance limits.

Dilutions:

None of the samples were diluted.

Non Conformance Reports:

The following Nonconformance Report was written for this batch.

GEL-AS-GC-1529

NITRATE BY ION CHROMATOGRAPHY

Analytical Batch Number: 154418

Analytical Method: EPA 300.0

Laboratory Number	Sample Description
9907679-03	TCLP 1
9907679-05	TCLP 2
9907679-17	TCLP 3
9907679-19	TCLP 4
9907679-21	TCLP 5
9907679-23	TCLP 6
9907679-25	TCLP 7
9907679-27	TCLP 8
9907679-39	TCLP 9
9907679-41	TCLP 10
9907679-43	TCLP 11
9907679-45	TCLP 12
9907679-47	TCLP 13
9907679-49	TCLP 14
9907679-51	TCLP 15
9907679-63	TCLP 16
QC632328	Duplicate of 9907679-03
QC632329	Matrix Spike of 9907679-03
QC632330	Duplicate of 9907679-05
QC632331	Matrix Spike of 9907679-05
QC632332	Laboratory Control Sample
QC632333	Blank

Sample Preparation:

All samples were prepared in accordance with accepted procedures.

Instrument Calibration:

The instrument used was a Dionex DX300 Ion Chromatography instrument with a Dionex AS9-HC general purpose anion column. Instrument IC-AF was properly calibrated on 07/12/99.

Holding Time

The following samples were accidentally not logged in for nitrate until the 48 hour holding time had almost completely expired. The samples were analyzed as soon as this was realized.

Laboratory Number

9907679-05
9907679-17
9907679-19
9907679-21
9907679-23
9907679-25
9907679-27
9907679-39
9907679-41
9907679-43
9907679-45
9907679-47
9907679-49
9907679-51
9907679-63

Blanks:

No target analytes were detected in the method blank above the required acceptance limit.

Spike Analyses:

The matrix spikes were run on the following Sample Numbers.

9907679-03 and 9907679-05

All analyte recoveries in the matrix spikes were within the required acceptance limits.

Laboratory Control Samples:

All analyte recoveries in the laboratory control sample were within the required acceptance limits.

Sample Duplicates:

All sample duplicate results were within the required acceptance limits.

Dilutions:

None of the samples were diluted.

Non Conformance Reports:

The following Nonconformance Report were written for this batch.

GEL-AS-GC-1527

TOTAL HALOGENS

Analytical Batch Number: 154421

Analytical Method: EPA 9056

Laboratory Number	Sample Description
9907679-03	TCLP 1
9907679-05	TCLP 2
9907679-17	TCLP 3
9907679-19	TCLP 4
9907679-21	TCLP 5
9907679-23	TCLP 6
9907679-25	TCLP 7
9907679-27	TCLP 8
9907679-39	TCLP 9
9907679-41	TCLP 10
9907679-43	TCLP 11
9907679-45	TCLP 12
9907679-47	TCLP 13
9907679-49	TCLP 14
9907679-51	TCLP 15
9907679-63	TCLP 16
QC632338	Duplicate of 9907679-03
QC632340	Matrix Spike of 9907679-03
QC632341	Duplicate of 9907679-05
QC632342	Matrix Spike of 9907679-05
QC632343	Laboratory Control Sample
QC632344	Blank

Sample Preparation:

All samples were prepared in accordance with accepted procedures.

Instrument Calibration:

The instrument used was a Dionex DX300 Ion Chromatography instrument with a Dionex AS9-HC general purpose anion column. Instrument IC-AF was properly calibrated on 07/12/99.

Holding Time:

All samples were analyzed within the required holding time.

Blanks:

No target analytes were detected in the method blank above the required acceptance limit.

Spike Analyses:

The matrix spikes were run on the following Sample Numbers.

9907679-03 and 9907679-05

All analyte recoveries in the matrix spikes were within the required acceptance limits.

Laboratory Control Samples:

All analyte recoveries in the laboratory control sample were within the required acceptance limits.

Sample Duplicates:

The sample and duplicate results were less than the PQL; therefore, the RPD is not applicable.

Dilutions:

None of the samples were diluted.

Non Conformance Reports:

The following Nonconformance Report was written for this batch.

GEL-AS-GC-1526

The preceding narratives have been reviewed by: _____ Date: 08/10/99

General Engineering Laboratories
Form GEL-XXX
(Rev. 09/98)

ROLLED DOCUMENT

1. NCR Report No.: GEL-AS-GC-1526
2. Page 1 of 1
3. Revision No.: 00

COMPANY-WIDE NONCONFORMANCE REPORT
COMPLETE EVERY ITEM
(See Instructions on Reverse Side)

4. Mo. Day Yr.: 07 | 27 | 99

5. Division: ☐ Industrial ☒ Federal ☐ Radiochemistry ☐ Bioassay ☐ Other

6. Type: Material ☐ Process ☒ Product ☐

7. Instrument Type: Ion Chromatography

8. Quality Criteria: ☒ SOP ☐ QAP or QAPJP ☐ Client Contract ☐ Purchase Document ☐ Drawing ☐ Specifications ☐ Others

9. Supplier/Client Name & Code: WSRC 00497

10. Test/Method: Method 300

11. Numerical Reference Identification: (Batch Number, Sample Number, ID number) 41, 43, 45, 47, 49, 51
Batch 154421; Sample 9907679-03, 05, 17, 19, 21, 23, 25, 27, 39,

12. Specifications and Requirements Nonconformance Description:

Item No.	
1	Samples were not scanned to custody

14. NRG Disposition:

Item No.	
1	Samples were not scan to custody since the samples did not have sample numbers and the immediate NO3 had to be run.

RECEIVED JUL 30 1999

15. NRG's Printed Name & Signature: Robert W Sosa — Date: 07/27/99

List NRG Participants: Jake Crook / [signature] 07/27/99

13. Originator's Printed Name & Signature: Robert W Sosa — Date: 07/27/99

Management Review ☑ or Management Approval ☐

Please review within 24 hours of receipt. 010074

NCR Review & Disposition Review or Approval:

Corrective Action Request and Approval: FI

16. Quality Review: [signature] Date: 7/30/99

18. CA Requested: Print Name and Sign — Date

17. Originator's Director/Group Leader: — Date

19. Corrective Action Approval & Number — Date

UNCONTROLLED DOCUMENT

...l Engineering Laboratories
EL-XXX
9/98)

1. NCR Report No.: WSRC-99C-1527
2. Page 1 of 1
3. Revision No.: 02

COMPANY-WIDE NONCONFORMANCE REPORT

COMPLETE EVERY ITEM

(See Instructions on Reverse Side)

o. Day Yr.: 7/27/99

5. Division: ☐ Industrial ☒ Federal ☐ Radiochemistry ☐ Bioassay ☒ Other

6. Type: Material ☐ Process ☒ Product ☐

strument Type: Ion Chromatography

8. Quality Criteria: ☒ SOP ☐ QAP or QAPJP ☐ Client Contract ☐ Purchase Document ☐ Drawing ☐ Specifications ☐ Others

upplier/Client Name & Code: WSTC 08497

10. Test/Method: Method 300

Numerical Reference Identification: (Batch Number, Sample Number, ID number) 41, 43, 45, 47, 49, 51
tch 15448; Samples 9907679-03, 05, 17, 19, 21, 23, 25, 27, 39, 63, 51

Specifications and Requirements Nonconformance Description:

No.	
1	Samples were not scanned to custody
2	Samples were run out of holding

14. NRG Disposition:

Item No.	
1	Samples were not scanned to custody since the samples did not have sample numbers and the immediate NO3 had to be run
2	Samples were forwarded to the Analyst late in the evening. The samples were immediately prepped and put on to run.

RECEIVED
JUL 30 1999

15. NRG's Printed Name & Signature: Robert W Sosa — Date: 07/27/99

List NRG Participants: Jake Crook / Jack M. Ard 07/27/99

Originator's Printed Name & Signature: Robert W Sosa — Date: 07/27/99

Management Review ☑ or Management Approval ☐

Please review within 24 hours of receipt.

010075

CR Review & Disposition Review or Approval:

. Quality Review: — Date: 7/30/99

Corrective Action Request and Approval: FI

18. CA Requested: Print Name and Sign — Date

17. Originator's Director/Group Leader — Date

19. Corrective Action Approval & Number — Date

General Engineering Laboratories
Form GEL-XXX
Rev. 09/98)

UNCONTROLLED DOCUMENT

1. NCR Report No.: GEL-AS-GC-1529
2. Page 1 of 1
3. Revision No.: —

COMPANY-WIDE NONCONFORMANCE REPORT

COMPLETE EVERY ITEM
(See Instructions on Reverse Side)

4. Mo. Day Yr.: 7 | 27 | 99

5. Division: ☐ Industrial ☑ Federal ☐ Radiochemistry ☐ Bioassay ☐ Other

6. Type: Material ☐ Process ☑ Product ☐

7. Instrument Type: TRAACS 800 Technicon

8. Quality Criteria: ☑ SOP ☐ QAP or QAPJP ☐ Client Contract ☐ Purchase Document ☐ Drawing ☐ Specifications ☐ Others

9. Supplier/Client Name & Code: WSRC

10. Test/Method: NH_3 - 350.1

11. Numerical Reference Identification: (Batch Number, Sample Number, ID number)
B/N 154212/154283

12. Specifications and Requirements Nonconformance Description:

Item No.	
1)	Samples were scanned into Analyst's custody just before LIMS outage - LIMS lost custody record

13. Originator's Printed Name & Signature: Thews [signature] Date: 7/27/99

14. NRG Disposition:

Item No.	
1)	Data good, Analyst had custody throughout analysis process

RECEIVED JUL 30 1999

15. NRG's Printed Name & Signature: Thews [signature] Date: 7/27/99

List NRG Participants: Jake Crook [signature] 07/28/99

Management Review ☐ or Management Approval ☐

010077

Please review within 24 hours of receipt.

NCR Review & Disposition Review or Approval:

Corrective Action Request and Approval: FI

16. Quality Review: [signature] Date: 7/30/99

18. CA Requested: Print Name and Sign Date

17. Originator's Director/Group Leader: Date

19. Corrective Action Approval & Number Date

QC Summary Report

Project Description: Hazardous Waste Contract

: WSRC00497 Lab. Sample ID: 9907679% Report Date: August 20, 1999

ıple/Parameter	Type	Batch	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Analyst	Date	Time
ıtile Organics													
;31534	BLANK	154227											
hyl Acetate						0.00	mg/kg				CAK	07/28/99	1352
hyl Ether						0.00	mg/kg						
hylene Glycol Monoethylether						1.10	mg/kg						
ɔbutyl Alcohol						0.00	mg/kg						
ethyl Alcohol						0.00	mg/kg						
Butyl Alcohol						0.00	mg/kg						
;31537	BLANK	154228											
hyl Acetate						0.00	mg/kg				CAK	07/28/99	1903
hyl Ether						0.00	mg/kg						
hylene Glycol Monoethylether						0.00	mg/kg						
ɔbutyl Alcohol						0.00	mg/kg						
ethyl Alcohol						1.60	mg/kg						
Butyl Alcohol						0.00	mg/kg						
;33193	BLANK	154228											
hyl Acetate						0.00	mg/kg				CAK	07/28/99	1929
hyl Ether						0.00	mg/kg						
hylene Glycol Monoethylether						1.60	mg/kg						
ɔbutyl Alcohol						0.00	mg/kg						
ethyl Alcohol						1.30	mg/kg						
Butyl Alcohol						2.50	mg/kg						
;31536	9907679-01DUP	154227											
hyl Acetate				0.00		0.00	mg/kg	0.00			CAK	07/28/99	1444
hyl Ether				0.00		0.00	mg/kg	0.00					
hylene Glycol Monoethylether				0.751		1.08	mg/kg	200					
ɔbutyl Alcohol				0.00		0.00	mg/kg	0.00					
ethyl Alcohol				0.00		0.00	mg/kg	0.00					
Butyl Alcohol				0.00		0.00	mg/kg	0.00					
;31539	9907679-03DUP	154228											
hyl Acetate				0.00		0.00	mg/kg	0.00			CAK	07/28/99	2021
hyl Ether				0.00		0.00	mg/kg	0.00					
hylene Glycol Monoethylether				0.00		0.00	mg/kg	0.00					
ɔbutyl Alcohol				0.00		0.00	mg/kg	0.00					
ethyl Alcohol				0.0143		11.0	MGKG	200					
Butyl Alcohol				0.00		0.00	mg/kg	0.00					
;31535	LCS	154227											
hyl Acetate			50			45.4	mg/kg		90.8	(-)	CAK	07/28/99	1418
hyl Ether			50			42.3	mg/kg		84.6	(-)			
hylene Glycol Monoethylether			50			48.2	mg/kg		96.4	(-)			

QC Summary Report

Project Description: Hazardous Waste Contract

cc: WSRC00497 Lab. Sample ID: 9907679% Report Date: August 20, 1999

Sample/Parameter	Type	Batch	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Analyst	Date	Tim
Isobutyl Alcohol			50			47.3	mg/kg		94.6	(-)	CAK	07/28/99	141
Methyl Alcohol			50			47.3	mg/kg		94.6	(-)			
n-Butyl Alcohol			50			47.3	mg/kg		94.6	(-)			
QC631538	LCS	154228											
Ethyl Acetate			50			44.0	mg/kg		88.0	(-)	CAK	07/28/99	195
Ethyl Ether			50			35.2	mg/kg		70.4	(-)			
Ethylene Glycol Monoethylether			50			50.4	mg/kg		101	(-)			
Isobutyl Alcohol			50			50.1	mg/kg		100	(-)			
Methyl Alcohol			50			54.4	mg/kg		109	(-)			
n-Butyl Alcohol			50			49.8	mg/kg		99.6	(-)			
QC631946	BLANK	154327											
1,1-Dichloroethylene						0.00	UGKG				JWF	07/26/99	090
Benzene						0.00	UGKG						
Chlorobenzene						0.00	UGKG						
Toluene						0.00	UGKG						
Trichloroethylene						0.00	UGKG						
*Bromofluorobenzene							UGKG		89.4	(73.0 - 129.)			
*Dibromofluoromethane							UGKG		103	(66.0 - 117.)			
*Toluene-d8							UGKG		102	(73.0 - 122.)			
1,1,1,2-Tetrachloroethane						0.00	UGKG						
1,1,1-Trichloroethane						0.00	UGKG						
1,1,2,2-Tetrachloroethane						0.00	UGKG						
1,1,2-Trichloroethane						0.00	UGKG						
1,1-Dichloroethane						0.00	UGKG						
1,2,3-Trichloropropane						0.00	UGKG						
1,2-Dibromo-3-chloropropane						0.00	UGKG						
1,2-Dibromoethane						0.00	UGKG						
1,2-Dichlorobenzene						0.00	UGKG						
1,2-Dichloroethane						0.00	UGKG						
1,2-Dichloropropane						0.00	UGKG						
1,2-trans-Dichloroethylene						0.00	UGKG						
1,3-Dichlorobenzene						0.00	UGKG						
1,4-Dichlorobenzene						0.00	UGKG						
2-Butanone						0.854	UGKG						
2-Chloroethylvinyl ether						0.00	UGKG						
2-Hexanone						0.00	UGKG						
2-Nitropropane						0.00	UGKG						
4-Methyl-2-pentanone						0.00	UGKG						
Acetone						3.00	UGKG						
Acetonitrile						6.83	UGKG						

QC Summary Report

Project Description: Hazardous Waste Contract

:: WSRC00497 Lab. Sample ID: 9907679% Report Date: August 20, 1999

ıple/Parameter	Type	Batch	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Analyst	Date	Time
crolein						0.00	UGKG				JWF	07/26/99	0905
crylonitrile						0.00	UGKG						
llyl Chloride						0.00	UGKG						
romoform						0.00	UGKG						
arbon Disulfide						1.26	UGKG						
arbon Tetrachloride						0.00	UGKG						
hlorodibromomethane						0.00	UGKG						
hloroethane						0.00	UGKG						
hloroform						0.00	UGKG						
hloroprene						0.00	UGKG						
ibromomethane						0.00	UGKG						
ichlorobromomethane						0.00	UGKG						
ichlorodifluoromethane						0.00	UGKG						
thyl methacrylate						0.00	UGKG						
thylbenzene						0.00	UGKG						
obutyl Alcohol						0.00	UGKG						
lethacrylonitrile						0.00	UGKG						
lethyl Bromide						0.00	UGKG						
lethyl Chloride						0.00	UGKG						
lethyl Iodide						0.00	UGKG						
lethyl Methacrylate						0.00	UGKG						
lethylene Chloride						1.93	UGKG						
entachloroethane						0.00	UGKG						
ropionitrile						0.00	UGKG						
tyrene						0.00	UGKG						
etrachloroethylene						0.00	UGKG						
richlorofluoromethane						0.00	UGKG						
richlorotrifluoroethane						0.00	UGKG						
inyl Acetate						0.00	UGKG						
inyl chloride						0.00	UGKG						
ylenes (TOTAL)						0.00	UGKG						
s-1,3-Dichloropropylene						0.00	UGKG						
ans-1,3-Dichloropropylene						0.00	UGKG						
ans-1,4-Dichloro-2-butene						0.00	UGKG						
632309	BLANK	154327											
,1-Dichloroethylene						0.00	UGKG				SDM	07/26/99	1922
enzene						0.00	UGKG						
hlorobenzene						0.00	UGKG						
oluene						0.00	UGKG						
richloroethylene						0.00	UGKG						

QC Summary Report

Project Description: Hazardous Waste Contract

cc: WSRC00497 Lab. Sample ID: 9907679% Report Date: August 20, 1999

Sample/Parameter	Type	Batch	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Analyst	Date	Tim
*Bromofluorobenzene							UGKG		90.1	(73.0 - 129.)	SDM	07/26/99	192
*Dibromofluoromethane							UGKG		104	(66.0 - 117.)			
*Toluene-d8							UGKG		102	(73.0 - 122.)			
1,1,1,2-Tetrachloroethane						0.00	UGKG						
1,1,1-Trichloroethane						0.00	UGKG						
1,1,2,2-Tetrachloroethane						0.00	UGKG						
1,1,2-Trichloroethane						0.00	UGKG						
1,1-Dichloroethane						0.00	UGKG						
1,2,3-Trichloropropane						0.00	UGKG						
1,2-Dibromo-3-chloropropane						0.00	UGKG						
1,2-Dibromoethane						0.00	UGKG						
1,2-Dichlorobenzene						0.00	UGKG						
1,2-Dichloroethane						0.00	UGKG						
1,2-Dichloropropane						0.00	UGKG						
1,2-trans-Dichloroethylene						0.00	UGKG						
1,3-Dichlorobenzene						0.00	UGKG						
1,4-Dichlorobenzene						0.00	UGKG						
2-Butanone						0.00	UGKG						
2-Chloroethylvinyl ether						0.00	UGKG						
2-Hexanone						0.00	UGKG						
2-Nitropropane						0.00	UGKG						
4-Methyl-2-pentanone						0.00	UGKG						
Acetone						3.12	UGKG						
Acetonitrile						5.82	UGKG						
Acrolein						0.00	UGKG						
Acrylonitrile						0.00	UGKG						
Allyl Chloride						0.00	UGKG						
Bromoform						0.00	UGKG						
Carbon Disulfide						0.00	UGKG						
Carbon Tetrachloride						0.00	UGKG						
Chlorodibromomethane						0.00	UGKG						
Chloroethane						0.00	UGKG						
Chloroform						0.00	UGKG						
Chloroprene						0.00	UGKG						
Dibromomethane						0.00	UGKG						
Dichlorobromomethane						0.00	UGKG						
Dichlorodifluoromethane						0.00	UGKG						
Ethyl methacrylate						0.00	UGKG						
Ethylbenzene						0.00	UGKG						
Isobutyl Alcohol						0.00	UGKG						

QC Summary Report

Project Description: Hazardous Waste Contract

c: WSRC00497 Lab. Sample ID: 9907679% Report Date: August 20, 1999 Page 5 of ~~58~~ 53

ıple/Parameter	Type	Batch	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Analyst	Date	Time
ethacrylonitrile						0.00	UGKG				SDM	07/26/99	1922
ethyl Bromide						0.00	UGKG						
ethyl Chloride						0.00	UGKG						
ethyl Iodide						0.00	UGKG						
ethyl Methacrylate						0.00	UGKG						
ethylene Chloride						1.93	UGKG						
ntachloroethane						0.00	UGKG						
opionitrile						0.00	UGKG						
yrene						0.00	UGKG						
trachloroethylene						0.00	UGKG						
ichlorofluoromethane						0.00	UGKG						
ichlorotrifluoroethane						0.00	UGKG						
inyl Acetate						0.00	UGKG						
inyl chloride						0.00	UGKG						
ylenes (TOTAL)						0.00	UGKG						
s-1,3-Dichloropropylene						0.00	UGKG						
ıns-1,3-Dichloropropylene						0.00	UGKG						
ıns-1,4-Dichloro-2-butene						0.00	UGKG						
532505	BLANK	154327											
1-Dichloroethylene						0.00	UGKG				JWF	07/27/99	0708
enzene						0.00	UGKG						
hlorobenzene						0.00	UGKG						
oluene						0.00	UGKG						
ichloroethylene						0.00	UGKG						
romofluorobenzene							UGKG		88.5	(73.0 - 129.)			
ibromofluoromethane							UGKG		105	(66.0 - 117.)			
oluene-d8							UGKG		101	(73.0 - 122.)			
1,1,2-Tetrachloroethane						0.00	UGKG						
1,1-Trichloroethane						0.00	UGKG						
1,2,2-Tetrachloroethane						0.00	UGKG						
1,2-Trichloroethane						0.00	UGKG						
1-Dichloroethane						0.00	UGKG						
2,3-Trichloropropane						0.00	UGKG						
2-Dibromo-3-chloropropane						0.00	UGKG						
2-Dibromoethane						0.00	UGKG						
2-Dichlorobenzene						0.00	UGKG						
2-Dichloroethane						0.00	UGKG						
2-Dichloropropane						0.00	UGKG						
2-trans-Dichloroethylene						0.00	UGKG						
3-Dichlorobenzene						0.00	UGKG						

QC Summary Report

Project Description: Hazardous Waste Contract

cc: WSRC00497 Lab. Sample ID: 9907679% Report Date: August 20, 1999 Page 6 of ~~58~~ 6

Sample/Parameter	Type	Batch	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Analyst	Date	Tim
1,4-Dichlorobenzene						0.00	UGKG				JWF	07/27/99	070
2-Butanone						0.00	UGKG						
2-Chloroethylvinyl ether						0.00	UGKG						
2-Hexanone						0.00	UGKG						
2-Nitropropane						0.00	UGKG						
4-Methyl-2-pentanone						0.00	UGKG						
Acetone						2.77	UGKG						
Acetonitrile						10.1	UGKG						
Acrolein						0.00	UGKG						
Acrylonitrile						0.00	UGKG						
Allyl Chloride						0.00	UGKG						
Bromoform						0.00	UGKG						
Carbon Disulfide						0.00	UGKG						
Carbon Tetrachloride						0.00	UGKG						
Chlorodibromomethane						0.00	UGKG						
Chloroethane						0.00	UGKG						
Chloroform						0.00	UGKG						
Chloroprene						0.00	UGKG						
Dibromomethane						0.00	UGKG						
Dichlorobromomethane						0.00	UGKG						
Dichlorodifluoromethane						0.00	UGKG						
Ethyl methacrylate						0.00	UGKG						
Ethylbenzene						0.00	UGKG						
Isobutyl Alcohol						0.00	UGKG						
Methacrylonitrile						0.00	UGKG						
Methyl Bromide						0.00	UGKG						
Methyl Chloride						0.00	UGKG						
Methyl Iodide						0.00	UGKG						
Methyl Methacrylate						0.00	UGKG						
Methylene Chloride						0.507	UGKG						
Pentachloroethane						0.00	UGKG						
Propionitrile						0.00	UGKG						
Styrene						0.00	UGKG						
Tetrachloroethylene						0.00	UGKG						
Trichlorofluoromethane						0.00	UGKG						
Trichlorotrifluoroethane						0.00	UGKG						
Vinyl Acetate						0.00	UGKG						
Vinyl chloride						0.00	UGKG						
Xylenes (TOTAL)						0.00	UGKG						
cis-1,3-Dichloropropylene						0.00	UGKG						

QC Summary Report

Project Description: Hazardous Waste Contract

:: WSRC00497 Lab. Sample ID: 9907679% Report Date: August 20, 1999

ıple/Parameter	Type	Batch	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Analyst	Date	Time
ıns-1,3-Dichloropropylene						0.00	UGKG				JWF	07/27/99	0708
ıns-1,4-Dichloro-2-butene						0.00	UGKG						
532792	BLANK	154538											
1-Dichloroethylene						0.00	UGKG				JWF	07/28/99	0649
ɜnzene						0.00	UGKG						
hlorobenzene						0.00	UGKG						
ɔluene						0.00	UGKG						
ichloroethylene						0.00	UGKG						
romofluorobenzene							UGKG		90.3	(73.0 - 129.)			
ibromofluoromethane							UGKG		101	(66.0 - 117.)			
oluene-d8							UGKG		103	(73.0 - 122.)			
1,1,2-Tetrachloroethane						0.00	UGKG						
1,1-Trichloroethane						0.00	UGKG						
1,2,2-Tetrachloroethane						0.00	UGKG						
1,2-Trichloroethane						0.00	UGKG						
1-Dichloroethane						0.00	UGKG						
2,3-Trichloropropane						0.00	UGKG						
2-Dibromo-3-chloropropane						0.00	UGKG						
2-Dibromoethane						0.00	UGKG						
2-Dichlorobenzene						0.00	UGKG						
2-Dichloroethane						0.00	UGKG						
2-Dichloropropane						0.00	UGKG						
2-trans-Dichloroethylene						0.00	UGKG						
3-Dichlorobenzene						0.00	UGKG						
4-Dichlorobenzene						0.00	UGKG						
Butanone						0.00	UGKG						
Chloroethylvinyl ether						0.00	UGKG						
Hexanone						0.00	UGKG						
Nitropropane						0.00	UGKG						
Methyl-2-pentanone						0.00	UGKG						
cetone						2.28	UGKG						
cetonitrile						5.83	UGKG						
crolein						0.00	UGKG						
crylonitrile						0.00	UGKG						
llyl Chloride						0.00	UGKG						
romoform						0.00	UGKG						
arbon Disulfide						0.00	UGKG						
arbon Tetrachloride						0.00	UGKG						
hlorodibromomethane						0.00	UGKG						
hloroethane						0.00	UGKG						

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Sample/Parameter	Type	Batch	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Analyst	Date	Time
Chloroform						0.00	UGKG				JWF	07/28/99	064
Chloroprene						0.00	UGKG						
Dibromomethane						0.00	UGKG						
Dichlorobromomethane						0.00	UGKG						
Dichlorodifluoromethane						0.00	UGKG						
Ethyl methacrylate						0.00	UGKG						
Ethylbenzene						0.00	UGKG						
Isobutyl Alcohol						0.00	UGKG						
Methacrylonitrile						0.00	UGKG						
Methyl Bromide						0.00	UGKG						
Methyl Chloride						0.00	UGKG						
Methyl Iodide						0.00	UGKG						
Methyl Methacrylate						0.00	UGKG						
Methylene Chloride						0.714	UGKG						
Pentachloroethane						0.00	UGKG						
Propionitrile						0.00	UGKG						
Styrene						0.00	UGKG						
Tetrachloroethylene						0.00	UGKG						
Trichlorofluoromethane						0.00	UGKG						
Trichlorotrifluoroethane						0.00	UGKG						
Vinyl Acetate						0.00	UGKG						
Vinyl chloride						0.00	UGKG						
Xylenes (TOTAL)						0.00	UGKG						
cis-1,3-Dichloropropylene						0.00	UGKG						
trans-1,3-Dichloropropylene						0.00	UGKG						
trans-1,4-Dichloro-2-butene						0.00	UGKG						
QC633219	BLANK	154538											
1,1-Dichloroethylene						0.00	UGKG				SDM	07/28/99	190
Benzene						0.00	UGKG						
Chlorobenzene						0.00	UGKG						
Toluene						0.00	UGKG						
Trichloroethylene						0.00	UGKG						
*Bromofluorobenzene							UGKG		90.0	(73.0 - 129.)			
*Dibromofluoromethane							UGKG		102	(66.0 - 117.)			
*Toluene-d8							UGKG		102	(73.0 - 122.)			
1,1,1,2-Tetrachloroethane						0.00	UGKG						
1,1,1-Trichloroethane						0.00	UGKG						
1,1,2,2-Tetrachloroethane						0.00	UGKG						
1,1,2-Trichloroethane						0.00	UGKG						
1,1-Dichloroethane						0.00	UGKG						

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ıple/Parameter	Type	Batch	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Analyst	Date	Time
2,3-Trichloropropane						0.00	UGKG				SDM	07/28/99	1909
2-Dibromo-3-chloropropane						0.00	UGKG						
2-Dibromoethane						0.00	UGKG						
2-Dichlorobenzene						0.00	UGKG						
2-Dichloroethane						0.00	UGKG						
2-Dichloropropane						0.00	UGKG						
2-trans-Dichloroethylene						0.00	UGKG						
3-Dichlorobenzene						0.00	UGKG						
4-Dichlorobenzene						0.00	UGKG						
Butanone						0.00	UGKG						
Chloroethylvinyl ether						0.00	UGKG						
Hexanone						0.00	UGKG						
Nitropropane						0.00	UGKG						
Methyl-2-pentanone						0.00	UGKG						
cetone						2.53	UGKG						
cetonitrile						14.8	UGKG						
crolein						0.00	UGKG						
crylonitrile						0.00	UGKG						
llyl Chloride						0.00	UGKG						
romoform						0.00	UGKG						
arbon Disulfide						0.00	UGKG						
arbon Tetrachloride						0.00	UGKG						
hlorodibromomethane						0.00	UGKG						
hloroethane						0.00	UGKG						
hloroform						1.97	UGKG						
hloroprene						0.00	UGKG						
ibromomethane						0.00	UGKG						
ichlorobromomethane						0.00	UGKG						
ichlorodifluoromethane						0.00	UGKG						
thyl methacrylate						0.00	UGKG						
thylbenzene						0.00	UGKG						
obutyl Alcohol						0.00	UGKG						
lethacrylonitrile						0.00	UGKG						
lethyl Bromide						0.00	UGKG						
lethyl Chloride						0.00	UGKG						
lethyl Iodide						0.00	UGKG						
lethyl Methacrylate						0.00	UGKG						
lethylene Chloride						1.01	UGKG						
entachloroethane						0.00	UGKG						
ropionitrile						0.00	UGKG						

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Sample/Parameter	Type	Batch	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Analyst	Date	Tim
Styrene						0.00	UGKG				SDM	07/28/99	190
Tetrachloroethylene						0.00	UGKG						
Trichlorofluoromethane						0.00	UGKG						
Trichlorotrifluoroethane						0.00	UGKG						
Vinyl Acetate						0.00	UGKG						
Vinyl chloride						0.00	UGKG						
Xylenes (TOTAL)						0.00	UGKG						
cis-1,3-Dichloropropylene						0.00	UGKG						
trans-1,3-Dichloropropylene						0.00	UGKG						
trans-1,4-Dichloro-2-butene						0.00	UGKG						
QC633229	BLANK	154649											
1,1-Dichloroethylene						0.00	MGL				DLS	07/28/99	212
Benzene						0.00	MGL						
Chlorobenzene						0.00	MGL						
Trichloroethylene						0.00	MGL						
*Bromofluorobenzene							MGL		89.1	(73.0 - 129.)			
*Dibromofluoromethane							MGL		91.4	(66.0 - 117.)			
*Toluene-d8							MGL		94.6	(73.0 - 122.)			
1,2-Dichloroethane						0.00	MGL						
1,4-Dichlorobenzene						0.00	MGL						
2-Butanone						0.00	MGL						
Carbon Tetrachloride						0.00	MGL						
Chloroform						0.00	MGL						
Tetrachloroethylene						0.00	MGL						
Trichlorotrifluoroethane						0.00	MGL						
Vinyl chloride						0.00	MGL						
QC633233	BLANK	154649											
1,1-Dichloroethylene						0.00	MGL				MAP	07/30/99	1218
Benzene						0.00	MGL						
Chlorobenzene						0.00	MGL						
Trichloroethylene						0.00752	MGL						
*Bromofluorobenzene							MGL		118	(73.0 - 129.)			
*Dibromofluoromethane							MGL		93.6	(66.0 - 117.)			
*Toluene-d8							MGL		101	(73.0 - 122.)			
1,2-Dichloroethane						0.00	MGL						
1,4-Dichlorobenzene						0.00	MGL						
2-Butanone						0.00	MGL						
Carbon Tetrachloride						0.00	MGL						
Chloroform						0.00	MGL						
Tetrachloroethylene						0.00	MGL						

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ple/Parameter	Type	Batch	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Analyst	Date	Time
ichlorotrifluoroethane						0.00	MGL				MAP	07/30/99	1218
nyl chloride						0.00	MGL						
33234	BLANK	154649											
1-Dichloroethylene						0.00	MGL				MAP	07/30/99	1148
nzene						0.00	MGL						
lorobenzene						0.00	MGL						
ichloroethylene						0.00	MGL						
romofluorobenzene							MGL		119	(73.0 - 129.)			
ibromofluoromethane							MGL		93.0	(66.0 - 117.)			
oluene-d8							MGL		104	(73.0 - 122.)			
2-Dichloroethane						0.00	MGL						
4-Dichlorobenzene						0.00	MGL						
Butanone						0.00	MGL						
rbon Tetrachloride						0.00	MGL						
loroform						0.00	MGL						
trachloroethylene						0.00	MGL						
ichlorotrifluoroethane						0.00	MGL						
nyl chloride						0.00	MGL						
33235	BLANK	154649											
1-Dichloroethylene						0.00	MGL				MAP	07/30/99	1118
nzene						0.00	MGL						
lorobenzene						0.00	MGL						
ichloroethylene						0.0287	MGL						
romofluorobenzene							MGL		119	(73.0 - 129.)			
ibromofluoromethane							MGL		92.9	(66.0 - 117.)			
oluene-d8							MGL		104	(73.0 - 122.)			
2-Dichloroethane						0.00	MGL						
4-Dichlorobenzene						0.00	MGL						
Butanone						0.00	MGL						
rbon Tetrachloride						0.00	MGL						
loroform						0.00	MGL						
trachloroethylene						0.00	MGL						
ichlorotrifluoroethane						0.00	MGL						
nyl chloride						0.00	MGL						
33659	BLANK	154649											
1-Dichloroethylene						0.00	MGL				MAP	07/30/99	0847
nzene						0.00	MGL						
lorobenzene						0.00	MGL						
ichloroethylene						0.00	MGL						
romofluorobenzene							MGL		122	(73.0 - 129.)			

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Sample/Parameter	Type	Batch	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Analyst	Date	Tim
*Dibromofluoromethane							MGL		97.9	(66.0 - 117.)	MAP	07/30/99	084
*Toluene-d8							MGL		108	(73.0 - 122.)			
1,2-Dichloroethane						0.00	MGL						
1,4-Dichlorobenzene						0.00	MGL						
2-Butanone						0.00	MGL						
Carbon Tetrachloride						0.00	MGL						
Chloroform						0.00	MGL						
Tetrachloroethylene						0.00	MGL						
Trichlorotrifluoroethane						0.00	MGL						
Vinyl chloride						0.00	MGL						
QC634543	BLANK	154649											
1,1-Dichloroethylene						0.00	MGL				MAP	08/02/99	082
Benzene						0.00	MGL						
Chlorobenzene						0.00	MGL						
Trichloroethylene						0.00	MGL						
*Bromofluorobenzene							MGL		109	(73.0 - 129.)			
*Dibromofluoromethane							MGL		100	(66.0 - 117.)			
*Toluene-d8							MGL		104	(73.0 - 122.)			
1,2-Dichloroethane						0.00	MGL						
1,4-Dichlorobenzene						0.00	MGL						
2-Butanone						0.00	MGL						
Carbon Tetrachloride						0.00	MGL						
Chloroform						0.00	MGL						
Tetrachloroethylene						0.00	MGL						
Trichlorotrifluoroethane						0.00	MGL						
Vinyl chloride						0.00	MGL						
QC631947	LCS	154327											
1,1-Dichloroethylene			50			50.4	UGKG		101	(70.0 - 144.)	JWF	07/26/99	075
Benzene			50			51.4	UGKG		103	(74.0 - 133.)			
Chlorobenzene			50			47.1	UGKG		94.2	(78.0 - 118.)			
Toluene			50			46.4	UGKG		92.8	(79.0 - 129.)			
Trichloroethylene			50			51.4	UGKG		103	(69.0 - 127.)			
*Bromofluorobenzene			50			47.6	UGKG		95.2	(73.0 - 129.)			
*Dibromofluoromethane			50			53.1	UGKG		106	(66.0 - 117.)			
*Toluene-d8			50			49.2	UGKG		98.4	(73.0 - 122.)			
QC632310	LCS	154327											
1,1-Dichloroethylene			50			47.3	UGKG		94.6	(70.0 - 144.)	SDM	07/26/99	181
Benzene			50			49.6	UGKG		99.2	(74.0 - 133.)			
Chlorobenzene			50			45.4	UGKG		90.8	(78.0 - 118.)			
Toluene			50			44.5	UGKG		89.0	(79.0 - 129.)			

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ıple/Parameter	Type	Batch	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Analyst	Date	Time
richloroethylene			50			49.4	UGKG		98.7	(69.0 - 127.)	SDM	07/26/99	1818
romofluorobenzene			50			46.1	UGKG		92.3	(73.0 - 129.)			
ibromofluoromethane			50			51.6	UGKG		103	(66.0 - 117.)			
oluene-d8			50			48.6	UGKG		97.2	(73.0 - 122.)			
632506	LCS	154327											
,1-Dichloroethylene			50			49.1	UGKG		98.2	(70.0 - 144.)	JWF	07/27/99	0602
enzene			50			51.8	UGKG		104	(74.0 - 133.)			
hlorobenzene			50			47.0	UGKG		94.0	(78.0 - 118.)			
oluene			50			46.4	UGKG		92.7	(79.0 - 129.)			
richloroethylene			50			51.7	UGKG		103	(69.0 - 127.)			
romofluorobenzene			50			46.4	UGKG		92.8	(73.0 - 129.)			
ibromofluoromethane			50			53.3	UGKG		107	(66.0 - 117.)			
oluene-d8			50			49.0	UGKG		98.1	(73.0 - 122.)			
632793	LCS	154538											
,1-Dichloroethylene			50			46.4	UGKG		92.8	(70.0 - 144.)	JWF	07/28/99	0546
enzene			50			48.2	UGKG		96.4	(74.0 - 133.)			
hlorobenzene			50			46.3	UGKG		92.5	(78.0 - 118.)			
oluene			50			45.3	UGKG		90.6	(79.0 - 129.)			
richloroethylene			50			48.8	UGKG		97.5	(69.0 - 127.)			
romofluorobenzene			50			47.2	UGKG		94.4	(73.0 - 129.)			
ibromofluoromethane			50			51.1	UGKG		102	(66.0 - 117.)			
oluene-d8			50			48.8	UGKG		97.7	(73.0 - 122.)			
633220	LCS	154538											
,1-Dichloroethylene			50			42.4	UGKG		84.8	(70.0 - 144.)	SDM	07/28/99	1804
enzene			50			45.6	UGKG		91.1	(74.0 - 133.)			
hlorobenzene			50			44.3	UGKG		88.5	(78.0 - 118.)			
oluene			50			43.0	UGKG		86.0	(79.0 - 129.)			
richloroethylene			50			45.6	UGKG		91.1	(69.0 - 127.)			
romofluorobenzene			50			46.7	UGKG		93.4	(73.0 - 129.)			
ibromofluoromethane			50			51.7	UGKG		103	(66.0 - 117.)			
oluene-d8			50			49.5	UGKG		99.0	(73.0 - 122.)			
633230	LCS	154649											
,1-Dichloroethylene			0.05			0.0464	MGL		92.8	(70.0 - 144.)	DLS	07/28/99	2025
enzene			0.05			0.0462	MGL		92.5	(74.0 - 133.)			
hlorobenzene			0.05			0.0442	MGL		88.4	(78.0 - 118.)			
oluene			0.05			0.0439	MGL		87.8	(79.0 - 129.)			
richloroethylene			0.05			0.0436	MGL		87.3	(69.0 - 127.)			
romofluorobenzene			50			41.7	UGL		83.3	(73.0 - 129.)			
ibromofluoromethane			50			46.5	UGL		93.1	(66.0 - 117.)			
oluene-d8			50			45.3	UGL		90.6	(73.0 - 122.)			

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Sample/Parameter	Type	Batch	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Analyst	Date	Tim
QC633660	LCS	154649											
1,1-Dichloroethylene			0.05			0.0514	MGL		103	(70.0 - 144.)	MAP	07/30/99	073
Benzene			0.05			0.0496	MGL		99.3	(74.0 - 133.)			
Chlorobenzene			0.05			0.0495	MGL		99.1	(78.0 - 118.)			
Toluene			0.05			0.0502	MGL		100	(79.0 - 129.)			
Trichloroethylene			0.05			0.0521	MGL		104	(69.0 - 127.)			
*Bromofluorobenzene			50			52.2	UGL		104	(73.0 - 129.)			
*Dibromofluoromethane			50			48.4	UGL		96.8	(66.0 - 117.)			
*Toluene-d8			50			48.7	UGL		97.4	(73.0 - 122.)			
QC634544	LCS	154649											
1,1-Dichloroethylene			0.05			0.0442	MGL		88.4	(70.0 - 144.)	MAP	08/02/99	071
Benzene			0.05			0.0437	MGL		87.3	(74.0 - 133.)			
Chlorobenzene			0.05			0.0446	MGL		89.1	(78.0 - 118.)			
Toluene			0.05			0.0433	MGL		86.5	(79.0 - 129.)			
Trichloroethylene			0.05			0.0455	MGL		91.0	(69.0 - 127.)			
*Bromofluorobenzene			50			47.9	UGL		95.8	(73.0 - 129.)			
*Dibromofluoromethane			50			48.5	UGL		96.9	(66.0 - 117.)			
*Toluene-d8			50			45.9	UGL		91.9	(73.0 - 122.)			
QC631948	9907679-45MS	154327											
1,1-Dichloroethylene			49.8	0.00		43.7	UGKG		87.6	(82.0 - 136.)	SDM	07/27/99	024
Benzene			49.8	0.00		47.2	UGKG		94.7	(85.0 - 126.)			
Chlorobenzene			49.8	0.00		40.9	UGKG		82.1	(70.0 - 115.)			
Toluene			49.8	0.00		39.4	UGKG		79.1	(73.0 - 117.)			
Trichloroethylene			49.8	0.00		49.1	UGKG		98.7	(70.0 - 130.)			
*Bromofluorobenzene			49.8			44.5	UGKG		89.4	(73.0 - 129.)			
*Dibromofluoromethane			49.8			52.5	UGKG		105	(66.0 - 117.)			
*Toluene-d8			49.8			46.8	UGKG		94.0	(73.0 - 122.)			
QC632794	9907679-68MS	154538											
1,1-Dichloroethylene			50	0.00		43.3	UGKG		86.6	(82.0 - 136.)	JWF	07/28/99	095
Benzene			50	0.00		47.1	UGKG		94.2	(85.0 - 126.)			
Chlorobenzene			50	0.00		46.0	UGKG		91.9	(70.0 - 115.)			
Toluene			50	0.00		43.4	UGKG		86.8	(73.0 - 117.)			
Trichloroethylene			50	0.00		46.8	UGKG		93.5	(70.0 - 130.)			
*Bromofluorobenzene			50			45.6	UGKG		91.2	(73.0 - 129.)			
*Dibromofluoromethane			50			51.0	UGKG		102	(66.0 - 117.)			
*Toluene-d8			50			48.7	UGKG		97.4	(73.0 - 122.)			
QC632796	9907579-05MS	154538											
1,1-Dichloroethylene			50	0.00		59.9	UGKG		89.9	(82.0 - 136.)	JWF	07/28/99	133
Benzene			50	0.00		63.4	UGKG		95.1	(85.0 - 126.)			
Chlorobenzene			50	0.00		59.4	UGKG		89.2	(70.0 - 115.)			

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nple/Parameter	Type	Batch	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Analyst	Date	Time
oluene			50	12.9		68.9	UGKG		84.0	(73.0 - 117.)	JWF	07/28/99	1339
richloroethylene			50	0.00		61.5	UGKG		92.2	(70.0 - 130.)			
romofluorobenzene			50			72.1	UGKG		108	(73.0 - 129.)			
ibromofluoromethane			50			66.7	UGKG		100	(66.0 - 117.)			
oluene-d8			50			66.9	UGKG		100	(73.0 - 122.)			
631949	9907679-45MSD	154327											
,1-Dichloroethylene			49.9	0.00		45.8	UGKG	4.68	91.8	(0.00 - 30.0)	SDM	07/27/99	0316
enzene			49.9	0.00		50.0	UGKG	5.63	100	(0.00 - 30.0)			
hlorobenzene			49.9	0.00		43.6	UGKG	6.27	87.4	(0.00 - 30.0)			
oluene			49.9	0.00		41.9	UGKG	5.90	83.9	(0.00 - 30.0)			
richloroethylene			49.9	0.00		52.3	UGKG	5.95	105	(0.00 - 30.0)			
romofluorobenzene			49.9			45.1	UGKG		90.4	(73.0 - 129.)			
ibromofluoromethane			49.9			52.2	UGKG		105	(66.0 - 117.)			
oluene-d8			49.9			46.9	UGKG		93.9	(73.0 - 122.)			
632795	9907679-68MSD	154538											
,1-Dichloroethylene			50	0.00		44.1	UGKG	1.90	88.2	(0.00 - 30.0)	JWF	07/28/99	1026
enzene			50	0.00		47.2	UGKG	0.290	94.4	(0.00 - 30.0)			
hlorobenzene			50	0.00		44.8	UGKG	2.62	89.6	(0.00 - 30.0)			
oluene			50	0.00		42.9	UGKG	1.19	85.7	(0.00 - 30.0)			
richloroethylene			50	0.00		47.8	UGKG	2.14	95.5	(0.00 - 30.0)			
romofluorobenzene			50			46.3	UGKG		92.5	(73.0 - 129.)			
ibromofluoromethane			50			50.5	UGKG		101	(66.0 - 117.)			
oluene-d8			50			47.3	UGKG		94.6	(73.0 - 122.)			
632797	9907579-05MSD	154538											
,1-Dichloroethylene			50	0.00		56.9	UGKG	5.22	85.3	(0.00 - 30.0)	JWF	07/28/99	1410
enzene			50	0.00		60.1	UGKG	5.30	90.2	(0.00 - 30.0)			
hlorobenzene			50	0.00		51.7	UGKG	14.0	77.5	(0.00 - 30.0)			
oluene			50	12.9		63.7	UGKG	9.75	76.1	(0.00 - 30.0)			
richloroethylene			50	0.00		56.3	UGKG	8.87	84.4	(0.00 - 30.0)			
romofluorobenzene			50			69.0	UGKG		104	(73.0 - 129.)			
ibromofluoromethane			50			67.7	UGKG		102	(66.0 - 117.)			
oluene-d8			50			68.2	UGKG		102	(73.0 - 122.)			
633231	9907679-40PS	154649											
,1-Dichloroethylene			0.05	0.00		0.472	MGL		94.4		MAP	07/30/99	1347
enzene			0.05	0.00		0.459	MGL		91.8				
hlorobenzene			0.05	0.00		0.462	MGL		92.4				
oluene			0.05	0.00		0.478	MGL		95.5				
richloroethylene			0.05	0.00681		0.477	MGL		94.0				
romofluorobenzene			50			51.6	UGL		103	(73.0 - 129.)			
Dibromofluoromethane			50			45.3	UGL		90.7	(66.0 - 117.)			

QC Summary Report

Project Description: Hazardous Waste Contract

cc: WSRC00497 Lab. Sample ID: 9907679% Report Date: August 20, 1999

Sample/Parameter	Type	Batch	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Analyst	Date	Time
*Toluene-d8			50			48.3	UGL		96.6	(73.0 - 122.)	MAP	07/30/99	1347
QC633232 9907679-40PSD		154649											
1,1-Dichloroethylene			0.05	0.00		0.473	MGL	0.220	94.6		MAP	08/02/99	0934
Benzene			0.05	0.00		0.466	MGL	1.57	93.2				
Chlorobenzene			0.05	0.00		0.480	MGL	3.92	96.0				
Toluene			0.05	0.00		0.468	MGL	1.97	93.7				
Trichloroethylene			0.05	0.00681		0.484	MGL	1.48	95.5				
*Bromofluorobenzene			50			49.4	UGL		98.9	(73.0 - 129.)			
*Dibromofluoromethane			50			46.9	UGL		93.8	(66.0 - 117.)			
*Toluene-d8			50			45.1	UGL		90.1	(73.0 - 122.)			

* represent a surrogate.

QC Summary Report

Project Description: Hazardous Waste Contract

:: WSRC00497 Lab. Sample ID: 9907679% Report Date: August 20, 1999

ıple/Parameter	Type	Batch	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Analyst	Date	Time
ractable Organics													
530746	BLANK	154032											
2,4-Trichlorobenzene						0.00	UGKG				DDT	07/23/99	1727
4-Dichlorobenzene						0.00	UGKG						
4-Dinitrotoluene						0.00	UGKG						
Chlorophenol						0.00	UGKG						
Nitrophenol						0.00	UGKG						
chloro-3-methyl phenol						0.00	UGKG						
cenaphthene						0.00	UGKG						
-Nitrosodipropylamine						0.00	UGKG						
ntachlorophenol						0.00	UGKG						
henol						0.00	UGKG						
yrene						0.00	UGKG						
,4,6-Tribromophenol							UGKG		74.8	(44.5 - 126.)			
-Fluorobiphenyl							UGKG		48.9	(44.7 - 110.)			
-Fluorophenol							UGKG		54.4	(37.0 - 102.)			
litrobenzene-d5							UGKG		42.6	(42.4 - 107.)			
henol-d6							UGKG		58.4	(41.5 - 102.)			
-Terphenyl-d14							UGKG		69.3	(45.5 - 104.)			
,2,4,5-Tetrachlorobenzene						0.00	UGKG						
,2-Dichlorobenzene						0.00	UGKG						
,3-Dichlorobenzene						0.00	UGKG						
,4-Dioxane						0.00	UGKG						
,4-Naphthoquinone						0.00	UGKG						
-Naphthylamine						0.00	UGKG						
,3,4,6-Tetrachlorophenol						0.00	UGKG						
,4,5-Trichlorophenol						0.00	UGKG						
,4,6-Trichlorophenol						0.00	UGKG						
,4-Dichlorophenol						0.00	UGKG						
,4-Dimethylphenol						0.00	UGKG						
,4-Dinitrophenol						0.00	UGKG						
,6-Dichlorophenol						0.00	UGKG						
,6-Dinitrotoluene						0.00	UGKG						
-Acetylaminofluorene						0.00	UGKG						
-Chloronaphthalene						0.00	UGKG						
-Methylnaphthalene						0.00	UGKG						
-Naphthylamine						0.00	UGKG						
-Nitrophenol						0.00	UGKG						
-Picoline						0.00	UGKG						
-methyl-4,6-dinitrophenol						0.00	UGKG						

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Sample/Parameter	Type	Batch	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Analyst	Date	Tim
2-sec-Butyl-4,6-Dinitrophenol						0.00	UGKG				DDT	07/23/99	172
3,3'-Dichlorobenzidine						0.00	UGKG						
3,3'-Dimethylbenzidine						0.00	UGKG						
3-Methylcholanthrene						0.00	UGKG						
4-Bromophenyl phenyl ether						0.00	UGKG						
4-Chloroaniline						0.00	UGKG						
4-Chlorophenyl phenyl ether						0.00	UGKG						
4-aminobiphenyl						0.00	UGKG						
5-Nitro-o-toluidine						0.00	UGKG						
7,12-Dimethylbenz(a)anthracene						0.00	UGKG						
Acenaphthylene						0.00	UGKG						
Acetophenone						0.00	UGKG						
Aniline						0.00	UGKG						
Anthracene						0.00	UGKG						
Aramite						0.00	UGKG						
Benzo(a)anthracene						0.00	UGKG						
Benzo(a)pyrene						0.00	UGKG						
Benzo(b)fluoranthene						0.00	UGKG						
Benzo(ghi)perylene						0.00	UGKG						
Benzo(k)fluoranthene						0.00	UGKG						
Benzyl Alcohol						0.00	UGKG						
Butyl benzyl phthalate						0.00	UGKG						
Chlorobenzilate						0.00	UGKG						
Chrysene						0.00	UGKG						
Di-n-butyl phthalate						0.00	UGKG						
Di-n-octyl phthalate						0.00	UGKG						
Diallate						0.00	UGKG						
Dibenzo(a,h)anthracene						0.00	UGKG						
Dibenzofuran						0.00	UGKG						
Diethyl phthalate						0.00	UGKG						
Dimethoate						0.00	UGKG						
Dimethyl phthalate						0.00	UGKG						
Diphenylamine						0.00	UGKG						
Disulfoton						0.00	UGKG						
Ethyl Methanesulfonate						0.00	UGKG						
Ethyl methacrylate						0.00	UGKG						
Famphur						0.00	UGKG						
Fluoranthene						0.00	UGKG						
Fluorene						0.00	UGKG						
Hexachlorobenzene						0.00	UGKG						

QC Summary Report

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:c: WSRC00497 Lab. Sample ID: 9907679% Report Date: August 20, 1999

nple/Parameter	Type	Batch	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Analyst	Date	Time
lexachlorobutadiene						0.00	UGKG				DDT	07/23/99	1727
lexachlorocyclopentadiene						0.00	UGKG						
lexachloroethane						0.00	UGKG						
lexachlorophene						0.00	UGKG						
lexachloropropene						0.00	UGKG						
ıdeno(1,2,3-c,d)pyrene						0.00	UGKG						
;odrin						0.00	UGKG						
;ophorone						0.00	UGKG						
;osafrole						0.00	UGKG						
:epone						0.00	UGKG						
1ethapyrilene						0.00	UGKG						
1ethyl Methanesulfonate						0.00	UGKG						
I-Nitrosodi-n-butylamine						0.00	UGKG						
I-Nitrosodiethylamine						0.00	UGKG						
I-Nitrosodimethylamine						0.00	UGKG						
I-Nitrosodiphenylamine						0.00	UGKG						
I-Nitrosomethylethylamine						0.00	UGKG						
I-Nitrosomorpholine						0.00	UGKG						
I-Nitrosopiperidine						0.00	UGKG						
I-Nitrosopyrolidine						0.00	UGKG						
laphthalene						0.00	UGKG						
litrobenzene						0.00	UGKG						
),O,O-Triethylphosphorothioate						0.00	UGKG						
'arathion						0.00	UGKG						
'arathion, methyl						0.00	UGKG						
'entachlorobenzene						0.00	UGKG						
'entachloroethane						0.00	UGKG						
'entachloronitrobenzene						0.00	UGKG						
'henacetin						0.00	UGKG						
'henanthrene						0.00	UGKG						
'horate						0.00	UGKG						
ronamide						0.00	UGKG						
yridine						0.00	UGKG						
afrole						0.00	UGKG						
ulfotepp						0.00	UGKG						
hionazin						0.00	UGKG						
-,a-Dimethylphenethylamine						0.00	UGKG						
is(2-Chloroethoxy)methane						0.00	UGKG						
is(2-Chloroethyl) ether						0.00	UGKG						
is(2-Chloroisopropyl)ether						0.00	UGKG						

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Sample/Parameter	Type	Batch	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Analyst	Date	Tim
bis(2-Ethylhexyl)phthalate						0.00	UGKG				DDT	07/23/99	172
m,p-Cresol						0.00	UGKG						
m-Dinitrobenzene						0.00	UGKG						
m-Nitroaniline						0.00	UGKG						
o-Cresol						0.00	UGKG						
o-Nitroaniline						0.00	UGKG						
o-Toluidine						0.00	UGKG						
p-Dimethylaminoazobenzene						0.00	UGKG						
p-Nitroaniline						0.00	UGKG						
p-Phenylenediamine						0.00	UGKG						
sym-Trinitrobenzene						0.00	UGKG						
QC630762	BLANK	154035											
*2,4,6-Tribromophenol							UGKG		67.4	(44.5 - 126.)	JPA	08/04/99	141
*2-Fluorobiphenyl							UGKG		59.4	(44.7 - 110.)			
*2-Fluorophenol							UGKG		64.9	(37.0 - 102.)			
*Nitrobenzene-d5							UGKG		60.7	(42.4 - 107.)			
*Phenol-d6							UGKG		67.6	(41.5 - 102.)			
*p-Terphenyl-d14							UGKG		81.1	(45.5 - 104.)			
Nitrobenzene						0.00	UGKG						
Pyridine						0.00	UGKG						
m,p-Cresol						0.00	UGKG						
o-Cresol						0.00	UGKG						
QC630902	BLANK	154067											
2,4,5-Trichlorophenol						0.00	MGL				TSD	07/27/99	185
2,4,6-Trichlorophenol						0.00	MGL						
2,4-Dinitrotoluene						0.00	MGL						
Hexachlorobenzene						0.00	MGL						
Hexachlorobutadiene						0.00	MGL						
Hexachloroethane						0.00	MGL						
Nitrobenzene						0.00	MGL						
Pentachlorophenol						0.00	MGL						
Pyridine						0.00	MGL						
m,p-Cresol						0.00	MGL						
o-Cresol						0.00	MGL						
*2,4,6-Tribromophenol							MGL		75.7	(41.0 - 122.)			
*2-Fluorobiphenyl							MGL		72.6	(41.2 - 107.)			
*2-Fluorophenol							MGL		49.1	(23.6 - 75.9)			
*Nitrobenzene-d5							MGL		85.6	(35.3 - 108.)			
*Phenol-d6							MGL		34.7	(10.9 - 54.6)			
*p-Terphenyl-d14							MGL		91.8	(36.6 - 110.)			

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nple/Parameter	Type	Batch	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Analyst	Date	Time
630903	BLANK	154067											
,4,5-Trichlorophenol						0.00	MGL				TSD	07/27/99	1907
,4,6-Trichlorophenol						0.00	MGL						
,4-Dinitrotoluene						0.00	MGL						
lexachlorobenzene						0.00	MGL						
lexachlorobutadiene						0.00	MGL						
lexachloroethane						0.00	MGL						
litrobenzene						0.00	MGL						
entachlorophenol						0.00	MGL						
yridine						0.00	MGL						
ı,p-Cresol						0.00	MGL						
-Cresol						0.00	MGL						
,4,6-Tribromophenol							MGL		77.8	(41.0 - 122.)			
-Fluorobiphenyl							MGL		69.0	(41.2 - 107.)			
-Fluorophenol							MGL		49.7	(23.6 - 75.9)			
litrobenzene-d5							MGL		81.9	(35.3 - 108.)			
henol-d6							MGL		34.4	(10.9 - 54.6)			
-Terphenyl-d14							MGL		93.9	(36.6 - 110.)			
630747	LCS	154032											
,2,4-Trichlorobenzene			1670			949	UGKG		56.8	(38.2 - 110.)	DDT	07/23/99	1756
,4-Dichlorobenzene			1670			863	UGKG		51.7	(41.8 - 103.)			
,4-Dinitrotoluene			1670			1190	UGKG		71.2	(56.5 - 119.)			
-Chlorophenol			3330			2020	UGKG		60.6	(45.5 - 95.2)			
-Nitrophenol			3330			3240	UGKG		97.3	(30.4 - 136.)			
-chloro-3-methyl phenol			3330			2370	UGKG		71.3	(57.5 - 101.)			
cenaphthene			1670			1110	UGKG		66.7	(48.2 - 108.)			
-Nitrosodipropylamine			1670			949	UGKG		56.8	(14.9 - 116.)			
entachlorophenol			3330			3900	UGKG		117**	(45.4 - 103.)			
henol			3330			1890	UGKG		56.8	(36.2 - 99.7)			
yrene			1670			1380	UGKG		82.6	(50.7 - 110.)			
,4,6-Tribromophenol			3330			3450	UGKG		104	(44.5 - 126.)			
-Fluorobiphenyl			1670			941	UGKG		56.3	(44.7 - 110.)			
-Fluorophenol			3330			1810	UGKG		54.3	(37.0 - 102.)			
litrobenzene-d5			1670			778	UGKG		46.6	(42.4 - 107.)			
henol-d6			3330			1960	UGKG		58.7	(41.5 - 102.)			
-Terphenyl-d14			1670			1350	UGKG		81.0	(45.5 - 104.)			
630763	LCS	154035											
2,4-Trichlorobenzene			1670			1070	UGKG		64.0	(38.2 - 110.)	JPA	08/04/99	1447
4-Dichlorobenzene			1670			1030	UGKG		61.7	(41.8 - 103.)			
4-Dinitrotoluene			1670			1290	UGKG		77.0	(56.5 - 119.)			

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Sample/Parameter	Type	Batch	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Analyst	Date	Tim
2-Chlorophenol			3330			2040	UGKG		61.2	(45.5 - 95.2)	JPA	08/04/99	144
4-Nitrophenol			3330			3000	UGKG		90.2	(30.4 - 136.)			
4-chloro-3-methyl phenol			3330			2120	UGKG		63.7	(57.5 - 101.)			
Acenaphthene			1670			1020	UGKG		61.2	(48.2 - 108.)			
N-Nitrosodipropylamine			1670			1120	UGKG		67.2	(14.9 - 116.)			
Pentachlorophenol			3330			2500	UGKG		75.2	(45.4 - 103.)			
Phenol			3330			2020	UGKG		60.6	(36.2 - 99.7)			
Pyrene			1670			1310	UGKG		78.1	(50.7 - 110.)			
*2,4,6-Tribromophenol			3330			2630	UGKG		78.9	(44.5 - 126.)			
*2-Fluorobiphenyl			1670			929	UGKG		55.6	(44.7 - 110.)			
*2-Fluorophenol			3330			2100	UGKG		63.1	(37.0 - 102.)			
*Nitrobenzene-d5			1670			974	UGKG		58.3	(42.4 - 107.)			
*Phenol-d6			3330			2140	UGKG		64.3	(41.5 - 102.)			
*p-Terphenyl-d14			1670			1190	UGKG		71.1	(45.5 - 104.)			
QC630904	LCS	154067											
1,4-Dichlorobenzene			0.1			0.0722	MGL		72.2	(34.6 - 96.9)	TSD	07/27/99	192
2,4,5-Trichlorophenol			0.1			0.0808	MGL		80.8	(63.4 - 95.9)			
2,4,6-Trichlorophenol			0.1			0.0736	MGL		73.6	(62.1 - 94.2)			
2,4-Dinitrotoluene			0.1			0.0859	MGL		85.9	(58.5 - 111.)			
Hexachlorobenzene			0.1			0.0921	MGL		92.1	(66.9 - 107.)			
Hexachlorobutadiene			0.1			0.0789	MGL		78.9	(40.1 - 102.)			
Hexachloroethane			0.1			0.0660	MGL		66.0	(25.4 - 101.)			
Nitrobenzene			0.1			0.0745	MGL		74.5	(56.3 - 100.)			
Pentachlorophenol			0.1			0.0789	MGL		78.9	(49.8 - 120.)			
Pyridine			0.1			0.0472	MGL		47.2	(20.7 - 125.)			
m,p-Cresol			0.1			0.0632	MGL		63.2	(11.2 - 108.)			
o-Cresol			0.1			0.0758	MGL		75.8	(17.7 - 101.)			
*2,4,6-Tribromophenol			0.1			0.0751	MGL		75.1	(41.0 - 122.)			
*2-Fluorobiphenyl			0.05			0.0349	MGL		69.9	(41.2 - 107.)			
*2-Fluorophenol			0.1			0.0479	MGL		47.9	(23.6 - 75.9)			
*Nitrobenzene-d5			0.05			0.0405	MGL		81.0	(35.3 - 108.)			
*Phenol-d6			0.1			0.0334	MGL		33.4	(10.9 - 54.6)			
*p-Terphenyl-d14			0.05			0.0477	MGL		95.5	(36.6 - 110.)			
QC630748	9907679-02MS	154032											
1,2,4-Trichlorobenzene			1650	0.00		922	UGKG		55.9	(46.3 - 102.)	DDT	07/23/99	182
1,4-Dichlorobenzene			1650	0.00		856	UGKG		51.9	(39.0 - 101.)			
2,4-Dinitrotoluene			1650	0.00		773	UGKG		46.8	(41.0 - 111.)			
2-Chlorophenol			3300	0.00		2070	UGKG		62.7	(50.1 - 99.8)			
4-Nitrophenol			3300	0.00		2180	UGKG		66.0	(42.6 - 119.)			
4-chloro-3-methyl phenol			3300	0.00		1980	UGKG		59.9	(50.5 - 110.)			

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nple/Parameter	Type	Batch	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Analyst	Date	Time
cenaphthene			1650	0.00		887	UGKG		53.7**	(54.9 - 105.)	DDT	07/23/99	1825
-Nitrosodipropylamine			1650	0.00		845	UGKG		51.2	(46.7 - 117.)			
entachlorophenol			3300	0.00		2710	UGKG		82.0	(49.1 - 123.)			
henol			3300	0.00		1830	UGKG		55.6	(55.3 - 92.4)			
yrene			1650	0.00		1160	UGKG		70.1	(57.2 - 123.)			
,4,6-Tribromophenol			3300			2470	UGKG		74.8	(44.5 - 126.)			
-Fluorobiphenyl			1650			839	UGKG		50.9	(44.7 - 110.)			
-Fluorophenol			3300			1860	UGKG		56.4	(37.0 - 102.)			
Nitrobenzene-d5			1650			781	UGKG		47.3	(42.4 - 107.)			
henol-d6			3300			2020	UGKG		61.2	(41.5 - 102.)			
-Terphenyl-d14			1650			1220	UGKG		73.7	(45.5 - 104.)			
630750	9907164-01MS	154032											
,2,4-Trichlorobenzene			1670	0.00		1150	UGKG		42.8**	(46.3 - 102.)	DDT	07/23/99	1952
,4-Dichlorobenzene			1670	0.00		855	UGKG		31.7**	(39.0 - 101.)			
,4-Dinitrotoluene			1670	0.00		1100	UGKG		40.7**	(41.0 - 111.)			
-Chlorophenol			3330	0.00		2630	UGKG		49.0**	(50.1 - 99.8)			
-Nitrophenol			3330	0.00		2840	UGKG		52.8	(42.6 - 119.)			
-chloro-3-methyl phenol			3330	0.00		2750	UGKG		51.1	(50.5 - 110.)			
cenaphthene			1670	0.00		1270	UGKG		47.1**	(54.9 - 105.)			
-Nitrosodipropylamine			1670	0.00		1100	UGKG		40.8**	(46.7 - 117.)			
entachlorophenol			3330	0.00		2870	UGKG		53.5	(49.1 - 123.)			
henol			3330	0.00		2320	UGKG		43.1**	(55.3 - 92.4)			
yrene			1670	0.00		2010	UGKG		74.5	(57.2 - 123.)			
2,4,6-Tribromophenol			3330			3100	UGKG		57.6	(44.5 - 126.)			
2-Fluorobiphenyl			1670			1150	UGKG		42.8**	(44.7 - 110.)			
2-Fluorophenol			3330			2290	UGKG		42.6	(37.0 - 102.)			
Nitrobenzene-d5			1670			1010	UGKG		37.4**	(42.4 - 107.)			
Phenol-d6			3330			2490	UGKG		46.4	(41.5 - 102.)			
p-Terphenyl-d14			1670			1660	UGKG		61.8	(45.5 - 104.)			
630764	9907679-03MS	154035											
,2,4-Trichlorobenzene			1670	0.00		1050	UGKG		62.6	(46.3 - 102.)	JPA	08/04/99	1517
,4-Dichlorobenzene			1670	0.00		977	UGKG		58.5	(39.0 - 101.)			
,4-Dinitrotoluene			1670	0.00		1050	UGKG		63.1	(41.0 - 111.)			
-Chlorophenol			3330	0.00		2000	UGKG		60.0	(50.1 - 99.8)			
-Nitrophenol			3330	0.00		2290	UGKG		68.8	(42.6 - 119.)			
-chloro-3-methyl phenol			3330	0.00		2030	UGKG		60.8	(50.5 - 110.)			
cenaphthene			1670	0.00		992	UGKG		59.4	(54.9 - 105.)			
-Nitrosodipropylamine			1670	0.00		1030	UGKG		61.9	(46.7 - 117.)			
entachlorophenol			3330	0.00		2250	UGKG		67.5	(49.1 - 123.)			
Phenol			3330	0.00		1930	UGKG		57.8	(55.3 - 92.4)			

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Sample/Parameter	Type	Batch	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Analyst	Date	Tim
Pyrene			1670	0.00		1350	UGKG		80.7	(57.2 - 123.)	JPA	08/04/99	151
*2,4,6-Tribromophenol			3330			2380	UGKG		71.5	(44.5 - 126.)			
*2-Fluorobiphenyl			1670			941	UGKG		56.3	(44.7 - 110.)			
*2-Fluorophenol			3330			2080	UGKG		62.4	(37.0 - 102.)			
*Nitrobenzene-d5			1670			955	UGKG		57.2	(42.4 - 107.)			
*Phenol-d6			3330			2140	UGKG		64.4	(41.5 - 102.)			
*p-Terphenyl-d14			1670			1350	UGKG		80.8	(45.5 - 104.)			
QC630905	9907679-06MS	154067											
1,4-Dichlorobenzene			0.5	0.00		0.361	MGL		72.2		TSD	07/27/99	193
2,4,5-Trichlorophenol			0.5	0.00		0.419	MGL		83.8				
2,4,6-Trichlorophenol			0.5	0.00		0.370	MGL		74.0				
2,4-Dinitrotoluene			0.5	0.00		0.442	MGL		88.5				
Hexachlorobenzene			0.5	0.00		0.444	MGL		88.8				
Hexachlorobutadiene			0.5	0.00		0.391	MGL		78.1				
Hexachloroethane			0.5	0.00		0.319	MGL		63.7				
Nitrobenzene			0.5	0.00		0.378	MGL		75.5				
Pentachlorophenol			0.5	0.00		0.411	MGL		82.3				
Pyridine			0.5	0.00		0.231	MGL		46.2				
m,p-Cresol			0.5	0.00		0.337	MGL		67.3				
o-Cresol			0.5	0.00		0.388	MGL		77.5				
*2,4,6-Tribromophenol			0.5			0.398	MGL		79.7	(41.0 - 122.)			
*2-Fluorobiphenyl			0.25			0.176	MGL		70.4	(41.2 - 107.)			
*2-Fluorophenol			0.5			0.246	MGL		49.3	(23.6 - 75.9)			
*Nitrobenzene-d5			0.25			0.208	MGL		83.3	(35.3 - 108.)			
*Phenol-d6			0.5			0.175	MGL		35.0	(10.9 - 54.6)			
*p-Terphenyl-d14			0.25			0.236	MGL		94.2	(36.6 - 110.)			
QC630749	9907679-02MSD	154032											
1,2,4-Trichlorobenzene			1660	0.00		927	UGKG	0.00337	55.9	(0.00 - 18.9)	DDT	07/23/99	185
1,4-Dichlorobenzene			1660	0.00		863	UGKG	0.191	52.0	(0.00 - 19.5)			
2,4-Dinitrotoluene			1660	0.00		862	UGKG	10.3	51.9	(0.00 - 21.6)			
2-Chlorophenol			3310	0.00		2110	UGKG	1.70	63.8	(0.00 - 19.7)			
4-Nitrophenol			3310	0.00		2560	UGKG	15.9	77.4	(0.00 - 23.3)			
4-chloro-3-methyl phenol			3310	0.00		2050	UGKG	3.50	62.1	(0.00 - 21.7)			
Acenaphthene			1660	0.00		926	UGKG	3.73	55.8	(0.00 - 18.9)			
N-Nitrosodipropylamine			1660	0.00		878	UGKG	3.23	52.9	(0.00 - 20.4)			
Pentachlorophenol			3310	0.00		2980	UGKG	9.30	90.0	(0.00 - 24.1)			
Phenol			3310	0.00		2020	UGKG	9.55	61.1	(0.00 - 19.4)			
Pyrene			1660	0.00		1190	UGKG	2.31	71.7	(0.00 - 21.4)			
*2,4,6-Tribromophenol			3310			2690	UGKG		81.2	(44.5 - 126.)			
*2-Fluorobiphenyl			1660			858	UGKG		51.7	(44.7 - 110.)			

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ıple/Parameter	Type	Batch	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Analyst	Date	Time
Fluorophenol			3310			1930	UGKG		58.2	(37.0 - 102.)	DDT	07/23/99	1854
itrobenzene-d5			1660			761	UGKG		45.8	(42.4 - 107.)			
ıenol-d6			3310			2200	UGKG		66.5	(41.5 - 102.)			
Terphenyl-d14			1660			1200	UGKG		72.0	(45.5 - 104.)			
530751	9907164-01MSD	154032											
2,4-Trichlorobenzene			1660	0.00		1010	UGKG	12.2	37.8	(0.00 - 18.9)	DDT	07/23/99	2021
4-Dichlorobenzene			1660	0.00		772	UGKG	9.50	28.8	(0.00 - 19.5)			
4-Dinitrotoluene			1660	0.00		1130	UGKG	3.12	42.0	(0.00 - 21.6)			
Chlorophenol			3320	0.00		2400	UGKG	8.94	44.8	(0.00 - 19.7)			
Nitrophenol			3320	0.00		3440	UGKG	19.6	64.3	(0.00 - 23.3)			
chloro-3-methyl phenol			3320	0.00		3100	UGKG	12.3	57.8	(0.00 - 21.7)			
cenaphthene			1660	0.00		1250	UGKG	0.770	46.8	(0.00 - 18.9)			
-Nitrosodipropylamine			1660	0.00		1000	UGKG	8.76	37.4	(0.00 - 20.4)			
ntachlorophenol			3320	0.00		3300	UGKG	14.1	61.6	(0.00 - 24.1)			
ıenol			3320	0.00		2150	UGKG	6.96	40.2	(0.00 - 19.4)			
yrene			1660	0.00		2560	UGKG	24.6**	95.5	(0.00 - 21.4)			
,4,6-Tribromophenol			3320			3680	UGKG		68.8	(44.5 - 126.)			
-Fluorobiphenyl			1660			1110	UGKG		41.5**	(44.7 - 110.)			
-Fluorophenol			3320			2070	UGKG		38.7	(37.0 - 102.)			
Iitrobenzene-d5			1660			903	UGKG		33.7**	(42.4 - 107.)			
henol-d6			3320			2380	UGKG		44.5	(41.5 - 102.)			
-Terphenyl-d14			1660			2150	UGKG		80.3	(45.5 - 104.)			
630765	9907679-03MSD	154035											
,2,4-Trichlorobenzene			1670	0.00		1070	UGKG	1.92	63.9	(0.00 - 18.9)	JPA	08/04/99	1546
,4-Dichlorobenzene			1670	0.00		1010	UGKG	3.06	60.3	(0.00 - 19.5)			
,4-Dinitrotoluene			1670	0.00		1040	UGKG	0.900	62.6	(0.00 - 21.6)			
-Chlorophenol			3330	0.00		2030	UGKG	1.56	60.9	(0.00 - 19.7)			
-Nitrophenol			3330	0.00		2360	UGKG	2.82	70.8	(0.00 - 23.3)			
-chloro-3-methyl phenol			3330	0.00		2050	UGKG	1.31	61.6	(0.00 - 21.7)			
cenaphthene			1670	0.00		1010	UGKG	1.53	60.3	(0.00 - 18.9)			
-Nitrosodipropylamine			1670	0.00		1040	UGKG	0.717	62.4	(0.00 - 20.4)			
entachlorophenol			3330	0.00		2250	UGKG	0.313	67.7	(0.00 - 24.1)			
henol			3330	0.00		1940	UGKG	0.832	58.3	(0.00 - 19.4)			
yrene			1670	0.00		1210	UGKG	10.8	72.4	(0.00 - 21.4)			
,4,6-Tribromophenol			3330			2290	UGKG		68.7	(44.5 - 126.)			
-Fluorobiphenyl			1670			929	UGKG		55.6	(44.7 - 110.)			
-Fluorophenol			3330			2090	UGKG		62.8	(37.0 - 102.)			
Iitrobenzene-d5			1670			971	UGKG		58.1	(42.4 - 107.)			
henol-d6			3330			2100	UGKG		63.0	(41.5 - 102.)			
-Terphenyl-d14			1670			1210	UGKG		72.7	(45.5 - 104.)			

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Sample/Parameter	Type	Batch	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Analyst	Date	Time
QC630906 9907679-06MSD		154067											
1,4-Dichlorobenzene			0.5	0.00		0.341	MGL	5.63	68.2		TSD	07/27/99	1954
2,4,5-Trichlorophenol			0.5	0.00		0.408	MGL	2.81	81.5				
2,4,6-Trichlorophenol			0.5	0.00		0.363	MGL	1.75	72.7				
2,4-Dinitrotoluene			0.5	0.00		0.433	MGL	2.11	86.6				
Hexachlorobenzene			0.5	0.00		0.429	MGL	3.35	85.9				
Hexachlorobutadiene			0.5	0.00		0.360	MGL	8.20	72.0				
Hexachloroethane			0.5	0.00		0.297	MGL	7.06	59.4				
Nitrobenzene			0.5	0.00		0.370	MGL	2.01	74.0				
Pentachlorophenol			0.5	0.00		0.401	MGL	2.69	80.1				
Pyridine			0.5	0.00		0.221	MGL	4.56	44.2				
m,p-Cresol			0.5	0.00		0.299	MGL	12.0	59.7				
o-Cresol			0.5	0.00		0.364	MGL	6.37	72.7				
*2,4,6-Tribromophenol			0.5			0.380	MGL		76.0	(41.0 - 122.)			
*2-Fluorobiphenyl			0.25			0.169	MGL		67.7	(41.2 - 107.)			
*2-Fluorophenol			0.5			0.235	MGL		46.9	(23.6 - 75.9)			
*Nitrobenzene-d5			0.25			0.197	MGL		78.8	(35.3 - 108.)			
*Phenol-d6			0.5			0.164	MGL		32.9	(10.9 - 54.6)			
*p-Terphenyl-d14			0.25			0.226	MGL		90.3	(36.6 - 110.)			
QC630737	BLANK	154030											
2,4,5-T						0.00	UGKG				JC	07/24/99	064
2,4,5-TP						0.00	UGKG						
2,4-D						0.00	UGKG						
*2,4-Dichlorophenylacetic acid							UGKG		52.6	(24.0 - 111.)			
QC631504	BLANK	154220											
2,4,5-TP						0.00	MGL				JC	07/28/99	111
2,4-D						0.00	MGL						
*2,4-Dichlorophenylacetic acid							MGL		57.6	(43.9 - 145.)			
QC631505	BLANK	154220											
2,4,5-TP						0.00	MGL				JC	07/28/99	113
2,4-D						0.00	MGL						
*2,4-Dichlorophenylacetic acid							MGL		67.4	(43.9 - 145.)			
QC630738	LCS	154030											
2,4,5-T			20			7.64	UGKG		38.2	(21.0 - 105.)	JC	07/24/99	071
2,4,5-TP			20			6.52	UGKG		32.6**	(33.0 - 73.0)			
2,4-D			20			8.58	UGKG		42.9	(20.0 - 119.)			
*2,4-Dichlorophenylacetic acid			100			46.9	UGKG		46.9	(24.0 - 111.)			
QC631506	LCS	154220											
2,4,5-TP			0.001			0.000640	MGL		64.0	(48.7 - 120.)	JC	07/28/99	120
2,4-D			0.001			0.000660	MGL		66.0	(48.6 - 121.)			

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ıple/Parameter	Type	Batch	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Analyst	Date	Time
,4-Dichlorophenylacetic acid			0.005			0.00289	MGL		57.8	(43.9 - 145.)	JC	07/28/99	1201
630945	LCS DUP	154030											
4,5-T			20			7.58	ug/kg	0.788	37.9	(-)	JC	07/24/99	0734
4,5-TP			20			7.16	ug/kg	9.36	35.8	(-)			
4-D			20			6.68	ug/kg	24.9	33.4	(-)			
,4-Dichlorophenylacetic acid			100			48.3	ug/kg		48.3	(-)			
630739	9907679-01MS	154030											
,4,5-T			100	0.00		44.9	UGKG		44.9**	(50.0 - 150.)	JC	07/24/99	0841
,4,5-TP			100	0.00		39.0	UGKG		39.0**	(50.0 - 150.)			
,4-D			100	0.00		37.7	UGKG		37.7**	(50.0 - 150.)			
,4-Dichlorophenylacetic acid			500			283	UGKG		56.5	(24.0 - 111.)			
630946	9907397-14MS	154030											
,4,5-T			20	0.00		15.3	UGKG		65.7	(-)	JC	07/24/99	0927
,4,5-TP			20	0.00		17.4	UGKG		74.8	(-)			
,4-D			20	0.00		15.4	UGKG		66.2	(-)			
,4-Dichlorophenylacetic acid			100			69.4	UGKG		59.7	(-)			
631507	9907679-46MS	154220											
,4,5-TP			0.2	0.00		0.152	MGL		76.0		JC	07/28/99	1224
,4-D			0.2	0.00		0.160	MGL		80.0				
,4-Dichlorophenylacetic acid			1			0.744	MGL		74.4	(43.9 - 145.)			
630740	9907679-01MSD	154030											
,4,5-T			100	0.00		35.0	UGKG	24.8**	35.0	(50.0 - 150.)	JC	07/24/99	0904
,4,5-TP			100	0.00		30.9	UGKG	23.2**	30.9	(50.0 - 150.)			
,4-D			100	0.00		29.1	UGKG	25.7**	29.1	(50.0 - 150.)			
,4-Dichlorophenylacetic acid			500			252	UGKG		50.4	(24.0 - 111.)			
630947	9907397-14MSD	154030											
,4,5-T			20	0.00		9.91	UGKG	42.6	42.6	(-)	JC	07/24/99	0949
,4,5-TP			20	0.00		9.93	UGKG	54.6	42.7	(-)			
,4-D			20	0.00		9.40	UGKG	48.4	40.4	(-)			
,4-Dichlorophenylacetic acid			100			44.7	UGKG		38.5	(-)			
631508	9907679-46MSD	154220											
,4,5-TP			0.2	0.00		0.140	MGL	8.22	70.0		JC	07/28/99	1246
,4-D			0.2	0.00		0.136	MGL	16.2	68.0				
,4-Dichlorophenylacetic acid			1			0.698	MGL		69.8	(43.9 - 145.)			
631309	BLANK	154173											
CB-1260						0.00	ug/kg				JLW	07/29/99	0415
CMX							ug/kg		57.5	(-)			
ecachlorobiphenyl							ug/kg		56.5	(-)			
CB-1016						0.00	ug/kg						
CB-1221						0.00	ug/kg						

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Sample/Parameter	Type	Batch	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Analyst	Date	Time
PCB-1232						0.00	ug/kg				JLW	07/29/99	0415
PCB-1242						0.00	ug/kg						
PCB-1248						0.00	ug/kg						
PCB-1254						0.00	ug/kg						
QC631310	LCS	154173											
PCB-1260			33.3			29.9	ug/kg		89.7	(-)	JLW	07/29/99	0434
*4CMX			6.67			4.03	ug/kg		60.5	(-)			
*Decachlorobiphenyl			6.67			4.77	ug/kg		71.5	(-)			
QC631311	9907679-01MS	154173											
PCB-1260			33.3	0.00		30.7	UGKG		92.1	(-)	JLW	07/29/99	0452
*4CMX			6.67			4.67	UGKG		70.0	(-)			
*Decachlorobiphenyl			6.67			4.87	UGKG		73.0	(-)			
QC631313	9907508-15MS	154173											
PCB-1260			33.3	0.00		32.1	ug/kg		96.3	(-)	JLW	07/29/99	1235
*4CMX			6.67			3.20	ug/kg		48.0	(-)			
*Decachlorobiphenyl			6.67			4.10	ug/kg		61.5	(-)			
QC631312	9907679-01MSD	154173											
PCB-1260			33.3	0.00		28.5	UGKG	7.43	85.5	(-)	JLW	07/29/99	0511
*4CMX			6.67			5.73	UGKG		86.0	(-)			
*Decachlorobiphenyl			6.67			4.53	UGKG		68.0	(-)			
QC631314	9907508-15MSD	154173											
PCB-1260			33.3	0.00		33.9	ug/kg	5.45	102	(-)	JLW	07/29/99	1254
*4CMX			6.67			4.93	ug/kg		74.0	(-)			
*Decachlorobiphenyl			6.67			3.90	ug/kg		58.5	(-)			
QC630911	BLANK	154069											
Chlordane						0.00	MGL				SJ	07/27/99	1209
Endrin						0.00	MGL						
Heptachlor						0.00	MGL						
Heptachlor & Hep. Epoxide						0.00	MGL						
Methoxychlor						0.00	MGL						
Toxaphene						0.00	MGL						
gamma-BHC						0.00	MGL						
*4CMX							MGL		85.5	(46.0 - 125.)			
*Decachlorobiphenyl							MGL		87.5	(42.0 - 143.)			
Heptachlor epoxide						0.00	MGL						
QC630912	BLANK	154069											
Chlordane						0.00	MGL				SJ	07/27/99	1236
Endrin						0.00	MGL						
Heptachlor						0.00	MGL						
Heptachlor & Hep. Epoxide						0.00	MGL						

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nple/Parameter	Type	Batch	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Analyst	Date	Time
lethoxychlor						0.00	MGL				SJ	07/27/99	1236
oxaphene						0.00	MGL						
amma-BHC						0.00	MGL						
CMX							MGL		86.0	(46.0 - 125.)			
)ecachlorobiphenyl							MGL		95.5	(42.0 - 143.)			
eptachlor epoxide						0.00	MGL						
630927	BLANK	154073											
,4'-DDT						0.00	ug/kg				MM	07/26/99	1953
ldrin						0.00	ug/kg						
ieldrin						0.00	ug/kg						
ndrin						0.00	ug/kg						
leptachlor						0.00	ug/kg						
amma-BHC						0.00	ug/kg						
CMX							ug/kg		47.0	(-)			
)ecachlorobiphenyl							ug/kg		73.2	(-)			
,4'-DDD						0.00	ug/kg						
,4'-DDE						0.00	ug/kg						
hlordane						0.00	ug/kg						
ndosulfan I						0.00	ug/kg						
ndosulfan II						0.00	ug/kg						
ndosulfan sulfate						0.00	ug/kg						
ndrin aldehyde						0.00	ug/kg						
leptachlor epoxide						0.00	ug/kg						
lethoxychlor						0.00	ug/kg						
oxaphene						0.00	ug/kg						
lpha-BHC						0.00	ug/kg						
eta-BHC						0.00	ug/kg						
elta-BHC						0.00	ug/kg						
638270	BLANK	155899											
hlordane						0.00	MGL				SJ	08/04/99	2152
ndrin						0.00	MGL						
leptachlor						0.00	MGL						
leptachlor & Hep. Epoxide						0.00	MGL						
lethoxychlor						0.00	MGL						
oxaphene						0.00	MGL						
amma-BHC						0.00	MGL						
CMX							MGL		95.0	(46.0 - 125.)			
)ecachlorobiphenyl							MGL		85.5	(42.0 - 143.)			
leptachlor epoxide						0.00	MGL						
630914	LCS	154069											

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Sample/Parameter	Type	Batch	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Analyst	Date	Time
Chlordane			0.1			0.0810	MGL		81.0	(70.0 - 130.)	SJ	07/27/99	1357
Endrin			0.005			0.00590	MGL		118	(52.6 - 142.)	SJ	07/27/99	1303
Heptachlor			0.005			0.00440	MGL		88.0	(58.6 - 137.)			
Heptachlor & Hep. Epoxide			0.01			0.00950	MGL		95.0	(70.0 - 130.)			
Methoxychlor			0.05			0.0508	MGL		102	(70.0 - 130.)			
Toxaphene			0.1			0.108	MGL		108	(70.0 - 130.)	SJ	07/27/99	1330
gamma-BHC			0.005			0.00530	MGL		106	(55.4 - 132.)	SJ	07/27/99	1303
*4CMX			0.01			0.0102	MGL		102	(46.0 - 125.)			
*Decachlorobiphenyl			0.01			0.00880	mg/l		88.0	(42.0 - 143.)			
QC630928	LCS	154073											
4,4'-DDT			8.33			8.70	ug/kg		104	(-)	MM	07/26/99	2016
Aldrin			3.33			2.27	ug/kg		68.3	(-)			
Dieldrin			8.33			6.33	ug/kg		76.0	(-)			
Endrin			8.33			7.50	ug/kg		90.0	(-)			
Heptachlor			3.33			2.23	ug/kg		67.0	(-)			
gamma-BHC			3.33			2.32	ug/kg		69.6	(-)			
*4CMX			6.6			3.43	ug/kg		52.0	(-)			
*Decachlorobiphenyl			6.6			5.67	ug/kg		85.8	(-)			
QC638271	LCS	155899											
Chlordane			0.1			0.0850	MGL		85.0	(70.0 - 130.)	SJ	08/05/99	0008
Endrin			0.005			0.00545	MGL		109	(52.6 - 142.)	SJ	08/04/99	2314
Heptachlor			0.005			0.00475	MGL		95.0	(58.6 - 137.)			
Heptachlor & Hep. Epoxide			0.01			0.00935	MGL		93.5	(70.0 - 130.)			
Methoxychlor			0.05			0.0540	MGL		108	(70.0 - 130.)			
Toxaphene			0.1			0.111	MGL		111	(70.0 - 130.)	SJ	08/04/99	2341
gamma-BHC			0.005			0.00450	MGL		90.0	(55.4 - 132.)	SJ	08/04/99	2314
*4CMX			0.01			0.00830	MGL		83.0	(46.0 - 125.)			
*Decachlorobiphenyl			0.01			0.00890	mg/l		89.0	(42.0 - 143.)			
QC630929	LCS DUP	154073											
4,4'-DDT			8.33			8.90	ug/kg	2.27	107	(-)	MM	07/26/99	2039
Aldrin			3.33			3.10	ug/kg	30.8	93.1	(-)			
Dieldrin			8.33			7.00	ug/kg	10.0	84.0	(-)			
Endrin			8.33			8.17	ug/kg	8.51	98.0	(-)			
Heptachlor			3.33			3.11	ug/kg	32.8	93.3	(-)			
gamma-BHC			3.33			2.95	ug/kg	24.2	88.7	(-)			
*4CMX			6.6			5.37	ug/kg		81.3	(-)			
*Decachlorobiphenyl			6.6			5.50	ug/kg		83.3	(-)			
QC630915	9907679-04MS	154069											
Chlordane			0.1	0.00		0.0888	MGL		88.8		SJ	07/27/99	1519
Endrin			0.005	0.00		0.00595	MGL		119		SJ	07/27/99	1425

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ıple/Parameter	Type	Batch	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Analyst	Date	Time
eptachlor			0.005	0.00		0.00430	MGL		86.0		SJ	07/27/99	1425
eptachlor & Hep. Epoxide			0.01	0.00		0.00905	MGL		90.5				
[ethoxychlor			0.05	0.00		0.0539	MGL		108				
ɔxaphene			0.1	0.00		0.109	MGL		109		SJ	07/27/99	1452
ımma-BHC			0.005	0.00		0.00500	MGL		100		SJ	07/27/99	1425
CMX			0.01			0.00975	MGL		97.5	(46.0 - 125.)			
)ecachlorobiphenyl			0.01			0.00885	mg/l		88.5	(42.0 - 143.)			
630930	9907397-13MS	154073											
,4'-DDT			8.33	0.00		9.58	UGKG		100	(-)	MM	07/28/99	2231
ldrin			3.33	0.00		3.02	UGKG		78.9	(-)			
ieldrin			8.33	0.00		8.20	UGKG		85.6	(-)			
ndrin			8.33	0.00		9.77	UGKG		102	(-)			
'eptachlor			3.33	0.00		2.89	UGKG		75.6	(-)			
amma-BHC			3.33	0.00		2.90	UGKG		75.7	(-)			
CMX			6.6			3.95	UGKG		52.0	(-)			
)ecachlorobiphenyl			6.6			5.44	UGKG		71.7	(-)			
630932	9907679-65MS	154073											
,4'-DDT			8.2	0.00		8.00	UGKG		97.6	(-)	MM	07/26/99	2318
ldrin			3.28	0.00		2.24	UGKG		68.4	(-)			
)ieldrin			8.2	0.00		6.36	UGKG		77.6	(-)			
ndrin			8.2	0.00		7.57	UGKG		92.4	(-)			
[eptachlor			3.28	0.00		2.20	UGKG		67.0	(-)			
amma-BHC			3.28	0.00		2.23	UGKG		68.0	(-)			
-CMX			6.6			3.48	UGKG		52.6	(-)			
)ecachlorobiphenyl			6.6			4.98	ug/kg		75.5	(-)			
'630916	9907679-04MSD	154069											
'hlordane			0.1	0.00		0.0911	MGL	2.56	91.1		SJ	07/27/99	1708
ndrin			0.005	0.00		0.00615	MGL	3.30	123		SJ	07/27/99	1546
[eptachlor			0.005	0.00		0.00460	MGL	6.74	92.0				
[eptachlor & Hep. Epoxide			0.01	0.00		0.00955	MGL	5.38	95.5				
'ethoxychlor			0.05	0.00		0.0563	MGL	4.27	113				
'oxaphene			0.1	0.00		0.122	MGL	11.2	122		SJ	07/27/99	1613
amma-BHC			0.005	0.00		0.00515	MGL	2.96	103		SJ	07/27/99	1546
CMX			0.01			0.00830	MGL		83.0	(46.0 - 125.)			
)ecachlorobiphenyl			0.01			0.00855	mg/l		85.5	(42.0 - 143.)			
'630931	9907397-13MSD	154073											
,4'-DDT			8.33	0.00		9.16	UGKG	4.50	95.6	(-)	MM	07/28/99	2254
ıldrin			3.33	0.00		2.51	UGKG	18.3	65.7	(-)			
)ieldrin			8.33	0.00		7.28	UGKG	11.9	76.0	(-)			
_ndrin			8.33	0.00		8.58	UGKG	12.9	89.6	(-)			

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Heptachlor			3.33	0.00		2.51	UGKG	14.2	65.6	(-)	MM	07/28/99	225
gamma-BHC			3.33	0.00		2.51	UGKG	14.2	65.7	(-)			
*4CMX			6.6			4.18	UGKG		55.0	(-)			
*Decachlorobiphenyl			6.6			5.48	UGKG		72.2	(-)			
QC630933 9907679-65MSD		154073											
4,4'-DDT			8.17	0.00		7.84	UGKG	1.61	96.0	(-)	MM	07/26/99	234
Aldrin			3.27	0.00		2.60	UGKG	14.9	79.4	(-)			
Dieldrin			8.17	0.00		6.31	UGKG	0.478	77.2	(-)			
Endrin			8.17	0.00		7.58	UGKG	0.471	92.8	(-)			
Heptachlor			3.27	0.00		2.56	UGKG	15.5	78.2	(-)			
gamma-BHC			3.27	0.00		2.65	UGKG	17.4	80.9	(-)			
*4CMX			6.6			4.54	UGKG		68.8	(-)			
*Decachlorobiphenyl			6.6			4.05	ug/kg		61.4	(-)			

* represent a surrogate.

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ıple/Parameter	Type	Batch	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Analyst	Date	Time
:als Analysis													
528773 ercury	BLANK	153549				-14.9	UGKG				RPM	07/22/99	1345
532020 ercury	BLANK	154343				-0.00134	MGL				RPM	07/27/99	1352
532021 ercury	BLANK	154343				-0.00138	MGL				RPM	07/27/99	1357
532745 lercury	BLANK	154526				-0.000554	MGL				RMJ	07/29/99	1721
532746 lercury	BLANK	154526				-0.000489	MGL				RMJ	07/29/99	1723
532747 lercury	BLANK	154526				-0.000384	MGL				RMJ	07/29/99	1728
533216 lercury	BLANK	154526				-6.08E-05	MGL				RMJ	07/29/99	1732
634146 lercury	BLANK	154871				-0.000811	MGL				RMJ	08/02/99	1730
634147 lercury	BLANK	154871				-0.000824	MGL				RMJ	08/02/99	1732
634148 lercury	BLANK	154871				-0.000877	MGL				RMJ	08/02/99	1734
634537 lercury	BLANK	154974				0.000227	MGL				RMJ	08/03/99	1347
634538 lercury	BLANK	154974				0.000179	MGL				RMJ	08/03/99	1352
634539 lercury	BLANK	154974				-6.36E-05	MGL				RMJ	08/03/99	1354
636156 lercury	BLANK	155374				-0.000218	MGL				RMJ	08/06/99	1210
636157 lercury	BLANK	155374				-0.000314	MGL				RMJ	08/06/99	1212
628774 lercury	LCS	153549	5290			5730	UGKG	108		(57.9 - 134.)	RPM	07/22/99	1347
632307 lercury	LCS	154343	0.02			0.0186	MGL	93.2		(81.5 - 124.)	RPM	07/27/99	1359
632748 lercury	LCS	154526	0.02			0.0205	MGL	103		(81.5 - 124.)	RMJ	07/29/99	1734
634149 lercury	LCS	154871	0.02			0.0184	MGL	92.0		(81.5 - 124.)	RMJ	08/02/99	1736
634540	LCS	154974											

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Sample/Parameter	Type	Batch	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Analyst	Date	Time
Mercury			0.02			0.0230	MGL		115	(81.5 - 124.)	RMJ	08/03/99	135(
QC636158	LCS	155374											
Mercury			0.02			0.0220	MGL		110	(81.5 - 124.)	RMJ	08/06/99	121
QC628775	9907465-02MS	153549											
Mercury			272	-5.01		341	UGKG		126	(64.6 - 136.)	RPM	07/22/99	140
QC630326	9907679-02MS	153549											
Mercury			333	-7.05		334	UGKG		100	(64.6 - 136.)	RPM	07/22/99	140
QC632022	9907679-04MS	154343											
Mercury			0.02	-0.00107		0.0194	MGL		97.1		RPM	07/27/99	140
QC632753	9907679-56MS	154526											
Mercury			0.02	-0.000523		0.0208	MGL		104		RMJ	07/29/99	175
QC634150	9907679-60MS	154871											
Mercury			0.02	-0.000997		0.0204	MGL		102		RMJ	08/02/99	175
QC634541	9907679-62MS	154974											
Mercury			0.02	-9.36E-05		0.0225	MGL		112		RMJ	08/03/99	140
QC636159	9907679-58MS	155374											
Mercury			0.02	-6.35E-05		0.0201	MGL		100		RMJ	08/06/99	122
QC628776	9907465-02MSD	153549											
Mercury			333	-5.01		296	UGKG	34.3**	88.8	(0.00 - 17.0)	RPM	07/22/99	140
QC630327	9907679-02MSD	153549											
Mercury			333	-7.05		310	UGKG	7.47	93.0	(0.00 - 17.0)	RPM	07/22/99	141
QC632023	9907679-04MSD	154343											
Mercury			0.02	-0.00107		0.0188	MGL	3.29	94.0		RPM	07/27/99	140
QC632754	9907679-56MSD	154526											
Mercury			0.02	-0.000523		0.0202	MGL	2.90	101		RMJ	07/29/99	180(
QC634151	9907679-60MSD	154871											
Mercury			0.02	-0.000997		0.0186	MGL	9.36	92.8		RMJ	08/02/99	175(
QC634542	9907679-62MSD	154974											
Mercury			0.02	-9.36E-05		0.0223	MGL	0.869	111		RMJ	08/03/99	141
QC636160	9907679-58MSD	155374											
Mercury			0.02	-6.35E-05		0.0196	MGL	2.59	97.9		RMJ	08/06/99	122(
QC630242	BLANK	153902											
Aluminum						6320	UGKG				MBL	08/02/99	165
Antimony						627	UGKG						
Arsenic						-278	UGKG						
Barium						-6.64	UGKG						
Beryllium						-19.4	UGKG						
Boron						338	UGKG				MBL	08/03/99	102
Cadmium						-58.3	UGKG				MBL	08/02/99	165
Calcium						2600	UGKG						

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ıple/Parameter	Type	Batch	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Analyst	Date	Time
hromium						-50.0	UGKG				MBL	08/02/99	1657
ɔbalt						-68.4	UGKG						
ɔpper						-647	UGKG						
ɔn						881	UGKG						
ɛad						-480	UGKG						
[agnesium						-552	UGKG						
[anganese						69.4	UGKG						
[olybdenum						-120	UGKG						
ickel						201	UGKG						
ɔtassium						2160	UGKG						
ɛlenium						65.2	UGKG						
ilicon						8060	UGKG				MBL	08/03/99	1027
ilver						-123	UGKG				MBL	08/02/99	1657
ɔdium						6450	UGKG				MBL	08/03/99	1027
trontium						-32.8	UGKG				MBL	08/02/99	1657
hallium						525	UGKG						
in						88.7	UGKG						
itanium						-8.22	UGKG						
ranium						1200	UGKG				MBL	08/03/99	1027
anadium						-77.8	UGKG				MBL	08/02/99	1657
inc						1240	UGKG				MBL	08/03/99	1027
630247	BLANK	153903											
luminum						2240	UGKG				MBL	07/23/99	1013
ntimony						-17.9	UGKG						
rsenic						238	UGKG				MBL	07/22/99	1323
arium						11.3	UGKG						
eryllium						6.58	UGKG						
oron						-252	UGKG				MBL	07/23/99	1013
admium						14.5	UGKG				MBL	07/22/99	1323
alcium						5680	UGKG						
hromium						60.6	UGKG						
obalt						-50.9	UGKG						
opper						-28.3	UGKG						
on						771	UGKG						
ead						63.4	UGKG						
lagnesium						485	UGKG						
anganese						43.1	UGKG						
olybdenum						26.2	UGKG						
ickel						165	UGKG				MBL	07/23/99	1013
otassium						960	UGKG				MBL	07/22/99	1323

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Sample/Parameter	Type	Batch	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Analyst	Date	Tim
Selenium						205	UGKG				MBL	07/23/99	101
Silicon						3350	UGKG						
Silver						2.30	UGKG				MBL	07/22/99	132
Sodium						1730	UGKG				MBL	07/23/99	101
Strontium						4.32	UGKG				MBL	07/22/99	132
Thallium						28.2	UGKG				MBL	07/23/99	101
Tin						445	UGKG				MBL	07/22/99	132
Titanium						-21.5	UGKG				MBL	07/23/99	101
Vanadium						14.4	UGKG				MBL	07/22/99	132
Zinc						327	UGKG				MBL	07/23/99	101
QC631615	BLANK	154250											
Arsenic						-0.0213	mg/l				AME	08/01/99	173
Barium						0.0200	mg/l						
Cadmium						0.000409	mg/l						
Chromium						0.0345	mg/l						
Lead						-0.00460	mg/l						
Selenium						-0.00601	mg/l						
Silver						0.00888	mg/l						
QC631616	BLANK	154250											
Arsenic						-0.0229	mg/l				AME	08/01/99	173
Barium						0.0159	mg/l						
Cadmium						0.000705	mg/l						
Chromium						0.0251	mg/l						
Lead						-0.00509	mg/l						
Selenium						0.0193	mg/l						
Silver						0.00980	mg/l						
QC632038	BLANK	154346											
Arsenic						0.00369	mg/l				AME	07/29/99	105
Barium						0.000214	mg/l						
Cadmium						0.000409	mg/l						
Chromium						0.000151	mg/l						
Lead						0.00103	mg/l						
Nickel						0.967	ug/l						
Selenium						-0.00305	mg/l						
Silver						-0.000519	mg/l						
QC632039	BLANK	154346											
Arsenic						0.00652	mg/l				AME	07/29/99	110
Barium						0.000491	mg/l						
Cadmium						0.000484	mg/l						
Chromium						-0.00127	mg/l						

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ıple/Parameter	Type	Batch	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Analyst	Date	Time
ead						0.0000407	mg/l				AME	07/29/99	1100
ickel						7.57	ug/l						
elenium						0.00364	mg/l						
lver						-0.00137	mg/l						
533212	BLANK	154346											
rsenic						-0.00538	mg/l				AME	07/29/99	1105
arium						0.000367	mg/l						
admium						0.000222	mg/l						
hromium						-0.000231	mg/l						
ead						0.000174	mg/l						
ickel						2.91	ug/l						
elenium						0.00456	mg/l						
lver						-0.000850	mg/l						
533213	BLANK	154346											
rsenic						-0.00182	mg/l				AME	07/29/99	1111
arium						0.0000259	mg/l						
admium						0.00119	mg/l						
hromium						0.000551	mg/l						
ead						0.00560	mg/l						
ickel						2.73	ug/l						
elenium						0.00410	mg/l						
lver						-0.00183	mg/l						
533214	BLANK	154346											
rsenic						0.00559	mg/l				AME	07/29/99	1117
arium						0.00139	mg/l						
admium						-7.94E-05	mg/l						
hromium						0.000371	mg/l						
ead						0.00340	mg/l						
ickel						5.97	ug/l						
elenium						0.00520	mg/l						
lver						-0.000521	mg/l						
534158	BLANK	154873											
rsenic						-0.0128	mg/l				MBL	08/03/99	1746
arium						-0.000134	mg/l						
admium						0.00436	mg/l						
hromium						-0.00440	mg/l						
ead						0.0103	mg/l						
ickel						-2.38	ug/l						
elenium						0.0222	mg/l						
lver						-0.000301	mg/l						

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Sample/Parameter	Type	Batch	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Analyst	Date	Tim
QC634159	BLANK	154873											
Arsenic						-0.0128	mg/l				MBL	08/03/99	175
Barium						-0.000459	mg/l						
Cadmium						0.00172	mg/l						
Chromium						-0.00429	mg/l						
Lead						0.00555	mg/l						
Nickel						-6.38	ug/l						
Selenium						0.0214	mg/l						
Silver						0.00185	mg/l						
QC634161	BLANK	154873											
Arsenic						-0.00320	mg/l				MBL	08/03/99	175
Barium						0.000530	mg/l						
Cadmium						0.00236	mg/l						
Chromium						-0.000795	mg/l						
Lead						0.00659	mg/l						
Nickel						-1.90	ug/l						
Selenium						0.0204	mg/l						
Silver						0.00287	mg/l						
QC634555	BLANK	154977											
Arsenic						-0.00847	mg/l				MBL	08/03/99	102
Barium						-3.24E-05	mg/l						
Cadmium						0.00175	mg/l						
Chromium						-0.00685	mg/l						
Lead						-0.000802	mg/l						
Nickel						-5.91	ug/l						
Selenium						0.00429	mg/l						
Silver						0.00760	mg/l						
QC634556	BLANK	154977											
Arsenic						-0.0149	mg/l				MBL	08/03/99	102
Barium						0.000517	mg/l						
Cadmium						0.000308	mg/l						
Chromium						-0.00121	mg/l						
Lead						-0.00351	mg/l						
Nickel						-5.65	ug/l						
Selenium						0.0235	mg/l						
Silver						0.00739	mg/l						
QC634557	BLANK	154977											
Arsenic						0.00194	mg/l				MBL	08/03/99	103
Barium						0.00143	mg/l						
Cadmium						0.00236	mg/l						

QC Summary Report

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ıple/Parameter	Type	Batch	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Analyst	Date	Time
hromium						-0.00118	mg/l				MBL	08/03/99	1033
ead						-0.00129	mg/l						
ickel						-8.99	ug/l						
elenium						0.0265	mg/l						
lver						0.00720	mg/l						
534558	BLANK	154977											
rsenic						-0.0214	mg/l				MBL	08/03/99	1039
arium						-2.00E-05	mg/l						
admium						0.00235	mg/l						
hromium						-0.00516	mg/l						
ead						-0.00612	mg/l						
ickel						-4.07	ug/l						
elenium						0.00725	mg/l						
lver						0.00775	mg/l						
535714	BLANK	155258											
rsenic						0.0179	mg/l				MBL	08/06/99	1055
arium						0.000610	mg/l						
admium						-0.00140	mg/l						
hromium						-0.00228	mg/l						
ead						0.00104	mg/l						
ickel						1.37	ug/l						
elenium						-0.00357	mg/l						
lver						-0.000575	mg/l						
535715	BLANK	155258											
rsenic						0.00768	mg/l				MBL	08/06/99	1101
arium						0.000411	mg/l						
admium						-0.00169	mg/l						
hromium						-0.00224	mg/l						
ead						0.0114	mg/l						
ickel						4.28	ug/l						
elenium						0.00428	mg/l						
lver						-0.00190	mg/l						
535716	BLANK	155258											
rsenic						0.0195	mg/l				MBL	08/06/99	1106
arium						0.000425	mg/l						
admium						-0.00218	mg/l						
hromium						-0.000187	mg/l						
ead						0.00963	mg/l						
ickel						3.51	ug/l						
elenium						-0.00104	mg/l						

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Sample/Parameter	Type	Batch	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Analyst	Date	Tim
Silver						0.000344	mg/l				MBL	08/06/99	110
QC630249 9907164-01DUP		153903											
Arsenic				697		545	UGKG	200					
Beryllium				47.9		39.7	UGKG	18.6					
Cadmium				379		3350	UGKG	159					
Chromium				5030		2970	UGKG	51.4					
Copper				86100		66700	UGKG	25.3					
Lead				10600		8820	UGKG	18.6					
Nickel				3940		3130	UGKG	23.0					
Silver				479		531	UGKG	10.2					
QC630243	LCS	153902											
Aluminum			6120000			5940000	UGKG		97.1	(75.2 - 126.)	MBL	08/02/99	170
Antimony			4180			4660	UGKG		112	(75.2 - 199.)			
Arsenic			24400			25500	UGKG		104	(84.6 - 133.)			
Barium			9810			11900	UGKG		121	(89.7 - 154.)			
Beryllium			2290			2440	UGKG		107	(76.9 - 128.)			
Boron			2390			1830	UGKG		76.4**	(33.3 - 74.7)	MBL	08/03/99	103
Cadmium			106000			108000	UGKG		102	(77.5 - 116.)	MBL	08/02/99	170
Calcium			10800000			13400000	UGKG		124	(95.4 - 139.)			
Chromium			46400			51700	UGKG		111	(73.0 - 150.)			
Cobalt			11300			13100	UGKG		116	(88.1 - 142.)			
Copper			53300			60200	UGKG		113	(81.3 - 149.)			
Iron			10100000			12700000	UGKG		125	(68.9 - 243.)			
Lead			129000			133000	UGKG		103	(80.4 - 117.)			
Magnesium			1020000			902000	UGKG		88.4	(72.8 - 109.)			
Manganese			278000			300000	UGKG		108	(83.8 - 152.)			
Molybdenum			45700			52800	UGKG		116	(92.2 - 141.)			
Nickel			40400			46100	UGKG		114	(85.3 - 149.)			
Potassium			181000			205000	UGKG		113	(71.5 - 164.)			
Selenium			52500			50800	UGKG		96.7	(86.6 - 122.)			
Silicon			751000			1090000	UGKG		145**	(70.0 - 130.)	MBL	08/03/99	103
Silver			3140			3180	UGKG		101	(93.2 - 130.)	MBL	08/02/99	170
Sodium			82900			87400	UGKG		105	(62.0 - 133.)	MBL	08/03/99	103
Strontium			35200			37900	UGKG		108	(85.9 - 125.)	MBL	08/02/99	170
Thallium			54400			55700	UGKG		102	(57.8 - 123.)			
Tin			55000			52800	UGKG		96.1	(70.0 - 130.)			
Titanium			39000			51900	UGKG		133	(27.6 - 250.)			
Uranium			14300			6800	UGKG		47.5**	(5.50 - 26.4)	MBL	08/03/99	103
Vanadium			59000			59900	UGKG		102	(78.3 - 124.)	MBL	08/02/99	170
Zinc			598000			587000	UGKG		98.1	(78.1 - 115.)	MBL	08/03/99	103

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nple/Parameter	Type	Batch	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Analyst	Date	Time
630248	LCS	153903											
luminum			5950000			6360000	UGKG		107	(75.2 - 126.)	MBL	07/23/99	1020
ntimony			2410			4730	UGKG		196	(75.2 - 199.)			
rsenic			23700			28300	UGKG		119	(84.6 - 133.)	MBL	07/22/99	1329
arium			9540			12500	UGKG		131	(89.7 - 154.)			
eryllium			2220			2580	UGKG		116	(76.9 - 128.)			
oron			1190			982	UGKG		82.8**	(33.3 - 74.7)	MBL	07/23/99	1020
admium			103000			114000	UGKG		111	(77.5 - 116.)	MBL	07/22/99	1329
alcium			10500000			13800000	UGKG		131	(95.4 - 139.)			
hromium			45100			57700	UGKG		128	(73.0 - 150.)			
obalt			11000			14000	UGKG		128	(88.1 - 142.)			
opper			51900			65600	UGKG		126	(81.3 - 149.)			
on			9810000			15200000	UGKG		155	(68.9 - 243.)			
ead			125000			141000	UGKG		112	(80.4 - 117.)			
lagnesium			991000			929000	UGKG		93.7	(72.8 - 109.)			
langanese			270000			339000	UGKG		126	(83.8 - 152.)			
olybdenum			44400			56700	UGKG		128	(92.2 - 141.)			
ickel			39300			51400	UGKG		131	(85.3 - 149.)	MBL	07/23/99	1020
otassium			176000			214000	UGKG		122	(71.5 - 164.)	MBL	07/22/99	1329
elenium			57800			54800	UGKG		94.8	(86.6 - 122.)	MBL	07/23/99	1020
ilicon			751000			874000	UGKG		116	(70.0 - 130.)			
ilver			3060			3370	UGKG		110	(93.2 - 130.)	MBL	07/22/99	1329
odium			80600			87500	UGKG		109	(70.0 - 130.)	MBL	07/23/99	1020
trontium			34300			39400	UGKG		115	(85.9 - 125.)	MBL	07/22/99	1329
hallium			52900			57700	UGKG		109	(57.8 - 123.)	MBL	07/23/99	1020
in			55000			58800	UGKG		107	(70.0 - 130.)	MBL	07/22/99	1329
itanium			38000			53900	UGKG		142	(27.6 - 250.)	MBL	07/23/99	1020
anadium			57400			62800	UGKG		109	(78.3 - 124.)	MBL	07/22/99	1329
inc			581000			618000	UGKG		106	(78.1 - 115.)	MBL	07/23/99	1020
631617	LCS	154250											
rsenic			5			5.15	mg/l		103	(89.5 - 112.)	AME	08/01/99	1744
arium			10			10.3	mg/l		103	(90.7 - 111.)			
admium			1			1.09	mg/l		109	(90.7 - 115.)			
hromium			5			5.03	mg/l		101	(90.0 - 112.)			
ead			5			5.24	mg/l		105	(89.3 - 114.)			
langanese			2000			1940	ug/l		97.1	(87.9 - 112.)			
ickel			2000			2170	ug/l		108	(91.3 - 115.)			
elenium			1			0.984	mg/l		98.4	(87.2 - 109.)			
ilver			0.5			0.523	mg/l		105	(90.9 - 116.)			
632040	LCS	154346											

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Sample/Parameter	Type	Batch	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Analyst	Date	Time
Arsenic			5			5.41	mg/l		108	(89.5 - 112.)	AME	07/29/99	1122
Barium			10			10.1	mg/l		101	(90.7 - 111.)	AME	07/29/99	1122
Cadmium			1			1.11	mg/l		111	(90.7 - 115.)			
Chromium			5			5.50	mg/l		110	(90.0 - 112.)			
Lead			5			5.54	mg/l		111	(89.3 - 114.)			
Manganese			2000			2190	ug/l		109	(87.9 - 112.)			
Nickel			2000			2240	ug/l		112	(91.3 - 115.)			
Selenium			1			1.03	mg/l		103	(87.2 - 109.)			
Silver			0.5			0.535	mg/l		107	(90.9 - 116.)			
QC634160	LCS	154873											
Arsenic			5			5.23	mg/l		105	(89.5 - 112.)	MBL	08/03/99	1802
Barium			10			9.87	mg/l		98.7	(90.7 - 111.)			
Cadmium			1			1.09	mg/l		109	(90.7 - 115.)			
Chromium			5			5.33	mg/l		107	(90.0 - 112.)			
Lead			5			5.38	mg/l		108	(89.3 - 114.)			
Manganese			2000			2060	ug/l		103	(87.9 - 112.)			
Nickel			2000			2160	ug/l		108	(91.3 - 115.)			
Selenium			1			0.952	mg/l		95.2	(87.2 - 109.)			
Silver			0.5			0.521	mg/l		104	(90.9 - 116.)			
QC634559	LCS	154977											
Arsenic			5			5.25	mg/l		105	(89.5 - 112.)	MBL	08/03/99	1044
Barium			10			10.1	mg/l		101	(90.7 - 111.)			
Cadmium			1			1.09	mg/l		109	(90.7 - 115.)			
Chromium			5			5.30	mg/l		106	(90.0 - 112.)			
Lead			5			5.40	mg/l		108	(89.3 - 114.)			
Manganese			2000			2060	ug/l		103	(87.9 - 112.)			
Nickel			2000			2180	ug/l		109	(91.3 - 115.)			
Selenium			1			0.952	mg/l		95.2	(87.2 - 109.)			
Silver			0.5			0.528	mg/l		106	(90.9 - 116.)			
QC635717	LCS	155258											
Arsenic			5			5.05	mg/l		101	(89.5 - 112.)	MBL	08/06/99	1112
Barium			10			9.62	mg/l		96.2	(90.7 - 111.)			
Cadmium			1			1.09	mg/l		109	(90.7 - 115.)			
Chromium			5			5.28	mg/l		106	(90.0 - 112.)			
Lead			5			5.36	mg/l		107	(89.3 - 114.)			
Manganese			2000			2100	ug/l		105	(87.9 - 112.)			
Nickel			2000			2140	ug/l		107	(91.3 - 115.)			
Selenium			1			0.932	mg/l		93.2	(87.2 - 109.)			
Silver			0.5			0.504	mg/l		101	(90.9 - 116.)			
QC630245	9907679-63MS	153902											

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ıple/Parameter	Type	Batch	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Analyst	Date	Time
luminum			46700	54000000		54000000	UGKG		n/a		MBL	08/02/99	1923
ıtimony			46700	-1270		5670	UGKG		12.1**	(70.0 - 130.)	MBL	08/02/99	1923
rsenic			46700	1610		49100	UGKG		105	(71.5 - 114.)			
ırium			46700	104000		148000	UGKG		93.5	(65.7 - 127.)			
eryllium			46700	995		48400	UGKG		102	(74.6 - 119.)			
ɔron			46700	30600000		30200000	UGKG		n/a		MBL	08/03/99	1012
ıdmium			46700	577		47400	UGKG		100	(76.0 - 118.)	MBL	08/02/99	1923
ılcium			234000	3190000		3390000	UGKG		n/a				
ıromium			46700	505000		552000	UGKG		n/a				
ɔbalt			46700	4500		51800	UGKG		101	(70.9 - 123.)			
ɔpper			46700	66600		113000	UGKG		99.6	(73.3 - 124.)			
ɔn			46700	20000000		20000000	UGKG		n/a				
ead			46700	39700		86900	UGKG		101	(70.6 - 123.)			
agnesium			46700	5140000		5130000	UGKG		n/a				
anganese			46700	304000		348000	UGKG		n/a				
olybdenum			46700	3480		45200	UGKG		89.3	(70.0 - 130.)			
ickel			46700	1520000		1550000	UGKG		n/a				
ɔtassium			234000	7540000		7470000	UGKG		n/a				
elenium			46700	394		47600	UGKG		102	(67.4 - 113.)			
licon			234000	5900000		5540000	UGKG		n/a		MBL	08/03/99	1012
lver			46700	1790		52200	UGKG		108	(75.9 - 124.)	MBL	08/02/99	1923
ɔdium			380000	95200000		92800000	UGKG		n/a		MBL	08/03/99	1012
rontium			46700	30100		75500	UGKG		97.3	(70.0 - 130.)	MBL	08/02/99	1923
ıallium			46700	-219		51400	UGKG		110	(70.7 - 117.)			
n			46700	9610		57100	UGKG		102	(70.0 - 130.)			
tanium			46700	726000		821000	UGKG		n/a				
ranium			46700	3870000		3920000	UGKG		n/a		MBL	08/03/99	1012
anadium			46700	19600		64200	UGKG		95.4	(66.8 - 130.)	MBL	08/02/99	1923
nc			46700	19800000		19700000	UGKG		n/a		MBL	08/03/99	1012
530251	9907164-01MS	153903											
rsenic			46700	697		84000	UGKG		111	(71.5 - 114.)			
eryllium			46700	47.9		81300	UGKG		108	(74.6 - 119.)			
ıdmium			46700	379		82200	UGKG		109	(76.0 - 118.)			
ıromium			46700	5030		88000	UGKG		110	(74.0 - 122.)			
ɔpper			46700	86100		157000	UGKG		94.2	(73.3 - 124.)			
ead			46700	10600		113000	UGKG		136**	(70.6 - 123.)			
ckel			46700	3940		87600	UGKG		111	(74.2 - 121.)			
lver			46700	479		76800	UGKG		101	(75.9 - 124.)			
530252	9907679-72MS	153903											
uminum			49500	52100000		59800000	UGKG		n/a		MBL	07/23/99	1139

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Sample/Parameter	Type	Batch	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Analyst	Date	Tim
Antimony			49500	2970		8340	UGKG		0.00**	(70.0 - 130.)	MBL	07/23/99	113
Arsenic			49500	2100		56200	UGKG		109	(71.5 - 114.)	MBL	07/22/99	153
Barium			49500	83300		153000	UGKG		140**	(65.7 - 127.)			
Beryllium			49500	523		47800	UGKG		95.6	(74.6 - 119.)			
Boron			49500	28400000		34400000	UGKG		n/a		MBL	07/23/99	113
Cadmium			49500	1800		48400	UGKG		94.2	(76.0 - 118.)	MBL	07/22/99	153
Calcium			248000	1370000		1810000	UGKG		n/a				
Chromium			49500	218000		311000	UGKG		n/a				
Cobalt			49500	11800		59100	UGKG		95.5	(70.9 - 123.)			
Copper			49500	49100		112000	UGKG		128**	(73.3 - 124.)			
Iron			49500	22400000		25900000	UGKG		n/a				
Lead			49500	61500		115000	UGKG		108	(70.6 - 123.)			
Magnesium			49500	4460000		5380000	UGKG		n/a				
Manganese			49500	355000		486000	UGKG		n/a				
Molybdenum			49500	3420		50600	UGKG		95.4	(70.0 - 130.)			
Nickel			49500	6420000		6740000	UGKG		n/a		MBL	07/23/99	113
Potassium			248000	5590000		7560000	UGKG		n/a		MBL	07/22/99	153
Selenium			49500	750		54600	UGKG		110	(67.4 - 113.)	MBL	07/23/99	113
Silicon			5000	3540000		2840000	UGKG		n/a				
Silver			49500	10200		66900	UGKG		115	(75.9 - 124.)	MBL	07/22/99	153
Sodium			8100	101000000		119000000	UGKG		n/a		MBL	07/23/99	113
Strontium			49500	23000		76800	UGKG		109	(70.0 - 130.)	MBL	07/22/99	153
Thallium			49500	15100		65500	UGKG		132**	(70.7 - 117.)	MBL	07/23/99	113
Tin			49500	18700		84400	UGKG		133**	(70.0 - 130.)	MBL	07/22/99	153
Titanium			49500	251000		331000	UGKG		n/a		MBL	07/23/99	113
Vanadium			49500	25800		73600	UGKG		96.5	(66.8 - 130.)	MBL	07/22/99	153
Zinc			49500	19300000		22400000	UGKG		n/a		MBL	07/23/99	113
QC631619	9907679-64MS	154250											
Arsenic			5	-0.0280		4.93	mg/l		98.5		AME	08/01/99	194
Barium			10	0.00815		9.90	mg/l		98.9				
Cadmium			1	-0.000649		1.01	mg/l		101				
Chromium			5	0.0153		4.74	mg/l		94.6				
Lead			5	-0.00776		4.92	mg/l		98.3				
Selenium			1	-0.00686		0.965	mg/l		96.5				
Silver			0.5	0.0168		0.505	mg/l		97.6				
QC632042	9907679-55MS	154346											
Arsenic			5	-0.00158		4.86	mg/l		97.2		AME	07/29/99	211
Barium			10	0.00523		9.46	mg/l		94.5				
Cadmium			1	0.000914		0.998	mg/l		99.8				
Chromium			5	0.0123		4.89	mg/l		97.4				

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nple/Parameter	Type	Batch	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Analyst	Date	Time
ead			5	0.00442		4.83	mg/l		96.7		AME	07/29/99	2112
ickel			2000	342		2320	ug/l		98.8				
elenium			1	0.00213		0.935	mg/l		93.5				
ilver			0.5	0.000170		0.473	mg/l		94.6				
634163	9907679-60MS	154873											
rsenic			5	-0.00445		5.39	mg/l		108		MBL	08/03/99	1858
arium			10	0.00698		10.1	mg/l		101				
admium			1	0.00362		1.09	mg/l		109				
hromium			5	0.00466		5.26	mg/l		105				
ead			5	0.00982		5.35	mg/l		107				
ickel			2000	309		2450	ug/l		107				
elenium			1	0.0203		1.08	mg/l		108				
ilver			0.5	-0.00166		0.515	mg/l		103				
634561	9907679-62MS	154977											
rsenic			5	0.0193		5.24	mg/l		105		MBL	08/03/99	1231
arium			10	0.00460		9.94	mg/l		99.4				
admium			1	0.00111		1.05	mg/l		105				
hromium			5	0.00370		5.07	mg/l		101				
ead			5	0.00877		5.19	mg/l		104				
ickel			2000	333		2390	ug/l		103				
elenium			1	0.0114		1.04	mg/l		104				
ilver			0.5	0.00384		0.516	mg/l		103				
635719	9907679-58MS	155258											
rsenic			5	0.0220		4.71	mg/l		94.2		MBL	08/06/99	1142
arium			10	0.00492		8.89	mg/l		88.8				
admium			1	-0.00155		0.971	mg/l		97.0				
hromium			5	0.00747		4.64	mg/l		92.6				
ead			5	0.00882		4.78	mg/l		95.6				
ickel			2000	299		2180	ug/l		94.1				
elenium			1	-0.00742		0.924	mg/l		92.4				
lver			0.5	-0.000143		0.460	mg/l		91.9				
530246	9907679-63MSD	153902											
luminum			49000	54000000		63600000	UGKG		n/a		MBL	08/02/99	1930
ntimony			49000	-1270		7110	UGKG	17.8	14.5	(0.00 - 28.4)			
rsenic			49000	1610		52700	UGKG	2.20	108	(0.00 - 16.3)			
arium			49000	104000		168000	UGKG	31.9**	129	(0.00 - 23.2)			
eryllium			49000	995		51800	UGKG	2.14	104	(0.00 - 16.5)			
oron			49000	30600000		34300000	UGKG		n/a		MBL	08/03/99	1019
admium			49000	577		50300	UGKG	1.28	101	(0.00 - 10.3)	MBL	08/02/99	1930
alcium			245000	3190000		3860000	UGKG		n/a				

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Sample/Parameter	Type	Batch	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Analyst	Date	Time
Chromium			49000	505000		641000	UGKG		n/a		MBL	08/02/99	1930
Cobalt			49000	4500		55600	UGKG	3.05	104	(0.00 - 12.4)			
Copper			49000	66600		127000	UGKG	20.9**	123	(0.00 - 17.1)			
Iron			49000	20000000		23400000	UGKG		n/a				
Lead			49000	39700		95300	UGKG	11.5	113	(0.00 - 20.3)			
Magnesium			49000	5140000		5920000	UGKG		n/a				
Manganese			49000	304000		397000	UGKG		n/a				
Molybdenum			49000	3480		49400	UGKG	4.78	93.7	(0.00 - 20.0)			
Nickel			49000	1520000		1780000	UGKG		n/a				
Potassium			245000	7540000		8050000	UGKG		n/a				
Selenium			49000	394		50300	UGKG	0.577	103	(0.00 - 17.0)			
Silicon			245000	5900000		6760000	UGKG		n/a		MBL	08/03/99	1019
Silver			49000	1790		56000	UGKG	2.39	111	(0.00 - 14.7)	MBL	08/02/99	1930
Sodium			398000	95200000		103000000	UGKG		n/a		MBL	08/03/99	1019
Strontium			49000	30100		83500	UGKG	11.4	109	(0.00 - 20.0)	MBL	08/02/99	1930
Thallium			49000	-219		53900	UGKG	0.0154	110	(0.00 - 10.0)			
Tin			49000	9610		62500	UGKG	5.90	108	(0.00 - 20.0)			
Titanium			49000	726000		985000	UGKG		n/a				
Uranium			49000	3870000		4620000	UGKG		n/a		MBL	08/03/99	1019
Vanadium			49000	19600		70700	UGKG	8.95	104	(0.00 - 20.6)	MBL	08/02/99	1930
Zinc			49000	19800000		22900000	UGKG		n/a		MBL	08/03/99	1019
QC630253	9907679-72MSD	153903											
Aluminum			49500	52100000		57900000	UGKG		n/a		MBL	07/23/99	1145
Antimony			49500	2970		8070	UGKG	0.00	0.00	(0.00 - 20.0)			
Arsenic			49500	2100		53000	UGKG	6.03	103	(0.00 - 20.0)	MBL	07/22/99	1537
Barium			49500	83300		141000	UGKG	18.1	117	(0.00 - 20.0)			
Beryllium			49500	523		45100	UGKG	5.89	90.1	(0.00 - 20.0)			
Boron			49500	28400000		32400000	UGKG		n/a		MBL	07/23/99	1145
Cadmium			49500	1800		45800	UGKG	5.88	88.8	(0.00 - 20.0)	MBL	07/22/99	1537
Calcium			248000	1370000		1730000	UGKG		n/a				
Chromium			49500	218000		288000	UGKG		n/a				
Cobalt			49500	11800		55400	UGKG	8.29	87.9	(0.00 - 20.0)			
Copper			49500	49100		102000	UGKG	17.9	107	(0.00 - 20.0)			
Iron			49500	22400000		24600000	UGKG		n/a				
Lead			49500	61500		110000	UGKG	9.26	98.7	(0.00 - 20.0)			
Magnesium			49500	4460000		4890000	UGKG		n/a				
Manganese			49500	355000		449000	UGKG		n/a				
Molybdenum			49500	3420		47800	UGKG	6.24	89.6	(0.00 - 20.0)			
Nickel			49500	6420000		6700000	UGKG		n/a		MBL	07/23/99	1145
Potassium			248000	5590000		6600000	UGKG		n/a		MBL	07/22/99	1537

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mple/Parameter	Type	Batch	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Analyst	Date	Time
elenium			49500	750		44000	UGKG	21.7**	88.8	(0.00 - 20.0)	MBL	07/23/99	1145
ilicon			0	3540000		4210000	UGKG		n/a				
ilver			49500	10200		64000	UGKG	5.26	109	(0.00 - 20.0)	MBL	07/22/99	1537
odium			0	101000000		112000000	UGKG		n/a		MBL	07/23/99	1145
trontium			49500	23000		73000	UGKG	7.39	101	(0.00 - 20.0)	MBL	07/22/99	1537
hallium			49500	15100		67900	UGKG	3.64	137	(0.00 - 20.0)	MBL	07/23/99	1145
in			49500	18700		70700	UGKG	23.3**	105	(0.00 - 20.0)	MBL	07/22/99	1537
itanium			49500	251000		340000	UGKG		n/a		MBL	07/23/99	1145
anadium			49500	25800		72400	UGKG	2.52	94.1	(0.00 - 20.0)	MBL	07/22/99	1537
inc			49500	19300000		21500000	UGKG		n/a		MBL	07/23/99	1145
631620	9907679-64MSD	154250											
rsenic			5	-0.0280		5.09	mg/l	3.35	102		AME	08/01/99	1952
arium			10	0.00815		10.3	mg/l	3.75	103				
admium			1	-0.000649		1.06	mg/l	4.33	106				
hromium			5	0.0153		4.95	mg/l	4.17	98.6				
ead			5	-0.00776		5.10	mg/l	3.69	102				
elenium			1	-0.00686		1.00	mg/l	3.71	100				
ilver			0.5	0.0168		0.521	mg/l	3.23	101				
632043	9907679-55MSD	154346											
rsenic			5	-0.00158		4.95	mg/l	1.73	98.9		AME	07/29/99	2118
arium			10	0.00523		9.57	mg/l	1.21	95.7				
admium			1	0.000914		1.03	mg/l	2.92	103				
hromium			5	0.0123		4.99	mg/l	2.18	99.6				
ead			5	0.00442		4.98	mg/l	2.89	99.5				
ickel			2000	342		2370	ug/l	2.56	101				
elenium			1	0.00213		0.948	mg/l	1.42	94.8				
ilver			0.5	0.000170		0.481	mg/l	1.68	96.2				
634164	9907679-60MSD	154873											
rsenic			5	-0.00445		5.31	mg/l	1.34	106		MBL	08/03/99	1903
arium			10	0.00698		9.97	mg/l	1.14	99.6				
admium			1	0.00362		1.07	mg/l	1.52	107				
hromium			5	0.00466		5.17	mg/l	1.68	103				
ead			5	0.00982		5.27	mg/l	1.40	105				
ickel			2000	309		2410	ug/l	1.80	105				
elenium			1	0.0203		1.07	mg/l	1.12	107				
ilver			0.5	-0.00166		0.509	mg/l	1.24	102				
634562	9907679-62MSD	154977											
rsenic			5	0.0193		5.37	mg/l	2.40	107		MBL	08/03/99	1236
arium			10	0.00460		10.1	mg/l	2.05	101				
admium			1	0.00111		1.08	mg/l	2.70	108				

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Sample/Parameter	Type	Batch	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Analyst	Date	Time
Chromium			5	0.00370		5.20	mg/l	2.47	104		MBL	08/03/99	123(
Lead			5	0.00877		5.33	mg/l	2.66	107				
Nickel			2000	333		2460	ug/l	3.33	106				
Selenium			1	0.0114		1.06	mg/l	1.30	106				
Silver			0.5	0.00384		0.529	mg/l	2.56	106				
QC635720	9907679-58MSD	155258											
Arsenic			5	0.0220		4.92	mg/l	4.36	98.3		MBL	08/06/99	1148
Barium			10	0.00492		9.21	mg/l	3.58	92.1				
Cadmium			1	-0.00155		1.00	mg/l	3.01	100				
Chromium			5	0.00747		4.81	mg/l	3.62	96.0				
Lead			5	0.00882		4.99	mg/l	4.21	99.7				
Nickel			2000	299		2270	ug/l	4.42	98.3				
Selenium			1	-0.00742		0.962	mg/l	3.94	96.1				
Silver			0.5	-0.000143		0.479	mg/l	4.17	95.8				
QC630244	9907679-63SERIAL	153902											
Aluminum				54000000		54700000	UGKG	1.25			MBL	08/02/99	1917
Antimony				-1270		-1100	UGKG	0.00					
Arsenic				1610		4750	UGKG	0.00					
Barium				104000		105000	UGKG	0.239					
Beryllium				995		881	UGKG	12.1					
Boron				30600000		36800000	UGKG	18.2			MBL	08/03/99	1006
Cadmium				577		462	UGKG	200					
Calcium				3190000		3230000	UGKG	0.996			MBL	08/02/99	1917
Chromium				505000		512000	UGKG	1.26			MBL	08/03/99	1006
Cobalt				4500		4650	UGKG	3.31					
Copper				66600		62300	UGKG	6.68			MBL	08/02/99	1917
Iron				20000000		20000000	UGKG	0.181					
Lead				39700		37200	UGKG	6.56					
Magnesium				5140000		5240000	UGKG	1.83					
Manganese				304000		306000	UGKG	0.540					
Molybdenum				3480		3900	UGKG	11.4					
Nickel				1520000		1550000	UGKG	1.91					
Potassium				7540000		7400000	UGKG	1.84					
Selenium				394		-531	UGKG	0.00					
Silicon				5900000		6560000	UGKG	10.5			MBL	08/03/99	1006
Silver				1790		1110	UGKG	200			MBL	08/02/99	1917
Sodium				95200000		122000000	UGKG	24.6			MBL	08/03/99	1006
Strontium				30100		30100	UGKG	0.0724			MBL	08/02/99	1917
Thallium				-219		-156	UGKG	0.00					
Tin				9610		11600	UGKG	200					

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nple/Parameter	Type	Batch	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Analyst	Date	Time
itanium				726000		734000	UGKG	1.14			MBL	08/02/99	1917
ranium				3870000		14300000	UGKG	115			MBL	08/03/99	1006
anadium				19600		19600	UGKG	0.0993			MBL	08/02/99	1917
inc				19800000		25200000	UGKG	24.3			MBL	08/03/99	1006
630250 9907164-01	SERIAL	153903											
rsenic				697		2330	UGKG	200					
eryllium				47.9		69.1	UGKG	200					
admium				379		255	UGKG	200					
hromium				5030		4950	UGKG	1.59					
opper				86100		79200	UGKG	8.33					
ead				10600		9510	UGKG	11.1					
ickel				3940		4080	UGKG	3.41					
ilver				479		724	UGKG	40.7					
631618 9907679-64	SERIAL	154250											
rsenic				-0.0280		-0.116	mg/l	0.00			AME	08/01/99	1941
arium				0.00815		0.0137	mg/l	200					
admium				-0.000649		-0.00415	mg/l	0.00					
hromium				0.0153		0.0214	mg/l	200					
ead				-0.00776		-0.0769	mg/l	0.00					
elenium				-0.00686		-0.0716	mg/l	0.00					
ilver				0.0168		0.0807	mg/l	131					
632041 9907679-55	SERIAL	154346											
rsenic				-0.00158		-0.0235	mg/l	0.00			AME	07/29/99	2107
arium				0.00523		0.00445	mg/l	200					
admium				0.000914		0.00139	mg/l	0.00					
hromium				0.0123		0.0187	mg/l	41.2					
ead				0.00442		0.0104	mg/l	0.00					
ickel				342		340	ug/l	0.629					
elenium				0.00213		-0.0215	mg/l	0.00					
ilver				0.000170		-0.00507	mg/l	0.00					
634162 9907679-60	SERIAL	154873											
rsenic				-0.00445		-0.111	mg/l	0.00			MBL	08/03/99	1852
arium				0.00698		0.00746	mg/l	200					
admium				0.00362		0.0137	mg/l	0.00					
hromium				0.00466		-0.00963	mg/l	0.00					
ead				0.00982		0.00926	mg/l	0.00					
ickel				309		290	ug/l	6.45					
elenium				0.0203		0.0341	mg/l	0.00					
lver				-0.00166		0.00862	mg/l	0.00					
634560 9907679-62	SERIAL	154977											

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Sample/Parameter	Type	Batch	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Analyst	Date	Time
Arsenic				0.0193		-0.0242	mg/l	0.00			MBL	08/03/99	1225
Barium				0.00460		0.00639	mg/l	0.00			MBL	08/03/99	1225
Cadmium				0.00111		0.00472	mg/l	0.00					
Chromium				0.00370		0.00116	mg/l	0.00					
Lead				0.00877		0.0655	mg/l	0.00					
Nickel				333		314	ug/l	5.89					
Selenium				0.0114		0.0208	mg/l	0.00					
Silver				0.00384		0.0236	mg/l	0.00					
QC635718 9907679-58SERIAL		155258											
Arsenic				0.0220		0.00254	mg/l	0.00			MBL	08/06/99	1137
Barium				0.00492		0.00796	mg/l	0.00					
Cadmium				-0.00155		-0.00850	mg/l	0.00					
Chromium				0.00747		-0.00990	mg/l	200					
Lead				0.00882		0.00127	mg/l	0.00					
Nickel				299		307	ug/l	2.55					
Selenium				-0.00742		-0.0239	mg/l	0.00					
Silver				-0.000143		-0.00327	mg/l	0.00					

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ple/Parameter	Type	Batch	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Analyst	Date	Time
eral Chemistry													
32333	BLANK	154418											
trogen, Nitrate						0.00	MGKG				RWS	07/16/99	1827
32337	BLANK	154420											
trogen, Nitrate						0.00	MGKG				RWS	07/16/99	1431
lfate as SO4						0.297	MGKG						
32344	BLANK	154421											
omide						0.00	MGKG				RWS	07/16/99	1827
lorides						0.132	MGKG						
uoride						0.00	MGKG						
32348	BLANK	154422											
omide						0.297	MGKG				RWS	07/16/99	1431
lorides						0.00	MGKG						
uoride						0.00	MGKG						
32328	9907679-03DUP	154418											
trogen, Nitrate				0.125		0.00	MGKG	0.00			RWS	07/16/99	2336
32330	9907679-05DUP	154418											
trogen, Nitrate				0.00		0.00	MGKG	0.00			RWS	07/17/99	0017
32334	9907679-02DUP	154420											
trogen, Nitrate				0.00		0.00	MGKG	0.00			RWS	07/16/99	2254
lfate as SO4				0.00		0.00	MGKG	0.00					
32338	9907679-03DUP	154421											
omide				0.00		0.00	MGKG	0.00			RWS	07/16/99	2336
lorides				0.00		0.00	MGKG	0.00					
uoride				0.00		0.00	MGKG	0.00					
32341	9907679-05DUP	154421											
omide				0.933		0.421	MGKG	75.6			RWS	07/17/99	0017
lorides				0.493		0.00	MGKG	200					
uoride				0.126		0.00	MGKG	0.00					
32345	9907679-02DUP	154422											
omide				0.00		0.00	MGKG	0.00			RWS	07/16/99	2254
lorides				0.507		0.00	MGKG	200					
uoride				0.233		0.109	MGKG	200					
32332	LCS	154418											
trogen, Nitrate			48.9			49.4	MGKG		101	(80.0 - 120.)	RWS	07/16/99	1841
32336	LCS	154420											
trogen, Nitrate			49			49.3	MGKG		101	(80.0 - 120.)	RWS	07/16/99	1445
lfate as SO4			196			202	MGKG		103	(80.0 - 120.)			
32343	LCS	154421											
omide			48.9			48.5	MGKG		99.3	(80.0 - 120.)	RWS	07/16/99	1841

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Sample/Parameter	Type	Batch	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Analyst	Date	Time
Chlorides			97.7			99.9	MGKG		102	(70.0 - 130.)	RWS	07/16/99	1841
Fluoride			48.9			47.5	MGKG		97.1	(80.0 - 120.)			
QC632347	LCS	154422											
Bromide		(nom_conc = 0)				50.6	MGKG				RWS	07/16/99	1445
Chlorides		(nom_conc = 0)				101	MGKG						
Fluoride		(nom_conc = 0)				48.8	MGKG						
QC632329	9907679-03MS	154418											
Nitrogen, Nitrate			47.2	0.125		47.0	MGKG		99.6	(70.0 - 130.)	RWS	07/16/99	2350
QC632331	9907679-05MS	154418											
Nitrogen, Nitrate			48.9	0.00		48.7	MGKG		99.5	(70.0 - 130.)	RWS	07/17/99	0059
QC632335	9907679-02MS	154420											
Nitrogen, Nitrate			47.7	0.00		47.4	MGKG		99.4	(67.0 - 125.)	RWS	07/16/99	2308
Sulfate as SO4			191	0.00		191	MGKG		100	(70.0 - 130.)			
QC632340	9907679-03MS	154421											
Bromide			47.2	0.00		48.9	MGKG		104	(70.0 - 130.)	RWS	07/27/99	2350
Chlorides			94.4	0.00		94.3	MGKG		99.8	(70.0 - 130.)			
Fluoride			47.2	0.00		47.4	MGKG		100	(70.0 - 130.)			
QC632342	9907679-05MS	154421											
Bromide			48.9	0.933		50.3	MGKG		101	(70.0 - 130.)	RWS	07/17/99	0059
Chlorides			97.8	0.493		98.2	MGKG		99.9	(70.0 - 130.)			
Fluoride			48.9	0.126		50.8	MGKG		104	(70.0 - 130.)			
QC632346	9907679-02MS	154422											
Bromide		(nom_conc = 0)		0.00		48.9	MGKG				RWS	07/16/99	2308
Chlorides			1	0.507		93.2	MGKG		9270**	(70.0 - 130.)			
Fluoride			1	0.233		48.5	MGKG		4830**	(70.0 - 130.)			
QC631610	BLANK	154246											
Evaporative Loss @ 105 C						0.00	wt%				GJ	07/27/99	1815
QC631608	9907679-51DUP	154246											
Evaporative Loss @ 105 C				0.00		0.00	wt%	0.00					
QC631609	9907679-27DUP	154246											
Evaporative Loss @ 105 C				0.00		0.00	wt%	0.00					
QC631008	BLANK	154102											
Phosphorus, Total as PO4						0.120	MGKG				THL	07/24/99	1144
QC631472	BLANK	154212											
Nitrogen, Ammonia						0.00	MGKG				THL	07/27/99	1236
QC631772	BLANK	154283											
Nitrogen, Ammonia						0.00	mg/kg				THL	07/27/99	1754
QC633845	BLANK	154795											
Nitrogen, Nitrate/Nitrite						0.00	MGKG				THL	07/30/99	1554
QC631010	9907679-69DUP	154102											

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: WSRC00497 Lab. Sample ID: 9907679% Report Date: August 20, 1999

ple/Parameter	Type	Batch	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Analyst	Date	Time
osphorus, Total as PO4				452		528	MGKG	15.5			THL	07/24/99	1144
31474 9907679-66DUP		154212											
trogen, Ammonia				0.200		0.00	MGKG	0.00			THL	07/27/99	1236
31770 9907679-27DUP		154283											
trogen, Ammonia				0.00		0.00	mg/kg	0.00			THL	07/27/99	1754
31774 9907679-49DUP		154283											
trogen, Ammonia				0.199		0.200	mg/kg	0.00					
33843 9907679-72DUP		154795											
trogen, Nitrate/Nitrite				0.00		0.0998	MGKG	200			THL	07/30/99	1554
31009	LCS	154102											
osphorus, Total as PO4			4			4.20	MGKG		105	(70.0 - 130.)	THL	07/24/99	1144
31473	LCS	154212											
trogen, Ammonia			10			10.7	MGKG		107	(70.0 - 130.)	THL	07/27/99	1236
31477	LCS	154213											
trogen, Total Kjeldahl			10			10.0	MGKG		100	(70.0 - 130.)	THL	07/28/99	1236
31773	LCS	154283											
trogen, Ammonia			10			11.8	mg/kg		118	(70.0 - 130.)	THL	07/27/99	1754
33846	LCS	154795											
trogen, Nitrate/Nitrite			10			10.4	MGKG		104	(70.0 - 130.)	THL	07/30/99	1554
31011 9907679-69MS		154102											
osphorus, Total as PO4			4	452		536	MGKG		n/a		THL	07/24/99	1144
31475 9907679-66MS		154212											
trogen, Ammonia			10	0.200		8.60	MGKG		85.9	(70.0 - 130.)	THL	07/27/99	1236
31771 9907679-27MS		154283											
trogen, Ammonia			9.93	0.00		8.15	mg/kg		82.0	(70.0 - 130.)	THL	07/27/99	1754
31775 9907679-49MS		154283											
trogen, Ammonia			19.8	0.199		14.9	mg/kg		75.1	(70.0 - 130.)			
33844 9907679-72MS		154795											
trogen, Nitrate/Nitrite			10	0.00		9.47	MGKG		94.7	(70.0 - 130.)	THL	07/30/99	1554

FEDERAL SAMPLE RECEIPT REVIEW

Client WSRC Received by BA Date 7/15/99

GEL COOLER___ GEL POLY COOLER___ CLIENT COOLER___ OTHER___

SAMPLE REVIEW CRITERIA	YES	NO	COMMENTS/QUALIFIERS
1. Were shipping containers received intact and sealed? If no. notify Project Manager	✓		
2. Was the Shipment screened following the radiochemistry survey procedure (EPI SOP S-007)?	✓		
Were the survey results negative? If no. notify Project Manager	✓		
Are any of the samples identified by the client as radioactive? If yes. did client provide RAD activity?	✓		
3. Were chain of custody documents included?	✓		
4. Were chain of custody documents completed correctly? (Ink. signed. match containers)	✓		
5. Were all sample containers properly labeled?	✓		
6. Were proper sample containers received?	✓		
7. Preserved samples checked for pH?	—	—	Misc
8. Were samples preserved correctly? If no. list samples & tests	—	—	
9. Shipping container temperature checked?	—	—	Ambient
10. Was shipping container temperature within specifications (4°± 2° C) If no. notify Project Manager	—	—	
11. Is temperature documented on the Chain of Custody?	—		
12. Were samples received within holding time? if No. notify Project Manger	✓		
13. Were VOA vials free of headspace?	—	—	
14. ARCOC# IF REQUIRED	—	—	
15. SDG# IF REQUIRED	✓		99,91

REVIEW [signature] DATE 7/15/99 SA - SEALS ATTACHED NSA - NO SEALS ATTACHED

Job Number	Customer Name: Pickett, John	BN	Company: General Engineering Laboratory
99191	Customer Department: FDD	Ship to:	Address: 2040 Savage Road
Contract Number AB93796N	Customer Address: 730-M		Charleston, South Carolina 29407
	Customer Phone: 5-3833 14956		Attention: Flora Ingram, Project Manager

Westinghouse Savannah River Company
Aiken, SC 29808

Environmental Monitoring Section
Environmental Geochemistry Group

Matrix Key: S=Soil, SO=Solid, SL=Sludge, O=Organic, A=Aqueous

Sample Analysis Requested	Sample ID: COMP-7	Sample ID: COMP-8	Sample ID: TCLP1	Sample ID: TCLP2	Sample ID: TCLP3	Sample ID: TCLP4
Collect Date	7/14/99	7/14/99	7/14/99	7/14/99	7/14/99	7/14/99
Collect Time	0830	0830	0830	0830	0830	0830
No. Containers	1/1L	1/1L	1/500mL	1/250mL	1/250mL	1/250mL
Matrix	Solid	Solid	S	S	S	S
Appendix IX (1) HGTOT 7471A	✓	✓				
Inductively Coupled Plasma Scan (39)	✓	✓	✓	✓	✓	✓
Total Halogens (336)	✓	✓	✓	✓	✓	✓
Ammonia/auto.phenate or electrode (205a)	✓	✓	✓	✓	✓	✓
Nitrate (as N) (237)	✓	✓	✓	✓	✓	✓
Halogenated Volatile Organics (75)		✓				
EAV Isotopes (190)						
TCLP, FULL (Prep & Analysis) (18)			✓	✓	✓	✓
Arsenic (AA,Furnace Technique) (45a)	✓	✓				
~~Mercury in Solid Waste (manual Cold-vapor tech.) (61)~~ cancelled	✓	✓				
Ion Chromatography Scan (194) (need SO4 and PO4)	✓	✓				
F001-F005 Listed Solvents (10) (Need "Freon")	✓	✓	✓	✓	✓	✓
Multiple Extraction Procedure (MEP) plus Ni (33)				✓		

50 Day TAT Note, ICP Scan to include Al, B, Be, Ca, Cu, Fe, Li, Mg, Mn, Ni, Si, Na U, Zn, and Zr

STR Authorization RS Groseclose

1 Relinquished by:	Date/Time	Received by:	2 Relinquished by:	Date/Time	Received by:
(Print) D.B. Pickett	Date 7/14/99	(Print) M Gilchrist Sr	(Print) Charles M. Day	Date 7/15/99	(Print) A VAN DOREN
(Sign)	Time 0900	(Sign)	(Sign)	Time 1238	(Sign)
3 Relinquished by:	**Date/Time**	**Received by:**	**4 Relinquished by:**	**Date/Time**	**Received by:**
(Print) A VAN DOREN	7/15/99	(Print) Ginger FRANCIS	(Print)		(Print)
(Sign)	Time	(Sign)	(Sign)	Time	(Sign)

CHAIN-OF-CUSTODY

Job Number: 99191
Contract Number: AB93796N

Customer Name: Pickett, John
Customer Department: FDD
Customer Address: 730-M
Customer Phone: 5-3833 14956

BN

Company: General Engineering Laboratory
Ship to: Address: 2040 Savage Road
Charleston, South Carolina 29407
Attention: Flora Ingram, Project Manager

Westinghouse Savannah River Company
Aiken, SC 29808

Environmental Monitoring Section
Environmental Geochemistry Group

Matrix Key: S=Soil, SO=Solid, SL=Sludge, O=Organic, A=Aqueous

Sample Analysis Requested

	Sample ID: TCLP 5	Sample ID: TCLP 6	Sample ID: TCLP 7	Sample ID: TCLP 8	Sample ID: TCLP 9	Sample ID: TCLP 10
Collect Date	7/14/99	7/14/99	7/14/99	7/14/99	7/14/99	7/14/99
Collect Time	0830	0830	0830	0830	0830	0830
No. Containers	1/250 mL	1/250 mL	1/500 mL	1/250 mL	1/250 mL	1/250 mL
Matrix	S .1	S .1	S .1	.1 S	.1 S .2	.1 S .2
Appendix IX (1)						
Inductively Coupled Plasma Scan (39)	✓	✓	✓	✓	✓	✓
Total Halogens (336)	✓	✓	✓	✓	✓	✓
Ammonia/auto.phenate or electrode (205a)	✓	✓	✓	✓	✓	✓
Nitrate (as N) (237)	✓	✓	✓	✓	✓	✓
Halogenated Volatile Organics (75)						
EAV Isotopes (190)						
TCLP, FULL (Prep & Analysis) (18)	✓	✓	✓	✓	✓	✓
Arsenic (AA,Furnace Technique) (45a)						
~~Mercury in Solid Waste (manual Cold-vapor tech.) (61)~~ cancelled						
Ion Chromatography Scan (194) (need SO4 and PO4)						
F001-F005 Listed Solvents (10) (Need "Freon")	✓	✓	✓	✓	✓	✓
ME P Plus Ni (33)				✓		

50 Day TAT Note, ICP Scan to include Al, B, Be, Ca, Cu, Fe, Li, Mg, Mn, Ni, Si, Na U, Zn, and Zr

STR Authorization RS Groseclose

1 Relinquished by:	Date/Time	Received by:	2 Relinquished by:	Date/Time	Received by:
(Print) J B Pickett	Date 7/14/99	(Print) M Gilchrist	(Print) Charles M. Day	Date 7/15/99	(Print) A VAN DOREN
(Sign)	Time 0830	(Sign)	(Sign) Charles M. Day	Time 1235	(Sign)
3 Relinquished by:	**Date/Time**	**Received by:**	**4 Relinquished by:**	**Date/Time**	**Received by:**
(Print) A VAN DOREN	7/15/99	(Print) Bonnie Frances	(Print)		(Print)
(Sign)	Time 12	(Sign) B Frances	(Sign)	Time	(Sign)

Job Number	Customer Name: Pickett, John	BN	Company: General Engineering Laboratory
99191	Customer Department: FDD	Ship to:	Address: 2040 Savage Road
Contract Number AB93796N	Customer Address: 730-M		Charleston, South Carolina 29407
	Customer Phone: 5-3833 14956		Attention: Flora Ingram, Project Manager

Westinghouse Savannah River Company
Aiken, SC 29808

Environmental Monitoring Section
Environmental Geochemistry Group

Matrix Key: S=Soil, SO=Solid, SL=Sludge, O=Organic, A=Aqueous

Sample Analysis Requested	Sample ID: TCLP 11	Sample ID: TCLP 12	Sample ID: TCLP 13	Sample ID: TCLP 14	Sample ID: TCLP 15	Sample ID: TCLP 16
Collect Date	7/14/99	7/14/99	7/14/99	7/14/99	7/14/99	7/14/99
Collect Time	0830	0830	0830	0830	0830	0830
No. Containers	1/250 AG	1/1L	1/250	1/250	1/250	1/250
Matrix	S	S	S	S	S	S
Appendix IX (1)						
Inductively Coupled Plasma Scan (39)	✓	✓	✓	✓	✓	✓
Total Halogens (336)	✓	✓	✓	✓	✓	✓
Ammonia/auto.phenate or electrode (205a)	✓	✓	✓	✓	✓	✓
Nitrate (as N) (237)	✓	✓	✓	✓	✓	✓
Halogenated Volatile Organics (75)						
EAV Isotopes (190)						
TCLP, FULL (Prep & Analysis) (18)	✓	✓	✓	✓	✓	✓
Arsenic (AA,Furnace Technique) (45a)						
~~Mercury in Solid Waste (manual Cold-vaper tech.) (61)~~ cancelled						
Ion Chromatography Scan (194) (need SO4 and PO4)						
F001-F005 Listed Solvents (10) (Need "Freon")	✓	✓	✓	✓	✓	✓
MEP + Ni (33)					✓	

50 Day TAT Note, ICP Scan to include Al, B, Be, Ca, Cu, Fe, Li, Mg, Mn, Ni, Si, Na U, Zn, and Zr

STR Authorization RS Groseclose

1 Relinquished by:	Date/Time	Received by:	2 Relinquished by:	Date/Time	Received by:
(Print) J.B. Pickett	Date 7/14/99	(Print) M.G. Ichart	(Print) Charles M. Day	Date 7/15/99	(Print) A Van Doren
(Sign) J.B. Pickett	Time 0900	(Sign) M.G. Ichart	(Sign) Charles M. Day	Time 1238	(Sign) A Van Doren
3 Relinquished by:	**Date/Time**	**Received by:**	**4 Relinquished by:**	**Date/Time**	**Received by:**
(Print) A Van Doren	7/15/99	(Print) Lonnie Francis	(Print)		(Print)
(Sign) A Van Doren	Time	(Sign) L Francis	(Sign)	Time	(Sign)

CHAIN-OF-CUSTODY

Job Number	Customer Name: Pickett, John	BN	Company: General Engineering Laboratory
99191	Customer Department: FDD	Ship to:	Address: 2040 Savage Road
Contract Number AB93796N	Customer Address: 730-M		Charleston, South Carolina 29407
	Customer Phone: 5-3833 14956		Attention: Flora Ingram, Project Manager

Westinghouse Savannah River Company
Aiken, SC 29808

Environmental Monitoring Section
Environmental Geochemistry Group

Matrix Key: S=Soil, SO=Solid, SL=Sludge, O=Organic, A=Aqueous

Sample Analysis Requested	Sample ID: Comp. 1	Sample ID: Comp. 2	Sample ID: Comp. 3	Sample ID: Comp. 4	Sample ID: Comp. 5	Sample ID: Comp-6
	Collect Date 7/14/99	Collect Date 7/14/99	Collect Date 7/14/99	Collect Date 7/14/99	Collect Date 7/14/99	Collect Date 7/14/99
	Collect Time 0830	Collect Time 0830	Collect Time 0830	Collect Time 0830	Collect Time 0830	Collect Time 0830
	No. Containers 1/2L	No. Containers 1/2L	No. Containers 1/2L	No. Containers 1/2L	No. Containers 1/2L	No. Containers 1/2L
	Matrix Solid	Matrix Solid	Matrix Solid	Matrix solid	Matrix solid	Matrix solid
Appendix IX (1)	✓	✓	✓	✓	✓	✓
Inductively Coupled Plasma Scan (39)	✓	✓	✓	✓	✓	✓
Total Halogens (336)	✓	✓	✓	✓	✓	✓
Ammonia/auto.phenate or electrode (205a)	✓	✓	✓	✓	✓	✓
Nitrate (as N) (237)	✓	✓	✓	✓	✓	✓
Halogenated Volatile Organics (75)	✓	✓	✓	✓	✓	✓
EAV Isotopes (190)		✓		✓		✓
TCLP, FULL (Prep & Analysis) (18)						
Arsenic (AA,Furnace Technique) (45a)	✓	✓	✓	✓	✓	✓
~~Mercury in Solid Waste (manual Cold-vapor tech.) (61)~~ cancelled	✓	✓	✓	✓	✓	✓
Ion Chromatography Scan (194) (need SO4 and PO4)	✓	✓	✓	✓	✓	✓
F001-F005 Listed Solvents (10) (Need "Freon")	✓	✓	✓	✓	✓	✓
Multiple Extraction Procedure (MEP) + Li (33)						

50 Day TAT Note, ICP Scan to include Al, B, Be, Ca, Cu, Fe, Li, Mg, Mn, Ni, Si, Na U, Zn, and Zr

STR Authorization RS Groseclose

1 Relinquished by:	Date/Time	Received by:	2 Relinquished by:	Date/Time	Received by:
(Print) V.B. Pickett	Date 7/14/99	(Print) W D Joyce	(Print) Charles M. Day	Date 7 15 99	(Print) A Van Doren
(Sign)	Time 0900	(Sign)	(Sign)	Time 1238	(Sign)
3 Relinquished by:	Date/Time	Received by:	4 Relinquished by:	Date/Time	Received by:
(Print) A Van Doren	7 15 99	(Print) Bionne Frances	(Print)		(Print)
(Sign)	Time	(Sign)	(Sign)	Time	(Sign)

01.01 - 1000 ml/P
L-99 20:33:13 Gustavus Chandler --> Rad Cooler
L-99 09:43:49 Frankie Davis --> Inorganic Prep
L-99 14:45:17 Amanda Miuccio --> Inorganic Prep
L-99 14:48:59 Amanda Miuccio --> Sample Receiving
L-99 15:37:55 Yolanda Jiles --> Rad Cooler
L-99 08:31:10 Hazel Bridges --> Organic Prep
L-99 08:31:58 Hazel Bridges --> Rad Cooler
L-99 09:53:28 Ruth Haselton --> Organic Prep
L-99 10:21:33 Ruth Haselton --> Sample Receiving
L-99 11:25:09 Yolanda Jiles --> Rad Cooler
L-99 09:00:17 Ruth Haselton --> Organic Prep
L-99 09:10:25 Ruth Haselton --> Sample Receiving
L-99 18:01:10 Justin Augliera --> Organic Prep
L-99 21:10:41 Helen Camello --> TRAACS lab
L-99 21:12:33 Helen Camello --> TRAACS lab
L-99 21:13:15 Helen Camello --> TRAACS lab
L-99 21:14:28 Helen Camello --> Sample Receiving
L-99 08:51:14 Gustavus Chandler --> Rad Cooler
L-99 11:03:36 Christopher Kerr --> FID lab
L-99 11:30:54 Christopher Kerr --> Rad Cooler
L-99 17:24:59 Frankie Davis --> Sample Receiving
L-99 09:29:16 Yolanda Jiles --> Rad Cooler
L-99 10:36:39 Tom Lewis --> TRAACS lab
L-99 10:42:22 Yolanda Jiles --> Rad Cooler

7 - 50 ml/P
JUL-99 09:44:06 Frankie Davis --> Inorganic Prep
JUL-99 13:10:44 Melinda Lewis --> ICP lab

9 - 60 ml/G
JUL-99 14:46:34 Amanda Miuccio --> Mercury lab
JUL-99 11:21:18 Roberta McGhee --> Mercury lab

6 - 2 ml vial
JUL-99 08:31:25 Hazel Bridges --> Organic Prep
JUL-99 09:44:50 Hazel Bridges --> Biological Cooler

9 - 2 ml vial
JUL-99 09:53:47 Ruth Haselton --> Organic Prep
JUL-99 15:30:12 Ruth Haselton --> Biological Cooler
JUL-99 15:37:34 Damon Tyree --> Semivolatiles lab

2 - 2 ml vial
JUL-99 09:09:29 Ruth Haselton --> Organic Prep
JUL-99 13:58:10 Ruth Haselton --> Biological Cooler

9 - 2 ml vial
JUL-99 18:02:02 Justin Augliera --> Organic Prep
JUL-99 18:04:45 Justin Augliera --> Biological Cooler

317654 - Other
23-JUL-99 21:10:53 Helen Camello --> TRAACS lab
27-JUL-99 12:44:25 Tom Lewis --> TRAACS lab

317662 - Other
23-JUL-99 21:12:44 Helen Camello --> TRAACS lab
28-JUL-99 08:54:59 Tom Lewis --> TRAACS lab

317670 - Other
23-JUL-99 21:13:28 Helen Camello --> TRAACS lab
24-JUL-99 10:32:20 Tom Lewis --> TRAACS lab

319327 - Other
30-JUL-99 10:37:06 Tom Lewis --> TRAACS lab

9907679-02.01 - 1000 ml/P
20-JUL-99 20:33:13 Gustavus Chandler --> Rad Cooler
21-JUL-99 09:43:49 Frankie Davis --> Inorganic Prep
21-JUL-99 14:45:17 Amanda Miuccio --> Inorganic Prep
21-JUL-99 14:48:59 Amanda Miuccio --> Sample Receiving
21-JUL-99 15:37:54 Yolanda Jiles --> Rad Cooler
22-JUL-99 08:31:10 Hazel Bridges --> Organic Prep
22-JUL-99 08:31:58 Hazel Bridges --> Rad Cooler
22-JUL-99 09:53:28 Ruth Haselton --> Organic Prep
22-JUL-99 10:21:33 Ruth Haselton --> Sample Receiving
22-JUL-99 11:25:09 Yolanda Jiles --> Rad Cooler
23-JUL-99 09:00:17 Ruth Haselton --> Organic Prep
23-JUL-99 09:10:25 Ruth Haselton --> Sample Receiving
23-JUL-99 18:01:10 Justin Augliera --> Organic Prep
23-JUL-99 21:10:41 Helen Camello --> TRAACS lab
23-JUL-99 21:12:33 Helen Camello --> TRAACS lab
23-JUL-99 21:13:15 Helen Camello --> TRAACS lab
23-JUL-99 21:14:28 Helen Camello --> Sample Receiving
24-JUL-99 08:51:14 Gustavus Chandler --> Rad Cooler
26-JUL-99 11:03:35 Christopher Kerr --> FID lab
26-JUL-99 11:30:54 Christopher Kerr --> Rad Cooler
26-JUL-99 17:24:59 Frankie Davis --> Sample Receiving
27-JUL-99 09:29:16 Yolanda Jiles --> Rad Cooler
30-JUL-99 10:36:39 Tom Lewis --> TRAACS lab
30-JUL-99 10:36:39 Tom Lewis --> TRAACS lab
30-JUL-99 10:42:22 Yolanda Jiles --> Rad Cooler

316776 - 50 ml/P
21-JUL-99 09:44:06 Frankie Davis --> Inorganic Prep
22-JUL-99 13:10:44 Melinda Lewis --> ICP lab

316868 - 60 ml/G
21-JUL-99 14:46:34 Amanda Miuccio --> Mercury lab
22-JUL-99 11:21:18 Roberta McGhee --> Mercury lab

317075 - 2 ml vial
22-JUL-99 08:31:24 Hazel Bridges --> Organic Prep
23-JUL-99 09:44:50 Hazel Bridges --> Biological Cooler

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8 - 2 ml vial
JUL-99 09:53:47 Ruth Haselton --> Organic Prep
JUL-99 15:30:12 Ruth Haselton --> Biological Cooler
JUL-99 15:37:33 Damon Tyree --> Semivolatiles lab

1 - 2 ml vial
JUL-99 09:09:28 Ruth Haselton --> Organic Prep
JUL-99 13:58:10 Ruth Haselton --> Biological Cooler

8 - 2 ml vial
JUL-99 18:02:02 Justin Augliera --> Organic Prep
JUL-99 18:04:45 Justin Augliera --> Biological Cooler

3 - Other
JUL-99 21:10:53 Helen Camello --> TRAACS lab
JUL-99 12:44:25 Tom Lewis --> TRAACS lab

1 - Other
JUL-99 21:12:44 Helen Camello --> TRAACS lab
JUL-99 08:54:59 Tom Lewis --> TRAACS lab

9 - Other
JUL-99 21:13:28 Helen Camello --> TRAACS lab
JUL-99 10:32:20 Tom Lewis --> TRAACS lab

6 - Other
JUL-99 10:37:06 Tom Lewis --> TRAACS lab

-03.01 - 500 ml/P
L-99 20:33:28 Gustavus Chandler --> Rad Cooler
L-99 15:53:20 Justin Augliera --> Organic Prep
L-99 19:05:23 Yolanda Jiles --> Rad Cooler
L-99 07:29:32 Yolanda Jiles --> Inorganic Prep
L-99 12:03:34 Frankie Davis --> Inorganic Prep
L-99 17:24:59 Frankie Davis --> Sample Receiving
L-99 22:05:19 Helen Camello --> TRAACS lab
L-99 22:06:27 Helen Camello --> Sample Receiving
L-99 09:33:08 Yolanda Jiles --> Rad Cooler
L-99 18:05:55 Gini Johnson --> Solids lab
L-99 18:36:45 Gini Johnson --> Sample Receiving
L-99 20:17:40 Yolanda Jiles --> Rad Cooler
G-99 20:06:07 Patricia Dover --> Rad Login

3 - 2 ml vial
JUL-99 15:53:35 Justin Augliera --> Organic Prep
JUL-99 15:56:00 Justin Augliera --> Biological Cooler
JUL-99 17:29:12 Damon Tyree --> Semivolatiles lab
AUG-99 13:55:10 Joey Amundsen --> Semivolatiles lab

1 - 50 ml/P
JUL-99 12:03:49 Frankie Davis --> Inorganic Prep
AUG-99 13:35:41 Melinda Lewis --> ICP lab

318248 - Other
26-JUL-99 22:05:31 Helen Camello --> TRAACS lab
27-JUL-99 18:05:10 Tom Lewis --> TRAACS lab

)907679-04.01 - 500 ml/P
20-JUL-99 20:33:28 Gustavus Chandler --> Rad Cooler
21-JUL-99 12:12:43 Jianguo Li --> TCLP Prep
21-JUL-99 12:20:43 Jianguo Li --> TCLP Prep
23-JUL-99 14:52:06 Jianguo Li --> TCLP Prep
23-JUL-99 19:05:23 Yolanda Jiles --> Rad Cooler
27-JUL-99 18:06:36 Gini Johnson --> Solids lab
27-JUL-99 18:36:45 Gini Johnson --> Sample Receiving
27-JUL-99 20:17:40 Yolanda Jiles --> Rad Cooler

316842 - 1000 ml/P
21-JUL-99 12:16:19 Jianguo Li --> TCLP Prep
26-JUL-99 15:10:32 Amanda Miuccio --> Inorganic Prep
26-JUL-99 17:06:54 Aaron Dias --> Inorganic Prep
27-JUL-99 10:45:47 Roberta McGhee --> Mercury lab

318077 - 50 ml/P
26-JUL-99 15:10:53 Amanda Miuccio --> Inorganic Prep

316858 - 1000 ml/G
21-JUL-99 12:21:38 Jianguo Li --> TCLP Prep
23-JUL-99 12:54:02 Hazel Bridges --> Organic Prep
23-JUL-99 12:55:15 Hazel Bridges --> Rad Cooler
23-JUL-99 15:03:28 Ruth Haselton --> Biological Cooler
26-JUL-99 05:30:14 Hazel Bridges --> Organic Prep
26-JUL-99 05:31:36 Hazel Bridges --> Rad Cooler
26-JUL-99 13:41:30 Joan Patrick-Bottoms --> Organic Prep
26-JUL-99 13:42:19 Joan Patrick-Bottoms --> Rad Cooler
26-JUL-99 14:44:47 Hazel Bridges --> Biological Cooler
27-JUL-99 11:30:56 Hazel Bridges --> Biological Cooler
27-JUL-99 12:47:56 Tommy Dixon --> Semivolatiles lab

317509 - 1000 ml Plastic Bag
23-JUL-99 15:19:44 Jianguo Li --> TCLP Prep

)07679-05.01 - 250 ml/P
20-JUL-99 20:34:42 Gustavus Chandler --> Rad Cooler
22-JUL-99 15:53:20 Justin Augliera --> Organic Prep
23-JUL-99 19:05:23 Yolanda Jiles --> Rad Cooler
26-JUL-99 07:29:32 Yolanda Jiles --> Inorganic Prep
26-JUL-99 12:03:34 Frankie Davis --> Inorganic Prep
26-JUL-99 17:24:59 Frankie Davis --> Sample Receiving
26-JUL-99 22:05:19 Helen Camello --> TRAACS lab
26-JUL-99 22:06:27 Helen Camello --> Sample Receiving
27-JUL-99 09:32:14 Yolanda Jiles --> Rad Cooler
27-JUL-99 09:33:08 Yolanda Jiles --> Rad Cooler
27-JUL-99 18:05:55 Gini Johnson --> Solids lab
27-JUL-99 18:36:45 Gini Johnson --> Sample Receiving
12-AUG-99 20:06:07 Patricia Dover --> Rad Login

07679%

Printed: 08/20/99 11:51

! - 2 ml vial
UL-99 15:53:35 Justin Augliera --> Organic Prep
UL-99 15:56:00 Justin Augliera --> Biological Cooler
UL-99 17:29:12 Damon Tyree --> Semivolatiles lab
UG-99 13:55:11 Joey Amundsen --> Semivolatiles lab

) - 50 ml/P
UL-99 12:03:49 Frankie Davis --> Inorganic Prep
UG-99 13:35:42 Melinda Lewis --> ICP lab

' - Other
UL-99 22:05:31 Helen Camello --> TRAACS lab
UL-99 18:05:10 Tom Lewis --> TRAACS lab

06.01 - 250 ml/P
-99 12:15:19 Yolanda Jiles --> Rad Cooler
-99 12:16:00 Jianguo Li --> TCLP Prep
-99 12:20:43 Jianguo Li --> TCLP Prep
-99 14:52:06 Jianguo Li --> TCLP Prep
-99 19:05:23 Yolanda Jiles --> Rad Cooler
-99 18:06:36 Gini Johnson --> Solids lab
-99 18:36:45 Gini Johnson --> Sample Receiving

L - 1000 ml/P
UL-99 12:16:19 Jianguo Li --> TCLP Prep
UL-99 15:10:32 Amanda Miuccio --> Inorganic Prep
UL-99 17:06:54 Aaron Dias --> Inorganic Prep
UL-99 10:45:47 Roberta McGhee --> Mercury lab

)79 - 50 ml/P
-JUL-99 15:10:59 Amanda Miuccio --> Inorganic Prep

' - 1000 ml/G
UL-99 12:21:37 Jianguo Li --> TCLP Prep
UL-99 12:54:02 Hazel Bridges --> Organic Prep
UL-99 12:55:15 Hazel Bridges --> Rad Cooler
UL-99 15:03:28 Ruth Haselton --> Biological Cooler
UL-99 05:30:14 Hazel Bridges --> Organic Prep
UL-99 05:31:36 Hazel Bridges --> Rad Cooler
UL-99 13:41:30 Joan Patrick-Bottoms --> Organic Prep
UL-99 13:42:19 Joan Patrick-Bottoms --> Rad Cooler
UL-99 14:44:48 Hazel Bridges --> Biological Cooler
UL-99 11:30:56 Hazel Bridges --> Biological Cooler
UL-99 12:47:56 Tommy Dixon --> Semivolatiles lab

1 - 1000 ml Plastic Bag
UL-99 15:19:44 Jianguo Li --> TCLP Prep

07.01 - 250 ml/P
-99 20:34:42 Gustavus Chandler --> Rad Cooler
-99 12:17:10 Jianguo Li --> TCLP Prep
-99 19:05:23 Yolanda Jiles --> Rad Cooler
-99 18:06:36 Gini Johnson --> Solids lab
-99 18:36:45 Gini Johnson --> Sample Receiving
-99 20:06:08 Patricia Dover --> Rad Login

907679%

317125 - 1000 ml/P
22-JUL-99 11:29:52 Jianguo Li --> TCLP Prep

907679-08.01 - 1000 ml/P
26-JUL-99 10:20:50 Gustavus Chandler --> Rad Cooler
28-JUL-99 16:55:39 Amanda Miuccio --> Inorganic Prep
28-JUL-99 17:07:21 Aaron Dias --> Inorganic Prep

318909 - 50 ml/P
28-JUL-99 16:56:04 Amanda Miuccio --> Inorganic Prep

318910 - 50 ml/P
28-JUL-99 16:56:18 Amanda Miuccio --> Inorganic Prep
29-JUL-99 17:24:41 Allison Evans --> ICP lab

318937 - 60 ml/G
28-JUL-99 17:07:33 Aaron Dias --> Inorganic Prep
29-JUL-99 16:53:31 Rose Jenkins --> Mercury lab

907679-09.01 - 1000 ml/P
26-JUL-99 10:20:50 Gustavus Chandler --> Rad Cooler
28-JUL-99 16:55:39 Amanda Miuccio --> Inorganic Prep
28-JUL-99 17:07:21 Aaron Dias --> Inorganic Prep

318908 - 50 ml/P
28-JUL-99 16:56:03 Amanda Miuccio --> Inorganic Prep

318911 - 50 ml/P
28-JUL-99 16:56:24 Amanda Miuccio --> Inorganic Prep
29-JUL-99 17:24:41 Allison Evans --> ICP lab

318936 - 60 ml/G
28-JUL-99 17:07:33 Aaron Dias --> Inorganic Prep
29-JUL-99 16:53:31 Rose Jenkins --> Mercury lab

907679-10.01 - 1000 ml/P
27-JUL-99 14:20:08 Patricia Dover --> Rad Cooler
28-JUL-99 16:55:40 Amanda Miuccio --> Inorganic Prep
28-JUL-99 17:07:21 Aaron Dias --> Inorganic Prep

318907 - 50 ml/P
28-JUL-99 16:56:03 Amanda Miuccio --> Inorganic Prep

318912 - 50 ml/P
28-JUL-99 16:56:34 Amanda Miuccio --> Inorganic Prep
29-JUL-99 17:24:41 Allison Evans --> ICP lab

318935 - 60 ml/G
28-JUL-99 17:07:33 Aaron Dias --> Inorganic Prep
29-JUL-99 16:53:31 Rose Jenkins --> Mercury lab

Internal Chain Of Custody
Audit Trail by Container

907679% Printed: 08/20/99 11:51

-11.01 - 1000 ml/P
JL-99 14:20:08 Patricia Dover --> Rad Cooler
JL-99 16:55:40 Amanda Miuccio --> Inorganic Prep
JL-99 17:07:21 Aaron Dias --> Inorganic Prep

)6 - 50 ml/P
-JUL-99 16:56:03 Amanda Miuccio --> Inorganic Prep

.3 - 50 ml/P
-JUL-99 16:56:41 Amanda Miuccio --> Inorganic Prep
-JUL-99 17:24:41 Allison Evans --> ICP lab

)4 - 60 ml/G
-JUL-99 17:07:33 Aaron Dias --> Inorganic Prep
-JUL-99 16:53:31 Rose Jenkins --> Mercury lab

)-12.01 - 1000 ml/P
JL-99 18:52:43 Gustavus Chandler --> Rad Cooler
JG-99 16:24:19 Amanda Miuccio --> Inorganic Prep
JG-99 19:05:35 Aaron Dias --> Inorganic Prep

)7 - 50 ml/P
-AUG-99 16:24:31 Amanda Miuccio --> Inorganic Prep
-AUG-99 10:22:06 Melinda Lewis --> ICP lab

)8 - 50 ml/P
-AUG-99 16:34:41 Amanda Miuccio --> Inorganic Prep

)3 - 60 ml/G
-AUG-99 19:06:06 Aaron Dias --> Inorganic Prep
-AUG-99 11:14:48 Rose Jenkins --> Mercury lab

)-13.01 - 1000 ml/P
JL-99 10:56:22 Yolanda Jiles --> Rad Cooler
JL-99 16:48:21 Aaron Dias --> Inorganic Prep
JG-99 09:06:20 Amanda Miuccio --> Inorganic Prep

)3 - 60 ml/G
-JUL-99 16:48:40 Aaron Dias --> Inorganic Prep
-AUG-99 09:44:56 Rose Jenkins --> Mercury lab

'3 - 50 ml/P
-AUG-99 09:06:33 Amanda Miuccio --> Inorganic Prep

'6 - 50 ml/P
-AUG-99 09:07:58 Amanda Miuccio --> Inorganic Prep
-AUG-99 16:24:21 Melinda Lewis --> ICP lab

-14.01 - 1000 ml/P
'L-99 15:17:27 Yolanda Jiles --> Rad Cooler
'L-99 16:48:21 Aaron Dias --> Inorganic Prep
'G-99 09:06:20 Amanda Miuccio --> Inorganic Prep

Internal Chain Of Custody
Audit Trail by Container

)907679% Printed: 08/20/99 11:51

319532 - 60 ml/G
30-JUL-99 16:48:40 Aaron Dias --> Inorganic Prep
02-AUG-99 09:44:56 Rose Jenkins --> Mercury lab

319672 - 50 ml/P
02-AUG-99 09:06:32 Amanda Miuccio --> Inorganic Prep

319677 - 50 ml/P
02-AUG-99 09:08:01 Amanda Miuccio --> Inorganic Prep
03-AUG-99 16:24:21 Melinda Lewis --> ICP lab

)907679-15.01 - 1000 ml/P
02-AUG-99 09:01:40 Login Trainee --> Rad Cooler
02-AUG-99 10:41:07 Amanda Miuccio --> Inorganic Prep
02-AUG-99 17:20:21 Aaron Dias --> Inorganic Prep

319729 - 50 ml/P
02-AUG-99 10:41:22 Amanda Miuccio --> Inorganic Prep

319730 - 50 ml/P
02-AUG-99 10:43:17 Amanda Miuccio --> Inorganic Prep
03-AUG-99 10:10:32 Melinda Lewis --> ICP lab

319823 - 60 ml/G
02-AUG-99 17:20:47 Aaron Dias --> Inorganic Prep
03-AUG-99 09:45:26 Rose Jenkins --> Mercury lab

907679-16.01 - 1000 ml/P
02-AUG-99 09:01:40 Login Trainee --> Rad Cooler
02-AUG-99 10:41:08 Amanda Miuccio --> Inorganic Prep
02-AUG-99 17:20:21 Aaron Dias --> Inorganic Prep

319728 - 50 ml/P
02-AUG-99 10:41:22 Amanda Miuccio --> Inorganic Prep

319731 - 50 ml/P
02-AUG-99 10:43:21 Amanda Miuccio --> Inorganic Prep
03-AUG-99 10:10:32 Melinda Lewis --> ICP lab

319822 - 60 ml/G
02-AUG-99 17:20:47 Aaron Dias --> Inorganic Prep
03-AUG-99 09:45:26 Rose Jenkins --> Mercury lab

907679-17.01 - 250 ml/P
20-JUL-99 20:34:42 Gustavus Chandler --> Rad Cooler
22-JUL-99 15:53:20 Justin Augliera --> Organic Prep
23-JUL-99 19:05:22 Yolanda Jiles --> Rad Cooler
26-JUL-99 07:29:32 Yolanda Jiles --> Inorganic Prep
26-JUL-99 12:03:34 Frankie Davis --> Inorganic Prep
26-JUL-99 17:24:59 Frankie Davis --> Sample Receiving
26-JUL-99 22:05:19 Helen Camello --> TRAACS lab
26-JUL-99 22:06:27 Helen Camello --> Sample Receiving
27-JUL-99 09:33:08 Yolanda Jiles --> Rad Cooler
27-JUL-99 18:05:55 Gini Johnson --> Solids lab
27-JUL-99 18:36:45 Gini Johnson --> Sample Receiving
27-JUL-99 20:17:40 Yolanda Jiles --> Rad Cooler
12-AUG-99 20:06:07 Patricia Dover --> Rad Login

- 2 ml vial
JUL-99 15:53:35 Justin Augliera --> Organic Prep
JUL-99 15:56:00 Justin Augliera --> Biological Cooler
JUL-99 17:29:12 Damon Tyree --> Semivolatiles lab
AUG-99 13:55:11 Joey Amundsen --> Semivolatiles lab

) - 50 ml/P
JUL-99 12:03:48 Frankie Davis --> Inorganic Prep
AUG-99 13:35:42 Melinda Lewis --> ICP lab

5 - Other
JUL-99 22:05:31 Helen Camello --> TRAACS lab
JUL-99 18:05:10 Tom Lewis --> TRAACS lab

-18.01 - 250 ml/P
L-99 20:34:42 Gustavus Chandler --> Rad Cooler
L-99 12:12:43 Jianguo Li --> TCLP Prep
L-99 12:20:43 Jianguo Li --> TCLP Prep
L-99 14:52:06 Jianguo Li --> TCLP Prep
L-99 19:05:22 Yolanda Jiles --> Rad Cooler
L-99 18:06:36 Gini Johnson --> Solids lab
L-99 18:36:45 Gini Johnson --> Sample Receiving
L-99 20:17:40 Yolanda Jiles --> Rad Cooler
3-99 20:06:07 Patricia Dover --> Rad Login

) - 1000 ml/P
JUL-99 12:16:18 Jianguo Li --> TCLP Prep
JUL-99 15:10:32 Amanda Miuccio --> Inorganic Prep
JUL-99 17:06:54 Aaron Dias --> Inorganic Prep
JUL-99 10:45:47 Roberta McGhee --> Mercury lab

)80 - 50 ml/P
5-JUL-99 15:11:07 Amanda Miuccio --> Inorganic Prep

5 - 1000 ml/G
JUL-99 12:21:37 Jianguo Li --> TCLP Prep
JUL-99 12:54:02 Hazel Bridges --> Organic Prep
JUL-99 12:55:15 Hazel Bridges --> Rad Cooler
JUL-99 15:03:28 Ruth Haselton --> Biological Cooler
JUL-99 05:30:14 Hazel Bridges --> Organic Prep
JUL-99 05:31:36 Hazel Bridges --> Rad Cooler
JUL-99 13:41:30 Joan Patrick-Bottoms --> Organic Prep
JUL-99 13:42:19 Joan Patrick-Bottoms --> Rad Cooler
JUL-99 14:44:48 Hazel Bridges --> Biological Cooler
JUL-99 11:30:56 Hazel Bridges --> Biological Cooler
JUL-99 12:47:56 Tommy Dixon --> Semivolatiles lab

7 - 1000 ml Plastic Bag
JUL-99 15:19:44 Jianguo Li --> TCLP Prep

-19.01 - 250 ml/P
L-99 20:34:42 Gustavus Chandler --> Rad Cooler
L-99 15:53:20 Justin Augliera --> Organic Prep
L-99 07:29:32 Yolanda Jiles --> Inorganic Prep
L-99 12:03:34 Frankie Davis --> Inorganic Prep
L-99 17:22:58 Frankie Davis --> Sample Receiving
L-99 22:05:19 Helen Camello --> TRAACS lab
L-99 22:06:27 Helen Camello --> Sample Receiving
L-99 09:32:14 Yolanda Jiles --> Rad Cooler

27-JUL-99 18:05:55	Gini Johnson	--> Solids lab
27-JUL-99 18:36:45	Gini Johnson	--> Sample Receiving
27-JUL-99 20:17:40	Yolanda Jiles	--> Rad Cooler
12-AUG-99 20:06:07	Patricia Dover	--> Rad Login

- 2 ml vial

JUL-99 15:53:34	Justin Augliera	--> Organic Prep
JUL-99 15:56:00	Justin Augliera	--> Biological Cooler
JUL-99 17:29:12	Damon Tyree	--> Semivolatiles lab
AUG-99 13:55:11	Joey Amundsen	--> Semivolatiles lab

8 - 50 ml/P

JUL-99 12:03:48	Frankie Davis	--> Inorganic Prep
AUG-99 13:35:42	Melinda Lewis	--> ICP lab

5 - Other

JUL-99 22:05:31	Helen Camello	--> TRAACS lab
JUL-99 18:05:10	Tom Lewis	--> TRAACS lab

-20.01 - 250 ml/P

L-99 20:34:42	Gustavus Chandler	--> Rad Cooler
L-99 12:12:43	Jianguo Li	--> TCLP Prep
L-99 12:20:43	Jianguo Li	--> TCLP Prep
L-99 16:45:12	Jianguo Li	--> TCLP Prep
L-99 19:00:04	Jianguo Li	--> Sample Receiving
L-99 09:32:14	Yolanda Jiles	--> Rad Cooler
L-99 18:06:36	Gini Johnson	--> Solids lab
L-99 18:36:45	Gini Johnson	--> Sample Receiving
L-99 20:17:40	Yolanda Jiles	--> Rad Cooler
G-99 20:06:07	Patricia Dover	--> Rad Login

9 - 1000 ml/P

JUL-99 12:16:18	Jianguo Li	--> TCLP Prep
JUL-99 15:10:32	Amanda Miuccio	--> Inorganic Prep
JUL-99 17:06:54	Aaron Dias	--> Inorganic Prep
JUL-99 10:45:47	Roberta McGhee	--> Mercury lab

)81 - 50 ml/P

5-JUL-99 15:11:10	Amanda Miuccio	--> Inorganic Prep

5 - 1000 ml/G

JUL-99 12:21:37	Jianguo Li	--> TCLP Prep
JUL-99 12:54:02	Hazel Bridges	--> Organic Prep
JUL-99 12:55:15	Hazel Bridges	--> Rad Cooler
JUL-99 15:03:28	Ruth Haselton	--> Biological Cooler
JUL-99 05:30:14	Hazel Bridges	--> Organic Prep
JUL-99 05:31:36	Hazel Bridges	--> Rad Cooler
JUL-99 13:41:30	Joan Patrick-Bottoms	--> Organic Prep
JUL-99 13:42:19	Joan Patrick-Bottoms	--> Rad Cooler
JUL-99 14:44:48	Hazel Bridges	--> Biological Cooler
JUL-99 11:30:56	Hazel Bridges	--> Biological Cooler
JUL-99 12:47:56	Tommy Dixon	--> Semivolatiles lab

- 1000 ml Plastic Bag

JUL-99 16:45:30	Jianguo Li	--> TCLP Prep

907679-21.01 - 250 ml/P

20-JUL-99 20:34:42	Gustavus Chandler	--> Rad Cooler
22-JUL-99 15:53:20	Justin Augliera	--> Organic Prep
26-JUL-99 07:29:32	Yolanda Jiles	--> Inorganic Prep
26-JUL-99 12:03:34	Frankie Davis	--> Inorganic Prep
26-JUL-99 17:22:58	Frankie Davis	--> Sample Receiving
26-JUL-99 18:47:42	Sandra Mason	--> VOA/MS lab
26-JUL-99 22:05:19	Helen Camello	--> TRAACS lab
26-JUL-99 22:06:27	Helen Camello	--> Sample Receiving
27-JUL-99 09:32:14	Yolanda Jiles	--> Rad Cooler
27-JUL-99 09:33:08	Yolanda Jiles	--> Rad Cooler
27-JUL-99 18:05:55	Gini Johnson	--> Solids lab
27-JUL-99 18:05:55	Gini Johnson	--> Solids lab
27-JUL-99 18:36:45	Gini Johnson	--> Sample Receiving
27-JUL-99 20:17:40	Yolanda Jiles	--> Rad Cooler
12-AUG-99 20:06:07	Patricia Dover	--> Rad Login

317259 - 2 ml vial

22-JUL-99 15:53:34	Justin Augliera	--> Organic Prep
22-JUL-99 15:56:00	Justin Augliera	--> Biological Cooler
28-JUL-99 17:29:12	Damon Tyree	--> Semivolatiles lab
04-AUG-99 13:55:11	Joey Amundsen	--> Semivolatiles lab

317997 - 50 ml/P

26-JUL-99 12:03:48	Frankie Davis	--> Inorganic Prep
02-AUG-99 13:35:42	Melinda Lewis	--> ICP lab

318244 - Other

26-JUL-99 22:05:31	Helen Camello	--> TRAACS lab
27-JUL-99 18:05:10	Tom Lewis	--> TRAACS lab

907679-22.01 - 250 ml/P

20-JUL-99 20:34:42	Gustavus Chandler	--> Rad Cooler
21-JUL-99 12:12:43	Jianguo Li	--> TCLP Prep
21-JUL-99 12:20:43	Jianguo Li	--> TCLP Prep
26-JUL-99 16:45:12	Jianguo Li	--> TCLP Prep
26-JUL-99 19:00:05	Jianguo Li	--> Sample Receiving
27-JUL-99 09:32:14	Yolanda Jiles	--> Rad Cooler
27-JUL-99 09:33:08	Yolanda Jiles	--> Rad Cooler
27-JUL-99 18:06:36	Gini Johnson	--> Solids lab
27-JUL-99 18:36:45	Gini Johnson	--> Sample Receiving
27-JUL-99 20:17:40	Yolanda Jiles	--> Rad Cooler
12-AUG-99 20:06:07	Patricia Dover	--> Rad Login

316838 - 1000 ml/P

21-JUL-99 12:16:18	Jianguo Li	--> TCLP Prep
26-JUL-99 15:10:32	Amanda Miuccio	--> Inorganic Prep
26-JUL-99 17:06:54	Aaron Dias	--> Inorganic Prep
27-JUL-99 10:45:47	Roberta McGhee	--> Mercury lab

318082 - 50 ml/P

26-JUL-99 15:11:19	Amanda Miuccio	--> Inorganic Prep

- 1000 ml/G

JUL-99 12:21:36	Jianguo Li	--> TCLP Prep
JUL-99 12:54:02	Hazel Bridges	--> Organic Prep
JUL-99 12:55:15	Hazel Bridges	--> Rad Cooler
JUL-99 15:03:28	Ruth Haselton	--> Biological Cooler
JUL-99 05:30:14	Hazel Bridges	--> Organic Prep
JUL-99 05:31:36	Hazel Bridges	--> Rad Cooler
JUL-99 13:41:30	Joan Patrick-Bottoms	--> Organic Prep
JUL-99 13:42:19	Joan Patrick-Bottoms	--> Rad Cooler
JUL-99 14:44:48	Hazel Bridges	--> Biological Cooler
JUL-99 11:30:56	Hazel Bridges	--> Biological Cooler
JUL-99 12:47:56	Tommy Dixon	--> Semivolatiles lab

5 - 1000 ml Plastic Bag

JUL-99 16:45:30	Jianguo Li	--> TCLP Prep

-23.01 - 250 ml/P

L-99 20:34:42	Gustavus Chandler	--> Rad Cooler
L-99 15:53:20	Justin Augliera	--> Organic Prep
L-99 07:29:32	Yolanda Jiles	--> Inorganic Prep
L-99 12:03:34	Frankie Davis	--> Inorganic Prep
L-99 17:22:58	Frankie Davis	--> Sample Receiving
L-99 18:49:03	Sandra Mason	--> VOA/MS lab
L-99 22:05:19	Helen Camello	--> TRAACS lab
L-99 22:06:27	Helen Camello	--> Sample Receiving
L-99 09:32:14	Yolanda Jiles	--> Rad Cooler
L-99 09:33:08	Yolanda Jiles	--> Rad Cooler
L-99 18:05:55	Gini Johnson	--> Solids lab
L-99 18:36:45	Gini Johnson	--> Sample Receiving
L-99 20:17:39	Yolanda Jiles	--> Rad Cooler
G-99 20:06:07	Patricia Dover	--> Rad Login

8 - 2 ml vial

JUL-99 15:53:34	Justin Augliera	--> Organic Prep
JUL-99 15:56:00	Justin Augliera	--> Biological Cooler
JUL-99 17:29:12	Damon Tyree	--> Semivolatiles lab
AUG-99 13:55:11	Joey Amundsen	--> Semivolatiles lab

6 - 50 ml/P

JUL-99 12:03:48	Frankie Davis	--> Inorganic Prep
AUG-99 13:35:42	Melinda Lewis	--> ICP lab

3 - Other

JUL-99 22:05:30	Helen Camello	--> TRAACS lab
JUL-99 18:05:10	Tom Lewis	--> TRAACS lab

-24.01 - 250 ml/P

L-99 20:34:42	Gustavus Chandler	--> Rad Cooler
L-99 12:12:43	Jianguo Li	--> TCLP Prep
L-99 12:20:43	Jianguo Li	--> TCLP Prep
L-99 16:45:12	Jianguo Li	--> TCLP Prep
L-99 19:00:05	Jianguo Li	--> Sample Receiving
L-99 09:32:14	Yolanda Jiles	--> Rad Cooler
L-99 09:33:08	Yolanda Jiles	--> Rad Cooler
L-99 18:06:36	Gini Johnson	--> Solids lab
L-99 18:36:45	Gini Johnson	--> Sample Receiving
L-99 20:17:40	Yolanda Jiles	--> Rad Cooler

316837 - 1000 ml/P

21-JUL-99 12:16:18	Jianguo Li	--> TCLP Prep
26-JUL-99 15:10:32	Amanda Miuccio	--> Inorganic Prep
26-JUL-99 17:06:54	Aaron Dias	--> Inorganic Prep
27-JUL-99 10:45:47	Roberta McGhee	--> Mercury lab

318083 - 50 ml/P

26-JUL-99 15:11:25	Amanda Miuccio	--> Inorganic Prep

316853 - 1000 ml/G

21-JUL-99 12:21:36	Jianguo Li	--> TCLP Prep
23-JUL-99 12:54:02	Hazel Bridges	--> Organic Prep
23-JUL-99 12:55:15	Hazel Bridges	--> Rad Cooler
23-JUL-99 15:03:28	Ruth Haselton	--> Biological Cooler
26-JUL-99 05:30:14	Hazel Bridges	--> Organic Prep
26-JUL-99 05:31:36	Hazel Bridges	--> Rad Cooler
26-JUL-99 13:41:30	Joan Patrick-Bottoms	--> Organic Prep
26-JUL-99 13:42:19	Joan Patrick-Bottoms	--> Rad Cooler
26-JUL-99 14:44:48	Hazel Bridges	--> Biological Cooler
27-JUL-99 11:30:56	Hazel Bridges	--> Biological Cooler
27-JUL-99 12:47:56	Tommy Dixon	--> Semivolatiles lab

318114 - 1000 ml Plastic Bag

26-JUL-99 16:45:30	Jianguo Li	--> TCLP Prep

907679-25.01 - 500 ml/P

20-JUL-99 20:33:28	Gustavus Chandler	--> Rad Cooler
22-JUL-99 15:53:20	Justin Augliera	--> Organic Prep
26-JUL-99 07:29:32	Yolanda Jiles	--> Inorganic Prep
26-JUL-99 12:03:34	Frankie Davis	--> Inorganic Prep
26-JUL-99 17:22:58	Frankie Davis	--> Sample Receiving
26-JUL-99 18:47:42	Sandra Mason	--> VOA/MS lab
26-JUL-99 22:05:19	Helen Camello	--> TRAACS lab
26-JUL-99 22:06:27	Helen Camello	--> Sample Receiving
27-JUL-99 09:33:08	Yolanda Jiles	--> Rad Cooler
27-JUL-99 18:05:55	Gini Johnson	--> Solids lab
27-JUL-99 18:36:45	Gini Johnson	--> Sample Receiving
27-JUL-99 20:17:40	Yolanda Jiles	--> Rad Cooler
12-AUG-99 20:06:07	Patricia Dover	--> Rad Login

317257 - 2 ml vial

22-JUL-99 15:53:34	Justin Augliera	--> Organic Prep
22-JUL-99 15:56:00	Justin Augliera	--> Biological Cooler
28-JUL-99 17:29:12	Damon Tyree	--> Semivolatiles lab
04-AUG-99 13:55:11	Joey Amundsen	--> Semivolatiles lab

317995 - 50 ml/P

26-JUL-99 12:03:48	Frankie Davis	--> Inorganic Prep
02-AUG-99 13:35:42	Melinda Lewis	--> ICP lab

318242 - Other

26-JUL-99 22:05:30	Helen Camello	--> TRAACS lab
27-JUL-99 18:05:10	Tom Lewis	--> TRAACS lab

26.01 - 500 ml/P
L-99 20:33:28 Gustavus Chandler --> Rad Cooler
L-99 12:12:43 Jianguo Li --> TCLP Prep
L-99 12:20:43 Jianguo Li --> TCLP Prep
L-99 16:45:12 Jianguo Li --> TCLP Prep
L-99 19:00:05 Jianguo Li --> Sample Receiving
L-99 09:33:08 Yolanda Jiles --> Rad Cooler
L-99 18:06:36 Gini Johnson --> Solids lab
L-99 18:36:45 Gini Johnson --> Sample Receiving
L-99 20:17:40 Yolanda Jiles --> Rad Cooler
G-99 20:06:07 Patricia Dover --> Rad Login

6 - 1000 ml/P
JUL-99 12:16:18 Jianguo Li --> TCLP Prep
JUL-99 15:10:32 Amanda Miuccio --> Inorganic Prep
JUL-99 17:06:54 Aaron Dias --> Inorganic Prep
JUL-99 10:45:47 Roberta McGhee --> Mercury lab

084 - 50 ml/P
6-JUL-99 15:11:33 Amanda Miuccio --> Inorganic Prep

2 - 1000 ml/G
JUL-99 12:21:36 Jianguo Li --> TCLP Prep
JUL-99 12:54:02 Hazel Bridges --> Organic Prep
JUL-99 12:55:15 Hazel Bridges --> Rad Cooler
JUL-99 15:03:28 Ruth Haselton --> Biological Cooler
JUL-99 05:30:14 Hazel Bridges --> Organic Prep
JUL-99 05:31:36 Hazel Bridges --> Rad Cooler
JUL-99 13:41:30 Joan Patrick-Bottoms --> Organic Prep
JUL-99 13:42:19 Joan Patrick-Bottoms --> Rad Cooler
JUL-99 14:44:48 Hazel Bridges --> Biological Cooler
JUL-99 11:30:56 Hazel Bridges --> Biological Cooler
JUL-99 12:47:56 Tommy Dixon --> Semivolatiles lab

3 - 1000 ml Plastic Bag
JUL-99 16:45:30 Jianguo Li --> TCLP Prep

-27.01 - 250 ml/P
-99 20:34:42 Gustavus Chandler --> Rad Cooler
-99 15:53:20 Justin Augliera --> Organic Prep
-99 07:29:32 Yolanda Jiles --> Inorganic Prep
-99 12:03:34 Frankie Davis --> Inorganic Prep
-99 17:22:58 Frankie Davis --> Sample Receiving
-99 18:47:42 Sandra Mason --> VOA/MS lab
-99 22:05:19 Helen Camello --> TRAACS lab
-99 22:06:27 Helen Camello --> Sample Receiving
-99 09:33:08 Yolanda Jiles --> Rad Cooler
-99 09:33:08 Yolanda Jiles --> Rad Cooler
-99 18:05:55 Gini Johnson --> Solids lab
-99 18:36:45 Gini Johnson --> Sample Receiving
-99 20:09:06 Patricia Dover --> Rad Login

317256 - 2 ml vial
22-JUL-99 15:53:34 Justin Augliera --> Organic Prep
22-JUL-99 15:56:00 Justin Augliera --> Biological Cooler
28-JUL-99 17:29:12 Damon Tyree --> Semivolatiles lab
04-AUG-99 13:55:11 Joey Amundsen --> Semivolatiles lab

317994 - 50 ml/P
26-JUL-99 12:03:47 Frankie Davis --> Inorganic Prep
02-AUG-99 13:35:42 Melinda Lewis --> ICP lab

318241 - Other
26-JUL-99 22:05:30 Helen Camello --> TRAACS lab
27-JUL-99 18:05:10 Tom Lewis --> TRAACS lab

)907679-28.01 - 250 ml/P
20-JUL-99 20:34:42 Gustavus Chandler --> Rad Cooler
21-JUL-99 12:12:42 Jianguo Li --> TCLP Prep
21-JUL-99 12:20:43 Jianguo Li --> TCLP Prep
26-JUL-99 16:45:12 Jianguo Li --> TCLP Prep
26-JUL-99 19:00:05 Jianguo Li --> Sample Receiving
27-JUL-99 09:33:08 Yolanda Jiles --> Rad Cooler
27-JUL-99 09:33:08 Yolanda Jiles --> Rad Cooler
27-JUL-99 18:06:36 Gini Johnson --> Solids lab
27-JUL-99 18:36:45 Gini Johnson --> Sample Receiving
27-JUL-99 20:17:40 Yolanda Jiles --> Rad Cooler

316835 - 1000 ml/P
21-JUL-99 12:16:18 Jianguo Li --> TCLP Prep
26-JUL-99 15:10:32 Amanda Miuccio --> Inorganic Prep
26-JUL-99 17:06:54 Aaron Dias --> Inorganic Prep
27-JUL-99 10:45:47 Roberta McGhee --> Mercury lab

318085 - 50 ml/P
26-JUL-99 15:11:40 Amanda Miuccio --> Inorganic Prep

316851 - 1000 ml/G
21-JUL-99 12:21:36 Jianguo Li --> TCLP Prep
23-JUL-99 12:54:02 Hazel Bridges --> Organic Prep
23-JUL-99 12:55:15 Hazel Bridges --> Rad Cooler
23-JUL-99 15:03:28 Ruth Haselton --> Biological Cooler
26-JUL-99 05:30:14 Hazel Bridges --> Organic Prep
26-JUL-99 05:31:36 Hazel Bridges --> Rad Cooler
26-JUL-99 13:41:30 Joan Patrick-Bottoms --> Organic Prep
26-JUL-99 13:42:19 Joan Patrick-Bottoms --> Rad Cooler
26-JUL-99 14:44:48 Hazel Bridges --> Biological Cooler
27-JUL-99 11:30:56 Hazel Bridges --> Biological Cooler
27-JUL-99 12:47:57 Tommy Dixon --> Semivolatiles lab

318112 - 1000 ml Plastic Bag
26-JUL-99 16:45:30 Jianguo Li --> TCLP Prep

29.01 - 250 ml/P
L-99 20:34:42 Gustavus Chandler --> Rad Cooler
L-99 12:17:10 Jianguo Li --> TCLP Prep
L-99 09:33:08 Yolanda Jiles --> Rad Cooler
L-99 09:33:08 Yolanda Jiles --> Rad Cooler
L-99 18:06:36 Gini Johnson --> Solids lab
L-99 18:36:45 Gini Johnson --> Sample Receiving
L-99 20:17:40 Yolanda Jiles --> Rad Cooler
3-99 20:09:06 Patricia Dover --> Rad Login

1 - 1000 ml/P
JUL-99 11:29:51 Jianguo Li --> TCLP Prep

-30.01 - 1000 ml/P
L-99 10:20:50 Gustavus Chandler --> Rad Cooler
L-99 16:55:40 Amanda Miuccio --> Inorganic Prep
L-99 17:07:21 Aaron Dias --> Inorganic Prep

5 - 50 ml/P
JUL-99 16:56:03 Amanda Miuccio --> Inorganic Prep

1 - 50 ml/P
JUL-99 16:56:49 Amanda Miuccio --> Inorganic Prep
JUL-99 17:24:41 Allison Evans --> ICP lab

3 - 60 ml/G
JUL-99 17:07:33 Aaron Dias --> Inorganic Prep
JUL-99 16:53:31 Rose Jenkins --> Mercury lab

-31.01 - 1000 ml/P
-99 10:20:50 Gustavus Chandler --> Rad Cooler
-99 16:55:40 Amanda Miuccio --> Inorganic Prep
-99 17:07:21 Aaron Dias --> Inorganic Prep

1 - 50 ml/P
JUL-99 16:56:03 Amanda Miuccio --> Inorganic Prep

5 - 50 ml/P
JUL-99 16:57:00 Amanda Miuccio --> Inorganic Prep
JUL-99 17:24:41 Allison Evans --> ICP lab

3 - 60 ml/G
UL-99 17:07:33 Aaron Dias --> Inorganic Prep
UL-99 16:53:31 Rose Jenkins --> Mercury lab

32.01 - 1000 ml/P
-99 14:20:08 Patricia Dover --> Rad Cooler
-99 16:55:40 Amanda Miuccio --> Inorganic Prep
-99 17:07:21 Aaron Dias --> Inorganic Prep

- 50 ml/P
UL-99 16:56:02 Amanda Miuccio --> Inorganic Prep

318916 - 50 ml/P
28-JUL-99 16:57:05 Amanda Miuccio --> Inorganic Prep
29-JUL-99 17:24:41 Allison Evans --> ICP lab

318931 - 60 ml/G
28-JUL-99 17:07:32 Aaron Dias --> Inorganic Prep
29-JUL-99 16:53:31 Rose Jenkins --> Mercury lab

9907679-33.01 - 1000 ml/P
27-JUL-99 14:20:08 Patricia Dover --> Rad Cooler
28-JUL-99 16:55:40 Amanda Miuccio --> Inorganic Prep
28-JUL-99 17:07:21 Aaron Dias --> Inorganic Prep

318902 - 50 ml/P
28-JUL-99 16:56:02 Amanda Miuccio --> Inorganic Prep

318917 - 50 ml/P
28-JUL-99 16:57:16 Amanda Miuccio --> Inorganic Prep
29-JUL-99 17:24:41 Allison Evans --> ICP lab

318930 - 60 ml/G
28-JUL-99 17:07:32 Aaron Dias --> Inorganic Prep
29-JUL-99 16:53:31 Rose Jenkins --> Mercury lab

9907679-34.01 - 1000 ml/P
28-JUL-99 18:52:43 Gustavus Chandler --> Rad Cooler
05-AUG-99 16:24:19 Amanda Miuccio --> Inorganic Prep
05-AUG-99 19:05:35 Aaron Dias --> Inorganic Prep

320886 - 50 ml/P
05-AUG-99 16:24:30 Amanda Miuccio --> Inorganic Prep
06-AUG-99 10:22:06 Melinda Lewis --> ICP lab

320889 - 50 ml/P
05-AUG-99 16:34:43 Amanda Miuccio --> Inorganic Prep

320892 - 60 ml/G
05-AUG-99 19:06:06 Aaron Dias --> Inorganic Prep
06-AUG-99 11:14:48 Rose Jenkins --> Mercury lab

9907679-35.01 - 1000 ml/P
30-JUL-99 10:56:22 Yolanda Jiles --> Rad Cooler
30-JUL-99 16:48:21 Aaron Dias --> Inorganic Prep
02-AUG-99 09:06:20 Amanda Miuccio --> Inorganic Prep

319531 - 60 ml/G
30-JUL-99 16:48:39 Aaron Dias --> Inorganic Prep
02-AUG-99 09:44:56 Rose Jenkins --> Mercury lab

319671 - 50 ml/P
02-AUG-99 09:06:32 Amanda Miuccio --> Inorganic Prep

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8 - 50 ml/P
-AUG-99 09:08:03 Amanda Miuccio --> Inorganic Prep
-AUG-99 16:24:20 Melinda Lewis --> ICP lab

)-36.01 - 1000 ml/P
JL-99 15:17:27 Yolanda Jiles --> Rad Cooler
JL-99 16:48:22 Aaron Dias --> Inorganic Prep
JG-99 09:06:20 Amanda Miuccio --> Inorganic Prep

)0 - 60 ml/G
-JUL-99 16:48:39 Aaron Dias --> Inorganic Prep
-AUG-99 09:44:56 Rose Jenkins --> Mercury lab

'0 - 50 ml/P
-AUG-99 09:06:31 Amanda Miuccio --> Inorganic Prep

'9 - 50 ml/P
-AUG-99 09:08:05 Amanda Miuccio --> Inorganic Prep
-AUG-99 16:24:21 Melinda Lewis --> ICP lab

)-37.01 - 1000 ml/P
JG-99 09:01:40 Login Trainee --> Rad Cooler
JG-99 10:41:08 Amanda Miuccio --> Inorganic Prep
JG-99 17:20:21 Aaron Dias --> Inorganic Prep

7 - 50 ml/P
AUG-99 10:41:22 Amanda Miuccio --> Inorganic Prep

2 - 50 ml/P
AUG-99 10:43:25 Amanda Miuccio --> Inorganic Prep
AUG-99 10:10:32 Melinda Lewis --> ICP lab

1 - 60 ml/G
AUG-99 17:20:47 Aaron Dias --> Inorganic Prep
AUG-99 09:45:26 Rose Jenkins --> Mercury lab

-38.01 - 1000 ml/P
G-99 09:01:40 Login Trainee --> Rad Cooler
G-99 10:41:08 Amanda Miuccio --> Inorganic Prep
G-99 17:20:21 Aaron Dias --> Inorganic Prep

6 - 50 ml/P
AUG-99 10:41:21 Amanda Miuccio --> Inorganic Prep

3 - 50 ml/P
AUG-99 10:43:31 Amanda Miuccio --> Inorganic Prep
AUG-99 10:10:32 Melinda Lewis --> ICP lab

0 - 60 ml/G
AUG-99 17:20:47 Aaron Dias --> Inorganic Prep
AUG-99 09:45:26 Rose Jenkins --> Mercury lab

907679-39.01 - 250 ml/P
20-JUL-99 20:34:42 Gustavus Chandler --> Rad Cooler
22-JUL-99 15:53:20 Justin Augliera --> Organic Prep
26-JUL-99 07:29:32 Yolanda Jiles --> Inorganic Prep
26-JUL-99 12:03:34 Frankie Davis --> Inorganic Prep
26-JUL-99 17:22:58 Frankie Davis --> Sample Receiving
26-JUL-99 18:49:03 Sandra Mason --> VOA/MS lab
26-JUL-99 22:05:19 Helen Camello --> TRAACS lab
26-JUL-99 22:06:27 Helen Camello --> Sample Receiving
27-JUL-99 09:32:14 Yolanda Jiles --> Rad Cooler
27-JUL-99 18:05:55 Gini Johnson --> Solids lab
27-JUL-99 18:36:45 Gini Johnson --> Sample Receiving
27-JUL-99 18:36:45 Gini Johnson --> Sample Receiving
27-JUL-99 20:17:40 Yolanda Jiles --> Rad Cooler
12-AUG-99 20:09:06 Patricia Dover --> Rad Login

317255 - 2 ml vial
22-JUL-99 15:53:34 Justin Augliera --> Organic Prep
22-JUL-99 15:56:00 Justin Augliera --> Biological Cooler
28-JUL-99 17:29:12 Damon Tyree --> Semivolatiles lab
04-AUG-99 13:55:11 Joey Amundsen --> Semivolatiles lab

317993 - 50 ml/P
26-JUL-99 12:03:47 Frankie Davis --> Inorganic Prep
02-AUG-99 13:35:42 Melinda Lewis --> ICP lab

318240 - Other
26-JUL-99 22:05:30 Helen Camello --> TRAACS lab
27-JUL-99 18:05:10 Tom Lewis --> TRAACS lab

907679-40.01 - 250 ml/P
20-JUL-99 20:34:42 Gustavus Chandler --> Rad Cooler
21-JUL-99 12:12:43 Jianguo Li --> TCLP Prep
21-JUL-99 12:20:43 Jianguo Li --> TCLP Prep
26-JUL-99 16:45:12 Jianguo Li --> TCLP Prep
26-JUL-99 19:00:05 Jianguo Li --> Sample Receiving
27-JUL-99 18:06:36 Gini Johnson --> Solids lab
27-JUL-99 18:36:45 Gini Johnson --> Sample Receiving
27-JUL-99 18:36:45 Gini Johnson --> Sample Receiving
27-JUL-99 20:17:40 Yolanda Jiles --> Rad Cooler

316834 - 1000 ml/P
21-JUL-99 12:16:18 Jianguo Li --> TCLP Prep
26-JUL-99 15:10:32 Amanda Miuccio --> Inorganic Prep
26-JUL-99 17:06:54 Aaron Dias --> Inorganic Prep
27-JUL-99 10:45:47 Roberta McGhee --> Mercury lab

318086 - 50 ml/P
26-JUL-99 15:11:48 Amanda Miuccio --> Inorganic Prep

316850 - 1000 ml/G
21-JUL-99 12:21:35 Jianguo Li --> TCLP Prep
23-JUL-99 12:54:02 Hazel Bridges --> Organic Prep
23-JUL-99 12:55:15 Hazel Bridges --> Rad Cooler
23-JUL-99 15:03:28 Ruth Haselton --> Biological Cooler
26-JUL-99 05:30:14 Hazel Bridges --> Organic Prep
26-JUL-99 05:31:36 Hazel Bridges --> Rad Cooler
26-JUL-99 13:41:30 Joan Patrick-Bottoms --> Organic Prep
26-JUL-99 13:42:19 Joan Patrick-Bottoms --> Rad Cooler

26-JUL-99 14:44:48	Hazel Bridges	--> Biological Cooler
27-JUL-99 11:30:56	Hazel Bridges	--> Biological Cooler
27-JUL-99 12:47:57	Tommy Dixon	--> Semivolatiles lab

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318111 - 1000 ml Plastic Bag
26-JUL-99 16:45:30 Jianguo Li --> TCLP Prep

)907679-41.01 - 250 ml/P
20-JUL-99 20:34:42 Gustavus Chandler --> Rad Cooler
22-JUL-99 15:53:20 Justin Augliera --> Organic Prep
26-JUL-99 07:29:32 Yolanda Jiles --> Inorganic Prep
26-JUL-99 12:03:34 Frankie Davis --> Inorganic Prep
26-JUL-99 17:22:58 Frankie Davis --> Sample Receiving
26-JUL-99 18:47:42 Sandra Mason --> VOA/MS lab
26-JUL-99 22:05:19 Helen Camello --> TRAACS lab
26-JUL-99 22:06:27 Helen Camello --> Sample Receiving
27-JUL-99 09:33:08 Yolanda Jiles --> Rad Cooler
27-JUL-99 18:05:55 Gini Johnson --> Solids lab
27-JUL-99 18:36:45 Gini Johnson --> Sample Receiving
27-JUL-99 20:17:40 Yolanda Jiles --> Rad Cooler
12-AUG-99 20:09:06 Patricia Dover --> Rad Login

317254 - 2 ml vial
22-JUL-99 15:53:33 Justin Augliera --> Organic Prep
22-JUL-99 15:56:00 Justin Augliera --> Biological Cooler
28-JUL-99 17:29:12 Damon Tyree --> Semivolatiles lab
04-AUG-99 13:55:11 Joey Amundsen --> Semivolatiles lab

317992 - 50 ml/P
26-JUL-99 12:03:47 Frankie Davis --> Inorganic Prep
02-AUG-99 13:35:42 Melinda Lewis --> ICP lab

318239 - Other
26-JUL-99 22:05:30 Helen Camello --> TRAACS lab
27-JUL-99 18:05:10 Tom Lewis --> TRAACS lab

)907679-42.01 - 250 ml/P
20-JUL-99 20:34:42 Gustavus Chandler --> Rad Cooler
21-JUL-99 12:12:43 Jianguo Li --> TCLP Prep
21-JUL-99 12:20:43 Jianguo Li --> TCLP Prep
26-JUL-99 16:45:12 Jianguo Li --> TCLP Prep
26-JUL-99 19:00:05 Jianguo Li --> Sample Receiving
27-JUL-99 09:33:08 Yolanda Jiles --> Rad Cooler
27-JUL-99 18:06:36 Gini Johnson --> Solids lab
27-JUL-99 18:36:45 Gini Johnson --> Sample Receiving
27-JUL-99 20:17:40 Yolanda Jiles --> Rad Cooler

316833 - 1000 ml/P
21-JUL-99 12:16:17 Jianguo Li --> TCLP Prep
26-JUL-99 15:10:32 Amanda Miuccio --> Inorganic Prep
26-JUL-99 17:06:54 Aaron Dias --> Inorganic Prep
27-JUL-99 10:45:47 Roberta McGhee --> Mercury lab

318087 - 50 ml/P
26-JUL-99 15:11:56 Amanda Miuccio --> Inorganic Prep

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9 - 1000 ml/G

JUL-99 12:21:35	Jianguo Li	--> TCLP Prep
JUL-99 12:54:02	Hazel Bridges	--> Organic Prep
JUL-99 12:55:15	Hazel Bridges	--> Rad Cooler
JUL-99 15:03:28	Ruth Haselton	--> Biological Cooler
JUL-99 05:30:14	Hazel Bridges	--> Organic Prep
JUL-99 05:31:36	Hazel Bridges	--> Rad Cooler
JUL-99 13:41:29	Joan Patrick-Bottoms	--> Organic Prep
JUL-99 13:42:19	Joan Patrick-Bottoms	--> Rad Cooler
JUL-99 14:44:48	Hazel Bridges	--> Biological Cooler
JUL-99 11:30:56	Hazel Bridges	--> Biological Cooler
JUL-99 12:47:57	Tommy Dixon	--> Semivolatiles lab

0 - 1000 ml Plastic Bag

JUL-99 16:45:29	Jianguo Li	--> TCLP Prep

-43.01 - 250 ml/P

L-99 20:34:42	Gustavus Chandler	--> Rad Cooler
L-99 15:53:20	Justin Augliera	--> Organic Prep
L-99 07:29:32	Yolanda Jiles	--> Inorganic Prep
L-99 12:03:34	Frankie Davis	--> Inorganic Prep
L-99 17:22:57	Frankie Davis	--> Sample Receiving
L-99 18:49:03	Sandra Mason	--> VOA/MS lab
L-99 22:05:19	Helen Camello	--> TRAACS lab
L-99 22:06:27	Helen Camello	--> Sample Receiving
L-99 09:33:08	Yolanda Jiles	--> Rad Cooler
L-99 18:05:55	Gini Johnson	--> Solids lab
L-99 18:36:45	Gini Johnson	--> Sample Receiving
L-99 20:17:40	Yolanda Jiles	--> Rad Cooler
G-99 20:09:06	Patricia Dover	--> Rad Login

3 - 2 ml vial

JUL-99 15:53:33	Justin Augliera	--> Organic Prep
JUL-99 15:56:00	Justin Augliera	--> Biological Cooler
JUL-99 17:29:12	Damon Tyree	--> Semivolatiles lab
AUG-99 13:55:11	Joey Amundsen	--> Semivolatiles lab

1 - 50 ml/P

JUL-99 12:03:47	Frankie Davis	--> Inorganic Prep
AUG-99 13:35:42	Melinda Lewis	--> ICP lab

8 - Other

JUL-99 22:05:30	Helen Camello	--> TRAACS lab
JUL-99 18:05:10	Tom Lewis	--> TRAACS lab

-44.01 - 250 ml/P

L-99 20:34:42	Gustavus Chandler	--> Rad Cooler
L-99 12:12:43	Jianguo Li	--> TCLP Prep
L-99 12:20:43	Jianguo Li	--> TCLP Prep
L-99 16:45:12	Jianguo Li	--> TCLP Prep
L-99 19:00:05	Jianguo Li	--> Sample Receiving
L-99 09:33:08	Yolanda Jiles	--> Rad Cooler
L-99 18:06:36	Gini Johnson	--> Solids lab
L-99 18:36:45	Gini Johnson	--> Sample Receiving
L-99 20:17:40	Yolanda Jiles	--> Rad Cooler

Internal Chain Of Custody
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316832 - 1000 ml/P
21-JUL-99 12:16:17 Jianguo Li --> TCLP Prep
26-JUL-99 15:10:32 Amanda Miuccio --> Inorganic Prep
26-JUL-99 17:06:54 Aaron Dias --> Inorganic Prep
27-JUL-99 10:45:47 Roberta McGhee --> Mercury lab

318093 - 50 ml/P
26-JUL-99 15:14:48 Amanda Miuccio --> Inorganic Prep

316848 - 1000 ml/G
21-JUL-99 12:21:35 Jianguo Li --> TCLP Prep
23-JUL-99 12:54:02 Hazel Bridges --> Organic Prep
23-JUL-99 12:55:15 Hazel Bridges --> Rad Cooler
23-JUL-99 15:03:28 Ruth Haselton --> Biological Cooler
26-JUL-99 05:30:14 Hazel Bridges --> Organic Prep
26-JUL-99 05:31:36 Hazel Bridges --> Rad Cooler
26-JUL-99 13:41:30 Joan Patrick-Bottoms --> Organic Prep
26-JUL-99 13:42:19 Joan Patrick-Bottoms --> Rad Cooler
26-JUL-99 14:44:48 Hazel Bridges --> Biological Cooler
27-JUL-99 11:30:56 Hazel Bridges --> Biological Cooler
27-JUL-99 12:47:57 Tommy Dixon --> Semivolatiles lab

318109 - 1000 ml Plastic Bag
26-JUL-99 16:45:29 Jianguo Li --> TCLP Prep

907679-45.01 - 1000 ml/P
20-JUL-99 20:33:13 Gustavus Chandler --> Rad Cooler
22-JUL-99 15:53:20 Justin Augliera --> Organic Prep
26-JUL-99 07:29:32 Yolanda Jiles --> Inorganic Prep
26-JUL-99 12:03:34 Frankie Davis --> Inorganic Prep
26-JUL-99 17:24:59 Frankie Davis --> Sample Receiving
26-JUL-99 19:45:48 Sandra Mason --> VOA/MS lab
26-JUL-99 22:05:19 Helen Camello --> TRAACS lab
26-JUL-99 22:06:27 Helen Camello --> Sample Receiving
27-JUL-99 09:32:14 Yolanda Jiles --> Rad Cooler
27-JUL-99 18:05:55 Gini Johnson --> Solids lab
27-JUL-99 18:36:45 Gini Johnson --> Sample Receiving
27-JUL-99 21:51:13 Jianguo Li --> Sample Receiving
28-JUL-99 07:47:18 Yolanda Jiles --> Rad Cooler
12-AUG-99 20:09:06 Patricia Dover --> Rad Login

317252 - 2 ml vial
22-JUL-99 15:53:33 Justin Augliera --> Organic Prep
22-JUL-99 15:56:01 Justin Augliera --> Biological Cooler
28-JUL-99 17:29:12 Damon Tyree --> Semivolatiles lab
04-AUG-99 13:55:11 Joey Amundsen --> Semivolatiles lab

317990 - 50 ml/P
26-JUL-99 12:03:46 Frankie Davis --> Inorganic Prep
02-AUG-99 13:35:42 Melinda Lewis --> ICP lab

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7 - Other
JUL-99 22:05:30 Helen Camello --> TRAACS lab
JUL-99 18:05:10 Tom Lewis --> TRAACS lab

-46.01 - 1000 ml/P
L-99 20:33:13 Gustavus Chandler --> Rad Cooler
L-99 12:12:43 Jianguo Li --> TCLP Prep
L-99 12:20:43 Jianguo Li --> TCLP Prep
L-99 09:32:13 Yolanda Jiles --> Rad Cooler
L-99 18:06:36 Gini Johnson --> Solids lab
L-99 18:36:45 Gini Johnson --> Sample Receiving
L-99 19:20:37 Jianguo Li --> TCLP Prep
L-99 21:51:13 Jianguo Li --> Sample Receiving
L-99 07:47:18 Yolanda Jiles --> Rad Cooler

1 - 1000 ml/P
JUL-99 12:16:17 Jianguo Li --> TCLP Prep
JUL-99 15:10:32 Amanda Miuccio --> Inorganic Prep
JUL-99 17:06:54 Aaron Dias --> Inorganic Prep
JUL-99 10:45:46 Roberta McGhee --> Mercury lab

088 - 50 ml/P
6-JUL-99 15:12:11 Amanda Miuccio --> Inorganic Prep

7 - 1000 ml/G
JUL-99 12:21:34 Jianguo Li --> TCLP Prep
JUL-99 12:54:02 Hazel Bridges --> Organic Prep
JUL-99 12:55:15 Hazel Bridges --> Rad Cooler
JUL-99 15:03:28 Ruth Haselton --> Biological Cooler
JUL-99 05:30:14 Hazel Bridges --> Organic Prep
JUL-99 05:31:36 Hazel Bridges --> Rad Cooler
JUL-99 13:41:30 Joan Patrick-Bottoms --> Organic Prep
JUL-99 13:42:19 Joan Patrick-Bottoms --> Rad Cooler
JUL-99 14:44:48 Hazel Bridges --> Biological Cooler
JUL-99 11:30:56 Hazel Bridges --> Biological Cooler
JUL-99 12:47:57 Tommy Dixon --> Semivolatiles lab

2 - 1000 ml Plastic Bag
JUL-99 19:21:06 Jianguo Li --> TCLP Prep
JUL-99 23:53:27 David Setzer --> VOA/MS lab

-47.01 - 250 ml/P
L-99 20:34:42 Gustavus Chandler --> Rad Cooler
L-99 15:53:20 Justin Augliera --> Organic Prep
L-99 07:29:32 Yolanda Jiles --> Inorganic Prep
L-99 12:03:34 Frankie Davis --> Inorganic Prep
L-99 17:24:59 Frankie Davis --> Sample Receiving
L-99 19:45:49 Sandra Mason --> VOA/MS lab
L-99 22:05:19 Helen Camello --> TRAACS lab
L-99 22:06:27 Helen Camello --> Sample Receiving
L-99 09:32:14 Yolanda Jiles --> Rad Cooler
L-99 18:05:55 Gini Johnson --> Solids lab
L-99 18:36:45 Gini Johnson --> Sample Receiving
L-99 21:51:14 Jianguo Li --> Sample Receiving
L-99 07:47:18 Yolanda Jiles --> Rad Cooler
G-99 20:09:06 Patricia Dover --> Rad Login

Internal Chain Of Custody
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317251 - 2 ml vial
22-JUL-99 15:53:33 Justin Augliera --> Organic Prep
22-JUL-99 15:56:01 Justin Augliera --> Biological Cooler
28-JUL-99 17:29:12 Damon Tyree --> Semivolatiles lab
04-AUG-99 13:55:11 Joey Amundsen --> Semivolatiles lab

317989 - 50 ml/P
26-JUL-99 12:03:46 Frankie Davis --> Inorganic Prep
02-AUG-99 13:35:42 Melinda Lewis --> ICP lab

318236 - Other
26-JUL-99 22:05:29 Helen Camello --> TRAACS lab
27-JUL-99 18:05:10 Tom Lewis --> TRAACS lab

)907679-48.01 - 250 ml/P
20-JUL-99 20:34:42 Gustavus Chandler --> Rad Cooler
21-JUL-99 12:12:43 Jianguo Li --> TCLP Prep
21-JUL-99 12:20:43 Jianguo Li --> TCLP Prep
27-JUL-99 09:32:14 Yolanda Jiles --> Rad Cooler
27-JUL-99 18:06:36 Gini Johnson --> Solids lab
27-JUL-99 18:36:45 Gini Johnson --> Sample Receiving
27-JUL-99 19:20:38 Jianguo Li --> TCLP Prep
27-JUL-99 21:51:14 Jianguo Li --> Sample Receiving
28-JUL-99 07:47:18 Yolanda Jiles --> Rad Cooler

316830 - 1000 ml/P
21-JUL-99 12:16:17 Jianguo Li --> TCLP Prep
26-JUL-99 15:10:32 Amanda Miuccio --> Inorganic Prep
26-JUL-99 17:06:54 Aaron Dias --> Inorganic Prep
27-JUL-99 10:45:46 Roberta McGhee --> Mercury lab

318089 - 50 ml/P
26-JUL-99 15:12:17 Amanda Miuccio --> Inorganic Prep

316846 - 1000 ml/G
21-JUL-99 12:21:34 Jianguo Li --> TCLP Prep
23-JUL-99 12:54:02 Hazel Bridges --> Organic Prep
23-JUL-99 12:55:15 Hazel Bridges --> Rad Cooler
23-JUL-99 15:03:28 Ruth Haselton --> Biological Cooler
26-JUL-99 05:30:14 Hazel Bridges --> Organic Prep
26-JUL-99 05:31:36 Hazel Bridges --> Rad Cooler
26-JUL-99 13:41:30 Joan Patrick-Bottoms --> Organic Prep
26-JUL-99 13:42:19 Joan Patrick-Bottoms --> Rad Cooler
26-JUL-99 14:44:48 Hazel Bridges --> Biological Cooler
27-JUL-99 11:30:56 Hazel Bridges --> Biological Cooler
27-JUL-99 12:47:57 Tommy Dixon --> Semivolatiles lab

318541 - 1000 ml Plastic Bag
27-JUL-99 19:21:06 Jianguo Li --> TCLP Prep
28-JUL-99 23:53:27 David Setzer --> VOA/MS lab

)-49.01 - 250 ml/P
JL-99 20:34:42 Gustavus Chandler --> Rad Cooler
JL-99 15:53:20 Justin Augliera --> Organic Prep
JL-99 07:29:32 Yolanda Jiles --> Inorganic Prep
JL-99 12:03:34 Frankie Davis --> Inorganic Prep
JL-99 17:24:59 Frankie Davis --> Sample Receiving
JL-99 19:45:49 Sandra Mason --> VOA/MS lab
JL-99 22:05:19 Helen Camello --> TRAACS lab
JL-99 22:06:27 Helen Camello --> Sample Receiving
JL-99 09:33:08 Yolanda Jiles --> Rad Cooler
JL-99 18:05:55 Gini Johnson --> Solids lab
JL-99 18:36:45 Gini Johnson --> Sample Receiving
JL-99 21:51:48 Jianguo Li --> Consumed by Analysis

0 - 2 ml vial
JUL-99 15:53:33 Justin Augliera --> Organic Prep
JUL-99 15:56:01 Justin Augliera --> Biological Cooler
JUL-99 17:29:13 Damon Tyree --> Semivolatiles lab
AUG-99 13:55:11 Joey Amundsen --> Semivolatiles lab

8 - 50 ml/P
JUL-99 12:03:46 Frankie Davis --> Inorganic Prep
AUG-99 13:35:42 Melinda Lewis --> ICP lab

5 - Other
JUL-99 22:05:29 Helen Camello --> TRAACS lab
JUL-99 18:05:10 Tom Lewis --> TRAACS lab

-50.01 - 250 ml/P
L-99 20:34:42 Gustavus Chandler --> Rad Cooler
L-99 12:12:43 Jianguo Li --> TCLP Prep
L-99 12:20:43 Jianguo Li --> TCLP Prep
L-99 09:33:08 Yolanda Jiles --> Rad Cooler
L-99 18:06:36 Gini Johnson --> Solids lab
L-99 18:36:45 Gini Johnson --> Sample Receiving
L-99 19:20:38 Jianguo Li --> TCLP Prep
L-99 21:51:48 Jianguo Li --> Consumed by Analysis

) - 1000 ml/P
JUL-99 12:16:17 Jianguo Li --> TCLP Prep
JUL-99 15:10:32 Amanda Miuccio --> Inorganic Prep
JUL-99 17:06:54 Aaron Dias --> Inorganic Prep
JUL-99 10:45:46 Roberta McGhee --> Mercury lab

)90 - 50 ml/P
5-JUL-99 15:12:24 Amanda Miuccio --> Inorganic Prep

5 - 1000 ml/G
JUL-99 12:21:34 Jianguo Li --> TCLP Prep
JUL-99 12:54:02 Hazel Bridges --> Organic Prep
JUL-99 12:55:15 Hazel Bridges --> Rad Cooler
JUL-99 15:03:28 Ruth Haselton --> Biological Cooler
JUL-99 05:30:14 Hazel Bridges --> Organic Prep
JUL-99 05:31:36 Hazel Bridges --> Rad Cooler
JUL-99 13:41:30 Joan Patrick-Bottoms --> Organic Prep
JUL-99 13:42:19 Joan Patrick-Bottoms --> Rad Cooler
JUL-99 14:44:48 Hazel Bridges --> Biological Cooler
27-JUL-99 11:30:56 Hazel Bridges --> Biological Cooler
27-JUL-99 12:47:57 Tommy Dixon --> Semivolatiles lab

Internal Chain Of Custody
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9907679%

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318540 - 1000 ml Plastic Bag

27-JUL-99 19:21:06	Jianguo Li	--> TCLP Prep
28-JUL-99 23:53:27	David Setzer	--> VOA/MS lab

9907679-51.01 - 250 ml/P

20-JUL-99 20:34:42	Gustavus Chandler	--> Rad Cooler
22-JUL-99 15:53:20	Justin Augliera	--> Organic Prep
26-JUL-99 07:29:32	Yolanda Jiles	--> Inorganic Prep
26-JUL-99 12:03:34	Frankie Davis	--> Inorganic Prep
26-JUL-99 17:24:59	Frankie Davis	--> Sample Receiving
26-JUL-99 19:45:49	Sandra Mason	--> VOA/MS lab
26-JUL-99 22:05:19	Helen Camello	--> TRAACS lab
26-JUL-99 22:06:27	Helen Camello	--> Sample Receiving
27-JUL-99 18:05:55	Gini Johnson	--> Solids lab
27-JUL-99 18:36:45	Gini Johnson	--> Sample Receiving
27-JUL-99 21:51:14	Jianguo Li	--> Sample Receiving
28-JUL-99 07:47:18	Yolanda Jiles	--> Rad Cooler

317249 - 2 ml vial

22-JUL-99 15:53:33	Justin Augliera	--> Organic Prep
22-JUL-99 15:56:01	Justin Augliera	--> Biological Cooler
28-JUL-99 17:29:13	Damon Tyree	--> Semivolatiles lab
04-AUG-99 13:55:11	Joey Amundsen	--> Semivolatiles lab

317987 - 50 ml/P

26-JUL-99 12:03:45	Frankie Davis	--> Inorganic Prep
02-AUG-99 13:35:42	Melinda Lewis	--> ICP lab

318234 - Other

26-JUL-99 22:05:29	Helen Camello	--> TRAACS lab
27-JUL-99 18:05:10	Tom Lewis	--> TRAACS lab

907679-52.01 - 250 ml/P

21-JUL-99 12:15:19	Yolanda Jiles	--> Rad Cooler
21-JUL-99 12:16:00	Jianguo Li	--> TCLP Prep
21-JUL-99 12:20:43	Jianguo Li	--> TCLP Prep
26-JUL-99 17:24:59	Frankie Davis	--> Sample Receiving
27-JUL-99 09:33:08	Yolanda Jiles	--> Rad Cooler
27-JUL-99 18:06:36	Gini Johnson	--> Solids lab
27-JUL-99 18:36:45	Gini Johnson	--> Sample Receiving
27-JUL-99 19:20:38	Jianguo Li	--> TCLP Prep
27-JUL-99 21:51:14	Jianguo Li	--> Sample Receiving
28-JUL-99 07:47:18	Yolanda Jiles	--> Rad Cooler
12-AUG-99 20:09:06	Patricia Dover	--> Rad Login

316828 - 1000 ml/P

21-JUL-99 12:16:17	Jianguo Li	--> TCLP Prep
26-JUL-99 15:10:32	Amanda Miuccio	--> Inorganic Prep
26-JUL-99 17:06:54	Aaron Dias	--> Inorganic Prep
27-JUL-99 10:45:46	Roberta McGhee	--> Mercury lab
27-JUL-99 10:45:46	Roberta McGhee	--> Mercury lab

Audit Trail by Container

)91 - 50 ml/P
)-JUL-99 15:12:31 Amanda Miuccio --> Inorganic Prep

- 1000 ml/G
UL-99 12:21:34 Jianguo Li --> TCLP Prep
UL-99 12:54:02 Hazel Bridges --> Organic Prep
UL-99 12:55:15 Hazel Bridges --> Rad Cooler
UL-99 15:03:28 Ruth Haselton --> Biological Cooler
UL-99 05:30:14 Hazel Bridges --> Organic Prep
UL-99 05:31:36 Hazel Bridges --> Rad Cooler
UL-99 13:41:30 Joan Patrick-Bottoms --> Organic Prep
UL-99 13:42:19 Joan Patrick-Bottoms --> Rad Cooler
UL-99 14:44:48 Hazel Bridges --> Biological Cooler
UL-99 11:30:57 Hazel Bridges --> Biological Cooler
UL-99 12:47:57 Tommy Dixon --> Semivolatiles lab

) - 1000 ml Plastic Bag
UL-99 19:21:06 Jianguo Li --> TCLP Prep
UL-99 23:53:27 David Setzer --> VOA/MS lab

-53.01 - 250 ml/P
-99 20:34:42 Gustavus Chandler --> Rad Cooler
-99 12:17:10 Jianguo Li --> TCLP Prep
-99 09:33:08 Yolanda Jiles --> Rad Cooler
-99 18:06:36 Gini Johnson --> Solids lab
-99 21:51:14 Jianguo Li --> Sample Receiving
-99 07:47:18 Yolanda Jiles --> Rad Cooler
-99 20:09:06 Patricia Dover --> Rad Login

3 - 1000 ml/P
JUL-99 11:29:51 Jianguo Li --> TCLP Prep

-54.01 - 1000 ml/P
L-99 10:20:50 Gustavus Chandler --> Rad Cooler
L-99 16:55:40 Amanda Miuccio --> Inorganic Prep
L-99 17:07:21 Aaron Dias --> Inorganic Prep

1 - 50 ml/P
JUL-99 16:56:02 Amanda Miuccio --> Inorganic Prep

8 - 50 ml/P
JUL-99 16:57:26 Amanda Miuccio --> Inorganic Prep
JUL-99 17:24:41 Allison Evans --> ICP lab

9 - 60 ml/G
JUL-99 17:07:32 Aaron Dias --> Inorganic Prep
JUL-99 16:53:31 Rose Jenkins --> Mercury lab

-55.01 - 1000 ml/P
L-99 10:20:50 Gustavus Chandler --> Rad Cooler
L-99 16:55:40 Amanda Miuccio --> Inorganic Prep
L-99 17:07:21 Aaron Dias --> Inorganic Prep

318900 - 50 ml/P
28-JUL-99 16:56:02 Amanda Miuccio --> Inorganic Prep

318919 - 50 ml/P
28-JUL-99 16:57:34 Amanda Miuccio --> Inorganic Prep
29-JUL-99 17:24:41 Allison Evans --> ICP lab

318928 - 60 ml/G
28-JUL-99 17:07:32 Aaron Dias --> Inorganic Prep
29-JUL-99 16:53:31 Rose Jenkins --> Mercury lab

907679-56.01 - 1000 ml/P
27-JUL-99 14:20:08 Patricia Dover --> Rad Cooler
28-JUL-99 16:55:40 Amanda Miuccio --> Inorganic Prep
28-JUL-99 17:07:21 Aaron Dias --> Inorganic Prep

318899 - 50 ml/P
28-JUL-99 16:56:02 Amanda Miuccio --> Inorganic Prep

318920 - 50 ml/P
28-JUL-99 16:57:41 Amanda Miuccio --> Inorganic Prep
29-JUL-99 17:24:41 Allison Evans --> ICP lab

318927 - 60 ml/G
28-JUL-99 17:07:32 Aaron Dias --> Inorganic Prep
29-JUL-99 16:53:31 Rose Jenkins --> Mercury lab

907679-57.01 - 1000 ml/P
27-JUL-99 14:20:08 Patricia Dover --> Rad Cooler
28-JUL-99 16:55:40 Amanda Miuccio --> Inorganic Prep
28-JUL-99 17:07:21 Aaron Dias --> Inorganic Prep

318898 - 50 ml/P
28-JUL-99 16:56:01 Amanda Miuccio --> Inorganic Prep

318921 - 50 ml/P
28-JUL-99 16:57:51 Amanda Miuccio --> Inorganic Prep
29-JUL-99 17:24:41 Allison Evans --> ICP lab

318926 - 60 ml/G
28-JUL-99 17:07:32 Aaron Dias --> Inorganic Prep
29-JUL-99 16:53:31 Rose Jenkins --> Mercury lab

907679-58.01 - 1000 ml/P
28-JUL-99 18:52:43 Gustavus Chandler --> Rad Cooler
05-AUG-99 16:24:19 Amanda Miuccio --> Inorganic Prep
05-AUG-99 19:05:35 Aaron Dias --> Inorganic Prep

320885 - 50 ml/P
05-AUG-99 16:24:29 Amanda Miuccio --> Inorganic Prep
06-AUG-99 10:22:06 Melinda Lewis --> ICP lab

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0 - 50 ml/P
AUG-99 16:34:46 Amanda Miuccio --> Inorganic Prep

1 - 60 ml/G
AUG-99 19:06:06 Aaron Dias --> Inorganic Prep
AUG-99 11:14:48 Rose Jenkins --> Mercury lab

-59.01 - 1000 ml/P
L-99 10:56:22 Yolanda Jiles --> Rad Cooler
L-99 16:48:22 Aaron Dias --> Inorganic Prep
G-99 09:06:20 Amanda Miuccio --> Inorganic Prep

9 - 60 ml/G
JUL-99 16:48:39 Aaron Dias --> Inorganic Prep
AUG-99 09:44:56 Rose Jenkins --> Mercury lab

9 - 50 ml/P
AUG-99 09:06:31 Amanda Miuccio --> Inorganic Prep

0 - 50 ml/P
AUG-99 09:08:08 Amanda Miuccio --> Inorganic Prep
AUG-99 16:24:21 Melinda Lewis --> ICP lab

-60.01 - 1000 ml/P
L-99 15:17:27 Yolanda Jiles --> Rad Cooler
L-99 16:48:22 Aaron Dias --> Inorganic Prep
G-99 09:06:20 Amanda Miuccio --> Inorganic Prep

8 - 60 ml/G
JUL-99 16:48:39 Aaron Dias --> Inorganic Prep
AUG-99 09:44:56 Rose Jenkins --> Mercury lab

8 - 50 ml/P
AUG-99 09:06:30 Amanda Miuccio --> Inorganic Prep

1 - 50 ml/P
AUG-99 09:08:10 Amanda Miuccio --> Inorganic Prep
AUG-99 16:24:21 Melinda Lewis --> ICP lab

-61.01 - 1000 ml/P
G-99 09:01:40 Login Trainee --> Rad Cooler
G-99 10:41:08 Amanda Miuccio --> Inorganic Prep
G-99 17:20:21 Aaron Dias --> Inorganic Prep

5 - 50 ml/P
AUG-99 10:41:21 Amanda Miuccio --> Inorganic Prep

5 - 50 ml/P
AUG-99 10:43:37 Amanda Miuccio --> Inorganic Prep
AUG-99 10:10:32 Melinda Lewis --> ICP lab

Internal Chain Of Custody
Audit Trail by Container

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319819 - 60 ml/G
02-AUG-99 17:20:47 Aaron Dias --> Inorganic Prep
03-AUG-99 09:45:26 Rose Jenkins --> Mercury lab

907679-62.01 - 1000 ml/P
02-AUG-99 09:01:40 Login Trainee --> Rad Cooler
02-AUG-99 10:41:08 Amanda Miuccio --> Inorganic Prep
02-AUG-99 17:20:21 Aaron Dias --> Inorganic Prep

319724 - 50 ml/P
02-AUG-99 10:41:20 Amanda Miuccio --> Inorganic Prep

319734 - 50 ml/P
02-AUG-99 10:43:37 Amanda Miuccio --> Inorganic Prep
03-AUG-99 10:10:32 Melinda Lewis --> ICP lab

319818 - 60 ml/G
02-AUG-99 17:20:47 Aaron Dias --> Inorganic Prep
03-AUG-99 09:45:26 Rose Jenkins --> Mercury lab

907679-63.01 - 250 ml/P
20-JUL-99 20:34:42 Gustavus Chandler --> Rad Cooler
22-JUL-99 15:53:20 Justin Augliera --> Organic Prep
26-JUL-99 07:29:32 Yolanda Jiles --> Inorganic Prep
26-JUL-99 12:03:34 Frankie Davis --> Inorganic Prep
26-JUL-99 17:24:59 Frankie Davis --> Sample Receiving
26-JUL-99 19:45:49 Sandra Mason --> VOA/MS lab
26-JUL-99 22:05:19 Helen Camello --> TRAACS lab
26-JUL-99 22:06:27 Helen Camello --> Sample Receiving
27-JUL-99 09:32:14 Yolanda Jiles --> Rad Cooler
27-JUL-99 18:05:55 Gini Johnson --> Solids lab
27-JUL-99 18:36:45 Gini Johnson --> Sample Receiving
27-JUL-99 20:17:40 Yolanda Jiles --> Rad Cooler
27-JUL-99 21:51:13 Jianguo Li --> Sample Receiving
28-JUL-99 07:47:18 Yolanda Jiles --> Rad Cooler
12-AUG-99 20:09:06 Patricia Dover --> Rad Login

317248 - 2 ml vial
22-JUL-99 15:53:32 Justin Augliera --> Organic Prep
22-JUL-99 15:56:01 Justin Augliera --> Biological Cooler
28-JUL-99 17:29:13 Damon Tyree --> Semivolatiles lab
04-AUG-99 13:55:11 Joey Amundsen --> Semivolatiles lab

317986 - 50 ml/P
26-JUL-99 12:03:45 Frankie Davis --> Inorganic Prep
02-AUG-99 13:35:42 Melinda Lewis --> ICP lab

318233 - Other
26-JUL-99 22:05:29 Helen Camello --> TRAACS lab
27-JUL-99 18:05:10 Tom Lewis --> TRAACS lab

Internal Chain Of Custody
Audit Trail by Container

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-64.01 - 250 ml/P
'L-99 20:34:42 Gustavus Chandler --> Rad Cooler
'L-99 12:12:43 Jianguo Li --> TCLP Prep
'L-99 12:20:43 Jianguo Li --> TCLP Prep
'L-99 09:32:14 Yolanda Jiles --> Rad Cooler
'L-99 18:06:36 Gini Johnson --> Solids lab
'L-99 18:36:45 Gini Johnson --> Sample Receiving
'L-99 19:20:38 Jianguo Li --> TCLP Prep
'L-99 20:17:40 Yolanda Jiles --> Rad Cooler
'L-99 21:51:13 Jianguo Li --> Sample Receiving
'L-99 07:47:18 Yolanda Jiles --> Rad Cooler
'G-99 20:09:06 Patricia Dover --> Rad Login

'7 - 1000 ml/P
-JUL-99 12:16:17 Jianguo Li --> TCLP Prep
-JUL-99 15:10:32 Amanda Miuccio --> Inorganic Prep
-JUL-99 17:06:54 Aaron Dias --> Inorganic Prep
-JUL-99 10:45:46 Roberta McGhee --> Mercury lab

'092 - 50 ml/P
'6-JUL-99 15:12:41 Amanda Miuccio --> Inorganic Prep

'3 - 1000 ml/G
-JUL-99 12:21:34 Jianguo Li --> TCLP Prep
-JUL-99 12:54:02 Hazel Bridges --> Organic Prep
-JUL-99 12:55:15 Hazel Bridges --> Rad Cooler
-JUL-99 15:03:28 Ruth Haselton --> Biological Cooler
-JUL-99 05:30:14 Hazel Bridges --> Organic Prep
-JUL-99 05:31:36 Hazel Bridges --> Rad Cooler
-JUL-99 13:41:30 Joan Patrick-Bottoms --> Organic Prep
-JUL-99 13:42:19 Joan Patrick-Bottoms --> Rad Cooler
-JUL-99 14:44:48 Hazel Bridges --> Biological Cooler
-JUL-99 11:30:57 Hazel Bridges --> Biological Cooler
-JUL-99 12:47:57 Tommy Dixon --> Semivolatiles lab

'8 - 1000 ml Plastic Bag
-JUL-99 19:21:06 Jianguo Li --> TCLP Prep
-JUL-99 23:53:26 David Setzer --> VOA/MS lab

'-65.01 - 1000 ml/P
JL-99 20:33:13 Gustavus Chandler --> Rad Cooler
JL-99 09:43:49 Frankie Davis --> Inorganic Prep
JL-99 14:45:17 Amanda Miuccio --> Inorganic Prep
JL-99 14:48:59 Amanda Miuccio --> Sample Receiving
JL-99 15:37:55 Yolanda Jiles --> Rad Cooler
JL-99 08:31:10 Hazel Bridges --> Organic Prep
JL-99 08:31:58 Hazel Bridges --> Rad Cooler
JL-99 09:53:28 Ruth Haselton --> Organic Prep
JL-99 10:21:33 Ruth Haselton --> Sample Receiving
JL-99 11:25:09 Yolanda Jiles --> Rad Cooler
JL-99 09:00:17 Ruth Haselton --> Organic Prep
JL-99 09:10:25 Ruth Haselton --> Sample Receiving
JL-99 18:01:10 Justin Augliera --> Organic Prep
JL-99 21:10:41 Helen Camello --> TRAACS lab
JL-99 21:12:33 Helen Camello --> TRAACS lab
JL-99 21:13:15 Helen Camello --> TRAACS lab
23-JUL-99 21:14:28 Helen Camello --> Sample Receiving
24-JUL-99 08:51:14 Gustavus Chandler --> Rad Cooler
26-JUL-99 11:03:35 Christopher Kerr --> FID lab

26-JUL-99 11:30:54	Christopher Kerr	--> Rad Cooler
27-JUL-99 20:27:33	Yolanda Jiles	--> Rad Cooler
30-JUL-99 10:36:39	Tom Lewis	--> TRAACS lab
30-JUL-99 10:36:39	Tom Lewis	--> TRAACS lab
30-JUL-99 10:42:22	Yolanda Jiles	--> Rad Cooler

Internal Chain Of Custody
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; - 50 ml/P
ʃUL-99 09:44:06 Frankie Davis --> Inorganic Prep
ʃUL-99 13:10:44 Melinda Lewis --> ICP lab

ʔ - 60 ml/G
ʃUL-99 14:46:34 Amanda Miuccio --> Mercury lab
ʃUL-99 11:21:18 Roberta McGhee --> Mercury lab

ł - 2 ml vial
ʃUL-99 08:31:24 Hazel Bridges --> Organic Prep
ʃUL-99 09:44:50 Hazel Bridges --> Biological Cooler

ʔ - 2 ml vial
JUL-99 09:53:46 Ruth Haselton --> Organic Prep
JUL-99 15:30:12 Ruth Haselton --> Biological Cooler
JUL-99 15:37:34 Damon Tyree --> Semivolatiles lab

ɔ - 2 ml vial
JUL-99 09:09:28 Ruth Haselton --> Organic Prep
JUL-99 13:58:10 Ruth Haselton --> Biological Cooler

7 - 2 ml vial
JUL-99 18:02:01 Justin Augliera --> Organic Prep
JUL-99 18:04:45 Justin Augliera --> Biological Cooler

2 - Other
JUL-99 21:10:52 Helen Camello --> TRAACS lab
JUL-99 12:44:25 Tom Lewis --> TRAACS lab

0 - Other
JUL-99 21:12:43 Helen Camello --> TRAACS lab
JUL-99 08:54:59 Tom Lewis --> TRAACS lab

8 - Other
JUL-99 21:13:27 Helen Camello --> TRAACS lab
JUL-99 10:32:20 Tom Lewis --> TRAACS lab

5 - Other
JUL-99 10:37:05 Tom Lewis --> TRAACS lab

-66.01 - 1000 ml/P
L-99 20:33:13 Gustavus Chandler --> Rad Cooler
L-99 09:43:49 Frankie Davis --> Inorganic Prep
L-99 14:45:17 Amanda Miuccio --> Inorganic Prep
L-99 14:48:58 Amanda Miuccio --> Sample Receiving
L-99 15:37:54 Yolanda Jiles --> Rad Cooler
L-99 08:31:10 Hazel Bridges --> Organic Prep
L-99 08:31:58 Hazel Bridges --> Rad Cooler
L-99 09:53:28 Ruth Haselton --> Organic Prep
L-99 10:21:33 Ruth Haselton --> Sample Receiving
L-99 11:25:09 Yolanda Jiles --> Rad Cooler
L-99 09:14:39 Ruth Haselton --> Organic Prep
L-99 09:15:32 Ruth Haselton --> Sample Receiving
L-99 18:01:10 Justin Augliera --> Organic Prep
L-99 21:10:41 Helen Camello --> TRAACS lab
L-99 21:12:33 Helen Camello --> TRAACS lab
23-JUL-99 21:13:15 Helen Camello --> TRAACS lab
23-JUL-99 21:14:28 Helen Camello --> Sample Receiving
24-JUL-99 08:51:14 Gustavus Chandler --> Rad Cooler

26-JUL-99 11:03:36	Christopher Kerr	--> FID lab
26-JUL-99 11:30:54	Christopher Kerr	--> Rad Cooler
27-JUL-99 20:27:33	Yolanda Jiles	--> Rad Cooler
30-JUL-99 10:36:39	Tom Lewis	--> TRAACS lab
30-JUL-99 10:36:39	Tom Lewis	--> TRAACS lab
30-JUL-99 10:42:22	Yolanda Jiles	--> Rad Cooler
17-AUG-99 14:28:15	Angela Albee	--> Radiological Prep
17-AUG-99 14:45:22	Patricia Dover	--> Rad Cooler

Internal Chain Of Custody

Audit Trail by Container

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- 50 ml/P
UL-99 09:44:05 Frankie Davis --> Inorganic Prep
UL-99 13:10:44 Melinda Lewis --> ICP lab

- 60 ml/G
UL-99 14:46:33 Amanda Miuccio --> Mercury lab
UL-99 11:21:18 Roberta McGhee --> Mercury lab

- 2 ml vial
UL-99 08:31:24 Hazel Bridges --> Organic Prep
UL-99 09:44:50 Hazel Bridges --> Biological Cooler

- 2 ml vial
UL-99 09:53:46 Ruth Haselton --> Organic Prep
UL-99 15:30:12 Ruth Haselton --> Biological Cooler
UL-99 15:37:34 Damon Tyree --> Semivolatiles lab

- 2 ml vial
UL-99 09:14:50 Ruth Haselton --> Sample Receiving
UL-99 13:58:10 Ruth Haselton --> Biological Cooler

- 2 ml vial
UL-99 18:02:01 Justin Augliera --> Organic Prep
UL-99 18:04:45 Justin Augliera --> Biological Cooler

- Other
UL-99 21:10:52 Helen Camello --> TRAACS lab
UL-99 12:44:25 Tom Lewis --> TRAACS lab

- Other
UL-99 21:12:43 Helen Camello --> TRAACS lab
UL-99 08:54:59 Tom Lewis --> TRAACS lab

- Other
UL-99 21:13:27 Helen Camello --> TRAACS lab
UL-99 10:32:20 Tom Lewis --> TRAACS lab

- Other
UL-99 10:37:05 Tom Lewis --> TRAACS lab

-67.01 - 1000 ml/P
L-99 20:33:13 Gustavus Chandler --> Rad Cooler
L-99 14:48:59 Amanda Miuccio --> Sample Receiving
L-99 15:37:54 Yolanda Jiles --> Rad Cooler
L-99 08:51:14 Gustavus Chandler --> Rad Cooler
L-99 20:27:33 Yolanda Jiles --> Rad Cooler
L-99 11:19:14 Chris Martin --> Radiological Soil Prep
L-99 10:42:22 Yolanda Jiles --> Rad Cooler
G-99 14:27:56 Angela Albee --> Radiological Prep
G-99 14:45:22 Patricia Dover --> Rad Cooler

Internal Chain Of Custody
Audit Trail by Container

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319171 - Other

29-JUL-99 16:16:49	Chris Martin	--> Radiological Soil Prep
17-AUG-99 16:29:37	Heather Anderson	--> Radiological Prep

)07679-68.01 - 1000 ml/P

20-JUL-99 20:33:13	Gustavus Chandler	--> Rad Cooler
21-JUL-99 09:43:49	Frankie Davis	--> Inorganic Prep
21-JUL-99 14:45:17	Amanda Miuccio	--> Inorganic Prep
21-JUL-99 14:48:59	Amanda Miuccio	--> Sample Receiving
21-JUL-99 15:37:54	Yolanda Jiles	--> Rad Cooler
22-JUL-99 08:31:10	Hazel Bridges	--> Organic Prep
22-JUL-99 08:31:58	Hazel Bridges	--> Rad Cooler
22-JUL-99 09:53:28	Ruth Haselton	--> Organic Prep
22-JUL-99 10:21:33	Ruth Haselton	--> Sample Receiving
22-JUL-99 11:25:09	Yolanda Jiles	--> Rad Cooler
23-JUL-99 09:00:17	Ruth Haselton	--> Organic Prep
23-JUL-99 09:10:25	Ruth Haselton	--> Sample Receiving
23-JUL-99 18:01:10	Justin Augliera	--> Organic Prep
23-JUL-99 21:10:41	Helen Camello	--> TRAACS lab
23-JUL-99 21:12:33	Helen Camello	--> TRAACS lab
23-JUL-99 21:13:15	Helen Camello	--> TRAACS lab
23-JUL-99 21:14:28	Helen Camello	--> Sample Receiving
24-JUL-99 08:51:14	Gustavus Chandler	--> Rad Cooler
26-JUL-99 11:03:35	Christopher Kerr	--> FID lab
26-JUL-99 11:30:54	Christopher Kerr	--> Rad Cooler
30-JUL-99 10:36:39	Tom Lewis	--> TRAACS lab
30-JUL-99 10:36:39	Tom Lewis	--> TRAACS lab
30-JUL-99 10:42:22	Yolanda Jiles	--> Rad Cooler

316773 - 50 ml/P

21-JUL-99 09:44:05	Frankie Davis	--> Inorganic Prep
22-JUL-99 13:10:44	Melinda Lewis	--> ICP lab

316865 - 60 ml/G

21-JUL-99 14:46:33	Amanda Miuccio	--> Mercury lab
22-JUL-99 11:21:18	Roberta McGhee	--> Mercury lab

317072 - 2 ml vial

22-JUL-99 08:31:24	Hazel Bridges	--> Organic Prep
23-JUL-99 09:44:50	Hazel Bridges	--> Biological Cooler

317095 - 2 ml vial

22-JUL-99 09:53:46	Ruth Haselton	--> Organic Prep
22-JUL-99 15:30:12	Ruth Haselton	--> Biological Cooler
23-JUL-99 15:37:34	Damon Tyree	--> Semivolatiles lab

317399 - 2 ml vial

23-JUL-99 09:09:27	Ruth Haselton	--> Organic Prep
23-JUL-99 13:58:10	Ruth Haselton	--> Biological Cooler

317565 - 2 ml vial

23-JUL-99 18:02:01	Justin Augliera	--> Organic Prep
23-JUL-99 18:04:45	Justin Augliera	--> Biological Cooler

- Other
JL-99 21:10:52 Helen Camello --> TRAACS lab
JL-99 12:44:25 Tom Lewis --> TRAACS lab

- Other
JL-99 21:12:43 Helen Camello --> TRAACS lab
JL-99 08:54:59 Tom Lewis --> TRAACS lab

- Other
UL-99 21:13:27 Helen Camello --> TRAACS lab
UL-99 10:32:20 Tom Lewis --> TRAACS lab

- Other
UL-99 10:37:04 Tom Lewis --> TRAACS lab

69.01 - 1000 ml/P
-99 20:33:13 Gustavus Chandler --> Rad Cooler
-99 09:43:49 Frankie Davis --> Inorganic Prep
-99 14:45:17 Amanda Miuccio --> Inorganic Prep
-99 14:48:59 Amanda Miuccio --> Sample Receiving
-99 15:37:54 Yolanda Jiles --> Rad Cooler
-99 08:31:10 Hazel Bridges --> Organic Prep
-99 08:31:58 Hazel Bridges --> Rad Cooler
-99 09:53:28 Ruth Haselton --> Organic Prep
-99 10:21:33 Ruth Haselton --> Sample Receiving
-99 11:25:09 Yolanda Jiles --> Rad Cooler
-99 09:14:38 Ruth Haselton --> Organic Prep
-99 09:15:32 Ruth Haselton --> Sample Receiving
-99 18:01:10 Justin Augliera --> Organic Prep
-99 21:10:41 Helen Camello --> TRAACS lab
-99 21:12:33 Helen Camello --> TRAACS lab
-99 21:13:15 Helen Camello --> TRAACS lab
-99 21:14:28 Helen Camello --> Sample Receiving
-99 08:51:14 Gustavus Chandler --> Rad Cooler
-99 11:03:36 Christopher Kerr --> FID lab
-99 11:30:54 Christopher Kerr --> Rad Cooler
-99 10:36:39 Tom Lewis --> TRAACS lab
-99 10:42:22 Yolanda Jiles --> Rad Cooler
G-99 14:28:15 Angela Albee --> Radiological Prep
G-99 14:45:22 Patricia Dover --> Rad Cooler

72 - 50 ml/P
-JUL-99 09:44:05 Frankie Davis --> Inorganic Prep
-JUL-99 13:10:44 Melinda Lewis --> ICP lab

64 - 60 ml/G
-JUL-99 14:46:33 Amanda Miuccio --> Mercury lab
-JUL-99 11:21:18 Roberta McGhee --> Mercury lab

71 - 2 ml vial
-JUL-99 08:31:24 Hazel Bridges --> Organic Prep
-JUL-99 09:44:50 Hazel Bridges --> Biological Cooler

Internal Chain Of Custody
Audit Trail by Container

Printed: 08/20/99 11:53

07679%

317094 - 2 ml vial
22-JUL-99 09:53:46 Ruth Haselton --> Organic Prep
22-JUL-99 15:30:12 Ruth Haselton --> Biological Cooler
23-JUL-99 15:37:34 Damon Tyree --> Semivolatiles lab

317404 - 2 ml vial
23-JUL-99 09:14:49 Ruth Haselton --> Sample Receiving
23-JUL-99 13:58:10 Ruth Haselton --> Biological Cooler

317564 - 2 ml vial
23-JUL-99 18:02:01 Justin Augliera --> Organic Prep
23-JUL-99 18:04:45 Justin Augliera --> Biological Cooler

317649 - Other
23-JUL-99 21:10:52 Helen Camello --> TRAACS lab
27-JUL-99 12:44:25 Tom Lewis --> TRAACS lab

317657 - Other
23-JUL-99 21:12:43 Helen Camello --> TRAACS lab
28-JUL-99 08:54:59 Tom Lewis --> TRAACS lab

317665 - Other
23-JUL-99 21:13:27 Helen Camello --> TRAACS lab
24-JUL-99 10:32:20 Tom Lewis --> TRAACS lab

319322 - Other
30-JUL-99 10:37:04 Tom Lewis --> TRAACS lab

9907679-70.01 - 1000 ml/P
20-JUL-99 20:33:13 Gustavus Chandler --> Rad Cooler
21-JUL-99 14:48:59 Amanda Miuccio --> Sample Receiving
21-JUL-99 15:37:54 Yolanda Jiles --> Rad Cooler
24-JUL-99 08:51:14 Gustavus Chandler --> Rad Cooler
29-JUL-99 11:19:14 Chris Martin --> Radiological Soil Prep
30-JUL-99 10:42:22 Yolanda Jiles --> Rad Cooler
17-AUG-99 14:27:56 Angela Albee --> Radiological Prep
17-AUG-99 14:45:22 Patricia Dover --> Rad Cooler

319170 - Other
29-JUL-99 16:16:48 Chris Martin --> Radiological Soil Prep
17-AUG-99 16:29:37 Heather Anderson --> Radiological Prep

9907679-71.01 - 1000 ml/P
20-JUL-99 20:33:13 Gustavus Chandler --> Rad Cooler
21-JUL-99 09:43:49 Frankie Davis --> Inorganic Prep
21-JUL-99 14:45:17 Amanda Miuccio --> Inorganic Prep
21-JUL-99 14:48:59 Amanda Miuccio --> Sample Receiving
21-JUL-99 15:37:54 Yolanda Jiles --> Rad Cooler
22-JUL-99 08:31:10 Hazel Bridges --> Organic Prep
22-JUL-99 08:31:58 Hazel Bridges --> Rad Cooler
22-JUL-99 09:53:28 Ruth Haselton --> Organic Prep
22-JUL-99 10:21:33 Ruth Haselton --> Sample Receiving
22-JUL-99 11:25:09 Yolanda Jiles --> Rad Cooler
23-JUL-99 09:00:17 Ruth Haselton --> Organic Prep
23-JUL-99 09:10:25 Ruth Haselton --> Sample Receiving
23-JUL-99 18:01:10 Justin Augliera --> Organic Prep
23-JUL-99 21:10:41 Helen Camello --> TRAACS lab
23-JUL-99 21:12:33 Helen Camello --> TRAACS lab
23-JUL-99 21:13:15 Helen Camello --> TRAACS lab

3-JUL-99 21:14:28	Helen Camello	--> Sample Receiving
4-JUL-99 08:51:14	Gustavus Chandler	--> Rad Cooler
6-JUL-99 11:03:36	Christopher Kerr	--> [illegible]
6-JUL-99 11:30:54	Christopher Kerr	--> Rad Cooler
[illegible]99 10:36:39	Tom Lewis	--> TRAACS lab
[illegible]99 10:42:22	Yolanda Jiles	--> Rad Cooler

Internal Chain Of Custody
Audit Trail by Container

Printed: 08/20/99 11:53

07679%

316771 - 50 ml/P
21-JUL-99 09:44:05 Frankie Davis --> Inorganic Prep
22-JUL-99 13:10:44 Melinda Lewis --> ICP lab

316863 - 60 ml/G
21-JUL-99 14:46:32 Amanda Miuccio --> Mercury lab
22-JUL-99 11:21:18 Roberta McGhee --> Mercury lab

317070 - 2 ml vial
22-JUL-99 08:31:23 Hazel Bridges --> Organic Prep
23-JUL-99 09:44:50 Hazel Bridges --> Biological Cooler

317093 - 2 ml vial
22-JUL-99 09:53:45 Ruth Haselton --> Organic Prep
22-JUL-99 15:30:12 Ruth Haselton --> Biological Cooler
23-JUL-99 15:37:34 Damon Tyree --> Semivolatiles lab

317398 - 2 ml vial
23-JUL-99 09:09:26 Ruth Haselton --> Organic Prep
23-JUL-99 13:58:10 Ruth Haselton --> Biological Cooler

317563 - 2 ml vial
23-JUL-99 18:02:01 Justin Augliera --> Organic Prep
23-JUL-99 18:04:45 Justin Augliera --> Biological Cooler

317648 - Other
23-JUL-99 21:10:52 Helen Camello --> TRAACS lab
27-JUL-99 12:44:25 Tom Lewis --> TRAACS lab

317656 - Other
23-JUL-99 21:12:43 Helen Camello --> TRAACS lab
28-JUL-99 08:54:59 Tom Lewis --> TRAACS lab

317664 - Other
23-JUL-99 21:13:27 Helen Camello --> TRAACS lab
24-JUL-99 10:32:20 Tom Lewis --> TRAACS lab

319321 - Other
30-JUL-99 10:37:04 Tom Lewis --> TRAACS lab

9907679-72.01 - 1000 ml/P
20-JUL-99 20:33:13 Gustavus Chandler --> Rad Cooler
21-JUL-99 09:43:49 Frankie Davis --> Inorganic Prep
21-JUL-99 14:45:17 Amanda Miuccio --> Inorganic Prep
21-JUL-99 14:48:59 Amanda Miuccio --> Sample Receiving
21-JUL-99 15:37:55 Yolanda Jiles --> Rad Cooler
22-JUL-99 08:31:10 Hazel Bridges --> Organic Prep
22-JUL-99 08:31:59 Hazel Bridges --> Rad Cooler
22-JUL-99 09:53:28 Ruth Haselton --> Organic Prep
22-JUL-99 10:21:33 Ruth Haselton --> Sample Receiving
22-JUL-99 11:25:09 Yolanda Jiles --> Rad Cooler
23-JUL-99 09:14:39 Ruth Haselton --> Organic Prep
23-JUL-99 09:15:32 Ruth Haselton --> Sample Receiving
23-JUL-99 18:01:10 Justin Augliera --> Organic Prep
23-JUL-99 21:10:41 Helen Camello --> TRAACS lab
23-JUL-99 21:12:33 Helen Camello --> TRAACS lab
23-JUL-99 21:13:15 Helen Camello --> TRAACS lab
23-JUL-99 21:14:28 Helen Camello --> Sample Receiving
24-JUL-99 08:51:14 Gustavus Chandler --> Rad Cooler

5-JUL-99 11:03:36	Christopher Kerr	--> FID lab
6-JUL-99 11:36:54	Christopher Kerr	--> Rad Cooler
0-JUL-99 10:36:39	Tom Lewis	--> TRAACS lab
-99 10:42:22	Yolanda Jiles	--> Rad Cooler
9 14:28:15	Angela Albee	--> Radiological Prep
-99 14:45:22	Patricia Dover	--> Rad Cooler

Internal Chain Of Custody
Audit Trail by Container

Printed: 08/20/99 11:54

07679%

316770 - 50 ml/P
21-JUL-99 09:44:04 Frankie Davis --> Inorganic Prep
22-JUL-99 13:10:44 Melinda Lewis --> ICP lab

316862 - 60 ml/G
21-JUL-99 14:46:32 Amanda Miuccio --> Mercury lab
22-JUL-99 11:21:18 Roberta McGhee --> Mercury lab

317069 - 2 ml vial
22-JUL-99 08:31:23 Hazel Bridges --> Organic Prep
23-JUL-99 09:44:50 Hazel Bridges --> Biological Cooler

317092 - 2 ml vial
22-JUL-99 09:53:45 Ruth Haselton --> Organic Prep
22-JUL-99 15:30:12 Ruth Haselton --> Biological Cooler
23-JUL-99 15:37:34 Damon Tyree --> Semivolatiles lab

317403 - 2 ml vial
23-JUL-99 09:14:49 Ruth Haselton --> Sample Receiving
23-JUL-99 13:58:10 Ruth Haselton --> Biological Cooler

317562 - 2 ml vial
23-JUL-99 18:02:01 Justin Augliera --> Organic Prep
23-JUL-99 18:04:45 Justin Augliera --> Biological Cooler

317647 - Other
23-JUL-99 21:10:52 Helen Camello --> TRAACS lab
27-JUL-99 12:44:24 Tom Lewis --> TRAACS lab

317655 - Other
23-JUL-99 21:12:43 Helen Camello --> TRAACS lab
28-JUL-99 08:54:58 Tom Lewis --> TRAACS lab

317663 - Other
23-JUL-99 21:13:27 Helen Camello --> TRAACS lab
24-JUL-99 10:32:20 Tom Lewis --> TRAACS lab

319320 - Other
30-JUL-99 10:37:03 Tom Lewis --> TRAACS lab

9907679-73.01 - 1000 ml/P
20-JUL-99 20:33:13 Gustavus Chandler --> Rad Cooler
21-JUL-99 14:48:59 Amanda Miuccio --> Sample Receiving
21-JUL-99 15:37:55 Yolanda Jiles --> Rad Cooler
24-JUL-99 08:51:14 Gustavus Chandler --> Rad Cooler
29-JUL-99 11:19:14 Chris Martin --> Radiological Soil Prep
30-JUL-99 10:42:22 Yolanda Jiles --> Rad Cooler
17-AUG-99 14:27:56 Angela Albee --> Radiological Prep
17-AUG-99 14:45:22 Patricia Dover --> Rad Cooler

319169 - Other
29-JUL-99 16:16:48 Chris Martin --> Radiological Soil Prep
17-AUG-99 16:29:37 Heather Anderson --> Radiological Prep

JOSEPH P. AMUNDSEN

Title	Organic Analyst II
Education	B.S. Biology, College of Charleston, 1992
Specialized Training	Hewlett Packard Target/Envision Software Training Benchtop GC/MS training, Virginia Tech University
Experience and Qualifications	**General Engineering Laboratories: 1991 - present** Organic Analyst (1995 - Present) Mr. Amunden's primary focus up until 1999 was on the analysis of PCB's, pesticides, and herbicides utilizing a gas chromatograph equipped with an electron capture detector. As of 1999, his primary focus has shifted to the analysis of base/neutral and acids (BNAs) using the GC/MS. In addition, Mr. Amundsen is responsible for daily instrument maintenance including capillary columns and detectors. He prepares standards and performs annual method detection limit studies. He is also innovative in trouble shooting procedures and method development. Mr. Amundsen assists in the writing and reviewing of Standard Operating Procedures. In addition to his expertise as a GC/ECD analyst, Mr. Amundsen also has experience in the analysis of Total Petroleum Hydrocarbons utilizing a GC with a flame ionization detector. He is also experienced with the analysis of semi-volatile organic compounds utilizing a mass spectrometer. Wet Chemistry Analyst (1993 - 1995) Mr. Amundsen was responsible for a variety of General Chemistry analyses including pH, conductivity, spectrophotometric analyses, and biological analysis. In addition, Mr. Amundsen was responsible for total organic carbon, total organic halogens, and ion chromatography.

J. CAMERON BEARDEN

Title

Group Leader - Semivolatile Organics

Education

BS Biology, University of South Carolina with Honors, 1990

Honors

Phi Beta Kappa
Magna Cum Laude
South Carolina College Graduate

Specialized Training

RTE-A Seminar, Hewlett Packard
Mass Spectral Interpretation Seminar, Hewlett Packard
Basic Capillary Column Techniques, J & W, 1995
Gas Chromatography Seminar, Dr. Stuart Cram
Chromatography Seminar, Restek
Target Software training, Thru-Put
Benchtop GC/MS Operations with Mass Spectral Interpretation, Dr. Umberto Gomez

Experience and Qualifications

General Engineering Laboratories: 1990 to Present

January 1996 - Present
Analyze samples by GC/MS using methods 8270 and 625. Proficient in both Hewlett-Packard RTE-A and Enviroquant software. Also perform analyses using GC/FIDand GC/ECD. Concentrate primarily on industrial samples from a wide variety of matrices including wastewater, groundwater, soils, and sludges. Utilize regulatory compliance guidelines and permit levels. Involved in continuing method development, SPC, and instrument maintenance. Serves as technical support for client services.

August 1993 - January 1996
Extractable Organics: Group Leader - Group Leader responsible for 8 individuals in the extractable organics lab. Experience includes 8 weeks working on-site at Allied-Signal Chemicals in Hopewell, VA performing air analyses by GC/MS and GC/FID.

June 1992 - August 1993
Volatile Organics: Analyst I - Analyzed samples by GC/MS according to methods 8240, 624 and 8260, including audits. Proficient in Hewlett-Packard RTE-A and Enviroquant software.

December 1990 - June 1992
Extractable Organics: Analyst I - Analyzed pesticides, herbicides and PCB's using GC/ECD by EPA methods 8080 and 8150. Proficient in PE Nelson and Hewlett-Packard software.

Department of Chemistry, University of South Carolina 1988 - 1990
Organic Chemistry Lab Assistant - Prepared exams, lab assignments and class notes, graded quizzes and exams, assisted in preparation of labs and tutored students.

RICHARD M. BOMAR

Title	Volatile Organic Analyst III
Education	BS Environmental Health, University of Georgia 1977
Specialized Training	Mass spectral interpretation, Hewlett Packard, 1995 Capillary column usage, Restek, 1994 GC Troubleshooting, Supelco, 1993 Advanced RTE, Hewlett Packard Training, 1993 GC trouble shooting and column selection, Supelco, 1993 ACS Capillary Chromatography Short Course, GEL, 1991
Experience and Qualifications	**General Engineering Laboratories, Inc.: 1990-Present** Volatile Organic Analyst III (1993 - Present) Analyzes a wide variety of matrices including groundwater, sediment, wastewater, and TCLP for volatile organics utilizing GC/MS. Proficient in instrument maintenance, tuning, analysis, trouble shooting, and cleaning. Responsible for preparation of stock solutions, calibration points and continuing calibration solutions. Familiar with client specific requirements including data packaging and CLP protocol using Target (ThruPut). Volatile Analyst (1990 - 1993): Responsible for the daily operations, maintenance and trouble shooting of Tracor 540 GC's with Tekmar Purge and Trap accessories. Coordinated daily runs with Laboratory Manager and maintained all quality control documentation. Proficient in the use of PE Nelson 2600 Chromatograph Data Handling System. Assisted in training new analysts in use of data system and EPA procedures for Methods 8010/8020 and BTEX analysis. **North Charleston Sewer District: 1987-1990** Industrial Pre-Treatment Inspector responsible for coordinating the Industrial Pre-Treatment Program for the District. Evaluated industry-supplied analysis reports; wrote official correspondence to the industries; created a database of analysis values from various industries to show compliance with laws over time; renewed permits, submitted draft permits to industries and negotiated a finalized permit. **Institute of Ecology, University of Georgia: 1977-1987** Laboratory Manager, General Chemist for the U.S. Forest Service Long Term Ecological Research Project (LTER), Coweeta Hydrologic Study. Data Manager for all other LTER projects in

the southeastern United States managed from the Institute of Ecology.

U.S. Department of Agriculture: 1974-1977
Laboratory Technician responsible for sample collection and analysis of soil, runoff water, and rain water using Technicon Auto Analyzer and Atomic Absorption Spectrophotometer.

JACOB H. CROOK

Title	General Chemistry Federal Division Group Leader
Education	BS Biology, Citadel, 1991
Specialized Training	Ion Selective Electrode training Supervisory Loss Control - The Hartford Insurance Group ACS Environmental Data Validation Course Zinger Miller Leadership Training Jane Goldner Leadership Training
Experience and Qualifications	**General Engineering Laboratories: 1991 - present** General Chemistry Analyst II/Group Leader (March 1993 - Present) Mr. Crook analyzes a variety of sample matrices including groundwater, sediment, and waste for automated colorimetric analysis using TRAACS and RFA instrumentation. He performs analyses utilizing potentiometric and titrimetric instrumentation. In addition, Mr. Crook has the ability to provide a wide range of wet chemistry analyses including pH, distillations, and strip tests. Due to his expertise in the Wet Chemistry area, Mr. Crook serves as a valuable technical resource. He is instrumental in trouble shooting, process improvement, and method development. Mr. Crook is responsible for all automated instruments in the General Chemistry area, including 2 Total Organic Carbon analyzers, 3 Total Organic Halogen analyzers, 2 Alpkem Rapid Flow Analyzers, a TRAACS 800 autoanalyzer, 3 digestion block systems, a steam distillation unit, and a Midi-still unit for cyanide distillation. In addition, Mr. Crook is very familiar with client specific requirements. This includes specialized data packaging and deliverables. **Special Projects:** Worked to implement new procedures for ammonia and Total Kjeldahl nitrogen preparation and cyanide distillation. Extensive work on developing a suitable procedure for TOC sample preparation of cement kiln feed samples, the implementation of a new type of software for the TRAACS, and data uploading for nearly all instruments in the group. Served as a member of several corrective action teams dealing with internal standards documentation and traceability, lab safety, and the testing of air samples. Worked on-site at an industrial client's process lab to isolate an ammonia contamination problem.

FRANCENA G. DAVIS

Title	Technician II - Metals Process Team
Education	High School Diploma, awarded 1969 Attended Hudson County Community College 1986 - 1989
Specialized Training	Basic Math Skills, In house training, 1992 Art of Sample Preparation, In house training, 1992 MSDS training, In house training, 1990
Experience and Qualifications	**General Engineering Laboratories 1990-present** Technician II (1992 - Present) Responsible for the preparation and acid/microwave digestion of environmental samples for analysis by Inductively Coupled Plasma, Graphite Furnace Atomic Absorption, and Inductively Coupled Plasma/Mass Spectroscopy. Maintains proper documentation and records for quality control/quality assurance following EPA, contract, and procedural specifications. Responsibilities also include the creation and revisions of standard operating procedures for the preparation and digestions of samples for elemental analyses. Trains new team members and schedules all work for the Metals Process Team. Responsible for peer review of data generated by other technicians. Technician I (1990 - 1992) Responsible for the preparation and acid digestion of environmental samples for instrument analysis using SW846, CLP Statement of Work, and other EPA procedures. Maintained daily records for quality control/quality assurance. **Bankers Trust Company of New York 1973 - 1989** CRT Entry Clerk responsible for receiving and delivery of securities from over the window, matched securities in systems to M-ticket, referred matchless securities to Administrator, gave completed securities to verifier. Sorted out delivery tickets and delivered to various departments same day, sent eligible securities to vault for withdrawal by certain deadlines to meet settlements dates.

ALLISON M. EVANS

Title

Metals Analyst II

Education

B.S. Chemistry, Winthrop University, 1993
American Chemical Society, Member

Research the Experience

August 1992 to May 1993: The Separation and Determination of Absolute Rotation of the Products of Thermal Decomposition of 3,4-Dicarbomethoxy-5,5-diphenyl-2-pyrazoline.

August 1991 to May 1992: Investigated the composition of heavy protein toxins from the spines of California rockfish by electrophoretic methods.

Experience and Qualifications

General Engineering Laboratories: January 1998-Present
Ms. Evans serves as an Analyst II in the inorganic laboratory. She performs metal analyses in water, soil, TCLP and miscellaneous matrices. She is responsible for the analysis of environmental samples utilizing the ICP/MS. She is proficient in EPA 6020/200.8 methodology. Ms. Evans is capable of analyzing elements in an isotopic fashion using an electronic multiplier. She also performs all related maintenance and data management.

Ms. Evans is also proficient in the operation of the ICP/Trace. She is familiar with 6010/200.7 methodology and has performed analyses on waters, soils, TCLP, and miscellaneous matrices.

High Purity Standards: March 1994 to December 1997
Chemist Evans Prepared all single element inorganic standards offered by High Purity. she prepared some multielement standards and custom mixes offered by High Purity Standards. She performed quality checks on the standards by Flame AAS and ICP-AES. Additionally, Ms. Evans prepared, completely digested and certified Reference Materials available from High Purity Standards. She digested samples for certification by EPA Method 3050A. Finally, she developed and tested TCLP Extraction Fluid #1 concentrate product.

GENERAL ENGINEERING LABORATORIES, INC.

ROSE A. JENKINS

Title Inorganic Analyst I

Education B.S. Biology, Benedict College, 1986

Specialized Training
Basic Math Skills, GEL, 1992
Art of Sample Preparation, GEL, 1992
MSDS training, 1990
ICP Training, GEL, 1990

Experience and Qualifications

General Engineering Laboratories, Inc.: 1991-Present

Analyst I (1994 - Present)
Responsible for analysis of trace metals in groundwater, wastewater, and drinking water samples using the Perkin-Elmer Z5100 Graphite Furnace Atomic Absorption Spectrometers (GFAAS). Maintains quality control documentation for the GFAA area. Responsible for peer review of data generated by other GFAAS metals analysts.

Wet Chemistry Analyst (1991-1994)
Responsible for the preparation and analysis of TDS, TS, TSS, VSS, VS, Fluorides, PH, Conductivity, % Ash, and Alkalinity. Maintains proper documentation and records for quality control following approved EPA Methodologies. Assists in Oil and Grease and TPH preparation and analysis.

Mercury Analyst (1990-1991)
Responsible for the preparation, digestion and analysis of environmental samples for Mercury using Cold Vapor technique. Maintains proper documentation and records for quality control following approved EPA Methodologies. Works closely with metals group leader in scheduling samples. Assists in metals prep laboratory with acid digestions of environmental samples.

United States Army: 1987-1990
1st Lieutenant/Platoon Leader: Responsible for the training, welfare and morale of 92 personnel. Management of equipment valued at $6 million. Maintained direct accountability of $700,000 of equipment. Supervised communications staff and provided continuous operations maintenance and accountability of five communications shelters, five generators, several vehicles, and related equipment.

Title Senior Chemist

Education B.A. Chemistry, College of Charleston , 1987.

Profesional Licenses Biological Wastewater Treatment Facility Operator, Level B
Physcial/Chemical Wastewater Treatment Facility Operator, Level D

Water Treatment Facility Operator, Level D

Experience and Qualifications

General Engineering Laboratories, Inc.:
Senior Chemist
Ms. Lewis brings over fifteen years of environmental laboratory experience to our metals team. As the Senior Chemist in GEL's Metals Division, her responsibilities include reviewing SOPs for technical accuracy and regulatory compliance, researching and develoiping new methodologies, and training laboratory personnel on new method

Trident Labs, Inc.: 1992 -
Environmental Laboratory Manager
Managed a South Carolina DHEC certified envorinmental laboratory from sample log-in, through analytical testing, and final report generation. In adddition, Ms Lewis performed a variety of analytical techniques on multiple matrices, and obtained applicable certifications.

Management Responsibilities included:

- Organized work flow for approximately three thousand analyses per month with standard five day turnaround time.
- Ensured rush turnaround requiests of twenty frour, forty eight, and seventy two hours were achieved. Reviewed quality control/quality assurance data on all analyses and final reports.
- Interact with clients to provide technical assistance.

Technical responsibilities included:

- Metals Analyses - Performed trace metal sample preparation on aqueous, organic, soil, polymer, oil and hazardous waste samples. Analyze samples with simultaneous trace ICP, Flame AA, Graphite Furnace AA, and Cold Vapor AA following EPA environmental procedures. Obtained South Carolina DHEC certification for ICP, Flame AA, Graphite Furnace AA, and Cold Vapor AA methods.
- General Chemistry Analyses - Supervise and perform titrimetric, gravimetric, colorimetric, and potentionmetric

techniques for inorganic chemical determinations following EPA environmental procedures.

- Biological Analyses - Supervise and perform total and fecal coliform analyses by membrane filter and most probable number techniques following EPA environmental procedures.

WILLIAM A. MCCULLOUGH

Title Semi-volatile Organic Analyst II

Education B.S. Chemistry, University of South Carolina 1990
Minor: Business Administration

Specialized Training
Bench Top GC/MS Operation and Mass Spectral Interpretation, Virginia Tech., 1996
Mass Spectral Interpretation, GEL, 1995
Target Training, Hewlett Packard, 1995
Basic Capillary Column Techniques, J&W, 1995
Column Optimization, Restek, 1994
GC trouble shooting and column selection, 1993
Operational Fundamentals of 5972 - MSD, Forms Development for CLP, Hewlett Packard, 1993

Experience and Qualifications:

General Engineering Lavoratories: January 1999 - Present
Organic Team Leader

General Engineering Laboratories: June 1993 - Present
Organic Analyst II

Mr. McCullough works primarily on analyzing environmental samples for semi-volatile organic compounds. His work includes pesticides, herbicides, pcbs, base/neutral/acids, and hydrocarbons. Mr. McCullough uses his analytical expertise to determine chemical properties with the use of specialized instrumentation, specifically Gas Chromatography and Gas Chromatography/Mass Spectrometry. Some of his other duties include writing and updating standard operating procedures, calibrating and troubleshooting instrumentation, and establishing and monitoring QA/QC precision and accuracy. Mr. McCullough has also been instrumental in method development. He has been innovative in bringing new methods on line as well as enhancing current methods.

Special projects:

Co-managed an on-site, mobile air monitoring laboratory to collect and study stack emissions at a major industrial site for permitting requirements under the Clean Air Act.

Aided in the implementation of the Contract Laboratory Program methodology to meet stipulations of federal government contracts, including installation of software necessary to meet reporting requirements.

Westvaco Chemical Division, North Charleston, SC, 1992 - 1993

Performed analyses on in-process samples for crude tall oil in the

refinery, analyzed and approved product shipments; verified that incoming raw materials met quality standards.

Shealy Environmental Services, Inc., Columbia, SC, 1990 - 1992
Specialized in the analysis of environmental matrices using Gas Chromatography and Gas Chromatography/Mass Spectrometry. Analyses included: volatile organic compounds; total petroleum hydrocarbons; semi-volatile organic compounds.

Organic Chemistry Laboratory, University of South Carolina, 1988 - 1990
Conducted instrument demonstrations and assisted with laboratory instruction.

Title Analyst

Education B.S. Biology, University of South Florida , 1989.

Experience and Qualifications

General Engineering Laboratories, Inc.: (1998 – Present)
Analyst II
Mr. Penny brings over five years of volatile organic experience to our laboratory. His primary responsibilities as an Analyst II include analysis of wastewater and soil matrices using EPA Methods 8260B, 8015B, and 8021B. In addition, Mr. Penny is responsible for both the technical and the mechanical maintenance for the Hewlett-Packard instrumentation and software, Tekmar P/T, O.I. Analytical P/T, and Varian ARCON Autosamplers.

U.S. Biosystems: (1997 – 1998)
As the Lead GC Analyst, Mr. Penny's responsibilities included anlaysis of wastewater and soil matrices using EPA methods 601/602, 8015, and 8021. In addition, he played and integral part in the creation and implementation of Standard Operating Procedures.

Toxikon Environmental Sciences: (1993 – 1997)
Responsibilities included analysis of environmental samples using EPA Methods 502.2, 601/602, and 8021. Experience with Semi-Volatile analysis with EPA 608, 610, 8080, and 8100. Maintenance of HP GC systems (PID/ELCD, ECD/ECD), Tremetrics, and Perkin-Elmer Autosystems (FID/FID).

JANNIE SHAW-BUSBY

Title	Data Validation and Interpretation Specialist
Education	B.S. Chemistry, College of Charleston, 1989
Specialized Training	Hewlett Packard Target/Envision Training Benchtop GC/MS training, Virginia Tech University Amino Assay Training, GEL Consulting Solid Phase Extraction Training, Varian
Experience and Qualifications	**General Engineering Laboratories: 1991 - present** Data Validation/Interpretation Specialist (1997 - Present) Ms. Shaw-Busby is primarily responsible for reviewing and validating all data that is produced in the gas chromatograph semi-volatile laboratory. This includes pesticide, herbicide, pcb, and total petroleum hydrocarbon data. With her expertise, Ms. Shaw-Busby's validation includes, but is not limited to, retention time windows, calibration curves, detectable target compounds, and second column confirmation. Ms. Shaw-Busby serves as a technical resource to those analysts who operate in this laboratory. Organic Analyst II/Group Leader (1994 - 1997) Analyzed samples by GC/ECD for pesticides, PCB's, and herbicides using methods 608, 8080, and 8150. Involved with method development, SPC, trouble shooting, and instrument maintenance. Group Leader for ECD, FID/Non-Volatile and IC. Proficient in the PE Nelson 2600 Chromatography Data Handling System. Maintained all quality control documentation and assists in training new personnel. Experience in GC/FID, Purge and Trap FID, Headspace GC/FID, and TCLP and ZHE preparation procedures. Assisted in laboratory extraction and concentration of semi-volatile organics. Familiar with client specific criteria and data packages. Team Task Leader (1991 - 1992) Team Task Leader for Inorganic prep, mercury prep, analysis, and oil and grease. Responsible for scheduling and supervising the preparation of samples for inorganic analysis including 7470, 3550, 310 and 7471.

DEBRA L. SMITH

Title Volatile Organic Analyst III

Education B.A. Chemistry/Biology, Marshall University, 1987

Specialized Training
Quality Control for Industrial Hygiene Labs, 1995
How to Manage Projects, Priorities, and Deadlines, 1993
Operation of Purge and Trap Instrumentation, 1992
How to Supervise People, 1990
Mass Spectral Interpretation, 1988

Experience and Qualifications

General Engineering Laboratories, Inc.: July 1995 - Present

Organic Analyst III(1995 – 1998):
Ms. Smith is an experienced GC/MS analyst of volatile and semi-volatile organic compounds using Hewlett-Packard 5970, 5972, and 5973 Mass Spectrometers. She is responsible for analyses including but not limited to 524.2, 624, 8000, 8260, and 8270. Her software experience includes HPRTE, HP Chemstation, HP Enviroquant and Target. Ms. Smith is proficient in instrument maintenance, tuning, analysis, and trouble shooting. In addition, she performs initial and final data review

Organic Analyst I (1995 - Present):
Experienced GC/MS analyst of volatile organic compounds by purge and trap using Hewlett-Packard 5970 (high level) and 5972 (low level) Mass Spectrometers. Analyses include, but are not limited to Priority Pollutant Volatiles (PPO), Target Compound List (TCL), Total Toxic Organics (TTO), Toxicity Characteristic Leaching Procedure (TCLP), Appendix IX by SW-846, 8260A. Software includes HPRTE, HP Chemstation, HP Enviroquant and Target (ThruPut). Proficient in instrument maintenance, tuning, analysis, and trouble shooting.

Azimuth Laboratories, 1994 -1995
Quality Assurance Manager for an industrial hygiene laboratory. Departmental representative during lab audits. Initial and final technical data review. Method development.

TES, Inc.: 1993- 1994
Responsible for the analysis of air samples for TGNMO by EPA Method 25.

IEA, Inc.: 1990 - 1993
GC/MS Supervisor responsible for training and scheduling of analysts. Planning, organization, and supervision of instrumentation and analysts. Technical responsibilities for analytical activities.

CompuChem Laboratories: 1987 - 1990
GC/MS Analysts responsible for volatile and semivolatile GC/MS analysis and data review.

PATRICIA STEELE

Title Group Leader/Data Validator - Volatiles Group

Education BS Biology, University of Texas at San Antonio, 1982

Experience and Qualifications

General Engineering Laboratories, Inc.: 1990 to Present
Volatiles Group Leader/Data Validator

Ms. Steele brings over sixteen years of experience to the volatiles group at GEL. As supervisor of the Volatiles Group, she is responsible for quality and production of volatiles data. Ms. Steele's duties include scheduling and coordinating workload for the group, monitoring performance of individuals and providing feedback to group members regarding performance. In addition, Ms. Steele manages special projects, reviews new work proposals, and oversees implementation of work.

Roy F. Weston, Inc.: (1995 - 1997)
As GC/MS Volatiles Unit Leader, Ms. Steele performed data package review for such Methods as SW846, EPA 624, EPA 524.2, OLM 03.1, and Low Level CLP. In addition, she analyzed and generated sample data, scheduled and maintained run logs & QC to meet client and method criteria/hold times/due dates/etc.

Galson Corporation, East Syracuse, NY (1991 - 1995)
As Extraction Laboratory Supervisor, Ms. Steele performed various extraction procedures on soil, water and air samples using DEC ASP, CLP, and ASTM protocols. Her duties also included scheduling sample workload and managing three to four laboratory technicians.

56th General Hospital, Muenchweiler, Germany (1986 - 1990)
As Medical Technician/Laboratory Supervisor, Ms. Steele's duties included performing medical laboratory procedures, monitoring and reporting all quality control procedures, work load units and manpower measures operating within the laboratory. She trained and supervised one to three military technicians.

Southwest Research Institute, Division of Chemistry and Chemical Engineering, San Antonio, Texas
As a Research Scientist, Ms. Steele analyzed environmental extracts using GC/MS following EPA protocols. She assisted in drug assay method development using HPLC and prepared analytical data for reports.

CHARLES W. WILSON, JR.

Title	Volatile Organic Analyst III
Education	B.S. Chemistry, Indiana University of Pennsylvania, 1982
Experience and Qualifications	**General Engineering Laboratories, Inc.: July 1998 - Present** Organic Analyst III(1995 – 1998): Mr. Wilson brings over twelve years of experience to GEL's volatile organics team. He is responsible for analyzing samples of various matrices using methods 5970, 5972, and 5973. He also runs the Hewlett Packard MSDs following EPA methods 524.2, 624, and 8260B. In addition, Mr. Wilson duties include reviewing data and validating client data packages. **Analytical Laboratory Services, Inc., (1986 – 1998)** As a GC/MS Analyst, Mr. Wilson's responsibilities included analyzing samples of various matrices using the Hewlett Packard MSDs. In addition, he reviewed and reported data and performed routine maintenance and troubleshooting of instrumentation.

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ppendix M-2, Appendix VIII/IX GEL Laboratory Analytical Reports on 8 Composite Verification Samples
2, pp. 1 through 102

GENERAL ENGINEERING LABORATORIES

Meeting today's needs with a vision for tomorrow.

Client: Westinghouse Savannah River Co.
Building 735-16A, Rm. 5
P.O. Box 616
Aiken, South Carolina 29802
Contact: Mr. Richard Groseclose
Project Description: Hazardous Waste Contract

cc: WSRC00497 Report Date: August 20, 1999

Sample ID	: COMP 1
Lab ID	: 9907679-65
Matrix	: Solid
Date Collected	: 07/14/99
Date Received	: 07/15/99
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Volatile Organics											
F003 Waste Constituents - FID - 4 items											
Ethyl Acetate	U	0.00	1.98	10.0	mg/kg	1.0	CAK	07/28/99	1602	154227	1
Ethyl Ether	U	0.00	3.96	9.90	mg/kg	1.0					
Methyl Alcohol	U	0.00	3.96	9.90	mg/kg	1.0					
n-Butyl Alcohol	U	0.00	3.96	9.90	mg/kg	1.0					
F005 Waste Constituents - FID - 2 items											
Ethylene Glycol Monoethylether	U	0.00	0.990	9.90	mg/kg	1.0					
Isobutyl Alcohol	U	0.00	3.96	10.0	mg/kg	1.0					
App. IX VOA - 54 items											
1,1,1,2-Tetrachloroethane	U	0.00	0.200	2.00	UGKG	1.0	JWF	07/27/99	0853	154327	2
1,1,1-Trichloroethane	U	0.00	0.100	2.00	UGKG	1.0					
1,1,2,2-Tetrachloroethane	U	0.00	0.600	2.00	UGKG	1.0					
1,1,2-Trichloroethane	U	0.00	0.300	2.00	UGKG	1.0					
1,1-Dichloroethane	U	0.00	0.100	2.00	UGKG	1.0					
1,1-Dichloroethylene	U	0.00	0.300	2.00	UGKG	1.0					
1,2,3-Trichloropropane	U	0.00	0.400	2.00	UGKG	1.0					
1,2-Dibromo-3-chloropropane	U	0.00	0.400	2.00	UGKG	1.0					
1,2-Dibromoethane	U	0.00	0.200	2.00	UGKG	1.0					
1,2-Dichloroethane	U	0.00	0.200	2.00	UGKG	1.0					
1,2-Dichloropropane	U	0.00	0.200	2.00	UGKG	1.0					
1,2-trans-Dichloroethylene	U	0.00	0.100	2.00	UGKG	1.0					
2-Butanone	U	0.00	3.20	10.0	UGKG	1.0					
2-Hexanone	U	0.00	2.80	10.0	UGKG	1.0					
4-Methyl-2-pentanone	U	0.00	3.10	10.0	UGKG	1.0					
Acetone	U	2.11	10.3	10.3	UGKG	1.0					
Acetonitrile	J	8.78	1.00	10.0	UGKG	1.0					
Acrolein	U	0.00	4.60	20.0	UGKG	1.0					
Acrylonitrile	U	0.00	3.90	50.0	UGKG	1.0					

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Aiken, South Carolina 29802
Contact: Mr. Richard Groseclose
Project Description: Hazardous Waste Contract

c: WSRC00497 Report Date: August 20, 1999

Sample ID : COMP 1

rameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
lyl Chloride	U	0.00	0.400	10.0	UGKG	1.0					
enzene	U	0.00	0.500	2.00	UGKG	1.0	JWF	07/27/99	0853	154327	2
omoform	U	0.00	0.300	2.00	UGKG	1.0					
rbon Disulfide	U	0.00	0.300	10.0	UGKG	1.0					
rbon Tetrachloride	U	0.00	0.500	2.00	UGKG	1.0					
lorobenzene	U	0.00	0.300	2.00	UGKG	1.0					
lorodibromomethane	U	0.00	0.200	2.00	UGKG	1.0					
loroethane	U	0.00	0.300	2.00	UGKG	1.0					
loroform	U	0.00	0.100	2.00	UGKG	1.0					
loroprene	U	0.00	2.00	10.0	UGKG	1.0					
ibromomethane	U	0.00	0.200	2.00	UGKG	1.0					
ichlorobromomethane	U	0.00	0.100	2.00	UGKG	1.0					
ichlorodifluoromethane	U	0.00	1.20	2.00	UGKG	1.0					
hyl methacrylate	U	0.00	0.400	10.0	UGKG	1.0					
hylbenzene	U	0.00	0.300	2.00	UGKG	1.0					
obutyl Alcohol	U	0.00	6.30	20.0	UGKG	1.0					
ethacrylonitrile	U	0.00	0.900	10.0	UGKG	1.0					
ethyl Bromide	U	0.00	0.300	2.00	UGKG	1.0					
ethyl Chloride	U	0.00	0.200	2.00	UGKG	1.0					
ethyl Iodide	U	0.00	0.600	5.00	UGKG	1.0					
ethyl Methacrylate	U	0.00	0.400	10.0	UGKG	1.0					
ethylene Chloride	U	1.37	1.40	5.00	UGKG	1.0					
ntachloroethane	U	0.00	0.500	10.0	UGKG	1.0					
opionitrile	U	0.00	3.40	20.0	UGKG	1.0					
yrene	U	0.00	0.300	2.00	UGKG	1.0					
trachloroethylene	U	0.00	0.400	2.00	UGKG	1.0					
oluene	U	0.00	0.900	2.00	UGKG	1.0					
richloroethylene	U	0.00	0.300	2.00	UGKG	1.0					
richlorofluoromethane	U	0.00	0.300	2.00	UGKG	1.0					
inyl Acetate	U	0.00	2.10	10.0	UGKG	1.0					
inyl chloride	U	0.00	0.400	2.00	UGKG	1.0					
ylenes (TOTAL)	U	0.00	0.700	4.00	UGKG	1.0					
s-1,3-Dichloropropylene	U	0.00	0.200	2.00	UGKG	1.0					
ans-1,3-Dichloropropylene	U	0.00	0.300	2.00	UGKG	1.0					
ans-1,4-Dichloro-2-butene	U	0.00	0.500	2.00	UGKG	1.0					

r001 Waste Constituents - 7 items

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Sample ID : COMP 1

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
1,1,1-Trichloroethane	U	0.00	0.100	2.00	UGKG	1.0					
Carbon Tetrachloride	U	0.00	0.500	2.00	UGKG	1.0	JWF	07/27/99	0853	154327	2
Methylene Chloride	U	1.37	1.40	5.00	UGKG	1.0					
Tetrachloroethylene	U	0.00	0.400	2.00	UGKG	1.0					
Trichloroethylene	U	0.00	0.300	2.00	UGKG	1.0					
Trichlorofluoromethane	U	0.00	0.300	2.00	UGKG	1.0					
Trichlorotrifluoroethane	U	0.00	10.0	10.0	UGKG	1.0					
F002 Waste Constituents - 9 items											
1,1,1-Trichloroethane	U	0.00	0.100	2.00	UGKG	1.0					
1,1,2-Trichloroethane	U	0.00	0.300	2.00	UGKG	1.0					
1,2-Dichlorobenzene	U	0.00	0.500	2.00	UGKG	1.0					
Chlorobenzene	U	0.00	0.300	2.00	UGKG	1.0					
Methylene Chloride	U	1.37	1.40	5.00	UGKG	1.0					
Tetrachloroethylene	U	0.00	0.400	2.00	UGKG	1.0					
Trichloroethylene	U	0.00	0.300	2.00	UGKG	1.0					
Trichlorofluoromethane	U	0.00	0.300	2.00	UGKG	1.0					
Trichlorotrifluoroethane	U	0.00	10.0	10.0	UGKG	1.0					
F003 Waste Constituents - GC/MS VOA - 4 items											
4-Methyl-2-pentanone	U	0.00	3.10	10.0	UGKG	1.0					
Acetone	U	2.11	10.3	10.3	UGKG	1.0					
Ethylbenzene	U	0.00	0.300	2.00	UGKG	1.0					
Xylenes (TOTAL)	U	0.00	0.700	4.00	UGKG	1.0					
F005 Waste Constituents - GC/MS VOA - 5 items											
2-Butanone	U	0.00	3.20	10.0	UGKG	1.0					
2-Nitropropane	U	0.00	3.30	10.0	UGKG	1.0					
Benzene	U	0.00	0.500	2.00	UGKG	1.0					
Carbon Disulfide	U	0.00	0.300	10.0	UGKG	1.0					
Toluene	U	0.00	0.900	2.00	UGKG	1.0					
Halogenated Volatile Organics - 29 items											
1,1,1-Trichloroethane	U	0.00	0.100	2.00	UGKG	1.0					
1,1,2,2-Tetrachloroethane	U	0.00	0.600	2.00	UGKG	1.0					
1,1,2-Trichloroethane	U	0.00	0.300	2.00	UGKG	1.0					
1,1-Dichloroethane	U	0.00	0.100	2.00	UGKG	1.0					
1,1-Dichloroethylene	U	0.00	0.300	2.00	UGKG	1.0					
1,2-Dichlorobenzene	U	0.00	0.500	2.00	UGKG	1.0					

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Sample ID : COMP 1

ırameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
2-Dichloroethane	U	0.00	0.200	2.00	UGKG	1.0					
2-Dichloropropane	U	0.00	0.200	2.00	UGKG	1.0	JWF	07/27/99	0853	154327	2
2-trans-Dichloroethylene	U	0.00	0.100	2.00	UGKG	1.0					
3-Dichlorobenzene	U	0.00	0.400	2.00	UGKG	1.0					
4-Dichlorobenzene	U	0.00	0.600	2.00	UGKG	1.0					
Chloroethylvinyl ether	U	0.00	4.04	5.00	UGKG	1.0					
romoform	U	0.00	0.300	2.00	UGKG	1.0					
arbon Tetrachloride	U	0.00	0.500	2.00	UGKG	1.0					
hlorobenzene	U	0.00	0.300	2.00	UGKG	1.0					
hlorodibromomethane	U	0.00	0.200	2.00	UGKG	1.0					
hloroethane	U	0.00	0.300	2.00	UGKG	1.0					
hloroform	U	0.00	0.100	2.00	UGKG	1.0					
ichlorobromomethane	U	0.00	0.100	2.00	UGKG	1.0					
ichlorodifluoromethane	U	0.00	1.20	2.00	UGKG	1.0					
[ethyl Bromide	U	0.00	0.300	2.00	UGKG	1.0					
[ethyl Chloride	U	0.00	0.200	2.00	UGKG	1.0					
[ethylene Chloride	U	1.37	1.40	5.00	UGKG	1.0					
etrachloroethylene	U	0.00	0.400	2.00	UGKG	1.0					
richloroethylene	U	0.00	0.300	2.00	UGKG	1.0					
richlorofluoromethane	U	0.00	0.300	2.00	UGKG	1.0					
inyl chloride	U	0.00	0.400	2.00	UGKG	1.0					
s-1,3-Dichloropropylene	U	0.00	0.200	2.00	UGKG	1.0					
ans-1,3-Dichloropropylene	U	0.00	0.300	2.00	UGKG	1.0					
tractable Organics											
pp. IX Acid Extractables - 18 items											
3,4,6-Tetrachlorophenol	U	0.00	286	332	UGKG	1.0	DDT	07/23/99	2149	154032	3
4,5-Trichlorophenol	U	0.00	153	332	UGKG	1.0					
4,6-Trichlorophenol	U	0.00	153	332	UGKG	1.0					
4-Dichlorophenol	U	0.00	176	332	UGKG	1.0					
4-Dimethylphenol	U	0.00	110	332	UGKG	1.0					
4-Dinitrophenol	U	0.00	365	664	UGKG	1.0					
6-Dichlorophenol	U	0.00	30.9	332	UGKG	1.0					
-Chlorophenol	U	0.00	156	332	UGKG	1.0					
-Nitrophenol	U	0.00	179	332	UGKG	1.0					
-methyl-4,6-dinitrophenol	U	0.00	99.6	332	UGKG	1.0					

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Sample ID : COMP 1

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
2-sec-Butyl-4,6-Dinitrophenol	U	0.00	329	332	UGKG	1.0					
4-Nitrophenol	U	0.00	110	664	UGKG	1.0	DDT	07/23/99	2149	154032	3
4-chloro-3-methyl phenol	U	0.00	126	332	UGKG	1.0					
Hexachlorophene	U	0.00	10700	16600	UGKG	1.0					
Pentachlorophenol	U	0.00	56.4	332	UGKG	1.0					
Phenol	U	0.00	120	332	UGKG	1.0					
m,p-Cresol	U	0.00	153	664	UGKG	1.0					
o-Cresol	U	0.00	63.1	332	UGKG	1.0					
App. IX B/N Extractables - 106 items											
1,2,4,5-Tetrachlorobenzene	U	0.00	186	332	UGKG	1.0					
1,2,4-Trichlorobenzene	U	0.00	186	332	UGKG	1.0					
1,2-Dichlorobenzene	U	0.00	169	332	UGKG	1.0					
1,3-Dichlorobenzene	U	0.00	129	332	UGKG	1.0					
1,4-Dichlorobenzene	U	0.00	129	332	UGKG	1.0					
1,4-Dioxane	U	0.00	60.8	332	UGKG	1.0					
1,4-Naphthoquinone	U	0.00	332	332	UGKG	1.0					
1-Naphthylamine	U	0.00	183	332	UGKG	1.0					
2,4-Dinitrotoluene	U	0.00	116	332	UGKG	1.0					
2,6-Dinitrotoluene	U	0.00	139	332	UGKG	1.0					
2-Acetylaminofluorene	U	0.00	332	332	UGKG	1.0					
2-Chloronaphthalene	U	0.00	173	332	UGKG	1.0					
2-Methylnaphthalene	U	0.00	203	332	UGKG	1.0					
2-Naphthylamine	U	0.00	319	332	UGKG	1.0					
2-Picoline	U	0.00	402	402	UGKG	1.0					
3,3'-Dichlorobenzidine	U	0.00	276	1660	UGKG	1.0					
3,3'-Dimethylbenzidine	U	0.00	166	1660	UGKG	1.0					
3-Methylcholanthrene	U	0.00	332	332	UGKG	1.0					
4-Bromophenyl phenyl ether	U	0.00	116	332	UGKG	1.0					
4-Chloroaniline	U	0.00	153	332	UGKG	1.0					
4-Chlorophenyl phenyl ether	U	0.00	146	332	UGKG	1.0					
4-aminobiphenyl	U	0.00	21.6	332	UGKG	1.0					
5-Nitro-o-toluidine	U	0.00	196	332	UGKG	1.0					
7,12-Dimethylbenz(a)anthracene	U	0.00	315	332	UGKG	1.0					
Acenaphthene	U	0.00	159	332	UGKG	1.0					
Acenaphthylene	U	0.00	146	332	UGKG	1.0					

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Contact: Mr. Richard Groseclose
Project Description: Hazardous Waste Contract

c: WSRC00497 Report Date: August 20, 1999

Sample ID : COMP 1

rameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
etophenone	U	0.00	126	332	UGKG	1.0					
iline	U	0.00	189	332	UGKG	1.0	DDT	07/23/99	2149	154032	3
thracene	U	0.00	86.3	332	UGKG	1.0					
amite	U	0.00	276	332	UGKG	1.0					
nzo(a)anthracene	U	0.00	66.4	332	UGKG	1.0					
nzo(a)pyrene	U	0.00	73.0	332	UGKG	1.0					
nzo(b)fluoranthene	U	0.00	143	332	UGKG	1.0					
nzo(ghi)perylene	U	0.00	79.7	332	UGKG	1.0					
nzo(k)fluoranthene	U	0.00	133	332	UGKG	1.0					
nzyl Alcohol	U	0.00	186	332	UGKG	1.0					
tyl benzyl phthalate	U	0.00	89.6	332	UGKG	1.0					
lorobenzilate	U	0.00	53.1	1660	UGKG	1.0					
rysene	U	0.00	53.1	332	UGKG	1.0					
i-n-butyl phthalate	U	0.00	73.0	332	UGKG	1.0					
i-n-octyl phthalate	U	0.00	173	332	UGKG	1.0					
iallate	U	0.00	229	332	UGKG	1.0					
ibenzo(a,h)anthracene	U	0.00	83.0	332	UGKG	1.0					
ibenzofuran	U	0.00	133	332	UGKG	1.0					
iethyl phthalate	U	0.00	76.4	332	UGKG	1.0					
imethoate	U	0.00	266	1660	UGKG	1.0					
imethyl phthalate	U	0.00	110	332	UGKG	1.0					
iphenylamine	U	0.00	286	332	UGKG	1.0					
isulfoton	U	0.00	46.1	332	UGKG	1.0					
thyl Methanesulfonate	U	0.00	20.3	332	UGKG	1.0					
thyl methacrylate	U	0.00	29.5	332	UGKG	1.0					
amphur	U	0.00	52.8	332	UGKG	1.0					
luoranthene	U	0.00	66.4	332	UGKG	1.0					
luorene	U	0.00	113	332	UGKG	1.0					
exachlorobenzene	U	0.00	69.7	332	UGKG	1.0					
exachlorobutadiene	U	0.00	153	332	UGKG	1.0					
exachlorocyclopentadiene	U	0.00	193	332	UGKG	1.0					
exachloroethane	U	0.00	133	332	UGKG	1.0					
exachloropropene	U	0.00	20.9	332	UGKG	1.0					
deno(1,2,3-c,d)pyrene	U	0.00	79.7	332	UGKG	1.0					
odrin	U	0.00	146	332	UGKG	1.0					

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Contact: Mr. Richard Groseclose
Project Description: Hazardous Waste Contract

cc: WSRC00497 Report Date: August 20, 1999

Sample ID : COMP 1

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Isophorone	U	0.00	146	332	UGKG	1.0					
Isosafrole	U	0.00	21.6	332	UGKG	1.0	DDT	07/23/99	2149	154032	3
Kepone	U	0.00	97.3	332	UGKG	1.0					
Methapyrilene	U	0.00	159	1660	UGKG	1.0					
Methyl Methanesulfonate	U	0.00	302	332	UGKG	1.0					
N-Nitrosodi-n-butylamine	U	0.00	22.9	332	UGKG	1.0					
N-Nitrosodiethylamine	U	0.00	20.6	332	UGKG	1.0					
N-Nitrosodimethylamine	U	0.00	10.3	332	UGKG	1.0					
N-Nitrosodiphenylamine	U	0.00	116	332	UGKG	1.0					
N-Nitrosodipropylamine	U	0.00	129	332	UGKG	1.0					
N-Nitrosomethylethylamine	U	0.00	72.7	332	UGKG	1.0					
N-Nitrosomorpholine	U	0.00	24.6	332	UGKG	1.0					
N-Nitrosopiperidine	U	0.00	219	332	UGKG	1.0					
N-Nitrosopyrolidine	U	0.00	22.2	332	UGKG	1.0					
Naphthalene	U	0.00	156	332	UGKG	1.0					
Nitrobenzene	U	0.00	133	332	UGKG	1.0					
O,O,O-Triethylphosphorothioate	U	0.00	232	332	UGKG	1.0					
Parathion	U	0.00	166	332	UGKG	1.0					
Parathion, methyl	U	0.00	266	332	UGKG	1.0					
Pentachlorobenzene	U	0.00	26.6	332	UGKG	1.0					
Pentachloroethane	U	0.00	44.5	332	UGKG	1.0					
Pentachloronitrobenzene	U	0.00	232	332	UGKG	1.0					
Phenacetin	U	0.00	193	332	UGKG	1.0					
Phenanthrene	U	0.00	59.8	332	UGKG	1.0					
Phorate	U	0.00	292	332	UGKG	1.0					
Pronamide	U	0.00	216	332	UGKG	1.0					
Pyrene	U	0.00	73.0	332	UGKG	1.0					
Pyridine	U	0.00	129	332	UGKG	1.0					
Safrole	U	0.00	17.6	332	UGKG	1.0					
Sulfotepp	U	0.00	43.2	332	UGKG	1.0					
Thionazin	U	0.00	226	332	UGKG	1.0					
a-,a-Dimethylphenethylamine	U	0.00	106	332	UGKG	1.0					
bis(2-Chloroethoxy)methane	U	0.00	169	332	UGKG	1.0					
bis(2-Chloroethyl) ether	U	0.00	149	332	UGKG	1.0					
bis(2-Chloroisopropyl)ether	U	0.00	103	332	UGKG	1.0					

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ıarameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
s(2-Ethylhexyl)phthalate	U	0.00	299	332	UGKG	1.0					
-Dinitrobenzene	U	0.00	29.5	332	UGKG	1.0	DDT	07/23/99	2149	154032	3
-Nitroaniline	U	0.00	83.0	332	UGKG	1.0					
Nitroaniline	U	0.00	66.4	332	UGKG	1.0					
Toluidine	U	0.00	279	332	UGKG	1.0					
Dimethylaminoazobenzene	U	0.00	209	332	UGKG	1.0					
Nitroaniline	U	0.00	103	332	UGKG	1.0					
Phenylenediamine	U	0.00	504	664	UGKG	1.0					
'm-Trinitrobenzene	U	0.00	23.2	1660	UGKG	1.0					
)04 Waste Constituents - GC/MS Ext. - 3 items											
itrobenzene	U	0.00	133	332	UGKG	1.0					
,p-Cresol	U	0.00	153	664	UGKG	1.0					
Cresol	U	0.00	63.1	332	UGKG	1.0					
yridine	U	0.00	129	332	UGKG	1.0					
pp. IX Herbicides - 3 items											
4,5-T	U	0.00	0.863	10.0	UGKG	10.	JC	07/24/99	1249	154030	4
4,5-TP	U	0.00	0.994	10.0	UGKG	10.					
4-D	U	0.00	1.46	10.0	UGKG	10.					
CB analysis - 7 items											
CB-1016	U	0.00	1.22	41.6	UGKG	1.0	JLW	07/29/99	0949	154173	5
CB-1221	U	0.00	2.82	41.6	UGKG	1.0					
CB-1232	U	0.00	1.63	41.6	UGKG	1.0					
CB-1242	U	0.00	1.67	41.6	UGKG	1.0					
CB-1248	U	0.00	0.906	41.6	UGKG	1.0					
CB-1254	U	0.00	1.16	41.6	UGKG	1.0					
CB-1260	U	0.00	0.942	41.6	UGKG	1.0					
pp. IX Pesticides - 19 items											
,4'-DDD	U	0.00	0.580	1.33	UGKG	1.0	MM	07/27/99	0049	154073	6
,4'-DDE	U	0.00	0.541	1.33	UGKG	1.0					
,4'-DDT	U	0.00	0.784	1.33	UGKG	1.0					
ldrin	U	0.00	0.256	0.670	UGKG	1.0					
hlordane	U	0.00	4.80	8.33	UGKG	1.0					
ieldrin	U	0.00	0.723	1.33	UGKG	1.0					
ndosulfan I	U	0.00	0.447	0.670	UGKG	1.0					
ndosulfan II	U	0.00	0.671	1.33	UGKG	1.0					

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Endosulfan sulfate	U	0.00	0.897	0.897	UGKG	1.0					
Endrin	U	0.00	0.671	1.33	UGKG	1.0	MM	07/27/99	0049	154073	6
Endrin aldehyde	U	0.00	0.978	1.33	UGKG	1.0					
Heptachlor	U	0.00	0.428	0.670	UGKG	1.0					
Heptachlor epoxide	U	0.00	0.214	0.670	UGKG	1.0					
Methoxychlor	U	0.00	3.50	6.70	UGKG	1.0					
Toxaphene	U	0.00	10.8	33.3	UGKG	1.0					
alpha-BHC	U	0.00	0.259	0.670	UGKG	1.0					
beta-BHC	U	0.00	0.382	0.670	UGKG	1.0					
delta-BHC	U	0.00	0.279	0.670	UGKG	1.0					
gamma-BHC	U	0.00	0.343	0.670	UGKG	1.0					
Metals Analysis											
Mercury	U	-11.0	2.21/1000	33.3	UGKG	1.0	RPM2	07/22/99	1415	153549	7
Silver		7440/1000 > 7.4	72.0	500	UGKG	2.0	MBL	07/22/99	1454	153903	8
Silver		7440	72.0	500	UGKG	2.0	MBL	07/22/99	1454	153903	9
Aluminum		40800000	59100	250000	UGKG	100	MBL	07/23/99	1042	153903	9
Arsenic		2370	455	500	UGKG	2.0	MBL	07/22/99	1454	153903	8
Arsenic		2370	455	500	UGKG	2.0	MBL	07/22/99	1454	153903	9
Boron		21400000	12700	250000	UGKG	100	MBL	07/23/99	1042	153903	9
Barium		79600	54.0	500	UGKG	2.0	MBL	07/22/99	1454	153903	8
Barium		79600	54.0	500	UGKG	2.0	MBL	07/22/99	1454	153903	9
Beryllium		520	24.0	500	UGKG	2.0	MBL	07/22/99	1454	153903	8
Beryllium		520	24.0	500	UGKG	2.0	MBL	07/22/99	1454	153903	9
Calcium		1560000	6970	10000	UGKG	2.0					
Cadmium		1330	38.0	500	UGKG	2.0	MBL	07/22/99	1454	153903	8
Cadmium		1330	38.0	500	UGKG	2.0	MBL	07/22/99	1454	153903	9
Cobalt		8720	33.0	500	UGKG	2.0	MBL	07/22/99	1454	153903	8
Cobalt		8720	33.0	500	UGKG	2.0	MBL	07/22/99	1454	153903	9
Chromium		293000	76.0	500	UGKG	2.0	MBL	07/22/99	1454	153903	8
Chromium		293000	76.0	500	UGKG	2.0	MBL	07/22/99	1454	153903	9
Copper		33400	134	500	UGKG	2.0	MBL	07/22/99	1454	153903	8
Copper		33400	134	500	UGKG	2.0	MBL	07/22/99	1454	153903	9
Iron		18700000	12100	12100	UGKG	2.0					
Potassium		5460000	2840	10000	UGKG	2.0					
Magnesium		3580000	507	1000	UGKG	2.0					

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rameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
anganese		280000	709	1000	UGKG	2.0					
olybdenum		2410	132	1000	UGKG	2.0	MBL	07/22/99	1454	153903	9
dium		76200000	321000	500000	UGKG	100	MBL	07/23/99	1042	153903	9
ckel		4450000	3150	25000	UGKG	100	MBL	07/23/99	1042	153903	8
ckel		4450000	3150	25000	UGKG	100	MBL	07/23/99	1042	153903	9
ad		53500	157	500	UGKG	2.0	MBL	07/22/99	1454	153903	8
ad		53500	157	500	UGKG	2.0	MBL	07/22/99	1454	153903	9
timony	U	-5310	19100	50000	UGKG	100	MBL	07/23/99	1042	153903	8
timony	U	-5310	19100	50000	UGKG	100	MBL	07/23/99	1042	153903	9
lenium	U	-4820	13500	25000	UGKG	100	MBL	07/23/99	1042	153903	8
lenium	U	-4820	13500	25000	UGKG	100	MBL	07/23/99	1042	153903	9
licon		4360000	140000	500000	UGKG	100					
n		8950	833	1000	UGKG	2.0	MBL	07/22/99	1454	153903	8
n		8950	833	1000	UGKG	2.0	MBL	07/22/99	1454	153903	9
rontium		20100	29.0	500	UGKG	2.0					
tanium		238000	2000	25000	UGKG	100	MBL	07/23/99	1042	153903	9
allium	U	12100	22100	50000	UGKG	100	MBL	07/23/99	1042	153903	8
allium	U	12100	22100	50000	UGKG	100	MBL	07/23/99	1042	153903	9
anium		28500000	98300	250000	UGKG	100					
anadium		26300	53.0	500	UGKG	2.0	MBL	07/22/99	1454	153903	8
anadium		26300	53.0	500	UGKG	2.0	MBL	07/22/99	1454	153903	9
nc		13900000	18500	25000	UGKG	100	MBL	07/23/99	1042	153903	8
nc		13900000	18500	25000	UGKG	100	MBL	07/23/99	1042	153903	9
neral Chemistry											
tal Halogens - 3 items											
omide	U	0.00	0.141	0.465	MGKG	1.0	RWS	07/16/99	2035	15442210	
lorides	U	0.00	0.168	0.930	MGKG	1.0					
uoride	U	0.00	0.203	0.465	MGKG	1.0					
trogen, Nitrate	U	0.00	0.118	0.500	MGKG	1.0	RWS	07/16/99	2035	15442011	
lfate as SO4	U	0.00	0.353	9.30	mg/kg	1.0					
trogen, Ammonia	U	0.0999	0.241	0.500	MGKG	1.0	THL	07/27/99	1236	15421212	
trogen, Total		0.300	0.0281	0.100	MGKG	1.0	THL	07/30/99	1600	15482213	
trogen, Nitrate/Nitrite	U	0.00	0.0815	0.474	MGKG	1.0	THL	07/30/99	1554	15479514	
osphorus, Total as PO4		220	7.64	20.0	MGKG	100	THL	07/24/99	1144	15410215	

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Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
The following prep procedures were performed:											
GC/MS 5970 Extractables							RDH	07/22/99	0800	154032	N
Herbicides							JPB	07/22/99	1400	154030	N
PCB's							JMA	07/24/99	1600	154173	N
Pesticides							RDH	07/23/99	0800	154073	N
Mercury							AJM	07/21/99	1530	153549	N
TRACE							FGD	07/21/99	1430	153903	N

Surrogate Recovery	Test	Percent %	Acceptable Limits
2,4,6-Tribromophenol	AIXAE-8270C	89.6	(44.5 - 126.)
2-Fluorophenol	AIXAE-8270C	66.5	(37.0 - 102.)
Phenol-d6	AIXAE-8270C	67.5	(41.5 - 102.)
2-Fluorobiphenyl	AIXBN-8270C	61.6	(44.7 - 110.)
Nitrobenzene-d5	AIXBN-8270C	55.3	(42.4 - 107.)
p-Terphenyl-d14	AIXBN-8270C	94.4	(45.5 - 104.)
2,4,6-Tribromophenol	F005C	89.6	(44.5 - 126.)
2-Fluorobiphenyl	F005C	61.6	(44.7 - 110.)
2-Fluorophenol	F005C	66.5	(37.0 - 102.)
Nitrobenzene-d5	F005C	55.3	(42.4 - 107.)
Phenol-d6	F005C	67.5	(41.5 - 102.)
p-Terphenyl-d14	F005C	94.4	(45.5 - 104.)
2,4-Dichlorophenylacetic acid	AIXH-8151B	61.9	(24.0 - 111.)
4CMX	AIXP-8082	63.0	(25.3 - 110.)
Decachlorobiphenyl	AIXP-8082	67.0	(46.8 - 131.)
4CMX	AIXP-8081A	42.0	(36.5 - 131.)
Decachlorobiphenyl	AIXP-8081A	59.3	(50.7 - 135.)
Bromofluorobenzene	AIXVOA-8260B	90.6	(73.0 - 129.)
Dibromofluoromethane	AIXVOA-8260B	98.7	(66.0 - 117.)
Toluene-d8	AIXVOA-8260B	101.	(73.0 - 122.)
Bromofluorobenzene	F001-8260	90.6	(73.0 - 129.)
Dibromofluoromethane	F001-8260	98.7	(66.0 - 117.)
Toluene-d8	F001-8260	101.	(73.0 - 122.)
Bromofluorobenzene	F002-8260	90.6	(73.0 - 129.)
Dibromofluoromethane	F002-8260	98.7	(66.0 - 117.)

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rrogate Recovery	Test	Percent%	Acceptable Limits
luene-d8	F002-8260	101.	(73.0 - 122.)
omofluorobenzene	F003A-8260	90.6	(73.0 - 129.)
bromofluoromethane	F003A-8260	98.7	(66.0 - 117.)
luene-d8	F003A-8260	101.	(73.0 - 122.)
omofluorobenzene	F005A-8260	90.6	(73.0 - 129.)
bromofluoromethane	F005A-8260	98.7	(66.0 - 117.)
luene-d8	F005A-8260	101.	(73.0 - 122.)
omofluorobenzene	M8010 BY 8260	90.6	(73.0 - 129.)
bromofluoromethane	M8010 BY 8260	98.7	(66.0 - 117.)
luene-d8	M8010 BY 8260	101.	(73.0 - 122.)

= Method	Method-Description
1	GC/FID
2	EPA 8260B
3	EPA 8270C
4	EPA8151A
5	EPA 8082
6	EPA 8081A
7	EPA 7471A
8	SW846 6010B
9	EPA 6010B
10	EPA 9056
11	EPA 300.0
12	EPA 350.1 modified
13	EPA 351.2/353.1
14	EPA 353.1 modified
15	EPA 365.4 modified

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M = Method	Method-Description

Notes:
The qualifiers in this report are defined as follows:
ND indicates that the analyte was not detected at a concentration greater than the detection limit.
J indicates presence of analyte at a concentration less than the reporting limit (RL) and greater than the detection limit (DL).
U indicates that the analyte was not detected at a concentration greater than the detection limit.
* indicates that a quality control analyte recovery is outside of specified acceptance criteria.

This data report has been prepared and reviewed
in accordance with General Engineering Laboratories
standard operating procedures. Please direct
any questions to your Project Manager, Stacy Griffin at 769-7376.

Reviewed By

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Project Description: Hazardous Waste Contract

c: WSRC00497 Report Date: August 20, 1999

Sample ID	: COMP 2
Lab ID	: 9907679-66
Matrix	: Solid
Date Collected	: 07/14/99
Date Received	: 07/15/99
Priority	: Routine
Collector	: Client

rameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
latile Organics											
)03 Waste Constituents - FID - 4 items											
hyl Acetate	U	0.00	1.76	10.0	mg/kg	1.0	CAK	07/28/99	1628	154227	1
hyl Ether	U	0.00	3.53	8.82	mg/kg	1.0					
ethyl Alcohol	U	0.00	3.53	8.82	mg/kg	1.0					
Butyl Alcohol	U	0.00	3.53	8.82	mg/kg	1.0					
)05 Waste Constituents - FID - 2 items											
hylene Glycol Monoethylether	U	0.00	0.882	8.82	mg/kg	1.0					
)butyl Alcohol	U	0.00	3.53	10.0	mg/kg	1.0					
)p. IX VOA - 54 items											
1,1,2-Tetrachloroethane	U	0.00	0.200	2.00	UGKG	1.0	JWF	07/27/99	0920	154327	2
1,1-Trichloroethane	U	0.00	0.100	2.00	UGKG	1.0					
1,2,2-Tetrachloroethane	U	0.00	0.600	2.00	UGKG	1.0					
1,2-Trichloroethane	U	0.00	0.300	2.00	UGKG	1.0					
1-Dichloroethane	U	0.00	0.100	2.00	UGKG	1.0					
1-Dichloroethylene	U	0.00	0.300	2.00	UGKG	1.0					
2,3-Trichloropropane	U	0.00	0.400	2.00	UGKG	1.0					
2-Dibromo-3-chloropropane	U	0.00	0.400	2.00	UGKG	1.0					
2-Dibromoethane	U	0.00	0.200	2.00	UGKG	1.0					
2-Dichloroethane	U	0.00	0.200	2.00	UGKG	1.0					
2-Dichloropropane	U	0.00	0.200	2.00	UGKG	1.0					
2-trans-Dichloroethylene	U	0.00	0.100	2.00	UGKG	1.0					
Butanone	U	0.00	3.20	10.0	UGKG	1.0					
Hexanone	U	0.00	2.80	10.0	UGKG	1.0					
Methyl-2-pentanone	U	0.00	3.10	10.0	UGKG	1.0					
cetone	U	1.98	10.3	10.3	UGKG	1.0					
cetonitrile	J	3.70	1.00	10.0	UGKG	1.0					
crolein	U	0.00	4.60	20.0	UGKG	1.0					
crylonitrile	U	0.00	3.90	50.0	UGKG	1.0					

GENERAL ENGINEERING LABORATORIES

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Client: Westinghouse Savannah River Co.
Building 735-16A, Rm. 5
P.O. Box 616
Aiken, South Carolina 29802
Contact: Mr. Richard Groseclose
Project Description: Hazardous Waste Contract

cc: WSRC00497 Report Date: August 20, 1999

Sample ID : COMP 2

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Allyl Chloride	U	0.00	0.400	10.0	UGKG	1.0					
Benzene	U	0.00	0.500	2.00	UGKG	1.0	JWF	07/27/99	0920	154327	2
Bromoform	U	0.00	0.300	2.00	UGKG	1.0					
Carbon Disulfide	U	0.00	0.300	10.0	UGKG	1.0					
Carbon Tetrachloride	U	0.00	0.500	2.00	UGKG	1.0					
Chlorobenzene	U	0.00	0.300	2.00	UGKG	1.0					
Chlorodibromomethane	U	0.00	0.200	2.00	UGKG	1.0					
Chloroethane	U	0.00	0.300	2.00	UGKG	1.0					
Chloroform	J	0.636	0.100	2.00	UGKG	1.0					
Chloroprene	U	0.00	2.00	10.0	UGKG	1.0					
Dibromomethane	U	0.00	0.200	2.00	UGKG	1.0					
Dichlorobromomethane	U	0.00	0.100	2.00	UGKG	1.0					
Dichlorodifluoromethane	U	0.00	1.20	2.00	UGKG	1.0					
Ethyl methacrylate	U	0.00	0.400	10.0	UGKG	1.0					
Ethylbenzene	U	0.00	0.300	2.00	UGKG	1.0					
Isobutyl Alcohol	U	0.00	6.30	20.0	UGKG	1.0					
Methacrylonitrile	U	0.00	0.900	10.0	UGKG	1.0					
Methyl Bromide	U	0.00	0.300	2.00	UGKG	1.0					
Methyl Chloride	U	0.00	0.200	2.00	UGKG	1.0					
Methyl Iodide	U	0.00	0.600	5.00	UGKG	1.0					
Methyl Methacrylate	U	0.00	0.400	10.0	UGKG	1.0					
Methylene Chloride	U	1.36	1.40	5.00	UGKG	1.0					
Pentachloroethane	U	0.00	0.500	10.0	UGKG	1.0					
Propionitrile	U	0.00	3.40	20.0	UGKG	1.0					
Styrene	U	0.00	0.300	2.00	UGKG	1.0					
Tetrachloroethylene	U	0.00	0.400	2.00	UGKG	1.0					
Toluene	U	0.00	0.900	2.00	UGKG	1.0					
Trichloroethylene	U	0.00	0.300	2.00	UGKG	1.0					
Trichlorofluoromethane	U	0.00	0.300	2.00	UGKG	1.0					
Vinyl Acetate	U	0.00	2.10	10.0	UGKG	1.0					
Vinyl chloride	U	0.00	0.400	2.00	UGKG	1.0					
Xylenes (TOTAL)	U	0.00	0.700	4.00	UGKG	1.0					
cis-1,3-Dichloropropylene	U	0.00	0.200	2.00	UGKG	1.0					
trans-1,3-Dichloropropylene	U	0.00	0.300	2.00	UGKG	1.0					
trans-1,4-Dichloro-2-butene	U	0.00	0.500	2.00	UGKG	1.0					

F001 Waste Constituents - 7 items

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arameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
1,1-Trichloroethane	U	0.00	0.100	2.00	UGKG	1.0					
arbon Tetrachloride	U	0.00	0.500	2.00	UGKG	1.0	JWF	07/27/99	0920	154327	2
[ethylene Chloride	U	1.36	1.40	5.00	UGKG	1.0					
etrachloroethylene	U	0.00	0.400	2.00	UGKG	1.0					
richloroethylene	U	0.00	0.300	2.00	UGKG	1.0					
richlorofluoromethane	U	0.00	0.300	2.00	UGKG	1.0					
richlorotrifluoroethane	U	0.00	10.0	10.0	UGKG	1.0					
002 Waste Constituents - 9 items											
1,1-Trichloroethane	U	0.00	0.100	2.00	UGKG	1.0					
1,2-Trichloroethane	U	0.00	0.300	2.00	UGKG	1.0					
2-Dichlorobenzene	U	0.00	0.500	2.00	UGKG	1.0					
hlorobenzene	U	0.00	0.300	2.00	UGKG	1.0					
[ethylene Chloride	U	1.36	1.40	5.00	UGKG	1.0					
etrachloroethylene	U	0.00	0.400	2.00	UGKG	1.0					
richloroethylene	U	0.00	0.300	2.00	UGKG	1.0					
richlorofluoromethane	U	0.00	0.300	2.00	UGKG	1.0					
richlorotrifluoroethane	U	0.00	10.0	10.0	UGKG	1.0					
003 Waste Constituents - GC/MS VOA - 4 items											
-Methyl-2-pentanone	U	0.00	3.10	10.0	UGKG	1.0					
cetone	U	1.98	10.3	10.3	UGKG	1.0					
thylbenzene	U	0.00	0.300	2.00	UGKG	1.0					
ylenes (TOTAL)	U	0.00	0.700	4.00	UGKG	1.0					
005 Waste Constituents - GC/MS VOA - 5 items											
-Butanone	U	0.00	3.20	10.0	UGKG	1.0					
-Nitropropane	U	0.00	3.30	10.0	UGKG	1.0					
enzene	U	0.00	0.500	2.00	UGKG	1.0					
arbon Disulfide	U	0.00	0.300	10.0	UGKG	1.0					
oluene	U	0.00	0.900	2.00	UGKG	1.0					
alogenated Volatile Organics - 29 items											
,1,1-Trichloroethane	U	0.00	0.100	2.00	UGKG	1.0					
,1,2,2-Tetrachloroethane	U	0.00	0.600	2.00	UGKG	1.0					
,1,2-Trichloroethane	U	0.00	0.300	2.00	UGKG	1.0					
,1-Dichloroethane	U	0.00	0.100	2.00	UGKG	1.0					
,1-Dichloroethylene	U	0.00	0.300	2.00	UGKG	1.0					
,2-Dichlorobenzene	U	0.00	0.500	2.00	UGKG	1.0					

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Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
1,2-Dichloroethane	U	0.00	0.200	2.00	UGKG	1.0					
1,2-Dichloropropane	U	0.00	0.200	2.00	UGKG	1.0	JWF	07/27/99	0920	154327	2
1,2-trans-Dichloroethylene	U	0.00	0.100	2.00	UGKG	1.0					
1,3-Dichlorobenzene	U	0.00	0.400	2.00	UGKG	1.0					
1,4-Dichlorobenzene	U	0.00	0.600	2.00	UGKG	1.0					
2-Chloroethylvinyl ether	U	0.00	4.04	5.00	UGKG	1.0					
Bromoform	U	0.00	0.300	2.00	UGKG	1.0					
Carbon Tetrachloride	U	0.00	0.500	2.00	UGKG	1.0					
Chlorobenzene	U	0.00	0.300	2.00	UGKG	1.0					
Chlorodibromomethane	U	0.00	0.200	2.00	UGKG	1.0					
Chloroethane	U	0.00	0.300	2.00	UGKG	1.0					
Chloroform	J	0.636	0.100	2.00	UGKG	1.0					
Dichlorobromomethane	U	0.00	0.100	2.00	UGKG	1.0					
Dichlorodifluoromethane	U	0.00	1.20	2.00	UGKG	1.0					
Methyl Bromide	U	0.00	0.300	2.00	UGKG	1.0					
Methyl Chloride	U	0.00	0.200	2.00	UGKG	1.0					
Methylene Chloride	U	1.36	1.40	5.00	UGKG	1.0					
Tetrachloroethylene	U	0.00	0.400	2.00	UGKG	1.0					
Trichloroethylene	U	0.00	0.300	2.00	UGKG	1.0					
Trichlorofluoromethane	U	0.00	0.300	2.00	UGKG	1.0					
Vinyl chloride	U	0.00	0.400	2.00	UGKG	1.0					
cis-1,3-Dichloropropylene	U	0.00	0.200	2.00	UGKG	1.0					
trans-1,3-Dichloropropylene	U	0.00	0.300	2.00	UGKG	1.0					
Extractable Organics											
App. IX Acid Extractables - 18 items											
2,3,4,6-Tetrachlorophenol	U	0.00	286	333	UGKG	1.0	DDT	07/23/99	2218	154032	3
2,4,5-Trichlorophenol	U	0.00	153	333	UGKG	1.0					
2,4,6-Trichlorophenol	U	0.00	153	333	UGKG	1.0					
2,4-Dichlorophenol	U	0.00	176	333	UGKG	1.0					
2,4-Dimethylphenol	U	0.00	110	333	UGKG	1.0					
2,4-Dinitrophenol	U	0.00	366	666	UGKG	1.0					
2,6-Dichlorophenol	U	0.00	31.0	333	UGKG	1.0					
2-Chlorophenol	U	0.00	157	333	UGKG	1.0					
2-Nitrophenol	U	0.00	180	333	UGKG	1.0					
2-methyl-4,6-dinitrophenol	U	0.00	99.9	333	UGKG	1.0					

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arameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
-sec-Butyl-4,6-Dinitrophenol	U	0.00	330	333	UGKG	1.0					
-Nitrophenol	U	0.00	110	666	UGKG	1.0	DDT	07/23/99	2218	154032	3
-chloro-3-methyl phenol	U	0.00	127	333	UGKG	1.0					
exachlorophene	U	0.00	10800	16700	UGKG	1.0					
entachlorophenol	U	0.00	56.6	333	UGKG	1.0					
henol	U	0.00	120	333	UGKG	1.0					
,p-Cresol	U	0.00	153	666	UGKG	1.0					
Cresol	U	0.00	63.3	333	UGKG	1.0					
pp. IX B/N Extractables - 106 items											
,2,4,5-Tetrachlorobenzene	U	0.00	186	333	UGKG	1.0					
,2,4-Trichlorobenzene	U	0.00	186	333	UGKG	1.0					
,2-Dichlorobenzene	U	0.00	170	333	UGKG	1.0					
,3-Dichlorobenzene	U	0.00	130	333	UGKG	1.0					
,4-Dichlorobenzene	U	0.00	130	333	UGKG	1.0					
,4-Dioxane	U	0.00	60.9	333	UGKG	1.0					
,4-Naphthoquinone	U	0.00	333	333	UGKG	1.0					
-Naphthylamine	U	0.00	184	333	UGKG	1.0					
,4-Dinitrotoluene	U	0.00	117	333	UGKG	1.0					
,6-Dinitrotoluene	U	0.00	140	333	UGKG	1.0					
-Acetylaminofluorene	U	0.00	333	333	UGKG	1.0					
-Chloronaphthalene	U	0.00	173	333	UGKG	1.0					
-Methylnaphthalene	U	0.00	203	333	UGKG	1.0					
-Naphthylamine	U	0.00	320	333	UGKG	1.0					
-Picoline	U	0.00	403	403	UGKG	1.0					
,3'-Dichlorobenzidine	U	0.00	276	1670	UGKG	1.0					
,3'-Dimethylbenzidine	U	0.00	167	1670	UGKG	1.0					
-Methylcholanthrene	U	0.00	333	333	UGKG	1.0					
-Bromophenyl phenyl ether	U	0.00	117	333	UGKG	1.0					
-Chloroaniline	U	0.00	153	333	UGKG	1.0					
-Chlorophenyl phenyl ether	U	0.00	147	333	UGKG	1.0					
-aminobiphenyl	U	0.00	21.6	333	UGKG	1.0					
-Nitro-o-toluidine	U	0.00	196	333	UGKG	1.0					
,12-Dimethylbenz(a)anthracene	U	0.00	316	333	UGKG	1.0					
cenaphthene	U	0.00	160	333	UGKG	1.0					
cenaphthylene	U	0.00	147	333	UGKG	1.0					

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Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Acetophenone	U	0.00	127	333	UGKG	1.0					
Aniline	U	0.00	190	333	UGKG	1.0	DDT	07/23/99	2218	154032	3
Anthracene	U	0.00	86.6	333	UGKG	1.0					
Aramite	U	0.00	276	333	UGKG	1.0					
Benzo(a)anthracene	U	0.00	66.6	333	UGKG	1.0					
Benzo(a)pyrene	U	0.00	73.3	333	UGKG	1.0					
Benzo(b)fluoranthene	U	0.00	143	333	UGKG	1.0					
Benzo(ghi)perylene	U	0.00	79.9	333	UGKG	1.0					
Benzo(k)fluoranthene	U	0.00	133	333	UGKG	1.0					
Benzyl Alcohol	U	0.00	186	333	UGKG	1.0					
Butyl benzyl phthalate	U	0.00	89.9	333	UGKG	1.0					
Chlorobenzilate	U	0.00	53.3	1670	UGKG	1.0					
Chrysene	U	0.00	53.3	333	UGKG	1.0					
Di-n-butyl phthalate	U	0.00	73.3	333	UGKG	1.0					
Di-n-octyl phthalate	U	0.00	173	333	UGKG	1.0					
Diallate	U	0.00	230	333	UGKG	1.0					
Dibenzo(a,h)anthracene	U	0.00	83.3	333	UGKG	1.0					
Dibenzofuran	U	0.00	133	333	UGKG	1.0					
Diethyl phthalate	U	0.00	76.6	333	UGKG	1.0					
Dimethoate	U	0.00	266	1670	UGKG	1.0					
Dimethyl phthalate	U	0.00	110	333	UGKG	1.0					
Diphenylamine	U	0.00	286	333	UGKG	1.0					
Disulfoton	U	0.00	46.3	333	UGKG	1.0					
Ethyl Methanesulfonate	U	0.00	20.3	333	UGKG	1.0					
Ethyl methacrylate	U	0.00	29.6	333	UGKG	1.0					
Famphur	U	0.00	52.9	333	UGKG	1.0					
Fluoranthene	U	0.00	66.6	333	UGKG	1.0					
Fluorene	U	0.00	113	333	UGKG	1.0					
Hexachlorobenzene	U	0.00	69.9	333	UGKG	1.0					
Hexachlorobutadiene	U	0.00	153	333	UGKG	1.0					
Hexachlorocyclopentadiene	U	0.00	193	333	UGKG	1.0					
Hexachloroethane	U	0.00	133	333	UGKG	1.0					
Hexachloropropene	U	0.00	21.0	333	UGKG	1.0					
Indeno(1,2,3-c,d)pyrene	U	0.00	79.9	333	UGKG	1.0					
Isodrin	U	0.00	147	333	UGKG	1.0					

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rameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
phorone	U	0.00	147	333	UGKG	1.0					
safrole	U	0.00	21.6	333	UGKG	1.0	DDT	07/23/99	2218	154032	3
pone	U	0.00	97.6	333	UGKG	1.0					
thapyrilene	U	0.00	160	1670	UGKG	1.0					
thyl Methanesulfonate	U	0.00	303	333	UGKG	1.0					
Nitrosodi-n-butylamine	U	0.00	23.0	333	UGKG	1.0					
Nitrosodiethylamine	U	0.00	20.6	333	UGKG	1.0					
Nitrosodimethylamine	U	0.00	10.3	333	UGKG	1.0					
Nitrosodiphenylamine	U	0.00	117	333	UGKG	1.0					
Nitrosodipropylamine	U	0.00	130	333	UGKG	1.0					
Nitrosomethylethylamine	U	0.00	72.9	333	UGKG	1.0					
Nitrosomorpholine	U	0.00	24.6	333	UGKG	1.0					
Nitrosopiperidine	U	0.00	220	333	UGKG	1.0					
Nitrosopyrolidine	U	0.00	22.3	333	UGKG	1.0					
phthalene	U	0.00	157	333	UGKG	1.0					
trobenzene	U	0.00	133	333	UGKG	1.0					
O,O-Triethylphosphorothioate	U	0.00	233	333	UGKG	1.0					
rathion	U	0.00	167	333	UGKG	1.0					
rathion, methyl	U	0.00	266	333	UGKG	1.0					
ntachlorobenzene	U	0.00	26.6	333	UGKG	1.0					
ntachloroethane	U	0.00	44.6	333	UGKG	1.0					
ntachloronitrobenzene	U	0.00	233	333	UGKG	1.0					
enacetin	U	0.00	193	333	UGKG	1.0					
enanthrene	U	0.00	59.9	333	UGKG	1.0					
orate	U	0.00	293	333	UGKG	1.0					
onamide	U	0.00	216	333	UGKG	1.0					
rene	U	0.00	73.3	333	UGKG	1.0					
ridine	U	0.00	130	333	UGKG	1.0					
frole	U	0.00	17.6	333	UGKG	1.0					
lfotepp	U	0.00	43.3	333	UGKG	1.0					
ionazin	U	0.00	226	333	UGKG	1.0					
,a-Dimethylphenethylamine	U	0.00	106	333	UGKG	1.0					
s(2-Chloroethoxy)methane	U	0.00	170	333	UGKG	1.0					
s(2-Chloroethyl) ether	U	0.00	150	333	UGKG	1.0					
s(2-Chloroisopropyl)ether	U	0.00	103	333	UGKG	1.0					

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bis(2-Ethylhexyl)phthalate	U	0.00	300	333	UGKG	1.0					
m-Dinitrobenzene	U	0.00	29.6	333	UGKG	1.0	DDT	07/23/99	2218	154032	3
m-Nitroaniline	U	0.00	83.3	333	UGKG	1.0					
o-Nitroaniline	U	0.00	66.6	333	UGKG	1.0					
o-Toluidine	U	0.00	280	333	UGKG	1.0					
p-Dimethylaminoazobenzene	U	0.00	210	333	UGKG	1.0					
p-Nitroaniline	U	0.00	103	333	UGKG	1.0					
p-Phenylenediamine	U	0.00	505	666	UGKG	1.0					
sym-Trinitrobenzene	U	0.00	23.3	1670	UGKG	1.0					
F004 Waste Constituents - GC/MS Ext. - 3 items											
Nitrobenzene	U	0.00	133	333	UGKG	1.0					
m,p-Cresol	U	0.00	153	666	UGKG	1.0					
o-Cresol	U	0.00	63.3	333	UGKG	1.0					
Pyridine	U	0.00	130	333	UGKG	1.0					
App. IX Herbicides - 3 items											
2,4,5-T	U	0.00	0.863	10.0	UGKG	10.	JC	07/24/99	1312	154030	4
2,4,5-TP	U	0.00	0.994	10.0	UGKG	10.					
2,4-D	U	0.00	1.46	10.0	UGKG	10.					
PCB analysis - 7 items											
PCB-1016	U	0.00	1.22	41.6	UGKG	1.0	JLW	07/29/99	1103	154173	5
PCB-1221	U	0.00	2.82	41.6	UGKG	1.0					
PCB-1232	U	0.00	1.63	41.6	UGKG	1.0					
PCB-1242	U	0.00	1.67	41.6	UGKG	1.0					
PCB-1248	U	0.00	0.906	41.6	UGKG	1.0					
PCB-1254	U	0.00	1.16	41.6	UGKG	1.0					
PCB-1260	U	0.00	0.942	41.6	UGKG	1.0					
App. IX Pesticides - 19 items											
4,4'-DDD	U	0.00	0.594	1.33	UGKG	1.0	MM	07/27/99	0112	154073	6
4,4'-DDE	U	0.00	0.554	1.33	UGKG	1.0					
4,4'-DDT	U	0.00	0.803	1.33	UGKG	1.0					
Aldrin	U	0.00	0.262	0.670	UGKG	1.0					
Chlordane	U	0.00	4.92	8.33	UGKG	1.0					
Dieldrin	U	0.00	0.740	1.33	UGKG	1.0					
Endosulfan I	U	0.00	0.458	0.670	UGKG	1.0					
Endosulfan II	U	0.00	0.687	1.33	UGKG	1.0					

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rameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
dosulfan sulfate	U	0.00	0.920	0.920	UGKG	1.0					
drin	U	0.00	0.687	1.33	UGKG	1.0	MM	07/27/99	0112	154073	6
drin aldehyde	U	0.00	1.00	1.33	UGKG	1.0					
ptachlor	U	0.00	0.438	0.670	UGKG	1.0					
ptachlor epoxide	U	0.00	0.219	0.670	UGKG	1.0					
ethoxychlor	U	0.00	3.58	6.70	UGKG	1.0					
xaphene	U	0.00	11.0	33.3	UGKG	1.0					
ha-BHC	U	0.00	0.266	0.670	UGKG	1.0					
a-BHC	U	0.00	0.392	0.670	UGKG	1.0					
ta-BHC	U	0.00	0.286	0.670	UGKG	1.0					
mma-BHC	U	0.00	0.352	0.670	UGKG	1.0					
tals Analysis											
ercury	U	-6.89	1.92	33.3	UGKG	1.0	RPM2	07/22/99	1417	153549	7
ver		11500	69.8	485	UGKG	2.0	MBL	07/22/99	1500	153903	8
ver		11500	69.8	485	UGKG	2.0	MBL	07/22/99	1500	153903	9
uminum		57300000	57300	243000	UGKG	100	MBL	07/23/99	1048	153903	9
senic		4840	441	485	UGKG	2.0	MBL	07/22/99	1500	153903	8
senic		4840	441	485	UGKG	2.0	MBL	07/22/99	1500	153903	9
ron		31300000	12300	243000	UGKG	100	MBL	07/23/99	1048	153903	9
rium		116000	52.4	485	UGKG	2.0	MBL	07/22/99	1500	153903	8
rium		116000	52.4	485	UGKG	2.0	MBL	07/22/99	1500	153903	9
ryllium		733	23.3	485	UGKG	2.0	MBL	07/22/99	1500	153903	8
ryllium		733	23.3	485	UGKG	2.0	MBL	07/22/99	1500	153903	9
lcium		2180000	6760	9700	UGKG	2.0					
dmium		2040	36.9	485	UGKG	2.0	MBL	07/22/99	1500	153903	8
dmium		2040	36.9	485	UGKG	2.0	MBL	07/22/99	1500	153903	9
balt		15900	32.0	485	UGKG	2.0	MBL	07/22/99	1500	153903	8
balt		15900	32.0	485	UGKG	2.0	MBL	07/22/99	1500	153903	9
romium		401000	73.7	485	UGKG	2.0	MBL	07/22/99	1500	153903	8
romium		401000	73.7	485	UGKG	2.0	MBL	07/22/99	1500	153903	9
pper		63100	130	485	UGKG	2.0	MBL	07/22/99	1500	153903	8
pper		63100	130	485	UGKG	2.0	MBL	07/22/99	1500	153903	9
n		23200000	11700	11700	UGKG	2.0					
tassium		7150000	2750	9700	UGKG	2.0					
agnesium		5130000	492	970	UGKG	2.0					

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Contact: Mr. Richard Groseclose
Project Description: Hazardous Waste Contract

cc: WSRC00497 Report Date: August 20, 1999

Sample ID : COMP 2

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Manganese		346000	688	970	UGKG	2.0					
Molybdenum		3610	128	970	UGKG	2.0	MBL	07/22/99	1500	153903	9
Sodium		107000000	311000	485000	UGKG	100	MBL	07/23/99	1048	153903	9
Nickel		6270000	3060	24300	UGKG	100	MBL	07/23/99	1048	153903	8
Nickel		6270000	3060	24300	UGKG	100	MBL	07/23/99	1048	153903	9
Lead		74900	152	485	UGKG	2.0	MBL	07/22/99	1500	153903	8
Lead		74900	152	485	UGKG	2.0	MBL	07/22/99	1500	153903	9
Antimony	U	1110	18500	48500	UGKG	100	MBL	07/23/99	1048	153903	8
Antimony	U	1110	18500	48500	UGKG	100	MBL	07/23/99	1048	153903	9
Selenium	U	3350	13100	24300	UGKG	100	MBL	07/23/99	1048	153903	8
Selenium	U	3350	13100	24300	UGKG	100	MBL	07/23/99	1048	153903	9
Silicon		2630000	136000	485000	UGKG	100					
Tin		12100	808	970	UGKG	2.0	MBL	07/22/99	1500	153903	8
Tin		12100	808	970	UGKG	2.0	MBL	07/22/99	1500	153903	9
Strontium		29500	28.1	485	UGKG	2.0					
Titanium		338000	1940	24300	UGKG	100	MBL	07/23/99	1048	153903	9
Thallium	U	13400	21400	48500	UGKG	100	MBL	07/23/99	1048	153903	8
Thallium	U	13400	21400	48500	UGKG	100	MBL	07/23/99	1048	153903	9
Uranium		43100000	95400	243000	UGKG	100					
Vanadium		37100	51.4	485	UGKG	2.0	MBL	07/22/99	1500	153903	8
Vanadium		37100	51.4	485	UGKG	2.0	MBL	07/22/99	1500	153903	9
Zinc		18900000	17900	24300	UGKG	100	MBL	07/23/99	1048	153903	8
Zinc		18900000	17900	24300	UGKG	100	MBL	07/23/99	1048	153903	9
General Chemistry											
Total Halogens - 3 items											
Bromide	U	0.00	0.170	0.560	MGKG	1.0	RWS	07/16/99	2049	15442210	
Chlorides	U	0.00	0.203	1.12	MGKG	1.0					
Fluoride	U	0.00	0.244	0.560	MGKG	1.0					
Nitrogen, Nitrate	U	0.00	0.142	0.560	MGKG	1.0	RWS	07/16/99	2049	15442011	
Sulfate as SO4	U	0.00	0.426	11.2	mg/kg	1.0					
Nitrogen, Ammonia	U	0.200	0.241	0.500	MGKG	1.0	THL	07/27/99	1236	15421212	
Nitrogen, Total		0.400	0.0281	0.100	MGKG	1.0	THL	07/30/99	1600	15482213	
Nitrogen, Nitrate/Nitrite	U	0.00	0.0835	0.486	MGKG	1.0	THL	07/30/99	1554	15479514	
Phosphorus, Total as PO4		344	7.64	20.0	MGKG	100	THL	07/24/99	1144	15410215	

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Sample ID : COMP 2

rameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
e following prep procedures were performed:											
C/MS 5970 Extractables							RDH	07/22/99	0800	154032	N
erbicides							JPB	07/22/99	1400	154030	N
CB's							JMA	07/24/99	1600	154173	N
sticides							RDH	07/23/99	0800	154073	N
ercury							AJM	07/21/99	1530	153549	N
RACE							FGD	07/21/99	1430	153903	N

rrogate Recovery	Test	Percent%	Acceptable Limits
4,6-Tribromophenol	AIXAE-8270C	72.2	(44.5 - 126.)
Fluorophenol	AIXAE-8270C	61.4	(37.0 - 102.)
enol-d6	AIXAE-8270C	63.0	(41.5 - 102.)
Fluorobiphenyl	AIXBN-8270C	58.4	(44.7 - 110.)
itrobenzene-d5	AIXBN-8270C	50.7	(42.4 - 107.)
Terphenyl-d14	AIXBN-8270C	96.9	(45.5 - 104.)
4,6-Tribromophenol	F005C	72.2	(44.5 - 126.)
Fluorobiphenyl	F005C	58.4	(44.7 - 110.)
Fluorophenol	F005C	61.4	(37.0 - 102.)
itrobenzene-d5	F005C	50.7	(42.4 - 107.)
enol-d6	F005C	63.0	(41.5 - 102.)
Terphenyl-d14	F005C	96.9	(45.5 - 104.)
4-Dichlorophenylacetic acid	AIXH-8151B	64.0	(24.0 - 111.)
CMX	AIXP-8082	57.5	(25.3 - 110.)
ecachlorobiphenyl	AIXP-8082	61.0	(46.8 - 131.)
CMX	AIXP-8081A	58.9	(36.5 - 131.)
CMX	AIXP-8081A	58.9	(36.5 - 131.)
ecachlorobiphenyl	AIXP-8081A	67.5	(50.7 - 135.)
ecachlorobiphenyl	AIXP-8081A	67.5	(50.7 - 135.)
romofluorobenzene	AIXVOA-8260B	89.8	(73.0 - 129.)
ibromofluoromethane	AIXVOA-8260B	97.9	(66.0 - 117.)
oluene-d8	AIXVOA-8260B	102.	(73.0 - 122.)
romofluorobenzene	F001-8260	89.8	(73.0 - 129.)
Dibromofluoromethane	F001-8260	97.9	(66.0 - 117.)
Toluene-d8	F001-8260	102.	(73.0 - 122.)

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Building 735-16A, Rm. 5
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Contact: Mr. Richard Groseclose
Project Description: Hazardous Waste Contract

cc: WSRC00497 Report Date: August 20, 1999

Sample ID : COMP 2

Surrogate Recovery	Test	Percent%	Acceptable Limits
Bromofluorobenzene	F002-8260	89.8	(73.0 - 129.)
Dibromofluoromethane	F002-8260	97.9	(66.0 - 117.)
Toluene-d8	F002-8260	102.	(73.0 - 122.)
Bromofluorobenzene	F003A-8260	89.8	(73.0 - 129.)
Dibromofluoromethane	F003A-8260	97.9	(66.0 - 117.)
Toluene-d8	F003A-8260	102.	(73.0 - 122.)
Bromofluorobenzene	F005A-8260	89.8	(73.0 - 129.)
Dibromofluoromethane	F005A-8260	97.9	(66.0 - 117.)
Toluene-d8	F005A-8260	102.	(73.0 - 122.)
Bromofluorobenzene	M8010 BY 8260	89.8	(73.0 - 129.)
Dibromofluoromethane	M8010 BY 8260	97.9	(66.0 - 117.)
Toluene-d8	M8010 BY 8260	102.	(73.0 - 122.)

M = Method	Method-Description
M 1	GC/FID
M 2	EPA 8260B
M 3	EPA 8270C
M 4	EPA8151A
M 5	EPA 8082
M 6	EPA 8081A
M 7	EPA 7471A
M 8	SW846 6010B
M 9	EPA 6010B
M 10	EPA 9056
M 11	EPA 300.0
M 12	EPA 350.1 modified
M 13	EPA 351.2/353.1
M 14	EPA 353.1 modified
M 15	EPA 365.4 modified

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= Method	Method-Description

tes:
: qualifiers in this report are defined as follows:
) indicates that the analyte was not detected at a concentration greater than the detection limit.
ıdicates presence of analyte at a concentration less than the reporting limit (RL) and greater than the detection limit (DL).
ndicates that the analyte was not detected at a concentration greater than the detection limit.
ldicates that a quality control analyte recovery is outside of specified acceptance criteria.

ıs data report has been prepared and reviewed
ıccordance with General Engineering Laboratories
ndard operating procedures. Please direct
/ questions to your Project Manager, Stacy Griffin at 769-7376.

viewed By

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Contact: Mr. Richard Groseclose
Project Description: Hazardous Waste Contract

cc: WSRC00497 Report Date: August 20, 1999

Sample ID	: COMP 3
Lab ID	: 9907679-68
Matrix	: Solid
Date Collected	: 07/14/99
Date Received	: 07/15/99
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Volatile Organics											
F003 Waste Constituents - FID - 4 items											
Ethyl Acetate	U	0.00	1.82	10.0	mg/kg	1.0	CAK	07/28/99	1654	154227	1
Ethyl Ether	U	0.00	3.64	9.09	mg/kg	1.0					
Methyl Alcohol	U	0.00	3.64	9.09	mg/kg	1.0					
n-Butyl Alcohol	U	0.00	3.64	9.09	mg/kg	1.0					
F005 Waste Constituents - FID - 2 items											
Ethylene Glycol Monoethylether	U	0.00	0.909	9.09	mg/kg	1.0					
Isobutyl Alcohol	U	0.00	3.64	10.0	mg/kg	1.0					
App. IX VOA - 54 items											
1,1,1,2-Tetrachloroethane	U	0.00	0.200	2.00	UGKG	1.0	JWF	07/28/99	0748	154538	2
1,1,1-Trichloroethane	U	0.00	0.100	2.00	UGKG	1.0					
1,1,2,2-Tetrachloroethane	U	0.00	0.600	2.00	UGKG	1.0					
1,1,2-Trichloroethane	U	0.00	0.300	2.00	UGKG	1.0					
1,1-Dichloroethane	U	0.00	0.100	2.00	UGKG	1.0					
1,1-Dichloroethylene	U	0.00	0.300	2.00	UGKG	1.0					
1,2,3-Trichloropropane	U	0.00	0.400	2.00	UGKG	1.0					
1,2-Dibromo-3-chloropropane	U	0.00	0.400	2.00	UGKG	1.0					
1,2-Dibromoethane	U	0.00	0.200	2.00	UGKG	1.0					
1,2-Dichloroethane	U	0.00	0.200	2.00	UGKG	1.0					
1,2-Dichloropropane	U	0.00	0.200	2.00	UGKG	1.0					
1,2-trans-Dichloroethylene	U	0.00	0.100	2.00	UGKG	1.0					
2-Butanone	U	0.00	3.20	10.0	UGKG	1.0					
2-Hexanone	U	0.00	2.80	10.0	UGKG	1.0					
4-Methyl-2-pentanone	U	0.00	3.10	10.0	UGKG	1.0					
Acetone	U	1.89	10.3	10.3	UGKG	1.0					
Acetonitrile	J	9.58	1.00	10.0	UGKG	1.0					
Acrolein	U	0.00	4.60	20.0	UGKG	1.0					
Acrylonitrile	U	0.00	3.90	50.0	UGKG	1.0					

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Sample ID : COMP 3

rameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
lyl Chloride	U	0.00	0.400	10.0	UGKG	1.0					
enzene	U	0.00	0.500	2.00	UGKG	1.0	JWF	07/28/99	0748	154538	2
omoform	U	0.00	0.300	2.00	UGKG	1.0					
rbon Disulfide	U	0.00	0.300	10.0	UGKG	1.0					
rbon Tetrachloride	U	0.00	0.500	2.00	UGKG	1.0					
lorobenzene	U	0.00	0.300	2.00	UGKG	1.0					
lorodibromomethane	U	0.00	0.200	2.00	UGKG	1.0					
loroethane	U	0.00	0.300	2.00	UGKG	1.0					
loroform	U	0.00	0.100	2.00	UGKG	1.0					
loroprene	U	0.00	2.00	10.0	UGKG	1.0					
ibromomethane	U	0.00	0.200	2.00	UGKG	1.0					
ichlorobromomethane	U	0.00	0.100	2.00	UGKG	1.0					
ichlorodifluoromethane	U	0.00	1.20	2.00	UGKG	1.0					
hyl methacrylate	U	0.00	0.400	10.0	UGKG	1.0					
hylbenzene	U	0.00	0.300	2.00	UGKG	1.0					
obutyl Alcohol	U	0.00	6.30	20.0	UGKG	1.0					
ethacrylonitrile	U	0.00	0.900	10.0	UGKG	1.0					
ethyl Bromide	U	0.00	0.300	2.00	UGKG	1.0					
ethyl Chloride	U	0.00	0.200	2.00	UGKG	1.0					
ethyl Iodide	U	0.00	0.600	5.00	UGKG	1.0					
ethyl Methacrylate	U	0.00	0.400	10.0	UGKG	1.0					
ethylene Chloride	U	1.07	1.40	5.00	UGKG	1.0					
ntachloroethane	U	0.00	0.500	10.0	UGKG	1.0					
opionitrile	U	0.00	3.40	20.0	UGKG	1.0					
yrene	U	0.00	0.300	2.00	UGKG	1.0					
etrachloroethylene	U	0.00	0.400	2.00	UGKG	1.0					
oluene	U	0.00	0.900	2.00	UGKG	1.0					
richloroethylene	U	0.00	0.300	2.00	UGKG	1.0					
richlorofluoromethane	U	0.00	0.300	2.00	UGKG	1.0					
inyl Acetate	U	0.00	2.10	10.0	UGKG	1.0					
inyl chloride	U	0.00	0.400	2.00	UGKG	1.0					
ylenes (TOTAL)	U	0.00	0.700	4.00	UGKG	1.0					
s-1,3-Dichloropropylene	U	0.00	0.200	2.00	UGKG	1.0					
ans-1,3-Dichloropropylene	U	0.00	0.300	2.00	UGKG	1.0					
ans-1,4-Dichloro-2-butene	U	0.00	0.500	2.00	UGKG	1.0					

F001 Waste Constituents - 7 items

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Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
1,1,1-Trichloroethane	U	0.00	0.100	2.00	UGKG	1.0					
Carbon Tetrachloride	U	0.00	0.500	2.00	UGKG	1.0	JWF	07/28/99	0748	154538	2
Methylene Chloride	U	1.07	1.40	5.00	UGKG	1.0					
Tetrachloroethylene	U	0.00	0.400	2.00	UGKG	1.0					
Trichloroethylene	U	0.00	0.300	2.00	UGKG	1.0					
Trichlorofluoromethane	U	0.00	0.300	2.00	UGKG	1.0					
Trichlorotrifluoroethane	U	0.00	10.0	10.0	UGKG	1.0					
F002 Waste Constituents - 9 items											
1,1,1-Trichloroethane	U	0.00	0.100	2.00	UGKG	1.0					
1,1,2-Trichloroethane	U	0.00	0.300	2.00	UGKG	1.0					
1,2-Dichlorobenzene	U	0.00	0.500	2.00	UGKG	1.0					
Chlorobenzene	U	0.00	0.300	2.00	UGKG	1.0					
Methylene Chloride	U	1.07	1.40	5.00	UGKG	1.0					
Tetrachloroethylene	U	0.00	0.400	2.00	UGKG	1.0					
Trichloroethylene	U	0.00	0.300	2.00	UGKG	1.0					
Trichlorofluoromethane	U	0.00	0.300	2.00	UGKG	1.0					
Trichlorotrifluoroethane	U	0.00	10.0	10.0	UGKG	1.0					
F003 Waste Constituents - GC/MS VOA - 4 items											
4-Methyl-2-pentanone	U	0.00	3.10	10.0	UGKG	1.0					
Acetone	U	1.89	10.3	10.3	UGKG	1.0					
Ethylbenzene	U	0.00	0.300	2.00	UGKG	1.0					
Xylenes (TOTAL)	U	0.00	0.700	4.00	UGKG	1.0					
F005 Waste Constituents - GC/MS VOA - 5 items											
2-Butanone	U	0.00	3.20	10.0	UGKG	1.0					
2-Nitropropane	U	0.00	3.30	10.0	UGKG	1.0					
Benzene	U	0.00	0.500	2.00	UGKG	1.0					
Carbon Disulfide	U	0.00	0.300	10.0	UGKG	1.0					
Toluene	U	0.00	0.900	2.00	UGKG	1.0					
Halogenated Volatile Organics - 29 items											
1,1,1-Trichloroethane	U	0.00	0.100	2.00	UGKG	1.0					
1,1,2,2-Tetrachloroethane	U	0.00	0.600	2.00	UGKG	1.0					
1,1,2-Trichloroethane	U	0.00	0.300	2.00	UGKG	1.0					
1,1-Dichloroethane	U	0.00	0.100	2.00	UGKG	1.0					
1,1-Dichloroethylene	U	0.00	0.300	2.00	UGKG	1.0					
1,2-Dichlorobenzene	U	0.00	0.500	2.00	UGKG	1.0					

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rameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
?-Dichloroethane	U	0.00	0.200	2.00	UGKG	1.0					
?-Dichloropropane	U	0.00	0.200	2.00	UGKG	1.0	JWF	07/28/99	0748	154538	2
?-trans-Dichloroethylene	U	0.00	0.100	2.00	UGKG	1.0					
?-Dichlorobenzene	U	0.00	0.400	2.00	UGKG	1.0					
?-Dichlorobenzene	U	0.00	0.600	2.00	UGKG	1.0					
Chloroethylvinyl ether	U	0.00	4.04	5.00	UGKG	1.0					
omoform	U	0.00	0.300	2.00	UGKG	1.0					
rbon Tetrachloride	U	0.00	0.500	2.00	UGKG	1.0					
lorobenzene	U	0.00	0.300	2.00	UGKG	1.0					
lorodibromomethane	U	0.00	0.200	2.00	UGKG	1.0					
loroethane	U	0.00	0.300	2.00	UGKG	1.0					
loroform	U	0.00	0.100	2.00	UGKG	1.0					
chlorobromomethane	U	0.00	0.100	2.00	UGKG	1.0					
chlorodifluoromethane	U	0.00	1.20	2.00	UGKG	1.0					
ethyl Bromide	U	0.00	0.300	2.00	UGKG	1.0					
ethyl Chloride	U	0.00	0.200	2.00	UGKG	1.0					
ethylene Chloride	U	1.07	1.40	5.00	UGKG	1.0					
trachloroethylene	U	0.00	0.400	2.00	UGKG	1.0					
ichloroethylene	U	0.00	0.300	2.00	UGKG	1.0					
ichlorofluoromethane	U	0.00	0.300	2.00	UGKG	1.0					
nyl chloride	U	0.00	0.400	2.00	UGKG	1.0					
s-1,3-Dichloropropylene	U	0.00	0.200	2.00	UGKG	1.0					
ns-1,3-Dichloropropylene	U	0.00	0.300	2.00	UGKG	1.0					
tractable Organics											
p. IX Acid Extractables - 18 items											
3,4,6-Tetrachlorophenol	U	0.00	280	330	UGKG	1.0	DDT	07/23/99	2247	154032	3
4,5-Trichlorophenol	U	0.00	150	330	UGKG	1.0					
4,6-Trichlorophenol	U	0.00	150	330	UGKG	1.0					
4-Dichlorophenol	U	0.00	172	330	UGKG	1.0					
4-Dimethylphenol	U	0.00	107	330	UGKG	1.0					
4-Dinitrophenol	U	0.00	358	660	UGKG	1.0					
6-Dichlorophenol	U	0.00	30.2	330	UGKG	1.0					
Chlorophenol	U	0.00	153	330	UGKG	1.0					
Nitrophenol	U	0.00	176	330	UGKG	1.0					
methyl-4,6-dinitrophenol	U	0.00	97.5	330	UGKG	1.0					

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cc: WSRC00497 Report Date: August 20, 1999

Sample ID : COMP 3

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
2-sec-Butyl-4,6-Dinitrophenol	U	0.00	322	330	UGKG	1.0					
4-Nitrophenol	U	0.00	107	660	UGKG	1.0	DDT	07/23/99	2247	154032	3
4-chloro-3-methyl phenol	U	0.00	124	330	UGKG	1.0					
Hexachlorophene	U	0.00	10500	16300	UGKG	1.0					
Pentachlorophenol	U	0.00	55.3	330	UGKG	1.0					
Phenol	U	0.00	117	330	UGKG	1.0					
m,p-Cresol	U	0.00	150	660	UGKG	1.0					
o-Cresol	U	0.00	61.8	330	UGKG	1.0					
App. IX B/N Extractables - 106 items											
1,2,4,5-Tetrachlorobenzene	U	0.00	182	330	UGKG	1.0					
1,2,4-Trichlorobenzene	U	0.00	182	330	UGKG	1.0					
1,2-Dichlorobenzene	U	0.00	166	330	UGKG	1.0					
1,3-Dichlorobenzene	U	0.00	127	330	UGKG	1.0					
1,4-Dichlorobenzene	U	0.00	127	330	UGKG	1.0					
1,4-Dioxane	U	0.00	59.5	330	UGKG	1.0					
1,4-Naphthoquinone	U	0.00	325	330	UGKG	1.0					
1-Naphthylamine	U	0.00	179	330	UGKG	1.0					
2,4-Dinitrotoluene	U	0.00	114	330	UGKG	1.0					
2,6-Dinitrotoluene	U	0.00	137	330	UGKG	1.0					
2-Acetylaminofluorene	U	0.00	325	330	UGKG	1.0					
2-Chloronaphthalene	U	0.00	169	330	UGKG	1.0					
2-Methylnaphthalene	U	0.00	198	330	UGKG	1.0					
2-Naphthylamine	U	0.00	312	330	UGKG	1.0					
2-Picoline	U	0.00	393	393	UGKG	1.0					
3,3'-Dichlorobenzidine	U	0.00	270	1650	UGKG	1.0					
3,3'-Dimethylbenzidine	U	0.00	163	1650	UGKG	1.0					
3-Methylcholanthrene	U	0.00	325	330	UGKG	1.0					
4-Bromophenyl phenyl ether	U	0.00	114	330	UGKG	1.0					
4-Chloroaniline	U	0.00	150	330	UGKG	1.0					
4-Chlorophenyl phenyl ether	U	0.00	143	330	UGKG	1.0					
4-aminobiphenyl	U	0.00	21.1	330	UGKG	1.0					
5-Nitro-o-toluidine	U	0.00	192	330	UGKG	1.0					
7,12-Dimethylbenz(a)anthracene	U	0.00	309	330	UGKG	1.0					
Acenaphthene	U	0.00	156	330	UGKG	1.0					
Acenaphthylene	U	0.00	143	330	UGKG	1.0					

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ırameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
cetophenone	U	0.00	124	330	UGKG	1.0					
niline	U	0.00	185	330	UGKG	1.0	DDT	07/23/99	2247	154032	3
nthracene	U	0.00	84.5	330	UGKG	1.0					
ramite	U	0.00	270	330	UGKG	1.0					
enzo(a)anthracene	U	0.00	65.0	330	UGKG	1.0					
enzo(a)pyrene	U	0.00	71.5	330	UGKG	1.0					
enzo(b)fluoranthene	U	0.00	140	330	UGKG	1.0					
nzo(ghi)perylene	U	0.00	78.0	330	UGKG	1.0					
enzo(k)fluoranthene	U	0.00	130	330	UGKG	1.0					
enzyl Alcohol	U	0.00	182	330	UGKG	1.0					
utyl benzyl phthalate	U	0.00	87.8	330	UGKG	1.0					
hlorobenzilate	U	0.00	52.0	1650	UGKG	1.0					
hrysene	U	0.00	52.0	330	UGKG	1.0					
i-n-butyl phthalate	U	0.00	71.5	330	UGKG	1.0					
i-n-octyl phthalate	U	0.00	169	330	UGKG	1.0					
iallate	U	0.00	224	330	UGKG	1.0					
ibenzo(a,h)anthracene	U	0.00	81.3	330	UGKG	1.0					
ibenzofuran	U	0.00	130	330	UGKG	1.0					
iethyl phthalate	U	0.00	74.8	330	UGKG	1.0					
imethoate	U	0.00	260	1650	UGKG	1.0					
imethyl phthalate	U	0.00	107	330	UGKG	1.0					
iphenylamine	U	0.00	280	330	UGKG	1.0					
isulfoton	U	0.00	45.2	330	UGKG	1.0					
thyl Methanesulfonate	U	0.00	19.8	330	UGKG	1.0					
thyl methacrylate	U	0.00	28.9	330	UGKG	1.0					
amphur	U	0.00	51.7	330	UGKG	1.0					
luoranthene	U	0.00	65.0	330	UGKG	1.0					
luorene	U	0.00	111	330	UGKG	1.0					
lexachlorobenzene	U	0.00	68.3	330	UGKG	1.0					
lexachlorobutadiene	U	0.00	150	330	UGKG	1.0					
lexachlorocyclopentadiene	U	0.00	189	330	UGKG	1.0					
lexachloroethane	U	0.00	130	330	UGKG	1.0					
lexachloropropene	U	0.00	20.5	330	UGKG	1.0					
ıdeno(1,2,3-c,d)pyrene	U	0.00	78.0	330	UGKG	1.0					
sodrin	U	0.00	143	330	UGKG	1.0					

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Isophorone	U	0.00	143	330	UGKG	1.0					
Isosafrole	U	0.00	21.1	330	UGKG	1.0	DDT	07/23/99	2247	154032	3
Kepone	U	0.00	95.2	330	UGKG	1.0					
Methapyrilene	U	0.00	156	1650	UGKG	1.0					
Methyl Methanesulfonate	U	0.00	296	330	UGKG	1.0					
N-Nitrosodi-n-butylamine	U	0.00	22.4	330	UGKG	1.0					
N-Nitrosodiethylamine	U	0.00	20.2	330	UGKG	1.0					
N-Nitrosodimethylamine	U	0.00	10.1	330	UGKG	1.0					
N-Nitrosodiphenylamine	U	0.00	114	330	UGKG	1.0					
N-Nitrosodipropylamine	U	0.00	127	330	UGKG	1.0					
N-Nitrosomethylethylamine	U	0.00	71.2	330	UGKG	1.0					
N-Nitrosomorpholine	U	0.00	24.1	330	UGKG	1.0					
N-Nitrosopiperidine	U	0.00	215	330	UGKG	1.0					
N-Nitrosopyrolidine	U	0.00	21.8	330	UGKG	1.0					
Naphthalene	U	0.00	153	330	UGKG	1.0					
Nitrobenzene	U	0.00	130	330	UGKG	1.0					
O,O,O-Triethylphosphorothioate	U	0.00	228	330	UGKG	1.0					
Parathion	U	0.00	163	330	UGKG	1.0					
Parathion, methyl	U	0.00	260	330	UGKG	1.0					
Pentachlorobenzene	U	0.00	26.0	330	UGKG	1.0					
Pentachloroethane	U	0.00	43.6	330	UGKG	1.0					
Pentachloronitrobenzene	U	0.00	228	330	UGKG	1.0					
Phenacetin	U	0.00	189	330	UGKG	1.0					
Phenanthrene	U	0.00	58.5	330	UGKG	1.0					
Phorate	U	0.00	286	330	UGKG	1.0					
Pronamide	U	0.00	211	330	UGKG	1.0					
Pyrene	U	0.00	71.5	330	UGKG	1.0					
Pyridine	U	0.00	127	330	UGKG	1.0					
Safrole	U	0.00	17.2	330	UGKG	1.0					
Sulfotepp	U	0.00	42.3	330	UGKG	1.0					
Thionazin	U	0.00	221	330	UGKG	1.0					
a-,a-Dimethylphenethylamine	U	0.00	103	330	UGKG	1.0					
bis(2-Chloroethoxy)methane	U	0.00	166	330	UGKG	1.0					
bis(2-Chloroethyl) ether	U	0.00	146	330	UGKG	1.0					
bis(2-Chloroisopropyl)ether	U	0.00	101	330	UGKG	1.0					

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rameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
(2-Ethylhexyl)phthalate	U	0.00	293	330	UGKG	1.0					
Dinitrobenzene	U	0.00	28.9	330	UGKG	1.0	DDT	07/23/99	2247	154032	3
Nitroaniline	U	0.00	81.3	330	UGKG	1.0					
Nitroaniline	U	0.00	65.0	330	UGKG	1.0					
Toluidine	U	0.00	273	330	UGKG	1.0					
Dimethylaminoazobenzene	U	0.00	205	330	UGKG	1.0					
Nitroaniline	U	0.00	101	330	UGKG	1.0					
Phenylenediamine	U	0.00	493	660	UGKG	1.0					
m-Trinitrobenzene	U	0.00	22.8	1650	UGKG	1.0					
04 Waste Constituents - GC/MS Ext. - 3 items											
trobenzene	U	0.00	130	330	UGKG	1.0					
p-Cresol	U	0.00	150	660	UGKG	1.0					
Cresol	U	0.00	61.8	330	UGKG	1.0					
ridine	U	0.00	127	330	UGKG	1.0					
p. IX Herbicides - 3 items											
4,5-T	U	0.00	0.863	10.0	UGKG	10.	JC	07/24/99	1334	154030	4
4,5-TP	U	0.00	0.994	10.0	UGKG	10.					
4-D	U	0.00	1.46	10.0	UGKG	10.					
CB analysis - 7 items											
CB-1016	U	0.00	1.22	41.6	UGKG	1.0	JLW	07/29/99	1121	154173	5
CB-1221	U	0.00	2.82	41.6	UGKG	1.0					
CB-1232	U	0.00	1.63	41.6	UGKG	1.0					
CB-1242	U	0.00	1.67	41.6	UGKG	1.0					
CB-1248	U	0.00	0.906	41.6	UGKG	1.0					
CB-1254	U	0.00	1.16	41.6	UGKG	1.0					
CB-1260	U	0.00	0.942	41.6	UGKG	1.0					
p. IX Pesticides - 19 items											
4'-DDD	U	0.00	0.596	1.33	UGKG	1.0	MM	07/27/99	0135	154073	6
4'-DDE	U	0.00	0.556	1.33	UGKG	1.0					
4'-DDT	U	0.00	0.806	1.33	UGKG	1.0					
ldrin	U	0.00	0.263	0.670	UGKG	1.0					
hlordane	U	0.00	4.94	8.33	UGKG	1.0					
ieldrin	U	0.00	0.743	1.33	UGKG	1.0					
ndosulfan I	U	0.00	0.460	0.670	UGKG	1.0					
ndosulfan II	U	0.00	0.689	1.33	UGKG	1.0					

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Endosulfan sulfate	U	0.00	0.922	0.922	UGKG	1.0					
Endrin	U	0.00	0.689	1.33	UGKG	1.0	MM	07/27/99	0135	154073	6
Endrin aldehyde	U	0.00	1.01	1.33	UGKG	1.0					
Heptachlor	U	0.00	0.440	0.670	UGKG	1.0					
Heptachlor epoxide	U	0.00	0.220	0.670	UGKG	1.0					
Methoxychlor	U	0.00	3.59	6.70	UGKG	1.0					
Toxaphene	U	0.00	11.1	33.3	UGKG	1.0					
alpha-BHC	U	0.00	0.266	0.670	UGKG	1.0					
beta-BHC	U	0.00	0.393	0.670	UGKG	1.0					
delta-BHC	U	0.00	0.286	0.670	UGKG	1.0					
gamma-BHC	U	0.00	0.353	0.670	UGKG	1.0					
Metals Analysis											
Mercury	U	-6.97	2.08	33.3	UGKG	1.0	RPM2	07/22/99	1419	153549	7
Silver		5270	69.8	485	UGKG	2.0	MBL	07/22/99	1506	153903	8
Silver		5270	69.8	485	UGKG	2.0	MBL	07/22/99	1506	153903	9
Aluminum		58000000	57300	243000	UGKG	100	MBL	07/23/99	1054	153903	9
Arsenic		2010	441	485	UGKG	2.0	MBL	07/22/99	1506	153903	8
Arsenic		2010	441	485	UGKG	2.0	MBL	07/22/99	1506	153903	9
Boron		30300000	12300	243000	UGKG	100	MBL	07/23/99	1054	153903	9
Barium		101000	52.4	485	UGKG	2.0	MBL	07/22/99	1506	153903	8
Barium		101000	52.4	485	UGKG	2.0	MBL	07/22/99	1506	153903	9
Beryllium		678	23.3	485	UGKG	2.0	MBL	07/22/99	1506	153903	8
Beryllium		678	23.3	485	UGKG	2.0	MBL	07/22/99	1506	153903	9
Calcium		1740000	6760	9700	UGKG	2.0					
Cadmium		972	36.9	485	UGKG	2.0	MBL	07/22/99	1506	153903	8
Cadmium		972	36.9	485	UGKG	2.0	MBL	07/22/99	1506	153903	9
Cobalt		7410	32.0	485	UGKG	2.0	MBL	07/22/99	1506	153903	8
Cobalt		7410	32.0	485	UGKG	2.0	MBL	07/22/99	1506	153903	9
Chromium		131000	73.7	485	UGKG	2.0	MBL	07/22/99	1506	153903	8
Chromium		131000	73.7	485	UGKG	2.0	MBL	07/22/99	1506	153903	9
Copper		39600	130	485	UGKG	2.0	MBL	07/22/99	1506	153903	8
Copper		39600	130	485	UGKG	2.0	MBL	07/22/99	1506	153903	9
Iron		13500000	11700	11700	UGKG	2.0					
Potassium		9330000	2750	9700	UGKG	2.0					
Magnesium		3880000	492	970	UGKG	2.0					

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anganese		288000	688	970	UGKG	2.0					
olybdenum		2300	128	970	UGKG	2.0	MBL	07/22/99	1506	153903	9
ɔdium		94200000	311000	485000	UGKG	100	MBL	07/23/99	1054	153903	9
ickel		3990000	3060	24300	UGKG	100	MBL	07/23/99	1054	153903	8
ickel		3990000	3060	24300	UGKG	100	MBL	07/23/99	1054	153903	9
ead		59200	152	485	UGKG	2.0	MBL	07/22/99	1506	153903	8
ead		59200	152	485	UGKG	2.0	MBL	07/22/99	1506	153903	9
ntimony	U	1000	18500	48500	UGKG	100	MBL	07/23/99	1054	153903	8
ntimony	U	1000	18500	48500	UGKG	100	MBL	07/23/99	1054	153903	9
elenium	U	5760	13100	24300	UGKG	100	MBL	07/23/99	1054	153903	8
elenium	U	5760	13100	24300	UGKG	100	MBL	07/23/99	1054	153903	9
licon		2360000	136000	485000	UGKG	100					
n		15800	808	970	UGKG	2.0	MBL	07/22/99	1506	153903	8
n		15800	808	970	UGKG	2.0	MBL	07/22/99	1506	153903	9
rontium		16900	28.1	485	UGKG	2.0					
tanium		210000	1940	24300	UGKG	100	MBL	07/23/99	1054	153903	9
allium	U	10900	21400	48500	UGKG	100	MBL	07/23/99	1054	153903	8
allium	U	10900	21400	48500	UGKG	100	MBL	07/23/99	1054	153903	9
ranium		18300000	95400	243000	UGKG	100					
anadium		18600	51.4	485	UGKG	2.0	MBL	07/22/99	1506	153903	8
anadium		18600	51.4	485	UGKG	2.0	MBL	07/22/99	1506	153903	9
inc		15600000	17900	24300	UGKG	100	MBL	07/23/99	1054	153903	8
inc		15600000	17900	24300	UGKG	100	MBL	07/23/99	1054	153903	9
neral Chemistry											
ɔtal Halogens - 3 items											
romide	U	0.00	0.163	0.535	MGKG	1.0	RWS	07/16/99	2103	15442210	
hlorides	J	0.203	0.194	1.07	MGKG	1.0					
uoride	U	0.00	0.233	0.535	MGKG	1.0					
itrogen, Nitrate	U	0.00	0.136	0.535	MGKG	1.0	RWS	07/16/99	2103	15442011	
ılfate as SO4	U	0.00	0.407	10.7	mg/kg	1.0					
itrogen, Ammonia	J	0.400	0.241	0.500	MGKG	1.0	THL	07/27/99	1236	15421212	
itrogen, Total		0.500	0.0281	0.100	MGKG	1.0	THL	07/30/99	1600	15482213	
itrogen, Nitrate/Nitrite	U	0.00	0.0854	0.497	MGKG	1.0	THL	07/30/99	1554	15479514	
ıosphorus, Total as PO4		452	7.64	20.0	MGKG	100	THL	07/24/99	1144	15410215	

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The following prep procedures were performed:

GC/MS 5970 Extractables	RDH	07/22/99	0800	154032 N
Herbicides	JPB	07/22/99	1400	154030 N
PCB's	JMA	07/24/99	1600	154173 N
Pesticides	RDH	07/23/99	0800	154073 N
Mercury	AJM	07/21/99	1530	153549 N
TRACE	FGD	07/21/99	1430	153903 N

Surrogate Recovery	Test	Percent%	Acceptable Limits
2,4,6-Tribromophenol	AIXAE-8270C	71.6	(44.5 - 126.)
2-Fluorophenol	AIXAE-8270C	64.9	(37.0 - 102.)
Phenol-d6	AIXAE-8270C	65.2	(41.5 - 102.)
2-Fluorobiphenyl	AIXBN-8270C	61.2	(44.7 - 110.)
Nitrobenzene-d5	AIXBN-8270C	54.1	(42.4 - 107.)
p-Terphenyl-d14	AIXBN-8270C	98.7	(45.5 - 104.)
2,4,6-Tribromophenol	F005C	71.6	(44.5 - 126.)
2-Fluorobiphenyl	F005C	61.2	(44.7 - 110.)
2-Fluorophenol	F005C	64.9	(37.0 - 102.)
Nitrobenzene-d5	F005C	54.1	(42.4 - 107.)
Phenol-d6	F005C	65.2	(41.5 - 102.)
p-Terphenyl-d14	F005C	98.7	(45.5 - 104.)
2,4-Dichlorophenylacetic acid	AIXH-8151B	70.2	(24.0 - 111.)
4CMX	AIXP-8082	55.5	(25.3 - 110.)
Decachlorobiphenyl	AIXP-8082	73.5	(46.8 - 131.)
4CMX	AIXP-8081A	63.6	(36.5 - 131.)
Decachlorobiphenyl	AIXP-8081A	79.8	(50.7 - 135.)
Bromofluorobenzene	AIXVOA-8260B	90.1	(73.0 - 129.)
Dibromofluoromethane	AIXVOA-8260B	100.	(66.0 - 117.)
Toluene-d8	AIXVOA-8260B	101.	(73.0 - 122.)
Bromofluorobenzene	F001-8260	90.1	(73.0 - 129.)
Dibromofluoromethane	F001-8260	100.	(66.0 - 117.)
Toluene-d8	F001-8260	101.	(73.0 - 122.)
Bromofluorobenzene	F002-8260	90.1	(73.0 - 129.)
Dibromofluoromethane	F002-8260	100.	(66.0 - 117.)

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: WSRC00497 Report Date: August 20, 1999

Sample ID : COMP 3

rrogate Recovery	Test	Percent%	Acceptable Limits
luene-d8	F002-8260	101.	(73.0 - 122.)
omofluorobenzene	F003A-8260	90.1	(73.0 - 129.)
romofluoromethane	F003A-8260	100.	(66.0 - 117.)
luene-d8	F003A-8260	101.	(73.0 - 122.)
omofluorobenzene	F005A-8260	90.1	(73.0 - 129.)
romofluoromethane	F005A-8260	100.	(66.0 - 117.)
luene-d8	F005A-8260	101.	(73.0 - 122.)
omofluorobenzene	M8010 BY 8260	90.1	(73.0 - 129.)
romofluoromethane	M8010 BY 8260	100.	(66.0 - 117.)
luene-d8	M8010 BY 8260	101.	(73.0 - 122.)

= Method	Method-Description
1	GC/FID
2	EPA 8260B
3	EPA 8270C
4	EPA8151A
5	EPA 8082
6	EPA 8081A
7	EPA 7471A
8	SW846 6010B
9	EPA 6010B
10	EPA 9056
11	EPA 300.0
12	EPA 350.1 modified
13	EPA 351.2/353.1
14	EPA 353.1 modified
15	EPA 365.4 modified

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Sample ID : COMP 3

M = Method	Method-Description

Notes:
The qualifiers in this report are defined as follows:
ND indicates that the analyte was not detected at a concentration greater than the detection limit.
J indicates presence of analyte at a concentration less than the reporting limit (RL) and greater than the detection limit (DL).
U indicates that the analyte was not detected at a concentration greater than the detection limit.
* indicates that a quality control analyte recovery is outside of specified acceptance criteria.

This data report has been prepared and reviewed
in accordance with General Engineering Laboratories
standard operating procedures. Please direct
any questions to your Project Manager, Stacy Griffin at 769-7376.

Reviewed By

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Contact: Mr. Richard Groseclose
Project Description: Hazardous Waste Contract

: WSRC00497 Report Date: August 20, 1999

Sample ID	: COMP 4
Lab ID	: 9907679-69
Matrix	: Solid
Date Collected	: 07/14/99
Date Received	: 07/15/99
Priority	: Routine
Collector	: Client

ameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
itile Organics											
)3 Waste Constituents - FID - 4 items											
yl Acetate	U	0.00	2.00	10.0	mg/kg	1.0	CAK	07/28/99	1720	154227	1
yl Ether	U	0.00	4.00	10.0	mg/kg	1.0					
thyl Alcohol	U	0.00	4.00	10.0	mg/kg	1.0					
Butyl Alcohol	U	0.00	4.00	10.0	mg/kg	1.0					
)5 Waste Constituents - FID - 2 items											
ylene Glycol Monoethylether	U	0.00	1.00	10.0	mg/kg	1.0					
butyl Alcohol	U	0.00	4.00	10.0	mg/kg	1.0					
p. IX VOA - 54 items											
,1,2-Tetrachloroethane	U	0.00	0.200	2.00	UGKG	1.0	JWF	07/28/99	0819	154538	2
,1-Trichloroethane	U	0.00	0.100	2.00	UGKG	1.0					
,2,2-Tetrachloroethane	U	0.00	0.600	2.00	UGKG	1.0					
,2-Trichloroethane	U	0.00	0.300	2.00	UGKG	1.0					
-Dichloroethane	U	0.00	0.100	2.00	UGKG	1.0					
-Dichloroethylene	U	0.00	0.300	2.00	UGKG	1.0					
,3-Trichloropropane	U	0.00	0.400	2.00	UGKG	1.0					
-Dibromo-3-chloropropane	U	0.00	0.400	2.00	UGKG	1.0					
-Dibromoethane	U	0.00	0.200	2.00	UGKG	1.0					
-Dichloroethane	U	0.00	0.200	2.00	UGKG	1.0					
-Dichloropropane	U	0.00	0.200	2.00	UGKG	1.0					
-trans-Dichloroethylene	U	0.00	0.100	2.00	UGKG	1.0					
Butanone	U	0.00	3.20	10.0	UGKG	1.0					
Hexanone	U	0.00	2.80	10.0	UGKG	1.0					
Methyl-2-pentanone	U	0.00	3.10	10.0	UGKG	1.0					
etone	U	1.62	10.3	10.3	UGKG	1.0					
etonitrile	J	5.70	1.00	10.0	UGKG	1.0					
rolein	U	0.00	4.60	20.0	UGKG	1.0					
Acrylonitrile	U	0.00	3.90	50.0	UGKG	1.0					

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Sample ID : COMP 4

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Allyl Chloride	U	0.00	0.400	10.0	UGKG	1.0					
Benzene	U	0.00	0.500	2.00	UGKG	1.0	JWF	07/28/99	0819	154538	2
Bromoform	U	0.00	0.300	2.00	UGKG	1.0					
Carbon Disulfide	U	0.00	0.300	10.0	UGKG	1.0					
Carbon Tetrachloride	U	0.00	0.500	2.00	UGKG	1.0					
Chlorobenzene	U	0.00	0.300	2.00	UGKG	1.0					
Chlorodibromomethane	U	0.00	0.200	2.00	UGKG	1.0					
Chloroethane	U	0.00	0.300	2.00	UGKG	1.0					
Chloroform	U	0.00	0.100	2.00	UGKG	1.0					
Chloroprene	U	0.00	2.00	10.0	UGKG	1.0					
Dibromomethane	U	0.00	0.200	2.00	UGKG	1.0					
Dichlorobromomethane	U	0.00	0.100	2.00	UGKG	1.0					
Dichlorodifluoromethane	U	0.00	1.20	2.00	UGKG	1.0					
Ethyl methacrylate	U	0.00	0.400	10.0	UGKG	1.0					
Ethylbenzene	U	0.00	0.300	2.00	UGKG	1.0					
Isobutyl Alcohol	U	0.00	6.30	20.0	UGKG	1.0					
Methacrylonitrile	U	0.00	0.900	10.0	UGKG	1.0					
Methyl Bromide	U	0.00	0.300	2.00	UGKG	1.0					
Methyl Chloride	U	0.00	0.200	2.00	UGKG	1.0					
Methyl Iodide	U	0.00	0.600	5.00	UGKG	1.0					
Methyl Methacrylate	U	0.00	0.400	10.0	UGKG	1.0					
Methylene Chloride	J	1.84	1.40	5.00	UGKG	1.0					
Pentachloroethane	U	0.00	0.500	10.0	UGKG	1.0					
Propionitrile	U	0.00	3.40	20.0	UGKG	1.0					
Styrene	U	0.00	0.300	2.00	UGKG	1.0					
Tetrachloroethylene	U	0.00	0.400	2.00	UGKG	1.0					
Toluene	U	0.00	0.900	2.00	UGKG	1.0					
Trichloroethylene		2.09	0.300	2.00	UGKG	1.0					
Trichlorofluoromethane	U	0.00	0.300	2.00	UGKG	1.0					
Vinyl Acetate	U	0.00	2.10	10.0	UGKG	1.0					
Vinyl chloride	U	0.00	0.400	2.00	UGKG	1.0					
Xylenes (TOTAL)	U	0.00	0.700	4.00	UGKG	1.0					
cis-1,3-Dichloropropylene	U	0.00	0.200	2.00	UGKG	1.0					
trans-1,3-Dichloropropylene	U	0.00	0.300	2.00	UGKG	1.0					
trans-1,4-Dichloro-2-butene	U	0.00	0.500	2.00	UGKG	1.0					

F001 Waste Constituents - 7 items

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Sample ID : COMP 4

rameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
,1-Trichloroethane	U	0.00	0.100	2.00	UGKG	1.0					
rbon Tetrachloride	U	0.00	0.500	2.00	UGKG	1.0	JWF	07/28/99	0819	154538	2
:thylene Chloride	J	1.84	1.40	5.00	UGKG	1.0					
trachloroethylene	U	0.00	0.400	2.00	UGKG	1.0					
ichloroethylene		2.09	0.300	2.00	UGKG	1.0					
ichlorofluoromethane	U	0.00	0.300	2.00	UGKG	1.0					
ichlorotrifluoroethane	U	0.00	10.0	10.0	UGKG	1.0					
)02 Waste Constituents - 9 items											
l,1-Trichloroethane	U	0.00	0.100	2.00	UGKG	1.0					
l,2-Trichloroethane	U	0.00	0.300	2.00	UGKG	1.0					
2-Dichlorobenzene	U	0.00	0.500	2.00	UGKG	1.0					
ılorobenzene	U	0.00	0.300	2.00	UGKG	1.0					
ethylene Chloride	J	1.84	1.40	5.00	UGKG	1.0					
:trachloroethylene	U	0.00	0.400	2.00	UGKG	1.0					
ichloroethylene		2.09	0.300	2.00	UGKG	1.0					
ichlorofluoromethane	U	0.00	0.300	2.00	UGKG	1.0					
ichlorotrifluoroethane	U	0.00	10.0	10.0	UGKG	1.0					
)03 Waste Constituents - GC/MS VOA - 4 items											
Methyl-2-pentanone	U	0.00	3.10	10.0	UGKG	1.0					
cetone	U	1.62	10.3	10.3	UGKG	1.0					
:hylbenzene	U	0.00	0.300	2.00	UGKG	1.0					
ylenes (TOTAL)	U	0.00	0.700	4.00	UGKG	1.0					
)05 Waste Constituents - GC/MS VOA - 5 items											
-Butanone	U	0.00	3.20	10.0	UGKG	1.0					
-Nitropropane	U	0.00	3.30	10.0	UGKG	1.0					
enzene	U	0.00	0.500	2.00	UGKG	1.0					
arbon Disulfide	U	0.00	0.300	10.0	UGKG	1.0					
oluene	U	0.00	0.900	2.00	UGKG	1.0					
'alogenated Volatile Organics - 29 items											
,1,1-Trichloroethane	U	0.00	0.100	2.00	UGKG	1.0					
,1,2,2-Tetrachloroethane	U	0.00	0.600	2.00	UGKG	1.0					
,1,2-Trichloroethane	U	0.00	0.300	2.00	UGKG	1.0					
,1-Dichloroethane	U	0.00	0.100	2.00	UGKG	1.0					
,1-Dichloroethylene	U	0.00	0.300	2.00	UGKG	1.0					
ı,2-Dichlorobenzene	U	0.00	0.500	2.00	UGKG	1.0					

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Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
1,2-Dichloroethane	U	0.00	0.200	2.00	UGKG	1.0					
1,2-Dichloropropane	U	0.00	0.200	2.00	UGKG	1.0	JWF	07/28/99	0819	154538	2
1,2-trans-Dichloroethylene	U	0.00	0.100	2.00	UGKG	1.0					
1,3-Dichlorobenzene	U	0.00	0.400	2.00	UGKG	1.0					
1,4-Dichlorobenzene	U	0.00	0.600	2.00	UGKG	1.0					
2-Chloroethylvinyl ether	U	0.00	4.04	5.00	UGKG	1.0					
Bromoform	U	0.00	0.300	2.00	UGKG	1.0					
Carbon Tetrachloride	U	0.00	0.500	2.00	UGKG	1.0					
Chlorobenzene	U	0.00	0.300	2.00	UGKG	1.0					
Chlorodibromomethane	U	0.00	0.200	2.00	UGKG	1.0					
Chloroethane	U	0.00	0.300	2.00	UGKG	1.0					
Chloroform	U	0.00	0.100	2.00	UGKG	1.0					
Dichlorobromomethane	U	0.00	0.100	2.00	UGKG	1.0					
Dichlorodifluoromethane	U	0.00	1.20	2.00	UGKG	1.0					
Methyl Bromide	U	0.00	0.300	2.00	UGKG	1.0					
Methyl Chloride	U	0.00	0.200	2.00	UGKG	1.0					
Methylene Chloride	J	1.84	1.40	5.00	UGKG	1.0					
Tetrachloroethylene	U	0.00	0.400	2.00	UGKG	1.0					
Trichloroethylene		2.09	0.300	2.00	UGKG	1.0					
Trichlorofluoromethane	U	0.00	0.300	2.00	UGKG	1.0					
Vinyl chloride	U	0.00	0.400	2.00	UGKG	1.0					
cis-1,3-Dichloropropylene	U	0.00	0.200	2.00	UGKG	1.0					
trans-1,3-Dichloropropylene	U	0.00	0.300	2.00	UGKG	1.0					
Extractable Organics											
App. IX Acid Extractables - 18 items											
2,3,4,6-Tetrachlorophenol	U	0.00	280	330	UGKG	1.0	DDT	07/23/99	2317	154032	3
2,4,5-Trichlorophenol	U	0.00	150	330	UGKG	1.0					
2,4,6-Trichlorophenol	U	0.00	150	330	UGKG	1.0					
2,4-Dichlorophenol	U	0.00	172	330	UGKG	1.0					
2,4-Dimethylphenol	U	0.00	107	330	UGKG	1.0					
2,4-Dinitrophenol	U	0.00	358	660	UGKG	1.0					
2,6-Dichlorophenol	U	0.00	30.2	330	UGKG	1.0					
2-Chlorophenol	U	0.00	153	330	UGKG	1.0					
2-Nitrophenol	U	0.00	176	330	UGKG	1.0					
2-methyl-4,6-dinitrophenol	U	0.00	97.5	330	UGKG	1.0					

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Sample ID : COMP 4

rameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
ec-Butyl-4,6-Dinitrophenol	U	0.00	322	330	UGKG	1.0					
Nitrophenol	U	0.00	107	660	UGKG	1.0	DDT	07/23/99	2317	154032	3
hloro-3-methyl phenol	U	0.00	124	330	UGKG	1.0					
xachlorophene	U	0.00	10500	16300	UGKG	1.0					
ntachlorophenol	U	0.00	55.3	330	UGKG	1.0					
enol	U	0.00	117	330	UGKG	1.0					
p-Cresol	U	0.00	150	660	UGKG	1.0					
Cresol	U	0.00	61.8	330	UGKG	1.0					
p. IX B/N Extractables - 106 items											
2,4,5-Tetrachlorobenzene	U	0.00	182	330	UGKG	1.0					
2,4-Trichlorobenzene	U	0.00	182	330	UGKG	1.0					
2-Dichlorobenzene	U	0.00	166	330	UGKG	1.0					
3-Dichlorobenzene	U	0.00	127	330	UGKG	1.0					
4-Dichlorobenzene	U	0.00	127	330	UGKG	1.0					
4-Dioxane	U	0.00	59.5	330	UGKG	1.0					
4-Naphthoquinone	U	0.00	325	330	UGKG	1.0					
Naphthylamine	U	0.00	179	330	UGKG	1.0					
4-Dinitrotoluene	U	0.00	114	330	UGKG	1.0					
6-Dinitrotoluene	U	0.00	137	330	UGKG	1.0					
Acetylaminofluorene	U	0.00	325	330	UGKG	1.0					
Chloronaphthalene	U	0.00	169	330	UGKG	1.0					
Methylnaphthalene	U	0.00	198	330	UGKG	1.0					
Naphthylamine	U	0.00	312	330	UGKG	1.0					
Picoline	U	0.00	393	393	UGKG	1.0					
3'-Dichlorobenzidine	U	0.00	270	1650	UGKG	1.0					
3'-Dimethylbenzidine	U	0.00	163	1650	UGKG	1.0					
Methylcholanthrene	U	0.00	325	330	UGKG	1.0					
Bromophenyl phenyl ether	U	0.00	114	330	UGKG	1.0					
Chloroaniline	U	0.00	150	330	UGKG	1.0					
Chlorophenyl phenyl ether	U	0.00	143	330	UGKG	1.0					
aminobiphenyl	U	0.00	21.1	330	UGKG	1.0					
Nitro-o-toluidine	U	0.00	192	330	UGKG	1.0					
,12-Dimethylbenz(a)anthracene	U	0.00	309	330	UGKG	1.0					
cenaphthene	U	0.00	156	330	UGKG	1.0					
cenaphthylene	U	0.00	143	330	UGKG	1.0					

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cc: WSRC00497 Report Date: August 20, 1999

Sample ID : COMP 4

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Acetophenone	U	0.00	124	330	UGKG	1.0					
Aniline	U	0.00	185	330	UGKG	1.0	DDT	07/23/99	2317	154032	3
Anthracene	U	0.00	84.5	330	UGKG	1.0					
Aramite	U	0.00	270	330	UGKG	1.0					
Benzo(a)anthracene	U	0.00	65.0	330	UGKG	1.0					
Benzo(a)pyrene	U	0.00	71.5	330	UGKG	1.0					
Benzo(b)fluoranthene	U	0.00	140	330	UGKG	1.0					
Benzo(ghi)perylene	U	0.00	78.0	330	UGKG	1.0					
Benzo(k)fluoranthene	U	0.00	130	330	UGKG	1.0					
Benzyl Alcohol	U	0.00	182	330	UGKG	1.0					
Butyl benzyl phthalate	U	0.00	87.8	330	UGKG	1.0					
Chlorobenzilate	U	0.00	52.0	1650	UGKG	1.0					
Chrysene	U	0.00	52.0	330	UGKG	1.0					
Di-n-butyl phthalate	U	0.00	71.5	330	UGKG	1.0					
Di-n-octyl phthalate	U	0.00	169	330	UGKG	1.0					
Diallate	U	0.00	224	330	UGKG	1.0					
Dibenzo(a,h)anthracene	U	0.00	81.3	330	UGKG	1.0					
Dibenzofuran	U	0.00	130	330	UGKG	1.0					
Diethyl phthalate	U	0.00	74.8	330	UGKG	1.0					
Dimethoate	U	0.00	260	1650	UGKG	1.0					
Dimethyl phthalate	U	0.00	107	330	UGKG	1.0					
Diphenylamine	U	0.00	280	330	UGKG	1.0					
Disulfoton	U	0.00	45.2	330	UGKG	1.0					
Ethyl Methanesulfonate	U	0.00	19.8	330	UGKG	1.0					
Ethyl methacrylate	U	0.00	28.9	330	UGKG	1.0					
Famphur	U	0.00	51.7	330	UGKG	1.0					
Fluoranthene	U	0.00	65.0	330	UGKG	1.0					
Fluorene	U	0.00	111	330	UGKG	1.0					
Hexachlorobenzene	U	0.00	68.3	330	UGKG	1.0					
Hexachlorobutadiene	U	0.00	150	330	UGKG	1.0					
Hexachlorocyclopentadiene	U	0.00	189	330	UGKG	1.0					
Hexachloroethane	U	0.00	130	330	UGKG	1.0					
Hexachloropropene	U	0.00	20.5	330	UGKG	1.0					
Indeno(1,2,3-c,d)pyrene	U	0.00	78.0	330	UGKG	1.0					
Isodrin	U	0.00	143	330	UGKG	1.0					

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P.O. Box 616
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Contact: Mr. Richard Groseclose
Project Description: Hazardous Waste Contract

: WSRC00497 Report Date: August 20, 1999

Sample ID : COMP 4

ameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
horone	U	0.00	143	330	UGKG	1.0					
safrole	U	0.00	21.1	330	UGKG	1.0	DDT	07/23/99	2317	154032	3
one	U	0.00	95.2	330	UGKG	1.0					
thapyrilene	U	0.00	156	1650	UGKG	1.0					
thyl Methanesulfonate	U	0.00	296	330	UGKG	1.0					
Nitrosodi-n-butylamine	U	0.00	22.4	330	UGKG	1.0					
Nitrosodiethylamine	U	0.00	20.2	330	UGKG	1.0					
Nitrosodimethylamine	U	0.00	10.1	330	UGKG	1.0					
Nitrosodiphenylamine	U	0.00	114	330	UGKG	1.0					
Nitrosodipropylamine	U	0.00	127	330	UGKG	1.0					
Nitrosomethylethylamine	U	0.00	71.2	330	UGKG	1.0					
Nitrosomorpholine	U	0.00	24.1	330	UGKG	1.0					
Nitrosopiperidine	U	0.00	215	330	UGKG	1.0					
Nitrosopyrolidine	U	0.00	21.8	330	UGKG	1.0					
phthalene	U	0.00	153	330	UGKG	1.0					
robenzene	U	0.00	130	330	UGKG	1.0					
O,O-Triethylphosphorothioate	U	0.00	228	330	UGKG	1.0					
athion	U	0.00	163	330	UGKG	1.0					
athion, methyl	U	0.00	260	330	UGKG	1.0					
ntachlorobenzene	U	0.00	26.0	330	UGKG	1.0					
ntachloroethane	U	0.00	43.6	330	UGKG	1.0					
ntachloronitrobenzene	U	0.00	228	330	UGKG	1.0					
enacetin	U	0.00	189	330	UGKG	1.0					
enanthrene	U	0.00	58.5	330	UGKG	1.0					
orate	U	0.00	286	330	UGKG	1.0					
namide	U	0.00	211	330	UGKG	1.0					
rene	U	0.00	71.5	330	UGKG	1.0					
ridine	U	0.00	127	330	UGKG	1.0					
frole	U	0.00	17.2	330	UGKG	1.0					
lfotepp	U	0.00	42.3	330	UGKG	1.0					
ionazin	U	0.00	221	330	UGKG	1.0					
a-Dimethylphenethylamine	U	0.00	103	330	UGKG	1.0					
(2-Chloroethoxy)methane	U	0.00	166	330	UGKG	1.0					
(2-Chloroethyl) ether	U	0.00	146	330	UGKG	1.0					
(2-Chloroisopropyl)ether	U	0.00	101	330	UGKG	1.0					

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Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
bis(2-Ethylhexyl)phthalate	U	0.00	293	330	UGKG	1.0					
m-Dinitrobenzene	U	0.00	28.9	330	UGKG	1.0	DDT	07/23/99	2317	154032	3
m-Nitroaniline	U	0.00	81.3	330	UGKG	1.0					
o-Nitroaniline	U	0.00	65.0	330	UGKG	1.0					
o-Toluidine	U	0.00	273	330	UGKG	1.0					
p-Dimethylaminoazobenzene	U	0.00	205	330	UGKG	1.0					
p-Nitroaniline	U	0.00	101	330	UGKG	1.0					
p-Phenylenediamine	U	0.00	493	660	UGKG	1.0					
sym-Trinitrobenzene	U	0.00	22.8	1650	UGKG	1.0					
F004 Waste Constituents - GC/MS Ext. - 3 items											
Nitrobenzene	U	0.00	130	330	UGKG	1.0					
m,p-Cresol	U	0.00	150	660	UGKG	1.0					
o-Cresol	U	0.00	61.8	330	UGKG	1.0					
Pyridine	U	0.00	127	330	UGKG	1.0					
App. IX Herbicides - 3 items											
2,4,5-T	U	0.00	0.863	10.0	UGKG	10.	JC	07/24/99	1357	154030	4
2,4,5-TP	U	0.00	0.994	10.0	UGKG	10.					
2,4-D	U	0.00	0.00	0.200	UGKG	0.0					
PCB analysis - 7 items											
PCB-1016	U	0.00	1.22	41.6	UGKG	1.0	JLW	07/29/99	1140	154173	5
PCB-1221	U	0.00	2.82	41.6	UGKG	1.0					
PCB-1232	U	0.00	1.63	41.6	UGKG	1.0					
PCB-1242	U	0.00	1.67	41.6	UGKG	1.0					
PCB-1248	U	0.00	0.906	41.6	UGKG	1.0					
PCB-1254	J	6.29	1.16	41.6	UGKG	1.0					
PCB-1260	U	0.00	0.942	41.6	UGKG	1.0					
App. IX Pesticides - 19 items											
4,4'-DDD	U	0.00	0.594	1.33	UGKG	1.0	MM	07/27/99	0158	154073	6
4,4'-DDE	U	0.00	0.554	1.33	UGKG	1.0					
4,4'-DDT	U	0.00	0.803	1.33	UGKG	1.0					
Aldrin	U	0.00	0.262	0.670	UGKG	1.0					
Chlordane	U	0.00	4.92	8.33	UGKG	1.0					
Dieldrin	U	0.00	0.740	1.33	UGKG	1.0					
Endosulfan I	U	0.00	0.458	0.670	UGKG	1.0					
Endosulfan II	U	0.00	0.687	1.33	UGKG	1.0					

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rameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
dosulfan sulfate	U	0.00	0.920	0.920	UGKG	1.0					
drin	U	0.00	0.687	1.33	UGKG	1.0	MM	07/27/99	0158	154073	6
drin aldehyde	U	0.00	1.00	1.33	UGKG	1.0					
ptachlor	U	0.00	0.438	0.670	UGKG	1.0					
ptachlor epoxide	U	0.00	0.219	0.670	UGKG	1.0					
ethoxychlor	U	0.00	3.58	6.70	UGKG	1.0					
xaphene	U	0.00	11.0	33.3	UGKG	1.0					
ha-BHC	U	0.00	0.266	0.670	UGKG	1.0					
ta-BHC	U	0.00	0.392	0.670	UGKG	1.0					
lta-BHC	U	0.00	0.286	0.670	UGKG	1.0					
mma-BHC	U	0.00	0.352	0.670	UGKG	1.0					
tals Analysis											
ercury	U	-12.8	2.01	33.3	UGKG	1.0	RPM2	07/22/99	1421	153549	7
lver		6040	71.3	495	UGKG	2.0	MBL	07/22/99	1512	153903	8
lver		6040	71.3	495	UGKG	2.0	MBL	07/22/99	1512	153903	9
uminum		71100000	58500	248000	UGKG	100	MBL	07/23/99	1100	153903	9
senic		2420	450	495	UGKG	2.0	MBL	07/22/99	1512	153903	8
senic		2420	450	495	UGKG	2.0	MBL	07/22/99	1512	153903	9
ron		33800000	12500	248000	UGKG	100	MBL	07/23/99	1100	153903	9
rium		127000	53.5	495	UGKG	2.0	MBL	07/22/99	1512	153903	8
rium		127000	53.5	495	UGKG	2.0	MBL	07/22/99	1512	153903	9
eryllium		823	23.8	495	UGKG	2.0	MBL	07/22/99	1512	153903	8
eryllium		823	23.8	495	UGKG	2.0	MBL	07/22/99	1512	153903	9
lcium		2070000	6900	9900	UGKG	2.0					
dmium		1210	37.6	495	UGKG	2.0	MBL	07/22/99	1512	153903	8
dmium		1210	37.6	495	UGKG	2.0	MBL	07/22/99	1512	153903	9
balt		13000	32.7	495	UGKG	2.0	MBL	07/22/99	1512	153903	8
balt		13000	32.7	495	UGKG	2.0	MBL	07/22/99	1512	153903	9
romium		163000	75.2	495	UGKG	2.0	MBL	07/22/99	1512	153903	8
romium		163000	75.2	495	UGKG	2.0	MBL	07/22/99	1512	153903	9
pper		78900	133	495	UGKG	2.0	MBL	07/22/99	1512	153903	8
pper		78900	133	495	UGKG	2.0	MBL	07/22/99	1512	153903	9
on		16100000	12000	12000	UGKG	2.0					
tassium		11100000	2810	9900	UGKG	2.0					
agnesium		4720000	502	990	UGKG	2.0					

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Manganese		357000	702	990	UGKG	2.0					
Molybdenum		2870	131	990	UGKG	2.0	MBL	07/22/99	1512	153903	9
Sodium		114000000	318000	495000	UGKG	100	MBL	07/23/99	1100	153903	9
Nickel		6130000	3120	24800	UGKG	100	MBL	07/23/99	1100	153903	8
Nickel		6130000	3120	24800	UGKG	100	MBL	07/23/99	1100	153903	9
Lead		99200	155	495	UGKG	2.0	MBL	07/22/99	1512	153903	8
Lead		99200	155	495	UGKG	2.0	MBL	07/22/99	1512	153903	9
Antimony	U	2230	18900	49500	UGKG	100	MBL	07/23/99	1100	153903	8
Antimony	U	2230	18900	49500	UGKG	100	MBL	07/23/99	1100	153903	9
Selenium	U	208	13400	24800	UGKG	100	MBL	07/23/99	1100	153903	8
Selenium	U	208	13400	24800	UGKG	100	MBL	07/23/99	1100	153903	9
Silicon		1830000	139000	495000	UGKG	100					
Tin		16700	825	990	UGKG	2.0	MBL	07/22/99	1512	153903	8
Tin		16700	825	990	UGKG	2.0	MBL	07/22/99	1512	153903	9
Strontium		20700	28.7	495	UGKG	2.0					
Titanium		246000	1980	24800	UGKG	100	MBL	07/23/99	1100	153903	9
Thallium	U	4530	21800	49500	UGKG	100	MBL	07/23/99	1100	153903	8
Thallium	U	4530	21800	49500	UGKG	100	MBL	07/23/99	1100	153903	9
Uranium		18400000	97300	248000	UGKG	100					
Vanadium		22100	52.5	495	UGKG	2.0	MBL	07/22/99	1512	153903	8
Vanadium		22100	52.5	495	UGKG	2.0	MBL	07/22/99	1512	153903	9
Zinc		20100000	18300	24800	UGKG	100	MBL	07/23/99	1100	153903	8
Zinc		20100000	18300	24800	UGKG	100	MBL	07/23/99	1100	153903	9
General Chemistry											
Total Halogens - 3 items											
Bromide	U	0.00	0.157	0.515	MGKG	1.0	RWS	07/16/99	2117	15442210	
Chlorides		3.41	0.186	1.03	MGKG	1.0					
Fluoride	J	0.453	0.225	0.515	MGKG	1.0					
Nitrogen, Nitrate	J	0.402	0.131	0.515	MGKG	1.0	RWS	07/16/99	2117	15442011	
Sulfate as SO4	J	7.61	0.391	10.3	mg/kg	1.0					
Nitrogen, Ammonia	J	0.300	0.241	0.500	MGKG	1.0	THL	07/27/99	1236	15421212	
Nitrogen, Total		0.500	0.0281	0.100	MGKG	1.0	THL	07/30/99	1600	15482213	
Nitrogen, Nitrate/Nitrite	U	0.00	0.0808	0.470	MGKG	1.0	THL	07/30/99	1554	15479514	
Phosphorus, Total as PO4		452	7.64	20.0	MGKG	100	THL	07/24/99	1144	15410215	

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rameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
following prep procedures were performed:											
C/MS 5970 Extractables							RDH	07/22/99	0800	154032	N
rbicides							JPB	07/22/99	1400	154030	N
CB's							JMA	07/24/99	1600	154173	N
sticides							RDH	07/23/99	0800	154073	N
ercury							AJM	07/21/99	1530	153549	N
CACE							FGD	07/21/99	1430	153903	N

rrogate Recovery	Test	Percent%	Acceptable Limits
4,6-Tribromophenol	AIXAE-8270C	80.7	(44.5 - 126.)
Fluorophenol	AIXAE-8270C	67.6	(37.0 - 102.)
enol-d6	AIXAE-8270C	67.2	(41.5 - 102.)
Fluorobiphenyl	AIXBN-8270C	66.2	(44.7 - 110.)
trobenzene-d5	AIXBN-8270C	56.0	(42.4 - 107.)
Terphenyl-d14	AIXBN-8270C	89.4	(45.5 - 104.)
4,6-Tribromophenol	F005C	80.7	(44.5 - 126.)
Fluorobiphenyl	F005C	66.2	(44.7 - 110.)
Fluorophenol	F005C	67.6	(37.0 - 102.)
trobenzene-d5	F005C	56.0	(42.4 - 107.)
enol-d6	F005C	67.2	(41.5 - 102.)
Terphenyl-d14	F005C	89.4	(45.5 - 104.)
4-Dichlorophenylacetic acid	AIXH-8151B	68.0	(24.0 - 111.)
CMX	AIXP-8082	62.5	(25.3 - 110.)
ecachlorobiphenyl	AIXP-8082	64.5	(46.8 - 131.)
CMX	AIXP-8081A	61.9	(36.5 - 131.)
ecachlorobiphenyl	AIXP-8081A	67.5	(50.7 - 135.)
romofluorobenzene	AIXVOA-8260B	89.6	(73.0 - 129.)
ibromofluoromethane	AIXVOA-8260B	100.	(66.0 - 117.)
oluene-d8	AIXVOA-8260B	101.	(73.0 - 122.)
romofluorobenzene	F001-8260	89.6	(73.0 - 129.)
ibromofluoromethane	F001-8260	100.	(66.0 - 117.)
Toluene-d8	F001-8260	101.	(73.0 - 122.)
Bromofluorobenzene	F002-8260	89.6	(73.0 - 129.)
Dibromofluoromethane	F002-8260	100.	(66.0 - 117.)

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Sample ID : COMP 4

Surrogate Recovery	Test	Percent%	Acceptable Limits
Toluene-d8	F002-8260	101.	(73.0 - 122.)
Bromofluorobenzene	F003A-8260	89.6	(73.0 - 129.)
Dibromofluoromethane	F003A-8260	100.	(66.0 - 117.)
Toluene-d8	F003A-8260	101.	(73.0 - 122.)
Bromofluorobenzene	F005A-8260	89.6	(73.0 - 129.)
Dibromofluoromethane	F005A-8260	100.	(66.0 - 117.)
Toluene-d8	F005A-8260	101.	(73.0 - 122.)
Bromofluorobenzene	M8010 BY 8260	89.6	(73.0 - 129.)
Dibromofluoromethane	M8010 BY 8260	100.	(66.0 - 117.)
Toluene-d8	M8010 BY 8260	101.	(73.0 - 122.)

M = Method	Method-Description
M 1	GC/FID
M 2	EPA 8260B
M 3	EPA 8270C
M 4	EPA8151A
M 5	EPA 8082
M 6	EPA 8081A
M 7	EPA 7471A
M 8	SW846 6010B
M 9	EPA 6010B
M 10	EPA 9056
M 11	EPA 300.0
M 12	EPA 350.1 modified
M 13	EPA 351.2/353.1
M 14	EPA 353.1 modified
M 15	EPA 365.4 modified

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Sample ID : COMP 4

= Method **Method-Description**

es:
qualifiers in this report are defined as follows:
indicates that the analyte was not detected at a concentration greater than the detection limit.
dicates presence of analyte at a concentration less than the reporting limit (RL) and greater than the detection limit (DL).
dicates that the analyte was not detected at a concentration greater than the detection limit.
dicates that a quality control analyte recovery is outside of specified acceptance criteria.

s data report has been prepared and reviewed
ccordance with General Engineering Laboratories
dard operating procedures. Please direct
questions to your Project Manager, Stacy Griffin at 769-7376.

Stacy L. Griffin
iewed By

P O Box 30712 • Charleston, SC 29417 • 2040 Savage Road • 29407
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Project Description: Hazardous Waste Contract

cc: WSRC00497 Report Date: August 20, 1999

Sample ID	: COMP 5
Lab ID	: 9907679-71
Matrix	: Solid
Date Collected	: 07/14/99
Date Received	: 07/15/99
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Volatile Organics											
F003 Waste Constituents - FID - 4 items											
Ethyl Acetate	U	0.00	2.02	10.1	mg/kg	1.0	CAK	07/28/99	1812	154227	1
Ethyl Ether	U	0.00	4.04	10.1	mg/kg	1.0					
Methyl Alcohol	U	0.00	4.04	10.1	mg/kg	1.0					
n-Butyl Alcohol	U	0.00	4.04	10.1	mg/kg	1.0					
F005 Waste Constituents - FID - 2 items											
Ethylene Glycol Monoethylether	U	0.00	1.01	10.1	mg/kg	1.0					
Isobutyl Alcohol	U	0.00	4.04	10.1	mg/kg	1.0					
App. IX VOA - 54 items											
1,1,1,2-Tetrachloroethane	U	0.00	0.200	2.00	UGKG	1.0	JWF	07/28/99	0850	154538	2
1,1,1-Trichloroethane	U	0.00	0.100	2.00	UGKG	1.0					
1,1,2,2-Tetrachloroethane	U	0.00	0.600	2.00	UGKG	1.0					
1,1,2-Trichloroethane	U	0.00	0.300	2.00	UGKG	1.0					
1,1-Dichloroethane	U	0.00	0.100	2.00	UGKG	1.0					
1,1-Dichloroethylene	U	0.00	0.300	2.00	UGKG	1.0					
1,2,3-Trichloropropane	U	0.00	0.400	2.00	UGKG	1.0					
1,2-Dibromo-3-chloropropane	U	0.00	0.400	2.00	UGKG	1.0					
1,2-Dibromoethane	U	0.00	0.200	2.00	UGKG	1.0					
1,2-Dichloroethane	U	0.00	0.200	2.00	UGKG	1.0					
1,2-Dichloropropane	U	0.00	0.200	2.00	UGKG	1.0					
1,2-trans-Dichloroethylene	U	0.00	0.100	2.00	UGKG	1.0					
2-Butanone	U	0.00	3.20	10.0	UGKG	1.0					
2-Hexanone	U	0.00	2.80	10.0	UGKG	1.0					
4-Methyl-2-pentanone	U	0.00	3.10	10.0	UGKG	1.0					
Acetone	U	1.35	10.3	10.3	UGKG	1.0					
Acetonitrile	J	8.54	1.00	10.0	UGKG	1.0					
Acrolein	U	0.00	4.60	20.0	UGKG	1.0					
Acrylonitrile	U	0.00	3.90	50.0	UGKG	1.0					

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Sample ID : COMP 5

rameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
yl Chloride	U	0.00	0.400	10.0	UGKG	1.0					
nzene	U	0.00	0.500	2.00	UGKG	1.0	JWF	07/28/99	0850	154538	2
omoform	U	0.00	0.300	2.00	UGKG	1.0					
rbon Disulfide	U	0.00	0.300	10.0	UGKG	1.0					
rbon Tetrachloride	U	0.00	0.500	2.00	UGKG	1.0					
lorobenzene	U	0.00	0.300	2.00	UGKG	1.0					
lorodibromomethane	U	0.00	0.200	2.00	UGKG	1.0					
loroethane	U	0.00	0.300	2.00	UGKG	1.0					
loroform	U	0.00	0.100	2.00	UGKG	1.0					
loroprene	U	0.00	2.00	10.0	UGKG	1.0					
promomethane	U	0.00	0.200	2.00	UGKG	1.0					
chlorobromomethane	U	0.00	0.100	2.00	UGKG	1.0					
chlorodifluoromethane	U	0.00	1.20	2.00	UGKG	1.0					
yl methacrylate	U	0.00	0.400	10.0	UGKG	1.0					
ylbenzene	U	0.00	0.300	2.00	UGKG	1.0					
butyl Alcohol	U	0.00	6.30	20.0	UGKG	1.0					
thacrylonitrile	U	0.00	0.900	10.0	UGKG	1.0					
thyl Bromide	U	0.00	0.300	2.00	UGKG	1.0					
thyl Chloride	U	0.00	0.200	2.00	UGKG	1.0					
thyl Iodide	U	0.00	0.600	5.00	UGKG	1.0					
thyl Methacrylate	U	0.00	0.400	10.0	UGKG	1.0					
thylene Chloride	U	0.787	1.40	5.00	UGKG	1.0					
ntachloroethane	U	0.00	0.500	10.0	UGKG	1.0					
opionitrile	U	0.00	3.40	20.0	UGKG	1.0					
yrene	U	0.00	0.300	2.00	UGKG	1.0					
trachloroethylene	U	0.00	0.400	2.00	UGKG	1.0					
luene	U	0.00	0.900	2.00	UGKG	1.0					
ichloroethylene	U	0.00	0.300	2.00	UGKG	1.0					
ichlorofluoromethane	U	0.00	0.300	2.00	UGKG	1.0					
nyl Acetate	U	0.00	2.10	10.0	UGKG	1.0					
nyl chloride	U	0.00	0.400	2.00	UGKG	1.0					
ylenes (TOTAL)	U	0.00	0.700	4.00	UGKG	1.0					
s-1,3-Dichloropropylene	U	0.00	0.200	2.00	UGKG	1.0					
ns-1,3-Dichloropropylene	U	0.00	0.300	2.00	UGKG	1.0					
ns-1,4-Dichloro-2-butene	U	0.00	0.500	2.00	UGKG	1.0					

F001 Waste Constituents - 7 items

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Building 735-16A, Rm. 5
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Contact: Mr. Richard Groseclose
Project Description: Hazardous Waste Contract

cc: WSRC00497 Report Date: August 20, 1999

Sample ID : COMP 5

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
1,1,1-Trichloroethane	U	0.00	0.100	2.00	UGKG	1.0					
Carbon Tetrachloride	U	0.00	0.500	2.00	UGKG	1.0	JWF	07/28/99	0850	154538	2
Methylene Chloride	U	0.787	1.40	5.00	UGKG	1.0					
Tetrachloroethylene	U	0.00	0.400	2.00	UGKG	1.0					
Trichloroethylene	U	0.00	0.300	2.00	UGKG	1.0					
Trichlorofluoromethane	U	0.00	0.300	2.00	UGKG	1.0					
Trichlorotrifluoroethane	U	0.00	10.0	10.0	UGKG	1.0					
F002 Waste Constituents - 9 items											
1,1,1-Trichloroethane	U	0.00	0.100	2.00	UGKG	1.0					
1,1,2-Trichloroethane	U	0.00	0.300	2.00	UGKG	1.0					
1,2-Dichlorobenzene	U	0.00	0.500	2.00	UGKG	1.0					
Chlorobenzene	U	0.00	0.300	2.00	UGKG	1.0					
Methylene Chloride	U	0.787	1.40	5.00	UGKG	1.0					
Tetrachloroethylene	U	0.00	0.400	2.00	UGKG	1.0					
Trichloroethylene	U	0.00	0.300	2.00	UGKG	1.0					
Trichlorofluoromethane	U	0.00	0.300	2.00	UGKG	1.0					
Trichlorotrifluoroethane	U	0.00	10.0	10.0	UGKG	1.0					
F003 Waste Constituents - GC/MS VOA - 4 items											
4-Methyl-2-pentanone	U	0.00	3.10	10.0	UGKG	1.0					
Acetone	U	1.35	10.3	10.3	UGKG	1.0					
Ethylbenzene	U	0.00	0.300	2.00	UGKG	1.0					
Xylenes (TOTAL)	U	0.00	0.700	4.00	UGKG	1.0					
F005 Waste Constituents - GC/MS VOA - 5 items											
2-Butanone	U	0.00	3.20	10.0	UGKG	1.0					
2-Nitropropane	U	0.00	3.30	10.0	UGKG	1.0					
Benzene	U	0.00	0.500	2.00	UGKG	1.0					
Carbon Disulfide	U	0.00	0.300	10.0	UGKG	1.0					
Toluene	U	0.00	0.900	2.00	UGKG	1.0					
Halogenated Volatile Organics - 29 items											
1,1,1-Trichloroethane	U	0.00	0.100	2.00	UGKG	1.0					
1,1,2,2-Tetrachloroethane	U	0.00	0.600	2.00	UGKG	1.0					
1,1,2-Trichloroethane	U	0.00	0.300	2.00	UGKG	1.0					
1,1-Dichloroethane	U	0.00	0.100	2.00	UGKG	1.0					
1,1-Dichloroethylene	U	0.00	0.300	2.00	UGKG	1.0					
1,2-Dichlorobenzene	U	0.00	0.500	2.00	UGKG	1.0					

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rameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
-Dichloroethane	U	0.00	0.200	2.00	UGKG	1.0					
-Dichloropropane	U	0.00	0.200	2.00	UGKG	1.0	JWF	07/28/99	0850	154538	2
-trans-Dichloroethylene	U	0.00	0.100	2.00	UGKG	1.0					
-Dichlorobenzene	U	0.00	0.400	2.00	UGKG	1.0					
-Dichlorobenzene	U	0.00	0.600	2.00	UGKG	1.0					
Chloroethylvinyl ether	U	0.00	4.04	5.00	UGKG	1.0					
omoform	U	0.00	0.300	2.00	UGKG	1.0					
rbon Tetrachloride	U	0.00	0.500	2.00	UGKG	1.0					
lorobenzene	U	0.00	0.300	2.00	UGKG	1.0					
lorodibromomethane	U	0.00	0.200	2.00	UGKG	1.0					
loroethane	U	0.00	0.300	2.00	UGKG	1.0					
loroform	U	0.00	0.100	2.00	UGKG	1.0					
chlorobromomethane	U	0.00	0.100	2.00	UGKG	1.0					
chlorodifluoromethane	U	0.00	1.20	2.00	UGKG	1.0					
ethyl Bromide	U	0.00	0.300	2.00	UGKG	1.0					
ethyl Chloride	U	0.00	0.200	2.00	UGKG	1.0					
ethylene Chloride	U	0.787	1.40	5.00	UGKG	1.0					
trachloroethylene	U	0.00	0.400	2.00	UGKG	1.0					
ichloroethylene	U	0.00	0.300	2.00	UGKG	1.0					
ichlorofluoromethane	U	0.00	0.300	2.00	UGKG	1.0					
nyl chloride	U	0.00	0.400	2.00	UGKG	1.0					
s-1,3-Dichloropropylene	U	0.00	0.200	2.00	UGKG	1.0					
ns-1,3-Dichloropropylene	U	0.00	0.300	2.00	UGKG	1.0					
tractable Organics											
p. IX Acid Extractables - 18 items											
3,4,6-Tetrachlorophenol	U	0.00	284	330	UGKG	1.0	DDT	07/23/99	2346	154032	3
4,5-Trichlorophenol	U	0.00	152	330	UGKG	1.0					
4,6-Trichlorophenol	U	0.00	152	330	UGKG	1.0					
4-Dichlorophenol	U	0.00	175	330	UGKG	1.0					
4-Dimethylphenol	U	0.00	109	330	UGKG	1.0					
4-Dinitrophenol	U	0.00	363	660	UGKG	1.0					
6-Dichlorophenol	U	0.00	30.7	330	UGKG	1.0					
-Chlorophenol	U	0.00	155	330	UGKG	1.0					
-Nitrophenol	U	0.00	178	330	UGKG	1.0					
-methyl-4,6-dinitrophenol	U	0.00	99.0	330	UGKG	1.0					

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2-sec-Butyl-4,6-Dinitrophenol	U	0.00	327	330	UGKG	1.0					
4-Nitrophenol	U	0.00	109	660	UGKG	1.0	DDT	07/23/99	2346	154032	3
4-chloro-3-methyl phenol	U	0.00	125	330	UGKG	1.0					
Hexachlorophene	U	0.00	10700	16500	UGKG	1.0					
Pentachlorophenol	U	0.00	56.1	330	UGKG	1.0					
Phenol	U	0.00	119	330	UGKG	1.0					
m,p-Cresol	U	0.00	152	660	UGKG	1.0					
o-Cresol	U	0.00	62.7	330	UGKG	1.0					
App. IX B/N Extractables - 106 items											
1,2,4,5-Tetrachlorobenzene	U	0.00	185	330	UGKG	1.0					
1,2,4-Trichlorobenzene	U	0.00	185	330	UGKG	1.0					
1,2-Dichlorobenzene	U	0.00	168	330	UGKG	1.0					
1,3-Dichlorobenzene	U	0.00	129	330	UGKG	1.0					
1,4-Dichlorobenzene	U	0.00	129	330	UGKG	1.0					
1,4-Dioxane	U	0.00	60.4	330	UGKG	1.0					
1,4-Naphthoquinone	U	0.00	330	330	UGKG	1.0					
1-Naphthylamine	U	0.00	182	330	UGKG	1.0					
2,4-Dinitrotoluene	U	0.00	116	330	UGKG	1.0					
2,6-Dinitrotoluene	U	0.00	139	330	UGKG	1.0					
2-Acetylaminofluorene	U	0.00	330	330	UGKG	1.0					
2-Chloronaphthalene	U	0.00	172	330	UGKG	1.0					
2-Methylnaphthalene	U	0.00	201	330	UGKG	1.0					
2-Naphthylamine	U	0.00	317	330	UGKG	1.0					
2-Picoline	U	0.00	399	399	UGKG	1.0					
3,3'-Dichlorobenzidine	U	0.00	274	1650	UGKG	1.0					
3,3'-Dimethylbenzidine	U	0.00	165	1650	UGKG	1.0					
3-Methylcholanthrene	U	0.00	330	330	UGKG	1.0					
4-Bromophenyl phenyl ether	U	0.00	116	330	UGKG	1.0					
4-Chloroaniline	U	0.00	152	330	UGKG	1.0					
4-Chlorophenyl phenyl ether	U	0.00	145	330	UGKG	1.0					
4-aminobiphenyl	U	0.00	21.5	330	UGKG	1.0					
5-Nitro-o-toluidine	U	0.00	195	330	UGKG	1.0					
7,12-Dimethylbenz(a)anthracene	U	0.00	314	330	UGKG	1.0					
Acenaphthene	U	0.00	158	330	UGKG	1.0					
Acenaphthylene	U	0.00	145	330	UGKG	1.0					

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ameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
etophenone	U	0.00	125	330	UGKG	1.0					
iline	U	0.00	188	330	UGKG	1.0	DDT	07/23/99	2346	154032	3
thracene	U	0.00	85.8	330	UGKG	1.0					
imite	U	0.00	274	330	UGKG	1.0					
nzo(a)anthracene	U	0.00	66.0	330	UGKG	1.0					
nzo(a)pyrene	U	0.00	72.6	330	UGKG	1.0					
nzo(b)fluoranthene	U	0.00	142	330	UGKG	1.0					
nzo(ghi)perylene	U	0.00	79.2	330	UGKG	1.0					
nzo(k)fluoranthene	U	0.00	132	330	UGKG	1.0					
nzyl Alcohol	U	0.00	185	330	UGKG	1.0					
tyl benzyl phthalate	U	0.00	89.1	330	UGKG	1.0					
lorobenzilate	U	0.00	52.8	1650	UGKG	1.0					
rysene	U	0.00	52.8	330	UGKG	1.0					
-n-butyl phthalate	U	0.00	72.6	330	UGKG	1.0					
-n-octyl phthalate	U	0.00	172	330	UGKG	1.0					
allate	U	0.00	228	330	UGKG	1.0					
benzo(a,h)anthracene	U	0.00	82.5	330	UGKG	1.0					
benzofuran	U	0.00	132	330	UGKG	1.0					
ethyl phthalate	U	0.00	75.9	330	UGKG	1.0					
methoate	U	0.00	264	1650	UGKG	1.0					
methyl phthalate	U	0.00	109	330	UGKG	1.0					
phenylamine	U	0.00	284	330	UGKG	1.0					
sulfoton	U	0.00	45.9	330	UGKG	1.0					
hyl Methanesulfonate	U	0.00	20.1	330	UGKG	1.0					
hyl methacrylate	U	0.00	29.4	330	UGKG	1.0					
mphur	U	0.00	52.5	330	UGKG	1.0					
uoranthene	U	0.00	66.0	330	UGKG	1.0					
uorene	U	0.00	112	330	UGKG	1.0					
exachlorobenzene	U	0.00	69.3	330	UGKG	1.0					
exachlorobutadiene	U	0.00	152	330	UGKG	1.0					
exachlorocyclopentadiene	U	0.00	191	330	UGKG	1.0					
exachloroethane	U	0.00	132	330	UGKG	1.0					
exachloropropene	U	0.00	20.8	330	UGKG	1.0					
deno(1,2,3-c,d)pyrene	U	0.00	79.2	330	UGKG	1.0					
odrin	U	0.00	145	330	UGKG	1.0					

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Isophorone	U	0.00	145	330	UGKG	1.0					
Isosafrole	U	0.00	21.5	330	UGKG	1.0	DDT	07/23/99	2346	154032	3
Kepone	U	0.00	96.7	330	UGKG	1.0					
Methapyrilene	U	0.00	158	1650	UGKG	1.0					
Methyl Methanesulfonate	U	0.00	300	330	UGKG	1.0					
N-Nitrosodi-n-butylamine	U	0.00	22.8	330	UGKG	1.0					
N-Nitrosodiethylamine	U	0.00	20.5	330	UGKG	1.0					
N-Nitrosodimethylamine	U	0.00	10.2	330	UGKG	1.0					
N-Nitrosodiphenylamine	U	0.00	116	330	UGKG	1.0					
N-Nitrosodipropylamine	U	0.00	129	330	UGKG	1.0					
N-Nitrosomethylethylamine	U	0.00	72.3	330	UGKG	1.0					
N-Nitrosomorpholine	U	0.00	24.4	330	UGKG	1.0					
N-Nitrosopiperidine	U	0.00	218	330	UGKG	1.0					
N-Nitrosopyrolidine	U	0.00	22.1	330	UGKG	1.0					
Naphthalene	U	0.00	155	330	UGKG	1.0					
Nitrobenzene	U	0.00	132	330	UGKG	1.0					
O,O,O-Triethylphosphorothioate	U	0.00	231	330	UGKG	1.0					
Parathion	U	0.00	165	330	UGKG	1.0					
Parathion, methyl	U	0.00	264	330	UGKG	1.0					
Pentachlorobenzene	U	0.00	26.4	330	UGKG	1.0					
Pentachloroethane	U	0.00	44.2	330	UGKG	1.0					
Pentachloronitrobenzene	U	0.00	231	330	UGKG	1.0					
Phenacetin	U	0.00	191	330	UGKG	1.0					
Phenanthrene	U	0.00	59.4	330	UGKG	1.0					
Phorate	U	0.00	290	330	UGKG	1.0					
Pronamide	U	0.00	215	330	UGKG	1.0					
Pyrene	U	0.00	72.6	330	UGKG	1.0					
Pyridine	U	0.00	129	330	UGKG	1.0					
Safrole	U	0.00	17.5	330	UGKG	1.0					
Sulfotepp	U	0.00	42.9	330	UGKG	1.0					
Thionazin	U	0.00	224	330	UGKG	1.0					
a-,a-Dimethylphenethylamine	U	0.00	105	330	UGKG	1.0					
bis(2-Chloroethoxy)methane	U	0.00	168	330	UGKG	1.0					
bis(2-Chloroethyl) ether	U	0.00	149	330	UGKG	1.0					
bis(2-Chloroisopropyl)ether	U	0.00	102	330	UGKG	1.0					

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ameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
(2-Ethylhexyl)phthalate	U	0.00	297	330	UGKG	1.0					
Dinitrobenzene	U	0.00	29.4	330	UGKG	1.0	DDT	07/23/99	2346	154032	3
Nitroaniline	U	0.00	82.5	330	UGKG	1.0					
Nitroaniline	U	0.00	66.0	330	UGKG	1.0					
oluidine	U	0.00	277	330	UGKG	1.0					
Dimethylaminoazobenzene	U	0.00	208	330	UGKG	1.0					
Nitroaniline	U	0.00	102	330	UGKG	1.0					
henylenediamine	U	0.00	501	660	UGKG	1.0					
n-Trinitrobenzene	U	0.00	23.1	1650	UGKG	1.0					
04 Waste Constituents - GC/MS Ext. - 3 items											
trobenzene	U	0.00	132	330	UGKG	1.0					
p-Cresol	U	0.00	152	660	UGKG	1.0					
Cresol	U	0.00	62.7	330	UGKG	1.0					
ridine	U	0.00	129	330	UGKG	1.0					
p. IX Herbicides - 3 items											
4,5-T	U	0.00	0.863	10.0	UGKG	10.	JC	07/24/99	1504	154030	4
4,5-TP	U	0.00	0.994	10.0	UGKG	10.					
4-D	U	0.00	1.46	10.0	UGKG	10.					
CB analysis - 7 items											
CB-1016	U	0.00	1.22	41.6	UGKG	1.0	JLW	07/29/99	1158	154173	5
CB-1221	U	0.00	2.82	41.6	UGKG	1.0					
CB-1232	U	0.00	1.63	41.6	UGKG	1.0					
CB-1242	U	0.00	1.67	41.6	UGKG	1.0					
CB-1248	U	0.00	0.906	41.6	UGKG	1.0					
CB-1254	U	0.00	1.16	41.6	UGKG	1.0					
CB-1260	U	0.00	0.942	41.6	UGKG	1.0					
p. IX Pesticides - 19 items											
4'-DDD	U	0.00	0.582	1.33	UGKG	1.0	MM	07/27/99	0221	154073	6
4'-DDE	U	0.00	0.543	1.33	UGKG	1.0					
4'-DDT	U	0.00	0.787	1.33	UGKG	1.0					
ldrin	U	0.00	0.257	0.670	UGKG	1.0					
hlordane	U	0.00	4.82	8.33	UGKG	1.0					
ieldrin	U	0.00	0.725	1.33	UGKG	1.0					
ndosulfan I	U	0.00	0.449	0.670	UGKG	1.0					
ndosulfan II	U	0.00	0.673	1.33	UGKG	1.0					

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Endosulfan sulfate	U	0.00	0.900	0.900	UGKG	1.0					
Endrin	U	0.00	0.673	1.33	UGKG	1.0	MM	07/27/99	0221	154073	6
Endrin aldehyde	U	0.00	0.982	1.33	UGKG	1.0					
Heptachlor	U	0.00	0.429	0.670	UGKG	1.0					
Heptachlor epoxide	U	0.00	0.215	0.670	UGKG	1.0					
Methoxychlor	U	0.00	3.51	6.70	UGKG	1.0					
Toxaphene	U	0.00	10.8	33.3	UGKG	1.0					
alpha-BHC	U	0.00	0.260	0.670	UGKG	1.0					
beta-BHC	U	0.00	0.384	0.670	UGKG	1.0					
delta-BHC	U	0.00	0.280	0.670	UGKG	1.0					
gamma-BHC	U	0.00	0.345	0.670	UGKG	1.0					
Metals Analysis											
Mercury	U	-21.7	2.16	33.3	UGKG	1.0	RPM2	07/22/99	1422	153549	7
Silver		10200	69.3	481	UGKG	2.0	MBL	07/22/99	1519	153903	8
Silver		10200	69.3	481	UGKG	2.0	MBL	07/22/99	1519	153903	9
Aluminum		65800000	56800	241000	UGKG	100	MBL	07/23/99	1107	153903	9
Arsenic		2540	438	481	UGKG	2.0	MBL	07/22/99	1519	153903	8
Arsenic		2540	438	481	UGKG	2.0	MBL	07/22/99	1519	153903	9
Boron		34800000	12200	241000	UGKG	100	MBL	07/23/99	1107	153903	9
Barium		104000	51.9	481	UGKG	2.0	MBL	07/22/99	1519	153903	8
Barium		104000	51.9	481	UGKG	2.0	MBL	07/22/99	1519	153903	9
Beryllium		648	23.1	481	UGKG	2.0	MBL	07/22/99	1519	153903	8
Beryllium		648	23.1	481	UGKG	2.0	MBL	07/22/99	1519	153903	9
Calcium		1730000	6710	9620	UGKG	2.0					
Cadmium		2060	36.6	481	UGKG	2.0	MBL	07/22/99	1519	153903	8
Cadmium		2060	36.6	481	UGKG	2.0	MBL	07/22/99	1519	153903	9
Cobalt		19800	31.7	481	UGKG	2.0	MBL	07/22/99	1519	153903	8
Cobalt		19800	31.7	481	UGKG	2.0	MBL	07/22/99	1519	153903	9
Chromium		224000	73.1	481	UGKG	2.0	MBL	07/22/99	1519	153903	8
Chromium		224000	73.1	481	UGKG	2.0	MBL	07/22/99	1519	153903	9
Copper		84700	129	481	UGKG	2.0	MBL	07/22/99	1519	153903	8
Copper		84700	129	481	UGKG	2.0	MBL	07/22/99	1519	153903	9
Iron		21500000	11600	11600	UGKG	2.0					
Potassium		7570000	2730	9620	UGKG	2.0					
Magnesium		4960000	488	962	UGKG	2.0					

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Aiken, South Carolina 29802
Contact: Mr. Richard Groseclose
Project Description: Hazardous Waste Contract

c: WSRC00497 Report Date: August 20, 1999

Sample ID : COMP 5

rameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
inganese		368000	682	962	UGKG	2.0					
ılybdenum		3740	127	962	UGKG	2.0	MBL	07/22/99	1519	153903	9
dium		122000000	309000	481000	UGKG	100	MBL	07/23/99	1107	153903	9
ckel		9800000	3030	24100	UGKG	100	MBL	07/23/99	1107	153903	8
ckel		9800000	3030	24100	UGKG	100	MBL	07/23/99	1107	153903	9
ad		94000	151	481	UGKG	2.0	MBL	07/22/99	1519	153903	8
ad		94000	151	481	UGKG	2.0	MBL	07/22/99	1519	153903	9
ıtimony	U	-207	18300	48100	UGKG	100	MBL	07/23/99	1107	153903	8
ıtimony	U	-207	18300	48100	UGKG	100	MBL	07/23/99	1107	153903	9
lenium	U	-3460	13000	24100	UGKG	100	MBL	07/23/99	1107	153903	8
lenium	U	-3460	13000	24100	UGKG	100	MBL	07/23/99	1107	153903	9
icon		5390000	135000	481000	UGKG	100					
ı		9500	801	962	UGKG	2.0	MBL	07/22/99	1519	153903	8
ı		9500	801	962	UGKG	2.0	MBL	07/22/99	1519	153903	9
ontium		26400	27.9	481	UGKG	2.0					
anium		333000	1920	24100	UGKG	100	MBL	07/23/99	1107	153903	9
allium	U	-3000	21200	48100	UGKG	100	MBL	07/23/99	1107	153903	8
allium	U	-3000	21200	48100	UGKG	100	MBL	07/23/99	1107	153903	9
anium		34600000	94600	241000	UGKG	100					
ınadium		33300	51.0	481	UGKG	2.0	MBL	07/22/99	1519	153903	8
ınadium		33300	51.0	481	UGKG	2.0	MBL	07/22/99	1519	153903	9
ıc		21700000	17800	24100	UGKG	100	MBL	07/23/99	1107	153903	8
ıc		21700000	17800	24100	UGKG	100	MBL	07/23/99	1107	153903	9
ıeral Chemistry											
tal Halogens - 3 items											
omide	U	0.00	0.133	0.437	MGKG	1.0	RWS	07/16/99	2131	15442210	
ılorides	U	0.00	0.158	0.873	MGKG	1.0					
ıoride	U	0.00	0.190	0.437	MGKG	1.0					
trogen, Nitrate	U	0.0786	0.111	0.500	MGKG	1.0	RWS	07/16/99	2131	15442011	
lfate as SO4	U	0.00	0.332	8.73	mg/kg	1.0					
trogen, Ammonia	U	0.100	0.241	0.500	MGKG	1.0	THL	07/27/99	1236	15421212	
trogen, Total		0.100	0.0281	0.100	MGKG	1.0	THL	07/30/99	1600	15482213	
trogen, Nitrate/Nitrite	U	0.00	0.0869	0.505	MGKG	1.0	THL	07/30/99	1554	15479514	
osphorus, Total as PO4		328	7.64	20.0	MGKG	100	THL	07/24/99	1144	15410215	

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Sample ID : COMP 5

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
The following prep procedures were performed:											
GC/MS 5970 Extractables							RDH	07/22/99	0800	154032	N
Herbicides							JPB	07/22/99	1400	154030	N
PCB's							JMA	07/24/99	1600	154173	N
Pesticides							RDH	07/23/99	0800	154073	N
Mercury							AJM	07/21/99	1530	153549	N
TRACE							FGD	07/21/99	1430	153903	N

Surrogate Recovery	Test	Percent%	Acceptable Limits
2,4,6-Tribromophenol	AIXAE-8270C	68.7	(44.5 - 126.)
2-Fluorophenol	AIXAE-8270C	54.2	(37.0 - 102.)
Phenol-d6	AIXAE-8270C	57.5	(41.5 - 102.)
2-Fluorobiphenyl	AIXBN-8270C	50.9	(44.7 - 110.)
Nitrobenzene-d5	AIXBN-8270C	43.5	(42.4 - 107.)
p-Terphenyl-d14	AIXBN-8270C	101.	(45.5 - 104.)
2,4,6-Tribromophenol	F005C	68.7	(44.5 - 126.)
2-Fluorobiphenyl	F005C	50.9	(44.7 - 110.)
2-Fluorophenol	F005C	54.2	(37.0 - 102.)
Nitrobenzene-d5	F005C	43.5	(42.4 - 107.)
Phenol-d6	F005C	57.5	(41.5 - 102.)
p-Terphenyl-d14	F005C	101.	(45.5 - 104.)
2,4-Dichlorophenylacetic acid	AIXH-8151B	65.9	(24.0 - 111.)
4CMX	AIXP-8082	37.5	(25.3 - 110.)
Decachlorobiphenyl	AIXP-8082	58.5	(46.8 - 131.)
4CMX	AIXP-8081A	54.1	(36.5 - 131.)
Decachlorobiphenyl	AIXP-8081A	73.8	(50.7 - 135.)
Bromofluorobenzene	AIXVOA-8260B	89.2	(73.0 - 129.)
Dibromofluoromethane	AIXVOA-8260B	99.5	(66.0 - 117.)
Toluene-d8	AIXVOA-8260B	101.	(73.0 - 122.)
Bromofluorobenzene	F001-8260	89.2	(73.0 - 129.)
Dibromofluoromethane	F001-8260	99.5	(66.0 - 117.)
Toluene-d8	F001-8260	101.	(73.0 - 122.)
Bromofluorobenzene	F002-8260	89.2	(73.0 - 129.)
Dibromofluoromethane	F002-8260	99.5	(66.0 - 117.)

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: WSRC00497 Report Date: August 20, 1999

Sample ID : COMP 5

rogate Recovery	Test	Percent%	Acceptable Limits
uene-d8	F002-8260	101.	(73.0 - 122.)
mofluorobenzene	F003A-8260	89.2	(73.0 - 129.)
romofluoromethane	F003A-8260	99.5	(66.0 - 117.)
uene-d8	F003A-8260	101.	(73.0 - 122.)
mofluorobenzene	F005A-8260	89.2	(73.0 - 129.)
romofluoromethane	F005A-8260	99.5	(66.0 - 117.)
uene-d8	F005A-8260	101.	(73.0 - 122.)
mofluorobenzene	M8010 BY 8260	89.2	(73.0 - 129.)
romofluoromethane	M8010 BY 8260	99.5	(66.0 - 117.)
uene-d8	M8010 BY 8260	101.	(73.0 - 122.)

= Method	Method-Description
1	GC/FID
2	EPA 8260B
3	EPA 8270C
4	EPA8151A
5	EPA 8082
6	EPA 8081A
7	EPA 7471A
8	SW846 6010B
9	EPA 6010B
10	EPA 9056
11	EPA 300.0
12	EPA 350.1 modified
13	EPA 351.2/353.1
14	EPA 353.1 modified
15	EPA 365.4 modified

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M = Method	Method-Description

Notes:
The qualifiers in this report are defined as follows:
ND indicates that the analyte was not detected at a concentration greater than the detection limit.
J indicates presence of analyte at a concentration less than the reporting limit (RL) and greater than the detection limit (DL).
U indicates that the analyte was not detected at a concentration greater than the detection limit.
* indicates that a quality control analyte recovery is outside of specified acceptance criteria.

This data report has been prepared and reviewed
in accordance with General Engineering Laboratories
standard operating procedures. Please direct
any questions to your Project Manager, Stacy Griffin at 769-7376.

Reviewed By

P O Box 30712 • Charleston, SC 29417 • 2040 Savage Road • 29407

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Project Description: Hazardous Waste Contract

c: WSRC00497 Report Date: August 20, 1999

Sample ID	: COMP 6
Lab ID	: 9907679-72
Matrix	: Solid
Date Collected	: 07/14/99
Date Received	: 07/15/99
Priority	: Routine
Collector	: Client

rameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
atile Organics											
03 Waste Constituents - FID - 4 items											
ıyl Acetate	U	0.00	1.95	10.0	mg/kg	1.0	CAK	07/28/99	1838	154227	1
ıyl Ether	U	0.00	3.91	9.77	mg/kg	1.0					
:thyl Alcohol	U	0.00	3.91	9.77	mg/kg	1.0					
3utyl Alcohol	U	0.00	3.91	9.77	mg/kg	1.0					
05 Waste Constituents - FID - 2 items											
ıylene Glycol Monoethylether	U	0.00	0.977	9.77	mg/kg	1.0					
ıbutyl Alcohol	U	0.00	3.91	10.0	mg/kg	1.0					
p. IX VOA - 54 items											
.,1,2-Tetrachloroethane	U	0.00	0.200	2.00	UGKG	1.0	JWF	07/28/99	0921	154538	2
.,1-Trichloroethane	U	0.00	0.100	2.00	UGKG	1.0					
.,2,2-Tetrachloroethane	U	0.00	0.600	2.00	UGKG	1.0					
.,2-Trichloroethane	U	0.00	0.300	2.00	UGKG	1.0					
.-Dichloroethane	U	0.00	0.100	2.00	UGKG	1.0					
.-Dichloroethylene	U	0.00	0.300	2.00	UGKG	1.0					
',3-Trichloropropane	U	0.00	0.400	2.00	UGKG	1.0					
'-Dibromo-3-chloropropane	U	0.00	0.400	2.00	UGKG	1.0					
'-Dibromoethane	U	0.00	0.200	2.00	UGKG	1.0					
'-Dichloroethane	U	0.00	0.200	2.00	UGKG	1.0					
'-Dichloropropane	U	0.00	0.200	2.00	UGKG	1.0					
'-trans-Dichloroethylene	U	0.00	0.100	2.00	UGKG	1.0					
3utanone	U	0.00	3.20	10.0	UGKG	1.0					
Hexanone	U	0.00	2.80	10.0	UGKG	1.0					
Methyl-2-pentanone	U	0.00	3.10	10.0	UGKG	1.0					
etone	U	1.11	10.3	10.3	UGKG	1.0					
etonitrile	J	9.85	1.00	10.0	UGKG	1.0					
rolein	U	0.00	4.60	20.0	UGKG	1.0					
rylonitrile	U	0.00	3.90	50.0	UGKG	1.0					

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Sample ID : COMP 6

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Allyl Chloride	U	0.00	0.400	10.0	UGKG	1.0					
Benzene	U	0.00	0.500	2.00	UGKG	1.0	JWF	07/28/99	0921	154538	2
Bromoform	U	0.00	0.300	2.00	UGKG	1.0					
Carbon Disulfide	U	0.00	0.300	10.0	UGKG	1.0					
Carbon Tetrachloride	U	0.00	0.500	2.00	UGKG	1.0					
Chlorobenzene	U	0.00	0.300	2.00	UGKG	1.0					
Chlorodibromomethane	U	0.00	0.200	2.00	UGKG	1.0					
Chloroethane	U	0.00	0.300	2.00	UGKG	1.0					
Chloroform	U	0.00	0.100	2.00	UGKG	1.0					
Chloroprene	U	0.00	2.00	10.0	UGKG	1.0					
Dibromomethane	U	0.00	0.200	2.00	UGKG	1.0					
Dichlorobromomethane	U	0.00	0.100	2.00	UGKG	1.0					
Dichlorodifluoromethane	U	0.00	1.20	2.00	UGKG	1.0					
Ethyl methacrylate	U	0.00	0.400	10.0	UGKG	1.0					
Ethylbenzene	U	0.00	0.300	2.00	UGKG	1.0					
Isobutyl Alcohol	U	0.00	6.30	20.0	UGKG	1.0					
Methacrylonitrile	U	0.00	0.900	10.0	UGKG	1.0					
Methyl Bromide	U	0.00	0.300	2.00	UGKG	1.0					
Methyl Chloride	U	0.00	0.200	2.00	UGKG	1.0					
Methyl Iodide	U	0.00	0.600	5.00	UGKG	1.0					
Methyl Methacrylate	U	0.00	0.400	10.0	UGKG	1.0					
Methylene Chloride	U	0.774	1.40	5.00	UGKG	1.0					
Pentachloroethane	U	0.00	0.500	10.0	UGKG	1.0					
Propionitrile	U	0.00	3.40	20.0	UGKG	1.0					
Styrene	U	0.00	0.300	2.00	UGKG	1.0					
Tetrachloroethylene	U	0.00	0.400	2.00	UGKG	1.0					
Toluene	U	0.00	0.900	2.00	UGKG	1.0					
Trichloroethylene	U	0.00	0.300	2.00	UGKG	1.0					
Trichlorofluoromethane	U	0.00	0.300	2.00	UGKG	1.0					
Vinyl Acetate	U	0.00	2.10	10.0	UGKG	1.0					
Vinyl chloride	U	0.00	0.400	2.00	UGKG	1.0					
Xylenes (TOTAL)	U	0.00	0.700	4.00	UGKG	1.0					
cis-1,3-Dichloropropylene	U	0.00	0.200	2.00	UGKG	1.0					
trans-1,3-Dichloropropylene	U	0.00	0.300	2.00	UGKG	1.0					
trans-1,4-Dichloro-2-butene	U	0.00	0.500	2.00	UGKG	1.0					

F001 Waste Constituents - 7 items

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·ameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
,1-Trichloroethane	U	0.00	0.100	2.00	UGKG	1.0					
bon Tetrachloride	U	0.00	0.500	2.00	UGKG	1.0	JWF	07/28/99	0921	154538	2
thylene Chloride	U	0.774	1.40	5.00	UGKG	1.0					
rachloroethylene	U	0.00	0.400	2.00	UGKG	1.0					
chloroethylene	U	0.00	0.300	2.00	UGKG	1.0					
chlorofluoromethane	U	0.00	0.300	2.00	UGKG	1.0					
chlorotrifluoroethane	U	0.00	10.0	10.0	UGKG	1.0					
)2 Waste Constituents - 9 items											
,1-Trichloroethane	U	0.00	0.100	2.00	UGKG	1.0					
,2-Trichloroethane	U	0.00	0.300	2.00	UGKG	1.0					
-Dichlorobenzene	U	0.00	0.500	2.00	UGKG	1.0					
lorobenzene	U	0.00	0.300	2.00	UGKG	1.0					
thylene Chloride	U	0.774	1.40	5.00	UGKG	1.0					
rachloroethylene	U	0.00	0.400	2.00	UGKG	1.0					
chloroethylene	U	0.00	0.300	2.00	UGKG	1.0					
chlorofluoromethane	U	0.00	0.300	2.00	UGKG	1.0					
chlorotrifluoroethane	U	0.00	10.0	10.0	UGKG	1.0					
)3 Waste Constituents - GC/MS VOA - 4 items											
Methyl-2-pentanone	U	0.00	3.10	10.0	UGKG	1.0					
etone	U	1.11	10.3	10.3	UGKG	1.0					
ylbenzene	U	0.00	0.300	2.00	UGKG	1.0					
lenes (TOTAL)	U	0.00	0.700	4.00	UGKG	1.0					
)5 Waste Constituents - GC/MS VOA - 5 items											
Butanone	U	0.00	3.20	10.0	UGKG	1.0					
Nitropropane	U	0.00	3.30	10.0	UGKG	1.0					
nzene	U	0.00	0.500	2.00	UGKG	1.0					
rbon Disulfide	U	0.00	0.300	10.0	UGKG	1.0					
luene	U	0.00	0.900	2.00	UGKG	1.0					
logenated Volatile Organics - 29 items											
,1-Trichloroethane	U	0.00	0.100	2.00	UGKG	1.0					
,2,2-Tetrachloroethane	U	0.00	0.600	2.00	UGKG	1.0					
,2-Trichloroethane	U	0.00	0.300	2.00	UGKG	1.0					
-Dichloroethane	U	0.00	0.100	2.00	UGKG	1.0					
-Dichloroethylene	U	0.00	0.300	2.00	UGKG	1.0					
-Dichlorobenzene	U	0.00	0.500	2.00	UGKG	1.0					

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1,2-Dichloroethane	U	0.00	0.200	2.00	UGKG	1.0					
1,2-Dichloropropane	U	0.00	0.200	2.00	UGKG	1.0	JWF	07/28/99	0921	154538	2
1,2-trans-Dichloroethylene	U	0.00	0.100	2.00	UGKG	1.0					
1,3-Dichlorobenzene	U	0.00	0.400	2.00	UGKG	1.0					
1,4-Dichlorobenzene	U	0.00	0.600	2.00	UGKG	1.0					
2-Chloroethylvinyl ether	U	0.00	4.04	5.00	UGKG	1.0					
Bromoform	U	0.00	0.300	2.00	UGKG	1.0					
Carbon Tetrachloride	U	0.00	0.500	2.00	UGKG	1.0					
Chlorobenzene	U	0.00	0.300	2.00	UGKG	1.0					
Chlorodibromomethane	U	0.00	0.200	2.00	UGKG	1.0					
Chloroethane	U	0.00	0.300	2.00	UGKG	1.0					
Chloroform	U	0.00	0.100	2.00	UGKG	1.0					
Dichlorobromomethane	U	0.00	0.100	2.00	UGKG	1.0					
Dichlorodifluoromethane	U	0.00	1.20	2.00	UGKG	1.0					
Methyl Bromide	U	0.00	0.300	2.00	UGKG	1.0					
Methyl Chloride	U	0.00	0.200	2.00	UGKG	1.0					
Methylene Chloride	U	0.774	1.40	5.00	UGKG	1.0					
Tetrachloroethylene	U	0.00	0.400	2.00	UGKG	1.0					
Trichloroethylene	U	0.00	0.300	2.00	UGKG	1.0					
Trichlorofluoromethane	U	0.00	0.300	2.00	UGKG	1.0					
Vinyl chloride	U	0.00	0.400	2.00	UGKG	1.0					
cis-1,3-Dichloropropylene	U	0.00	0.200	2.00	UGKG	1.0					
trans-1,3-Dichloropropylene	U	0.00	0.300	2.00	UGKG	1.0					
Extractable Organics											
App. IX Acid Extractables - 18 items											
2,3,4,6-Tetrachlorophenol	U	0.00	281	330	UGKG	1.0	DDT	07/24/99	0015	154032	3
2,4,5-Trichlorophenol	U	0.00	150	330	UGKG	1.0					
2,4,6-Trichlorophenol	U	0.00	150	330	UGKG	1.0					
2,4-Dichlorophenol	U	0.00	173	330	UGKG	1.0					
2,4-Dimethylphenol	U	0.00	108	330	UGKG	1.0					
2,4-Dinitrophenol	U	0.00	360	660	UGKG	1.0					
2,6-Dichlorophenol	U	0.00	30.4	330	UGKG	1.0					
2-Chlorophenol	U	0.00	154	330	UGKG	1.0					
2-Nitrophenol	U	0.00	177	330	UGKG	1.0					
2-methyl-4,6-dinitrophenol	U	0.00	98.1	330	UGKG	1.0					

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Project Description: Hazardous Waste Contract

:: WSRC00497 Report Date: August 20, 1999

Sample ID : COMP 6

;ameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
ec-Butyl-4,6-Dinitrophenol	U	0.00	324	330	UGKG	1.0					
Jitrophenol	U	0.00	108	660	UGKG	1.0	DDT	07/24/99	0015	154032	3
hloro-3-methyl phenol	U	0.00	124	330	UGKG	1.0					
xachlorophene	U	0.00	10600	16400	UGKG	1.0					
ıtachlorophenol	U	0.00	55.6	330	UGKG	1.0					
:nol	U	0.00	118	330	UGKG	1.0					
)-Cresol	U	0.00	150	660	UGKG	1.0					
:resol	U	0.00	62.1	330	UGKG	1.0					
). IX B/N Extractables - 106 items											
,4,5-Tetrachlorobenzene	U	0.00	183	330	UGKG	1.0					
,4-Trichlorobenzene	U	0.00	183	330	UGKG	1.0					
-Dichlorobenzene	U	0.00	167	330	UGKG	1.0					
-Dichlorobenzene	U	0.00	128	330	UGKG	1.0					
-Dichlorobenzene	U	0.00	128	330	UGKG	1.0					
-Dioxane	U	0.00	59.8	330	UGKG	1.0					
-Naphthoquinone	U	0.00	327	330	UGKG	1.0					
Japhthylamine	U	0.00	181	330	UGKG	1.0					
-Dinitrotoluene	U	0.00	114	330	UGKG	1.0					
-Dinitrotoluene	U	0.00	137	330	UGKG	1.0					
\cetylaminofluorene	U	0.00	327	330	UGKG	1.0					
:hloronaphthalene	U	0.00	170	330	UGKG	1.0					
Aethylnaphthalene	U	0.00	199	330	UGKG	1.0					
Japhthylamine	U	0.00	314	330	UGKG	1.0					
'icoline	U	0.00	396	396	UGKG	1.0					
'-Dichlorobenzidine	U	0.00	271	1650	UGKG	1.0					
'-Dimethylbenzidine	U	0.00	164	1650	UGKG	1.0					
Aethylcholanthrene	U	0.00	327	330	UGKG	1.0					
3romophenyl phenyl ether	U	0.00	114	330	UGKG	1.0					
:hloroaniline	U	0.00	150	330	UGKG	1.0					
:hlorophenyl phenyl ether	U	0.00	144	330	UGKG	1.0					
.minobiphenyl	U	0.00	21.3	330	UGKG	1.0					
Jitro-o-toluidine	U	0.00	193	330	UGKG	1.0					
2-Dimethylbenz(a)anthracene	U	0.00	311	330	UGKG	1.0					
enaphthene	U	0.00	157	330	UGKG	1.0					
enaphthylene	U	0.00	144	330	UGKG	1.0					

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Acetophenone	U	0.00	124	330	UGKG	1.0					
Aniline	U	0.00	186	330	UGKG	1.0	DDT	07/24/99	0015	154032	3
Anthracene	U	0.00	85.0	330	UGKG	1.0					
Aramite	U	0.00	271	330	UGKG	1.0					
Benzo(a)anthracene	U	0.00	65.4	330	UGKG	1.0					
Benzo(a)pyrene	U	0.00	71.9	330	UGKG	1.0					
Benzo(b)fluoranthene	U	0.00	141	330	UGKG	1.0					
Benzo(ghi)perylene	U	0.00	78.5	330	UGKG	1.0					
Benzo(k)fluoranthene	U	0.00	131	330	UGKG	1.0					
Benzyl Alcohol	U	0.00	183	330	UGKG	1.0					
Butyl benzyl phthalate	U	0.00	88.3	330	UGKG	1.0					
Chlorobenzilate	U	0.00	52.3	1650	UGKG	1.0					
Chrysene	U	0.00	52.3	330	UGKG	1.0					
Di-n-butyl phthalate	U	0.00	71.9	330	UGKG	1.0					
Di-n-octyl phthalate	U	0.00	170	330	UGKG	1.0					
Diallate	U	0.00	226	330	UGKG	1.0					
Dibenzo(a,h)anthracene	U	0.00	81.8	330	UGKG	1.0					
Dibenzofuran	U	0.00	131	330	UGKG	1.0					
Diethyl phthalate	U	0.00	75.2	330	UGKG	1.0					
Dimethoate	U	0.00	262	1650	UGKG	1.0					
Dimethyl phthalate	U	0.00	108	330	UGKG	1.0					
Diphenylamine	U	0.00	281	330	UGKG	1.0					
Disulfoton	U	0.00	45.5	330	UGKG	1.0					
Ethyl Methanesulfonate	U	0.00	19.9	330	UGKG	1.0					
Ethyl methacrylate	U	0.00	29.1	330	UGKG	1.0					
Famphur	U	0.00	52.0	330	UGKG	1.0					
Fluoranthene	U	0.00	65.4	330	UGKG	1.0					
Fluorene	U	0.00	111	330	UGKG	1.0					
Hexachlorobenzene	U	0.00	68.7	330	UGKG	1.0					
Hexachlorobutadiene	U	0.00	150	330	UGKG	1.0					
Hexachlorocyclopentadiene	U	0.00	190	330	UGKG	1.0					
Hexachloroethane	U	0.00	131	330	UGKG	1.0					
Hexachloropropene	U	0.00	20.6	330	UGKG	1.0					
Indeno(1,2,3-c,d)pyrene	U	0.00	78.5	330	UGKG	1.0					
Isodrin	U	0.00	144	330	UGKG	1.0					

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ameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
phorone	U	0.00	144	330	UGKG	1.0					
safrole	U	0.00	21.3	330	UGKG	1.0	DDT	07/24/99	0015	154032	3
pone	U	0.00	95.8	330	UGKG	1.0					
thapyrilene	U	0.00	157	1650	UGKG	1.0					
thyl Methanesulfonate	U	0.00	298	330	UGKG	1.0					
Nitrosodi-n-butylamine	U	0.00	22.6	330	UGKG	1.0					
Nitrosodiethylamine	U	0.00	20.3	330	UGKG	1.0					
Nitrosodimethylamine	U	0.00	10.1	330	UGKG	1.0					
Nitrosodiphenylamine	U	0.00	114	330	UGKG	1.0					
Nitrosodipropylamine	U	0.00	128	330	UGKG	1.0					
Nitrosomethylethylamine	U	0.00	71.6	330	UGKG	1.0					
Nitrosomorpholine	U	0.00	24.2	330	UGKG	1.0					
Nitrosopiperidine	U	0.00	216	330	UGKG	1.0					
Nitrosopyrolidine	U	0.00	21.9	330	UGKG	1.0					
phthalene	U	0.00	154	330	UGKG	1.0					
robenzene	U	0.00	131	330	UGKG	1.0					
O,O-Triethylphosphorothioate	U	0.00	229	330	UGKG	1.0					
rathion	U	0.00	164	330	UGKG	1.0					
rathion, methyl	U	0.00	262	330	UGKG	1.0					
ntachlorobenzene	U	0.00	26.2	330	UGKG	1.0					
ntachloroethane	U	0.00	43.8	330	UGKG	1.0					
ntachloronitrobenzene	U	0.00	229	330	UGKG	1.0					
enacetin	U	0.00	190	330	UGKG	1.0					
enanthrene	U	0.00	58.9	330	UGKG	1.0					
orate	U	0.00	288	330	UGKG	1.0					
onamide	U	0.00	213	330	UGKG	1.0					
rene	U	0.00	71.9	330	UGKG	1.0					
ridine	U	0.00	128	330	UGKG	1.0					
frole	U	0.00	17.3	330	UGKG	1.0					
lfotepp	U	0.00	42.5	330	UGKG	1.0					
ionazin	U	0.00	222	330	UGKG	1.0					
a-Dimethylphenethylamine	U	0.00	104	330	UGKG	1.0					
s(2-Chloroethoxy)methane	U	0.00	167	330	UGKG	1.0					
s(2-Chloroethyl) ether	U	0.00	147	330	UGKG	1.0					
s(2-Chloroisopropyl)ether	U	0.00	101	330	UGKG	1.0					

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Sample ID : COMP 6

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
bis(2-Ethylhexyl)phthalate	U	0.00	294	330	UGKG	1.0					
m-Dinitrobenzene	U	0.00	29.1	330	UGKG	1.0	DDT	07/24/99	0015	154032	3
m-Nitroaniline	U	0.00	81.8	330	UGKG	1.0					
o-Nitroaniline	U	0.00	65.4	330	UGKG	1.0					
o-Toluidine	U	0.00	275	330	UGKG	1.0					
p-Dimethylaminoazobenzene	U	0.00	206	330	UGKG	1.0					
p-Nitroaniline	U	0.00	101	330	UGKG	1.0					
p-Phenylenediamine	U	0.00	496	660	UGKG	1.0					
sym-Trinitrobenzene	U	0.00	22.9	1650	UGKG	1.0					
F004 Waste Constituents - GC/MS Ext. - 3 items											
Nitrobenzene	U	0.00	131	330	UGKG	1.0					
m,p-Cresol	U	0.00	150	660	UGKG	1.0					
o-Cresol	U	0.00	62.1	330	UGKG	1.0					
Pyridine	U	0.00	128	330	UGKG	1.0					
App. IX Herbicides - 3 items											
2,4,5-T	U	0.00	0.863	10.0	UGKG	10.	JC	07/24/99	1527	154030	4
2,4,5-TP	U	0.00	0.994	10.0	UGKG	10.					
2,4-D	U	0.00	1.46	10.0	UGKG	10.					
PCB analysis - 7 items											
PCB-1016	U	0.00	1.22	41.6	UGKG	1.0	JLW	07/29/99	1217	154173	5
PCB-1221	U	0.00	2.82	41.6	UGKG	1.0					
PCB-1232	U	0.00	1.63	41.6	UGKG	1.0					
PCB-1242	U	0.00	1.67	41.6	UGKG	1.0					
PCB-1248	U	0.00	0.906	41.6	UGKG	1.0					
PCB-1254	U	0.00	1.16	41.6	UGKG	1.0					
PCB-1260	U	0.00	0.942	41.6	UGKG	1.0					
App. IX Pesticides - 19 items											
4,4'-DDD	U	0.00	0.596	1.33	UGKG	1.0	MM	07/27/99	0243	154073	6
4,4'-DDE	U	0.00	0.556	1.33	UGKG	1.0					
4,4'-DDT	U	0.00	0.806	1.33	UGKG	1.0					
Aldrin	U	0.00	0.263	0.670	UGKG	1.0					
Chlordane	U	0.00	4.94	8.33	UGKG	1.0					
Dieldrin	U	0.00	0.743	1.33	UGKG	1.0					
Endosulfan I	U	0.00	0.460	0.670	UGKG	1.0					
Endosulfan II	U	0.00	0.689	1.33	UGKG	1.0					

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rameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
dosulfan sulfate	U	0.00	0.922	0.922	UGKG	1.0					
drin	U	0.00	0.689	1.33	UGKG	1.0	MM	07/27/99	0243	154073	6
drin aldehyde	U	0.00	1.01	1.33	UGKG	1.0					
ptachlor	U	0.00	0.440	0.670	UGKG	1.0					
ptachlor epoxide	U	0.00	0.220	0.670	UGKG	1.0					
thoxychlor	U	0.00	3.59	6.70	UGKG	1.0					
xaphene	U	0.00	11.1	33.3	UGKG	1.0					
ha-BHC	U	0.00	0.266	0.670	UGKG	1.0					
a-BHC	U	0.00	0.393	0.670	UGKG	1.0					
ta-BHC	U	0.00	0.286	0.670	UGKG	1.0					
mma-BHC	U	0.00	0.353	0.670	UGKG	1.0					
tals Analysis											
ercury	U	-7.81	2.01	33.3	UGKG	1.0	RPM2	07/22/99	1424	153549	7
ver		10200	70.6	490	UGKG	2.0	MBL	07/22/99	1525	153903	8
ver		10200	70.6	490	UGKG	2.0	MBL	07/22/99	1525	153903	9
uminum		52100000	57900	245000	UGKG	100	MBL	07/23/99	1133	153903	9
senic		2090	446	490	UGKG	2.0	MBL	07/22/99	1525	153903	8
senic		2090	446	490	UGKG	2.0	MBL	07/22/99	1525	153903	9
ron		28400000	12400	245000	UGKG	100	MBL	07/23/99	1133	153903	9
rium		83300	52.9	490	UGKG	2.0	MBL	07/22/99	1525	153903	8
rium		83300	52.9	490	UGKG	2.0	MBL	07/22/99	1525	153903	9
ryllium		.522	23.5	490	UGKG	2.0	MBL	07/22/99	1525	153903	8
ryllium		522	23.5	490	UGKG	2.0	MBL	07/22/99	1525	153903	9
lcium		1370000	6830	9800	UGKG	2.0					
dmium		1800	37.2	490	UGKG	2.0	MBL	07/22/99	1525	153903	8
dmium		1800	37.2	490	UGKG	2.0	MBL	07/22/99	1525	153903	9
balt		11800	32.3	490	UGKG	2.0	MBL	07/22/99	1525	153903	8
balt		11800	32.3	490	UGKG	2.0	MBL	07/22/99	1525	153903	9
romium		218000	74.5	490	UGKG	2.0	MBL	07/22/99	1525	153903	8
romium		218000	74.5	490	UGKG	2.0	MBL	07/22/99	1525	153903	9
pper		49100	131	490	UGKG	2.0	MBL	07/22/99	1525	153903	8
pper		49100	131	490	UGKG	2.0	MBL	07/22/99	1525	153903	9
n		22400000	11800	11800	UGKG	2.0					
tassium		5590000	2780	9800	UGKG	2.0					
agnesium		4450000	497	980	UGKG	2.0					

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Manganese		354000	695	980	UGKG	2.0					
Molybdenum		3410	129	980	UGKG	2.0	MBL	07/22/99	1525	153903	9
Sodium		101000000	315000	490000	UGKG	100	MBL	07/23/99	1133	153903	9
Nickel		6420000	3090	24500	UGKG	100	MBL	07/23/99	1133	153903	8
Nickel		6420000	3090	24500	UGKG	100	MBL	07/23/99	1133	153903	9
Lead		61500	154	490	UGKG	2.0	MBL	07/22/99	1525	153903	8
Lead		61500	154	490	UGKG	2.0	MBL	07/22/99	1525	153903	9
Antimony	U	2970	18700	49000	UGKG	100	MBL	07/23/99	1133	153903	8
Antimony	U	2970	18700	49000	UGKG	100	MBL	07/23/99	1133	153903	9
Selenium	U	749	13200	24500	UGKG	100	MBL	07/23/99	1133	153903	8
Selenium	U	749	13200	24500	UGKG	100	MBL	07/23/99	1133	153903	9
Silicon		3540000	137000	490000	UGKG	100					
Tin		18700	816	980	UGKG	2.0	MBL	07/22/99	1525	153903	8
Tin		18700	816	980	UGKG	2.0	MBL	07/22/99	1525	153903	9
Strontium		23000	28.4	490	UGKG	2.0					
Titanium		251000	1960	24500	UGKG	100	MBL	07/23/99	1133	153903	9
Thallium	U	15000	21600	49000	UGKG	100	MBL	07/23/99	1133	153903	8
Thallium	U	15000	21600	49000	UGKG	100	MBL	07/23/99	1133	153903	9
Uranium		34600000	96300	245000	UGKG	100					
Vanadium		25800	51.9	490	UGKG	2.0	MBL	07/22/99	1525	153903	8
Vanadium		25800	51.9	490	UGKG	2.0	MBL	07/22/99	1525	153903	9
Zinc		19300000	18100	24500	UGKG	100	MBL	07/23/99	1133	153903	8
Zinc		19300000	18100	24500	UGKG	100	MBL	07/23/99	1133	153903	9
General Chemistry											
Total Halogens - 3 items											
Bromide	U	0.00	0.145	0.476	MGKG	1.0	RWS	07/16/99	2145	15442210	
Chlorides	J	0.809	0.172	0.952	MGKG	1.0					
Fluoride	J	0.267	0.208	0.476	MGKG	1.0					
Nitrogen, Nitrate	U	0.0666	0.121	0.500	MGKG	1.0	RWS	07/16/99	2145	15442011	
Sulfate as SO4	U	0.00	0.362	9.52	mg/kg	1.0					
Nitrogen, Ammonia	U	0.00	0.241	0.500	MGKG	1.0	THL	07/27/99	1236	15421212	
Nitrogen, Total		0.400	0.0281	0.100	MGKG	1.0	THL	07/30/99	1600	15482213	
Nitrogen, Nitrate/Nitrite	U	0.00	0.0860	0.500	MGKG	1.0	THL	07/30/99	1554	15479514	
Phosphorus, Total as PO4		826	7.62	20.0	MGKG	100	THL	07/24/99	1144	15410215	

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following prep procedures were performed:											
/MS 5970 Extractables							RDH	07/22/99	0800	154032	N
:bicides							JPB	07/22/99	1400	154030	N
B's							JMA	07/24/99	1600	154173	N
ticides							RDH	07/23/99	0800	154073	N
rcury							AJM	07/21/99	1530	153549	N
ACE							FGD	07/21/99	1430	153903	N

rrogate Recovery	Test	Percent%	Acceptable Limits
,6-Tribromophenol	AIXAE-8270C	69.6	(44.5 - 126.)
luorophenol	AIXAE-8270C	58.3	(37.0 - 102.)
enol-d6	AIXAE-8270C	66.7	(41.5 - 102.)
luorobiphenyl	AIXBN-8270C	53.1	(44.7 - 110.)
robenzene-d5	AIXBN-8270C	46.2	(42.4 - 107.)
erphenyl-d14	AIXBN-8270C	90.1	(45.5 - 104.)
,6-Tribromophenol	F005C	69.6	(44.5 - 126.)
luorobiphenyl	F005C	53.1	(44.7 - 110.)
luorophenol	F005C	58.3	(37.0 - 102.)
robenzene-d5	F005C	46.2	(42.4 - 107.)
enol-d6	F005C	66.7	(41.5 - 102.)
erphenyl-d14	F005C	90.1	(45.5 - 104.)
-Dichlorophenylacetic acid	AIXH-8151B	75.1	(24.0 - 111.)
MX	AIXP-8082	63.0	(25.3 - 110.)
cachlorobiphenyl	AIXP-8082	55.0	(46.8 - 131.)
MX	AIXP-8081A	72.7	(36.5 - 131.)
cachlorobiphenyl	AIXP-8081A	89.4	(50.7 - 135.)
omofluorobenzene	AIXVOA-8260B	88.8	(73.0 - 129.)
bromofluoromethane	AIXVOA-8260B	97.9	(66.0 - 117.)
luene-d8	AIXVOA-8260B	100.	(73.0 - 122.)
omofluorobenzene	F001-8260	88.8	(73.0 - 129.)
bromofluoromethane	F001-8260	97.9	(66.0 - 117.)
luene-d8	F001-8260	100.	(73.0 - 122.)
Bromofluorobenzene	F002-8260	88.8	(73.0 - 129.)
Dibromofluoromethane	F002-8260	97.9	(66.0 - 117.)

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Building 735-16A, Rm. 5
P.O. Box 616
Aiken, South Carolina 29802
Contact: Mr. Richard Groseclose
Project Description: Hazardous Waste Contract

cc: WSRC00497 Report Date: August 20, 1999

Sample ID : COMP 6

Surrogate Recovery	Test	Percent%	Acceptable Limits
Toluene-d8	F002-8260	100.	(73.0 - 122.)
Bromofluorobenzene	F003A-8260	88.8	(73.0 - 129.)
Dibromofluoromethane	F003A-8260	97.9	(66.0 - 117.)
Toluene-d8	F003A-8260	100.	(73.0 - 122.)
Bromofluorobenzene	F005A-8260	88.8	(73.0 - 129.)
Dibromofluoromethane	F005A-8260	97.9	(66.0 - 117.)
Toluene-d8	F005A-8260	100.	(73.0 - 122.)
Bromofluorobenzene	M8010 BY 8260	88.8	(73.0 - 129.)
Dibromofluoromethane	M8010 BY 8260	97.9	(66.0 - 117.)
Toluene-d8	M8010 BY 8260	100.	(73.0 - 122.)

M = Method	Method-Description
M 1	GC/FID
M 2	EPA 8260B
M 3	EPA 8270C
M 4	EPA8151A
M 5	EPA 8082
M 6	EPA 8081A
M 7	EPA 7471A
M 8	SW846 6010B
M 9	EPA 6010B
M 10	EPA 9056
M 11	EPA 300.0
M 12	EPA 350.1 modified
M 13	EPA 351.2/353.1
M 14	EPA 353.1 modified
M 15	EPA 365.4 modified

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Project Description:	Hazardous Waste Contract

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Sample ID : COMP 6

= Method	Method-Description

:s:
qualifiers in this report are defined as follows:
indicates that the analyte was not detected at a concentration greater than the detection limit.
licates presence of analyte at a concentration less than the reporting limit (RL) and greater than the detection limit (DL).
dicates that the analyte was not detected at a concentration greater than the detection limit.
licates that a quality control analyte recovery is outside of specified acceptance criteria.

data report has been prepared and reviewed
:cordance with General Engineering Laboratories
dard operating procedures. Please direct
questions to your Project Manager, Stacy Griffin at 769-7376.

iewed By

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Contact: Mr. Richard Groseclose
Project Description: Hazardous Waste Contract

cc: WSRC00497 Report Date: August 20, 1999

Sample ID	: COMP-7
Lab ID	: 9907679-01
Matrix	: Solid
Date Collected	: 07/14/99
Date Received	: 07/15/99
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Volatile Organics											
F003 Waste Constituents - FID - 4 items											
Ethyl Acetate	U	0.00	1.88	10.0	mg/kg	1.0	CAK	07/28/99	1510	154227	1
Ethyl Ether	U	0.00	3.75	9.38	mg/kg	1.0					
Methyl Alcohol	U	0.00	3.75	9.38	mg/kg	1.0					
n-Butyl Alcohol	U	0.00	3.75	9.38	mg/kg	1.0					
F005 Waste Constituents - FID - 2 items											
Ethylene Glycol Monoethylether	U	0.750	0.938	9.38	mg/kg	1.0					
Isobutyl Alcohol	U	0.00	3.75	10.0	mg/kg	1.0					
App. IX VOA - 54 items											
1,1,1,2-Tetrachloroethane	U	0.00	0.200	2.00	UGKG	1.0	JWF	07/26/99	1315	154327	2
1,1,1-Trichloroethane	U	0.00	0.100	2.00	UGKG	1.0					
1,1,2,2-Tetrachloroethane	U	0.00	0.600	2.00	UGKG	1.0					
1,1,2-Trichloroethane	U	0.00	0.300	2.00	UGKG	1.0					
1,1-Dichloroethane	U	0.00	0.100	2.00	UGKG	1.0					
1,1-Dichloroethylene	U	0.00	0.300	2.00	UGKG	1.0					
1,2,3-Trichloropropane	U	0.00	0.400	2.00	UGKG	1.0					
1,2-Dibromo-3-chloropropane	U	0.00	0.400	2.00	UGKG	1.0					
1,2-Dibromoethane	U	0.00	0.200	2.00	UGKG	1.0					
1,2-Dichloroethane	U	0.00	0.200	2.00	UGKG	1.0					
1,2-Dichloropropane	U	0.00	0.200	2.00	UGKG	1.0					
1,2-trans-Dichloroethylene	U	0.00	0.100	2.00	UGKG	1.0					
2-Butanone	U	0.00	3.20	10.0	UGKG	1.0					
2-Hexanone	U	0.791	2.80	10.0	UGKG	1.0					
4-Methyl-2-pentanone	U	0.00	3.10	10.0	UGKG	1.0					
Acetone	U	3.54	10.3	10.3	UGKG	1.0					
Acetonitrile	J	9.39	1.00	10.0	UGKG	1.0					
Acrolein	U	0.00	4.60	20.0	UGKG	1.0					
Acrylonitrile	U	0.00	3.90	50.0	UGKG	1.0					

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Project Description: Hazardous Waste Contract

: WSRC00497 Report Date: August 20, 1999

Sample ID : COMP-7

ameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
/l Chloride	U	0.00	0.400	10.0	UGKG	1.0					
ızene	U	0.00	0.500	2.00	UGKG	1.0	JWF	07/26/99	1315	154327	2
moform	U	0.00	0.300	2.00	UGKG	1.0					
bon Disulfide	U	0.00	0.300	10.0	UGKG	1.0					
bon Tetrachloride	U	0.00	0.500	2.00	UGKG	1.0					
orobenzene	U	0.00	0.300	2.00	UGKG	1.0					
orodibromomethane	U	0.00	0.200	2.00	UGKG	1.0					
oroethane	U	0.00	0.300	2.00	UGKG	1.0					
oroform	U	0.00	0.100	2.00	UGKG	1.0					
oroprene	U	0.00	2.00	10.0	UGKG	1.0					
romomethane	U	0.00	0.200	2.00	UGKG	1.0					
hlorobromomethane	U	0.00	0.100	2.00	UGKG	1.0					
hlorodifluoromethane	U	0.00	1.20	2.00	UGKG	1.0					
yl methacrylate	U	0.00	0.400	10.0	UGKG	1.0					
ylbenzene	U	0.00	0.300	2.00	UGKG	1.0					
ɔutyl Alcohol	U	0.00	6.30	20.0	UGKG	1.0					
thacrylonitrile	U	0.00	0.900	10.0	UGKG	1.0					
thyl Bromide	U	0.00	0.300	2.00	UGKG	1.0					
thyl Chloride	U	0.00	0.200	2.00	UGKG	1.0					
thyl Iodide	U	0.00	0.600	5.00	UGKG	1.0					
thyl Methacrylate	U	0.00	0.400	10.0	UGKG	1.0					
thylene Chloride	J	3.51	1.40	5.00	UGKG	1.0					
ıtachloroethane	U	0.00	0.500	10.0	UGKG	1.0					
pionitrile	U	0.00	3.40	20.0	UGKG	1.0					
rene	U	0.00	0.300	2.00	UGKG	1.0					
rachloroethylene	U	0.00	0.400	2.00	UGKG	1.0					
uene	U	0.00	0.900	2.00	UGKG	1.0					
chloroethylene	U	0.00	0.300	2.00	UGKG	1.0					
chlorofluoromethane	U	0.00	0.300	2.00	UGKG	1.0					
ıyl Acetate	U	0.00	2.10	10.0	UGKG	1.0					
ıyl chloride	U	0.00	0.400	2.00	UGKG	1.0					
lenes (TOTAL)	U	0.00	0.700	4.00	UGKG	1.0					
-1,3-Dichloropropylene	U	0.00	0.200	2.00	UGKG	1.0					
ıs-1,3-Dichloropropylene	U	0.00	0.300	2.00	UGKG	1.0					
ıs-1,4-Dichloro-2-butene	U	0.00	0.500	2.00	UGKG	1.0					

F001 Waste Constituents - 7 items

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Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
1,1,1-Trichloroethane	U	0.00	0.100	2.00	UGKG	1.0					
Carbon Tetrachloride	U	0.00	0.500	2.00	UGKG	1.0	JWF	07/26/99	1315	154327	2
Methylene Chloride	J	3.51	1.40	5.00	UGKG	1.0					
Tetrachloroethylene	U	0.00	0.400	2.00	UGKG	1.0					
Trichloroethylene	U	0.00	0.300	2.00	UGKG	1.0					
Trichlorofluoromethane	U	0.00	0.300	2.00	UGKG	1.0					
Trichlorotrifluoroethane	U	0.00	10.0	10.0	UGKG	1.0					
F002 Waste Constituents - 9 items											
1,1,1-Trichloroethane	U	0.00	0.100	2.00	UGKG	1.0					
1,1,2-Trichloroethane	U	0.00	0.300	2.00	UGKG	1.0					
1,2-Dichlorobenzene	U	0.00	0.500	2.00	UGKG	1.0					
Chlorobenzene	U	0.00	0.300	2.00	UGKG	1.0					
Methylene Chloride	J	3.51	1.40	5.00	UGKG	1.0					
Tetrachloroethylene	U	0.00	0.400	2.00	UGKG	1.0					
Trichloroethylene	U	0.00	0.300	2.00	UGKG	1.0					
Trichlorofluoromethane	U	0.00	0.300	2.00	UGKG	1.0					
Trichlorotrifluoroethane	U	0.00	10.0	10.0	UGKG	1.0					
F003 Waste Constituents - GC/MS VOA - 4 items											
4-Methyl-2-pentanone	U	0.00	3.10	10.0	UGKG	1.0					
Acetone	U	3.54	10.3	10.3	UGKG	1.0					
Ethylbenzene	U	0.00	0.300	2.00	UGKG	1.0					
Xylenes (TOTAL)	U	0.00	0.700	4.00	UGKG	1.0					
F005 Waste Constituents - GC/MS VOA - 5 items											
2-Butanone	U	0.00	3.20	10.0	UGKG	1.0					
2-Nitropropane	U	0.00	3.30	10.0	UGKG	1.0					
Benzene	U	0.00	0.500	2.00	UGKG	1.0					
Carbon Disulfide	U	0.00	0.300	10.0	UGKG	1.0					
Toluene	U	0.00	0.900	2.00	UGKG	1.0					
Halogenated Volatile Organics - 29 items											
1,1,1-Trichloroethane	U	0.00	0.100	2.00	UGKG	1.0					
1,1,2,2-Tetrachloroethane	U	0.00	0.600	2.00	UGKG	1.0					
1,1,2-Trichloroethane	U	0.00	0.300	2.00	UGKG	1.0					
1,1-Dichloroethane	U	0.00	0.100	2.00	UGKG	1.0					
1,1-Dichloroethylene	U	0.00	0.300	2.00	UGKG	1.0					
1,2-Dichlorobenzene	U	0.00	0.500	2.00	UGKG	1.0					

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rameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
-Dichloroethane	U	0.00	0.200	2.00	UGKG	1.0					
-Dichloropropane	U	0.00	0.200	2.00	UGKG	1.0	JWF	07/26/99	1315	154327	2
-trans-Dichloroethylene	U	0.00	0.100	2.00	UGKG	1.0					
-Dichlorobenzene	U	0.00	0.400	2.00	UGKG	1.0					
-Dichlorobenzene	U	0.00	0.600	2.00	UGKG	1.0					
Chloroethylvinyl ether	U	0.00	4.04	5.00	UGKG	1.0					
omoform	U	0.00	0.300	2.00	UGKG	1.0					
rbon Tetrachloride	U	0.00	0.500	2.00	UGKG	1.0					
lorobenzene	U	0.00	0.300	2.00	UGKG	1.0					
lorodibromomethane	U	0.00	0.200	2.00	UGKG	1.0					
loroethane	U	0.00	0.300	2.00	UGKG	1.0					
loroform	U	0.00	0.100	2.00	UGKG	1.0					
chlorobromomethane	U	0.00	0.100	2.00	UGKG	1.0					
chlorodifluoromethane	U	0.00	1.20	2.00	UGKG	1.0					
thyl Bromide	U	0.00	0.300	2.00	UGKG	1.0					
thyl Chloride	U	0.00	0.200	2.00	UGKG	1.0					
thylene Chloride	J	3.51	1.40	5.00	UGKG	1.0					
trachloroethylene	U	0.00	0.400	2.00	UGKG	1.0					
ichloroethylene	U	0.00	0.300	2.00	UGKG	1.0					
ichlorofluoromethane	U	0.00	0.300	2.00	UGKG	1.0					
nyl chloride	U	0.00	0.400	2.00	UGKG	1.0					
-1,3-Dichloropropylene	U	0.00	0.200	2.00	UGKG	1.0					
ns-1,3-Dichloropropylene	U	0.00	0.300	2.00	UGKG	1.0					
ractable Organics											
p. IX Acid Extractables - 18 items											
,4,6-Tetrachlorophenol	U	0.00	284	330	UGKG	1.0	DDT	07/23/99	2120	154032	3
,5-Trichlorophenol	U	0.00	152	330	UGKG	1.0					
,6-Trichlorophenol	U	0.00	152	330	UGKG	1.0					
-Dichlorophenol	U	0.00	175	330	UGKG	1.0					
-Dimethylphenol	U	0.00	109	330	UGKG	1.0					
-Dinitrophenol	U	0.00	363	660	UGKG	1.0					
-Dichlorophenol	U	0.00	30.7	330	UGKG	1.0					
Chlorophenol	U	0.00	155	330	UGKG	1.0					
Nitrophenol	U	0.00	178	330	UGKG	1.0					
methyl-4,6-dinitrophenol	U	0.00	99.0	330	UGKG	1.0					

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Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
2-sec-Butyl-4,6-Dinitrophenol	U	0.00	327	330	UGKG	1.0					
4-Nitrophenol	U	0.00	109	660	UGKG	1.0	DDT	07/23/99	2120	154032	3
4-chloro-3-methyl phenol	U	0.00	125	330	UGKG	1.0					
Hexachlorophene	U	0.00	10700	16500	UGKG	1.0					
Pentachlorophenol	U	0.00	56.1	330	UGKG	1.0					
Phenol	U	0.00	119	330	UGKG	1.0					
m,p-Cresol	U	0.00	152	660	UGKG	1.0					
o-Cresol	U	0.00	62.7	330	UGKG	1.0					
App. IX B/N Extractables - 106 items											
1,2,4,5-Tetrachlorobenzene	U	0.00	185	330	UGKG	1.0					
1,2,4-Trichlorobenzene	U	0.00	185	330	UGKG	1.0					
1,2-Dichlorobenzene	U	0.00	168	330	UGKG	1.0					
1,3-Dichlorobenzene	U	0.00	129	330	UGKG	1.0					
1,4-Dichlorobenzene	U	0.00	129	330	UGKG	1.0					
1,4-Dioxane	U	0.00	60.4	330	UGKG	1.0					
1,4-Naphthoquinone	U	0.00	330	330	UGKG	1.0					
1-Naphthylamine	U	0.00	182	330	UGKG	1.0					
2,4-Dinitrotoluene	U	0.00	116	330	UGKG	1.0					
2,6-Dinitrotoluene	U	0.00	139	330	UGKG	1.0					
2-Acetylaminofluorene	U	0.00	330	330	UGKG	1.0					
2-Chloronaphthalene	U	0.00	172	330	UGKG	1.0					
2-Methylnaphthalene	U	0.00	201	330	UGKG	1.0					
2-Naphthylamine	U	0.00	317	330	UGKG	1.0					
2-Picoline	U	0.00	399	399	UGKG	1.0					
3,3'-Dichlorobenzidine	U	0.00	274	1650	UGKG	1.0					
3,3'-Dimethylbenzidine	U	0.00	165	1650	UGKG	1.0					
3-Methylcholanthrene	U	0.00	330	330	UGKG	1.0					
4-Bromophenyl phenyl ether	U	0.00	116	330	UGKG	1.0					
4-Chloroaniline	U	0.00	152	330	UGKG	1.0					
4-Chlorophenyl phenyl ether	U	0.00	145	330	UGKG	1.0					
4-aminobiphenyl	U	0.00	21.5	330	UGKG	1.0					
5-Nitro-o-toluidine	U	0.00	195	330	UGKG	1.0					
7,12-Dimethylbenz(a)anthracene	U	0.00	314	330	UGKG	1.0					
Acenaphthene	U	0.00	158	330	UGKG	1.0					
Acenaphthylene	U	0.00	145	330	UGKG	1.0					

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ırameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
ɔetophenone	U	0.00	125	330	UGKG	1.0					
ıiline	U	0.00	188	330	UGKG	1.0	DDT	07/23/99	2120	154032	3
ıthracene	U	0.00	85.8	330	UGKG	1.0					
ɔamite	U	0.00	274	330	UGKG	1.0					
ɔnzo(a)anthracene	U	0.00	66.0	330	UGKG	1.0					
ɔnzo(a)pyrene	U	0.00	72.6	330	UGKG	1.0					
ɔnzo(b)fluoranthene	U	0.00	142	330	UGKG	1.0					
ɓnzo(ghi)perylene	U	0.00	79.2	330	UGKG	1.0					
ɔnzo(k)fluoranthene	U	0.00	132	330	UGKG	1.0					
ɔnzyl Alcohol	U	0.00	185	330	UGKG	1.0					
ıtyl benzyl phthalate	U	0.00	89.1	330	UGKG	1.0					
ılorobenzilate	U	0.00	52.8	1650	UGKG	1.0					
ırysene	U	0.00	52.8	330	UGKG	1.0					
i-n-butyl phthalate	U	0.00	72.6	330	UGKG	1.0					
i-n-octyl phthalate	U	0.00	172	330	UGKG	1.0					
iallate	U	0.00	228	330	UGKG	1.0					
ibenzo(a,h)anthracene	U	0.00	82.5	330	UGKG	1.0					
ibenzofuran	U	0.00	132	330	UGKG	1.0					
iethyl phthalate	U	0.00	75.9	330	UGKG	1.0					
imethoate	U	0.00	264	1650	UGKG	1.0					
imethyl phthalate	U	0.00	109	330	UGKG	1.0					
iphenylamine	U	0.00	284	330	UGKG	1.0					
isulfoton	U	0.00	45.9	330	UGKG	1.0					
thyl Methanesulfonate	U	0.00	20.1	330	UGKG	1.0					
thyl methacrylate	U	0.00	29.4	330	UGKG	1.0					
ımphur	U	0.00	52.5	330	UGKG	1.0					
luoranthene	U	0.00	66.0	330	UGKG	1.0					
luorene	U	0.00	112	330	UGKG	1.0					
exachlorobenzene	U	0.00	69.3	330	UGKG	1.0					
exachlorobutadiene	U	0.00	152	330	UGKG	1.0					
exachlorocyclopentadiene	U	0.00	191	330	UGKG	1.0					
exachloroethane	U	0.00	132	330	UGKG	1.0					
exachloropropene	U	0.00	20.8	330	UGKG	1.0					
ıdeno(1,2,3-c,d)pyrene	U	0.00	79.2	330	UGKG	1.0					
odrin	U	0.00	145	330	UGKG	1.0					

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Sample ID : COMP-7

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Isophorone	U	0.00	145	330	UGKG	1.0					
Isosafrole	U	0.00	21.5	330	UGKG	1.0	DDT	07/23/99	2120	154032	3
Kepone	U	0.00	96.7	330	UGKG	1.0					
Methapyrilene	U	0.00	158	1650	UGKG	1.0					
Methyl Methanesulfonate	U	0.00	300	330	UGKG	1.0					
N-Nitrosodi-n-butylamine	U	0.00	22.8	330	UGKG	1.0					
N-Nitrosodiethylamine	U	0.00	20.5	330	UGKG	1.0					
N-Nitrosodimethylamine	U	0.00	10.2	330	UGKG	1.0					
N-Nitrosodiphenylamine	U	0.00	116	330	UGKG	1.0					
N-Nitrosodipropylamine	U	0.00	129	330	UGKG	1.0					
N-Nitrosomethylethylamine	U	0.00	72.3	330	UGKG	1.0					
N-Nitrosomorpholine	U	0.00	24.4	330	UGKG	1.0					
N-Nitrosopiperidine	U	0.00	218	330	UGKG	1.0					
N-Nitrosopyrolidine	U	0.00	22.1	330	UGKG	1.0					
Naphthalene	U	0.00	155	330	UGKG	1.0					
Nitrobenzene	U	0.00	132	330	UGKG	1.0					
O,O,O-Triethylphosphorothioate	U	0.00	231	330	UGKG	1.0					
Parathion	U	0.00	165	330	UGKG	1.0					
Parathion, methyl	U	0.00	264	330	UGKG	1.0					
Pentachlorobenzene	U	0.00	26.4	330	UGKG	1.0					
Pentachloroethane	U	0.00	44.2	330	UGKG	1.0					
Pentachloronitrobenzene	U	0.00	231	330	UGKG	1.0					
Phenacetin	U	0.00	191	330	UGKG	1.0					
Phenanthrene	U	0.00	59.4	330	UGKG	1.0					
Phorate	U	0.00	290	330	UGKG	1.0					
Pronamide	U	0.00	215	330	UGKG	1.0					
Pyrene	U	0.00	72.6	330	UGKG	1.0					
Pyridine	U	0.00	129	330	UGKG	1.0					
Safrole	U	0.00	17.5	330	UGKG	1.0					
Sulfotepp	U	0.00	42.9	330	UGKG	1.0					
Thionazin	U	0.00	224	330	UGKG	1.0					
a-,a-Dimethylphenethylamine	U	0.00	105	330	UGKG	1.0					
bis(2-Chloroethoxy)methane	U	0.00	168	330	UGKG	1.0					
bis(2-Chloroethyl) ether	U	0.00	149	330	UGKG	1.0					
bis(2-Chloroisopropyl)ether	U	0.00	102	330	UGKG	1.0					

GENERAL ENGINEERING LABORATORIES

Meeting today's needs with a vision for tomorrow.

Client: Westinghouse Savannah River Co.
Building 735-16A, Rm. 5
P.O. Box 616
Aiken, South Carolina 29802
Contact: Mr. Richard Groseclose
Project Description: Hazardous Waste Contract

:: WSRC00497 Report Date: August 20, 1999

Sample ID : COMP-7

rameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
(2-Ethylhexyl)phthalate	U	0.00	297	330	UGKG	1.0					
Dinitrobenzene	U	0.00	29.4	330	UGKG	1.0	DDT	07/23/99	2120	154032	3
Nitroaniline	U	0.00	82.5	330	UGKG	1.0					
Nitroaniline	U	0.00	66.0	330	UGKG	1.0					
Toluidine	U	0.00	277	330	UGKG	1.0					
Dimethylaminoazobenzene	U	0.00	208	330	UGKG	1.0					
Nitroaniline	U	0.00	102	330	UGKG	1.0					
Phenylenediamine	U	0.00	501	660	UGKG	1.0					
n-Trinitrobenzene	U	0.00	23.1	1650	UGKG	1.0					
04 Waste Constituents - GC/MS Ext. - 3 items											
robenzene ✓	U	0.00	132	330	UGKG	1.0					
p-Cresol ✓	U	0.00	152	660	UGKG	1.0					
Cresol ✓	U	0.00	62.7	330	UGKG	1.0					
ridine ✓	U	0.00	129	330	UGKG	1.0					
p. IX Herbicides - 3 items											
,5-T	U	0.00	0.863	10.0	UGKG	10.	JC	07/24/99	1204	154030	4
,5-TP	U	0.00	0.994	10.0	UGKG	10.					
-D	U	0.00	1.46	10.0	UGKG	10.					
B analysis - 7 items											
B-1016	U	0.00	1.22	41.6	UGKG	1.0	JLW	07/29/99	0912	154173	5
B-1221	U	0.00	2.82	41.6	UGKG	1.0					
B-1232	U	0.00	1.63	41.6	UGKG	1.0					
B-1242	U	0.00	1.67	41.6	UGKG	1.0					
B-1248	U	0.00	0.906	41.6	UGKG	1.0					
B-1254	U	0.00	1.16	41.6	UGKG	1.0					
B-1260	U	0.00	0.942	41.6	UGKG	1.0					
p. IX Pesticides - 19 items											
'-DDD	U	0.00	0.589	1.33	UGKG	1.0	MM	07/27/99	0004	154073	6
'-DDE	U	0.00	0.549	1.33	UGKG	1.0					
'-DDT	U	0.00	0.796	1.33	UGKG	1.0					
drin	U	0.00	0.260	0.670	UGKG	1.0					
lordane	U	0.00	4.88	8.33	UGKG	1.0					
eldrin	U	0.00	0.734	1.33	UGKG	1.0					
dosulfan I	U	0.00	0.454	0.670	UGKG	1.0					
dosulfan II	U	0.00	0.681	1.33	UGKG	1.0					

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Sample ID : COMP-7

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Endosulfan sulfate	U	0.00	0.911	0.911	UGKG	1.0					
Endrin	U	0.00	0.681	1.33	UGKG	1.0	MM	07/27/99	0004	154073	6
Endrin aldehyde	U	0.00	0.994	1.33	UGKG	1.0					
Heptachlor	U	0.00	0.434	0.670	UGKG	1.0					
Heptachlor epoxide	U	0.00	0.217	0.670	UGKG	1.0					
Methoxychlor	U	0.00	3.55	6.70	UGKG	1.0					
Toxaphene	U	0.00	10.9	33.3	UGKG	1.0					
alpha-BHC	U	0.00	0.263	0.670	UGKG	1.0					
beta-BHC	U	0.00	0.388	0.670	UGKG	1.0					
delta-BHC	U	0.00	0.283	0.670	UGKG	1.0					
gamma-BHC	U	0.00	0.349	0.670	UGKG	1.0					
Metals Analysis											
Mercury	U	-10.6	2.13	33.3	UGKG	1.0	RPM2	07/22/99	1405	153549	7
Silver		8340	68.5	476	UGKG	2.0	MBL	07/22/99	1441	153903	8
Silver		8340	68.5	476	UGKG	2.0	MBL	07/22/99	1441	153903	9
Aluminum		66200000	56200	238000	UGKG	100	MBL	07/23/99	1029	153903	9
Arsenic		1810	433	476	UGKG	2.0	MBL	07/22/99	1441	153903	8
Arsenic		1810	433	476	UGKG	2.0	MBL	07/22/99	1441	153903	9
Boron		30300000	12000	238000	UGKG	100	MBL	07/23/99	1029	153903	9
Barium		85300	51.4	476	UGKG	2.0	MBL	07/22/99	1441	153903	8
Barium		85300	51.4	476	UGKG	2.0	MBL	07/22/99	1441	153903	9
Beryllium		563	22.8	476	UGKG	2.0	MBL	07/22/99	1441	153903	8
Beryllium		563	22.8	476	UGKG	2.0	MBL	07/22/99	1441	153903	9
Calcium		1790000	6640	9520	UGKG	2.0					
Cadmium		2430	36.2	476	UGKG	2.0	MBL	07/22/99	1441	153903	8
Cadmium		2430	36.2	476	UGKG	2.0	MBL	07/22/99	1441	153903	9
Cobalt		17000	31.4	476	UGKG	2.0	MBL	07/22/99	1441	153903	8
Cobalt		17000	31.4	476	UGKG	2.0	MBL	07/22/99	1441	153903	9
Chromium		443000	72.4	476	UGKG	2.0	MBL	07/22/99	1441	153903	8
Chromium		443000	72.4	476	UGKG	2.0	MBL	07/22/99	1441	153903	9
Copper		62900	128	476	UGKG	2.0	MBL	07/22/99	1441	153903	8
Copper		62900	128	476	UGKG	2.0	MBL	07/22/99	1441	153903	9
Iron		20800000	11500	11500	UGKG	2.0					
Potassium		4530000	2700	9520	UGKG	2.0					
Magnesium		5130000	483	952	UGKG	2.0					

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Sample ID : COMP-7

ameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
ıganese		292000	675	952	UGKG	2.0					
lybdenum		2910	126	952	UGKG	2.0	MBL	07/22/99	1441	153903	9
ium		100000000	306000	476000	UGKG	100	MBL	07/23/99	1029	153903	9
kel		8680000	3000	23800	UGKG	100	MBL	07/23/99	1029	153903	8
kel		8680000	3000	23800	UGKG	100	MBL	07/23/99	1029	153903	9
d		76000	149	476	UGKG	2.0	MBL	07/22/99	1441	153903	8
d		76000	149	476	UGKG	2.0	MBL	07/22/99	1441	153903	9
imony	U	-6340	18100	47600	UGKG	100	MBL	07/23/99	1029	153903	8
imony	U	-6340	18100	47600	UGKG	100	MBL	07/23/99	1029	153903	9
ɜnium	U	305	12900	23800	UGKG	100	MBL	07/23/99	1029	153903	8
ɜnium	U	305	12900	23800	UGKG	100	MBL	07/23/99	1029	153903	9
con		5480000	133000	476000	UGKG	100					
		11500	793	952	UGKG	2.0	MBL	07/22/99	1441	153903	8
		11500	793	952	UGKG	2.0	MBL	07/22/99	1441	153903	9
ɔntium		24200	27.6	476	UGKG	2.0					
ıium		351000	1900	23800	UGKG	100	MBL	07/23/99	1029	153903	9
ıllium	U	-1080	21000	47600	UGKG	100	MBL	07/23/99	1029	153903	8
ıllium	U	-1080	21000	47600	UGKG	100	MBL	07/23/99	1029	153903	9
ınium		28400000	93600	238000	UGKG	100					
ıadium		35000	50.5	476	UGKG	2.0	MBL	07/22/99	1441	153903	8
ıadium		35000	50.5	476	UGKG	2.0	MBL	07/22/99	1441	153903	9
c		20000000	17600	23800	UGKG	100	MBL	07/23/99	1029	153903	8
c		20000000	17600	23800	UGKG	100	MBL	07/23/99	1029	153903	9
eral Chemistry											
al Halogens - 3 items											
ɔmide	U	0.00	0.136	0.448	MGKG	1.0	RWS	07/16/99	2226	15442210	
lorides	J	0.215	0.162	0.895	MGKG	1.0					
oride	U	0.00	0.195	0.448	MGKG	1.0					
rogen, Nitrate	U	0.00	0.114	0.500	MGKG	1.0	RWS	07/16/99	2226	15442011	
fate as SO4	U	0.00	0.340	8.95	mg/kg	1.0					
rogen, Ammonia		0.800	0.241	0.500	MGKG	1.0	THL	07/27/99	1236	15421212	
rogen, Total		0.700	0.0281	0.100	MGKG	1.0	THL	07/30/99	1600	15482213	
rogen, Nitrate/Nitrite	U	0.00	0.0869	0.505	MGKG	1.0	THL	07/30/99	1554	15479514	
ɔsphorus, Total as PO4		411	7.62	20.0	MGKG	100	THL	07/24/99	1144	15410215	

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Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M

The following prep procedures were performed:

GC/MS 5970 Extractables	RDH	07/22/99	0800	154032	N
Herbicides	JPB	07/22/99	1400	154030	N
PCB's	JMA	07/24/99	1600	154173	N
Pesticides	RDH	07/23/99	0800	154073	N
Mercury	AJM	07/21/99	1530	153549	N
TRACE	FGD	07/21/99	1430	153903	N

Surrogate Recovery	Test	Percent%	Acceptable Limits
2,4,6-Tribromophenol	AIXAE-8270C	85.2	(44.5 - 126.)
2-Fluorophenol	AIXAE-8270C	62.9	(37.0 - 102.)
Phenol-d6	AIXAE-8270C	65.4	(41.5 - 102.)
2-Fluorobiphenyl	AIXBN-8270C	61.8	(44.7 - 110.)
Nitrobenzene-d5	AIXBN-8270C	53.7	(42.4 - 107.)
p-Terphenyl-d14	AIXBN-8270C	93.1	(45.5 - 104.)
2,4,6-Tribromophenol	F005C	85.2	(44.5 - 126.)
2-Fluorobiphenyl	F005C	61.8	(44.7 - 110.)
2-Fluorophenol	F005C	62.9	(37.0 - 102.)
Nitrobenzene-d5	F005C	53.7	(42.4 - 107.)
Phenol-d6	F005C	65.4	(41.5 - 102.)
p-Terphenyl-d14	F005C	93.1	(45.5 - 104.)
2,4-Dichlorophenylacetic acid	AIXH-8151B	62.7	(24.0 - 111.)
4CMX	AIXP-8082	66.0	(25.3 - 110.)
Decachlorobiphenyl	AIXP-8082	64.5	(46.8 - 131.)
4CMX	AIXP-8081A	62.3	(36.5 - 131.)
Decachlorobiphenyl	AIXP-8081A	65.8	(50.7 - 135.)
Bromofluorobenzene	AIXVOA-8260B	91.6	(73.0 - 129.)
Dibromofluoromethane	AIXVOA-8260B	105.	(66.0 - 117.)
Toluene-d8	AIXVOA-8260B	102.	(73.0 - 122.)
Bromofluorobenzene	F001-8260	91.6	(73.0 - 129.)
Dibromofluoromethane	F001-8260	105.	(66.0 - 117.)
Toluene-d8	F001-8260	102.	(73.0 - 122.)
Bromofluorobenzene	F002-8260	91.6	(73.0 - 129.)
Dibromofluoromethane	F002-8260	105.	(66.0 - 117.)

GENERAL ENGINEERING LABORATORIES

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:: WSRC00497 Report Date: August 20, 1999

Sample ID : COMP-7

rrogate Recovery	Test	Percent%	Acceptable Limits
luene-d8	F002-8260	102.	(73.0 - 122.)
ɔmofluorobenzene	F003A-8260	91.6	(73.0 - 129.)
ɔromofluoromethane	F003A-8260	105.	(66.0 - 117.)
luene-d8	F003A-8260	102.	(73.0 - 122.)
ɔmofluorobenzene	F005A-8260	91.6	(73.0 - 129.)
ɔromofluoromethane	F005A-8260	105.	(66.0 - 117.)
luene-d8	F005A-8260	102.	(73.0 - 122.)
ɔmofluorobenzene	M8010 BY 8260	91.6	(73.0 - 129.)
ɔromofluoromethane	M8010 BY 8260	105.	(66.0 - 117.)
luene-d8	M8010 BY 8260	102.	(73.0 - 122.)

= Method	Method-Description
1	GC/FID
2	EPA 8260B
3	EPA 8270C
4	EPA8151A
5	EPA 8082
6	EPA 8081A
7	EPA 7471A
8	SW846 6010B
9	EPA 6010B
10	EPA 9056
11	EPA 300.0
12	EPA 350.1 modified
13	EPA 351.2/353.1
14	EPA 353.1 modified
15	EPA 365.4 modified

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Sample ID : COMP-7

M = Method	Method-Description

Notes:
The qualifiers in this report are defined as follows:
ND indicates that the analyte was not detected at a concentration greater than the detection limit.
J indicates presence of analyte at a concentration less than the reporting limit (RL) and greater than the detection limit (DL).
U indicates that the analyte was not detected at a concentration greater than the detection limit.
* indicates that a quality control analyte recovery is outside of specified acceptance criteria.

This data report has been prepared and reviewed
in accordance with General Engineering Laboratories
standard operating procedures. Please direct
any questions to your Project Manager, Stacy Griffin at 769-7376.

Reviewed By

GENERAL ENGINEERING LABORATORIES

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Contact: Mr. Richard Groseclose
Project Description: Hazardous Waste Contract

:: WSRC00497 Report Date: August 20, 1999

Sample ID	: COMP-8
Lab ID	: 9907679-02
Matrix	: Solid
Date Collected	: 07/14/99
Date Received	: 07/15/99
Priority	: Routine
Collector	: Client

rameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
atile Organics											
03 Waste Constituents - FID - 4 items											
ıyl Acetate	U	0.00	1.83	10.0	mg/kg	1.0	CAK	07/28/99	1536	154227	1
ıyl Ether	U	0.00	3.66	9.14	mg/kg	1.0					
:thyl Alcohol	U	0.00	3.66	9.14	mg/kg	1.0					
3utyl Alcohol	U	0.00	3.66	9.14	mg/kg	1.0					
05 Waste Constituents - FID - 2 items											
ıylene Glycol Monoethylether	U	0.00	0.914	9.14	mg/kg	1.0					
butyl Alcohol	U	0.00	3.66	10.0	mg/kg	1.0					
p. IX VOA - 54 items											
,1,2-Tetrachloroethane	U	0.00	0.200	2.00	UGKG	1.0	JWF	07/26/99	1347	154327	2
,1-Trichloroethane	U	0.00	0.100	2.00	UGKG	1.0					
,2,2-Tetrachloroethane	U	0.00	0.600	2.00	UGKG	1.0					
,2-Trichloroethane	U	0.00	0.300	2.00	UGKG	1.0					
-Dichloroethane	U	0.00	0.100	2.00	UGKG	1.0					
-Dichloroethylene	U	0.00	0.300	2.00	UGKG	1.0					
',3-Trichloropropane	U	0.00	0.400	2.00	UGKG	1.0					
:-Dibromo-3-chloropropane	U	0.00	0.400	2.00	UGKG	1.0					
:-Dibromoethane	U	0.00	0.200	2.00	UGKG	1.0					
:-Dichloroethane	U	0.00	0.200	2.00	UGKG	1.0					
:-Dichloropropane	U	0.00	0.200	2.00	UGKG	1.0					
:-trans-Dichloroethylene	U	0.00	0.100	2.00	UGKG	1.0					
3utanone	U	0.00	3.20	10.0	UGKG	1.0					
Hexanone	U	0.00	2.80	10.0	UGKG	1.0					
Methyl-2-pentanone	U	0.00	3.10	10.0	UGKG	1.0					
etone	U	2.84	10.3	10.3	UGKG	1.0					
etonitrile	J	6.18	1.00	10.0	UGKG	1.0					
rolein	U	0.00	4.60	20.0	UGKG	1.0					
rylonitrile	U	0.00	3.90	50.0	UGKG	1.0					

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Project Description: Hazardous Waste Contract

cc: WSRC00497 Report Date: August 20, 1999

Sample ID : COMP-8

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Allyl Chloride	U	0.00	0.400	10.0	UGKG	1.0					
Benzene	U	0.00	0.500	2.00	UGKG	1.0	JWF	07/26/99	1347	154327	2
Bromoform	U	0.00	0.300	2.00	UGKG	1.0					
Carbon Disulfide	U	0.00	0.300	10.0	UGKG	1.0					
Carbon Tetrachloride	U	0.00	0.500	2.00	UGKG	1.0					
Chlorobenzene	U	0.00	0.300	2.00	UGKG	1.0					
Chlorodibromomethane	U	0.00	0.200	2.00	UGKG	1.0					
Chloroethane	U	0.00	0.300	2.00	UGKG	1.0					
Chloroform	U	0.00	0.100	2.00	UGKG	1.0					
Chloroprene	U	0.00	2.00	10.0	UGKG	1.0					
Dibromomethane	U	0.00	0.200	2.00	UGKG	1.0					
Dichlorobromomethane	U	0.00	0.100	2.00	UGKG	1.0					
Dichlorodifluoromethane	U	0.00	1.20	2.00	UGKG	1.0					
Ethyl methacrylate	U	0.00	0.400	10.0	UGKG	1.0					
Ethylbenzene	U	0.00	0.300	2.00	UGKG	1.0					
Isobutyl Alcohol	U	0.00	6.30	20.0	UGKG	1.0					
Methacrylonitrile	U	0.00	0.900	10.0	UGKG	1.0					
Methyl Bromide	U	0.00	0.300	2.00	UGKG	1.0					
Methyl Chloride	U	0.00	0.200	2.00	UGKG	1.0					
Methyl Iodide	U	0.00	0.600	5.00	UGKG	1.0					
Methyl Methacrylate	U	0.00	0.400	10.0	UGKG	1.0					
Methylene Chloride	J	3.59	1.40	5.00	UGKG	1.0					
Pentachloroethane	U	0.00	0.500	10.0	UGKG	1.0					
Propionitrile	U	0.00	3.40	20.0	UGKG	1.0					
Styrene	U	0.00	0.300	2.00	UGKG	1.0					
Tetrachloroethylene	U	0.00	0.400	2.00	UGKG	1.0					
Toluene	U	0.00	0.900	2.00	UGKG	1.0					
Trichloroethylene	U	0.00	0.300	2.00	UGKG	1.0					
Trichlorofluoromethane	U	0.00	0.300	2.00	UGKG	1.0					
Vinyl Acetate	U	0.00	2.10	10.0	UGKG	1.0					
Vinyl chloride	U	0.00	0.400	2.00	UGKG	1.0					
Xylenes (TOTAL)	U	0.00	0.700	4.00	UGKG	1.0					
cis-1,3-Dichloropropylene	U	0.00	0.200	2.00	UGKG	1.0					
trans-1,3-Dichloropropylene	U	0.00	0.300	2.00	UGKG	1.0					
trans-1,4-Dichloro-2-butene	U	0.00	0.500	2.00	UGKG	1.0					

F001 Waste Constituents - 7 items

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Aiken, South Carolina 29802
Contact: Mr. Richard Groseclose
Project Description: Hazardous Waste Contract

: WSRC00497 Report Date: August 20, 1999

Sample ID : COMP-8

ameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
1-Trichloroethane	U	0.00	0.100	2.00	UGKG	1.0					
bon Tetrachloride	U	0.00	0.500	2.00	UGKG	1.0	JWF	07/26/99	1347	154327	2
thylene Chloride	J	3.59	1.40	5.00	UGKG	1.0					
rachloroethylene	U	0.00	0.400	2.00	UGKG	1.0					
chloroethylene	U	0.00	0.300	2.00	UGKG	1.0					
chlorofluoromethane	U	0.00	0.300	2.00	UGKG	1.0					
chlorotrifluoroethane	U	0.00	10.0	10.0	UGKG	1.0					
02 Waste Constituents - 9 items											
,1-Trichloroethane	U	0.00	0.100	2.00	UGKG	1.0					
,2-Trichloroethane	U	0.00	0.300	2.00	UGKG	1.0					
-Dichlorobenzene	U	0.00	0.500	2.00	UGKG	1.0					
lorobenzene	U	0.00	0.300	2.00	UGKG	1.0					
thylene Chloride	J	3.59	1.40	5.00	UGKG	1.0					
rachloroethylene	U	0.00	0.400	2.00	UGKG	1.0					
chloroethylene	U	0.00	0.300	2.00	UGKG	1.0					
chlorofluoromethane	U	0.00	0.300	2.00	UGKG	1.0					
chlorotrifluoroethane	U	0.00	10.0	10.0	UGKG	1.0					
03 Waste Constituents - GC/MS VOA - 4 items											
Methyl-2-pentanone	U	0.00	3.10	10.0	UGKG	1.0					
etone	U	2.84	10.3	10.3	UGKG	1.0					
ylbenzene	U	0.00	0.300	2.00	UGKG	1.0					
lenes (TOTAL)	U	0.00	0.700	4.00	UGKG	1.0					
05 Waste Constituents - GC/MS VOA - 5 items											
Butanone	U	0.00	3.20	10.0	UGKG	1.0					
Nitropropane	U	0.00	3.30	10.0	UGKG	1.0					
nzene	U	0.00	0.500	2.00	UGKG	1.0					
rbon Disulfide	U	0.00	0.300	10.0	UGKG	1.0					
luene	U	0.00	0.900	2.00	UGKG	1.0					
logenated Volatile Organics - 29 items											
,1-Trichloroethane	U	0.00	0.100	2.00	UGKG	1.0					
,2,2-Tetrachloroethane	U	0.00	0.600	2.00	UGKG	1.0					
,2-Trichloroethane	U	0.00	0.300	2.00	UGKG	1.0					
-Dichloroethane	U	0.00	0.100	2.00	UGKG	1.0					
-Dichloroethylene	U	0.00	0.300	2.00	UGKG	1.0					
,2-Dichlorobenzene	U	0.00	0.500	2.00	UGKG	1.0					

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Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
1,2-Dichloroethane	U	0.00	0.200	2.00	UGKG	1.0					
1,2-Dichloropropane	U	0.00	0.200	2.00	UGKG	1.0	JWF	07/26/99	1347	154327	2
1,2-trans-Dichloroethylene	U	0.00	0.100	2.00	UGKG	1.0					
1,3-Dichlorobenzene	U	0.00	0.400	2.00	UGKG	1.0					
1,4-Dichlorobenzene	U	0.00	0.600	2.00	UGKG	1.0					
2-Chloroethylvinyl ether	U	0.00	4.04	5.00	UGKG	1.0					
Bromoform	U	0.00	0.300	2.00	UGKG	1.0					
Carbon Tetrachloride	U	0.00	0.500	2.00	UGKG	1.0					
Chlorobenzene	U	0.00	0.300	2.00	UGKG	1.0					
Chlorodibromomethane	U	0.00	0.200	2.00	UGKG	1.0					
Chloroethane	U	0.00	0.300	2.00	UGKG	1.0					
Chloroform	U	0.00	0.100	2.00	UGKG	1.0					
Dichlorobromomethane	U	0.00	0.100	2.00	UGKG	1.0					
Dichlorodifluoromethane	U	0.00	1.20	2.00	UGKG	1.0					
Methyl Bromide	U	0.00	0.300	2.00	UGKG	1.0					
Methyl Chloride	U	0.00	0.200	2.00	UGKG	1.0					
Methylene Chloride	J	3.59	1.40	5.00	UGKG	1.0					
Tetrachloroethylene	U	0.00	0.400	2.00	UGKG	1.0					
Trichloroethylene	U	0.00	0.300	2.00	UGKG	1.0					
Trichlorofluoromethane	U	0.00	0.300	2.00	UGKG	1.0					
Vinyl chloride	U	0.00	0.400	2.00	UGKG	1.0					
cis-1,3-Dichloropropylene	U	0.00	0.200	2.00	UGKG	1.0					
trans-1,3-Dichloropropylene	U	0.00	0.300	2.00	UGKG	1.0					
Extractable Organics											
App. IX Acid Extractables - 18 items											
2,3,4,6-Tetrachlorophenol	U	0.00	281	330	UGKG	1.0	DDT	07/23/99	1923	154032	3
2,4,5-Trichlorophenol	U	0.00	150	330	UGKG	1.0					
2,4,6-Trichlorophenol	U	0.00	150	330	UGKG	1.0					
2,4-Dichlorophenol	U	0.00	173	330	UGKG	1.0					
2,4-Dimethylphenol	U	0.00	108	330	UGKG	1.0					
2,4-Dinitrophenol	U	0.00	360	660	UGKG	1.0					
2,6-Dichlorophenol	U	0.00	30.4	330	UGKG	1.0					
2-Chlorophenol	U	0.00	154	330	UGKG	1.0					
2-Nitrophenol	U	0.00	177	330	UGKG	1.0					
2-methyl-4,6-dinitrophenol	U	0.00	98.1	330	UGKG	1.0					

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rameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
sec-Butyl-4,6-Dinitrophenol	U	0.00	324	330	UGKG	1.0					
Nitrophenol	U	0.00	108	660	UGKG	1.0	DDT	07/23/99	1923	154032	3
chloro-3-methyl phenol	U	0.00	124	330	UGKG	1.0					
xachlorophene	U	0.00	10600	16400	UGKG	1.0					
ntachlorophenol	U	0.00	55.6	330	UGKG	1.0					
enol	U	0.00	118	330	UGKG	1.0					
p-Cresol	U	0.00	150	660	UGKG	1.0					
Cresol	U	0.00	62.1	330	UGKG	1.0					
p. IX B/N Extractables - 106 items											
2,4,5-Tetrachlorobenzene	U	0.00	183	330	UGKG	1.0					
2,4-Trichlorobenzene	U	0.00	183	330	UGKG	1.0					
2-Dichlorobenzene	U	0.00	167	330	UGKG	1.0					
3-Dichlorobenzene	U	0.00	128	330	UGKG	1.0					
4-Dichlorobenzene	U	0.00	128	330	UGKG	1.0					
4-Dioxane	U	0.00	59.8	330	UGKG	1.0					
4-Naphthoquinone	U	0.00	327	330	UGKG	1.0					
Naphthylamine	U	0.00	181	330	UGKG	1.0					
4-Dinitrotoluene	U	0.00	114	330	UGKG	1.0					
6-Dinitrotoluene	U	0.00	137	330	UGKG	1.0					
Acetylaminofluorene	U	0.00	327	330	UGKG	1.0					
Chloronaphthalene	U	0.00	170	330	UGKG	1.0					
Methylnaphthalene	U	0.00	199	330	UGKG	1.0					
Naphthylamine	U	0.00	314	330	UGKG	1.0					
Picoline	U	0.00	396	396	UGKG	1.0					
3'-Dichlorobenzidine	U	0.00	271	1650	UGKG	1.0					
3'-Dimethylbenzidine	U	0.00	164	1650	UGKG	1.0					
Methylcholanthrene	U	0.00	327	330	UGKG	1.0					
Bromophenyl phenyl ether	U	0.00	114	330	UGKG	1.0					
Chloroaniline	U	0.00	150	330	UGKG	1.0					
Chlorophenyl phenyl ether	U	0.00	144	330	UGKG	1.0					
aminobiphenyl	U	0.00	21.3	330	UGKG	1.0					
Nitro-o-toluidine	U	0.00	193	330	UGKG	1.0					
12-Dimethylbenz(a)anthracene	U	0.00	311	330	UGKG	1.0					
cenaphthene	U	0.00	157	330	UGKG	1.0					
cenaphthylene	U	0.00	144	330	UGKG	1.0					

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Sample ID : COMP-8

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Acetophenone	U	0.00	124	330	UGKG	1.0					
Aniline	U	0.00	186	330	UGKG	1.0	DDT	07/23/99	1923	154032	3
Anthracene	U	0.00	85.0	330	UGKG	1.0					
Aramite	U	0.00	271	330	UGKG	1.0					
Benzo(a)anthracene	U	0.00	65.4	330	UGKG	1.0					
Benzo(a)pyrene	U	0.00	71.9	330	UGKG	1.0					
Benzo(b)fluoranthene	U	0.00	141	330	UGKG	1.0					
Benzo(ghi)perylene	U	0.00	78.5	330	UGKG	1.0					
Benzo(k)fluoranthene	U	0.00	131	330	UGKG	1.0					
Benzyl Alcohol	U	0.00	183	330	UGKG	1.0					
Butyl benzyl phthalate	U	0.00	88.3	330	UGKG	1.0					
Chlorobenzilate	U	0.00	52.3	1650	UGKG	1.0					
Chrysene	U	0.00	52.3	330	UGKG	1.0					
Di-n-butyl phthalate	U	0.00	71.9	330	UGKG	1.0					
Di-n-octyl phthalate	U	0.00	170	330	UGKG	1.0					
Diallate	U	0.00	226	330	UGKG	1.0					
Dibenzo(a,h)anthracene	U	0.00	81.8	330	UGKG	1.0					
Dibenzofuran	U	0.00	131	330	UGKG	1.0					
Diethyl phthalate	U	0.00	75.2	330	UGKG	1.0					
Dimethoate	U	0.00	262	1650	UGKG	1.0					
Dimethyl phthalate	U	0.00	108	330	UGKG	1.0					
Diphenylamine	U	0.00	281	330	UGKG	1.0					
Disulfoton	U	0.00	45.5	330	UGKG	1.0					
Ethyl Methanesulfonate	U	0.00	19.9	330	UGKG	1.0					
Ethyl methacrylate	U	0.00	29.1	330	UGKG	1.0					
Famphur	U	0.00	52.0	330	UGKG	1.0					
Fluoranthene	U	0.00	65.4	330	UGKG	1.0					
Fluorene	U	0.00	111	330	UGKG	1.0					
Hexachlorobenzene	U	0.00	68.7	330	UGKG	1.0					
Hexachlorobutadiene	U	0.00	150	330	UGKG	1.0					
Hexachlorocyclopentadiene	U	0.00	190	330	UGKG	1.0					
Hexachloroethane	U	0.00	131	330	UGKG	1.0					
Hexachloropropene	U	0.00	20.6	330	UGKG	1.0					
Indeno(1,2,3-c,d)pyrene	U	0.00	78.5	330	UGKG	1.0					
Isodrin	U	0.00	144	330	UGKG	1.0					

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·ameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
phorone	U	0.00	144	330	UGKG	1.0					
safrole	U	0.00	21.3	330	UGKG	1.0	DDT	07/23/99	1923	154032	3
pone	U	0.00	95.8	330	UGKG	1.0					
thapyrilene	U	0.00	157	1650	UGKG	1.0					
thyl Methanesulfonate	U	0.00	298	330	UGKG	1.0					
Nitrosodi-n-butylamine	U	0.00	22.6	330	UGKG	1.0					
Nitrosodiethylamine	U	0.00	20.3	330	UGKG	1.0					
Nitrosodimethylamine	U	0.00	10.1	330	UGKG	1.0					
Nitrosodiphenylamine	U	0.00	114	330	UGKG	1.0					
Nitrosodipropylamine	U	0.00	128	330	UGKG	1.0					
Nitrosomethylethylamine	U	0.00	71.6	330	UGKG	1.0					
Nitrosomorpholine	U	0.00	24.2	330	UGKG	1.0					
Nitrosopiperidine	U	0.00	216	330	UGKG	1.0					
Nitrosopyrolidine	U	0.00	21.9	330	UGKG	1.0					
phthalene	U	0.00	154	330	UGKG	1.0					
robenzene	U	0.00	131	330	UGKG	1.0					
O,O-Triethylphosphorothioate	U	0.00	229	330	UGKG	1.0					
rathion	U	0.00	164	330	UGKG	1.0					
rathion, methyl	U	0.00	262	330	UGKG	1.0					
ntachlorobenzene	U	0.00	26.2	330	UGKG	1.0					
ntachloroethane	U	0.00	43.8	330	UGKG	1.0					
ntachloronitrobenzene	U	0.00	229	330	UGKG	1.0					
enacetin	U	0.00	190	330	UGKG	1.0					
enanthrene	U	0.00	58.9	330	UGKG	1.0					
orate	U	0.00	288	330	UGKG	1.0					
onamide	U	0.00	213	330	UGKG	1.0					
rene	U	0.00	71.9	330	UGKG	1.0					
ridine	U	0.00	128	330	UGKG	1.0					
frole	U	0.00	17.3	330	UGKG	1.0					
lfotepp	U	0.00	42.5	330	UGKG	1.0					
ionazin	U	0.00	222	330	UGKG	1.0					
a-Dimethylphenethylamine	U	0.00	104	330	UGKG	1.0					
(2-Chloroethoxy)methane	U	0.00	167	330	UGKG	1.0					
(2-Chloroethyl) ether	U	0.00	147	330	UGKG	1.0					
(2-Chloroisopropyl)ether	U	0.00	101	330	UGKG	1.0					

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bis(2-Ethylhexyl)phthalate	U	0.00	294	330	UGKG	1.0					
m-Dinitrobenzene	U	0.00	29.1	330	UGKG	1.0	DDT	07/23/99	1923	154032	3
m-Nitroaniline	U	0.00	81.8	330	UGKG	1.0					
o-Nitroaniline	U	0.00	65.4	330	UGKG	1.0					
o-Toluidine	U	0.00	275	330	UGKG	1.0					
p-Dimethylaminoazobenzene	U	0.00	206	330	UGKG	1.0					
p-Nitroaniline	U	0.00	101	330	UGKG	1.0					
p-Phenylenediamine	U	0.00	496	660	UGKG	1.0					
sym-Trinitrobenzene	U	0.00	22.9	1650	UGKG	1.0					
F004 Waste Constituents - GC/MS Ext. - 3 items											
Nitrobenzene	U	0.00	131	330	UGKG	1.0					
m,p-Cresol	U	0.00	150	660	UGKG	1.0					
o-Cresol	U	0.00	62.1	330	UGKG	1.0					
Pyridine	U	0.00	128	330	UGKG	1.0					
App. IX Herbicides - 3 items											
2,4,5-T	U	0.00	0.863	10.0	UGKG	10.	JC	07/24/99	1227	154030	4
2,4,5-TP	U	0.00	0.994	10.0	UGKG	10.					
2,4-D	U	0.00	1.46	10.0	UGKG	10.					
PCB analysis - 7 items											
PCB-1016	U	0.00	1.22	41.6	UGKG	1.0	JLW	08/03/99	0930	154173	5
PCB-1221	U	0.00	2.82	41.6	UGKG	1.0					
PCB-1232	U	0.00	1.63	41.6	UGKG	1.0					
PCB-1242	U	0.00	1.67	41.6	UGKG	1.0					
PCB-1248	U	0.00	0.906	41.6	UGKG	1.0					
PCB-1254	U	0.00	1.16	41.6	UGKG	1.0					
PCB-1260	U	0.00	0.942	41.6	UGKG	1.0					
App. IX Pesticides - 19 items											
4,4'-DDD	U	0.00	0.584	1.33	UGKG	1.0	MM	07/27/99	0027	154073	6
4,4'-DDE	U	0.00	0.544	1.33	UGKG	1.0					
4,4'-DDT	U	0.00	0.789	1.33	UGKG	1.0					
Aldrin	U	0.00	0.258	0.670	UGKG	1.0					
Chlordane	U	0.00	4.83	8.33	UGKG	1.0					
Dieldrin	U	0.00	0.727	1.33	UGKG	1.0					
Endosulfan I	U	0.00	0.450	0.670	UGKG	1.0					
Endosulfan II	U	0.00	0.675	1.33	UGKG	1.0					

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rameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
dosulfan sulfate	U	0.00	0.903	0.903	UGKG	1.0					
drin	U	0.00	0.675	1.33	UGKG	1.0	MM	07/27/99	0027	154073	6
drin aldehyde	U	0.00	0.985	1.33	UGKG	1.0					
ptachlor	U	0.00	0.430	0.670	UGKG	1.0					
ptachlor epoxide	U	0.00	0.215	0.670	UGKG	1.0					
ethoxychlor	U	0.00	3.52	6.70	UGKG	1.0					
xaphene	U	0.00	10.8	33.3	UGKG	1.0					
ha-BHC	U	0.00	0.261	0.670	UGKG	1.0					
ta-BHC	U	0.00	0.385	0.670	UGKG	1.0					
lta-BHC	U	0.00	0.280	0.670	UGKG	1.0					
mma-BHC	U	0.00	0.346	0.670	UGKG	1.0					
tals Analysis											
ercury	U	-7.04	1.92	33.3	UGKG	1.0	RPM2	07/22/99	1407	153549	7
ver		1510	69.8	485	UGKG	2.0	MBL	07/22/99	1448	153903	8
ver		1510	69.8	485	UGKG	2.0	MBL	07/22/99	1448	153903	9
uminum		55500000	57300	243000	UGKG	100	MBL	07/23/99	1036	153903	9
senic		1520	441	485	UGKG	2.0	MBL	07/22/99	1448	153903	8
senic		1520	441	485	UGKG	2.0	MBL	07/22/99	1448	153903	9
ron		27100000	12300	243000	UGKG	100	MBL	07/23/99	1036	153903	9
rium		101000	52.4	485	UGKG	2.0	MBL	07/22/99	1448	153903	8
rium		101000	52.4	485	UGKG	2.0	MBL	07/22/99	1448	153903	9
ryllium		1000	23.3	485	UGKG	2.0	MBL	07/22/99	1448	153903	8
ryllium		1000	23.3	485	UGKG	2.0	MBL	07/22/99	1448	153903	9
lcium		2890000	6760	9700	UGKG	2.0					
dmium		1090	36.9	485	UGKG	2.0	MBL	07/22/99	1448	153903	8
dmium		1090	36.9	485	UGKG	2.0	MBL	07/22/99	1448	153903	9
balt		4040	32.0	485	UGKG	2.0	MBL	07/22/99	1448	153903	8
balt		4040	32.0	485	UGKG	2.0	MBL	07/22/99	1448	153903	9
romium		449000	73.7	485	UGKG	2.0	MBL	07/22/99	1448	153903	8
romium		449000	73.7	485	UGKG	2.0	MBL	07/22/99	1448	153903	9
pper		57200	130	485	UGKG	2.0	MBL	07/22/99	1448	153903	8
pper		57200	130	485	UGKG	2.0	MBL	07/22/99	1448	153903	9
n		17600000	11700	11700	UGKG	2.0					
tassium		5780000	2750	9700	UGKG	2.0					
agnesium		4770000	492	970	UGKG	2.0					

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Client: Westinghouse Savannah River Co.
Building 735-16A, Rm. 5
P.O. Box 616
Aiken, South Carolina 29802
Contact: Mr. Richard Groseclose
Project Description: Hazardous Waste Contract

cc: WSRC00497 Report Date: August 20, 1999

Sample ID : COMP-8

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Manganese		274000	688	970	UGKG	2.0					
Molybdenum		2980	128	970	UGKG	2.0	MBL	07/22/99	1448	153903	9
Sodium		82200000	311000	485000	UGKG	100	MBL	07/23/99	1036	153903	9
Nickel		1540000	3060	24300	UGKG	100	MBL	07/23/99	1036	153903	8
Nickel		1540000	3060	24300	UGKG	100	MBL	07/23/99	1036	153903	9
Lead		33600	152	485	UGKG	2.0	MBL	07/22/99	1448	153903	8
Lead		33600	152	485	UGKG	2.0	MBL	07/22/99	1448	153903	9
Antimony	U	-7410	18500	48500	UGKG	100	MBL	07/23/99	1036	153903	8
Antimony	U	-7410	18500	48500	UGKG	100	MBL	07/23/99	1036	153903	9
Selenium	U	6530	13100	24300	UGKG	100	MBL	07/23/99	1036	153903	8
Selenium	U	6530	13100	24300	UGKG	100	MBL	07/23/99	1036	153903	9
Silicon		3240000	136000	485000	UGKG	100					
Tin		9000	808	970	UGKG	2.0	MBL	07/22/99	1448	153903	8
Tin		9000	808	970	UGKG	2.0	MBL	07/22/99	1448	153903	9
Strontium		29100	28.1	485	UGKG	2.0					
Titanium		747000	1940	24300	UGKG	100	MBL	07/23/99	1036	153903	9
Thallium	U	-3540	21400	48500	UGKG	100	MBL	07/23/99	1036	153903	8
Thallium	U	-3540	21400	48500	UGKG	100	MBL	07/23/99	1036	153903	9
Uranium		4030000	95400	243000	UGKG	100					
Vanadium		18600	51.4	485	UGKG	2.0	MBL	07/22/99	1448	153903	8
Vanadium		18600	51.4	485	UGKG	2.0	MBL	07/22/99	1448	153903	9
Zinc		18900000	17900	24300	UGKG	100	MBL	07/23/99	1036	153903	8
Zinc		18900000	17900	24300	UGKG	100	MBL	07/23/99	1036	153903	9
General Chemistry											
Total Halogens - 3 items											
Bromide	U	0.00	0.154	0.505	MGKG	1.0	RWS	07/16/99	2240	15442210	
Chlorides	J	0.505	0.183	1.01	MGKG	1.0					
Fluoride	J	0.232	0.220	0.505	MGKG	1.0					
Nitrogen, Nitrate	U	0.00	0.128	0.505	MGKG	1.0	RWS	07/16/99	2240	15442011	
Sulfate as SO4	U	0.00	0.384	10.1	mg/kg	1.0					
Nitrogen, Ammonia	U	0.200	0.241	0.500	MGKG	1.0	THL	07/27/99	1236	15421212	
Nitrogen, Total		0.900	0.0281	0.100	MGKG	1.0	THL	07/30/99	1600	15482213	
Nitrogen, Nitrate/Nitrite	U	0.00	0.0920	0.535	MGKG	1.0	THL	07/30/99	1554	15479514	
Phosphorus, Total as PO4		208	7.64	20.0	MGKG	100	THL	07/24/99	1144	15410215	

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Client: Westinghouse Savannah River Co.
Building 735-16A, Rm. 5
P.O. Box 616
Aiken, South Carolina 29802
Contact: Mr. Richard Groseclose
Project Description: Hazardous Waste Contract

cc: WSRC00497 Report Date: August 20, 1999

Sample ID : COMP-8

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M

The following prep procedures were performed:

GC/MS 5970 Extractables	RDH	07/22/99	0800	154032	N
Herbicides	JPB	07/22/99	1400	154030	N
PCB's	JMA	07/24/99	1600	154173	N
Pesticides	RDH	07/23/99	0800	154073	N
Mercury	AJM	07/21/99	1530	153549	N
TRACE	FGD	07/21/99	1430	153903	N

Surrogate Recovery	Test	Percent%	Acceptable Limits
2,4,6-Tribromophenol	AIXAE-8270C	76.7	(44.5 - 126.)
2-Fluorophenol	AIXAE-8270C	59.2	(37.0 - 102.)
Phenol-d6	AIXAE-8270C	63.0	(41.5 - 102.)
2-Fluorobiphenyl	AIXBN-8270C	57.3	(44.7 - 110.)
Nitrobenzene-d5	AIXBN-8270C	47.6	(42.4 - 107.)
p-Terphenyl-d14	AIXBN-8270C	77.3	(45.5 - 104.)
2,4,6-Tribromophenol	F005C	76.7	(44.5 - 126.)
2-Fluorobiphenyl	F005C	57.3	(44.7 - 110.)
2-Fluorophenol	F005C	59.2	(37.0 - 102.)
Nitrobenzene-d5	F005C	47.6	(42.4 - 107.)
Phenol-d6	F005C	63.0	(41.5 - 102.)
p-Terphenyl-d14	F005C	77.3	(45.5 - 104.)
2,4-Dichlorophenylacetic acid	AIXH-8151B	69.7	(24.0 - 111.)
4CMX	AIXP-8082	74.0	(25.3 - 110.)
Decachlorobiphenyl	AIXP-8082	64.5	(46.8 - 131.)
4CMX	AIXP-8081A	71.6	(36.5 - 131.)
Decachlorobiphenyl	AIXP-8081A	76.0	(50.7 - 135.)
Bromofluorobenzene	AIXVOA-8260B	90.4	(73.0 - 129.)
Dibromofluoromethane	AIXVOA-8260B	103.	(66.0 - 117.)
Toluene-d8	AIXVOA-8260B	102.	(73.0 - 122.)
Bromofluorobenzene	F001-8260	90.4	(73.0 - 129.)
Dibromofluoromethane	F001-8260	103.	(66.0 - 117.)
Toluene-d8	F001-8260	102.	(73.0 - 122.)
Bromofluorobenzene	F002-8260	90.4	(73.0 - 129.)
Dibromofluoromethane	F002-8260	103.	(66.0 - 117.)

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Project Description: Hazardous Waste Contract

cc: WSRC00497 Report Date: August 20, 1999

Sample ID : COMP-8

Surrogate Recovery	Test	Percent%	Acceptable Limits
Toluene-d8	F002-8260	102.	(73.0 - 122.)
Bromofluorobenzene	F003A-8260	90.4	(73.0 - 129.)
Dibromofluoromethane	F003A-8260	103.	(66.0 - 117.)
Toluene-d8	F003A-8260	102.	(73.0 - 122.)
Bromofluorobenzene	F005A-8260	90.4	(73.0 - 129.)
Dibromofluoromethane	F005A-8260	103.	(66.0 - 117.)
Toluene-d8	F005A-8260	102.	(73.0 - 122.)
Bromofluorobenzene	M8010 BY 8260	90.4	(73.0 - 129.)
Dibromofluoromethane	M8010 BY 8260	103.	(66.0 - 117.)
Toluene-d8	M8010 BY 8260	102.	(73.0 - 122.)

M = Method	Method-Description
M 1	GC/FID
M 2	EPA 8260B
M 3	EPA 8270C
M 4	EPA8151A
M 5	EPA 8082
M 6	EPA 8081A
M 7	EPA 7471A
M 8	SW846 6010B
M 9	EPA 6010B
M 10	EPA 9056
M 11	EPA 300.0
M 12	EPA 350.1 modified
M 13	EPA 351.2/353.1
M 14	EPA 353.1 modified
M 15	EPA 365.4 modified

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Project Description:	Hazardous Waste Contract

cc: WSRC00497 Report Date: August 20, 1999

Sample ID : COMP-8

M = Method	Method-Description

Notes:
The qualifiers in this report are defined as follows:
ND indicates that the analyte was not detected at a concentration greater than the detection limit.
J indicates presence of analyte at a concentration less than the reporting limit (RL) and greater than the detection limit (DL).
U indicates that the analyte was not detected at a concentration greater than the detection limit.
* indicates that a quality control analyte recovery is outside of specified acceptance criteria.

This data report has been prepared and reviewed
in accordance with General Engineering Laboratories
standard operating procedures. Please direct
any questions to your Project Manager, Stacy Griffin at 769-7376.

Stacy L. Griffin
Reviewed By

General Engineering Analytical Results for Batches "44" and "Turnover" For Chlorinated DibenzoDioxins and Dibenzo Furans

Environmental Geochemistry Group

EGG-RSG-00010

Date: March 2, 2000

To: Bernard Nora, 735-11A
John Pickett, 730-M

From: Richard S. Groseclose, 735-16A

Job 00010

Attached is the final report from General Engineering Laboratories for two (2) solid samples on Job 00010 for Dioxins and Furans analysis.

If you have any questions, please give me a call at 5-5687.

Reviewed by: RS Groseclose

Richard S. Groseclose, Environmental Geochemistry Group

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CASE NARRATIVE REPORT
for
Westinghouse Savannah River Site
Subcontract No. AB93796N
Job# 00010

February 29, 2000

Laboratory Identification:

General Engineering Laboratories, Inc.

Summary:

Sample receipt

Two solid samples for Westinghouse Savannah River Site arrived at General Engineering Laboratories, Inc., (GEL) Charleston, South Carolina on February 1, 2000 for analysis. The samples listed on the chain arrived at the laboratory without any form of tampering or breakage. A twenty-one day turnaround was requested on the chain.

The samples were stored properly according to SW-846 procedures and GEL Standard Operating Procedures (SOP).

The laboratory received the following samples:

Description	Sample Number
21239002	00010-2826
21239001	00010-2840

Case Narrative

Sample analyses were conducted using methodology as outlined in General Engineering Laboratories (GEL) Standard Operating Procedures. Any technical or administrative problems during analysis, data review, and reduction are written by analytical fraction in the enclosed narratives.

Data Package:

The enclosed data package contains the following sections: Case Narrative, Level II Certificate of Analysis, Chain of Custody, Sample Tracking Report, and Nonconformance Reports if applicable. The QC Summary Report and Electronic Data Deliverable are not included due to the extra work necessary to generate these reports.

The Level II Certificate of Analysis contains the following headings:

Sample ID:	Sample Identification
Lab ID:	This is the laboratory identification number
Matrix:	Sample matrix
Date Collected:	Date of sample collection
Date Received:	Date of sample receipt by the laboratory
Priority:	Internal status of sample turnaround
Collector:	Party responsible for sample collection.

The detail on the Certificate includes the following:

Parameter:	Analyte or characteristic tested for in the sample
Qualifier:	Qualifier used for data interpretation
Result:	Final result of each parameter.
DL:	Method Detection Limit
RL:	Reporting Limit
Units:	Units of final result
DF:	Dilution factor
Analyst:	Initials of analyst who performed the test
Date:	Date of analysis
Time:	Time of analysis
Batch:	Analytical batch in which the sample was analyzed
Method:	Analytical method used for the analysis of the sample. Identified on the report numerically with a corresponding table.
Surrogate Recovery:	Provided for organic analysis only. Surrogate compound identified.
Test:	Analytical test associated with surrogate compound.
Percent%:	Surrogate percent recovery
Acceptable Limits:	Limits established for surrogate recoveries based upon the method requirements.

The QC Summary Report contains the following headings:

Sample Parameter:	Analyte or characteristic tested for in the QC sample
Type:	Type of QC sample (i.e., blank, dup, LCS, LCS dup, MS, MSD)
Batch:	Analytical batch in which the QC sample was analyzed
NOM:	Nominal concentration of the spiking compound
Sample:	Amount of compound found in the sample associated with the QC sample.
QC:	Amount of compound found in the QC sample.

Units:	Units of final result
RPD%:	Relative percent difference between LCS/LCS dup, MS/MSD, and Sample/Sample duplicate
REC%:	Recovery for the control samples
Range:	Acceptance limits for control samples
Analyst:	Initials of analyst who performed the test
Date:	Date of analysis
Time:	Time of analysis

Types of QC samples that may be found on the QC Summary Report are:

Blank:	Results of the blank analysis for the sample batch
Dup:	Duplicate analysis of sample
LCS:	Lab control sample
LCS dup:	Lab control sample duplicate
MS:	Matrix spike
MSD:	Matrix spike duplicate

The following are definitions of reporting limits used at General Engineering Laboratories:

DL — Detection Limit: The minimum level of an analyte that can be determined (identified not quantified) with 99% confidence. The values are normally achieved by preparing and analyzing seven aliquots of laboratory water spiked 1 to 5 times the estimated MDL, taking the standard deviation and multiplying it against the one-tailed t-statistic at 99%. This computed value is then verified for reasonableness by repeating the study using the concentration found in the initial study, calculating an F-ratio, and computing the final limit. Sample specific preparation and dilution factors are applied to these limits when they are reported.

The detection limit is the minimum concentration of a substance that can be identified, measured, and reported with 99% confidence that the analyte concentration is above zero. It answers the question "Is It Present".

QL — Quantitation Limit: The lowest concentration that can be reliably achieved within specified limits of precision and accuracy during routine laboratory operating conditions. The QL is generally 5 to 10 times the MDL. However, it may be nominally chosen within these guidelines to simplify data reporting. For many analytes the QL analyte concentration is selected as the lowest non-zero standard in the calibration curve. Sample QL's are highly matrix-dependent. Sample specific preparation and dilution factors are applied to these limits when they are reported.

The QL is always ≥ DL

RL — Reporting Limit: Same as the QL except where driven by contract or client specifications. If the sample specific preparation and dilution factors cause the QL to be elevated above the RL, then the QL is used as the RL.

The quantitation limit is the lowest level at which a chemical may be accurately and reproducibly quantitated. It answers the question "HOW MUCH IS PRESENT".

Interpretation of RESULT column on the Certificate of Analysis:

If the final concentration in the sample was found to be above the RL, then the value reported is reported without a flag;

If the final concentration in the sample was found to be below the RL but above the DL, then the value reported is flagged with a "J";

If the final concentration in the sample was found to be below the DL, the value reported is flagged with a "U".

Quality Control Flags

General Engineering Laboratories maintains acceptance criteria for QC samples through use of statistical process control (SPC). The SPC limits are used to qualify data usability. The flagging criterion identified in WSRC AN98 Format does not necessarily coincide with the laboratory SPC criteria. There may be instances where the Electronic Data Deliverable (EDD) has flagged data based on the AN98 criteria and the lab has not identified the data to be outside of established control limits.

Those instances where the QC has not met laboratory SPC established criteria will be noted in the section case narratives that are included in this package.

This data package, to the best of my knowledge, is in compliance with technical and administrative requirements.

Stacy L. Griffin
Project Manager

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Dioxin and Furan Case Narrative
WSRC
SDG 00010
Dioxin and Furan Analysis by GC/MS

Sample Analysis

The following samples were analyzed for dioxins and/or furans using the analytical protocol from EPA SW-846 Third Edition, Method 8280, Revision 0, September, 1986:

Lab ID	Client ID
1000022175	DBLK01 (Blank)
1000024500	DBLK02 (Blank)
1000022176	00010-2826DUP (Sample Duplicate)
21239001	00010-2840
21239002	00010-2826

Analysis/Instrument Information:

Batch #:	10976
Prep Batch #:	10484
Procedure:	8280 Dioxins/Furans in soil-FED
Analytical Method:	SW846 8280
Prep Method:	SW846 8280 PREP
Lab Group:	Semi-volatile Mass/Spec Federal

System Configuration

The chromatographic hardware system consists of a HP 6890 gas chromatograph and a HP 5973 Mass Selective Detector. The configuration is equipped with electronic pressure control. The MS interface is capillary direct.

Chromatographic Column

Chromatographic separation of dioxin and furan components is accomplished through analysis on the following column (with dimensions of 60 meters x 0.25 mm ID and 0.1 um film):

- J&WDX: DB - 5MS (5%-Phenyl)-methylpolysiloxane (identified by a DB-5MS designation on quantitation reports and reconstructed ion chromotograms), with low bleed characteristics.

Instrument Configuration

The samples reported in this SDG were analyzed on one or more of the following instrument systems (instrument systems are identified by the instrument ID designations listed below which can be found on the raw data or individual form headers):

Instrument ID	System Config.	Chromatographic Column
MSD6	HP5890/HP5970	J&WDX

SOP Reference

Procedures for preparation, analysis and reporting of analytical data are controlled by General Engineering Laboratories, Inc. (GEL) as Standard Operating Procedures (SOP). The data discussed in this narrative has been prepared and analyzed in accordance with the following GEL SOPs: GL-OA-E-007 Rev.2

Preparation/Analytical Method Verification

The SOP stated above has been prepared based on technical research and testing conducted by General Engineering Laboratories, Inc. and with guidance from the regulatory documents listed in this "Analysis/Instrument Information" section.

Calibration Information:

Initial Calibration

All initial calibration requirements have been met for this analysis.

CCAL Requirements

All continuing calibration criteria have been met for this sample set.

Quality Control (QC) Information:

Blank Acceptance

Both of the blanks analyzed with this SDG met the established report acceptance criteria. Both blanks passed

QC Sample Designation

The following sample from this sample set was chosen for method QC: 21239002 (00010-2826).

Sample Duplicates

The duplicate RPD for this sample set was within the required acceptance limits.

Recovery Standard

The percent recovery is determined using the area response for IS1 and IS2 on the Form VIII. A sample calculation is:

(IS2 Area/IS Area) X 100% = % Recovery

The calculated values are listed in the comment column of the runlog. There is no entry for IS1 Area and RT for the 12 hour standard since the C13-1, 2, 3, 4-TCDD is not present in the calibration standards or in the 12 hour standard (check standard). IS1 is used only in the %

recovery determination. It is not used for quantitation purposes.

Recovery of each internal standard versus the recovery standard was within the required acceptance limits of 40% -120%.

Technical Information:

Holding Time Specifications

GEL assigns holding times based on the date and time of sample collection. Those holding times expressed in hours are calculated in the GELIMS system by hours. Those holding times expressed as days expire at midnight on the day of expiration.

All samples in this sample set met the specified holding time requirements.

Sample Re-prep/Re-analysis

The following samples had multiple analyses for reasons other than dilution: Re-prepped/reanalyzed due to recovery failure. Re-prepped extracts passed recovery criteria.

Samples 21239001 (00010-2840) and 21239002 (00010-2826) failed recovery criteria and were reextracted within holding. The reextracts passed recovery.

Sample Dilutions

None of the samples in this set required dilutions.

Miscellaneous Information:

NCR Documentation

Nonconformance reports are generated to document procedural anomalies that may deviate from referenced SOP or contractual documents.

The following nonconformance report has been generated to document procedural deviations: GEL-AS-OA-3507.

Samples 21239001 (00010-2840) and 21239002 (00010-2826) failed recovery criteria and were reextracted. The reextracts passed recovery.

While samples 21239001 (00010-2840) and 21239002 (00010-2826) failed recovery low in the first extraction, the method blank (DBLK01) and sample duplicate (00010-2826DUP) were within required acceptance limits. The samples were reextracted, with another method blank (DBLK02), within holding. The samples passed in the second extraction.

Manual Integrations

Manual integrations may be required when instrument software fails to integrate target data properly.

No data files required manual integrations.

Additional Comments

The additional comments field is used to address special issues associated with each analysis, clarify method/contractual issues pertaining to the analysis and to list any report documents generated as a result of sample analysis or review.

The 1,2,3,4-TCDD-C13 is defined as a target compound because the software does not have a suitable designation of recovery standard.

Since each of the seven TCDD isomers in the FDC mix have the same parent ion and it is with a degree of difficulty to have the software identify each one, six are labeled as 2,3,7,8-TCDD and the seventh one is labeled as 1,3,6,8-TCDD on all the forms and raw data.

There appears on the Form VI (Initial Calibration Report) the entries "Starting CCAL" and "Ending CCAL". There is a Form VII for only the "Starting CCAL" but not the "Ending CCAL". This is because the only purpose of the "Ending CCAL" is to determine if the ion ratios at the end of the 12 hour analytical period are still within the acceptable window.

Review/Validation:

GEL requires all analytical data to be verified by a qualified data validator. In addition, all data designated for CLP of CLP-like packaging will receive a third level validation upon completion of the data package.

The data presented in this sample set has been verified by the following qualified data validator:

Reviewer: Erin Haubert

Date: 2/24/00

3, Taylor
D-ENG-99-0123, Rev.1
ge 23
rch 3, 2000
8)

UNCONTROLLED DOCUMENT

1. NCR Report No.: GEL-AS-00-3507
2. Page 1 of 1
3. Revision No.: 0

COMPANY-WIDE NONCONFORMANCE REPORT

COMPLETE EVERY ITEM
(See Instructions on Reverse Side)

Day	Yr.	5. Division: ☐ Industrial ☑ Federal ☐ Radiochemistry ☐ Bioassay ☐ Other	6. Type: Material ☐ Process ☑ Product ☐
17	00		

ument Type:	8. Quality Criteria: ☑ SOP ☐ QAP or QAPP ☐ Client Contract ☐ Purchase Document ☐ Drawing ☐ Specifications ☐ Others
GC/MS	

plier/Client Name & Code:	10. Test/Method:
WSRC	8280

mical Reference Identification: (Batch Number, Sample Number, ID number)
10976, 21239001 and 21239002

ecifications and Requirements nonconformance Description:	14. NRG Disposition:

No.	Item No.
Sample 21239001 and 21239002 both failed recovery criteria and were reextracted. Both re-extracts passed recovery criteria.	1. Use data from re-extracted analysis.

RLC 2/17/00

RECEIVED FEB 18 2000

RLC 2/17/00

Originator's Printed Name & Signature	Date
Robert L. Carpenter	2/17/00

15. NRG's Printed Name & Signature: Robert L. Carpenter — Date: 2/17/00

List NRG Participants:
Johnnie Frazier — 2/17/00

Management Review ☑ or Management Approval ☐

Please review within 24 hours of receipt.

Review & Disposition Review or Approval:	Corrective Action Request and Approval:
Quality Review: Date 2/24/00	18. CA Requested: Print Name and Sign — Date
17. Originator's Director/Group Leader: Date	19. Corrective Action Approval & Number — Date

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Certificate of Analysis

Company : Westinghouse Savannah Rivr Co.
Address : Building 735-16A, Rm 5
P.O. Box 616
Aiken, SC 29802
Contact: Mr. Richard Groseclose
Project: HazWaste Contract

Report Date: February 21, 2000

Client Sample ID:	00010-2840	Proiect:	WSRC00497
Sample ID:	21239001	Client ID:	WSRC006
Matrix:	Misc Solid		
Collect Date:	27-JAN-00		
Receive Date:	01-FEB-00		
Collector:	Client		
Moisture:	<0.1%		

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
ni-Volatiles-GC/MS Federal											
280 Dioxin/Furan Soil Federal											
1,2,3,4,6,7,8-HpCDD	U	0	0.345	0.944	ug/kg	1	RLC	02/16/00	0813	10976	1
1,2,3,4,6,7,8-HpCDF	U	0	0.458	0.944	ug/kg	1					
1,2,3,4,7,8-HxCDD	U	0	0.312	0.944	ug/kg	1					
1,2,3,4,7,8-HxCDF	U	0	0.278	0.944	ug/kg	1					
1,2,3,7,8-PCDD	U	0	0.302	0.944	ug/kg	1					
1,2,3,7,8-PCDF	U	0	0.272	0.944	ug/kg	1					
2,3,7,8-TCDD	U	0	0.143	0.944	ug/kg	1					
2,3,7,8-TCDF	U	0	0.278	0.944	ug/kg	1					
OCDD	U	0	0.188	0.944	ug/kg	1					
OCDF	U	0	0.4	0.944	ug/kg	1					

ie following Prep Methods were performed

ethod	Description	Analyst	Date	Time	Prep Batch
7846 8280 PRE	8280 Dioxins/Furans in soil prep-FED	RLC	02/09/00	1043	10484

ie following Analytical Methods were performed

ethod	Description
	SW846 8280

otes:
The Qualifiers in this report are defined as follows :

EPA Functional Guideline Code:Result > MDA and result < 2 * Error
EPA Functional Guideline Code:Result >= MDL but result < PQL/RDL
EPA Functional Guideline Code:Data Rejected
EPA Functional Guideline Code:Result < 5 * blank result
EPA Functional Guideline Code:Result < MDL

The above sample is reported on a dry weight basis.
This data report has been prepared and reviewed in accordance with General Engineering Laboratories, Inc.
standard operating procedures. Please direct any questions to your Project Manager, Stacy L. Griffin at 843-556-8171 Ext. 4264.

GENERAL ENGINEERING LABORATORIES

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Certificate of Analysis

Company : Westinghouse Savannah Rivr Co.
Address : Building 735-16A, Rm 5
P.O. Box 616
Aiken, SC 29802
Contact: Mr. Richard Groseclose
Project: HazWaste Contract

Report Date: February 21, 2000

Client Sample ID: 00010-2840
Sample ID: 21239001

Project: WSRC00497
Client ID: WSRC006

meter	Qualifier	Result	DL	RL	Units	DF	AnalystDate	Time	Batch	Method

wed by Stacy L Griffin

GENERAL ENGINEERING LABORATORIES

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Certificate of Analysis

Company : Westinghouse Savannah Rivr Co.
Address : Building 735-16A, Rm 5
P.O. Box 616
Aiken, SC 29802
Contact: Mr. Richard Groseclose
Project: HazWaste Contract

Report Date: February 21, 2000

Client Sample ID:	00010-2826	Project:	WSRC00497
Sample ID:	21239002	Client ID:	WSRC006
Matrix:	Misc Solid		
Collect Date:	27-JAN-00		
Receive Date:	01-FEB-00		
Collector:	Client		
Moisture:	<0.1%		

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
emi-Volatiles-GC/MS Federal											
8280 Dioxin/Furan Soil Federal											
1,2,3,4,6,7,8-HpCDD	U	0	0.341	0.935	ug/kg	1	RLC	02/16/00	0848	10976	1
1,2,3,4,6,7,8-HpCDF	U	0	0.453	0.935	ug/kg	1					
1,2,3,4,7,8-HxCDD	U	0	0.309	0.935	ug/kg	1					
1,2,3,4,7,8-HxCDF	U	0	0.275	0.935	ug/kg	1					
1,2,3,7,8-PCDD	U	0	0.299	0.935	ug/kg	1					
1,2,3,7,8-PCDF	U	0	0.269	0.935	ug/kg	1					
2,3,7,8-TCDD	U	0	0.141	0.935	ug/kg	1					
2,3,7,8-TCDF	U	0	0.275	0.935	ug/kg	1					
OCDD	U	0	0.186	0.935	ug/kg	1					
OCDF	U	0	0.396	0.935	ug/kg	1					

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
W846 8280 PRE	8280 Dioxins/Furans in soil prep-FED	RLC	02/09/00	1043	10484

The following Analytical Methods were performed

Method	Description
	SW846 8280

Notes:
The Qualifiers in this report are defined as follows :

J EPA Functional Guideline Code:Result > MDA and result < 2 * Error
J EPA Functional Guideline Code:Result >= MDL but result < PQL/RDL
R EPA Functional Guideline Code:Data Rejected
U EPA Functional Guideline Code:Result < 5 * blank result
U EPA Functional Guideline Code:Result < MDL

The above sample is reported on a dry weight basis.
This data report has been prepared and reviewed in accordance with General Engineering Laboratories, Inc. standard operating procedures. Please direct any questions to your Project Manager, Stacy L. Griffin at 843-556-8171 Ext. 4264.

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Certificate of Analysis

Company : Westinghouse Savannah Rivr Co.
Address : Building 735-16A, Rm 5
P.O. Box 616
Aiken, SC 29802
Contact: Mr. Richard Groseclose
Project: HazWaste Contract

Report Date: February 21, 2000

Client Sample ID: 00010-2826
Sample ID: 21239002

Project: WSRC00497
Client ID: WSRC006

ıeter	Qualifier	Result	DL	RL	Units	DF	AnalystDate	Time	Batch	Method

ed by

FEDERAL SAMPLE RECEIPT REVIEW

Client WSRC Received by BF Date 2/1/00

GEL COOLER # GEL POLY COOLER___ CLIENT COOLER___ OTHER___

#704-QB

SAMPLE REVIEW CRITERIA	YES	NO	COMMENTS/QUALIFIERS
1. Were shipping containers received intact and sealed? If no, notify Project Manager	✓		
2. Was the Shipment screened following the radiochemistry survey procedure (EPI SOP S-007)?	✓		
Were the survey results negative? If no, notify Project Manager	✓		
Are any of the samples identified by the client as radioactive? If yes, did client provide RAD activity?	✓		
3. Were chain of custody documents included?	✓		
4. Were chain of custody documents completed correctly? (Ink, signed, match containers)	✓		
5. Were all sample containers properly labeled?	✓		
6. Were proper sample containers received?	✓		
7. Preserved samples checked for pH?	—		N/A
8. Were samples preserved correctly? If no, list samples & tests	—		N/A
9. Shipping container temperature checked?	✓		
10. Was shipping conatiner temperature within specifications (4°± 2° C) If no, notify Project Manager	✓		4°C
11. Is temperature documented on the Chain of Custody?	✓		
12. Were samples received within holding time? if No, notify Project Manger	✓		
13. Were VOA vials free of headspace?	—		N/A
14. ARCOC# IF REQUIRED	—		N/A
15. SDG# IF REQUIRED	✓		00010

REVIEW [signature] DATE 2/1/00 SA - SEALS ATTACHED NSA - NO SEALS ATTACHED

Work Order Containers

Submit

Work Order: 21239

21239001.01 - 1000 ml/P

01-FEB-2000 17:57:54	Dionne Francis		Login Area
01-FEB-2000 21:50:49	Dwayne Barnett		Radioactive Cooler
03-FEB-2000 16:20:51	Gini Johnson		Login Area
03-FEB-2000 22:09:58	David Setzer		Radioactive Cooler
07-FEB-2000 07:40:03	Bob Carpenter	10484	Dioxin Lab
07-FEB-2000 09:25:34	Bob Carpenter		Radioactive Cooler

21239002.01 - 1000 ml/P

01-FEB-2000 17:57:54	Dionne Francis		Login Area
01-FEB-2000 21:50:49	Dwayne Barnett		Radioactive Cooler
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03-FEB-2000 22:09:58	David Setzer		Radioactive Cooler
07-FEB-2000 07:40:03	Bob Carpenter	10484	Dioxin Lab
07-FEB-2000 09:25:34	Bob Carpenter		Radioactive Cooler

Version 1.0 12/16/99
General Engineering Laboratories, Inc.

CHAIN-OF-CUSTODY

21239

Job Number 00010	Customer Name: Pickett, John	Company: General Engineering Laboratory
Contract Number AB93796N	Customer Department: FDD	Ship to: Address: 2040 Savage Road, Charleston, South Carolina 29407
	Customer Address: 730-M FAX 5-4095	Attention: Stacy Griffin, Project Manager
	Customer Phone: 5-3838 14956	

Westinghouse Savannah River
COC creation date. Company
1/6/00 Aiken, SC 29808

Environmental Monitoring Section
Environmental Geochemistry Group

Matrix Key: S=Soil, SO=Solid, SL=Sludge, O=Organic, A=Aqueous

Sample Analysis Requested	Sample ID: 0001	Sample ID: 0002	Sample ID:	Sample ID:	Sample ID:	Sample ID:
	0001-2824	0001-2826				
	Collect Date 1-27-00	Collect Date 1-27-00	Collect Date	Collect Date	Collect Date	Collect Date
	Collect Time 1430	Collect Time 1435	Collect Time	Collect Time	Collect Time	Collect Time
	No. Containers 1	No. Containers 1	No. Containers	No. Containers	No. Containers	No. Containers
	Matrix SO	Matrix SO	Matrix	Matrix	Matrix	Matrix
Dioxins and Furans high scan (HRGC/HRMS) (104)	✓	✓				

21 Day TAT

STR Authorization RS Groseclose

1 Relinquished by:	Date/Time	Received by:	2 Relinquished by:	Date/Time	Received by:
(Print) John R. Pickett	Date 1/27/2000	(Print) Renee Edmonds	(Print) Charles M. Jay	Date 2-1-00	(Print) Beeley Newman
(Sign)	Time 1435	(Sign)	(Sign)	Time 1015	(Sign)
3 Relinquished by:	Date/Time	Received by:	4 Relinquished by:	Date/Time	Received by:
(Print) Beeley Newman	2/1/00	(Print)	(Print)		(Print)
(Sign)	Time 1600	(Sign)	(Sign)	Time	(Sign)

ppendix M-4, Additional Total Metals, Plus F-001, F-002, F-003, F-004, and F-005 Hazardous Constituents
ı the 16 TCLP Grab Samples
4, pp. 1 through 82

GENERAL ENGINEERING LABORATORIES

Meeting today's needs with a vision for tomorrow.

Client: Westinghouse Savannah River Co.
Building 735-16A, Rm. 5
P.O. Box 616
Aiken, South Carolina 29802
Contact: Mr. Richard Groseclose
Project Description: Hazardous Waste Contract

cc: WSRC00497 Report Date: August 20, 1999

Sample ID	: TCLP 1
Lab ID	: 9907679-03
Matrix	: Soil
Date Collected	: 07/14/99
Date Received	: 07/15/99
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Volatile Organics											
F003 Waste Constituents - FID - 4 items											
Ethyl Acetate	U	0.00	10.0	10.0	mg/kg	1.0	CAK	07/28/99	2047	154228	1
Ethyl Ether	U	0.00	10.0	10.0	mg/kg	1.0					
Methyl Alcohol	U	0.0143	4.00	10.0	MGKG	1.0					
n-Butyl Alcohol	U	0.00	4.00	10.0	mg/kg	1.0					
F005 Waste Constituents - FID - 2 items											
Ethylene Glycol Monoethylether	U	0.00	20.0	20.0	mg/kg	1.0					
Isobutyl Alcohol	U	0.00	4.00	10.0	mg/kg	1.0					
F001 Waste Constituents - 7 items											
1,1,1-Trichloroethane	U	0.00	0.100	1.00	UGKG	1.0	JWF	07/26/99	1417	154327	2
Carbon Tetrachloride	U	0.00	0.500	1.00	UGKG	1.0					
Methylene Chloride		3.35	1.40	1.40	UGKG	1.0					
Tetrachloroethylene	U	0.00	0.400	1.00	UGKG	1.0					
Trichloroethylene	U	0.00	0.300	1.00	UGKG	1.0					
Trichlorofluoromethane	U	0.00	0.300	1.00	UGKG	1.0					
Trichlorotrifluoroethane	U	0.00	10.0	20.0	UGKG	1.0					
F002 Waste Constituents - 9 items											
1,1,1-Trichloroethane	U	0.00	0.100	1.00	UGKG	1.0					
1,1,2-Trichloroethane	U	0.00	0.300	1.00	UGKG	1.0					
1,2-Dichlorobenzene	U	0.00	0.500	1.00	UGKG	1.0					
Chlorobenzene	U	0.00	0.300	1.00	UGKG	1.0					
Methylene Chloride		3.35	1.40	1.40	UGKG	1.0					
Tetrachloroethylene	U	0.00	0.400	1.00	UGKG	1.0					
Trichloroethylene	U	0.00	0.300	1.00	UGKG	1.0					
Trichlorofluoromethane	U	0.00	0.300	1.00	UGKG	1.0					
Trichlorotrifluoroethane	U	0.00	10.0	20.0	UGKG	1.0					
F003 Waste Constituents - GC/MS VOA - 4 items											
4-Methyl-2-pentanone	U	0.00	3.10	5.00	UGKG	1.0					

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Client: Westinghouse Savannah River Co.
Building 735-16A, Rm. 5
P.O. Box 616
Aiken, South Carolina 29802
Contact: Mr. Richard Groseclose
Project Description: Hazardous Waste Contract

:c: WSRC00497 Report Date: August 20, 1999

Sample ID : TCLP 1

arameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
cetone	U	2.68	10.3	10.3	UGKG	1.0					
hylbenzene	U	0.00	0.300	1.00	UGKG	1.0	JWF	07/26/99	1417	154327	2
ylenes (TOTAL)	U	0.00	0.700	1.00	UGKG	1.0					
005 Waste Constituents - GC/MS VOA - 5 items											
Butanone	U	0.00	3.20	5.00	UGKG	1.0					
Nitropropane	U	0.00	3.30	5.00	UGKG	1.0					
enzene	U	0.00	0.500	1.00	UGKG	1.0					
rbon Disulfide	U	0.00	0.300	5.00	UGKG	1.0					
oluene	U	0.00	0.900	1.00	UGKG	1.0					
tractable Organics											
004 Waste Constituents - GC/MS Ext. - 3 items											
itrobenzene	U	0.00	133	333	UGKG	1.0	JPA	08/04/99	1615	154035	3
,p-Cresol	U	0.00	153	333	UGKG	1.0					
-Cresol	U	0.00	63.3	333	UGKG	1.0					
yridine	U	0.00	130	333	UGKG	1.0					
tals Analysis											
lver		4630	349	2430	UGKG	10.	MBL	08/02/99	1713	153902	4
luminum		65800000	5730	24300	UGKG	10.					
rsenic		3170	2210	2430	UGKG	10.					
oron		40700000	12300	243000	UGKG	100	MBL	08/03/99	0759	153902	4
arium		110000	262	2430	UGKG	10.	MBL	08/02/99	1713	153902	4
eryllium	J	936	116	2430	UGKG	10.					
alcium		2960000	33800	48500	UGKG	10.					
admium	J	751	184	2430	UGKG	10.					
obalt		6730	160	2430	UGKG	10.					
hromium		1600000	369	2430	UGKG	10.					
opper		34000	650	2430	UGKG	10.					
on		5040000	58600	58600	UGKG	10.					
otassium		15900000	13700	48500	UGKG	10.					
lagnesium		860000	2460	4850	UGKG	10.					
anganese		238000	3440	4850	UGKG	10.					
olybdenum	J	3620	640	4850	UGKG	10.					
odium		156000000	311000	485000	UGKG	100	MBL	08/03/99	0759	153902	4
ickel		2330000	306	2430	UGKG	10.	MBL	08/02/99	1713	153902	4
ead		44100	761	2430	UGKG	10.					

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Client: Westinghouse Savannah River Co.
Building 735-16A, Rm. 5
P.O. Box 616
Aiken, South Carolina 29802
Contact: Mr. Richard Groseclose
Project Description: Hazardous Waste Contract

cc: WSRC00497 Report Date: August 20, 1999

Sample ID : TCLP 1

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Antimony	U	-5130	1850	4850	UGKG	10.					
Selenium	U	-1120	1310	2430	UGKG	10.	MBL	08/02/99	1713	153902	4
Silicon		4550000	136000	485000	UGKG	100	MBL	08/03/99	0759	153902	4
Tin		23300	4040	4850	UGKG	10.	MBL	08/02/99	1713	153902	4
Strontium		13200	141	2430	UGKG	10.					
Titanium		194000	194	2430	UGKG	10.					
Thallium	U	155	2140	4850	UGKG	10.					
Uranium		14300000	95400	243000	UGKG	100	MBL	08/03/99	0759	153902	4
Vanadium		20100	257	2430	UGKG	10.	MBL	08/02/99	1713	153902	4
Zinc		163000	17900	24300	UGKG	100	MBL	08/03/99	0759	153902	4
General Chemistry											
Total Halogens - 3 items											
Bromide	U	0.00	0.158	2.60	MGKG	1.0	RWS	07/16/99	2322	154421	5
Chlorides	U	0.00	0.188	1.04	MGKG	1.0					
Fluoride	U	0.00	0.227	0.520	MGKG	1.0					
Nitrogen, Nitrate	U	0.125	0.132	0.520	MGKG	1.0	RWS	07/16/99	2322	154418	6
Evaporative Loss @ 105 C	U	0.00	1.00	1.00	wt%	1.0	GJ	07/27/99	1815	154246	7
Nitrogen, Ammonia	U	0.00	0.240	1.00	mg/kg	1.0	THL	07/27/99	1754	154283	8

The following prep procedures were performed:

FID Analysis		08/03/99		154228 N
Volatiles 8260 High Level	SM	07/26/99	2000	154327 N
GC/MS 5970 Extractables	JMA	07/22/99	1600	154035 N
TRACE	FGD	07/26/99	1830	153902 N

Surrogate Recovery	Test	Percent%	Acceptable Limits
2,4,6-Tribromophenol	F005C	53.0	(44.5 - 126.)
2-Fluorobiphenyl	F005C	52.2	(44.7 - 110.)
2-Fluorophenol	F005C	56.2	(37.0 - 102.)
Nitrobenzene-d5	F005C	51.7	(42.4 - 107.)
Phenol-d6	F005C	57.3	(41.5 - 102.)
p-Terphenyl-d14	F005C	74.8	(45.5 - 104.)

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Contact: Mr. Richard Groseclose
Project Description: Hazardous Waste Contract

:c: WSRC00497 Report Date: August 20, 1999

Sample ID : TCLP 1

ırrogate Recovery	Test	Percent%	Acceptable Limits
·omofluorobenzene	F001-8260	89.2	(73.0 - 129.)
ibromofluoromethane	F001-8260	101.	(66.0 - 117.)
)luene-d8	F001-8260	100.	(73.0 - 122.)
·omofluorobenzene	F002-8260	89.2	(73.0 - 129.)
ibromofluoromethane	F002-8260	101.	(66.0 - 117.)
)luene-d8	F002-8260	100.	(73.0 - 122.)
·omofluorobenzene	F003A-8260	89.2	(73.0 - 129.)
bromofluoromethane	F003A-8260	101.	(66.0 - 117.)
)luene-d8	F003A-8260	100.	(73.0 - 122.)
·omofluorobenzene	F005A-8260	89.2	(73.0 - 129.)
ibromofluoromethane	F005A-8260	101.	(66.0 - 117.)
)luene-d8	F005A-8260	100.	(73.0 - 122.)

: = Method	Method-Description
1	GC/FID
2	EPA 8260B
3	EPA 8270C
4	EPA 6010B
5	EPA 9056
6	EPA 300.0
7	EPA 3550
8	EPA 350.1 modified

tes:
: qualifiers in this report are defined as follows:
) indicates that the analyte was not detected at a concentration greater than the detection limit.
dicates presence of analyte at a concentration less than the reporting limit (RL) and greater than the detection limit (DL).
ndicates that the analyte was not detected at a concentration greater than the detection limit.
ıdicates that a quality control analyte recovery is outside of specified acceptance criteria.

a reported in mass/mass units is reported as 'dry weight'.

GENERAL ENGINEERING LABORATORIES

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Client:	Westinghouse Savannah River Co.
	Building 735-16A, Rm. 5
	P.O. Box 616
	Aiken, South Carolina 29802
Contact:	Mr. Richard Groseclose
Project Description:	Hazardous Waste Contract

cc: WSRC00497 Report Date: August 20, 1999

Sample ID : TCLP 1

M = Method	Method-Description

This data report has been prepared and reviewed in accordance with General Engineering Laboratories standard operating procedures. Please direct any questions to your Project Manager, Stacy Griffin at 769-7376.

Stacy L. Griffin

Reviewed By

P O Box 30712 • Charleston, SC 29417 • 2040 Savage Road • 29407

(843) 556-8171 • Fax (843) 766-1178

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Building 735-16A, Rm. 5
P.O. Box 616
Aiken, South Carolina 29802
Contact: Mr. Richard Groseclose
Project Description: Hazardous Waste Contract

c: WSRC00497 Report Date: August 20, 1999

Sample ID	: TCLP 2
Lab ID	: 9907679-05
Matrix	: Soil
Date Collected	: 07/14/99
Date Received	: 07/15/99
Priority	: Routine
Collector	: Client

arameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
latile Organics											
003 Waste Constituents - FID - 4 items											
hyl Acetate	U	0.00	10.0	10.0	mg/kg	1.0	CAK	07/28/99	2113	154228	1
hyl Ether	U	0.00	10.0	10.0	mg/kg	1.0					
ethyl Alcohol	U	0.00	4.00	10.0	MGKG	1.0					
Butyl Alcohol	U	0.00	4.00	10.0	mg/kg	1.0					
005 Waste Constituents - FID - 2 items											
hylene Glycol Monoethylether	U	0.00	20.0	20.0	mg/kg	1.0					
obutyl Alcohol	U	0.00	4.00	10.0	mg/kg	1.0					
001 Waste Constituents - 7 items											
1,1-Trichloroethane	U	0.00	0.100	1.00	UGKG	1.0	JWF	07/26/99	1449	154327	2
arbon Tetrachloride	U	0.00	0.500	1.00	UGKG	1.0					
lethylene Chloride		3.32	1.40	1.40	UGKG	1.0					
etrachloroethylene	U	0.00	0.400	1.00	UGKG	1.0					
richloroethylene	U	0.00	0.300	1.00	UGKG	1.0					
richlorofluoromethane	U	0.00	0.300	1.00	UGKG	1.0					
richlorotrifluoroethane	U	0.00	10.0	20.0	UGKG	1.0					
002 Waste Constituents - 9 items											
1,1-Trichloroethane	U	0.00	0.100	1.00	UGKG	1.0					
1,2-Trichloroethane	U	0.00	0.300	1.00	UGKG	1.0					
2-Dichlorobenzene	U	0.00	0.500	1.00	UGKG	1.0					
hlorobenzene	U	0.00	0.300	1.00	UGKG	1.0					
lethylene Chloride		3.32	1.40	1.40	UGKG	1.0					
etrachloroethylene	U	0.00	0.400	1.00	UGKG	1.0					
richloroethylene	U	0.00	0.300	1.00	UGKG	1.0					
richlorofluoromethane	U	0.00	0.300	1.00	UGKG	1.0					
richlorotrifluoroethane	U	0.00	10.0	20.0	UGKG	1.0					
003 Waste Constituents - GC/MS VOA - 4 items											
-Methyl-2-pentanone	U	0.00	3.10	5.00	UGKG	1.0					

GENERAL ENGINEERING LABORATORIES

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Client: Westinghouse Savannah River Co.
Building 735-16A, Rm. 5
P.O. Box 616
Aiken, South Carolina 29802
Contact: Mr. Richard Groseclose
Project Description: Hazardous Waste Contract

cc: WSRC00497 Report Date: August 20, 1999

Sample ID : TCLP 2

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Acetone	U	2.20	10.3	10.3	UGKG	1.0					
Ethylbenzene	U	0.00	0.300	1.00	UGKG	1.0	JWF	07/26/99	1449	154327	2
Xylenes (TOTAL)	U	0.00	0.700	1.00	UGKG	1.0					
F005 Waste Constituents - GC/MS VOA - 5 items											
2-Butanone	U	0.00	3.20	5.00	UGKG	1.0					
2-Nitropropane	U	0.00	3.30	5.00	UGKG	1.0					
Benzene	U	0.00	0.500	1.00	UGKG	1.0					
Carbon Disulfide	U	0.00	0.300	5.00	UGKG	1.0					
Toluene	U	0.00	0.900	1.00	UGKG	1.0					
Extractable Organics											
F004 Waste Constituents - GC/MS Ext. - 3 items											
Nitrobenzene	U	0.00	133	333	UGKG	1.0	JPA	08/04/99	1645	154035	3
m,p-Cresol	U	0.00	153	333	UGKG	1.0					
o-Cresol	U	0.00	63.3	333	UGKG	1.0					
Pyridine	U	0.00	130	333	UGKG	1.0					
Metals Analysis											
Silver		6760	343	2380	UGKG	10.	MBL	08/02/99	1719	153902	4
Aluminum		54000000	5620	23800	UGKG	10.					
Arsenic		5820	2170	2380	UGKG	10.					
Boron		38800000	12000	238000	UGKG	100	MBL	08/03/99	0805	153902	4
Barium		281000	257	2380	UGKG	10.	MBL	08/02/99	1719	153902	4
Beryllium		2630	114	2380	UGKG	10.					
Calcium		2690000	33200	47600	UGKG	10.					
Cadmium	J	695	181	2380	UGKG	10.					
Cobalt		55300	157	2380	UGKG	10.					
Chromium		311000	362	2380	UGKG	10.					
Copper		77200	638	2380	UGKG	10.					
Iron		15300000	57500	57500	UGKG	10.					
Potassium		10600000	13500	47600	UGKG	10.					
Magnesium		7610000	2410	4760	UGKG	10.					
Manganese		310000	3370	4760	UGKG	10.					
Molybdenum	J	1920	628	4760	UGKG	10.					
Sodium		109000000	306000	476000	UGKG	100	MBL	08/03/99	0805	153902	4
Nickel		4250000	300	2380	UGKG	10.	MBL	08/02/99	1719	153902	4
Lead		47500	747	2380	UGKG	10.					

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Client: Westinghouse Savannah River Co.
Building 735-16A, Rm. 5
P.O. Box 616
Aiken, South Carolina 29802
Contact: Mr. Richard Groseclose
Project Description: Hazardous Waste Contract

:: WSRC00497 Report Date: August 20, 1999

Sample ID : TCLP 2

;ameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
timony	U	-842	1810	4760	UGKG	10.					
enium	U	-367	1290	2380	UGKG	10.	MBL	08/02/99	1719	153902	4
.con		5080000	133000	476000	UGKG	100	MBL	08/03/99	0805	153902	4
		7730	3970	4760	UGKG	10.	MBL	08/02/99	1719	153902	4
ɔntium		40300	138	2380	UGKG	10.					
anium		240000	190	2380	UGKG	10.					
allium	U	-874	2100	4760	UGKG	10.					
ınium		22300000	93600	238000	UGKG	100	MBL	08/03/99	0805	153902	4
nadium		24900	252	2380	UGKG	10.	MBL	08/02/99	1719	153902	4
ıc		19900000	17600	23800	UGKG	100	MBL	08/03/99	0805	153902	4
eral Chemistry											
al Halogens - 3 items											
ɔmide	J	0.935	0.160	2.63	MGKG	1.0	RWS	07/17/99	0003	154421	5
lorides	J	0.494	0.190	1.05	MGKG	1.0					
oride	U	0.126	0.229	0.525	MGKG	1.0					
rogen, Nitrate	U	0.00	0.133	0.525	MGKG	1.0	RWS	07/17/99	0003	154418	6
aporative Loss @ 105 C	U	0.00	1.00	1.00	wt%	1.0	GJ	07/27/99	1815	154246	7
rogen, Ammonia	U	0.00	0.239	1.00	mg/kg	1.0	THL	07/27/99	1754	154283	8

following prep procedures were performed:

) Analysis		08/03/99		154228 N
latiles 8260 High Level	SM	07/26/99	2000	154327 N
/MS 5970 Extractables	JMA	07/22/99	1600	154035 N
ACE	FGD	07/26/99	1830	153902 N

;rogate Recovery	Test	Percent%	Acceptable Limits
,6-Tribromophenol	F005C	59.2	(44.5 - 126.)
luorobiphenyl	F005C	55.3	(44.7 - 110.)
luorophenol	F005C	60.5	(37.0 - 102.)
robenzene-d5	F005C	56.2	(42.4 - 107.)
:nol-d6	F005C	62.4	(41.5 - 102.)
'erphenyl-d14	F005C	79.8	(45.5 - 104.)

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Contact: Mr. Richard Groseclose
Project Description: Hazardous Waste Contract

cc: WSRC00497 Report Date: August 20, 1999

Sample ID : TCLP 2

Surrogate Recovery	Test	Percent%	Acceptable Limits
Bromofluorobenzene	F001-8260	88.8	(73.0 - 129.)
Dibromofluoromethane	F001-8260	103.	(66.0 - 117.)
Toluene-d8	F001-8260	101.	(73.0 - 122.)
Bromofluorobenzene	F002-8260	88.8	(73.0 - 129.)
Dibromofluoromethane	F002-8260	103.	(66.0 - 117.)
Toluene-d8	F002-8260	101.	(73.0 - 122.)
Bromofluorobenzene	F003A-8260	88.8	(73.0 - 129.)
Dibromofluoromethane	F003A-8260	103.	(66.0 - 117.)
Toluene-d8	F003A-8260	101.	(73.0 - 122.)
Bromofluorobenzene	F005A-8260	88.8	(73.0 - 129.)
Dibromofluoromethane	F005A-8260	103.	(66.0 - 117.)
Toluene-d8	F005A-8260	101.	(73.0 - 122.)

M = Method	Method-Description
M 1	GC/FID
M 2	EPA 8260B
M 3	EPA 8270C
M 4	EPA 6010B
M 5	EPA 9056
M 6	EPA 300.0
M 7	EPA 3550
M 8	EPA 350.1 modified

Notes:
The qualifiers in this report are defined as follows:
ND indicates that the analyte was not detected at a concentration greater than the detection limit.
J indicates presence of analyte at a concentration less than the reporting limit (RL) and greater than the detection limit (DL).
U indicates that the analyte was not detected at a concentration greater than the detection limit.
* indicates that a quality control analyte recovery is outside of specified acceptance criteria.

Data reported in mass/mass units is reported as 'dry weight'.

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Contact:	Mr. Richard Groseclose
Project Description:	Hazardous Waste Contract

:: WSRC00497 Report Date: August 20, 1999 Page 5 of 5

Sample ID : TCLP 2

= Method	Method-Description

; data report has been prepared and reviewed
:cordance with General Engineering Laboratories
dard operating procedures. Please direct
questions to your Project Manager, Stacy Griffin at 769-7376.

Stacy L. Griffin

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Contact: Mr. Richard Groseclose
Project Description: Hazardous Waste Contract

cc: WSRC00497 Report Date: August 20, 1999

Sample ID	: TCLP 3
Lab ID	: 9907679-17
Matrix	: Soil
Date Collected	: 07/14/99
Date Received	: 07/15/99
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Volatile Organics											
F003 Waste Constituents - FID - 4 items											
Ethyl Acetate	U	0.00	10.0	10.0	mg/kg	1.0	CAK	07/28/99	2139	154228	1
Ethyl Ether	U	0.00	10.0	10.0	mg/kg	1.0					
Methyl Alcohol		21.2	4.00	10.0	MGKG	1.0					
n-Butyl Alcohol	U	0.00	4.00	10.0	mg/kg	1.0					
F005 Waste Constituents - FID - 2 items											
Ethylene Glycol Monoethylether	U	0.00	20.0	20.0	mg/kg	1.0					
Isobutyl Alcohol	U	0.00	4.00	10.0	mg/kg	1.0					
F001 Waste Constituents - 7 items											
1,1,1-Trichloroethane	U	0.00	0.100	1.00	UGKG	1.0	JWF	07/27/99	0750	154327	2
Carbon Tetrachloride	U	0.00	0.500	1.00	UGKG	1.0					
Methylene Chloride		3.98	1.40	1.40	UGKG	1.0					
Tetrachloroethylene	U	0.00	0.400	1.00	UGKG	1.0					
Trichloroethylene	U	0.00	0.300	1.00	UGKG	1.0					
Trichlorofluoromethane	U	0.00	0.300	1.00	UGKG	1.0					
Trichlorotrifluoroethane	U	0.00	10.0	20.0	UGKG	1.0					
F002 Waste Constituents - 9 items											
1,1,1-Trichloroethane	U	0.00	0.100	1.00	UGKG	1.0					
1,1,2-Trichloroethane	U	0.00	0.300	1.00	UGKG	1.0					
1,2-Dichlorobenzene	U	0.00	0.500	1.00	UGKG	1.0					
Chlorobenzene	U	0.00	0.300	1.00	UGKG	1.0					
Methylene Chloride		3.98	1.40	1.40	UGKG	1.0					
Tetrachloroethylene	U	0.00	0.400	1.00	UGKG	1.0					
Trichloroethylene	U	0.00	0.300	1.00	UGKG	1.0					
Trichlorofluoromethane	U	0.00	0.300	1.00	UGKG	1.0					
Trichlorotrifluoroethane	U	0.00	10.0	20.0	UGKG	1.0					
F003 Waste Constituents - GC/MS VOA - 4 items											
4-Methyl-2-pentanone	U	0.00	3.10	5.00	UGKG	1.0					

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Contact: Mr. Richard Groseclose
Project Description: Hazardous Waste Contract

:: WSRC00497 Report Date: August 20, 1999

Sample ID : TCLP 3

rameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
etone	U	2.51	10.3	10.3	UGKG	1.0					
ıylbenzene	U	0.00	0.300	1.00	UGKG	1.0	JWF	07/27/99	0750	154327	2
lenes (TOTAL)	U	0.00	0.700	1.00	UGKG	1.0					
05 Waste Constituents - GC/MS VOA - 5 items											
3utanone	U	0.00	3.20	5.00	UGKG	1.0					
Nitropropane	U	0.00	3.30	5.00	UGKG	1.0					
nzene	U	0.00	0.500	1.00	UGKG	1.0					
rbon Disulfide	U	0.00	0.300	5.00	UGKG	1.0					
luene	U	0.00	0.900	1.00	UGKG	1.0					
ractable Organics											
04 Waste Constituents - GC/MS Ext. - 3 items											
trobenzene	U	0.00	133	333	UGKG	1.0	JPA	08/04/99	1714	154035	3
p-Cresol	U	0.00	153	333	UGKG	1.0					
Cresol	U	0.00	63.3	333	UGKG	1.0					
ridine	U	0.00	130	333	UGKG	1.0					
tals Analysis											
ver		14200	353	2450	UGKG	10.	MBL	08/02/99	1725	153902	4
uminum		62300000	5790	24500	UGKG	10.					
senic		5520	2230	2450	UGKG	10.					
ron		35000000	12400	245000	UGKG	100	MBL	08/03/99	0811	153902	4
rium		143000	265	2450	UGKG	10.	MBL	08/02/99	1725	153902	4
ryllium	J	944	118	2450	UGKG	10.					
lcium		2690000	34200	49000	UGKG	10.					
dmium	J	1300	186	2450	UGKG	10.					
balt		23700	162	2450	UGKG	10.					
romium		480000	372	2450	UGKG	10.					
pper		75700	657	2450	UGKG	10.					
n		26300000	59200	59200	UGKG	10.					
tassium		8570000	13900	49000	UGKG	10.					
agnesium		6120000	2480	4900	UGKG	10.					
anganese		390000	3470	4900	UGKG	10.					
olybdenum	J	4060	647	4900	UGKG	10.					
dium		118000000	315000	490000	UGKG	100	MBL	08/03/99	0811	153902	4
ickel		6460000	309	2450	UGKG	10.	MBL	08/02/99	1725	153902	4
ead		87600	769	2450	UGKG	10.					

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Contact: Mr. Richard Groseclose
Project Description: Hazardous Waste Contract

cc: WSRC00497 Report Date: August 20, 1999

Sample ID : TCLP 3

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Antimony	U	-1940	1870	4900	UGKG	10.					
Selenium	U	360	1320	2450	UGKG	10.	MBL	08/02/99	1725	153902	4
Silicon		3170000	137000	490000	UGKG	100	MBL	08/03/99	0811	153902	4
Tin		13500	4080	4900	UGKG	10.	MBL	08/02/99	1725	153902	4
Strontium		34600	142	2450	UGKG	10.					
Titanium		383000	196	2450	UGKG	10.					
Thallium	U	-3190	2160	4900	UGKG	10.					
Uranium		46700000	96300	245000	UGKG	100	MBL	08/03/99	0811	153902	4
Vanadium		43500	260	2450	UGKG	10.	MBL	08/02/99	1725	153902	4
Zinc		20200000	18100	24500	UGKG	100	MBL	08/03/99	0811	153902	4
General Chemistry											
Total Halogens - 3 items											
Bromide	U	0.00	0.141	2.50	MGKG	1.0	RWS	07/17/99	0113	154421	5
Chlorides	U	0.00	0.168	1.00	MGKG	1.0					
Fluoride	U	0.00	0.203	0.500	MGKG	1.0					
Nitrogen, Nitrate	U	0.00	0.118	0.500	MGKG	1.0	RWS	07/17/99	0113	154418	6
Evaporative Loss @ 105 C	U	0.00	1.00	1.00	wt%	1.0	GJ	07/27/99	1815	154246	7
Nitrogen, Ammonia	U	0.00	0.241	1.00	mg/kg	1.0	THL	07/27/99	1754	154283	8

The following prep procedures were performed:

FID Analysis		08/03/99		154228 N
Volatiles 8260 High Level	SM	07/26/99	2000	154327 N
GC/MS 5970 Extractables	JMA	07/22/99	1600	154035 N
TRACE	FGD	07/26/99	1830	153902 N

Surrogate Recovery	Test	Percent%	Acceptable Limits
2,4,6-Tribromophenol	F005C	67.0	(44.5 - 126.)
2-Fluorobiphenyl	F005C	59.7	(44.7 - 110.)
2-Fluorophenol	F005C	66.3	(37.0 - 102.)
Nitrobenzene-d5	F005C	58.6	(42.4 - 107.)
Phenol-d6	F005C	68.5	(41.5 - 102.)
p-Terphenyl-d14	F005C	82.9	(45.5 - 104.)

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Contact: Mr. Richard Groseclose
Project Description: Hazardous Waste Contract

:c: WSRC00497 Report Date: August 20, 1999

Sample ID : TCLP 3

ırrogate Recovery	Test	Percent%	Acceptable Limits
romofluorobenzene	F001-8260	88.8	(73.0 - 129.)
ibromofluoromethane	F001-8260	105.	(66.0 - 117.)
oluene-d8	F001-8260	101.	(73.0 - 122.)
romofluorobenzene	F002-8260	88.8	(73.0 - 129.)
ibromofluoromethane	F002-8260	105.	(66.0 - 117.)
oluene-d8	F002-8260	101.	(73.0 - 122.)
romofluorobenzene	F003A-8260	88.8	(73.0 - 129.)
bromofluoromethane	F003A-8260	105.	(66.0 - 117.)
oluene-d8	F003A-8260	101.	(73.0 - 122.)
romofluorobenzene	F005A-8260	88.8	(73.0 - 129.)
ibromofluoromethane	F005A-8260	105.	(66.0 - 117.)
oluene-d8	F005A-8260	101.	(73.0 - 122.)

[= Method	Method-Description
[1	GC/FID
[2	EPA 8260B
[3	EPA 8270C
[4	EPA 6010B
[5	EPA 9056
[6	EPA 300.0
[7	EPA 3550
[8	EPA 350.1 modified

tes:
e qualifiers in this report are defined as follows:
) indicates that the analyte was not detected at a concentration greater than the detection limit.
ndicates presence of analyte at a concentration less than the reporting limit (RL) and greater than the detection limit (DL).
indicates that the analyte was not detected at a concentration greater than the detection limit.
ndicates that a quality control analyte recovery is outside of specified acceptance criteria.

ta reported in mass/mass units is reported as 'dry weight'.

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Contact:	Mr. Richard Groseclose
Project Description:	Hazardous Waste Contract

cc: WSRC00497 Report Date: August 20, 1999

Sample ID : TCLP 3

M = Method	Method-Description

This data report has been prepared and reviewed in accordance with General Engineering Laboratories standard operating procedures. Please direct any questions to your Project Manager, Stacy Griffin at 769-7376.

Reviewed By

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Contact: Mr. Richard Groseclose
Project Description: Hazardous Waste Contract

:: WSRC00497 Report Date: August 20, 1999

Sample ID	: TCLP 4
Lab ID	: 9907679-19
Matrix	: Soil
Date Collected	: 07/14/99
Date Received	: 07/15/99
Priority	: Routine
Collector	: Client

rameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
atile Organics											
)03 Waste Constituents - FID - 4 items											
hyl Acetate	U	0.00	10.0	10.0	mg/kg	1.0	CAK	07/28/99	2205	154228	1
hyl Ether	U	0.00	10.0	10.0	mg/kg	1.0					
ethyl Alcohol	U	0.00900	4.00	10.0	MGKG	1.0					
Butyl Alcohol	U	0.00	4.00	10.0	mg/kg	1.0					
)05 Waste Constituents - FID - 2 items											
hylene Glycol Monoethylether	U	0.00	20.0	20.0	mg/kg	1.0					
)butyl Alcohol	U	0.00	4.00	10.0	mg/kg	1.0					
)01 Waste Constituents - 7 items											
1,1-Trichloroethane	U	0.00	0.0958	1.00	UGKG	1.0	JWF	07/27/99	0821	154327	2
ırbon Tetrachloride	U	0.00	0.479	1.00	UGKG	1.0					
ethylene Chloride		3.63	1.34	1.34	UGKG	1.0					
:trachloroethylene	U	0.00	0.383	1.00	UGKG	1.0					
ichloroethylene	U	0.00	0.287	1.00	UGKG	1.0					
ichlorofluoromethane	U	0.00	0.287	1.00	UGKG	1.0					
ichlorotrifluoroethane	U	0.00	9.58	20.0	UGKG	1.0					
)02 Waste Constituents - 9 items											
1,1-Trichloroethane	U	0.00	0.0958	1.00	UGKG	1.0					
1,2-Trichloroethane	U	0.00	0.287	1.00	UGKG	1.0					
2-Dichlorobenzene	U	0.00	0.479	1.00	UGKG	1.0					
ılorobenzene	U	0.00	0.287	1.00	UGKG	1.0					
ethylene Chloride		3.63	1.34	1.34	UGKG	1.0					
:trachloroethylene	U	0.00	0.383	1.00	UGKG	1.0					
ichloroethylene	U	0.00	0.287	1.00	UGKG	1.0					
ichlorofluoromethane	U	0.00	0.287	1.00	UGKG	1.0					
ichlorotrifluoroethane	U	0.00	9.58	20.0	UGKG	1.0					
)03 Waste Constituents - GC/MS VOA - 4 items											
Methyl-2-pentanone	U	0.00	2.97	5.00	UGKG	1.0					

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Contact: Mr. Richard Groseclose
Project Description: Hazardous Waste Contract

cc: WSRC00497 Report Date: August 20, 1999

Sample ID : TCLP 4

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Acetone	U	2.17	9.87	9.87	UGKG	1.0					
Ethylbenzene	U	0.00	0.287	1.00	UGKG	1.0	JWF	07/27/99	0821	154327	2
Xylenes (TOTAL)	U	0.00	0.671	1.00	UGKG	1.0					
F005 Waste Constituents - GC/MS VOA - 5 items											
2-Butanone	U	0.00	3.07	5.00	UGKG	1.0					
2-Nitropropane	U	0.00	3.16	4.79	UGKG	1.0					
Benzene	U	0.00	0.479	1.00	UGKG	1.0					
Carbon Disulfide	U	0.00	0.287	5.00	UGKG	1.0					
Toluene	U	0.00	0.862	1.00	UGKG	1.0					
Extractable Organics											
F004 Waste Constituents - GC/MS Ext. - 3 items											
Nitrobenzene	U	0.00	133	333	UGKG	1.0	JPA	08/04/99	1743	154035	3
m,p-Cresol	U	0.00	153	333	UGKG	1.0					
o-Cresol	U	0.00	63.3	333	UGKG	1.0					
Pyridine	U	0.00	130	333	UGKG	1.0					
Metals Analysis											
Silver		10300	360	2500	UGKG	10.	MBL	08/02/99	1731	153902	4
Aluminum		65100000	5910	25000	UGKG	10.					
Arsenic		3600	2280	2500	UGKG	10.					
Boron		32400000	12700	250000	UGKG	100	MBL	08/03/99	0817	153902	4
Barium		135000	270	2500	UGKG	10.	MBL	08/02/99	1731	153902	4
Beryllium	J	889	120	2500	UGKG	10.					
Calcium		3060000	34900	50000	UGKG	10.					
Cadmium	J	785	190	2500	UGKG	10.					
Cobalt		11000	165	2500	UGKG	10.					
Chromium		202000	380	2500	UGKG	10.					
Copper		46400	670	2500	UGKG	10.					
Iron		27400000	60400	60400	UGKG	10.					
Potassium		11800000	14200	50000	UGKG	10.					
Magnesium		5350000	2540	5000	UGKG	10.					
Manganese		457000	3550	5000	UGKG	10.					
Molybdenum	J	3730	660	5000	UGKG	10.					
Sodium		109000000	321000	500000	UGKG	100	MBL	08/03/99	0817	153902	4
Nickel		4470000	315	2500	UGKG	10.	MBL	08/02/99	1731	153902	4
Lead		72200	785	2500	UGKG	10.					

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Client: Westinghouse Savannah River Co.
Building 735-16A, Rm. 5
P.O. Box 616
Aiken, South Carolina 29802
Contact: Mr. Richard Groseclose
Project Description: Hazardous Waste Contract

:: WSRC00497 Report Date: August 20, 1999

Sample ID : TCLP 4

rameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
timony	U	-1850	1910	5000	UGKG	10.					
enium	U	-268	1350	2500	UGKG	10.	MBL	08/02/99	1731	153902	4
icon		1220000	140000	500000	UGKG	100	MBL	08/03/99	0817	153902	4
ı		20200	4170	5000	UGKG	10.	MBL	08/02/99	1731	153902	4
ontium		30500	145	2500	UGKG	10.					
anium		311000	200	2500	UGKG	10.					
allium	U	-957	2210	5000	UGKG	10.					
anium		34400000	98300	250000	UGKG	100	MBL	08/03/99	0817	153902	4
nadium		35200	265	2500	UGKG	10.	MBL	08/02/99	1731	153902	4
ıc		28500000	37000	50000	UGKG	200	MBL	08/03/99	1039	153902	4
ıeral Chemistry											
tal Halogens - 3 items											
ɔmide	U	0.00	0.150	2.50	MGKG	1.0	RWS	07/17/99	0127	154421	5
lorides	U	0.00	0.179	1.00	MGKG	1.0					
ıoride	U	0.0692	0.215	0.500	MGKG	1.0					
trogen, Nitrate	U	0.00	0.125	0.500	MGKG	1.0	RWS	07/17/99	0127	154418	6
aporative Loss @ 105 C	U	0.00	1.00	1.00	wt%	1.0	GJ	07/27/99	1815	154246	7
trogen, Ammonia	U	0.00	0.239	1.00	mg/kg	1.0	THL	07/27/99	1754	154283	8

following prep procedures were performed:

D Analysis		08/03/99		154228 N
ılatiles 8260 High Level	SM	07/26/99	2000	154327 N
C/MS 5970 Extractables	JMA	07/22/99	1600	154035 N
CACE	FGD	07/26/99	1830	153902 N

rrogate Recovery	Test	Percent%	Acceptable Limits
,6-Tribromophenol	F005C	64.5	(44.5 - 126.)
Fluorobiphenyl	F005C	59.4	(44.7 - 110.)
Fluorophenol	F005C	65.0	(37.0 - 102.)
trobenzene-d5	F005C	59.9	(42.4 - 107.)
enol-d6	F005C	67.0	(41.5 - 102.)
Terphenyl-d14	F005C	77.8	(45.5 - 104.)

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Contact: Mr. Richard Groseclose
Project Description: Hazardous Waste Contract

cc: WSRC00497 Report Date: August 20, 1999

Sample ID : TCLP 4

Surrogate Recovery	Test	Percent%	Acceptable Limits
Bromofluorobenzene	F001-8260	88.5	(73.0 - 129.)
Dibromofluoromethane	F001-8260	106.	(66.0 - 117.)
Toluene-d8	F001-8260	99.6	(73.0 - 122.)
Bromofluorobenzene	F002-8260	88.5	(73.0 - 129.)
Dibromofluoromethane	F002-8260	106.	(66.0 - 117.)
Toluene-d8	F002-8260	99.6	(73.0 - 122.)
Bromofluorobenzene	F003A-8260	88.5	(73.0 - 129.)
Dibromofluoromethane	F003A-8260	106.	(66.0 - 117.)
Toluene-d8	F003A-8260	99.6	(73.0 - 122.)
Bromofluorobenzene	F005A-8260	88.5	(73.0 - 129.)
Dibromofluoromethane	F005A-8260	106.	(66.0 - 117.)
Toluene-d8	F005A-8260	99.6	(73.0 - 122.)

M = Method	Method-Description
M 1	GC/FID
M 2	EPA 8260B
M 3	EPA 8270C
M 4	EPA 6010B
M 5	EPA 9056
M 6	EPA 300.0
M 7	EPA 3550
M 8	EPA 350.1 modified

Notes:
The qualifiers in this report are defined as follows:
ND indicates that the analyte was not detected at a concentration greater than the detection limit.
J indicates presence of analyte at a concentration less than the reporting limit (RL) and greater than the detection limit (DL).
U indicates that the analyte was not detected at a concentration greater than the detection limit.
* indicates that a quality control analyte recovery is outside of specified acceptance criteria.

Data reported in mass/mass units is reported as 'dry weight'.

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Contact:	Mr. Richard Groseclose
Project Description:	Hazardous Waste Contract

c: WSRC00497 Report Date: August 20, 1999 Page 5 of 5

Sample ID : TCLP 4

= Method **Method-Description**

s data report has been prepared and reviewed
ccordance with General Engineering Laboratories
ıdard operating procedures. Please direct
questions to your Project Manager, Stacy Griffin at 769-7376.

Stacy L. Griffin

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Contact: Mr. Richard Groseclose
Project Description: Hazardous Waste Contract

cc: WSRC00497 Report Date: August 20, 1999

Sample ID	: TCLP 5
Lab ID	: 9907679-21
Matrix	: Soil
Date Collected	: 07/14/99
Date Received	: 07/15/99
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Volatile Organics											
F003 Waste Constituents - FID - 4 items											
Ethyl Acetate	U	0.00	10.0	10.0	mg/kg	1.0	CAK	07/29/99	1019	154228	1
Ethyl Ether	U	0.00	10.0	10.0	mg/kg	1.0					
Methyl Alcohol	U	0.00880	4.00	10.0	MGKG	1.0	CAK	07/28/99	2257	154228	1
n-Butyl Alcohol	U	0.00	4.00	10.0	mg/kg	1.0					
F005 Waste Constituents - FID - 2 items											
Ethylene Glycol Monoethylether	U	0.00	20.0	20.0	mg/kg	1.0					
Isobutyl Alcohol	U	0.00	4.00	10.0	mg/kg	1.0					
F001 Waste Constituents - 7 items											
1,1,1-Trichloroethane	U	0.00	0.0992	1.00	UGKG	1.0	SDM	07/26/99	2020	154327	2
Carbon Tetrachloride	U	0.00	0.496	1.00	UGKG	1.0					
Methylene Chloride		2.22	1.39	1.39	UGKG	1.0					
Tetrachloroethylene	U	0.00	0.397	1.00	UGKG	1.0					
Trichloroethylene	U	0.00	0.298	1.00	UGKG	1.0					
Trichlorofluoromethane	U	0.00	0.298	1.00	UGKG	1.0					
Trichlorotrifluoroethane	U	0.00	9.92	20.0	UGKG	1.0					
F002 Waste Constituents - 9 items											
1,1,1-Trichloroethane	U	0.00	0.0992	1.00	UGKG	1.0					
1,1,2-Trichloroethane	U	0.00	0.298	1.00	UGKG	1.0					
1,2-Dichlorobenzene	U	0.00	0.496	1.00	UGKG	1.0					
Chlorobenzene	U	0.00	0.298	1.00	UGKG	1.0					
Methylene Chloride		2.22	1.39	1.39	UGKG	1.0					
Tetrachloroethylene	U	0.00	0.397	1.00	UGKG	1.0					
Trichloroethylene	U	0.00	0.298	1.00	UGKG	1.0					
Trichlorofluoromethane	U	0.00	0.298	1.00	UGKG	1.0					
Trichlorotrifluoroethane	U	0.00	9.92	20.0	UGKG	1.0					
F003 Waste Constituents - GC/MS VOA - 4 items											
4-Methyl-2-pentanone	U	0.00	3.08	5.00	UGKG	1.0					

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Contact: Mr. Richard Groseclose
Project Description: Hazardous Waste Contract

:: WSRC00497 Report Date: August 20, 1999

Sample ID : TCLP 5

rameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
etone	U	2.32	10.2	10.2	UGKG	1.0					
ıylbenzene	U	0.00	0.298	1.00	UGKG	1.0	SDM	07/26/99	2020	154327	2
lenes (TOTAL)	U	0.00	0.694	1.00	UGKG	1.0					
05 Waste Constituents - GC/MS VOA - 5 items											
3utanone	U	0.00	3.17	5.00	UGKG	1.0					
Nitropropane	U	0.00	3.27	4.96	UGKG	1.0					
nzene	U	0.00	0.496	1.00	UGKG	1.0					
rbon Disulfide	U	0.00	0.298	5.00	UGKG	1.0					
luene	U	0.00	0.893	1.00	UGKG	1.0					
ractable Organics											
04 Waste Constituents - GC/MS Ext. - 3 items											
trobenzene	U	0.00	133	333	UGKG	1.0	JPA	08/04/99	1813	154035	3
p-Cresol	U	0.00	153	333	UGKG	1.0					
Cresol	U	0.00	63.3	333	UGKG	1.0					
ridine	U	0.00	130	333	UGKG	1.0					
tals Analysis											
ver		7980	336	2340	UGKG	10.	MBL	08/02/99	1737	153902	4
uminum		64400000	5520	23400	UGKG	10.					
senic		2720	2120	2340	UGKG	10.					
ron		33000000	11800	234000	UGKG	100	MBL	08/03/99	0824	153902	4
rium		136000	252	2340	UGKG	10.	MBL	08/02/99	1737	153902	4
ryllium	J	915	112	2340	UGKG	10.					
lcium		3620000	32600	46700	UGKG	10.					
dmium	J	380	177	2340	UGKG	10.					
balt		9020	154	2340	UGKG	10.					
romium		189000	355	2340	UGKG	10.					
pper		40400	626	2340	UGKG	10.					
n		27500000	56400	56400	UGKG	10.					
tassium		13400000	13200	46700	UGKG	10.					
agnesium		5240000	2370	4670	UGKG	10.					
anganese		500000	3310	4670	UGKG	10.					
olybdenum	J	3160	616	4670	UGKG	10.					
dium		112000000	300000	467000	UGKG	100	MBL	08/03/99	0824	153902	4
ckel		3970000	294	2340	UGKG	10.	MBL	08/02/99	1737	153902	4
ad		68100	733	2340	UGKG	10.					

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Contact: Mr. Richard Groseclose
Project Description: Hazardous Waste Contract

cc: WSRC00497 Report Date: August 20, 1999

Sample ID : TCLP 5

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Antimony	U	-985	1780	4670	UGKG	10.					
Selenium	U	1100	1260	2340	UGKG	10.	MBL	08/02/99	1737	153902	4
Silicon		5540000	131000	467000	UGKG	100	MBL	08/03/99	0824	153902	4
Tin		23400	3890	4670	UGKG	10.	MBL	08/02/99	1737	153902	4
Strontium		29500	135	2340	UGKG	10.					
Titanium		317000	187	2340	UGKG	10.					
Thallium	U	-941	2060	4670	UGKG	10.					
Uranium		27300000	91800	234000	UGKG	100	MBL	08/03/99	0824	153902	4
Vanadium		29700	248	2340	UGKG	10.	MBL	08/02/99	1737	153902	4
Zinc		19700000	17300	23400	UGKG	100	MBL	08/03/99	0824	153902	4
General Chemistry											
Total Halogens - 3 items											
Bromide	U	0.00	0.166	2.73	MGKG	1.0	RWS	07/17/99	0140	154421	5
Chlorides	U	0.196	0.197	1.09	MGKG	1.0					
Fluoride	U	0.00	0.238	0.545	MGKG	1.0					
Nitrogen, Nitrate	U	0.00	0.138	0.545	MGKG	1.0	RWS	07/17/99	0140	154418	6
Evaporative Loss @ 105 C	U	0.00	1.00	1.00	wt%	1.0	GJ	07/27/99	1815	154246	7
Nitrogen, Ammonia	U	0.00	0.240	1.00	mg/kg	1.0	THL	07/27/99	1754	154283	8

The following prep procedures were performed:

FID Analysis		08/03/99		154228	N
Volatiles 8260 High Level	SM	07/26/99	2000	154327	N
GC/MS 5970 Extractables	JMA	07/22/99	1600	154035	N
TRACE	FGD	07/26/99	1830	153902	N

Surrogate Recovery	Test	Percent%	Acceptable Limits
2,4,6-Tribromophenol	F005C	60.2	(44.5 - 126.)
2-Fluorobiphenyl	F005C	55.2	(44.7 - 110.)
2-Fluorophenol	F005C	61.4	(37.0 - 102.)
Nitrobenzene-d5	F005C	56.3	(42.4 - 107.)
Phenol-d6	F005C	62.5	(41.5 - 102.)
p-Terphenyl-d14	F005C	77.3	(45.5 - 104.)

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Contact: Mr. Richard Groseclose
Project Description: Hazardous Waste Contract

:: WSRC00497 Report Date: August 20, 1999

Sample ID : TCLP 5

rrogate Recovery	Test	Percent%	Acceptable Limits
omofluorobenzene	F001-8260	89.9	(73.0 - 129.)
bromofluoromethane	F001-8260	103.	(66.0 - 117.)
luene-d8	F001-8260	101.	(73.0 - 122.)
omofluorobenzene	F002-8260	89.9	(73.0 - 129.)
bromofluoromethane	F002-8260	103.	(66.0 - 117.)
luene-d8	F002-8260	101.	(73.0 - 122.)
omofluorobenzene	F003A-8260	89.9	(73.0 - 129.)
bromofluoromethane	F003A-8260	103.	(66.0 - 117.)
luene-d8	F003A-8260	101.	(73.0 - 122.)
omofluorobenzene	F005A-8260	89.9	(73.0 - 129.)
bromofluoromethane	F005A-8260	103.	(66.0 - 117.)
luene-d8	F005A-8260	101.	(73.0 - 122.)

= Method	Method-Description
1	GC/FID
2	EPA 8260B
3	EPA 8270C
4	EPA 6010B
5	EPA 9056
6	EPA 300.0
7	EPA 3550
8	EPA 350.1 modified

es:
qualifiers in this report are defined as follows:
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dicates presence of analyte at a concentration less than the reporting limit (RL) and greater than the detection limit (DL).
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	Aiken, South Carolina 29802
Contact:	Mr. Richard Groseclose
Project Description:	Hazardous Waste Contract

cc: WSRC00497 Report Date: August 20, 1999

Sample ID : TCLP 5

M = Method	Method-Description

This data report has been prepared and reviewed in accordance with General Engineering Laboratories standard operating procedures. Please direct any questions to your Project Manager, Stacy Griffin at 769-7376.

Reviewed By

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P.O. Box 616
Aiken, South Carolina 29802
Contact: Mr. Richard Groseclose
Project Description: Hazardous Waste Contract

e: WSRC00497 Report Date: August 20, 1999

Sample ID	: TCLP 6
Lab ID	: 9907679-23
Matrix	: Soil
Date Collected	: 07/14/99
Date Received	: 07/15/99
Priority	: Routine
Collector	: Client

rameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
latile Organics											
)03 Waste Constituents - FID - 4 items											
hyl Acetate	U	0.00	10.0	10.0	mg/kg	1.0	CAK	07/29/99	1046	154228	1
hyl Ether	U	0.00	10.0	10.0	mg/kg	1.0					
ethyl Alcohol	U	0.0187	4.00	10.0	MGKG	1.0	CAK	07/28/99	2323	154228	1
Butyl Alcohol	U	0.00	4.00	10.0	mg/kg	1.0					
)05 Waste Constituents - FID - 2 items											
hylene Glycol Monoethylether	U	0.00	20.0	20.0	mg/kg	1.0					
obutyl Alcohol	U	0.00	4.00	10.0	mg/kg	1.0					
)01 Waste Constituents - 7 items											
1,1-Trichloroethane	U	0.00	0.0996	1.00	UGKG	1.0	SDM	07/26/99	2052	154327	2
arbon Tetrachloride	U	0.00	0.498	1.00	UGKG	1.0					
ethylene Chloride		2.36	1.39	1.39	UGKG	1.0					
etrachloroethylene	U	0.00	0.398	1.00	UGKG	1.0					
ichloroethylene	U	0.00	0.299	1.00	UGKG	1.0					
ichlorofluoromethane	U	0.00	0.299	1.00	UGKG	1.0					
richlorotrifluoroethane	U	0.00	9.96	20.0	UGKG	1.0					
)02 Waste Constituents - 9 items											
1,1-Trichloroethane	U	0.00	0.0996	1.00	UGKG	1.0					
1,2-Trichloroethane	U	0.00	0.299	1.00	UGKG	1.0					
2-Dichlorobenzene	U	0.00	0.498	1.00	UGKG	1.0					
hlorobenzene	U	0.00	0.299	1.00	UGKG	1.0					
lethylene Chloride		2.36	1.39	1.39	UGKG	1.0					
etrachloroethylene	U	0.00	0.398	1.00	UGKG	1.0					
richloroethylene	U	0.00	0.299	1.00	UGKG	1.0					
richlorofluoromethane	U	0.00	0.299	1.00	UGKG	1.0					
richlorotrifluoroethane	U	0.00	9.96	20.0	UGKG	1.0					
)03 Waste Constituents - GC/MS VOA - 4 items											
-Methyl-2-pentanone	U	0.00	3.09	5.00	UGKG	1.0					

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Contact: Mr. Richard Groseclose
Project Description: Hazardous Waste Contract

cc: WSRC00497 Report Date: August 20, 1999

Sample ID : TCLP 6

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Acetone	U	2.03	10.3	10.3	UGKG	1.0					
Ethylbenzene	U	0.00	0.299	1.00	UGKG	1.0	SDM	07/26/99	2052	154327	2
Xylenes (TOTAL)	U	0.00	0.697	1.00	UGKG	1.0					
F005 Waste Constituents - GC/MS VOA - 5 items											
2-Butanone	U	0.00	3.19	5.00	UGKG	1.0					
2-Nitropropane	U	0.00	3.29	4.98	UGKG	1.0					
Benzene	U	0.00	0.498	1.00	UGKG	1.0					
Carbon Disulfide	U	0.00	0.299	5.00	UGKG	1.0					
Toluene	U	0.00	0.896	1.00	UGKG	1.0					
Extractable Organics											
F004 Waste Constituents - GC/MS Ext. - 3 items											
Nitrobenzene	U	0.00	133	333	UGKG	1.0	JPA	08/04/99	1842	154035	3
m,p-Cresol	U	0.00	153	333	UGKG	1.0					
o-Cresol	U	0.00	63.3	333	UGKG	1.0					
Pyridine	U	0.00	130	333	UGKG	1.0					
Metals Analysis											
Silver		7570	349	2430	UGKG	10.	MBL	08/02/99	1744	153902	4
Aluminum		66200000	5730	24300	UGKG	10.					
Arsenic	U	1920	2210	2430	UGKG	10.					
Boron		38100000	12300	243000	UGKG	100	MBL	08/03/99	0830	153902	4
Barium		130000	262	2430	UGKG	10.	MBL	08/02/99	1744	153902	4
Beryllium	J	912	116	2430	UGKG	10.					
Calcium		2500000	33800	48500	UGKG	10.					
Cadmium	J	574	184	2430	UGKG	10.					
Cobalt		9720	160	2430	UGKG	10.					
Chromium		202000	369	2430	UGKG	10.					
Copper		39700	650	2430	UGKG	10.					
Iron		19500000	58600	58600	UGKG	10.					
Potassium		13100000	13700	48500	UGKG	10.					
Magnesium		5040000	2460	4850	UGKG	10.					
Manganese		391000	3440	4850	UGKG	10.					
Molybdenum	J	3300	640	4850	UGKG	10.					
Sodium		111000000	311000	485000	UGKG	100	MBL	08/03/99	0830	153902	4
Nickel		6000000	306	2430	UGKG	10.	MBL	08/02/99	1744	153902	4
Lead		67700	761	2430	UGKG	10.					

GENERAL ENGINEERING LABORATORIES

Meeting today's needs with a vision for tomorrow.

Client: Westinghouse Savannah River Co.
Building 735-16A, Rm. 5
P.O. Box 616
Aiken, South Carolina 29802
Contact: Mr. Richard Groseclose
Project Description: Hazardous Waste Contract

:: WSRC00497 Report Date: August 20, 1999

Sample ID : TCLP 6

rameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
timony	U	-1280	1850	4850	UGKG	10.					
lenium	U	-323	1310	2430	UGKG	10.	MBL	08/02/99	1744	153902	4
icon		3930000	136000	485000	UGKG	100	MBL	08/03/99	0830	153902	4
ı		23700	4040	4850	UGKG	10.	MBL	08/02/99	1744	153902	4
ontium		23900	141	2430	UGKG	10.					
anium		317000	194	2430	UGKG	10.					
allium	U	-1570	2140	4850	UGKG	10.					
anium		26100000	95400	243000	UGKG	100	MBL	08/03/99	0830	153902	4
ınadium		27900	257	2430	UGKG	10.	MBL	08/02/99	1744	153902	4
ıc		21300000	17900	24300	UGKG	100	MBL	08/03/99	0830	153902	4
ıeral Chemistry											
tal Halogens - 3 items											
omide	U	0.00	0.161	2.65	MGKG	1.0	RWS	07/17/99	0154	154421	5
ılorides	U	0.0954	0.192	1.06	MGKG	1.0					
ıoride	U	0.00	0.231	0.530	MGKG	1.0					
trogen, Nitrate	U	0.00	0.135	0.530	MGKG	1.0	RWS	07/17/99	0154	154418	6
aporative Loss @ 105 C	U	0.00	1.00	1.00	wt%	1.0	GJ	07/27/99	1815	154246	7
trogen, Ammonia	U	0.00	0.240	1.00	mg/kg	1.0	THL	07/27/99	1754	154283	8

e following prep procedures were performed:

D Analysis		08/03/99	154228 N
olatiles 8260 High Level	SM	07/26/99 2000	154327 N
C/MS 5970 Extractables	JMA	07/22/99 1600	154035 N
RACE	FGD	07/26/99 1830	153902 N

ırrogate Recovery	Test	Percent%	Acceptable Limits
4,6-Tribromophenol	F005C	57.5	(44.5 - 126.)
Fluorobiphenyl	F005C	54.1	(44.7 - 110.)
Fluorophenol	F005C	58.3	(37.0 - 102.)
itrobenzene-d5	F005C	52.8	(42.4 - 107.)
ıenol-d6	F005C	59.8	(41.5 - 102.)
Terphenyl-d14	F005C	78.1	(45.5 - 104.)

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Project Description: Hazardous Waste Contract

cc: WSRC00497 Report Date: August 20, 1999

Sample ID : TCLP 6

Surrogate Recovery	Test	Percent%	Acceptable Limits
Bromofluorobenzene	F001-8260	89.1	(73.0 - 129.)
Dibromofluoromethane	F001-8260	103.	(66.0 - 117.)
Toluene-d8	F001-8260	101.	(73.0 - 122.)
Bromofluorobenzene	F002-8260	89.1	(73.0 - 129.)
Dibromofluoromethane	F002-8260	103.	(66.0 - 117.)
Toluene-d8	F002-8260	101.	(73.0 - 122.)
Bromofluorobenzene	F003A-8260	89.1	(73.0 - 129.)
Dibromofluoromethane	F003A-8260	103.	(66.0 - 117.)
Toluene-d8	F003A-8260	101.	(73.0 - 122.)
Bromofluorobenzene	F005A-8260	89.1	(73.0 - 129.)
Dibromofluoromethane	F005A-8260	103.	(66.0 - 117.)
Toluene-d8	F005A-8260	101.	(73.0 - 122.)

M = Method	Method-Description
M 1	GC/FID
M 2	EPA 8260B
M 3	EPA 8270C
M 4	EPA 6010B
M 5	EPA 9056
M 6	EPA 300.0
M 7	EPA 3550
M 8	EPA 350.1 modified

Notes:
The qualifiers in this report are defined as follows:
ND indicates that the analyte was not detected at a concentration greater than the detection limit.
J indicates presence of analyte at a concentration less than the reporting limit (RL) and greater than the detection limit (DL).
U indicates that the analyte was not detected at a concentration greater than the detection limit.
* indicates that a quality control analyte recovery is outside of specified acceptance criteria.

Data reported in mass/mass units is reported as 'dry weight'.

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: WSRC00497 Report Date: August 20, 1999

Sample ID : TCLP 6

= Method	Method-Description

data report has been prepared and reviewed
:cordance with General Engineering Laboratories
dard operating procedures. Please direct
questions to your Project Manager, Stacy Griffin at 769-7376.

Stacy L. Griffin
iewed By

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Project Description: Hazardous Waste Contract

cc: WSRC00497 Report Date: August 20, 1999

Sample ID	: TCLP 7
Lab ID	: 9907679-25
Matrix	: Soil
Date Collected	: 07/14/99
Date Received	: 07/15/99
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Volatile Organics											
F003 Waste Constituents - FID - 4 items											
Ethyl Acetate	U	0.00	10.0	10.0	mg/kg	1.0	CAK	07/29/99	1112	154228	1
Ethyl Ether	U	0.00	10.0	10.0	mg/kg	1.0					
Methyl Alcohol	U	0.0164	4.00	10.0	MGKG	1.0	CAK	07/28/99	2349	154228	1
n-Butyl Alcohol	U	0.00	4.00	10.0	mg/kg	1.0					
F005 Waste Constituents - FID - 2 items											
Ethylene Glycol Monoethylether	U	1.60	20.0	20.0	mg/kg	1.0					
Isobutyl Alcohol	U	0.00	4.00	10.0	mg/kg	1.0					
F001 Waste Constituents - 7 items											
1,1,1-Trichloroethane	U	0.00	0.100	1.00	UGKG	1.0	SDM	07/26/99	2125	154327	2
Carbon Tetrachloride	U	0.00	0.500	1.00	UGKG	1.0					
Methylene Chloride		2.44	1.40	1.40	UGKG	1.0					
Tetrachloroethylene	U	0.00	0.400	1.00	UGKG	1.0					
Trichloroethylene	U	0.00	0.300	1.00	UGKG	1.0					
Trichlorofluoromethane	U	0.00	0.300	1.00	UGKG	1.0					
Trichlorotrifluoroethane	U	0.00	10.0	20.0	UGKG	1.0					
F002 Waste Constituents - 9 items											
1,1,1-Trichloroethane	U	0.00	0.100	1.00	UGKG	1.0					
1,1,2-Trichloroethane	U	0.00	0.300	1.00	UGKG	1.0					
1,2-Dichlorobenzene	U	0.00	0.500	1.00	UGKG	1.0					
Chlorobenzene	U	0.00	0.300	1.00	UGKG	1.0					
Methylene Chloride		2.44	1.40	1.40	UGKG	1.0					
Tetrachloroethylene	U	0.00	0.400	1.00	UGKG	1.0					
Trichloroethylene	U	0.00	0.300	1.00	UGKG	1.0					
Trichlorofluoromethane	U	0.00	0.300	1.00	UGKG	1.0					
Trichlorotrifluoroethane	U	0.00	10.0	20.0	UGKG	1.0					
F003 Waste Constituents - GC/MS VOA - 4 items											
4-Methyl-2-pentanone	U	0.00	3.10	5.00	UGKG	1.0					

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Project Description: Hazardous Waste Contract

c: WSRC00497 Report Date: August 20, 1999

Sample ID : TCLP 7

rameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
etone	U	2.08	10.3	10.3	UGKG	1.0					
hylbenzene	U	0.00	0.300	1.00	UGKG	1.0	SDM	07/26/99	2125	154327	2
lenes (TOTAL)	U	0.00	0.700	1.00	UGKG	1.0					
)05 Waste Constituents - GC/MS VOA - 5 items											
Butanone	U	0.00	3.20	5.00	UGKG	1.0					
Nitropropane	U	0.00	3.30	5.00	UGKG	1.0					
nzene	U	0.00	0.500	1.00	UGKG	1.0					
rbon Disulfide	U	0.00	0.300	5.00	UGKG	1.0					
luene	U	0.00	0.900	1.00	UGKG	1.0					
ractable Organics											
)04 Waste Constituents - GC/MS Ext. - 3 items											
trobenzene	U	0.00	133	333	UGKG	1.0	JPA	08/04/99	1912	154035	3
p-Cresol	U	0.00	153	333	UGKG	1.0					
Cresol	U	0.00	63.3	333	UGKG	1.0					
ridine	U	0.00	130	333	UGKG	1.0					
tals Analysis											
lver		6130	353	2450	UGKG	10.	MBL	08/02/99	1750	153902	4
luminum		69800000	5790	24500	UGKG	10.					
rsenic	U	881	2230	2450	UGKG	10.					
ron		38800000	12400	245000	UGKG	100	MBL	08/03/99	0836	153902	4
rium		119000	265	2450	UGKG	10.	MBL	08/02/99	1750	153902	4
eryllium	J	831	118	2450	UGKG	10.					
lcium		2230000	34200	49000	UGKG	10.					
dmium	J	417	186	2450	UGKG	10.					
balt		9850	162	2450	UGKG	10.					
romium		163000	372	2450	UGKG	10.					
pper		47900	657	2450	UGKG	10.					
n		16500000	59200	59200	UGKG	10.					
tassium		12900000	13900	49000	UGKG	10.					
agnesium		4980000	2480	4900	UGKG	10.					
anganese		353000	3470	4900	UGKG	10.					
olybdenum	J	2600	647	4900	UGKG	10.					
dium		119000000	315000	490000	UGKG	100	MBL	08/03/99	0836	153902	4
ickel		4390000	309	2450	UGKG	10.	MBL	08/02/99	1750	153902	4
ead		79600	769	2450	UGKG	10.					

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Contact: Mr. Richard Groseclose
Project Description: Hazardous Waste Contract

cc: WSRC00497 Report Date: August 20, 1999

Sample ID : TCLP 7

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Antimony	U	-1270	1870	4900	UGKG	10.					
Selenium	U	-198	1320	2450	UGKG	10.	MBL	08/02/99	1750	153902	4
Silicon		4560000	137000	490000	UGKG	100	MBL	08/03/99	0836	153902	4
Tin		17900	4080	4900	UGKG	10.	MBL	08/02/99	1750	153902	4
Strontium		19100	142	2450	UGKG	10.					
Titanium		244000	196	2450	UGKG	10.					
Thallium	U	393	2160	4900	UGKG	10.					
Uranium		22000000	96300	245000	UGKG	100	MBL	08/03/99	0836	153902	4
Vanadium		22400	260	2450	UGKG	10.	MBL	08/02/99	1750	153902	4
Zinc		20100000	18100	24500	UGKG	100	MBL	08/03/99	0836	153902	4
General Chemistry											
Total Halogens - 3 items											
Bromide	J	0.190	0.145	2.50	MGKG	1.0	RWS	07/17/99	0208	154421	5
Chlorides	J	0.181	0.172	1.00	MGKG	1.0					
Fluoride	U	0.00	0.208	0.500	MGKG	1.0					
Nitrogen, Nitrate	U	0.00	0.121	0.500	MGKG	1.0	RWS	07/17/99	0208	154418	6
Evaporative Loss @ 105 C	U	0.00	1.00	1.00	wt%	1.0	GJ	07/27/99	1815	154246	7
Nitrogen, Ammonia	U	0.00	0.239	1.00	mg/kg	1.0	THL	07/27/99	1754	154283	8

The following prep procedures were performed:

FID Analysis		08/03/99		154228 N
Volatiles 8260 High Level	SM	07/26/99	2000	154327 N
GC/MS 5970 Extractables	JMA	07/22/99	1600	154035 N
TRACE	FGD	07/26/99	1830	153902 N

Surrogate Recovery	Test	Percent%	Acceptable Limits
2,4,6-Tribromophenol	F005C	61.2	(44.5 - 126.)
2-Fluorobiphenyl	F005C	55.3	(44.7 - 110.)
2-Fluorophenol	F005C	58.9	(37.0 - 102.)
Nitrobenzene-d5	F005C	54.4	(42.4 - 107.)
Phenol-d6	F005C	61.1	(41.5 - 102.)
p-Terphenyl-d14	F005C	79.6	(45.5 - 104.)

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Project Description: Hazardous Waste Contract

c: WSRC00497 Report Date: August 20, 1999

Sample ID : TCLP 7

rrogate Recovery	Test	Percent%	Acceptable Limits
omofluorobenzene	F001-8260	88.4	(73.0 - 129.)
bromofluoromethane	F001-8260	103.	(66.0 - 117.)
luene-d8	F001-8260	99.4	(73.0 - 122.)
omofluorobenzene	F002-8260	88.4	(73.0 - 129.)
bromofluoromethane	F002-8260	103.	(66.0 - 117.)
luene-d8	F002-8260	99.4	(73.0 - 122.)
omofluorobenzene	F003A-8260	88.4	(73.0 - 129.)
bromofluoromethane	F003A-8260	103.	(66.0 - 117.)
luene-d8	F003A-8260	99.4	(73.0 - 122.)
omofluorobenzene	F005A-8260	88.4	(73.0 - 129.)
bromofluoromethane	F005A-8260	103.	(66.0 - 117.)
luene-d8	F005A-8260	99.4	(73.0 - 122.)

= Method	Method-Description
1	GC/FID
2	EPA 8260B
3	EPA 8270C
4	EPA 6010B
5	EPA 9056
6	EPA 300.0
7	EPA 3550
8	EPA 350.1 modified

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ndicates that a quality control analyte recovery is outside of specified acceptance criteria.

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Project Description:	Hazardous Waste Contract

cc: WSRC00497 Report Date: August 20, 1999

Sample ID : TCLP 7

M = Method	Method-Description

This data report has been prepared and reviewed in accordance with General Engineering Laboratories standard operating procedures. Please direct any questions to your Project Manager, Stacy Griffin at 769-7376.

Reviewed By

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Contact: Mr. Richard Groseclose
Project Description: Hazardous Waste Contract

: WSRC00497 Report Date: August 20, 1999

Sample ID	: TCLP 8
Lab ID	: 9907679-27
Matrix	: Soil
Date Collected	: 07/14/99
Date Received	: 07/15/99
Priority	: Routine
Collector	: Client

rameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
atile Organics											
03 Waste Constituents - FID - 4 items											
ıyl Acetate	U	0.00	10.0	10.0	mg/kg	1.0	CAK	07/29/99	1138	154228	1
ıyl Ether	U	0.00	10.0	10.0	mg/kg	1.0					
ethyl Alcohol	U	0.00	4.00	10.0	MGKG	1.0	CAK	07/29/99	0015	154228	1
Butyl Alcohol	U	0.00	4.00	10.0	mg/kg	1.0					
05 Waste Constituents - FID - 2 items											
hylene Glycol Monoethylether	U	0.00	20.0	20.0	mg/kg	1.0					
butyl Alcohol	U	0.00	4.00	10.0	mg/kg	1.0					
01 Waste Constituents - 7 items											
1,1-Trichloroethane	U	0.00	0.0994	1.00	UGKG	1.0	SDM	07/26/99	2157	154327	2
rbon Tetrachloride	U	0.00	0.497	1.00	UGKG	1.0					
ethylene Chloride		2.06	1.39	1.39	UGKG	1.0					
trachloroethylene	U	0.00	0.398	1.00	UGKG	1.0					
ichloroethylene	U	0.00	0.298	1.00	UGKG	1.0					
ichlorofluoromethane	U	0.00	0.298	1.00	UGKG	1.0					
ichlorotrifluoroethane	U	0.00	9.94	20.0	UGKG	1.0					
02 Waste Constituents - 9 items											
1,1-Trichloroethane	U	0.00	0.0994	1.00	UGKG	1.0					
1,2-Trichloroethane	U	0.00	0.298	1.00	UGKG	1.0					
2-Dichlorobenzene	U	0.00	0.497	1.00	UGKG	1.0					
hlorobenzene	U	0.00	0.298	1.00	UGKG	1.0					
[ethylene Chloride		2.06	1.39	1.39	UGKG	1.0					
etrachloroethylene	U	0.00	0.398	1.00	UGKG	1.0					
richloroethylene	U	0.00	0.298	1.00	UGKG	1.0					
richlorofluoromethane	U	0.00	0.298	1.00	UGKG	1.0					
richlorotrifluoroethane	U	0.00	9.94	20.0	UGKG	1.0					
003 Waste Constituents - GC/MS VOA - 4 items											
-Methyl-2-pentanone	U	0.00	3.08	5.00	UGKG	1.0					

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Project Description: Hazardous Waste Contract

cc: WSRC00497 Report Date: August 20, 1999

Sample ID : TCLP 8

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Acetone	U	1.83	10.2	10.2	UGKG	1.0					
Ethylbenzene	U	0.00	0.298	1.00	UGKG	1.0	SDM	07/26/99	2157	154327	2
Xylenes (TOTAL)	U	0.00	0.696	1.00	UGKG	1.0					
F005 Waste Constituents - GC/MS VOA - 5 items											
2-Butanone	U	0.00	3.18	5.00	UGKG	1.0					
2-Nitropropane	U	0.00	3.28	4.97	UGKG	1.0					
Benzene	U	0.00	0.497	1.00	UGKG	1.0					
Carbon Disulfide	U	0.00	0.298	5.00	UGKG	1.0					
Toluene	U	0.00	0.895	1.00	UGKG	1.0					
Extractable Organics											
F004 Waste Constituents - GC/MS Ext. - 3 items											
Nitrobenzene	U	0.00	133	333	UGKG	1.0	JPA	08/04/99	1941	154035	3
m,p-Cresol	U	0.00	153	333	UGKG	1.0					
o-Cresol	U	0.00	63.3	333	UGKG	1.0					
Pyridine	U	0.00	130	333	UGKG	1.0					
Metals Analysis											
Silver		5470	336	2340	UGKG	10.	MBL	08/02/99	1756	153902	4
Aluminum		71800000	5520	23400	UGKG	10.					
Arsenic	U	947	2120	2340	UGKG	10.					
Boron		33700000	11800	234000	UGKG	100	MBL	08/03/99	0842	153902	4
Barium		128000	252	2340	UGKG	10.	MBL	08/02/99	1756	153902	4
Beryllium	J	842	112	2340	UGKG	10.					
Calcium		2260000	32600	46700	UGKG	10.					
Cadmium	J	402	177	2340	UGKG	10.					
Cobalt		13700	154	2340	UGKG	10.					
Chromium		162000	355	2340	UGKG	10.					
Copper		74900	626	2340	UGKG	10.					
Iron		17300000	56400	56400	UGKG	10.					
Potassium		13100000	13200	46700	UGKG	10.					
Magnesium		4830000	2370	4670	UGKG	10.					
Manganese		379000	3310	4670	UGKG	10.					
Molybdenum	J	2520	616	4670	UGKG	10.					
Sodium		118000000	300000	467000	UGKG	100	MBL	08/03/99	0842	153902	4
Nickel		6040000	294	2340	UGKG	10.	MBL	08/02/99	1756	153902	4
Lead		107000	733	2340	UGKG	10.					

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Contact: Mr. Richard Groseclose
Project Description: Hazardous Waste Contract

:: WSRC00497 Report Date: August 20, 1999

Sample ID : TCLP 8

rameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
timony	U	-1080	1780	4670	UGKG	10.					
enium	U	487	1260	2340	UGKG	10.	MBL	08/02/99	1756	153902	4
icon		3090000	131000	467000	UGKG	100	MBL	08/03/99	0842	153902	4
ı		15100	3890	4670	UGKG	10.	MBL	08/02/99	1756	153902	4
ontium		21000	135	2340	UGKG	10.					
anium		242000	187	2340	UGKG	10.					
allium	U	240	2060	4670	UGKG	10.					
anium		18900000	91800	234000	UGKG	100	MBL	08/03/99	0842	153902	4
nadium		22600	248	2340	UGKG	10.	MBL	08/02/99	1756	153902	4
ıc		20200000	17300	23400	UGKG	100	MBL	08/03/99	0842	153902	4
ıeral Chemistry											
tal Halogens - 3 items											
omide	U	0.00	0.152	2.50	MGKG	1.0	RWS	07/17/99	0222	154421	5
ılorides	J	0.690	0.181	1.00	MGKG	1.0					
ıoride		0.650	0.218	0.500	MGKG	1.0					
trogen, Nitrate	U	0.00	0.127	0.500	MGKG	1.0	RWS	07/17/99	0222	154418	6
aporative Loss @ 105 C	U	0.00	1.00	1.00	wt%	1.0	GJ	07/27/99	1815	154246	7
trogen, Ammonia	U	0.00	0.239	1.00	mg/kg	1.0	THL	07/27/99	1754	154283	8

e following prep procedures were performed:

D Analysis		08/03/99	154228 N
ılatiles 8260 High Level	SM	07/26/99 2000	154327 N
C/MS 5970 Extractables	JMA	07/22/99 1600	154035 N
RACE	FGD	07/26/99 1830	153902 N

ırrogate Recovery	Test	Percent%	Acceptable Limits
4,6-Tribromophenol	F005C	56.8	(44.5 - 126.)
Fluorobiphenyl	F005C	56.1	(44.7 - 110.)
Fluorophenol	F005C	60.4	(37.0 - 102.)
itrobenzene-d5	F005C	55.2	(42.4 - 107.)
ıenol-d6	F005C	60.9	(41.5 - 102.)
Terphenyl-d14	F005C	79.7	(45.5 - 104.)

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Aiken, South Carolina 29802
Contact: Mr. Richard Groseclose
Project Description: Hazardous Waste Contract

cc: WSRC00497 Report Date: August 20, 1999

Sample ID : TCLP 8

Surrogate Recovery	Test	Percent%	Acceptable Limits
Bromofluorobenzene	F001-8260	88.2	(73.0 - 129.)
Dibromofluoromethane	F001-8260	102.	(66.0 - 117.)
Toluene-d8	F001-8260	100.	(73.0 - 122.)
Bromofluorobenzene	F002-8260	88.2	(73.0 - 129.)
Dibromofluoromethane	F002-8260	102.	(66.0 - 117.)
Toluene-d8	F002-8260	100.	(73.0 - 122.)
Bromofluorobenzene	F003A-8260	88.2	(73.0 - 129.)
Dibromofluoromethane	F003A-8260	102.	(66.0 - 117.)
Toluene-d8	F003A-8260	100.	(73.0 - 122.)
Bromofluorobenzene	F005A-8260	88.2	(73.0 - 129.)
Dibromofluoromethane	F005A-8260	102.	(66.0 - 117.)
Toluene-d8	F005A-8260	100.	(73.0 - 122.)

M = Method	Method-Description
M 1	GC/FID
M 2	EPA 8260B
M 3	EPA 8270C
M 4	EPA 6010B
M 5	EPA 9056
M 6	EPA 300.0
M 7	EPA 3550
M 8	EPA 350.1 modified

Notes:
The qualifiers in this report are defined as follows:
ND indicates that the analyte was not detected at a concentration greater than the detection limit.
J indicates presence of analyte at a concentration less than the reporting limit (RL) and greater than the detection limit (DL).
U indicates that the analyte was not detected at a concentration greater than the detection limit.
* indicates that a quality control analyte recovery is outside of specified acceptance criteria.

Data reported in mass/mass units is reported as 'dry weight'.

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	Building 735-16A, Rm. 5
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Project Description:	Hazardous Waste Contract

: WSRC00497 Report Date: August 20, 1999 Page 5 of 5

Sample ID : TCLP 8

= Method **Method-Description**

data report has been prepared and reviewed
cordance with General Engineering Laboratories
lard operating procedures. Please direct
questions to your Project Manager, Stacy Griffin at 769-7376.

Stacy L. Griffin

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Contact: Mr. Richard Groseclose
Project Description: Hazardous Waste Contract

cc: WSRC00497 Report Date: August 20, 1999

Sample ID	: TCLP 9
Lab ID	: 9907679-39
Matrix	: Soil
Date Collected	: 07/14/99
Date Received	: 07/15/99
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Volatile Organics											
F003 Waste Constituents - FID - 4 items											
Ethyl Acetate	U	0.00	10.0	10.0	mg/kg	1.0	CAK	07/29/99	1204	154228	1
Ethyl Ether	U	0.00	10.0	10.0	mg/kg	1.0					
Methyl Alcohol	U	0.0288	4.00	10.0	MGKG	1.0	CAK	07/29/99	0042	154228	1
n-Butyl Alcohol	U	0.00	4.00	10.0	mg/kg	1.0					
F005 Waste Constituents - FID - 2 items											
Ethylene Glycol Monoethylether	U	0.00	20.0	20.0	mg/kg	1.0					
Isobutyl Alcohol	U	0.00	4.00	10.0	mg/kg	1.0					
F001 Waste Constituents - 7 items											
1,1,1-Trichloroethane	U	0.00	0.100	1.00	UGKG	1.0	SDM	07/26/99	2227	154327	2
Carbon Tetrachloride	U	0.00	0.500	1.00	UGKG	1.0					
Methylene Chloride		2.37	1.40	1.40	UGKG	1.0					
Tetrachloroethylene	U	0.00	0.400	1.00	UGKG	1.0					
Trichloroethylene	U	0.00	0.300	1.00	UGKG	1.0					
Trichlorofluoromethane	U	0.00	0.300	1.00	UGKG	1.0					
Trichlorotrifluoroethane	U	0.00	10.0	20.0	UGKG	1.0					
F002 Waste Constituents - 9 items											
1,1,1-Trichloroethane	U	0.00	0.100	1.00	UGKG	1.0					
1,1,2-Trichloroethane	U	0.00	0.300	1.00	UGKG	1.0					
1,2-Dichlorobenzene	U	0.00	0.500	1.00	UGKG	1.0					
Chlorobenzene	U	0.00	0.300	1.00	UGKG	1.0					
Methylene Chloride		2.37	1.40	1.40	UGKG	1.0					
Tetrachloroethylene	U	0.00	0.400	1.00	UGKG	1.0					
Trichloroethylene	U	0.00	0.300	1.00	UGKG	1.0					
Trichlorofluoromethane	U	0.00	0.300	1.00	UGKG	1.0					
Trichlorotrifluoroethane	U	0.00	10.0	20.0	UGKG	1.0					
F003 Waste Constituents - GC/MS VOA - 4 items											
4-Methyl-2-pentanone	U	0.00	3.10	5.00	UGKG	1.0					

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:: WSRC00497 Report Date: August 20, 1999

Sample ID : TCLP 9

rameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
etone	U	1.85	10.3	10.3	UGKG	1.0					
ıylbenzene	U	0.00	0.300	1.00	UGKG	1.0	SDM	07/26/99	2227	154327	2
lenes (TOTAL)	U	0.00	0.700	1.00	UGKG	1.0					
05 Waste Constituents - GC/MS VOA - 5 items											
3utanone	U	0.00	3.20	5.00	UGKG	1.0					
Nitropropane	U	0.00	3.30	5.00	UGKG	1.0					
nzene	U	0.00	0.500	1.00	UGKG	1.0					
rbon Disulfide	U	0.00	0.300	5.00	UGKG	1.0					
luene	U	0.00	0.900	1.00	UGKG	1.0					
ractable Organics											
04 Waste Constituents - GC/MS Ext. - 3 items											
trobenzene	U	0.00	133	333	UGKG	1.0	JPA	08/04/99	2011	154035	3
p-Cresol	U	0.00	153	333	UGKG	1.0					
Cresol	U	0.00	63.3	333	UGKG	1.0					
ridine	U	0.00	130	333	UGKG	1.0					
tals Analysis											
lver		6100	336	2340	UGKG	10.	MBL	08/02/99	1815	153902	4
uminum		70600000	5520	23400	UGKG	10.					
senic	U	1520	2120	2340	UGKG	10.					
ıron		37500000	11800	234000	UGKG	100	MBL	08/03/99	0903	153902	4
ırium		121000	252	2340	UGKG	10.	MBL	08/02/99	1815	153902	4
ryllium	J	870	112	2340	UGKG	10.					
ılcium		2180000	32600	46700	UGKG	10.					
ıdmium	J	1180	177	2340	UGKG	10.					
ıbalt		16700	154	2340	UGKG	10.					
ıromium		174000	355	2340	UGKG	10.					
ıpper		86600	626	2340	UGKG	10.					
ın		14800000	56400	56400	UGKG	10.					
ıtassium		11900000	13200	46700	UGKG	10.					
agnesium		4950000	2370	4670	UGKG	10.					
anganese		332000	3310	4670	UGKG	10.					
olybdenum	J	3800	616	4670	UGKG	10.					
ıdium		134000000	300000	467000	UGKG	100	MBL	08/03/99	0903	153902	4
ickel		7010000	294	2340	UGKG	10.	MBL	08/02/99	1815	153902	4
ead		115000	733	2340	UGKG	10.					

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Contact: Mr. Richard Groseclose
Project Description: Hazardous Waste Contract

cc: WSRC00497 Report Date: August 20, 1999

Sample ID : TCLP 9

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Antimony	U	-476	1780	4670	UGKG	10.					
Selenium	U	-740	1260	2340	UGKG	10.	MBL	08/02/99	1815	153902	4
Silicon		2420000	131000	467000	UGKG	100	MBL	08/03/99	0903	153902	4
Tin		14500	3890	4670	UGKG	10.	MBL	08/02/99	1815	153902	4
Strontium		20400	135	2340	UGKG	10.					
Titanium		285000	187	2340	UGKG	10.					
Thallium	U	-1200	2060	4670	UGKG	10.					
Uranium		20800000	91800	234000	UGKG	100	MBL	08/03/99	0903	153902	4
Vanadium		25900	248	2340	UGKG	10.	MBL	08/02/99	1815	153902	4
Zinc		17700000	17300	23400	UGKG	100	MBL	08/03/99	0903	153902	4
General Chemistry											
Total Halogens - 3 items											
Bromide	J	0.572	0.161	2.65	MGKG	1.0	RWS	07/17/99	0236	154421	5
Chlorides	U	0.191	0.192	1.06	MGKG	1.0					
Fluoride	U	0.201	0.231	0.530	MGKG	1.0					
Nitrogen, Nitrate	U	0.00	0.135	0.530	MGKG	1.0	RWS	07/17/99	0236	154418	6
Evaporative Loss @ 105 C	U	0.00	1.00	1.00	wt%	1.0	GJ	07/27/99	1815	154246	7
Nitrogen, Ammonia	U	0.00	0.236	1.00	mg/kg	1.0	THL	07/27/99	1754	154283	8

The following prep procedures were performed:

FID Analysis		08/03/99		154228 N
Volatiles 8260 High Level	SM	07/26/99	2000	154327 N
GC/MS 5970 Extractables	JMA	07/22/99	1600	154035 N
TRACE	FGD	07/26/99	1830	153902 N

Surrogate Recovery	Test	Percent%	Acceptable Limits
2,4,6-Tribromophenol	F005C	57.5	(44.5 - 126.)
2-Fluorobiphenyl	F005C	50.5	(44.7 - 110.)
2-Fluorophenol	F005C	53.8	(37.0 - 102.)
Nitrobenzene-d5	F005C	48.3	(42.4 - 107.)
Phenol-d6	F005C	56.2	(41.5 - 102.)
p-Terphenyl-d14	F005C	69.8	(45.5 - 104.)

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Project Description: Hazardous Waste Contract

c: WSRC00497 Report Date: August 20, 1999

Sample ID : TCLP 9

irrogate Recovery	Test	Percent%	Acceptable Limits
omofluorobenzene	F001-8260	89.3	(73.0 - 129.)
bromofluoromethane	F001-8260	102.	(66.0 - 117.)
luene-d8	F001-8260	101.	(73.0 - 122.)
omofluorobenzene	F002-8260	89.3	(73.0 - 129.)
bromofluoromethane	F002-8260	102.	(66.0 - 117.)
luene-d8	F002-8260	101.	(73.0 - 122.)
omofluorobenzene	F003A-8260	89.3	(73.0 - 129.)
bromofluoromethane	F003A-8260	102.	(66.0 - 117.)
luene-d8	F003A-8260	101.	(73.0 - 122.)
omofluorobenzene	F005A-8260	89.3	(73.0 - 129.)
bromofluoromethane	F005A-8260	102.	(66.0 - 117.)
luene-d8	F005A-8260	101.	(73.0 - 122.)

= Method	Method-Description
1	GC/FID
2	EPA 8260B
3	EPA 8270C
4	EPA 6010B
5	EPA 9056
6	EPA 300.0
7	EPA 3550
8	EPA 350.1 modified

tes:
e qualifiers in this report are defined as follows:
) indicates that the analyte was not detected at a concentration greater than the detection limit.
dicates presence of analyte at a concentration less than the reporting limit (RL) and greater than the detection limit (DL).
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ndicates that a quality control analyte recovery is outside of specified acceptance criteria.

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Contact:	Mr. Richard Groseclose
Project Description:	Hazardous Waste Contract

cc: WSRC00497 Report Date: August 20, 1999

Sample ID : TCLP 9

M = Method	Method-Description

This data report has been prepared and reviewed in accordance with General Engineering Laboratories standard operating procedures. Please direct any questions to your Project Manager, Stacy Griffin at 769-7376.

Reviewed By

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Contact: Mr. Richard Groseclose
Project Description: Hazardous Waste Contract

:: WSRC00497 Report Date: August 20, 1999

Sample ID	: TCLP 10
Lab ID	: 9907679-41
Matrix	: Soil
Date Collected	: 07/14/99
Date Received	: 07/15/99
Priority	: Routine
Collector	: Client

rameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
atile Organics											
03 Waste Constituents - FID - 4 items											
ıyl Acetate	U	0.00	10.0	10.0	mg/kg	1.0	CAK	07/29/99	1230	154228	1
ıyl Ether	U	0.00	10.0	10.0	mg/kg	1.0					
:thyl Alcohol	U	0.0189	4.00	10.0	MGKG	1.0	CAK	07/29/99	0108	154228	1
3utyl Alcohol	U	0.00	4.00	10.0	mg/kg	1.0					
05 Waste Constituents - FID - 2 items											
ıylene Glycol Monoethylether	U	0.00	20.0	20.0	mg/kg	1.0					
)butyl Alcohol	U	0.00	4.00	10.0	mg/kg	1.0					
01 Waste Constituents - 7 items											
.,1-Trichloroethane	U	0.00	0.100	1.00	UGKG	1.0	SDM	07/26/99	2300	154327	2
rbon Tetrachloride	U	0.00	0.500	1.00	UGKG	1.0					
:thylene Chloride		2.12	1.40	1.40	UGKG	1.0					
trachloroethylene	U	0.00	0.400	1.00	UGKG	1.0					
ichloroethylene	U	0.00	0.300	1.00	UGKG	1.0					
ichlorofluoromethane	U	0.00	0.300	1.00	UGKG	1.0					
ichlorotrifluoroethane	U	0.00	10.0	20.0	UGKG	1.0					
02 Waste Constituents - 9 items											
l,1-Trichloroethane	U	0.00	0.100	1.00	UGKG	1.0					
l,2-Trichloroethane	U	0.00	0.300	1.00	UGKG	1.0					
2-Dichlorobenzene	U	0.00	0.500	1.00	UGKG	1.0					
ılorobenzene	U	0.00	0.300	1.00	UGKG	1.0					
:thylene Chloride		2.12	1.40	1.40	UGKG	1.0					
trachloroethylene	U	0.00	0.400	1.00	UGKG	1.0					
ichloroethylene	U	0.00	0.300	1.00	UGKG	1.0					
ichlorofluoromethane	U	0.00	0.300	1.00	UGKG	1.0					
ichlorotrifluoroethane	U	0.00	10.0	20.0	UGKG	1.0					
03 Waste Constituents - GC/MS VOA - 4 items											
Methyl-2-pentanone	U	0.00	3.10	5.00	UGKG	1.0					

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Contact: Mr. Richard Groseclose
Project Description: Hazardous Waste Contract

cc: WSRC00497 Report Date: August 20, 1999

Sample ID : TCLP 10

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Acetone	U	1.84	10.3	10.3	UGKG	1.0					
Ethylbenzene	U	0.00	0.300	1.00	UGKG	1.0	SDM	07/26/99	2300	154327	2
Xylenes (TOTAL)	U	0.00	0.700	1.00	UGKG	1.0					
F005 Waste Constituents - GC/MS VOA - 5 items											
2-Butanone	U	0.00	3.20	5.00	UGKG	1.0					
2-Nitropropane	U	0.00	3.30	5.00	UGKG	1.0					
Benzene	U	0.00	0.500	1.00	UGKG	1.0					
Carbon Disulfide	U	0.00	0.300	5.00	UGKG	1.0					
Toluene	U	0.00	0.900	1.00	UGKG	1.0					
Extractable Organics											
F004 Waste Constituents - GC/MS Ext. - 3 items											
Nitrobenzene	U	0.00	133	333	UGKG	1.0	JPA	08/04/99	2040	154035	3
m,p-Cresol	U	0.00	153	333	UGKG	1.0					
o-Cresol	U	0.00	63.3	333	UGKG	1.0					
Pyridine	U	0.00	130	333	UGKG	1.0					
Metals Analysis											
Silver		6040	340	2360	UGKG	10.	MBL	08/02/99	1821	153902	4
Aluminum		57500000	5570	23600	UGKG	10.					
Arsenic	U	1770	2150	2360	UGKG	10.					
Boron		31600000	11900	236000	UGKG	100	MBL	08/03/99	0909	153902	4
Barium		97900	255	2360	UGKG	10.	MBL	08/02/99	1821	153902	4
Beryllium	J	693	113	2360	UGKG	10.					
Calcium		1760000	32900	47200	UGKG	10.					
Cadmium	J	1270	179	2360	UGKG	10.					
Cobalt		15400	156	2360	UGKG	10.					
Chromium		149000	359	2360	UGKG	10.					
Copper		75600	632	2360	UGKG	10.					
Iron		14700000	57000	57000	UGKG	10.					
Potassium		10200000	13400	47200	UGKG	10.					
Magnesium		4500000	2390	4720	UGKG	10.					
Manganese		301000	3350	4720	UGKG	10.					
Molybdenum	J	3040	623	4720	UGKG	10.					
Sodium		118000000	303000	472000	UGKG	100	MBL	08/03/99	0909	153902	4
Nickel		6360000	297	2360	UGKG	10.	MBL	08/02/99	1821	153902	4
Lead		101000	741	2360	UGKG	10.					

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Contact: Mr. Richard Groseclose
Project Description: Hazardous Waste Contract

:: WSRC00497 Report Date: August 20, 1999

Sample ID : TCLP 10

rameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
timony	U	-780	1800	4720	UGKG	10.					
enium	U	-114	1270	2360	UGKG	10.	MBL	08/02/99	1821	153902	4
icon		1420000	132000	472000	UGKG	100	MBL	08/03/99	0909	153902	4
ı		10800	3930	4720	UGKG	10.	MBL	08/02/99	1821	153902	4
ontium		18000	137	2360	UGKG	10.					
anium		190000	189	2360	UGKG	10.					
allium	U	-127	2080	4720	UGKG	10.					
anium		21600000	92800	236000	UGKG	100	MBL	08/03/99	0909	153902	4
nadium		21800	250	2360	UGKG	10.	MBL	08/02/99	1821	153902	4
ıc		16600000	17500	23600	UGKG	100	MBL	08/03/99	0909	153902	4
ıeral Chemistry											
tal Halogens - 3 items											
ɔmide	U	0.00	0.142	2.50	MGKG	1.0	RWS	07/17/99	0250	154421	5
lorides	J	0.272	0.170	1.00	MGKG	1.0					
ıoride	U	0.00	0.204	0.500	MGKG	1.0					
trogen, Nitrate	U	0.00	0.119	0.500	MGKG	1.0	RWS	07/17/99	0250	154418	6
aporative Loss @ 105 C	U	0.00	1.00	1.00	wt%	1.0	GJ	07/27/99	1815	154246	7
trogen, Ammonia	U	0.00	0.240	1.00	mg/kg	1.0	THL	07/27/99	1754	154283	8

following prep procedures were performed:

D Analysis		08/03/99		154228 N
latiles 8260 High Level	SM	07/26/99	2000	154327 N
C/MS 5970 Extractables	JMA	07/22/99	1600	154035 N
ACE	FGD	07/26/99	1830	153902 N

rrogate Recovery	Test	Percent%	Acceptable Limits
,6-Tribromophenol	F005C	69.3	(44.5 - 126.)
Fluorobiphenyl	F005C	54.2	(44.7 - 110.)
Fluorophenol	F005C	61.2	(37.0 - 102.)
trobenzene-d5	F005C	53.6	(42.4 - 107.)
enol-d6	F005C	65.1	(41.5 - 102.)
Terphenyl-d14	F005C	84.6	(45.5 - 104.)

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	Building 735-16A, Rm. 5
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Contact:	Mr. Richard Groseclose
Project Description:	Hazardous Waste Contract

cc: WSRC00497 Report Date: August 20, 1999

Sample ID : TCLP 10

Surrogate Recovery	Test	Percent%	Acceptable Limits
Bromofluorobenzene	F001-8260	89.5	(73.0 - 129.)
Dibromofluoromethane	F001-8260	101.	(66.0 - 117.)
Toluene-d8	F001-8260	99.8	(73.0 - 122.)
Bromofluorobenzene	F002-8260	89.5	(73.0 - 129.)
Dibromofluoromethane	F002-8260	101.	(66.0 - 117.)
Toluene-d8	F002-8260	99.8	(73.0 - 122.)
Bromofluorobenzene	F003A-8260	89.5	(73.0 - 129.)
Dibromofluoromethane	F003A-8260	101.	(66.0 - 117.)
Toluene-d8	F003A-8260	99.8	(73.0 - 122.)
Bromofluorobenzene	F005A-8260	89.5	(73.0 - 129.)
Dibromofluoromethane	F005A-8260	101.	(66.0 - 117.)
Toluene-d8	F005A-8260	99.8	(73.0 - 122.)

M = Method	Method-Description
M 1	GC/FID
M 2	EPA 8260B
M 3	EPA 8270C
M 4	EPA 6010B
M 5	EPA 9056
M 6	EPA 300.0
M 7	EPA 3550
M 8	EPA 350.1 modified

Notes:
The qualifiers in this report are defined as follows:
ND indicates that the analyte was not detected at a concentration greater than the detection limit.
J indicates presence of analyte at a concentration less than the reporting limit (RL) and greater than the detection limit (DL).
U indicates that the analyte was not detected at a concentration greater than the detection limit.
* indicates that a quality control analyte recovery is outside of specified acceptance criteria.

Data reported in mass/mass units is reported as 'dry weight'.

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Project Description: Hazardous Waste Contract

:: WSRC00497 Report Date: August 20, 1999 Page 5 of 5

Sample ID : TCLP 10

= Method **Method-Description**

; data report has been prepared and reviewed
:cordance with General Engineering Laboratories
dard operating procedures. Please direct
questions to your Project Manager, Stacy Griffin at 769-7376.

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Contact: Mr. Richard Groseclose
Project Description: Hazardous Waste Contract

cc: WSRC00497 Report Date: August 20, 1999

Sample ID	: TCLP 11
Lab ID	: 9907679-43
Matrix	: Soil
Date Collected	: 07/14/99
Date Received	: 07/15/99
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Volatile Organics											
F003 Waste Constituents - FID - 4 items											
Ethyl Acetate	U	0.00	10.0	10.0	mg/kg	1.0	CAK	07/29/99	1257	154228	1
Ethyl Ether	U	0.00	10.0	10.0	mg/kg	1.0					
Methyl Alcohol	U	0.00	4.00	10.0	MGKG	1.0	CAK	07/29/99	0134	154228	1
n-Butyl Alcohol	U	0.00	4.00	10.0	mg/kg	1.0					
F005 Waste Constituents - FID - 2 items											
Ethylene Glycol Monoethylether	U	0.00	20.0	20.0	mg/kg	1.0					
Isobutyl Alcohol	U	0.00	4.00	10.0	mg/kg	1.0					
F001 Waste Constituents - 7 items											
1,1,1-Trichloroethane	U	0.00	0.100	1.00	UGKG	1.0	SDM	07/26/99	2334	154327	2
Carbon Tetrachloride	U	0.00	0.500	1.00	UGKG	1.0					
Methylene Chloride		2.25	1.40	1.40	UGKG	1.0					
Tetrachloroethylene	U	0.00	0.400	1.00	UGKG	1.0					
Trichloroethylene	U	0.00	0.300	1.00	UGKG	1.0					
Trichlorofluoromethane	U	0.00	0.300	1.00	UGKG	1.0					
Trichlorotrifluoroethane	U	0.00	10.0	20.0	UGKG	1.0					
F002 Waste Constituents - 9 items											
1,1,1-Trichloroethane	U	0.00	0.100	1.00	UGKG	1.0					
1,1,2-Trichloroethane	U	0.00	0.300	1.00	UGKG	1.0					
1,2-Dichlorobenzene	U	0.00	0.500	1.00	UGKG	1.0					
Chlorobenzene	U	0.00	0.300	1.00	UGKG	1.0					
Methylene Chloride		2.25	1.40	1.40	UGKG	1.0					
Tetrachloroethylene	U	0.00	0.400	1.00	UGKG	1.0					
Trichloroethylene	U	0.00	0.300	1.00	UGKG	1.0					
Trichlorofluoromethane	U	0.00	0.300	1.00	UGKG	1.0					
Trichlorotrifluoroethane	U	0.00	10.0	20.0	UGKG	1.0					
F003 Waste Constituents - GC/MS VOA - 4 items											
4-Methyl-2-pentanone	U	0.00	3.10	5.00	UGKG	1.0					

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Contact: Mr. Richard Groseclose
Project Description: Hazardous Waste Contract

: WSRC00497 Report Date: August 20, 1999

Sample ID : TCLP 11

·ameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
:tone	U	1.85	10.3	10.3	UGKG	1.0					
ylbenzene	U	0.00	0.300	1.00	UGKG	1.0	SDM	07/26/99	2334	154327	2
lenes (TOTAL)	U	0.00	0.700	1.00	UGKG	1.0					
)5 Waste Constituents - GC/MS VOA - 5 items											
Butanone	U	0.00	3.20	5.00	UGKG	1.0					
Nitropropane	U	0.00	3.30	5.00	UGKG	1.0					
ızene	U	0.00	0.500	1.00	UGKG	1.0					
:bon Disulfide	U	0.00	0.300	5.00	UGKG	1.0					
luene	U	0.00	0.900	1.00	UGKG	1.0					
ractable Organics											
)4 Waste Constituents - GC/MS Ext. - 3 items											
robenzene	U	0.00	133	333	UGKG	1.0	JPA	08/04/99	2110	154035	3
)-Cresol	U	0.00	153	333	UGKG	1.0					
Cresol	U	0.00	63.3	333	UGKG	1.0					
ridine	U	0.00	130	333	UGKG	1.0					
:als Analysis											
ver		9660	353	2450	UGKG	10.	MBL	08/02/99	1827	153902	4
ıminum		53000000	5790	24500	UGKG	10.					
senic		2580	2230	2450	UGKG	10.					
ron		33400000	12400	245000	UGKG	100	MBL	08/03/99	0915	153902	4
rium		92900	265	2450	UGKG	10.	MBL	08/02/99	1827	153902	4
ryllium	J	623	118	2450	UGKG	10.					
lcium		1770000	34200	49000	UGKG	10.					
dmium	J	1510	186	2450	UGKG	10.					
balt		24700	162	2450	UGKG	10.					
romium		238000	372	2450	UGKG	10.					
pper		83300	657	2450	UGKG	10.					
n		21500000	59200	59200	UGKG	10.					
tassium		6820000	13900	49000	UGKG	10.					
ıgnesium		4900000	2480	4900	UGKG	10.					
ınganese		368000	3470	4900	UGKG	10.					
ɔlybdenum	J	3070	647	4900	UGKG	10.					
dium		119000000	315000	490000	UGKG	100	MBL	08/03/99	0915	153902	4
ckel		10600000	309	2450	UGKG	10.	MBL	08/02/99	1827	153902	4
ad		103000	769	2450	UGKG	10.					

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Contact: Mr. Richard Groseclose
Project Description: Hazardous Waste Contract

cc: WSRC00497 Report Date: August 20, 1999

Sample ID : TCLP 11

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Antimony	U	-1030	1870	4900	UGKG	10.					
Selenium	U	-97.9	1320	2450	UGKG	10.	MBL	08/02/99	1827	153902	4
Silicon		7340000	137000	490000	UGKG	100	MBL	08/03/99	0915	153902	4
Tin		7860	4080	4900	UGKG	10.	MBL	08/02/99	1827	153902	4
Strontium		25200	142	2450	UGKG	10.					
Titanium		308000	196	2450	UGKG	10.					
Thallium	U	-1670	2160	4900	UGKG	10.					
Uranium		34300000	96300	245000	UGKG	100	MBL	08/03/99	0915	153902	4
Vanadium		34300	260	2450	UGKG	10.	MBL	08/02/99	1827	153902	4
Zinc		20300000	18100	24500	UGKG	100	MBL	08/03/99	0915	153902	4
General Chemistry											
Total Halogens - 3 items											
Bromide	U	0.00	0.150	2.50	MGKG	1.0	RWS	07/17/99	0304	154421	5
Chlorides	J	0.287	0.179	1.00	MGKG	1.0					
Fluoride	U	0.00	0.215	0.500	MGKG	1.0					
Nitrogen, Nitrate	U	0.00	0.125	0.500	MGKG	1.0	RWS	07/17/99	0304	154418	6
Evaporative Loss @ 105 C	U	0.00	1.00	1.00	wt%	1.0	GJ	07/27/99	1815	154246	7
Nitrogen, Ammonia	U	0.00	0.240	1.00	mg/kg	1.0	THL	07/27/99	1754	154283	8

The following prep procedures were performed:

FID Analysis		08/03/99		154228 N
Volatiles 8260 High Level	SM	07/26/99	2000	154327 N
GC/MS 5970 Extractables	JMA	07/22/99	1600	154035 N
TRACE	FGD	07/26/99	1830	153902 N

Surrogate Recovery	Test	Percent%	Acceptable Limits
2,4,6-Tribromophenol	F005C	60.1	(44.5 - 126.)
2-Fluorobiphenyl	F005C	53.6	(44.7 - 110.)
2-Fluorophenol	F005C	59.8	(37.0 - 102.)
Nitrobenzene-d5	F005C	51.9	(42.4 - 107.)
Phenol-d6	F005C	59.7	(41.5 - 102.)
p-Terphenyl-d14	F005C	71.0	(45.5 - 104.)

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Contact: Mr. Richard Groseclose
Project Description: Hazardous Waste Contract

c: WSRC00497 Report Date: August 20, 1999

Sample ID : TCLP 11

ırrogate Recovery	Test	Percent%	Acceptable Limits
omofluorobenzene	F001-8260	88.8	(73.0 - 129.)
bromofluoromethane	F001-8260	102.	(66.0 - 117.)
ıluene-d8	F001-8260	100.	(73.0 - 122.)
omofluorobenzene	F002-8260	88.8	(73.0 - 129.)
bromofluoromethane	F002-8260	102.	(66.0 - 117.)
ıluene-d8	F002-8260	100.	(73.0 - 122.)
omofluorobenzene	F003A-8260	88.8	(73.0 - 129.)
bromofluoromethane	F003A-8260	102.	(66.0 - 117.)
ıluene-d8	F003A-8260	100.	(73.0 - 122.)
omofluorobenzene	F005A-8260	88.8	(73.0 - 129.)
bromofluoromethane	F005A-8260	102.	(66.0 - 117.)
ıluene-d8	F005A-8260	100.	(73.0 - 122.)

= Method	Method-Description
1	GC/FID
2	EPA 8260B
3	EPA 8270C
4	EPA 6010B
5	EPA 9056
6	EPA 300.0
7	EPA 3550
8	EPA 350.1 modified

es:
qualifiers in this report are defined as follows:
indicates that the analyte was not detected at a concentration greater than the detection limit.
dicates presence of analyte at a concentration less than the reporting limit (RL) and greater than the detection limit (DL).
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a reported in mass/mass units is reported as 'dry weight'.

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Contact:	Mr. Richard Groseclose
Project Description:	Hazardous Waste Contract

cc: WSRC00497 Report Date: August 20, 1999

Sample ID : TCLP 11

M = Method	Method-Description

This data report has been prepared and reviewed in accordance with General Engineering Laboratories standard operating procedures. Please direct any questions to your Project Manager, Stacy Griffin at 769-7376.

Stacy L Griffin

Reviewed By

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Contact: Mr. Richard Groseclose
Project Description: Hazardous Waste Contract

c: WSRC00497 Report Date: August 20, 1999

Sample ID	: TCLP 12
Lab ID	: 9907679-45
Matrix	: Soil
Date Collected	: 07/14/99
Date Received	: 07/15/99
Priority	: Routine
Collector	: Client

rameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
latile Organics											
)03 Waste Constituents - FID - 4 items											
hyl Acetate	U	0.00	10.0	10.0	mg/kg	1.0	CAK	07/29/99	1323	154228	1
hyl Ether	U	0.00	10.0	10.0	mg/kg	1.0					
ethyl Alcohol	U	0.00840	4.00	10.0	MGKG	1.0	CAK	07/29/99	0200	154228	1
Butyl Alcohol	U	0.00	4.00	10.0	mg/kg	1.0					
)05 Waste Constituents - FID - 2 items											
hylene Glycol Monoethylether	U	0.00	20.0	20.0	mg/kg	1.0					
obutyl Alcohol	U	0.00	4.00	10.0	mg/kg	1.0					
)01 Waste Constituents - 7 items											
1,1-Trichloroethane	U	0.00	0.0996	1.00	UGKG	1.0	SDM	07/27/99	0006	154327	2
arbon Tetrachloride	U	0.00	0.498	1.00	UGKG	1.0					
ethylene Chloride		3.90	1.39	1.39	UGKG	1.0					
etrachloroethylene	U	0.00	0.398	1.00	UGKG	1.0					
richloroethylene	U	0.00	0.299	1.00	UGKG	1.0					
richlorofluoromethane	U	0.00	0.299	1.00	UGKG	1.0					
richlorotrifluoroethane	U	0.00	9.96	20.0	UGKG	1.0					
)02 Waste Constituents - 9 items											
1,1-Trichloroethane	U	0.00	0.0996	1.00	UGKG	1.0					
1,2-Trichloroethane	U	0.00	0.299	1.00	UGKG	1.0					
2-Dichlorobenzene	U	0.00	0.498	1.00	UGKG	1.0					
hlorobenzene	U	0.00	0.299	1.00	UGKG	1.0					
lethylene Chloride		3.90	1.39	1.39	UGKG	1.0					
etrachloroethylene	U	0.00	0.398	1.00	UGKG	1.0					
richloroethylene	U	0.00	0.299	1.00	UGKG	1.0					
richlorofluoromethane	U	0.00	0.299	1.00	UGKG	1.0					
richlorotrifluoroethane	U	0.00	9.96	20.0	UGKG	1.0					
003 Waste Constituents - GC/MS VOA - 4 items											
-Methyl-2-pentanone	U	0.00	3.09	5.00	UGKG	1.0					

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Contact: Mr. Richard Groseclose
Project Description: Hazardous Waste Contract

cc: WSRC00497 Report Date: August 20, 1999

Sample ID : TCLP 12

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Acetone	U	1.90	10.3	10.3	UGKG	1.0					
Ethylbenzene	U	0.00	0.299	1.00	UGKG	1.0	SDM	07/27/99	0006	154327	2
Xylenes (TOTAL)	U	0.00	0.697	1.00	UGKG	1.0					
F005 Waste Constituents - GC/MS VOA - 5 items											
2-Butanone	U	0.00	3.19	5.00	UGKG	1.0					
2-Nitropropane	U	0.00	3.29	4.98	UGKG	1.0					
Benzene	U	0.00	0.498	1.00	UGKG	1.0					
Carbon Disulfide	U	0.00	0.299	5.00	UGKG	1.0					
Toluene	U	0.00	0.896	1.00	UGKG	1.0					
Extractable Organics											
F004 Waste Constituents - GC/MS Ext. - 3 items											
Nitrobenzene	U	0.00	133	333	UGKG	1.0	JPA	08/04/99	2139	154035	3
m,p-Cresol	U	0.00	153	333	UGKG	1.0					
o-Cresol	U	0.00	63.3	333	UGKG	1.0					
Pyridine	U	0.00	130	333	UGKG	1.0					
Metals Analysis											
Silver		9310	346	2410	UGKG	10.	MBL	08/02/99	1833	153902	4
Aluminum		49400000	5680	24100	UGKG	10.					
Arsenic		2630	2190	2410	UGKG	10.					
Boron		29800000	12200	241000	UGKG	100	MBL	08/03/99	0921	153902	4
Barium		83600	260	2410	UGKG	10.	MBL	08/02/99	1833	153902	4
Beryllium	J	530	115	2410	UGKG	10.					
Calcium		1540000	33500	48100	UGKG	10.					
Cadmium	J	607	183	2410	UGKG	10.					
Cobalt		10900	159	2410	UGKG	10.					
Chromium		240000	366	2410	UGKG	10.					
Copper		42300	645	2410	UGKG	10.					
Iron		24700000	58100	58100	UGKG	10.					
Potassium		6580000	13600	48100	UGKG	10.					
Magnesium		4800000	2440	4810	UGKG	10.					
Manganese		408000	3410	4810	UGKG	10.					
Molybdenum	J	3600	635	4810	UGKG	10.					
Sodium		107000000	309000	481000	UGKG	100	MBL	08/03/99	0921	153902	4
Nickel		5210000	303	2410	UGKG	10.	MBL	08/02/99	1833	153902	4
Lead		64600	755	2410	UGKG	10.					

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Project Description: Hazardous Waste Contract

c: WSRC00497 Report Date: August 20, 1999

Sample ID : TCLP 12

rameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
ıtimony	U	-2710	1830	4810	UGKG	10.					
lenium	U	170	1300	2410	UGKG	10.	MBL	08/02/99	1833	153902	4
.icon		6110000	135000	481000	UGKG	100	MBL	08/03/99	0921	153902	4
n		23800	4010	4810	UGKG	10.	MBL	08/02/99	1833	153902	4
·ontium		22800	139	2410	UGKG	10.					
tanium		236000	192	2410	UGKG	10.					
ıallium	U	-548	2120	4810	UGKG	10.					
'anium		33000000	94600	241000	UGKG	100	MBL	08/03/99	0921	153902	4
ınadium		25600	255	2410	UGKG	10.	MBL	08/02/99	1833	153902	4
nc		19100000	17800	24100	UGKG	100	MBL	08/03/99	0921	153902	4
ıeral Chemistry											
ıtal Halogens - 3 items											
·omide	U	0.00	0.142	2.50	MGKG	1.0	RWS	07/17/99	0345	154421	5
ılorides	J	0.206	0.170	1.00	MGKG	1.0					
uoride	U	0.197	0.204	0.500	MGKG	1.0					
.trogen, Nitrate	U	0.00	0.119	0.500	MGKG	1.0	RWS	07/17/99	0345	154418	6
/aporative Loss @ 105 C	U	0.00	1.00	1.00	wt%	1.0	GJ	07/27/99	1815	154246	7
.trogen, Ammonia	U	0.00	0.240	1.00	mg/kg	1.0	THL	07/27/99	1754	154283	8

e following prep procedures were performed:

D Analysis		08/03/99		154228 N
ɔlatiles 8260 High Level	SM	07/26/99	2000	154327 N
C/MS 5970 Extractables	JMA	07/22/99	1600	154035 N
RACE	FGD	07/26/99	1830	153902 N

ırrogate Recovery	Test	Percent%	Acceptable Limits
4,6-Tribromophenol	F005C	66.9	(44.5 - 126.)
Fluorobiphenyl	F005C	57.3	(44.7 - 110.)
Fluorophenol	F005C	63.0	(37.0 - 102.)
itrobenzene-d5	F005C	55.8	(42.4 - 107.)
ıenol-d6	F005C	61.9	(41.5 - 102.)
Terphenyl-d14	F005C	74.9	(45.5 - 104.)

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Client: Westinghouse Savannah River Co.
Building 735-16A, Rm. 5
P.O. Box 616
Aiken, South Carolina 29802
Contact: Mr. Richard Groseclose
Project Description: Hazardous Waste Contract

cc: WSRC00497 Report Date: August 20, 1999

Sample ID : TCLP 12

Surrogate Recovery	Test	Percent%	Acceptable Limits
Bromofluorobenzene	F001-8260	89.9	(73.0 - 129.)
Dibromofluoromethane	F001-8260	102.	(66.0 - 117.)
Toluene-d8	F001-8260	99.5	(73.0 - 122.)
Bromofluorobenzene	F002-8260	89.9	(73.0 - 129.)
Dibromofluoromethane	F002-8260	102.	(66.0 - 117.)
Toluene-d8	F002-8260	99.5	(73.0 - 122.)
Bromofluorobenzene	F003A-8260	89.9	(73.0 - 129.)
Dibromofluoromethane	F003A-8260	102.	(66.0 - 117.)
Toluene-d8	F003A-8260	99.5	(73.0 - 122.)
Bromofluorobenzene	F005A-8260	89.9	(73.0 - 129.)
Dibromofluoromethane	F005A-8260	102.	(66.0 - 117.)
Toluene-d8	F005A-8260	99.5	(73.0 - 122.)

M = Method	Method-Description
M 1	GC/FID
M 2	EPA 8260B
M 3	EPA 8270C
M 4	EPA 6010B
M 5	EPA 9056
M 6	EPA 300.0
M 7	EPA 3550
M 8	EPA 350.1 modified

Notes:
The qualifiers in this report are defined as follows:
ND indicates that the analyte was not detected at a concentration greater than the detection limit.
J indicates presence of analyte at a concentration less than the reporting limit (RL) and greater than the detection limit (DL).
U indicates that the analyte was not detected at a concentration greater than the detection limit.
* indicates that a quality control analyte recovery is outside of specified acceptance criteria.

Data reported in mass/mass units is reported as 'dry weight'.

GENERAL ENGINEERING LABORATORIES

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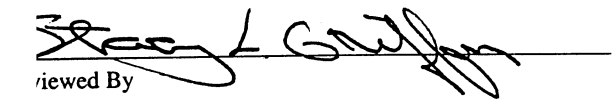
Contact:	Mr. Richard Groseclose
Project Description:	Hazardous Waste Contract

c: WSRC00497 Report Date: August 20, 1999

Sample ID : TCLP 12

= Method	Method-Description

s data report has been prepared and reviewed
ccordance with General Engineering Laboratories
ıdard operating procedures. Please direct
questions to your Project Manager, Stacy Griffin at 769-7376.



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Building 735-16A, Rm. 5
P.O. Box 616
Aiken, South Carolina 29802
Contact: Mr. Richard Groseclose
Project Description: Hazardous Waste Contract

cc: WSRC00497 Report Date: August 20, 1999

Sample ID	: TCLP 13
Lab ID	: 9907679-47
Matrix	: Soil
Date Collected	: 07/14/99
Date Received	: 07/15/99
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Volatile Organics											
F003 Waste Constituents - FID - 4 items											
Ethyl Acetate	U	0.00	10.0	10.0	mg/kg	1.0	CAK	07/29/99	1349	154228	1
Ethyl Ether	U	0.00	10.0	10.0	mg/kg	1.0					
Methyl Alcohol	J	4.60	4.00	10.0	MGKG	1.0	CAK	07/29/99	0227	154228	1
n-Butyl Alcohol	U	0.00	4.00	10.0	mg/kg	1.0					
F005 Waste Constituents - FID - 2 items											
Ethylene Glycol Monoethylether	U	0.00	20.0	20.0	mg/kg	1.0					
Isobutyl Alcohol	U	0.00	4.00	10.0	mg/kg	1.0					
F001 Waste Constituents - 7 items											
1,1,1-Trichloroethane	U	0.00	0.0996	1.00	UGKG	1.0	SDM	07/27/99	0037	154327	2
Carbon Tetrachloride	U	0.00	0.498	1.00	UGKG	1.0					
Methylene Chloride		3.76	1.39	1.39	UGKG	1.0					
Tetrachloroethylene	U	0.00	0.398	1.00	UGKG	1.0					
Trichloroethylene	U	0.00	0.299	1.00	UGKG	1.0					
Trichlorofluoromethane	U	0.00	0.299	1.00	UGKG	1.0					
Trichlorotrifluoroethane	U	0.00	9.96	20.0	UGKG	1.0					
F002 Waste Constituents - 9 items											
1,1,1-Trichloroethane	U	0.00	0.0996	1.00	UGKG	1.0					
1,1,2-Trichloroethane	U	0.00	0.299	1.00	UGKG	1.0					
1,2-Dichlorobenzene	U	0.00	0.498	1.00	UGKG	1.0					
Chlorobenzene	U	0.00	0.299	1.00	UGKG	1.0					
Methylene Chloride		3.76	1.39	1.39	UGKG	1.0					
Tetrachloroethylene	U	0.00	0.398	1.00	UGKG	1.0					
Trichloroethylene	U	0.00	0.299	1.00	UGKG	1.0					
Trichlorofluoromethane	U	0.00	0.299	1.00	UGKG	1.0					
Trichlorotrifluoroethane	U	0.00	9.96	20.0	UGKG	1.0					
F003 Waste Constituents - GC/MS VOA - 4 items											
4-Methyl-2-pentanone	U	0.00	3.09	5.00	UGKG	1.0					

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Contact: Mr. Richard Groseclose
Project Description: Hazardous Waste Contract

:: WSRC00497 Report Date: August 20, 1999

Sample ID : TCLP 13

rameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
etone	U	2.00	10.3	10.3	UGKG	1.0					
ıylbenzene	U	0.00	0.299	1.00	UGKG	1.0	SDM	07/27/99	0037	154327	2
lenes (TOTAL)	U	0.00	0.697	1.00	UGKG	1.0					
05 Waste Constituents - GC/MS VOA - 5 items											
3utanone	U	0.00	3.19	5.00	UGKG	1.0					
Nitropropane	U	0.00	3.29	4.98	UGKG	1.0					
nzene	U	0.00	0.498	1.00	UGKG	1.0					
rbon Disulfide	U	0.00	0.299	5.00	UGKG	1.0					
luene	U	0.00	0.896	1.00	UGKG	1.0					
ractable Organics											
04 Waste Constituents - GC/MS Ext. - 3 items											
trobenzene	U	0.00	133	333	UGKG	1.0	JPA	08/04/99	2209	154035	3
p-Cresol	U	0.00	153	333	UGKG	1.0					
Cresol	U	0.00	63.3	333	UGKG	1.0					
ridine	U	0.00	130	333	UGKG	1.0					
tals Analysis											
lver		10800	353	2450	UGKG	10.	MBL	08/02/99	1840	153902	4
uminum		56100000	5790	24500	UGKG	10.					
rsenic	J	2330	2230	2450	UGKG	10.					
ıron		31800000	12400	245000	UGKG	100	MBL	08/03/99	0927	153902	4
ırium		84500	265	2450	UGKG	10.	MBL	08/02/99	1840	153902	4
eryllium	J	557	118	2450	UGKG	10.					
alcium		1750000	34200	49000	UGKG	10.					
admium	J	1030	186	2450	UGKG	10.					
obalt		12700	162	2450	UGKG	10.					
hromium		332000	372	2450	UGKG	10.					
opper		43100	657	2450	UGKG	10.					
on		27500000	59200	59200	UGKG	10.					
otassium		5520000	13900	49000	UGKG	10.					
lagnesium		5150000	2480	4900	UGKG	10.					
anganese		388000	3470	4900	UGKG	10.					
olybdenum	J	3330	647	4900	UGKG	10.					
odium		108000000	315000	490000	UGKG	100	MBL	08/03/99	0927	153902	4
ickel		6200000	309	2450	UGKG	10.	MBL	08/02/99	1840	153902	4
Lead		72400	769	2450	UGKG	10.					

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Project Description: Hazardous Waste Contract

cc: WSRC00497 Report Date: August 20, 1999

Sample ID : TCLP 13

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Antimony	U	-2190	1870	4900	UGKG	10.					
Selenium	U	-96.0	1320	2450	UGKG	10.	MBL	08/02/99	1840	153902	4
Silicon		8120000	137000	490000	UGKG	100	MBL	08/03/99	0927	153902	4
Tin		6300	4080	4900	UGKG	10.	MBL	08/02/99	1840	153902	4
Strontium		25100	142	2450	UGKG	10.					
Titanium		288000	196	2450	UGKG	10.					
Thallium	U	-3090	2160	4900	UGKG	10.					
Uranium		38900000	96300	245000	UGKG	100	MBL	08/03/99	0927	153902	4
Vanadium		34900	260	2450	UGKG	10.	MBL	08/02/99	1840	153902	4
Zinc		20900000	18100	24500	UGKG	100	MBL	08/03/99	0927	153902	4
General Chemistry											
Total Halogens - 3 items											
Bromide	U	0.00	0.151	2.50	MGKG	1.0	RWS	07/17/99	0359	154421	5
Chlorides	U	0.00	0.180	1.00	MGKG	1.0					
Fluoride	U	0.00	0.217	0.500	MGKG	1.0					
Nitrogen, Nitrate	U	0.0796	0.126	0.500	MGKG	1.0	RWS	07/17/99	0359	154418	6
Evaporative Loss @ 105 C	U	0.00	1.00	1.00	wt%	1.0	GJ	07/27/99	1815	154246	7
Nitrogen, Ammonia	U	0.00	0.241	1.00	mg/kg	1.0	THL	07/27/99	1754	154283	8

The following prep procedures were performed:

FID Analysis		08/03/99		154228 N
Volatiles 8260 High Level	SM	07/26/99	2000	154327 N
GC/MS 5970 Extractables	JMA	07/22/99	1600	154035 N
TRACE	FGD	07/26/99	1830	153902 N

Surrogate Recovery	Test	Percent%	Acceptable Limits
2,4,6-Tribromophenol	F005C	66.1	(44.5 - 126.)
2-Fluorobiphenyl	F005C	51.4	(44.7 - 110.)
2-Fluorophenol	F005C	57.7	(37.0 - 102.)
Nitrobenzene-d5	F005C	51.5	(42.4 - 107.)
Phenol-d6	F005C	57.0	(41.5 - 102.)
p-Terphenyl-d14	F005C	79.8	(45.5 - 104.)

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Project Description: Hazardous Waste Contract

c: WSRC00497 Report Date: August 20, 1999

Sample ID : TCLP 13

rrogate Recovery	Test	Percent%	Acceptable Limits
omofluorobenzene	F001-8260	88.8	(73.0 - 129.)
bromofluoromethane	F001-8260	103.	(66.0 - 117.)
luene-d8	F001-8260	100.	(73.0 - 122.)
omofluorobenzene	F002-8260	88.8	(73.0 - 129.)
bromofluoromethane	F002-8260	103.	(66.0 - 117.)
luene-d8	F002-8260	100.	(73.0 - 122.)
omofluorobenzene	F003A-8260	88.8	(73.0 - 129.)
bromofluoromethane	F003A-8260	103.	(66.0 - 117.)
luene-d8	F003A-8260	100.	(73.0 - 122.)
omofluorobenzene	F005A-8260	88.8	(73.0 - 129.)
bromofluoromethane	F005A-8260	103.	(66.0 - 117.)
luene-d8	F005A-8260	100.	(73.0 - 122.)

= Method	Method-Description
1	GC/FID
2	EPA 8260B
3	EPA 8270C
4	EPA 6010B
5	EPA 9056
6	EPA 300.0
7	EPA 3550
8	EPA 350.1 modified

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Project Description:	Hazardous Waste Contract

cc: WSRC00497 Report Date: August 20, 1999

Sample ID : TCLP 13

M = Method	Method-Description

This data report has been prepared and reviewed in accordance with General Engineering Laboratories standard operating procedures. Please direct any questions to your Project Manager, Stacy Griffin at 769-7376.

Reviewed By

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Contact: Mr. Richard Groseclose
Project Description: Hazardous Waste Contract

c: WSRC00497 Report Date: August 20, 1999

Sample ID	: TCLP 14
Lab ID	: 9907679-49
Matrix	: Soil
Date Collected	: 07/14/99
Date Received	: 07/15/99
Priority	: Routine
Collector	: Client

rameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
latile Organics											
)03 Waste Constituents - FID - 4 items											
hyl Acetate	U	0.00	10.0	10.0	mg/kg	1.0	CAK	07/29/99	1526	154228	1
hyl Ether	U	0.00	10.0	10.0	mg/kg	1.0					
ethyl Alcohol	U	0.0261	4.00	10.0	MGKG	1.0	CAK	07/29/99	0253	154228	1
Butyl Alcohol	U	0.00	4.00	10.0	mg/kg	1.0					
)05 Waste Constituents - FID - 2 items											
hylene Glycol Monoethylether	U	0.00	20.0	20.0	mg/kg	1.0					
ɔbutyl Alcohol	U	0.00	4.00	10.0	mg/kg	1.0					
)01 Waste Constituents - 7 items											
1,1-Trichloroethane	U	0.00	0.100	1.00	UGKG	1.0	SDM	07/27/99	0108	154327	2
ɪrbon Tetrachloride	U	0.00	0.500	1.00	UGKG	1.0					
ethylene Chloride		4.47	1.40	1.40	UGKG	1.0					
ɛtrachloroethylene	U	0.00	0.400	1.00	UGKG	1.0					
ɪichloroethylene	U	0.00	0.300	1.00	UGKG	1.0					
ɪichlorofluoromethane	U	0.00	0.300	1.00	UGKG	1.0					
ɪichlorotrifluoroethane	U	0.00	10.0	20.0	UGKG	1.0					
)02 Waste Constituents - 9 items											
1,1-Trichloroethane	U	0.00	0.100	1.00	UGKG	1.0					
1,2-Trichloroethane	U	0.00	0.300	1.00	UGKG	1.0					
2-Dichlorobenzene	U	0.00	0.500	1.00	UGKG	1.0					
hlorobenzene	U	0.00	0.300	1.00	UGKG	1.0					
ɛthylene Chloride		4.47	1.40	1.40	UGKG	1.0					
ɛtrachloroethylene	U	0.00	0.400	1.00	UGKG	1.0					
ɪichloroethylene	U	0.00	0.300	1.00	UGKG	1.0					
ɪichlorofluoromethane	U	0.00	0.300	1.00	UGKG	1.0					
ɪichlorotrifluoroethane	U	0.00	10.0	20.0	UGKG	1.0					
)03 Waste Constituents - GC/MS VOA - 4 items											
-Methyl-2-pentanone	U	0.00	3.10	5.00	UGKG	1.0					

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Contact: Mr. Richard Groseclose
Project Description: Hazardous Waste Contract

cc: WSRC00497 Report Date: August 20, 1999

Sample ID : TCLP 14

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Acetone	U	2.02	10.3	10.3	UGKG	1.0					
Ethylbenzene	U	0.00	0.300	1.00	UGKG	1.0	SDM	07/27/99	0108	154327	2
Xylenes (TOTAL)	U	0.00	0.700	1.00	UGKG	1.0					
F005 Waste Constituents - GC/MS VOA - 5 items											
2-Butanone	U	0.00	3.20	5.00	UGKG	1.0					
2-Nitropropane	U	0.00	3.30	5.00	UGKG	1.0					
Benzene	U	0.00	0.500	1.00	UGKG	1.0					
Carbon Disulfide	U	0.00	0.300	5.00	UGKG	1.0					
Toluene	U	0.00	0.900	1.00	UGKG	1.0					
Extractable Organics											
F004 Waste Constituents - GC/MS Ext. - 3 items											
Nitrobenzene	U	0.00	133	333	UGKG	1.0	JPA	08/04/99	2239	154035	3
m,p-Cresol	U	0.00	153	333	UGKG	1.0					
o-Cresol	U	0.00	63.3	333	UGKG	1.0					
Pyridine	U	0.00	130	333	UGKG	1.0					
Metals Analysis											
Silver		12100	353	2450	UGKG	10.	MBL	08/02/99	1846	153902	4
Aluminum		63800000	5790	24500	UGKG	10.					
Arsenic	U	2170	2230	2450	UGKG	10.					
Boron		32500000	12400	245000	UGKG	100	MBL	08/03/99	0933	153902	4
Barium		99100	265	2450	UGKG	10.	MBL	08/02/99	1846	153902	4
Beryllium	J	646	118	2450	UGKG	10.					
Calcium		2160000	34200	49000	UGKG	10.					
Cadmium	J	1720	186	2450	UGKG	10.					
Cobalt		20400	162	2450	UGKG	10.					
Chromium		344000	372	2450	UGKG	10.					
Copper		66800	657	2450	UGKG	10.					
Iron		26800000	59200	59200	UGKG	10.					
Potassium		5620000	13900	49000	UGKG	10.					
Magnesium		5490000	2480	4900	UGKG	10.					
Manganese		348000	3470	4900	UGKG	10.					
Molybdenum	J	3810	647	4900	UGKG	10.					
Sodium		117000000	315000	490000	UGKG	100	MBL	08/03/99	0933	153902	4
Nickel		9370000	309	2450	UGKG	10.	MBL	08/02/99	1846	153902	4
Lead		96700	769	2450	UGKG	10.					

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Contact: Mr. Richard Groseclose
Project Description: Hazardous Waste Contract

:: WSRC00497 Report Date: August 20, 1999

Sample ID : TCLP 14

rameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
timony	U	-2000	1870	4900	UGKG	10.					
enium	U	360	1320	2450	UGKG	10.	MBL	08/02/99	1846	153902	4
icon		3490000	137000	490000	UGKG	100	MBL	08/03/99	0933	153902	4
ı		6020	4080	4900	UGKG	10.	MBL	08/02/99	1846	153902	4
ontium		29100	142	2450	UGKG	10.					
anium		413000	196	2450	UGKG	10.					
allium	U	-1720	2160	4900	UGKG	10.					
anium		41300000	96300	245000	UGKG	100	MBL	08/03/99	0933	153902	4
nadium		46100	260	2450	UGKG	10.	MBL	08/02/99	1846	153902	4
ıc		21300000	18100	24500	UGKG	100	MBL	08/03/99	0933	153902	4
ıeral Chemistry											
tal Halogens - 3 items											
ɔmide	U	0.00	0.143	2.50	MGKG	1.0	RWS	07/17/99	0413	154421	5
lorides	U	0.00	0.170	1.00	MGKG	1.0					
ıoride	U	0.104	0.205	0.500	MGKG	1.0					
trogen, Nitrate	U	0.00	0.120	0.500	MGKG	1.0	RWS	07/17/99	0413	154418	6
aporative Loss @ 105 C	U	0.00	1.00	1.00	wt%	1.0	GJ	07/27/99	1815	154246	7
trogen, Ammonia	U	0.199	0.480	1.00	mg/kg	1.0	THL	07/27/99	1754	154283	8

: following prep procedures were performed:

D Analysis		08/03/99	154228 N
ılatiles 8260 High Level	SM	07/26/99 2000	154327 N
C/MS 5970 Extractables	JMA	07/22/99 1600	154035 N
ŁACE	FGD	07/26/99 1830	153902 N

ırrogate Recovery	Test	Percent%	Acceptable Limits
4,6-Tribromophenol	F005C	62.7	(44.5 - 126.)
Fluorobiphenyl	F005C	49.2	(44.7 - 110.)
Fluorophenol	F005C	54.3	(37.0 - 102.)
trobenzene-d5	F005C	48.0	(42.4 - 107.)
ıenol-d6	F005C	52.2	(41.5 - 102.)
Terphenyl-d14	F005C	74.1	(45.5 - 104.)

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Contact: Mr. Richard Groseclose
Project Description: Hazardous Waste Contract

cc: WSRC00497 Report Date: August 20, 1999

Sample ID : TCLP 14

Surrogate Recovery	Test	Percent%	Acceptable Limits
Bromofluorobenzene	F001-8260	88.3	(73.0 - 129.)
Dibromofluoromethane	F001-8260	101.	(66.0 - 117.)
Toluene-d8	F001-8260	100.	(73.0 - 122.)
Bromofluorobenzene	F002-8260	88.3	(73.0 - 129.)
Dibromofluoromethane	F002-8260	101.	(66.0 - 117.)
Toluene-d8	F002-8260	100.	(73.0 - 122.)
Bromofluorobenzene	F003A-8260	88.3	(73.0 - 129.)
Dibromofluoromethane	F003A-8260	101.	(66.0 - 117.)
Toluene-d8	F003A-8260	100.	(73.0 - 122.)
Bromofluorobenzene	F005A-8260	88.3	(73.0 - 129.)
Dibromofluoromethane	F005A-8260	101.	(66.0 - 117.)
Toluene-d8	F005A-8260	100.	(73.0 - 122.)

M = Method	Method-Description
M 1	GC/FID
M 2	EPA 8260B
M 3	EPA 8270C
M 4	EPA 6010B
M 5	EPA 9056
M 6	EPA 300.0
M 7	EPA 3550
M 8	EPA 350.1 modified

Notes:
The qualifiers in this report are defined as follows:
ND indicates that the analyte was not detected at a concentration greater than the detection limit.
J indicates presence of analyte at a concentration less than the reporting limit (RL) and greater than the detection limit (DL).
U indicates that the analyte was not detected at a concentration greater than the detection limit.
* indicates that a quality control analyte recovery is outside of specified acceptance criteria.

Data reported in mass/mass units is reported as 'dry weight'.

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Contact:	Mr. Richard Groseclose
Project Description:	Hazardous Waste Contract

: WSRC00497 Report Date: August 20, 1999 Page 5 of 5

Sample ID : TCLP 14

= Method	Method-Description

data report has been prepared and reviewed
:cordance with General Engineering Laboratories
lard operating procedures. Please direct
questions to your Project Manager, Stacy Griffin at 769-7376.

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cc: WSRC00497 Report Date: August 20, 1999 Page 1 of 5

Sample ID	: TCLP 15
Lab ID	: 9907679-51
Matrix	: Soil
Date Collected	: 07/14/99
Date Received	: 07/15/99
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Volatile Organics											
F003 Waste Constituents - FID - 4 items											
Ethyl Acetate	U	0.00	10.0	10.0	mg/kg	1.0	CAK	07/29/99	1552	154228	1
Ethyl Ether	U	0.00	10.0	10.0	mg/kg	1.0					
Methyl Alcohol	U	0.00	4.00	10.0	MGKG	1.0	CAK	07/29/99	0345	154228	1
n-Butyl Alcohol	U	0.00	4.00	10.0	mg/kg	1.0					
F005 Waste Constituents - FID - 2 items											
Ethylene Glycol Monoethylether	U	0.00	20.0	20.0	mg/kg	1.0					
Isobutyl Alcohol	U	0.00	4.00	10.0	mg/kg	1.0					
F001 Waste Constituents - 7 items											
1,1,1-Trichloroethane	U	0.00	0.0998	1.00	UGKG	1.0	SDM	07/27/99	0139	154327	2
Carbon Tetrachloride	U	0.00	0.499	1.00	UGKG	1.0					
Methylene Chloride		3.94	1.40	1.40	UGKG	1.0					
Tetrachloroethylene	U	0.00	0.399	1.00	UGKG	1.0					
Trichloroethylene	U	0.00	0.299	1.00	UGKG	1.0					
Trichlorofluoromethane	U	0.00	0.299	1.00	UGKG	1.0					
Trichlorotrifluoroethane	U	0.00	9.98	20.0	UGKG	1.0					
F002 Waste Constituents - 9 items											
1,1,1-Trichloroethane	U	0.00	0.0998	1.00	UGKG	1.0					
1,1,2-Trichloroethane	U	0.00	0.299	1.00	UGKG	1.0					
1,2-Dichlorobenzene	U	0.00	0.499	1.00	UGKG	1.0					
Chlorobenzene	U	0.00	0.299	1.00	UGKG	1.0					
Methylene Chloride		3.94	1.40	1.40	UGKG	1.0					
Tetrachloroethylene	U	0.00	0.399	1.00	UGKG	1.0					
Trichloroethylene	U	0.00	0.299	1.00	UGKG	1.0					
Trichlorofluoromethane	U	0.00	0.299	1.00	UGKG	1.0					
Trichlorotrifluoroethane	U	0.00	9.98	20.0	UGKG	1.0					
F003 Waste Constituents - GC/MS VOA - 4 items											
4-Methyl-2-pentanone	U	0.00	3.09	5.00	UGKG	1.0					

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:: WSRC00497 Report Date: August 20, 1999

Sample ID : TCLP 15

rameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
etone	U	2.05	10.3	10.3	UGKG	1.0					
ıylbenzene	U	0.00	0.299	1.00	UGKG	1.0	SDM	07/27/99	0139	154327	2
lenes (TOTAL)	U	0.00	0.699	1.00	UGKG	1.0					
05 Waste Constituents - GC/MS VOA - 5 items											
3utanone	U	0.00	3.19	5.00	UGKG	1.0					
Nitropropane	U	0.00	3.29	4.99	UGKG	1.0					
nzene	U	0.00	0.499	1.00	UGKG	1.0					
rbon Disulfide	U	0.00	0.299	5.00	UGKG	1.0					
luene	U	0.00	0.898	1.00	UGKG	1.0					
ractable Organics											
04 Waste Constituents - GC/MS Ext. - 3 items											
trobenzene	U	0.00	133	333	UGKG	1.0	JPA	08/04/99	2309	154035	3
p-Cresol	U	0.00	153	333	UGKG	1.0					
Cresol	U	0.00	63.3	333	UGKG	1.0					
ridine	U	0.00	130	333	UGKG	1.0					
tals Analysis											
lver		10800	346	2410	UGKG	10.	MBL	08/02/99	1852	153902	4
uminum		68900000	5680	24100	UGKG	10.					
senic	U	1450	2190	2410	UGKG	10.					
ron		32800000	12200	241000	UGKG	100	MBL	08/03/99	0939	153902	4
rium		101000	260	2410	UGKG	10.	MBL	08/02/99	1852	153902	4
ryllium	J	618	115	2410	UGKG	10.					
lcium		2120000	33500	48100	UGKG	10.					
dmium	J	1830	183	2410	UGKG	10.					
balt		20300	159	2410	UGKG	10.					
romium		385000	366	2410	UGKG	10.					
pper		69000	645	2410	UGKG	10.					
n		24600000	58100	58100	UGKG	10.					
tassium		5920000	13600	48100	UGKG	10.					
agnesium		5510000	2440	4810	UGKG	10.					
anganese		323000	3410	4810	UGKG	10.					
olybdenum	J	3260	635	4810	UGKG	10.					
dium		114000000	309000	481000	UGKG	100	MBL	08/03/99	0939	153902	4
ickel		9540000	303	2410	UGKG	10.	MBL	08/02/99	1852	153902	4
ead		89800	755	2410	UGKG	10.					

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Project Description: Hazardous Waste Contract

cc: WSRC00497 Report Date: August 20, 1999

Sample ID : TCLP 15

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Antimony	U	-2190	1830	4810	UGKG	10.					
Selenium	U	-55.2	1300	2410	UGKG	10.	MBL	08/02/99	1852	153902	4
Silicon		6380000	135000	481000	UGKG	100	MBL	08/03/99	0939	153902	4
Tin		8700	4010	4810	UGKG	10.	MBL	08/02/99	1852	153902	4
Strontium		28400	139	2410	UGKG	10.					
Titanium		431000	192	2410	UGKG	10.					
Thallium	U	-3530	2120	4810	UGKG	10.					
Uranium		34100000	94600	241000	UGKG	100	MBL	08/03/99	0939	153902	4
Vanadium		43300	255	2410	UGKG	10.	MBL	08/02/99	1852	153902	4
Zinc		20900000	17800	24100	UGKG	100	MBL	08/03/99	0939	153902	4
General Chemistry											
Total Halogens - 3 items											
Bromide	J	0.329	0.143	2.50	MGKG	1.0	RWS	07/17/99	0427	154421	5
Chlorides	J	0.207	0.170	1.00	MGKG	1.0					
Fluoride	U	0.00	0.205	0.500	MGKG	1.0					
Nitrogen, Nitrate	U	0.00	0.120	0.500	MGKG	1.0	RWS	07/17/99	0427	154418	6
Evaporative Loss @ 105 C	U	0.00	1.00	1.00	wt%	1.0	GJ	07/27/99	1815	154246	7
Nitrogen, Ammonia	J	0.598	0.240	1.00	mg/kg	1.0	THL	07/27/99	1754	154283	8

The following prep procedures were performed:

FID Analysis		08/03/99		154228 N
Volatiles 8260 High Level	SM	07/26/99	2000	154327 N
GC/MS 5970 Extractables	JMA	07/22/99	1600	154035 N
TRACE	FGD	07/26/99	1830	153902 N

Surrogate Recovery	Test	Percent%	Acceptable Limits
2,4,6-Tribromophenol	F005C	65.3	(44.5 - 126.)
2-Fluorobiphenyl	F005C	57.9	(44.7 - 110.)
2-Fluorophenol	F005C	63.0	(37.0 - 102.)
Nitrobenzene-d5	F005C	56.0	(42.4 - 107.)
Phenol-d6	F005C	63.4	(41.5 - 102.)
p-Terphenyl-d14	F005C	79.9	(45.5 - 104.)

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Sample ID : TCLP 15

rrogate Recovery	Test	Percent%	Acceptable Limits
omofluorobenzene	F001-8260	88.4	(73.0 - 129.)
bromofluoromethane	F001-8260	102.	(66.0 - 117.)
luene-d8	F001-8260	100.	(73.0 - 122.)
omofluorobenzene	F002-8260	88.4	(73.0 - 129.)
bromofluoromethane	F002-8260	102.	(66.0 - 117.)
luene-d8	F002-8260	100.	(73.0 - 122.)
omofluorobenzene	F003A-8260	88.4	(73.0 - 129.)
bromofluoromethane	F003A-8260	102.	(66.0 - 117.)
luene-d8	F003A-8260	100.	(73.0 - 122.)
omofluorobenzene	F005A-8260	88.4	(73.0 - 129.)
bromofluoromethane	F005A-8260	102.	(66.0 - 117.)
luene-d8	F005A-8260	100.	(73.0 - 122.)

= Method	Method-Description
1	GC/FID
2	EPA 8260B
3	EPA 8270C
4	EPA 6010B
5	EPA 9056
6	EPA 300.0
7	EPA 3550
8	EPA 350.1 modified

es:
qualifiers in this report are defined as follows:
indicates that the analyte was not detected at a concentration greater than the detection limit.
dicates presence of analyte at a concentration less than the reporting limit (RL) and greater than the detection limit (DL).
ndicates that the analyte was not detected at a concentration greater than the detection limit.
ndicates that a quality control analyte recovery is outside of specified acceptance criteria.

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Sample ID : TCLP 15

M = Method	Method-Description

This data report has been prepared and reviewed in accordance with General Engineering Laboratories standard operating procedures. Please direct any questions to your Project Manager, Stacy Griffin at 769-7376.

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Project Description: Hazardous Waste Contract

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Sample ID	: TCLP 16
Lab ID	: 9907679-63
Matrix	: Soil
Date Collected	: 07/14/99
Date Received	: 07/15/99
Priority	: Routine
Collector	: Client

rameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
atile Organics											
03 Waste Constituents - FID - 4 items											
ıyl Acetate	U	0.00	10.0	10.0	mg/kg	1.0	CAK	07/29/99	1618	154228	1
ıyl Ether	U	0.00	10.0	10.0	mg/kg	1.0					
ɛthyl Alcohol	U	0.00	4.00	10.0	MGKG	1.0	CAK	07/29/99	0412	154228	1
3utyl Alcohol	U	0.00	4.00	10.0	mg/kg	1.0					
05 Waste Constituents - FID - 2 items											
ıylene Glycol Monoethylether	U	0.00	20.0	20.0	mg/kg	1.0					
ɔbutyl Alcohol	U	0.00	4.00	10.0	mg/kg	1.0					
01 Waste Constituents - 7 items											
,1-Trichloroethane	U	0.00	0.100	1.00	UGKG	1.0	SDM	07/27/99	0212	154327	2
rbon Tetrachloride	U	0.00	0.500	1.00	UGKG	1.0					
ɛthylene Chloride		3.97	1.40	1.40	UGKG	1.0					
trachloroethylene	U	0.00	0.400	1.00	UGKG	1.0					
ichloroethylene	U	0.00	0.300	1.00	UGKG	1.0					
ichlorofluoromethane	U	0.00	0.300	1.00	UGKG	1.0					
ichlorotrifluoroethane	U	0.00	10.0	20.0	UGKG	1.0					
02 Waste Constituents - 9 items											
,1-Trichloroethane	U	0.00	0.100	1.00	UGKG	1.0					
,2-Trichloroethane	U	0.00	0.300	1.00	UGKG	1.0					
?-Dichlorobenzene	U	0.00	0.500	1.00	UGKG	1.0					
ılorobenzene	U	0.00	0.300	1.00	UGKG	1.0					
ɛthylene Chloride		3.97	1.40	1.40	UGKG	1.0					
trachloroethylene	U	0.00	0.400	1.00	UGKG	1.0					
ichloroethylene	U	0.00	0.300	1.00	UGKG	1.0					
ichlorofluoromethane	U	0.00	0.300	1.00	UGKG	1.0					
ichlorotrifluoroethane	U	0.00	10.0	20.0	UGKG	1.0					
03 Waste Constituents - GC/MS VOA - 4 items											
Methyl-2-pentanone	U	0.00	3.10	5.00	UGKG	1.0					

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Sample ID : TCLP 16

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Acetone	U	1.90	10.3	10.3	UGKG	1.0					
Ethylbenzene	U	0.00	0.300	1.00	UGKG	1.0	SDM	07/27/99	0212	154327	2
Xylenes (TOTAL)	U	0.00	0.700	1.00	UGKG	1.0					
F005 Waste Constituents - GC/MS VOA - 5 items											
2-Butanone	U	0.00	3.20	5.00	UGKG	1.0					
2-Nitropropane	U	0.00	3.30	5.00	UGKG	1.0					
Benzene	U	0.00	0.500	1.00	UGKG	1.0					
Carbon Disulfide	U	0.00	0.300	5.00	UGKG	1.0					
Toluene	U	0.00	0.900	1.00	UGKG	1.0					
Extractable Organics											
F004 Waste Constituents - GC/MS Ext. - 3 items											
Nitrobenzene	U	0.00	133	333	UGKG	1.0	JPA	08/04/99	2338	154035	3
m,p-Cresol	U	0.00	153	333	UGKG	1.0					
o-Cresol	U	0.00	63.3	333	UGKG	1.0					
Pyridine	U	0.00	130	333	UGKG	1.0					
Metals Analysis											
Silver	J	1790	353	2450	UGKG	10.	MBL	08/02/99	1911	153902	4
Aluminum		54000000	5790	24500	UGKG	10.					
Arsenic	U	1610	2230	2450	UGKG	10.					
Boron		30600000	12400	245000	UGKG	100	MBL	08/03/99	1000	153902	4
Barium		104000	265	2450	UGKG	10.	MBL	08/02/99	1911	153902	4
Beryllium	J	994	118	2450	UGKG	10.					
Calcium		3190000	34200	49000	UGKG	10.					
Cadmium	J	577	186	2450	UGKG	10.					
Cobalt		4490	162	2450	UGKG	10.					
Chromium		505000	372	2450	UGKG	10.					
Copper		66600	657	2450	UGKG	10.					
Iron		20000000	59200	59200	UGKG	10.					
Potassium		7540000	13900	49000	UGKG	10.					
Magnesium		5140000	2480	4900	UGKG	10.					
Manganese		304000	3470	4900	UGKG	10.					
Molybdenum	J	3470	647	4900	UGKG	10.					
Sodium		95200000	315000	490000	UGKG	100	MBL	08/03/99	1000	153902	4
Nickel		1520000	309	2450	UGKG	10.	MBL	08/02/99	1911	153902	4
Lead		39700	769	2450	UGKG	10.					

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WSRC00497 Report Date: August 20, 1999

Sample ID : TCLP 16

ameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
imony	U	-1270	1870	4900	UGKG	10.					
enium	U	394	1320	2450	UGKG	10.	MBL	08/02/99	1911	153902	4
con		5900000	137000	490000	UGKG	100	MBL	08/03/99	1000	153902	4
		9610	4080	4900	UGKG	10.	MBL	08/02/99	1911	153902	4
ntium		30100	142	2450	UGKG	10.					
nium		726000	196	2450	UGKG	10.					
llium	U	-219	2160	4900	UGKG	10.					
nium		3860000	96300	245000	UGKG	100	MBL	08/03/99	1000	153902	4
adium		19600	260	2450	UGKG	10.	MBL	08/02/99	1911	153902	4
c		19800000	18100	24500	UGKG	100	MBL	08/03/99	1000	153902	4
eral Chemistry											
al Halogens - 3 items											
mide	U	0.00	0.154	2.53	MGKG	1.0	RWS	07/17/99	0441	154421	5
orides	U	0.00	0.183	1.01	MGKG	1.0					
oride	U	0.00	0.220	0.505	MGKG	1.0					
rogen, Nitrate	U	0.00	0.128	0.505	MGKG	1.0	RWS	07/17/99	0441	154418	6
aporative Loss @ 105 C	U	0.00	1.00	1.00	wt%	1.0	GJ	07/27/99	1815	154246	7
rogen, Ammonia	J	0.299	0.240	1.00	mg/kg	1.0	THL	07/27/99	1754	154283	8

following prep procedures were performed:

) Analysis		08/03/99	154228 N
latiles 8260 High Level	SM	07/26/99 2000	154327 N
/MS 5970 Extractables	JMA	07/22/99 1600	154035 N
ACE	FGD	07/26/99 1830	153902 N

rrogate Recovery	Test	Percent%	Acceptable Limits
,6-Tribromophenol	F005C	62.9	(44.5 - 126.)
luorobiphenyl	F005C	53.2	(44.7 - 110.)
luorophenol	F005C	58.5	(37.0 - 102.)
robenzene-d5	F005C	52.6	(42.4 - 107.)
enol-d6	F005C	57.9	(41.5 - 102.)
erphenyl-d14	F005C	74.2	(45.5 - 104.)

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Contact: Mr. Richard Groseclose
Project Description: Hazardous Waste Contract

cc: WSRC00497 Report Date: August 20, 1999

Sample ID : TCLP 16

Surrogate Recovery	Test	Percent%	Acceptable Limits
Bromofluorobenzene	F001-8260	89.8	(73.0 - 129.)
Dibromofluoromethane	F001-8260	101.	(66.0 - 117.)
Toluene-d8	F001-8260	101.	(73.0 - 122.)
Bromofluorobenzene	F002-8260	89.8	(73.0 - 129.)
Dibromofluoromethane	F002-8260	101.	(66.0 - 117.)
Toluene-d8	F002-8260	101.	(73.0 - 122.)
Bromofluorobenzene	F003A-8260	89.8	(73.0 - 129.)
Dibromofluoromethane	F003A-8260	101.	(66.0 - 117.)
Toluene-d8	F003A-8260	101.	(73.0 - 122.)
Bromofluorobenzene	F005A-8260	89.8	(73.0 - 129.)
Dibromofluoromethane	F005A-8260	101.	(66.0 - 117.)
Toluene-d8	F005A-8260	101.	(73.0 - 122.)

M = Method	Method-Description
M 1	GC/FID
M 2	EPA 8260B
M 3	EPA 8270C
M 4	EPA 6010B
M 5	EPA 9056
M 6	EPA 300.0
M 7	EPA 3550
M 8	EPA 350.1 modified

Notes:
The qualifiers in this report are defined as follows:
ND indicates that the analyte was not detected at a concentration greater than the detection limit.
J indicates presence of analyte at a concentration less than the reporting limit (RL) and greater than the detection limit (DL).
U indicates that the analyte was not detected at a concentration greater than the detection limit.
* indicates that a quality control analyte recovery is outside of specified acceptance criteria.

Data reported in mass/mass units is reported as 'dry weight'.

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Contact:	Mr. Richard Groseclose
Project Description:	Hazardous Waste Contract

c: WSRC00497 Report Date: August 20, 1999 Page 5 of 5

Sample ID : TCLP 16

= Method **Method-Description**

s data report has been prepared and reviewed
ccordance with General Engineering Laboratories
ıdard operating procedures. Please direct
questions to your Project Manager, Stacy Griffin at 769-7376.

Stacy L Griffin

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pendix M-5,
ial TCLP Results on 16 Grab Samples
s Rerun of the TCLP Leachant Solutions for all Metals, Including Nickel
, pp. 1 through 128

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Aiken, South Carolina 29802
Contact: Mr. Richard Groseclose
Project Description: Hazardous Waste Contract

cc: WSRC00497 Report Date: August 20, 1999

Sample ID	: TCLP 1
Lab ID	: 9907679-04
Matrix	: TCLP
Date Collected	: 07/14/99
Date Received	: 07/15/99
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Volatile Organics											
TCLP,Volatiles - 12 items											
1,1-Dichloroethylene	U	0.00	0.00700	0.0700	MGL	10.	DLS	07/29/99	0125	154649	1
1,2-Dichloroethane	U	0.00	0.00200	0.0500	MGL	10.					
1,4-Dichlorobenzene	U	0.00	0.00300	0.750	MGL	10.					
2-Butanone	U	0.00	0.0590	20.0	MGL	10.					
Benzene	U	0.00	0.00300	0.0500	MGL	10.					
Carbon Tetrachloride	U	0.00	0.00200	0.0500	MGL	10.					
Chlorobenzene	U	0.00	0.00300	10.0	MGL	10.					
Chloroform	U	0.00	0.00700	0.600	MGL	10.					
Tetrachloroethylene	U	0.00	0.00700	0.0700	MGL	10.					
Trichloroethylene	U	0.00	0.00600	0.0500	MGL	10.					
Trichlorotrifluoroethane	U	0.00	0.0113	0.0500	MGL	10.					
Vinyl chloride	U	0.00	0.00400	0.0200	MGL	10.					
Extractable Organics											
TCLP Semivolatile Compounds - 11 items											
2,4,5-Trichlorophenol	U	0.00	0.0125	40.0	MGL	1.0	TSD	07/27/99	2026	154067	2
2,4,6-Trichlorophenol	U	0.00	0.00480	0.200	MGL	1.0					
2,4-Dinitrotoluene	U	0.00	0.00700	0.0500	MGL	1.0					
Hexachlorobenzene	U	0.00	0.0145	0.0500	MGL	1.0					
Hexachlorobutadiene	U	0.00	0.0190	0.0500	MGL	1.0					
Hexachloroethane	U	0.00	0.0170	0.300	MGL	1.0					
Nitrobenzene	U	0.00	0.0165	0.200	MGL	1.0					
Pentachlorophenol	U	0.00	0.0140	10.0	MGL	1.0					
Pyridine	U	0.00	0.0165	0.500	MGL	1.0					
m,p-Cresol	U	0.00	0.00900	20.0	MGL	1.0					
o-Cresol	U	0.00	0.0105	20.0	MGL	1.0					
TCLP, Herbicides - 2 items											
2,4,5-TP	U	0.00	0.00940	0.100	MGL	10.	JC	07/28/99	1309	154220	3

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Contact: Mr. Richard Groseclose
Project Description: Hazardous Waste Contract

:: WSRC00497 Report Date: August 20, 1999

Sample ID : TCLP 1

rameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
-D	U	0.00	0.00900	1.00	MGL	10.					
LP Pesticides - 8 items											
lordane	U	0.00	0.00695	0.0125	MGL	1.0	SJ	07/27/99	1735	154069	4
drin	U	0.00	0.000400	0.00200	MGL	1.0					
ptachlor	U	0.00	0.000525	0.00100	MGL	1.0					
ptachlor & Hep. Epoxide	U	0.00	0.000710	0.00200	MGL	1.0					
ptachlor epoxide	U	0.00	0.000470	0.00100	MGL	1.0					
thoxychlor	U	0.00	0.00229	1.00	MGL	1.0					
xaphene	U	0.00	0.0132	0.0500	MGL	1.0					
nma-BHC	U	0.00	0.000185	0.0400	MGL	1.0					
tals Analysis											
rcury	U	-0.00107	0.000350	0.0200	MGL	1.0	RPM2	07/27/99	1400	154343	5
ver	J	0.0104	0.00730	0.500	MGL	10.	AME	08/01/99	1750	154250	6
senic	U	-0.0266	0.0451	0.500	MGL	10.					
rium	J	0.0175	0.00510	10.0	MGL	10.					
dmium	U	-0.00212	0.00440	0.100	MGL	10.					
romium	J	0.183	0.00560	0.500	MGL	10.					
ad	U	-0.00301	0.0159	0.500	MGL	10.					
lenium	U	0.00476	0.0271	0.100	MGL	10.					

following prep procedures were performed:

C/MS 5970 Extractables	ES	07/23/99	1000	154067	7
rbicides	HDB	07/26/99	1400	154220	7
sticides	HDB	07/26/99	1400	154069	7
ercury	ARD	07/26/99	1800	154343	7
CLP Extraction - Semivolatiles	JL	07/22/99	1555	153946	7
CLP Extraction - Volatiles	JL	07/23/99	1730	154087	7
CLP Prep (Metals, Prep Only)	JL	07/22/99	1555	153947	7

rrogate Recovery	Test	Percent%	Acceptable Limits
4,6-Tribromophenol	TCLP SEMIVOA	73.5	(41.0 - 122.)
Fluorobiphenyl	TCLP SEMIVOA	61.6	(41.2 - 107.)

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Project Description: Hazardous Waste Contract

cc: WSRC00497 Report Date: August 20, 1999

Sample ID : TCLP 1

Surrogate Recovery	Test	Percent%	Acceptable Limits
2-Fluorophenol	TCLP SEMIVOA	41.2	(23.6 - 75.9)
Nitrobenzene-d5	TCLP SEMIVOA	73.8	(35.3 - 108.)
Phenol-d6	TCLP SEMIVOA	28.8	(10.9 - 54.6)
p-Terphenyl-d14	TCLP SEMIVOA	92.6	(36.6 - 110.)
2,4-Dichlorophenylacetic acid	TCLP HERBICIDES	71.2	(43.9 - 145.)
4CMX	TCLP PESTICIDES	79.0	(46.0 - 125.)
Decachlorobiphenyl	TCLP PESTICIDES	86.5	(42.0 - 143.)
Bromofluorobenzene	TCLP VOA-8260B	84.7	(73.0 - 129.)
Dibromofluoromethane	TCLP VOA-8260B	93.8	(66.0 - 117.)
Toluene-d8	TCLP VOA-8260B	92.5	(73.0 - 122.)

M = Method	Method-Description
M 1	EPA 8260B
M 2	SW1311/8270C
M 3	EPA 8151
M 4	SW1311/8081A
M 5	EPA 7470A
M 6	SW846 6010A
M 7	SW846 3010A

Notes:
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Project Description: Hazardous Waste Contract

:: WSRC00497 Report Date: August 20, 1999 Page 4 of 4

Sample ID : TCLP 1

= Method	Method-Description

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questions to your Project Manager, Stacy Griffin at 769-7376.

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Contact: Mr. Richard Groseclose
Project Description: Hazardous Waste Contract

cc: WSRC00497 Report Date: August 20, 1999

Sample ID	: TCLP 2
Lab ID	: 9907679-06
Matrix	: TCLP
Date Collected	: 07/14/99
Date Received	: 07/15/99
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Volatile Organics											
TCLP,Volatiles - 12 items											
1,1-Dichloroethylene	U	0.00	0.00700	0.0700	MGL	10.	DLS	07/29/99	0152	154649	1
1,2-Dichloroethane	U	0.00	0.00200	0.0500	MGL	10.					
1,4-Dichlorobenzene	U	0.00	0.00300	0.750	MGL	10.					
2-Butanone	U	0.00	0.0590	20.0	MGL	10.					
Benzene	U	0.00	0.00300	0.0500	MGL	10.					
Carbon Tetrachloride	U	0.00	0.00200	0.0500	MGL	10.					
Chlorobenzene	U	0.00	0.00300	10.0	MGL	10.					
Chloroform	U	0.00	0.00700	0.600	MGL	10.					
Tetrachloroethylene	U	0.00	0.00700	0.0700	MGL	10.					
Trichloroethylene	U	0.00	0.00600	0.0500	MGL	10.					
Trichlorotrifluoroethane	U	0.00	0.0113	0.0500	MGL	10.					
Vinyl chloride	U	0.00	0.00400	0.0200	MGL	10.					
Extractable Organics											
TCLP Semivolatile Compounds - 11 items											
2,4,5-Trichlorophenol	U	0.00	0.0125	40.0	MGL	1.0	TSD	07/27/99	2010	154067	2
2,4,6-Trichlorophenol	U	0.00	0.00480	0.200	MGL	1.0					
2,4-Dinitrotoluene	U	0.00	0.00700	0.0500	MGL	1.0					
Hexachlorobenzene	U	0.00	0.0145	0.0500	MGL	1.0					
Hexachlorobutadiene	U	0.00	0.0190	0.0500	MGL	1.0					
Hexachloroethane	U	0.00	0.0170	0.300	MGL	1.0					
Nitrobenzene	U	0.00	0.0165	0.200	MGL	1.0					
Pentachlorophenol	U	0.00	0.0140	10.0	MGL	1.0					
Pyridine	U	0.00	0.0165	0.500	MGL	1.0					
m,p-Cresol	U	0.00	0.00900	20.0	MGL	1.0					
o-Cresol	U	0.00	0.0105	20.0	MGL	1.0					
TCLP, Herbicides - 2 items											
2,4,5-TP	U	0.00	0.00940	0.100	MGL	10.	JC	07/28/99	1331	154220	3

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Contact: Mr. Richard Groseclose
Project Description: Hazardous Waste Contract

: WSRC00497 Report Date: August 20, 1999

Sample ID : TCLP 2

·ameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
-D	U	0.00	0.00900	1.00	MGL	10.					
LP Pesticides - 8 items											
lordane	U	0.00	0.00695	0.0125	MGL	1.0	SJ	07/27/99	1802	154069	4
drin	U	0.00	0.000400	0.00200	MGL	1.0					
ptachlor	U	0.00	0.000525	0.00100	MGL	1.0					
ptachlor & Hep. Epoxide	U	0.00	0.000710	0.00200	MGL	1.0					
ptachlor epoxide	U	0.00	0.000470	0.00100	MGL	1.0					
thoxychlor	U	0.00	0.00229	1.00	MGL	1.0					
xaphene	U	0.00	0.0132	0.0500	MGL	1.0					
nma-BHC	U	0.00	0.000185	0.0400	MGL	1.0					
als Analysis											
rcury	U	-0.00118	0.000350	0.0200	MGL	1.0	RPM2	07/27/99	1406	154343	5
ver	J	0.00902	0.00730	0.500	MGL	10.	AME	08/01/99	1755	154250	6
senic	U	-0.0190	0.0451	0.500	MGL	10.					
rium	J	0.0269	0.00510	10.0	MGL	10.					
dmium	U	-0.000884	0.00440	0.100	MGL	10.					
romium	J	0.0148	0.00560	0.500	MGL	10.					
ad	U	-0.00802	0.0159	0.500	MGL	10.					
lenium	U	-0.00120	0.0271	0.100	MGL	10.					

following prep procedures were performed:

C/MS 5970 Extractables	ES	07/23/99	1000	154067	7
rbicides	HDB	07/26/99	1400	154220	7
sticides	HDB	07/26/99	1400	154069	7
rcury	ARD	07/26/99	1800	154343	7
CLP Extraction - Semivolatiles	JL	07/22/99	1555	153946	7
CLP Extraction - Volatiles	JL	07/23/99	1730	154087	7
CLP Prep (Metals, Prep Only)	JL	07/22/99	1555	153947	7

rrogate Recovery	Test	Percent%	Acceptable Limits
4,6-Tribromophenol	TCLP SEMIVOA	77.4	(41.0 - 122.)
Fluorobiphenyl	TCLP SEMIVOA	67.2	(41.2 - 107.)

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Project Description: Hazardous Waste Contract

cc: WSRC00497 Report Date: August 20, 1999

Sample ID : TCLP 2

Surrogate Recovery	Test	Percent %	Acceptable Limits
2-Fluorophenol	TCLP SEMIVOA	43.5	(23.6 - 75.9)
Nitrobenzene-d5	TCLP SEMIVOA	84.6	(35.3 - 108.)
Phenol-d6	TCLP SEMIVOA	29.9	(10.9 - 54.6)
p-Terphenyl-d14	TCLP SEMIVOA	94.4	(36.6 - 110.)
2,4-Dichlorophenylacetic acid	TCLP HERBICIDES	77.6	(43.9 - 145.)
4CMX	TCLP PESTICIDES	90.5	(46.0 - 125.)
Decachlorobiphenyl	TCLP PESTICIDES	87.5	(42.0 - 143.)
Bromofluorobenzene	TCLP VOA-8260B	85.5	(73.0 - 129.)
Dibromofluoromethane	TCLP VOA-8260B	92.8	(66.0 - 117.)
Toluene-d8	TCLP VOA-8260B	91.8	(73.0 - 122.)

M = Method	Method-Description
M 1	EPA 8260B
M 2	SW1311/8270C
M 3	EPA 8151
M 4	SW1311/8081A
M 5	EPA 7470A
M 6	SW846 6010A
M 7	SW846 3010A

Notes:
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:: WSRC00497 Report Date: August 20, 1999 Page 4 of 4

Sample ID : TCLP 2

= Method	Method-Description

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Contact: Mr. Richard Groseclose
Project Description: Hazardous Waste Contract

cc: WSRC00497 Report Date: August 20, 1999

Sample ID	: TCLP 3
Lab ID	: 9907679-18
Matrix	: TCLP
Date Collected	: 07/14/99
Date Received	: 07/15/99
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Volatile Organics											
TCLP,Volatiles - 12 items											
1,1-Dichloroethylene	U	0.00	0.00700	0.0700	MGL	10.	DLS	07/29/99	0221	154649	1
1,2-Dichloroethane	U	0.00	0.00200	0.0500	MGL	10.					
1,4-Dichlorobenzene	U	0.00	0.00300	0.750	MGL	10.					
2-Butanone	U	0.00	0.0590	20.0	MGL	10.					
Benzene	U	0.00	0.00300	0.0500	MGL	10.					
Carbon Tetrachloride	U	0.00	0.00200	0.0500	MGL	10.					
Chlorobenzene	U	0.00	0.00300	10.0	MGL	10.					
Chloroform	U	0.00	0.00700	0.600	MGL	10.					
Tetrachloroethylene	U	0.00	0.00700	0.0700	MGL	10.					
Trichloroethylene	J	0.0187	0.00600	0.0500	MGL	10.					
Trichlorotrifluoroethane	U	0.00	0.0113	0.0500	MGL	10.					
Vinyl chloride	U	0.00	0.00400	0.0200	MGL	10.					
Extractable Organics											
TCLP Semivolatile Compounds - 11 items											
2,4,5-Trichlorophenol	U	0.00	0.0125	40.0	MGL	1.0	TSD	07/27/99	2042	154067	2
2,4,6-Trichlorophenol	U	0.00	0.00480	0.200	MGL	1.0					
2,4-Dinitrotoluene	U	0.00	0.00700	0.0500	MGL	1.0					
Hexachlorobenzene	U	0.00	0.0145	0.0500	MGL	1.0					
Hexachlorobutadiene	U	0.00	0.0190	0.0500	MGL	1.0					
Hexachloroethane	U	0.00	0.0170	0.300	MGL	1.0					
Nitrobenzene	U	0.00	0.0165	0.200	MGL	1.0					
Pentachlorophenol	U	0.00	0.0140	10.0	MGL	1.0					
Pyridine	U	0.00	0.0165	0.500	MGL	1.0					
m,p-Cresol	U	0.00	0.00900	20.0	MGL	1.0					
o-Cresol	U	0.00	0.0105	20.0	MGL	1.0					
TCLP, Herbicides - 2 items											
2,4,5-TP	U	0.00	0.00940	0.100	MGL	10.	JC	07/28/99	1354	154220	3

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Contact: Mr. Richard Groseclose
Project Description: Hazardous Waste Contract

c: WSRC00497 Report Date: August 20, 1999

Sample ID : TCLP 3

rameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
l-D	U	0.00	0.00900	1.00	MGL	10.					
LP Pesticides - 8 items											
ılordane	U	0.00	0.00695	0.0125	MGL	1.0	SJ	07/27/99	1829	154069	4
drin	U	0.00	0.000400	0.00200	MGL	1.0					
ptachlor	U	0.00	0.000525	0.00100	MGL	1.0					
ptachlor & Hep. Epoxide	U	0.00	0.000710	0.00200	MGL	1.0					
ptachlor epoxide	U	0.00	0.000470	0.00100	MGL	1.0					
ethoxychlor	U	0.00	0.00229	1.00	MGL	1.0					
xaphene	U	0.00	0.0132	0.0500	MGL	1.0					
mma-BHC	U	0.00	0.000185	0.0400	MGL	1.0					
tals Analysis											
ercury	U	-0.00122	0.000350	0.0200	MGL	1.0	RPM2	07/27/99	1407	154343	5
lver	J	0.0118	0.00730	0.500	MGL	10.	AME	08/01/99	1801	154250	6
senic	U	-0.0248	0.0451	0.500	MGL	10.					
rium	J	0.0115	0.00510	10.0	MGL	10.					
dmium	U	-0.00145	0.00440	0.100	MGL	10.					
romium	J	0.0134	0.00560	0.500	MGL	10.					
ad	U	-0.00650	0.0159	0.500	MGL	10.					
lenium	U	-0.00196	0.0271	0.100	MGL	10.					

e following prep procedures were performed:

C/MS 5970 Extractables	ES	07/23/99	1000	154067	7
rbicides	HDB	07/26/99	1400	154220	7
sticides	HDB	07/26/99	1400	154069	7
ercury	ARD	07/26/99	1800	154343	7
CLP Extraction - Semivolatiles	JL	07/22/99	1555	153946	7
CLP Extraction - Volatiles	JL	07/23/99	1730	154087	7
CLP Prep (Metals, Prep Only)	JL	07/22/99	1555	153947	7

rrogate Recovery	Test	Percent%	Acceptable Limits
4,6-Tribromophenol	TCLP SEMIVOA	75.8	(41.0 - 122.)
Fluorobiphenyl	TCLP SEMIVOA	61.8	(41.2 - 107.)

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Client: Westinghouse Savannah River Co.
Building 735-16A, Rm. 5
P.O. Box 616
Aiken, South Carolina 29802
Contact: Mr. Richard Groseclose
Project Description: Hazardous Waste Contract

cc: WSRC00497 Report Date: August 20, 1999

Sample ID : TCLP 3

Surrogate Recovery	Test	Percent%	Acceptable Limits
2-Fluorophenol	TCLP SEMIVOA	40.1	(23.6 - 75.9)
Nitrobenzene-d5	TCLP SEMIVOA	70.7	(35.3 - 108.)
Phenol-d6	TCLP SEMIVOA	29.0	(10.9 - 54.6)
p-Terphenyl-d14	TCLP SEMIVOA	105.	(36.6 - 110.)
2,4-Dichlorophenylacetic acid	TCLP HERBICIDES	67.4	(43.9 - 145.)
4CMX	TCLP PESTICIDES	83.0	(46.0 - 125.)
Decachlorobiphenyl	TCLP PESTICIDES	82.5	(42.0 - 143.)
Bromofluorobenzene	TCLP VOA-8260B	85.7	(73.0 - 129.)
Dibromofluoromethane	TCLP VOA-8260B	94.0	(66.0 - 117.)
Toluene-d8	TCLP VOA-8260B	94.0	(73.0 - 122.)

M = Method	Method-Description
M 1	EPA 8260B
M 2	SW1311/8270C
M 3	EPA 8151
M 4	SW1311/8081A
M 5	EPA 7470A
M 6	SW846 6010A
M 7	SW846 3010A

Notes:
The qualifiers in this report are defined as follows:
ND indicates that the analyte was not detected at a concentration greater than the detection limit.
J indicates presence of analyte at a concentration less than the reporting limit (RL) and greater than the detection limit (DL).
U indicates that the analyte was not detected at a concentration greater than the detection limit.
* indicates that a quality control analyte recovery is outside of specified acceptance criteria.

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Contact: Mr. Richard Groseclose
Project Description: Hazardous Waste Contract

:: WSRC00497 Report Date: August 20, 1999

Sample ID : TCLP 3

= Method	Method-Description

; data report has been prepared and reviewed
:cordance with General Engineering Laboratories
dard operating procedures. Please direct
questions to your Project Manager, Stacy Griffin at 769-7376.

Stacy L. Griffin
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Aiken, South Carolina 29802
Contact: Mr. Richard Groseclose
Project Description: Hazardous Waste Contract

cc: WSRC00497 Report Date: August 20, 1999

Sample ID	: TCLP 4
Lab ID	: 9907679-20
Matrix	: TCLP
Date Collected	: 07/14/99
Date Received	: 07/15/99
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Volatile Organics											
TCLP,Volatiles - 12 items											
1,1-Dichloroethylene	U	0.00	0.00700	0.0700	MGL	10.	DLS	07/29/99	0249	154649	1
1,2-Dichloroethane	U	0.00	0.00200	0.0500	MGL	10.					
1,4-Dichlorobenzene	U	0.00	0.00300	0.750	MGL	10.					
2-Butanone	U	0.00	0.0590	20.0	MGL	10.					
Benzene	U	0.00	0.00300	0.0500	MGL	10.					
Carbon Tetrachloride	U	0.00	0.00200	0.0500	MGL	10.					
Chlorobenzene	U	0.00	0.00300	10.0	MGL	10.					
Chloroform	U	0.00	0.00700	0.600	MGL	10.					
Tetrachloroethylene	U	0.00	0.00700	0.0700	MGL	10.					
Trichloroethylene	U	0.00	0.00600	0.0500	MGL	10.					
Trichlorotrifluoroethane	U	0.00	0.0113	0.0500	MGL	10.					
Vinyl chloride	U	0.00	0.00400	0.0200	MGL	10.					
Extractable Organics											
TCLP Semivolatile Compounds - 11 items											
2,4,5-Trichlorophenol	U	0.00	0.0125	40.0	MGL	1.0	TSD	07/27/99	2058	154067	2
2,4,6-Trichlorophenol	U	0.00	0.00480	0.200	MGL	1.0					
2,4-Dinitrotoluene	U	0.00	0.00700	0.0500	MGL	1.0					
Hexachlorobenzene	U	0.00	0.0145	0.0500	MGL	1.0					
Hexachlorobutadiene	U	0.00	0.0190	0.0500	MGL	1.0					
Hexachloroethane	U	0.00	0.0170	0.300	MGL	1.0					
Nitrobenzene	U	0.00	0.0165	0.200	MGL	1.0					
Pentachlorophenol	U	0.00	0.0140	10.0	MGL	1.0					
Pyridine	U	0.00	0.0165	0.500	MGL	1.0					
m,p-Cresol	U	0.00	0.00900	20.0	MGL	1.0					
o-Cresol	U	0.00	0.0105	20.0	MGL	1.0					
TCLP, Herbicides - 2 items											
2,4,5-TP	U	0.00	0.00940	0.100	MGL	10.	JC	07/28/99	1416	154220	3

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Contact: Mr. Richard Groseclose
Project Description: Hazardous Waste Contract

c: WSRC00497 Report Date: August 20, 1999

Sample ID : TCLP 4

ırameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
4-D	U	0.00	0.00900	1.00	MGL	10.					
CLP Pesticides - 8 items											
ılordane	U	0.00	0.00695	0.0125	MGL	1.0	SJ	07/27/99	1856	154069	4
ıdrin	U	0.00	0.000400	0.00200	MGL	1.0					
ɛptachlor	U	0.00	0.000525	0.00100	MGL	1.0					
ɛptachlor & Hep. Epoxide	U	0.00	0.000710	0.00200	MGL	1.0					
ɛptachlor epoxide	U	0.00	0.000470	0.00100	MGL	1.0					
ethoxychlor	U	0.00	0.00229	1.00	MGL	1.0					
ɔxaphene	U	0.00	0.0132	0.0500	MGL	1.0					
ımma-BHC	U	0.00	0.000185	0.0400	MGL	1.0					
tals Analysis											
ercury	U	-0.00124	0.000350	0.0200	MGL	1.0	RPM2	07/27/99	1409	154343	5
lver	J	0.0109	0.00730	0.500	MGL	10.	AME	08/01/99	1806	154250	6
ɛsenic	U	-0.0175	0.0451	0.500	MGL	10.					
ırium	J	0.00986	0.00510	10.0	MGL	10.					
ıdmium	U	0.000370	0.00440	0.100	MGL	10.					
ıromium	J	0.00653	0.00560	0.500	MGL	10.					
ɛad	U	-0.00811	0.0159	0.500	MGL	10.					
ɛlenium	U	0.0106	0.0271	0.100	MGL	10.					

e following prep procedures were performed:

C/MS 5970 Extractables	ES	07/23/99	1000	154067	7
ɛrbicides	HDB	07/26/99	1400	154220	7
ɛsticides	HDB	07/26/99	1400	154069	7
ercury	ARD	07/26/99	1800	154343	7
CLP Extraction - Semivolatiles	JL	07/22/99	1555	153946	7
CLP Extraction - Volatiles	JL	07/26/99	1855	154354	7
CLP Prep (Metals, Prep Only)	JL	07/22/99	1555	153947	7

ırrogate Recovery	Test	Percent%	Acceptable Limits
4,6-Tribromophenol	TCLP SEMIVOA	81.2	(41.0 - 122.)
Fluorobiphenyl	TCLP SEMIVOA	68.0	(41.2 - 107.)

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cc: WSRC00497 Report Date: August 20, 1999

Sample ID : TCLP 4

Surrogate Recovery	Test	Percent%	Acceptable Limits
2-Fluorophenol	TCLP SEMIVOA	47.6	(23.6 - 75.9)
Nitrobenzene-d5	TCLP SEMIVOA	83.7	(35.3 - 108.)
Phenol-d6	TCLP SEMIVOA	32.8	(10.9 - 54.6)
p-Terphenyl-d14	TCLP SEMIVOA	96.2	(36.6 - 110.)
2,4-Dichlorophenylacetic acid	TCLP HERBICIDES	77.0	(43.9 - 145.)
4CMX	TCLP PESTICIDES	88.5	(46.0 - 125.)
Decachlorobiphenyl	TCLP PESTICIDES	98.5	(42.0 - 143.)
Bromofluorobenzene	TCLP VOA-8260B	85.2	(73.0 - 129.)
Dibromofluoromethane	TCLP VOA-8260B	93.8	(66.0 - 117.)
Toluene-d8	TCLP VOA-8260B	93.2	(73.0 - 122.)

M = Method	Method-Description
M 1	EPA 8260B
M 2	SW1311/8270C
M 3	EPA 8151
M 4	SW1311/8081A
M 5	EPA 7470A
M 6	SW846 6010A
M 7	SW846 3010A

Notes:
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Contact:	Mr. Richard Groseclose
Project Description:	Hazardous Waste Contract

c: WSRC00497 Report Date: August 20, 1999

Sample ID : TCLP 4

= Method	Method-Description

s data report has been prepared and reviewed
ccordance with General Engineering Laboratories
ıdard operating procedures. Please direct
questions to your Project Manager, Stacy Griffin at 769-7376.

Stacy L. Griffin

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Contact: Mr. Richard Groseclose
Project Description: Hazardous Waste Contract

cc: WSRC00497 Report Date: August 20, 1999

Sample ID	: TCLP 5
Lab ID	: 9907679-22
Matrix	: TCLP
Date Collected	: 07/14/99
Date Received	: 07/15/99
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Volatile Organics											
TCLP,Volatiles - 12 items											
1,1-Dichloroethylene	U	0.00	0.00700	0.0700	MGL	10.	DLS	07/29/99	0318	154649	1
1,2-Dichloroethane	U	0.00	0.00200	0.0500	MGL	10.					
1,4-Dichlorobenzene	U	0.00	0.00300	0.750	MGL	10.					
2-Butanone	U	0.00	0.0590	20.0	MGL	10.					
Benzene	U	0.00	0.00300	0.0500	MGL	10.					
Carbon Tetrachloride	U	0.00	0.00200	0.0500	MGL	10.					
Chlorobenzene	U	0.00	0.00300	10.0	MGL	10.					
Chloroform	U	0.00	0.00700	0.600	MGL	10.					
Tetrachloroethylene	U	0.00	0.00700	0.0700	MGL	10.					
Trichloroethylene	U	0.00	0.00600	0.0500	MGL	10.					
Trichlorotrifluoroethane	U	0.00	0.0113	0.0500	MGL	10.					
Vinyl chloride	U	0.00	0.00400	0.0200	MGL	10.					
Extractable Organics											
TCLP Semivolatile Compounds - 11 items											
2,4,5-Trichlorophenol	U	0.00	0.0125	40.0	MGL	1.0	TSD	07/27/99	2114	154067	2
2,4,6-Trichlorophenol	U	0.00	0.00480	0.200	MGL	1.0					
2,4-Dinitrotoluene	U	0.00	0.00700	0.0500	MGL	1.0					
Hexachlorobenzene	U	0.00	0.0145	0.0500	MGL	1.0					
Hexachlorobutadiene	U	0.00	0.0190	0.0500	MGL	1.0					
Hexachloroethane	U	0.00	0.0170	0.300	MGL	1.0					
Nitrobenzene	U	0.00	0.0165	0.200	MGL	1.0					
Pentachlorophenol	U	0.00	0.0140	10.0	MGL	1.0					
Pyridine	U	0.00	0.0165	0.500	MGL	1.0					
m,p-Cresol	U	0.00	0.00900	20.0	MGL	1.0					
o-Cresol	U	0.00	0.0105	20.0	MGL	1.0					
TCLP, Herbicides - 2 items											
2,4,5-TP	U	0.00	0.00940	0.100	MGL	10.	JC	07/28/99	1439	154220	3

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Contact: Mr. Richard Groseclose
Project Description: Hazardous Waste Contract

c: WSRC00497 Report Date: August 20, 1999

Sample ID : TCLP 5

rameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
l-D	U	0.00	0.00900	1.00	MGL	10.					
CLP Pesticides - 8 items											
ılordane	U	0.00	0.00695	0.0125	MGL	1.0	SJ	07/27/99	1924	154069	4
ıdrin	U	0.00	0.000400	0.00200	MGL	1.0					
ptachlor	U	0.00	0.000525	0.00100	MGL	1.0					
ptachlor & Hep. Epoxide	U	0.00	0.000710	0.00200	MGL	1.0					
ptachlor epoxide	U	0.00	0.000470	0.00100	MGL	1.0					
ethoxychlor	U	0.00	0.00229	1.00	MGL	1.0					
oxaphene	U	0.00	0.0132	0.0500	MGL	1.0					
mma-BHC	U	0.00	0.000185	0.0400	MGL	1.0					
tals Analysis											
ercury	U	-0.00120	0.000350	0.0200	MGL	1.0	RPM2	07/27/99	1411	154343	5
lver	J	0.00952	0.00730	0.500	MGL	10.	AME	08/01/99	1812	154250	6
rsenic	U	-0.0272	0.0451	0.500	MGL	10.					
ırium	J	0.00837	0.00510	10.0	MGL	10.					
ıdmium	U	-0.00136	0.00440	0.100	MGL	10.					
ıromium	U	0.00341	0.00560	0.500	MGL	10.					
ad	U	-0.00919	0.0159	0.500	MGL	10.					
lenium	U	0.00777	0.0271	0.100	MGL	10.					

e following prep procedures were performed:

C/MS 5970 Extractables	ES	07/23/99	1000	154067 7
erbicides	HDB	07/26/99	1400	154220 7
esticides	HDB	07/26/99	1400	154069 7
ercury	ARD	07/26/99	1800	154343 7
CLP Extraction - Semivolatiles	JL	07/22/99	1555	153946 7
CLP Extraction - Volatiles	JL	07/26/99	1855	154354 7
CLP Prep (Metals, Prep Only)	JL	07/22/99	1555	153947 7

urrogate Recovery	Test	Percent%	Acceptable Limits
,4,6-Tribromophenol	TCLP SEMIVOA	74.4	(41.0 - 122.)
-Fluorobiphenyl	TCLP SEMIVOA	59.7	(41.2 - 107.)

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Contact: Mr. Richard Groseclose
Project Description: Hazardous Waste Contract

cc: WSRC00497 Report Date: August 20, 1999

Sample ID : TCLP 5

Surrogate Recovery	Test	Percent%	Acceptable Limits
2-Fluorophenol	TCLP SEMIVOA	41.0	(23.6 - 75.9)
Nitrobenzene-d5	TCLP SEMIVOA	73.7	(35.3 - 108.)
Phenol-d6	TCLP SEMIVOA	28.8	(10.9 - 54.6)
p-Terphenyl-d14	TCLP SEMIVOA	87.8	(36.6 - 110.)
2,4-Dichlorophenylacetic acid	TCLP HERBICIDES	65.0	(43.9 - 145.)
4CMX	TCLP PESTICIDES	90.5	(46.0 - 125.)
Decachlorobiphenyl	TCLP PESTICIDES	94.5	(42.0 - 143.)
Bromofluorobenzene	TCLP VOA-8260B	86.4	(73.0 - 129.)
Dibromofluoromethane	TCLP VOA-8260B	93.6	(66.0 - 117.)
Toluene-d8	TCLP VOA-8260B	93.0	(73.0 - 122.)

M = Method	Method-Description
M 1	EPA 8260B
M 2	SW1311/8270C
M 3	EPA 8151
M 4	SW1311/8081A
M 5	EPA 7470A
M 6	SW846 6010A
M 7	SW846 3010A

Notes:
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Project Description: Hazardous Waste Contract

c: WSRC00497 Report Date: August 20, 1999 Page 4 of 4

Sample ID : TCLP 5

= Method	Method-Description

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ıdard operating procedures. Please direct
questions to your Project Manager, Stacy Griffin at 769-7376.

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Contact: Mr. Richard Groseclose
Project Description: Hazardous Waste Contract

cc: WSRC00497 Report Date: August 20, 1999

Sample ID	: TCLP 6
Lab ID	: 9907679-24
Matrix	: TCLP
Date Collected	: 07/14/99
Date Received	: 07/15/99
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Volatile Organics											
TCLP, Volatiles - 12 items											
1,1-Dichloroethylene	U	0.00	0.00700	0.0700	MGL	10.	DLS	07/29/99	0347	154649	1
1,2-Dichloroethane	U	0.00	0.00200	0.0500	MGL	10.					
1,4-Dichlorobenzene	U	0.00	0.00300	0.750	MGL	10.					
2-Butanone	U	0.00	0.0590	20.0	MGL	10.					
Benzene	U	0.00	0.00300	0.0500	MGL	10.					
Carbon Tetrachloride	U	0.00	0.00200	0.0500	MGL	10.					
Chlorobenzene	U	0.00	0.00300	10.0	MGL	10.					
Chloroform	U	0.00	0.00700	0.600	MGL	10.					
Tetrachloroethylene	U	0.00	0.00700	0.0700	MGL	10.					
Trichloroethylene	J	0.0197	0.00600	0.0500	MGL	10.					
Trichlorotrifluoroethane	U	0.00	0.0113	0.0500	MGL	10.					
Vinyl chloride	U	0.00	0.00400	0.0200	MGL	10.					
Extractable Organics											
TCLP Semivolatile Compounds - 11 items											
2,4,5-Trichlorophenol	U	0.00	0.0125	40.0	MGL	1.0	TSD	07/27/99	2129	154067	2
2,4,6-Trichlorophenol	U	0.00	0.00480	0.200	MGL	1.0					
2,4-Dinitrotoluene	U	0.00	0.00700	0.0500	MGL	1.0					
Hexachlorobenzene	U	0.00	0.0145	0.0500	MGL	1.0					
Hexachlorobutadiene	U	0.00	0.0190	0.0500	MGL	1.0					
Hexachloroethane	U	0.00	0.0170	0.300	MGL	1.0					
Nitrobenzene	U	0.00	0.0165	0.200	MGL	1.0					
Pentachlorophenol	U	0.00	0.0140	10.0	MGL	1.0					
Pyridine	U	0.00	0.0165	0.500	MGL	1.0					
m,p-Cresol	U	0.00	0.00900	20.0	MGL	1.0					
o-Cresol	U	0.00	0.0105	20.0	MGL	1.0					
TCLP, Herbicides - 2 items											
2,4,5-TP	U	0.00	0.00940	0.100	MGL	10.	JC	07/28/99	1524	154220	3

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P.O. Box 616
Aiken, South Carolina 29802
Contact: Mr. Richard Groseclose
Project Description: Hazardous Waste Contract

c: WSRC00497 Report Date: August 20, 1999

Sample ID : TCLP 6

rameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
l-D	U	0.00	0.00900	1.00	MGL	10.					
LP Pesticides - 8 items											
ılordane	U	0.00	0.00695	0.0125	MGL	1.0	SJ	07/27/99	1951	154069	4
ıdrin	U	0.00	0.000400	0.00200	MGL	1.0					
ptachlor	U	0.00	0.000525	0.00100	MGL	1.0					
ptachlor & Hep. Epoxide	U	0.00	0.000710	0.00200	MGL	1.0					
ptachlor epoxide	U	0.00	0.000470	0.00100	MGL	1.0					
ethoxychlor	U	0.00	0.00229	1.00	MGL	1.0					
oxaphene	U	0.00	0.0132	0.0500	MGL	1.0					
mma-BHC	U	0.00	0.000185	0.0400	MGL	1.0					
tals Analysis											
ercury	U	-0.00129	0.000350	0.0200	MGL	1.0	RPM2	07/27/99	1412	154343	5
lver	J	0.0136	0.00730	0.500	MGL	10.	AME	08/01/99	1829	154250	6
senic	U	-0.00716	0.0451	0.500	MGL	10.					
ırium	J	0.0131	0.00510	10.0	MGL	10.					
ıdmium	U	-0.000463	0.00440	0.100	MGL	10.					
ıromium	J	0.00709	0.00560	0.500	MGL	10.					
ad	U	-0.000341	0.0159	0.500	MGL	10.					
lenium	U	0.0146	0.0271	0.100	MGL	10.					

e following prep procedures were performed:

C/MS 5970 Extractables	ES	07/23/99	1000	154067 7
erbicides	HDB	07/26/99	1400	154220 7
sticides	HDB	07/26/99	1400	154069 7
ercury	ARD	07/26/99	1800	154343 7
CLP Extraction - Semivolatiles	JL	07/22/99	1555	153946 7
CLP Extraction - Volatiles	JL	07/26/99	1855	154354 7
CLP Prep (Metals, Prep Only)	JL	07/22/99	1555	153947 7

ırrogate Recovery	Test	Percent%	Acceptable Limits
4,6-Tribromophenol	TCLP SEMIVOA	80.8	(41.0 - 122.)
Fluorobiphenyl	TCLP SEMIVOA	70.4	(41.2 - 107.)

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GENERAL ENGINEERING LABORATORIES
Meeting today's needs with a vision for tomorrow.

Client: Westinghouse Savannah River Co.
Building 735-16A, Rm. 5
P.O. Box 616
Aiken, South Carolina 29802
Contact: Mr. Richard Groseclose
Project Description: Hazardous Waste Contract

cc: WSRC00497 Report Date: August 20, 1999

Sample ID : TCLP 6

Surrogate Recovery	Test	Percent%	Acceptable Limits
2-Fluorophenol	TCLP SEMIVOA	49.0	(23.6 - 75.9)
Nitrobenzene-d5	TCLP SEMIVOA	83.7	(35.3 - 108.)
Phenol-d6	TCLP SEMIVOA	34.6	(10.9 - 54.6)
p-Terphenyl-d14	TCLP SEMIVOA	97.8	(36.6 - 110.)
2,4-Dichlorophenylacetic acid	TCLP HERBICIDES	82.2	(43.9 - 145.)
4CMX	TCLP PESTICIDES	104.	(46.0 - 125.)
Decachlorobiphenyl	TCLP PESTICIDES	86.5	(42.0 - 143.)
Bromofluorobenzene	TCLP VOA-8260B	85.5	(73.0 - 129.)
Dibromofluoromethane	TCLP VOA-8260B	94.2	(66.0 - 117.)
Toluene-d8	TCLP VOA-8260B	93.4	(73.0 - 122.)

M = Method	Method-Description
M 1	EPA 8260B
M 2	SW1311/8270C
M 3	EPA 8151
M 4	SW1311/8081A
M 5	EPA 7470A
M 6	SW846 6010A
M 7	SW846 3010A

Notes:
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Project Description:	Hazardous Waste Contract

c: WSRC00497 Report Date: August 20, 1999

Sample ID : TCLP 6

= Method	Method-Description

s data report has been prepared and reviewed
ccordance with General Engineering Laboratories
dard operating procedures. Please direct
questions to your Project Manager, Stacy Griffin at 769-7376.

Stacy L Griffin

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P.O. Box 616
Aiken, South Carolina 29802
Contact: Mr. Richard Groseclose
Project Description: Hazardous Waste Contract

cc: WSRC00497 Report Date: August 20, 1999

Sample ID	: TCLP 7
Lab ID	: 9907679-26
Matrix	: TCLP
Date Collected	: 07/14/99
Date Received	: 07/15/99
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Volatile Organics											
TCLP, Volatiles - 12 items											
1,1-Dichloroethylene	U	0.00	0.00700	0.0700	MGL	10.	DLS	07/29/99	0415	154649	1
1,2-Dichloroethane	U	0.00	0.00200	0.0500	MGL	10.					
1,4-Dichlorobenzene	U	0.00	0.00300	0.750	MGL	10.					
2-Butanone	U	0.00	0.0590	20.0	MGL	10.					
Benzene	U	0.00	0.00300	0.0500	MGL	10.					
Carbon Tetrachloride	U	0.00	0.00200	0.0500	MGL	10.					
Chlorobenzene	U	0.00	0.00300	10.0	MGL	10.					
Chloroform	U	0.00	0.00700	0.600	MGL	10.					
Tetrachloroethylene	U	0.00	0.00700	0.0700	MGL	10.					
Trichloroethylene	J	0.0118	0.00600	0.0500	MGL	10.					
Trichlorotrifluoroethane	U	0.00	0.0113	0.0500	MGL	10.					
Vinyl chloride	U	0.00	0.00400	0.0200	MGL	10.					
Extractable Organics											
TCLP Semivolatile Compounds - 11 items											
2,4,5-Trichlorophenol	U	0.00	0.0125	40.0	MGL	1.0	TSD	07/27/99	2145	154067	2
2,4,6-Trichlorophenol	U	0.00	0.00480	0.200	MGL	1.0					
2,4-Dinitrotoluene	U	0.00	0.00700	0.0500	MGL	1.0					
Hexachlorobenzene	U	0.00	0.0145	0.0500	MGL	1.0					
Hexachlorobutadiene	U	0.00	0.0190	0.0500	MGL	1.0					
Hexachloroethane	U	0.00	0.0170	0.300	MGL	1.0					
Nitrobenzene	U	0.00	0.0165	0.200	MGL	1.0					
Pentachlorophenol	U	0.00	0.0140	10.0	MGL	1.0					
Pyridine	U	0.00	0.0165	0.500	MGL	1.0					
m,p-Cresol	U	0.00	0.00900	20.0	MGL	1.0					
o-Cresol	U	0.00	0.0105	20.0	MGL	1.0					
TCLP, Herbicides - 2 items											
2,4,5-TP	U	0.00	0.00940	0.100	MGL	10.	JC	07/28/99	1546	154220	3

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Contact: Mr. Richard Groseclose
Project Description: Hazardous Waste Contract

c: WSRC00497 Report Date: August 20, 1999

Sample ID : TCLP 7

rameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
-D	U	0.00	0.00900	1.00	MGL	10.					
LP Pesticides - 8 items											
lordane	U	0.00	0.00695	0.0125	MGL	1.0	SJ	07/27/99	2018	154069	4
drin	U	0.00	0.000400	0.00200	MGL	1.0					
ptachlor	U	0.00	0.000525	0.00100	MGL	1.0					
ptachlor & Hep. Epoxide	U	0.00	0.000710	0.00200	MGL	1.0					
ptachlor epoxide	U	0.00	0.000470	0.00100	MGL	1.0					
thoxychlor	U	0.00	0.00229	1.00	MGL	1.0					
xaphene	U	0.00	0.0132	0.0500	MGL	1.0					
mma-BHC	U	0.00	0.000185	0.0400	MGL	1.0					
tals Analysis											
ercury	U	-0.00112	0.000350	0.0200	MGL	1.0	RPM2	07/27/99	1418	154343	5
ver	J	0.0189	0.00730	0.500	MGL	10.	AME	08/01/99	1835	154250	6
senic	U	-0.0206	0.0451	0.500	MGL	10.					
rium	J	0.00873	0.00510	10.0	MGL	10.					
dmium	U	-0.00141	0.00440	0.100	MGL	10.					
romium	J	0.00966	0.00560	0.500	MGL	10.					
ad	U	0.00348	0.0159	0.500	MGL	10.					
lenium	U	0.00411	0.0271	0.100	MGL	10.					

following prep procedures were performed:

C/MS 5970 Extractables	ES	07/23/99	1000	154067 7
rbicides	HDB	07/26/99	1400	154220 7
sticides	HDB	07/26/99	1400	154069 7
ercury	ARD	07/26/99	1800	154343 7
CLP Extraction - Semivolatiles	JL	07/22/99	1555	153946 7
CLP Extraction - Volatiles	JL	07/26/99	1855	154354 7
CLP Prep (Metals, Prep Only)	JL	07/22/99	1555	153947 7

rrogate Recovery	Test	Percent%	Acceptable Limits
,6-Tribromophenol	TCLP SEMIVOA	71.6	(41.0 - 122.)
Fluorobiphenyl	TCLP SEMIVOA	63.0	(41.2 - 107.)

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Contact: Mr. Richard Groseclose
Project Description: Hazardous Waste Contract

cc: WSRC00497 Report Date: August 20, 1999

Sample ID : TCLP 7

Surrogate Recovery	Test	Percent%	Acceptable Limits
2-Fluorophenol	TCLP SEMIVOA	43.5	(23.6 - 75.9)
Nitrobenzene-d5	TCLP SEMIVOA	75.3	(35.3 - 108.)
Phenol-d6	TCLP SEMIVOA	30.6	(10.9 - 54.6)
p-Terphenyl-d14	TCLP SEMIVOA	101.	(36.6 - 110.)
2,4-Dichlorophenylacetic acid	TCLP HERBICIDES	78.8	(43.9 - 145.)
4CMX	TCLP PESTICIDES	101.	(46.0 - 125.)
Decachlorobiphenyl	TCLP PESTICIDES	99.0	(42.0 - 143.)
Bromofluorobenzene	TCLP VOA-8260B	86.2	(73.0 - 129.)
Dibromofluoromethane	TCLP VOA-8260B	94.4	(66.0 - 117.)
Toluene-d8	TCLP VOA-8260B	93.2	(73.0 - 122.)

M = Method	Method-Description
M 1	EPA 8260B
M 2	SW1311/8270C
M 3	EPA 8151
M 4	SW1311/8081A
M 5	EPA 7470A
M 6	SW846 6010A
M 7	SW846 3010A

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Contact:	Mr. Richard Groseclose
Project Description:	Hazardous Waste Contract

cc: WSRC00497 Report Date: August 20, 1999

Sample ID : TCLP 7

I = Method	Method-Description

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y questions to your Project Manager, Stacy Griffin at 769-7376.

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Client: Westinghouse Savannah River Co.
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P.O. Box 616
Aiken, South Carolina 29802
Contact: Mr. Richard Groseclose
Project Description: Hazardous Waste Contract

cc: WSRC00497 Report Date: August 20, 1999

Sample ID	: TCLP 8
Lab ID	: 9907679-28
Matrix	: TCLP
Date Collected	: 07/14/99
Date Received	: 07/15/99
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Volatile Organics											
TCLP, Volatiles - 12 items											
1,1-Dichloroethylene	U	0.00	0.00700	0.0700	MGL	10.	DLS	07/29/99	0444	154649	1
1,2-Dichloroethane	U	0.00	0.00200	0.0500	MGL	10.					
1,4-Dichlorobenzene	U	0.00	0.00300	0.750	MGL	10.					
2-Butanone	U	0.00	0.0590	20.0	MGL	10.					
Benzene	U	0.00	0.00300	0.0500	MGL	10.					
Carbon Tetrachloride	U	0.00	0.00200	0.0500	MGL	10.					
Chlorobenzene	U	0.00	0.00300	10.0	MGL	10.					
Chloroform	U	0.00	0.00700	0.600	MGL	10.					
Tetrachloroethylene	U	0.00	0.00700	0.0700	MGL	10.					
Trichloroethylene	U	0.00	0.00600	0.0500	MGL	10.					
Trichlorotrifluoroethane	U	0.00	0.0113	0.0500	MGL	10.					
Vinyl chloride	U	0.00	0.00400	0.0200	MGL	10.					
Extractable Organics											
TCLP Semivolatile Compounds - 11 items											
2,4,5-Trichlorophenol	U	0.00	0.0125	40.0	MGL	1.0	TSD	07/27/99	2201	154067	2
2,4,6-Trichlorophenol	U	0.00	0.00480	0.200	MGL	1.0					
2,4-Dinitrotoluene	U	0.00	0.00700	0.0500	MGL	1.0					
Hexachlorobenzene	U	0.00	0.0145	0.0500	MGL	1.0					
Hexachlorobutadiene	U	0.00	0.0190	0.0500	MGL	1.0					
Hexachloroethane	U	0.00	0.0170	0.300	MGL	1.0					
Nitrobenzene	U	0.00	0.0165	0.200	MGL	1.0					
Pentachlorophenol	U	0.00	0.0140	10.0	MGL	1.0					
Pyridine	U	0.00	0.0165	0.500	MGL	1.0					
m,p-Cresol	U	0.00	0.00900	20.0	MGL	1.0					
o-Cresol	U	0.00	0.0105	20.0	MGL	1.0					
TCLP, Herbicides - 2 items											
2,4,5-TP	U	0.00	0.00940	0.100	MGL	10.	JC	07/28/99	1609	154220	3

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Contact: Mr. Richard Groseclose
Project Description: Hazardous Waste Contract

c: WSRC00497 Report Date: August 20, 1999

Sample ID : TCLP 8

rameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
I-D	U	0.00	0.00900	1.00	MGL	10.					
:LP Pesticides - 8 items											
ılordane	U	0.00	0.00695	0.0125	MGL	1.0	SJ	08/05/99	1249	155899	4
ıdrin	U	0.00	0.000400	0.00200	MGL	1.0					
:ptachlor	U	0.00	0.000525	0.00100	MGL	1.0					
:ptachlor & Hep. Epoxide	U	0.00	0.000710	0.00200	MGL	1.0					
:ptachlor epoxide	U	0.00	0.000470	0.00100	MGL	1.0					
ethoxychlor	U	0.00	0.00229	1.00	MGL	1.0					
)xaphene	U	0.00	0.0132	0.0500	MGL	1.0					
mma-BHC	U	0.00	0.000185	0.0400	MGL	1.0					
tals Analysis											
ercury	U	-0.00138	0.000350	0.0200	MGL	1.0	RPM2	07/27/99	1420	154343	5
lver	J	0.0124	0.00730	0.500	MGL	10.	AME	08/01/99	1840	154250	6
:senic	U	-0.0132	0.0451	0.500	MGL	10.					
ırium	J	0.0113	0.00510	10.0	MGL	10.					
ıdmium	U	-0.000517	0.00440	0.100	MGL	10.					
ıromium	U	0.00444	0.00560	0.500	MGL	10.					
:ad	U	-0.0153	0.0159	0.500	MGL	10.					
:lenium	U	0.0139	0.0271	0.100	MGL	10.					

e following prep procedures were performed:

C/MS 5970 Extractables	ES	07/23/99	1000	154067 7
erbicides	HDB	07/26/99	1400	154220 7
:sticides	SJ	08/04/99		155899 7
ercury	ARD	07/26/99	1800	154343 7
CLP Extraction - Semivolatiles	JL	07/22/99	1555	153946 7
CLP Extraction - Volatiles	JL	07/26/99	1855	154354 7
CLP Prep (Metals, Prep Only)	JL	07/22/99	1555	153947 7

ırrogate Recovery	Test	Percent%	Acceptable Limits
4,6-Tribromophenol	TCLP SEMIVOA	77.9	(41.0 - 122.)
-Fluorobiphenyl	TCLP SEMIVOA	64.6	(41.2 - 107.)

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P.O. Box 616
Aiken, South Carolina 29802
Contact: Mr. Richard Groseclose
Project Description: Hazardous Waste Contract

cc: WSRC00497 Report Date: August 20, 1999

Sample ID : TCLP 8

Surrogate Recovery	Test	Percent%	Acceptable Limits
2-Fluorophenol	TCLP SEMIVOA	45.1	(23.6 - 75.9)
Nitrobenzene-d5	TCLP SEMIVOA	77.3	(35.3 - 108.)
Phenol-d6	TCLP SEMIVOA	31.3	(10.9 - 54.6)
p-Terphenyl-d14	TCLP SEMIVOA	97.8	(36.6 - 110.)
2,4-Dichlorophenylacetic acid	TCLP HERBICIDES	86.0	(43.9 - 145.)
4CMX	TCLP PESTICIDES	95.5	(46.0 - 125.)
Decachlorobiphenyl	TCLP PESTICIDES	83.5	(42.0 - 143.)
Bromofluorobenzene	TCLP VOA-8260B	84.5	(73.0 - 129.)
Dibromofluoromethane	TCLP VOA-8260B	92.9	(66.0 - 117.)
Toluene-d8	TCLP VOA-8260B	92.7	(73.0 - 122.)

M = Method	Method-Description
M 1	EPA 8260B
M 2	SW1311/8270C
M 3	EPA 8151
M 4	SW1311/8081A
M 5	EPA 7470A
M 6	SW846 6010A
M 7	SW846 3010A

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Building 735-16A, Rm. 5
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Aiken, South Carolina 29802
Contact: Mr. Richard Groseclose
Project Description: Hazardous Waste Contract

c: WSRC00497 Report Date: August 20, 1999

Sample ID : TCLP 8

= Method	Method-Description

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	Building 735-16A, Rm. 5
	P.O. Box 616
	Aiken, South Carolina 29802
Contact:	Mr. Richard Groseclose
Project Description:	Hazardous Waste Contract

cc: WSRC00497 Report Date: August 20, 1999

Sample ID	: TCLP 8
Lab ID	: 9907679-29
Matrix	: TCLP
Date Collected	: 07/14/99
Date Received	: 07/15/99
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M

Notes:
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J indicates presence of analyte at a concentration less than the reporting limit (RL) and greater than the detection limit (DL).
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* indicates that a quality control analyte recovery is outside of specified acceptance criteria.

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P.O. Box 616
Aiken, South Carolina 29802
Contact: Mr. Richard Groseclose
Project Description: Hazardous Waste Contract

c: WSRC00497 Report Date: August 20, 1999

Sample ID	: TCLP 9
Lab ID	: 9907679-40
Matrix	: TCLP
Date Collected	: 07/14/99
Date Received	: 07/15/99
Priority	: Routine
Collector	: Client

rameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
atile Organics											
'LP, Volatiles - 12 items											
l-Dichloroethylene	U	0.00	0.00700	0.0700	MGL	10.	MAP	07/30/99	1248	154649	1
2-Dichloroethane	U	0.00	0.00200	0.0500	MGL	10.					
l-Dichlorobenzene	U	0.00	0.00300	0.750	MGL	10.					
Butanone	U	0.00	0.0590	20.0	MGL	10.					
nzene	U	0.00	0.00300	0.0500	MGL	10.					
rbon Tetrachloride	U	0.00	0.00200	0.0500	MGL	10.					
lorobenzene	U	0.00	0.00300	10.0	MGL	10.					
loroform	U	0.00	0.00700	0.600	MGL	10.					
trachloroethylene	U	0.00	0.00700	0.0700	MGL	10.					
ichloroethylene	J	0.00681	0.00600	0.0500	MGL	10.					
ichlorotrifluoroethane	U	0.00	0.0113	0.0500	MGL	10.					
nyl chloride	U	0.00	0.00400	0.0200	MGL	10.					
ractable Organics											
'LP Semivolatile Compounds - 11 items											
l,5-Trichlorophenol	U	0.00	0.0125	40.0	MGL	1.0	TSD	07/27/99	2217	154067	2
l,6-Trichlorophenol	U	0.00	0.00480	0.200	MGL	1.0					
l-Dinitrotoluene	U	0.00	0.00700	0.0500	MGL	1.0					
xachlorobenzene	U	0.00	0.0145	0.0500	MGL	1.0					
xachlorobutadiene	U	0.00	0.0190	0.0500	MGL	1.0					
xachloroethane	U	0.00	0.0170	0.300	MGL	1.0					
trobenzene	U	0.00	0.0165	0.200	MGL	1.0					
ntachlorophenol	U	0.00	0.0140	10.0	MGL	1.0					
ridine	U	0.00	0.0165	0.500	MGL	1.0					
p-Cresol	U	0.00	0.00900	20.0	MGL	1.0					
Cresol	U	0.00	0.0105	20.0	MGL	1.0					
'LP, Herbicides - 2 items											
l,5-TP	U	0.00	0.00940	0.100	MGL	10.	JC	07/28/99	1704	154220	3

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Client: Westinghouse Savannah River Co.
Building 735-16A, Rm. 5
P.O. Box 616
Aiken, South Carolina 29802
Contact: Mr. Richard Groseclose
Project Description: Hazardous Waste Contract

cc: WSRC00497 Report Date: August 20, 1999

Sample ID : TCLP 9

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
2,4-D	U	0.00	0.00900	1.00	MGL	10.					
TCLP Pesticides - 8 items											
Chlordane	U	0.00	0.00695	0.0125	MGL	1.0	SJ	07/27/99	2112	154069	4
Endrin	U	0.00	0.000400	0.00200	MGL	1.0					
Heptachlor	U	0.00	0.000525	0.00100	MGL	1.0					
Heptachlor & Hep. Epoxide	U	0.00	0.000710	0.00200	MGL	1.0					
Heptachlor epoxide	U	0.00	0.000470	0.00100	MGL	1.0					
Methoxychlor	U	0.00	0.00229	1.00	MGL	1.0					
Toxaphene	U	0.00	0.0132	0.0500	MGL	1.0					
gamma-BHC	U	0.00	0.000185	0.0400	MGL	1.0					
Metals Analysis											
Mercury	U	-0.00134	0.000350	0.0200	MGL	1.0	RPM2	07/27/99	1421	154343	5
Silver	J	0.0130	0.00730	0.500	MGL	10.	AME	08/01/99	1846	154250	6
Arsenic	U	-0.0224	0.0451	0.500	MGL	10.					
Barium	J	0.00946	0.00510	10.0	MGL	10.					
Cadmium	U	-0.00115	0.00440	0.100	MGL	10.					
Chromium	U	0.00441	0.00560	0.500	MGL	10.					
Lead	U	-0.0115	0.0159	0.500	MGL	10.					
Selenium	U	-0.00930	0.0271	0.100	MGL	10.					

The following prep procedures were performed:

GC/MS 5970 Extractables	ES	07/23/99	1000	154067	7
Herbicides	HDB	07/26/99	1400	154220	7
Pesticides	HDB	07/26/99	1400	154069	7
Mercury	ARD	07/26/99	1800	154343	7
TCLP Extraction - Semivolatiles	JL	07/22/99	1555	153946	7
TCLP Extraction - Volatiles	JL	07/26/99	1855	154354	7
TCLP Prep (Metals, Prep Only)	JL	07/22/99	1555	153947	7

Surrogate Recovery	Test	Percent%	Acceptable Limits
2,4,6-Tribromophenol	TCLP SEMIVOA	73.8	(41.0 - 122.)
2-Fluorobiphenyl	TCLP SEMIVOA	65.8	(41.2 - 107.)

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Contact: Mr. Richard Groseclose
Project Description: Hazardous Waste Contract

:: WSRC00497 Report Date: August 20, 1999

Sample ID : TCLP 9

rrogate Recovery	Test	Percent%	Acceptable Limits
luorophenol	TCLP SEMIVOA	45.1	(23.6 - 75.9)
robenzene-d5	TCLP SEMIVOA	81.3	(35.3 - 108.)
enol-d6	TCLP SEMIVOA	31.7	(10.9 - 54.6)
erphenyl-d14	TCLP SEMIVOA	90.7	(36.6 - 110.)
-Dichlorophenylacetic acid	TCLP HERBICIDES	82.8	(43.9 - 145.)
MX	TCLP PESTICIDES	108.	(46.0 - 125.)
cachlorobiphenyl	TCLP PESTICIDES	93.5	(42.0 - 143.)
omofluorobenzene	TCLP VOA-8260B	123.	(73.0 - 129.)
bromofluoromethane	TCLP VOA-8260B	95.0	(66.0 - 117.)
luene-d8	TCLP VOA-8260B	108.	(73.0 - 122.)

= Method	Method-Description
1	EPA 8260B
2	SW1311/8270C
3	EPA 8151
4	SW1311/8081A
5	EPA 7470A
6	SW846 6010A
7	SW846 3010A

tes:
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ndicates that the analyte was not detected at a concentration greater than the detection limit.
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Contact:	Mr. Richard Groseclose
Project Description:	Hazardous Waste Contract

cc: WSRC00497 Report Date: August 20, 1999

Sample ID : TCLP 9

M = Method	Method-Description

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Contact: Mr. Richard Groseclose
Project Description: Hazardous Waste Contract

:c: WSRC00497 Report Date: August 20, 1999

Sample ID	: TCLP 10
Lab ID	: 9907679-42
Matrix	: TCLP
Date Collected	: 07/14/99
Date Received	: 07/15/99
Priority	: Routine
Collector	: Client

arameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
latile Organics											
CLP,Volatiles - 12 items											
,1-Dichloroethylene	U	0.00	0.00700	0.0700	MGL	10.	MAP	07/30/99	1317	154649	1
,2-Dichloroethane	U	0.00	0.00200	0.0500	MGL	10.					
,4-Dichlorobenzene	U	0.00	0.00300	0.750	MGL	10.					
-Butanone	U	0.00	0.0590	20.0	MGL	10.					
enzene	U	0.00	0.00300	0.0500	MGL	10.					
arbon Tetrachloride	U	0.00	0.00200	0.0500	MGL	10.					
hlorobenzene	U	0.00	0.00300	10.0	MGL	10.					
hloroform	U	0.00	0.00700	0.600	MGL	10.					
etrachloroethylene	U	0.00	0.00700	0.0700	MGL	10.					
richloroethylene	J	0.0105	0.00600	0.0500	MGL	10.					
richlorotrifluoroethane	U	0.00	0.0113	0.0500	MGL	10.					
inyl chloride	U	0.00	0.00400	0.0200	MGL	10.					
ctractable Organics											
CLP Semivolatile Compounds - 11 items											
,4,5-Trichlorophenol	U	0.00	0.0125	40.0	MGL	1.0	TSD	07/27/99	2233	154067	2
,4,6-Trichlorophenol	U	0.00	0.00480	0.200	MGL	1.0					
,4-Dinitrotoluene	U	0.00	0.00700	0.0500	MGL	1.0					
Iexachlorobenzene	U	0.00	0.0145	0.0500	MGL	1.0					
Iexachlorobutadiene	U	0.00	0.0190	0.0500	MGL	1.0					
Iexachloroethane	U	0.00	0.0170	0.300	MGL	1.0					
Nitrobenzene	U	0.00	0.0165	0.200	MGL	1.0					
entachlorophenol	U	0.00	0.0140	10.0	MGL	1.0					
yridine	U	0.00	0.0165	0.500	MGL	1.0					
n,p-Cresol	U	0.00	0.00900	20.0	MGL	1.0					
o-Cresol	U	0.00	0.0105	20.0	MGL	1.0					
TCLP, Herbicides - 2 items											
2,4,5-TP	U	0.00	0.00940	0.100	MGL	10.	JC	07/28/99	1727	154220	3

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Contact: Mr. Richard Groseclose
Project Description: Hazardous Waste Contract

cc: WSRC00497 Report Date: August 20, 1999

Sample ID : TCLP 10

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
2,4-D	U	0.00	0.00900	1.00	MGL	10.					
TCLP Pesticides - 8 items											
Chlordane	U	0.00	0.00695	0.0125	MGL	1.0	SJ	07/27/99	2140	154069	4
Endrin	U	0.00	0.000400	0.00200	MGL	1.0					
Heptachlor	U	0.00	0.000525	0.00100	MGL	1.0					
Heptachlor & Hep. Epoxide	U	0.00	0.000710	0.00200	MGL	1.0					
Heptachlor epoxide	U	0.00	0.000470	0.00100	MGL	1.0					
Methoxychlor	U	0.00	0.00229	1.00	MGL	1.0					
Toxaphene	U	0.00	0.0132	0.0500	MGL	1.0					
gamma-BHC	U	0.00	0.000185	0.0400	MGL	1.0					
Metals Analysis											
Mercury	U	-0.00128	0.000350	0.0200	MGL	1.0	RPM2	07/27/99	1423	154343	5
Silver	J	0.0145	0.00730	0.500	MGL	10.	AME	08/01/99	1851	154250	6
Arsenic	U	-0.0366	0.0451	0.500	MGL	10.					
Barium	J	0.00885	0.00510	10.0	MGL	10.					
Cadmium	U	-0.00159	0.00440	0.100	MGL	10.					
Chromium	J	0.00628	0.00560	0.500	MGL	10.					
Lead	U	0.0109	0.0159	0.500	MGL	10.					
Selenium	U	-0.00538	0.0271	0.100	MGL	10.					

The following prep procedures were performed:

GC/MS 5970 Extractables	ES	07/23/99	1000	154067	7
Herbicides	HDB	07/26/99	1400	154220	7
Pesticides	HDB	07/26/99	1400	154069	7
Mercury	ARD	07/26/99	1800	154343	7
TCLP Extraction - Semivolatiles	JL	07/22/99	1555	153946	7
TCLP Extraction - Volatiles	JL	07/26/99	1855	154354	7
TCLP Prep (Metals, Prep Only)	JL	07/22/99	1555	153947	7

Surrogate Recovery	Test	Percent%	Acceptable Limits
2,4,6-Tribromophenol	TCLP SEMIVOA	70.0	(41.0 - 122.)
2-Fluorobiphenyl	TCLP SEMIVOA	65.6	(41.2 - 107.)

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Project Description: Hazardous Waste Contract

cc: WSRC00497 Report Date: August 20, 1999

Sample ID : TCLP 10

urrogate Recovery	Test	Percent%	Acceptable Limits
-Fluorophenol	TCLP SEMIVOA	44.5	(23.6 - 75.9)
litrobenzene-d5	TCLP SEMIVOA	72.3	(35.3 - 108.)
henol-d6	TCLP SEMIVOA	30.3	(10.9 - 54.6)
-Terphenyl-d14	TCLP SEMIVOA	87.4	(36.6 - 110.)
,4-Dichlorophenylacetic acid	TCLP HERBICIDES	88.0	(43.9 - 145.)
CMX	TCLP PESTICIDES	89.0	(46.0 - 125.)
ecachlorobiphenyl	TCLP PESTICIDES	88.5	(42.0 - 143.)
romofluorobenzene	TCLP VOA-8260B	235.*	(73.0 - 129.)
ibromofluoromethane	TCLP VOA-8260B	138.*	(66.0 - 117.)
oluene-d8	TCLP VOA-8260B	247.*	(73.0 - 122.)

= Method	Method-Description
1	EPA 8260B
2	SW1311/8270C
3	EPA 8151
4	SW1311/8081A
5	EPA 7470A
6	SW846 6010A
7	SW846 3010A

otes:
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ndicates presence of analyte at a concentration less than the reporting limit (RL) and greater than the detection limit (DL).
indicates that the analyte was not detected at a concentration greater than the detection limit.
indicates that a quality control analyte recovery is outside of specified acceptance criteria.

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Contact:	Mr. Richard Groseclose
Project Description:	Hazardous Waste Contract

cc: WSRC00497 Report Date: August 20, 1999

Sample ID : TCLP 10

M = Method	Method-Description

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Contact: Mr. Richard Groseclose
Project Description: Hazardous Waste Contract

c: WSRC00497 Report Date: August 20, 1999

Sample ID	: TCLP 11
Lab ID	: 9907679-44
Matrix	: TCLP
Date Collected	: 07/14/99
Date Received	: 07/15/99
Priority	: Routine
Collector	: Client

rameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
latile Organics											
CLP, Volatiles - 12 items											
1-Dichloroethylene	U	0.00	0.00700	0.0700	MGL	10.	DLS	07/29/99	0512	154649	1
2-Dichloroethane	U	0.00	0.00200	0.0500	MGL	10.					
4-Dichlorobenzene	U	0.00	0.00300	0.750	MGL	10.					
Butanone	U	0.00	0.0590	20.0	MGL	10.					
enzene	U	0.00	0.00300	0.0500	MGL	10.					
arbon Tetrachloride	U	0.00	0.00200	0.0500	MGL	10.					
lorobenzene	U	0.00	0.00300	10.0	MGL	10.					
loroform	U	0.00	0.00700	0.600	MGL	10.					
trachloroethylene	U	0.00	0.00700	0.0700	MGL	10.					
ichloroethylene	U	0.00	0.00600	0.0500	MGL	10.					
ichlorotrifluoroethane	U	0.00	0.0113	0.0500	MGL	10.					
inyl chloride	U	0.00	0.00400	0.0200	MGL	10.					
tractable Organics											
CLP Semivolatile Compounds - 11 items											
4,5-Trichlorophenol	U	0.00	0.0125	40.0	MGL	1.0	TSD	07/27/99	2249	154067	2
4,6-Trichlorophenol	U	0.00	0.00480	0.200	MGL	1.0					
4-Dinitrotoluene	U	0.00	0.00700	0.0500	MGL	1.0					
exachlorobenzene	U	0.00	0.0145	0.0500	MGL	1.0					
exachlorobutadiene	U	0.00	0.0190	0.0500	MGL	1.0					
exachloroethane	U	0.00	0.0170	0.300	MGL	1.0					
itrobenzene	U	0.00	0.0165	0.200	MGL	1.0					
entachlorophenol	U	0.00	0.0140	10.0	MGL	1.0					
yridine	U	0.00	0.0165	0.500	MGL	1.0					
,p-Cresol	U	0.00	0.00900	20.0	MGL	1.0					
-Cresol	U	0.00	0.0105	20.0	MGL	1.0					
CLP, Herbicides - 2 items											
,4,5-TP	U	0.00	0.00940	0.100	MGL	10.	JC	07/28/99	1749	154220	3

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Contact: Mr. Richard Groseclose
Project Description: Hazardous Waste Contract

cc: WSRC00497 Report Date: August 20, 1999

Sample ID : TCLP 11

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
2,4-D	U	0.00	0.00900	1.00	MGL	10.					
TCLP Pesticides - 8 items											
Chlordane	U	0.00	0.00695	0.0125	MGL	1.0	SJ	07/27/99	2301	154069	4
Endrin	U	0.00	0.000400	0.00200	MGL	1.0					
Heptachlor	U	0.00	0.000525	0.00100	MGL	1.0					
Heptachlor & Hep. Epoxide	U	0.00	0.000710	0.00200	MGL	1.0					
Heptachlor epoxide	U	0.00	0.000470	0.00100	MGL	1.0					
Methoxychlor	U	0.00	0.00229	1.00	MGL	1.0					
Toxaphene	U	0.00	0.0132	0.0500	MGL	1.0					
gamma-BHC	U	0.00	0.000185	0.0400	MGL	1.0					
Metals Analysis											
Mercury	U	-0.00130	0.000350	0.0200	MGL	1.0	RPM2	07/27/99	1426	154343	5
Silver	J	0.0193	0.00730	0.500	MGL	10.	AME	08/01/99	1856	154250	6
Arsenic	U	-0.0227	0.0451	0.500	MGL	10.					
Barium	J	0.00986	0.00510	10.0	MGL	10.					
Cadmium	U	0.000871	0.00440	0.100	MGL	10.					
Chromium	J	0.0123	0.00560	0.500	MGL	10.					
Lead	U	0.000403	0.0159	0.500	MGL	10.					
Selenium	U	-0.00192	0.0271	0.100	MGL	10.					

The following prep procedures were performed:

GC/MS 5970 Extractables	ES	07/23/99	1000	154067 7
Herbicides	HDB	07/26/99	1400	154220 7
Pesticides	HDB	07/26/99	1400	154069 7
Mercury	ARD	07/26/99	1800	154343 7
TCLP Extraction - Semivolatiles	JL	07/22/99	1555	153946 7
TCLP Extraction - Volatiles	JL	07/26/99	1855	154354 7
TCLP Prep (Metals, Prep Only)	JL	07/22/99	1555	153947 7

Surrogate Recovery	Test	Percent%	Acceptable Limits
2,4,6-Tribromophenol	TCLP SEMIVOA	75.5	(41.0 - 122.)
2-Fluorobiphenyl	TCLP SEMIVOA	66.0	(41.2 - 107.)

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Contact: Mr. Richard Groseclose
Project Description: Hazardous Waste Contract

c: WSRC00497 Report Date: August 20, 1999

Sample ID : TCLP 11

rrogate Recovery	Test	Percent%	Acceptable Limits
Fluorophenol	TCLP SEMIVOA	45.4	(23.6 - 75.9)
trobenzene-d5	TCLP SEMIVOA	81.4	(35.3 - 108.)
enol-d6	TCLP SEMIVOA	31.4	(10.9 - 54.6)
Terphenyl-d14	TCLP SEMIVOA	101.	(36.6 - 110.)
4-Dichlorophenylacetic acid	TCLP HERBICIDES	84.6	(43.9 - 145.)
MX	TCLP PESTICIDES	121.	(46.0 - 125.)
cachlorobiphenyl	TCLP PESTICIDES	109.	(42.0 - 143.)
omofluorobenzene	TCLP VOA-8260B	86.4	(73.0 - 129.)
bromofluoromethane	TCLP VOA-8260B	93.6	(66.0 - 117.)
luene-d8	TCLP VOA-8260B	93.9	(73.0 - 122.)

= Method	Method-Description
1	EPA 8260B
2	SW1311/8270C
3	EPA 8151
4	SW1311/8081A
5	EPA 7470A
6	SW846 6010A
7	SW846 3010A

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	Aiken, South Carolina 29802
Contact:	Mr. Richard Groseclose
Project Description:	Hazardous Waste Contract

cc: WSRC00497 Report Date: August 20, 1999

Sample ID : TCLP 11

M = Method	Method-Description

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9907679-44

GENERAL ENGINEERING LABORATORIES
Meeting today's needs with a vision for tomorrow.

Client: Westinghouse Savannah River Co.
Building 735-16A, Rm. 5
P.O. Box 616
Aiken, South Carolina 29802
Contact: Mr. Richard Groseclose
Project Description: Hazardous Waste Contract

: WSRC00497 Report Date: August 20, 1999

Sample ID	: TCLP 12
Lab ID	: 9907679-46
Matrix	: TCLP
Date Collected	: 07/14/99
Date Received	: 07/15/99
Priority	: Routine
Collector	: Client

rameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
atile Organics											
CLP, Volatiles - 12 items											
l-Dichloroethylene	U	0.00	0.00700	0.0700	MGL	10.	DLS	07/28/99	2303	154649	1
2-Dichloroethane	U	0.00	0.00200	0.0500	MGL	10.					
4-Dichlorobenzene	U	0.00	0.00300	0.750	MGL	10.					
Butanone	U	0.00	0.0590	20.0	MGL	10.					
nzene	U	0.00	0.00300	0.0500	MGL	10.					
rbon Tetrachloride	U	0.00	0.00200	0.0500	MGL	10.					
lorobenzene	U	0.00	0.00300	10.0	MGL	10.					
loroform	U	0.00	0.00700	0.600	MGL	10.					
trachloroethylene	U	0.00	0.00700	0.0700	MGL	10.					
ichloroethylene	U	0.00	0.00600	0.0500	MGL	10.					
ichlorotrifluoroethane	U	0.00	0.0113	0.0500	MGL	10.					
nyl chloride	U	0.00	0.00400	0.0200	MGL	10.					
tractable Organics											
CLP Semivolatile Compounds - 11 items											
4,5-Trichlorophenol	U	0.00	0.0125	40.0	MGL	1.0	TSD	07/27/99	2304	154067	2
4,6-Trichlorophenol	U	0.00	0.00480	0.200	MGL	1.0					
4-Dinitrotoluene	U	0.00	0.00700	0.0500	MGL	1.0					
exachlorobenzene	U	0.00	0.0145	0.0500	MGL	1.0					
exachlorobutadiene	U	0.00	0.0190	0.0500	MGL	1.0					
exachloroethane	U	0.00	0.0170	0.300	MGL	1.0					
itrobenzene	U	0.00	0.0165	0.200	MGL	1.0					
ntachlorophenol	U	0.00	0.0140	10.0	MGL	1.0					
ridine	U	0.00	0.0165	0.500	MGL	1.0					
,p-Cresol	U	0.00	0.00900	20.0	MGL	1.0					
-Cresol	U	0.00	0.0105	20.0	MGL	1.0					
CLP, Herbicides - 2 items											
-,4,5-TP	U	0.00	0.00940	0.100	MGL	10.	JC	07/28/99	1812	154220	3

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9907679-46

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Building 735-16A, Rm. 5
P.O. Box 616
Aiken, South Carolina 29802
Contact: Mr. Richard Groseclose
Project Description: Hazardous Waste Contract

cc: WSRC00497 Report Date: August 20, 1999

Sample ID : TCLP 12

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
2,4-D	U	0.00	0.00900	1.00	MGL	10.					
TCLP Pesticides - 8 items											
Chlordane	U	0.00	0.00695	0.0125	MGL	1.0	SJ	07/27/99	2328	154069	4
Endrin	U	0.00	0.000400	0.00200	MGL	1.0					
Heptachlor	U	0.00	0.000525	0.00100	MGL	1.0					
Heptachlor & Hep. Epoxide	U	0.00	0.000710	0.00200	MGL	1.0					
Heptachlor epoxide	U	0.00	0.000470	0.00100	MGL	1.0					
Methoxychlor	U	0.00	0.00229	1.00	MGL	1.0					
Toxaphene	U	0.00	0.0132	0.0500	MGL	1.0					
gamma-BHC	U	0.00	0.000185	0.0400	MGL	1.0					
Metals Analysis											
Mercury	U	-0.00119	0.000350	0.0200	MGL	1.0	RPM2	07/27/99	1426	154343	5
Silver	J	0.0128	0.00730	0.500	MGL	10.	AME	08/01/99	1902	154250	6
Arsenic	U	-0.0205	0.0451	0.500	MGL	10.					
Barium	J	0.00959	0.00510	10.0	MGL	10.					
Cadmium	U	-0.000857	0.00440	0.100	MGL	10.					
Chromium	J	0.0101	0.00560	0.500	MGL	10.					
Lead	U	0.00390	0.0159	0.500	MGL	10.					
Selenium	U	0.00836	0.0271	0.100	MGL	10.					

The following prep procedures were performed:

GC/MS 5970 Extractables	ES	07/23/99	1000	154067 7
Herbicides	HDB	07/26/99	1400	154220 7
Pesticides	HDB	07/26/99	1400	154069 7
Mercury	ARD	07/26/99	1800	154343 7
TCLP Extraction - Semivolatiles	JL	07/22/99	1555	153946 7
TCLP Extraction - Volatiles	JL	07/27/99	2145	154384 7
TCLP Prep (Metals, Prep Only)	JL	07/22/99	1555	153947 7

Surrogate Recovery	Test	Percent%	Acceptable Limits
2,4,6-Tribromophenol	TCLP SEMIVOA	78.0	(41.0 - 122.)
2-Fluorobiphenyl	TCLP SEMIVOA	63.3	(41.2 - 107.)

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P.O. Box 616
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Contact: Mr. Richard Groseclose
Project Description: Hazardous Waste Contract

: WSRC00497 Report Date: August 20, 1999

Sample ID : TCLP 12

rrogate Recovery	Test	Percent%	Acceptable Limits
Fluorophenol	TCLP SEMIVOA	45.4	(23.6 - 75.9)
trobenzene-d5	TCLP SEMIVOA	76.5	(35.3 - 108.)
enol-d6	TCLP SEMIVOA	31.6	(10.9 - 54.6)
Terphenyl-d14	TCLP SEMIVOA	93.5	(36.6 - 110.)
l-Dichlorophenylacetic acid	TCLP HERBICIDES	77.6	(43.9 - 145.)
MX	TCLP PESTICIDES	113.	(46.0 - 125.)
cachlorobiphenyl	TCLP PESTICIDES	103.	(42.0 - 143.)
omofluorobenzene	TCLP VOA-8260B	86.0	(73.0 - 129.)
bromofluoromethane	TCLP VOA-8260B	92.8	(66.0 - 117.)
luene-d8	TCLP VOA-8260B	92.3	(73.0 - 122.)

= Method	Method-Description
1	EPA 8260B
2	SW1311/8270C
3	EPA 8151
4	SW1311/8081A
5	EPA 7470A
6	SW846 6010A
7	SW846 3010A

tes:
e qualifiers in this report are defined as follows:
) indicates that the analyte was not detected at a concentration greater than the detection limit.
ndicates presence of analyte at a concentration less than the reporting limit (RL) and greater than the detection limit (DL).
ndicates that the analyte was not detected at a concentration greater than the detection limit.
ndicates that a quality control analyte recovery is outside of specified acceptance criteria.

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	Building 735-16A, Rm. 5
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	Aiken, South Carolina 29802
Contact:	Mr. Richard Groseclose
Project Description:	Hazardous Waste Contract

cc: WSRC00497 Report Date: August 20, 1999

Sample ID : TCLP 12

M = Method	Method-Description

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Stacy L. Griffin

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Aiken, South Carolina 29802
Contact: Mr. Richard Groseclose
Project Description: Hazardous Waste Contract

c: WSRC00497 Report Date: August 20, 1999

Sample ID	: TCLP 13
Lab ID	: 9907679-48
Matrix	: TCLP
Date Collected	: 07/14/99
Date Received	: 07/15/99
Priority	: Routine
Collector	: Client

arameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
latile Organics											
CLP, Volatiles - 12 items											
1-Dichloroethylene	U	0.00	0.00700	0.0700	MGL	10.	DLS	07/28/99	2331	154649	1
2-Dichloroethane	U	0.00	0.00200	0.0500	MGL	10.					
4-Dichlorobenzene	U	0.00	0.00300	0.750	MGL	10.					
Butanone	U	0.00	0.0590	20.0	MGL	10.					
enzene	U	0.00	0.00300	0.0500	MGL	10.					
arbon Tetrachloride	U	0.00	0.00200	0.0500	MGL	10.					
hlorobenzene	U	0.00	0.00300	10.0	MGL	10.					
hloroform	U	0.00	0.00700	0.600	MGL	10.					
etrachloroethylene	U	0.00	0.00700	0.0700	MGL	10.					
richloroethylene	U	0.00	0.00600	0.0500	MGL	10.					
richlorotrifluoroethane	U	0.00	0.0113	0.0500	MGL	10.					
inyl chloride	U	0.00	0.00400	0.0200	MGL	10.					
tractable Organics											
CLP Semivolatile Compounds - 11 items											
4,5-Trichlorophenol	U	0.00	0.0125	40.0	MGL	1.0	TSD	07/28/99	1302	154067	2
4,6-Trichlorophenol	U	0.00	0.00480	0.200	MGL	1.0					
4-Dinitrotoluene	U	0.00	0.00700	0.0500	MGL	1.0					
exachlorobenzene	U	0.00	0.0145	0.0500	MGL	1.0					
exachlorobutadiene	U	0.00	0.0190	0.0500	MGL	1.0					
exachloroethane	U	0.00	0.0170	0.300	MGL	1.0					
itrobenzene	U	0.00	0.0165	0.200	MGL	1.0					
entachlorophenol	U	0.00	0.0140	10.0	MGL	1.0					
yridine	U	0.00	0.0165	0.500	MGL	1.0					
ı,p-Cresol	U	0.00	0.00900	20.0	MGL	1.0					
-Cresol	U	0.00	0.0105	20.0	MGL	1.0					
CLP, Herbicides - 2 items											
,4,5-TP	U	0.00	0.00940	0.100	MGL	10.	JC	07/28/99	1834	154220	3

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Contact: Mr. Richard Groseclose
Project Description: Hazardous Waste Contract

cc: WSRC00497 Report Date: August 20, 1999

Sample ID : TCLP 13

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
2,4-D	U	0.00	0.00900	1.00	MGL	10.					
TCLP Pesticides - 8 items											
Chlordane	U	0.00	0.00695	0.0125	MGL	1.0	SJ	07/27/99	2355	154069	4
Endrin	U	0.00	0.000400	0.00200	MGL	1.0					
Heptachlor	U	0.00	0.000525	0.00100	MGL	1.0					
Heptachlor & Hep. Epoxide	U	0.00	0.000710	0.00200	MGL	1.0					
Heptachlor epoxide	U	0.00	0.000470	0.00100	MGL	1.0					
Methoxychlor	U	0.00	0.00229	1.00	MGL	1.0					
Toxaphene	U	0.00	0.0132	0.0500	MGL	1.0					
gamma-BHC	U	0.00	0.000185	0.0400	MGL	1.0					
Metals Analysis											
Mercury	U	-0.00115	0.000350	0.0200	MGL	1.0	RPM2	07/27/99	1428	154343	5
Silver	J	0.0171	0.00730	0.500	MGL	10.	AME	08/01/99	1907	154250	6
Arsenic	U	-0.0161	0.0451	0.500	MGL	10.					
Barium	J	0.00659	0.00510	10.0	MGL	10.					
Cadmium	U	-0.0000927	0.00440	0.100	MGL	10.					
Chromium	J	0.00830	0.00560	0.500	MGL	10.					
Lead	U	-0.000211	0.0159	0.500	MGL	10.					
Selenium	U	0.00527	0.0271	0.100	MGL	10.					

The following prep procedures were performed:

GC/MS 5970 Extractables	ES	07/23/99	1000	154067 7
Herbicides	HDB	07/26/99	1400	154220 7
Pesticides	HDB	07/26/99	1400	154069 7
Mercury	ARD	07/26/99	1800	154343 7
TCLP Extraction - Semivolatiles	JL	07/22/99	1555	153946 7
TCLP Extraction - Volatiles	JL	07/27/99	2145	154384 7
TCLP Prep (Metals, Prep Only)	JL	07/22/99	1555	153947 7

Surrogate Recovery	Test	Percent%	Acceptable Limits
2,4,6-Tribromophenol	TCLP SEMIVOA	63.7	(41.0 - 122.)
2-Fluorobiphenyl	TCLP SEMIVOA	56.4	(41.2 - 107.)

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Project Description: Hazardous Waste Contract

c: WSRC00497 Report Date: August 20, 1999

Sample ID : TCLP 13

rrogate Recovery	Test	Percent%	Acceptable Limits
Fluorophenol	TCLP SEMIVOA	39.7	(23.6 - 75.9)
trobenzene-d5	TCLP SEMIVOA	67.8	(35.3 - 108.)
enol-d6	TCLP SEMIVOA	27.4	(10.9 - 54.6)
Terphenyl-d14	TCLP SEMIVOA	72.4	(36.6 - 110.)
4-Dichlorophenylacetic acid	TCLP HERBICIDES	82.6	(43.9 - 145.)
MX	TCLP PESTICIDES	106.	(46.0 - 125.)
cachlorobiphenyl	TCLP PESTICIDES	93.0	(42.0 - 143.)
omofluorobenzene	TCLP VOA-8260B	87.3	(73.0 - 129.)
bromofluoromethane	TCLP VOA-8260B	92.8	(66.0 - 117.)
luene-d8	TCLP VOA-8260B	93.1	(73.0 - 122.)

= Method	Method-Description
1	EPA 8260B
2	SW1311/8270C
3	EPA 8151
4	SW1311/8081A
5	EPA 7470A
6	SW846 6010A
7	SW846 3010A

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Project Description:	Hazardous Waste Contract

cc: WSRC00497 Report Date: August 20, 1999

Sample ID : TCLP 13

M = Method	Method-Description

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Contact: Mr. Richard Groseclose
Project Description: Hazardous Waste Contract

c: WSRC00497 Report Date: August 20, 1999

Sample ID	: TCLP 14
Lab ID	: 9907679-50
Matrix	: TCLP
Date Collected	: 07/14/99
Date Received	: 07/15/99
Priority	: Routine
Collector	: Client

rameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
latile Organics											
CLP, Volatiles - 12 items											
-Dichloroethylene	U	0.00	0.00700	0.0700	MGL	10.	DLS	07/28/99	2358	154649	1
-Dichloroethane	U	0.00	0.00200	0.0500	MGL	10.					
-Dichlorobenzene	U	0.00	0.00300	0.750	MGL	10.					
Butanone	U	0.00	0.0590	20.0	MGL	10.					
nzene	U	0.00	0.00300	0.0500	MGL	10.					
rbon Tetrachloride	U	0.00	0.00200	0.0500	MGL	10.					
lorobenzene	U	0.00	0.00300	10.0	MGL	10.					
loroform	U	0.00	0.00700	0.600	MGL	10.					
trachloroethylene	U	0.00	0.00700	0.0700	MGL	10.					
ichloroethylene	U	0.00	0.00600	0.0500	MGL	10.					
ichlorotrifluoroethane	U	0.00	0.0113	0.0500	MGL	10.					
nyl chloride	U	0.00	0.00400	0.0200	MGL	10.					
tractable Organics											
CLP Semivolatile Compounds - 11 items											
4,5-Trichlorophenol	U	0.00	0.0125	40.0	MGL	1.0	TSD	07/28/99	1318	154067	2
4,6-Trichlorophenol	U	0.00	0.00480	0.200	MGL	1.0					
4-Dinitrotoluene	U	0.00	0.00700	0.0500	MGL	1.0					
xachlorobenzene	U	0.00	0.0145	0.0500	MGL	1.0					
xachlorobutadiene	U	0.00	0.0190	0.0500	MGL	1.0					
xachloroethane	U	0.00	0.0170	0.300	MGL	1.0					
trobenzene	U	0.00	0.0165	0.200	MGL	1.0					
ntachlorophenol	U	0.00	0.0140	10.0	MGL	1.0					
ridine	U	0.00	0.0165	0.500	MGL	1.0					
p-Cresol	U	0.00	0.00900	20.0	MGL	1.0					
Cresol	U	0.00	0.0105	20.0	MGL	1.0					
CLP, Herbicides - 2 items											
4,5-TP	U	0.00	0.00940	0.100	MGL	10.	JC	07/28/99	1856	154220	3

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Contact: Mr. Richard Groseclose
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cc: WSRC00497 Report Date: August 20, 1999

Sample ID : TCLP 14

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
2,4-D	U	0.00	0.00900	1.00	MGL	10.					
TCLP Pesticides - 8 items											
Chlordane	U	0.00	0.00695	0.0125	MGL	1.0	SJ	07/28/99	0023	154069	4
Endrin	U	0.00	0.000400	0.00200	MGL	1.0					
Heptachlor	U	0.00	0.000525	0.00100	MGL	1.0					
Heptachlor & Hep. Epoxide	U	0.00	0.000710	0.00200	MGL	1.0					
Heptachlor epoxide	U	0.00	0.000470	0.00100	MGL	1.0					
Methoxychlor	U	0.00	0.00229	1.00	MGL	1.0					
Toxaphene	U	0.00	0.0132	0.0500	MGL	1.0					
gamma-BHC	U	0.00	0.000185	0.0400	MGL	1.0					
Metals Analysis											
Mercury	U	-0.00127	0.000350	0.0200	MGL	1.0	RPM2	07/27/99	1430	154343	5
Silver	J	0.0161	0.00730	0.500	MGL	10.	AME	08/01/99	1913	154250	6
Arsenic	U	-0.0254	0.0451	0.500	MGL	10.					
Barium	J	0.00831	0.00510	10.0	MGL	10.					
Cadmium	U	-0.00103	0.00440	0.100	MGL	10.					
Chromium	J	0.00960	0.00560	0.500	MGL	10.					
Lead	U	-0.0124	0.0159	0.500	MGL	10.					
Selenium	U	0.00381	0.0271	0.100	MGL	10.					

The following prep procedures were performed:

GC/MS 5970 Extractables	ES	07/23/99	1000	154067 7
Herbicides	HDB	07/26/99	1400	154220 7
Pesticides	HDB	07/26/99	1400	154069 7
Mercury	ARD	07/26/99	1800	154343 7
TCLP Extraction - Semivolatiles	JL	07/22/99	1555	153946 7
TCLP Extraction - Volatiles	JL	07/27/99	2145	154384 7
TCLP Prep (Metals, Prep Only)	JL	07/22/99	1555	153947 7

Surrogate Recovery	Test	Percent%	Acceptable Limits
2,4,6-Tribromophenol	TCLP SEMIVOA	76.1	(41.0 - 122.)
2-Fluorobiphenyl	TCLP SEMIVOA	64.6	(41.2 - 107.)

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Aiken, South Carolina 29802
Contact: Mr. Richard Groseclose
Project Description: Hazardous Waste Contract

c: WSRC00497 Report Date: August 20, 1999

Sample ID : TCLP 14

rrogate Recovery	Test	Percent%	Acceptable Limits
Fluorophenol	TCLP SEMIVOA	43.9	(23.6 - 75.9)
trobenzene-d5	TCLP SEMIVOA	75.9	(35.3 - 108.)
enol-d6	TCLP SEMIVOA	30.1	(10.9 - 54.6)
Terphenyl-d14	TCLP SEMIVOA	76.9	(36.6 - 110.)
4-Dichlorophenylacetic acid	TCLP HERBICIDES	78.4	(43.9 - 145.)
MX	TCLP PESTICIDES	102.	(46.0 - 125.)
cachlorobiphenyl	TCLP PESTICIDES	94.0	(42.0 - 143.)
omofluorobenzene	TCLP VOA-8260B	85.6	(73.0 - 129.)
bromofluoromethane	TCLP VOA-8260B	90.9	(66.0 - 117.)
luene-d8	TCLP VOA-8260B	93.1	(73.0 - 122.)

= Method	Method-Description
1	EPA 8260B
2	SW1311/8270C
3	EPA 8151
4	SW1311/8081A
5	EPA 7470A
6	SW846 6010A
7	SW846 3010A

tes:
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dicates presence of analyte at a concentration less than the reporting limit (RL) and greater than the detection limit (DL).
ndicates that the analyte was not detected at a concentration greater than the detection limit.
ndicates that a quality control analyte recovery is outside of specified acceptance criteria.

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	Building 735-16A, Rm. 5
	P.O. Box 616
	Aiken, South Carolina 29802
Contact:	Mr. Richard Groseclose
Project Description:	Hazardous Waste Contract

cc: WSRC00497 Report Date: August 20, 1999

Sample ID : TCLP 14

M = Method	Method-Description

This data report has been prepared and reviewed in accordance with General Engineering Laboratories standard operating procedures. Please direct any questions to your Project Manager, Stacy Griffin at 769-7376.

Reviewed By

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Project Description: Hazardous Waste Contract

:: WSRC00497 Report Date: August 20, 1999

Sample ID	: TCLP 15
Lab ID	: 9907679-52
Matrix	: TCLP
Date Collected	: 07/14/99
Date Received	: 07/15/99
Priority	: Routine
Collector	: Client

rameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
atile Organics											
'LP, Volatiles - 12 items											
-Dichloroethylene	U	0.00	0.00700	0.0700	MGL	10.	DLS	07/29/99	0026	154649	1
-Dichloroethane	U	0.00	0.00200	0.0500	MGL	10.					
-Dichlorobenzene	U	0.00	0.00300	0.750	MGL	10.					
3utanone	U	0.00	0.0590	20.0	MGL	10.					
nzene	U	0.00	0.00300	0.0500	MGL	10.					
rbon Tetrachloride	U	0.00	0.00200	0.0500	MGL	10.					
lorobenzene	U	0.00	0.00300	10.0	MGL	10.					
loroform	U	0.00	0.00700	0.600	MGL	10.					
trachloroethylene	U	0.00	0.00700	0.0700	MGL	10.					
chloroethylene	U	0.00	0.00600	0.0500	MGL	10.					
chlorotrifluoroethane	U	0.00	0.0113	0.0500	MGL	10.					
nyl chloride	U	0.00	0.00400	0.0200	MGL	10.					
ractable Organics											
'LP Semivolatile Compounds - 11 items											
,5-Trichlorophenol	U	0.00	0.0125	40.0	MGL	1.0	TSD	07/28/99	1333	154067	2
,6-Trichlorophenol	U	0.00	0.00480	0.200	MGL	1.0					
-Dinitrotoluene	U	0.00	0.00700	0.0500	MGL	1.0					
xachlorobenzene	U	0.00	0.0145	0.0500	MGL	1.0					
xachlorobutadiene	U	0.00	0.0190	0.0500	MGL	1.0					
xachloroethane	U	0.00	0.0170	0.300	MGL	1.0					
trobenzene	U	0.00	0.0165	0.200	MGL	1.0					
ntachlorophenol	U	0.00	0.0140	10.0	MGL	1.0					
ridine	U	0.00	0.0165	0.500	MGL	1.0					
p-Cresol	U	0.00	0.00900	20.0	MGL	1.0					
Cresol	U	0.00	0.0105	20.0	MGL	1.0					
'LP, Herbicides - 2 items											
,5-TP	U	0.00	0.00940	0.100	MGL	10.	JC	07/28/99	1919	154220	3

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Project Description: Hazardous Waste Contract

cc: WSRC00497 Report Date: August 20, 1999

Sample ID : TCLP 15

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
2,4-D	U	0.00	0.00900	1.00	MGL	10.					
TCLP Pesticides - 8 items											
Chlordane	U	0.00	0.00695	0.0125	MGL	1.0	SJ	07/28/99	0050	154069	4
Endrin	U	0.00	0.000400	0.00200	MGL	1.0					
Heptachlor	U	0.00	0.000525	0.00100	MGL	1.0					
Heptachlor & Hep. Epoxide	U	0.00	0.000710	0.00200	MGL	1.0					
Heptachlor epoxide	U	0.00	0.000470	0.00100	MGL	1.0					
Methoxychlor	U	0.00	0.00229	1.00	MGL	1.0					
Toxaphene	U	0.00	0.0132	0.0500	MGL	1.0					
gamma-BHC	U	0.00	0.000185	0.0400	MGL	1.0					
Metals Analysis											
Mercury	U	-0.000700	0.000350	0.0200	MGL	1.0	RPM2	07/27/99	1432	154343	5
Silver	J	0.0144	0.00730	0.500	MGL	10.	AME	08/01/99	1930	154250	6
Arsenic	U	-0.0201	0.0451	0.500	MGL	10.					
Barium	J	0.00969	0.00510	10.0	MGL	10.					
Cadmium	U	0.000361	0.00440	0.100	MGL	10.					
Chromium	J	0.0124	0.00560	0.500	MGL	10.					
Lead	U	-0.00482	0.0159	0.500	MGL	10.					
Selenium	U	0.00927	0.0271	0.100	MGL	10.					

The following prep procedures were performed:

GC/MS 5970 Extractables	ES	07/23/99	1000	154067 7
Herbicides	HDB	07/26/99	1400	154220 7
Pesticides	HDB	07/26/99	1400	154069 7
Mercury	ARD	07/26/99	1800	154343 7
TCLP Extraction - Semivolatiles	JL	07/22/99	1555	153946 7
TCLP Extraction - Volatiles	JL	07/27/99	2145	154384 7
TCLP Prep (Metals, Prep Only)	JL	07/22/99	1555	153947 7

Surrogate Recovery	Test	Percent%	Acceptable Limits
2,4,6-Tribromophenol	TCLP SEMIVOA	72.4	(41.0 - 122.)
2-Fluorobiphenyl	TCLP SEMIVOA	63.0	(41.2 - 107.)

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9907679-52

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Contact: Mr. Richard Groseclose
Project Description: Hazardous Waste Contract

:: WSRC00497 Report Date: August 20, 1999

Sample ID : TCLP 15

rrogate Recovery	Test	Percent%	Acceptable Limits
luorophenol	TCLP SEMIVOA	43.1	(23.6 - 75.9)
robenzene-d5	TCLP SEMIVOA	69.6	(35.3 - 108.)
enol-d6	TCLP SEMIVOA	29.6	(10.9 - 54.6)
erphenyl-d14	TCLP SEMIVOA	70.1	(36.6 - 110.)
-Dichlorophenylacetic acid	TCLP HERBICIDES	85.8	(43.9 - 145.)
MX	TCLP PESTICIDES	119.	(46.0 - 125.)
cachlorobiphenyl	TCLP PESTICIDES	76.5	(42.0 - 143.)
omofluorobenzene	TCLP VOA-8260B	86.9	(73.0 - 129.)
promofluoromethane	TCLP VOA-8260B	91.9	(66.0 - 117.)
luene-d8	TCLP VOA-8260B	93.1	(73.0 - 122.)

= Method	Method-Description
1	EPA 8260B
2	SW1311/8270C
3	EPA 8151
4	SW1311/8081A
5	EPA 7470A
6	SW846 6010A
7	SW846 3010A

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cc: WSRC00497 Report Date: August 20, 1999

Sample ID : TCLP 15

M = Method	Method-Description

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Aiken, South Carolina 29802
Contact: Mr. Richard Groseclose
Project Description: Hazardous Waste Contract

c: WSRC00497 Report Date: August 20, 1999

Sample ID	: TCLP 16
Lab ID	: 9907679-64
Matrix	: TCLP
Date Collected	: 07/14/99
Date Received	: 07/15/99
Priority	: Routine
Collector	: Client

rameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
latile Organics											
CLP, Volatiles - 12 items											
1-Dichloroethylene	U	0.00	0.00700	0.0700	MGL	10.	DLS	07/29/99	0055	154649	1
2-Dichloroethane	U	0.00	0.00200	0.0500	MGL	10.					
4-Dichlorobenzene	U	0.00	0.00300	0.750	MGL	10.					
Butanone	U	0.00	0.0590	20.0	MGL	10.					
enzene	U	0.00	0.00300	0.0500	MGL	10.					
arbon Tetrachloride	U	0.00	0.00200	0.0500	MGL	10.					
hlorobenzene	U	0.00	0.00300	10.0	MGL	10.					
hloroform	U	0.00	0.00700	0.600	MGL	10.					
etrachloroethylene	U	0.00	0.00700	0.0700	MGL	10.					
richloroethylene	U	0.00	0.00600	0.0500	MGL	10.					
richlorotrifluoroethane	U	0.00	0.0113	0.0500	MGL	10.					
inyl chloride	U	0.00	0.00400	0.0200	MGL	10.					
tractable Organics											
CLP Semivolatile Compounds - 11 items											
4,5-Trichlorophenol	U	0.00	0.0125	40.0	MGL	1.0	TSD	07/28/99	1349	154067	2
4,6-Trichlorophenol	U	0.00	0.00480	0.200	MGL	1.0					
4-Dinitrotoluene	U	0.00	0.00700	0.0500	MGL	1.0					
exachlorobenzene	U	0.00	0.0145	0.0500	MGL	1.0					
exachlorobutadiene	U	0.00	0.0190	0.0500	MGL	1.0					
exachloroethane	U	0.00	0.0170	0.300	MGL	1.0					
itrobenzene	U	0.00	0.0165	0.200	MGL	1.0					
entachlorophenol	U	0.00	0.0140	10.0	MGL	1.0					
yridine	U	0.00	0.0165	0.500	MGL	1.0					
ı,p-Cresol	U	0.00	0.00900	20.0	MGL	1.0					
-Cresol	U	0.00	0.0105	20.0	MGL	1.0					
CLP, Herbicides - 2 items											
,4,5-TP	U	0.00	0.00940	0.100	MGL	10.	JC	07/28/99	2004	154220	3

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Contact: Mr. Richard Groseclose
Project Description: Hazardous Waste Contract

cc: WSRC00497 Report Date: August 20, 1999

Sample ID : TCLP 16

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
2,4-D	U	0.00	0.00900	1.00	MGL	10.					
TCLP Pesticides - 8 items											
Chlordane	U	0.00	0.00695	0.0125	MGL	1.0	SJ	07/28/99	0117	154069	4
Endrin	U	0.00	0.000400	0.00200	MGL	1.0					
Heptachlor	U	0.00	0.000525	0.00100	MGL	1.0					
Heptachlor & Hep. Epoxide	U	0.00	0.000710	0.00200	MGL	1.0					
Heptachlor epoxide	U	0.00	0.000470	0.00100	MGL	1.0					
Methoxychlor	U	0.00	0.00229	1.00	MGL	1.0					
Toxaphene	U	0.00	0.0132	0.0500	MGL	1.0					
gamma-BHC	U	0.00	0.000185	0.0400	MGL	1.0					
Metals Analysis											
Mercury	U	-0.00131	0.000350	0.0200	MGL	1.0	RPM2	07/27/99	1433	154343	5
Silver	J	0.0168	0.00730	0.500	MGL	10.	AME	08/01/99	1936	154250	6
Arsenic	U	-0.0280	0.0451	0.500	MGL	10.					
Barium	J	0.00815	0.00510	10.0	MGL	10.					
Cadmium	U	-0.000649	0.00440	0.100	MGL	10.					
Chromium	J	0.0153	0.00560	0.500	MGL	10.					
Lead	U	-0.00776	0.0159	0.500	MGL	10.					
Selenium	U	-0.00686	0.0271	0.100	MGL	10.					

The following prep procedures were performed:

GC/MS 5970 Extractables	ES	07/23/99	1000	154067	7
Herbicides	HDB	07/26/99	1400	154220	7
Pesticides	HDB	07/26/99	1400	154069	7
Mercury	ARD	07/26/99	1800	154343	7
TCLP Extraction - Semivolatiles	JL	07/22/99	1555	153946	7
TCLP Extraction - Volatiles	JL	07/27/99	2145	154384	7
TCLP Prep (Metals, Prep Only)	JL	07/22/99	1555	153947	7

Surrogate Recovery	Test	Percent%	Acceptable Limits
2,4,6-Tribromophenol	TCLP SEMIVOA	67.3	(41.0 - 122.)
2-Fluorobiphenyl	TCLP SEMIVOA	62.7	(41.2 - 107.)

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Project Description: Hazardous Waste Contract

:: WSRC00497 Report Date: August 20, 1999

Sample ID : TCLP 16

rrogate Recovery	Test	Percent%	Acceptable Limits
luorophenol	TCLP SEMIVOA	45.7	(23.6 - 75.9)
robenzene-d5	TCLP SEMIVOA	75.5	(35.3 - 108.)
enol-d6	TCLP SEMIVOA	31.1	(10.9 - 54.6)
erphenyl-d14	TCLP SEMIVOA	64.8	(36.6 - 110.)
-Dichlorophenylacetic acid	TCLP HERBICIDES	91.2	(43.9 - 145.)
MX	TCLP PESTICIDES	116.	(46.0 - 125.)
cachlorobiphenyl	TCLP PESTICIDES	97.5	(42.0 - 143.)
omofluorobenzene	TCLP VOA-8260B	86.1	(73.0 - 129.)
bromofluoromethane	TCLP VOA-8260B	92.5	(66.0 - 117.)
luene-d8	TCLP VOA-8260B	93.3	(73.0 - 122.)

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1	EPA 8260B
2	SW1311/8270C
3	EPA 8151
4	SW1311/8081A
5	EPA 7470A
6	SW846 6010A
7	SW846 3010A

tes:
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ıdicates presence of analyte at a concentration less than the reporting limit (RL) and greater than the detection limit (DL).
ndicates that the analyte was not detected at a concentration greater than the detection limit.
ıdicates that a quality control analyte recovery is outside of specified acceptance criteria.

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Contact:	Mr. Richard Groseclose
Project Description:	Hazardous Waste Contract

cc: WSRC00497 Report Date: August 20, 1999

Sample ID : TCLP 16

M = Method	Method-Description

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Stacy L. Griffin

Reviewed By

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Environmental Geochemistry Group

EGG-RSG-99191

Date: August 26, 1999

To: Bernard Nora, 735-11A
John Pickett, 730-M

From: Richard S. Groseclose, 735-16A

Job 99191

Attached is the lab report from General Engineering Laboratories for the sixteen (16) relogged TCLP samples for Job 99191.

If you have any questions, please give me a call at 5-5687.

Reviewed by: RS Groseclose

Richard S. Groseclose, Environmental Geochemistry Group

GENERAL ENGINEERING LABORATORIES

Meeting today's needs with a vision for tomorrow.

CASE NARRATIVE REPORT
for
Westinghouse Savannah River Site
Subcontract No. AB93796N
Job# 99191

August 16, 1999

Laboratory Identification:

General Engineering Laboratories, Inc.

Summary:

Sample receipt

Eight solid and sixteen sludge samples for Westinghouse Savannah River Site arrived at General Engineering Laboratories, Inc., (GEL) Charleston, South Carolina on July 15, 1999 for analysis. The samples listed below were re-logged samples for job number 99191. The samples listed on the chain arrived without any visible signs of tampering. A thirty-day turnaround was requested on the chain.

The samples were stored properly according to SW-846 procedures and GEL Standard Operating Procedures (SOP).

The laboratory received the following samples:

Description	Sample Number
9908434-01	TCLP 1
9908434-02	TCLP 2
9908434-03	TCLP 3
9908434-04	TCLP 4
9908434-05	TCLP 5
9908434-06	TCLP 6
9908434-07	TCLP 7
9908434-08	TCLP 8
9908434-09	TCLP 9
9908434-10	TCLP 9
9908434-11	TCLP 10
9908434-12	TCLP 10
9908434-13	TCLP 11
9908434-14	TCLP 12
9908434-15	TCLP 13
9908434-17	TCLP 15
9908434-18	TCLP 16

Case Narrative

Sample analyses were conducted using methodology as outlined in General Engineering Laboratories (GEL) Standard Operating Procedures. Any technical or administrative problems during analysis, data review, and reduction are written by

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analytical fraction in the enclosed narratives. During the time of the reanalysis, the client was informed that the sample for TCLP 14 had been used to run the first set of tests. The lab was told to continue analyzing the other samples due to time constraints. The client was also informed that the metals fractions would have to be re-tumbled for QC due to the extra compounds on the ICP SCAN (39) vs. TCLP Metals. The client stated that the extra compounds were for informational purposes only and not needed for the delisting project. Therefore, no post spike or extra QC would be needed.

Data Package:

The enclosed data package contains the following sections: Case Narrative, Level II Certificate of Analysis, QC Sample Summaries, Chain of Custody, Sample Tracking Report, Nonconformance Reports if applicable & Electronic Data Hardcopy Report.

The Level **II** Certificate of Analysis contains the following headings:

Sample ID:	Sample Identification
Lab ID:	This is the laboratory identification number
Matrix:	Sample matrix
Date Collected:	Date of sample collection
Date Received:	Date of sample receipt by the laboratory
Priority:	Internal status of sample turnaround
Collector:	Party responsible for sample collection.

The detail on the Certificate includes the following:

Parameter:	Analyte or characteristic tested for in the sample
Qualifier:	Qualifier used for data interpretation
Result:	Final result of each parameter.
DL:	Method Detection Limit
RL:	Reporting Limit
Units:	Units of final result
DF:	Dilution factor
Analyst:	Initials of analyst who performed the test
Date:	Date of analysis
Time:	Time of analysis
Batch:	Analytical batch in which the sample was analyzed
Method:	Analytical method used for the analysis of the sample. Identified on the report numerically with a corresponding table.
Surrogate Recovery:	Provided for organic analysis only. Surrogate compound identified.
Test:	Analytical test associated with surrogate compound.
Percent%:	Surrogate percent recovery
Acceptable Limits:	Limits established for surrogate recoveries based upon the method requirements.

The QC Summary Report contains the following headings:

Sample Parameter:	Analyte or characteristic tested for in the QC sample
Type:	Type of QC sample (i.e., blank, dup, LCS, LCS dup, MS, MSD)

Batch:	Analytical batch in which the QC sample was analyzed
NOM:	Nominal concentration of the spiking compound
Sample:	Amount of compound found in the sample associated with the QC sample.
QC:	Amount of compound found in the QC sample.
Units:	Units of final result
RPD%:	Relative percent difference between LCS/LCS dup, MS/MSD, and Sample/Sample duplicate
REC%:	Recovery for the control samples
Range:	Acceptance limits for control samples
Analyst:	Initials of analyst who performed the test
Date:	Date of analysis
Time:	Time of analysis

Types of QC samples that may be found on the QC Summary Report are:

Blank:	Results of the blank analysis for the sample batch
Dup:	Duplicate analysis of sample
LCS:	Lab control sample
LCS dup:	Lab control sample duplicate
MS:	Matrix spike
MSD:	Matrix spike duplicate

The following are definitions of reporting limits used at General Engineering Laboratories:

DL — Detection Limit: The minimum level of an analyte that can be determined (identified not quantified) with 99% confidence. The values are normally achieved by preparing and analyzing seven aliquots of laboratory water spiked 1 to 5 times the estimated MDL, taking the standard deviation and multiplying it against the one-tailed t-statistic at 99%. This computed value is then verified for reasonableness by repeating the study using the concentration found in the initial study, calculating an F-ratio, and computing the final limit. Sample specific preparation and dilution factors are applied to these limits when they are reported.

The detection limit is the minimum concentration of a substance that can be identified, measured, and reported with 99% confidence that the analyte concentration is above zero. It answers the question "Is It Present".

QL — Quantitation Limit: The lowest concentration that can be reliably achieved within specified limits of precision and accuracy during routine laboratory operating conditions. The QL is generally 5 to 10 times the MDL. However, it may be nominally chosen within these guidelines to simplify data reporting. For many analytes the QL analyte concentration is selected as the lowest non-zero standard in the calibration curve. Sample QL's are highly matrix-dependent. Sample specific preparation and dilution factors are applied to these limits when they are reported.

The QL is always ≥ DL

RL — Reporting Limit: Same as the QL except where driven by contract or client specifications. If the sample specific preparation and dilution factors cause the QL to be elevated above the RL, then the QL is used as the RL.

The quantitation limit is the lowest level at which a chemical may be accurately and reproducibly quantitated. It answers the question "HOW MUCH IS PRESENT".

Interpretation of RESULT column on the Certificate of Analysis:

If the final concentration in the sample was found to be above the RL, then the value reported is reported without a flag;

If the final concentration in the sample was found to be below the RL but above the DL, then the value reported is flagged with a "J";

If the final concentration in the sample was found to be below the DL, the value reported is flagged with a "U".

Quality Control Flags

General Engineering Laboratories maintains acceptance criteria for QC samples through use of statistical process control (SPC). The SPC limits are used to qualify data usability. The flagging criteria identified in WSRC AN98 Format does not necessarily coincide with the laboratory SPC criteria. There may be instances where the Electronic Data Deliverable (EDD) has flagged data based on the AN98 criteria and the lab has not identified the data to be outside of established control limits.

Those instances where the QC has not met laboratory SPC established criteria will be noted in the section case narratives that are included in this package.

This data package, to the best of my knowledge, is in compliance with technical and administrative requirements.

Stacy L. Griffin
Project Manager

wsrc00497.99191

Case Narrative for WSRC SDG 99191T

Metals Analysis by ICP

Sample Analysis and Sample Preparation

The following samples were analyzed for metals using ICP Method EPA 6010B:

Laboratory Number	Sample Description
9908434-01	TCLP 1
9908434-02	TCLP 2
9908434-03	TCLP 3
9908434-04	TCLP 4
9908434-05	TCLP 5
9908434-06	TCLP 6
9908434-07	TCLP 7
9908434-08	TCLP 8
9908434-09	TCLP 9
9908434-11	TCLP 10
9908434-13	TCLP 11
9908434-14	TCLP 12
9908434-15	TCLP 13
9908434-17	TCLP 15
9908434-18	TCLP 16
QC639099-ICP	Preparation Blank (PB)
QC639100-ICP	TCLP Preparation Blank #1 (TPB1)
QC639102-ICP	Laboratory Control Sample (LCS)
QC639103-ICP	TCLP 16L-Serial Dilution (SD)
QC639104-ICP	TCLP 16S-Matrix Spike (MS)
QC639105-ICP	TCLP 16SD-Matrix Spike Duplicate (MSD)

System Configurations

ICP analysis was performed on a Thermo Jarrell Ash 61E Trace axial-viewing inductively coupled plasma atomic emission spectrometer. The instrument is equipped with a Meinhardt nebulizer, cyclonic spray chamber, and yttrium internal standard. Operating conditions for the Trace ICP were set at a power level of 950 watts, a peristaltic pump flow rate of 140 RPM (2.0 mL/min sample uptake rate), argon gas flows of 15 L/min and 0.5 L/min for the torch and auxiliary gases, and a nebulizer pressure setting of 26 PSI.

Sample Preparation

All samples were prepared in accordance with the appropriate EPA SW846 procedures.

Instrument Calibration
The instrument was calibrated following the manufacturers' specifications.

Holding Time
All samples were analyzed within the required holding times.

Blanks
All quality control criteria were met for the ICP preparation blanks.

Spike Analyses
Sample TCLP 16 was designated as the quality control sample for the ICP batch. The ICP batch included a matrix spike (MS) and a matrix spike duplicate (MSD). The percent recoveries (%R) obtained from the MS analyses are evaluated when the sample concentration is less than four times (4X) the spike concentration added. The relative percent difference (RPD) obtained from the DUP is evaluated when the sample concentration is greater than five times (5X) the contract required detection limit (RL). The MS met the recommended quality control criteria for percent recovery (%R) for all applicable analytes as established by in-house generated statistical process control (SPC) limits. Boron, sodium and titanium are not included in the matrix spiking solution. The MS/MSD set met the recommended quality control criteria for relative percent difference (RPD%) for all applicable analytes.

Laboratory Control Samples
The laboratory control samples (LCS) met the quality control acceptance criteria for %R and for all analytes. Boron, sodium and titanium are not components of the certified aqueous laboratory control sample used by the laboratory.

Sample Dilutions
All ICP samples were diluted to a 2X to minimize potential client identified interferences, with the exception of the LCST, which was analyzed undiluted. Sodium in all samples was analyzed at a 10X dilution to minimize interferences resulting from the high sodium concentration in the TCLP leaching solution.

Serial Dilution Analysis
The designated quality control sample TCLP 16 for the ICP batch was analyzed as the serial dilution (SD) at a 10X dilution. All quality control criteria were achieved for percent difference for all applicable analytes. The acceptance criteria only applies to those elements present at a concentration greater than 50X the IDL. This is a tool used to monitor matrix enhancement or suppression caused by interferences present in the sample.

Nonconformance Reports
There were no Nonconformance Reports associated with this SDG.

General Comments

This Case Narrative has been reviewed using Batch Data Reports generated by the analysts and QC Summary Reports.

This package has been reviewed by: Rod Miller

Date: 8-25-99

CASE NARRATIVE
WSRC
SDG # 99191T-RE -VOA
Analysis by GC/MS

Sample Analysis:

The following samples were analyzed for Volatile Organic Compounds using the analytical protocol from EPA SW-846 Third Edition, Method 8260B, Revision 2, December 1996:

Laboratory Number	Sample Description
9908434-10	TCLP 9
9908434-12	TCLP 10
QC640135	VBLK01 (Method Blank)
QC640136	VBLK01LCS (Laboratory Control Sample)
QC640137	VBLK01TCLP (TCLP Prep Blank)

The above samples were re-extracted TCLP leachates and reanalyzed for the target analyte Freon-113.

System Configuration:

The laboratory utilizes a variety of instrument configurations for volatile analyses. These analyses are accomplished using one or more of the GC and MS couplings, as follows:

GC/MS	Interface	Purge and Trap-Concentrator / Autosampler
5890 Series II / 5970	Jet Separator	Tekmar 2000 / Archon
5890 Series II / 5972	Direct	OI 4560 / Archon
6890 Series / 5973	Direct	Tekmar 3000 / Precept
6890 Series / 5973	Direct	OI 4560 / DPM-16
6890 Series / 5973	Direct	Tekmar 2000 / Archon

Chromatographic Column:

Chromatographic separation of volatile components is accomplished through analysis on one or more of the following columns:

J&W1	DB - 624, 60 m x 0.32 mm, 1.8um (identified by the J&W1 designation)
J&W2:	DB - 624, 75 m x 0.53 mm, 3 um (identified by the J&W2 designation)
Rtx1	Rtx Volatiles, 60 m x 0.53 mm, 1.5 um (identified by the Rtx VOA designation)
J&W3	DB-624, 60 m x 0.25 mm, 1.4 um (identified by the J&W3 designation)

Samples are prepared using Purge and Trap samplers containing the following P & T trap:

VOCARB 3000: Carbopack B/ Carboxen 1000 &1001

Instrument Configuration:

The samples reported in this sample delivery group (SDG) were analyzed on one or more of the following instrument systems (instrument systems are identified by the instrument ID designations listed below which can be found on the raw data or individual form headers):

Instrument ID	System Configuration	Chromatographic Column	P & T Trap
VOA1	HP5890/HP5970	J&W2	VOCARB 3000
VOA2	HP6890/HP5973	J&W3	VOCARB 3000
VOA4	HP5890/HP5972	Rtx VOA	VOCARB 3000
VOA5	HP5890/HP5972	J&W3	VOCARB 3000
VOA7	HP5890/HP5972	Rtx VOA	VOCARB 3000
VOA8	HP6890/HP5973	J&W3	VOCARB 3000
VOA9	HP6890/HP5973	J&W3	Tenax/Silicagel/ Charcoal

Instrument Calibration:

The instrument was properly calibrated.

Holding Time:

Samples were re-extracted beyond the 14 days from collection holding time for the TCLP leaching process. Samples were analyzed per client request.

Surrogates:

Surrogate recoveries in all samples were within the required acceptance limits.

Internal Standards:

Internal standards in all samples were within the required acceptance limits.

Blanks:

Target analytes were not detected in the method blank above the required reporting limit.

Spike Analyses:

The matrix spikes were analyzed on a sample from this SDG in another analytical batch.

All of the analyte recoveries in the MS and MSD were within the required acceptance limits.

The relative percent differences (RPDs) between the MS and MSD were within the required acceptance limits.

Laboratory Control Samples:

All analyte recoveries in the laboratory control sample were within the required acceptance limits.

Dilutions:

The following samples were diluted.

Laboratory Number
9908434-10
9908434-12

QC640137

Due to problems associated with the leachate matrix, TCLP volatile extracts are routinely diluted 10 times before analysis. The dilution factor does not increase detection limits above the regulatory limits required by the client.

Non Conformance Reports:

There were no Nonconformance Reports associated with this batch.

The preceding narrative has been reviewed by: Pat Steele Date: 8/20/98

Case Narrative for
WSRC
SDG# 99191

TOTAL HALOGENS

Analytical Batch Number: 156004

Analytical Method: EPA 300.0, EPA 9056

Laboratory Number	Sample Description
9908434-01	TCLP 1
9908434-02	TCLP 2
9908434-03	TCLP 3
9908434-04	TCLP 4
9908434-05	TCLP 5
9908434-06	TCLP 6
9908434-07	TCLP 7
9908434-08	TCLP 8
9908434-09	TCLP 9
9908434-11	TCLP 10
9908434-13	TCLP 11
9908434-14	TCLP 12
9908434-15	TCLP 13
9908434-17	TCLP 15
9908434-18	TCLP 16
QC638673	Duplicate of 9908434-01
QC638674	Post Spike of 9908434-01
QC638675	Duplicate of 9908434-02
QC638676	Post Spike of 9908434-02
QC638677	Laboratory Control Sample
QC638678	Blank

Sample Preparation:

All samples were prepared in accordance with accepted procedures.

Instrument Calibration:

The instrument used was a Dionex DX300 Ion Chromatography instrument with a Dionex AS9-HC general purpose anion column. Instrument IC-AF was properly calibrated on 07/28/99.

Holding Time

The following samples were received out of holding.

Laboratory Number

9908434-01
9908434-02
9908434-03
9908434-04
9908434-05
9908434-06
9908434-07
9908434-08
9908434-09
9908434-11
9908434-13
9908434-14
9908434-15
9908434-17
9908434-18

Blanks:

No target analytes were detected in the method blank above the required acceptance limit.

Spike Analyses:

The post spikes were run on the following Sample Numbers.

9908434-01 and 9908434-02

All analyte recoveries in the post spike were within the required acceptance limits.

Laboratory Control Samples:

All analyte recoveries in the laboratory control sample were within the required acceptance limits.

Sample Duplicates:

With the exception of the following samples all sample duplicate results were within the required acceptance limits.

Laboratory Number

9908434-01
9908434-02

Value for Cl in 9908434-01 was less than the PQL, so the RPD does not apply. In 9908434-02 , the value for the sample and duplicate for Cl were both less than 5x the PQL. Since both values were less than 1 PQL values apart from each other, the RPD is considered acceptable.

Dilutions:

None of the samples were diluted.

Non Conformance Reports:

The following Nonconformance Reports were written for this batch.

GEL-AS-GC-1553

General Comments:

F could not be determined by regular IC analysis because of the high acetate levels found in TCLP extraction solutions. The acetate elutes very close to the fluoride, making fluoride quantitation impossible.

AMMONIA

Analytical Batch Number: 156096

Analytical Method: EPA 350.1

Laboratory Number	Sample Description
9908434-01	TCLP 1
9908434-02	TCLP 2
9908434-03	TCLP 3
9908434-04	TCLP 4
9908434-05	TCLP 5
9908434-06	TCLP 6
9908434-07	TCLP 7
9908434-08	TCLP 8
9908434-09	TCLP 9
9908434-11	TCLP 10
9908434-13	TCLP 11
9908434-14	TCLP 12
9908434-15	TCLP 13
9908434-17	TCLP 15
9908434-18	TCLP 16
QC639035	Blank
QC639036	Laboratory Control Sample
QC639037	Duplicate of 9908434-06
QC639038	Post Spike of 9908434-06
QC639039	Duplicate of 9908434-17
QC639040	Post Spike of 9908434-17

Sample Preparation:

All samples were prepared in accordance with accepted procedures.

Instrument Calibration:

The instrument used was a TRAACS 800 colorimetric autoanalyzer. The instrument was properly calibrated.

Holding Time:

All samples were analyzed within the required holding time.

Blanks:

No target analytes were detected in the method blank above the required acceptance limit.

Spike Analyses:

The post spikes were run on the following Sample Numbers.

9908434-06 and 9908434-17

All analyte recoveries in the post spike were within the required acceptance limits.

Laboratory Control Samples:

All analyte recoveries in the laboratory control sample were within the required acceptance limits.

Sample Duplicates:

All sample duplicate results were within the required acceptance limits.

Dilutions:

None of the samples were diluted.

Non Conformance Reports:

There were no Nonconformance Reports associated with this batch.

The above narrative has been reviewed by: _____ Date: 08/25/99

General Engineering Laboratories
Form GEL-XXX
Rev. 09/98)

UNCONTROLLED DOCUMENT

1. NCR Report No.: GEL-HS-(97C-155?
2. Page 1 of 1
3. Revision No.: 0

COMPANY-WIDE NONCONFORMANCE REPORT

COMPLETE EVERY ITEM

(See Instructions on Reverse Side)

4. Mo. Day Yr.: 08 | 14 | 99

5. Division: ☐ Industrial ☒ Federal ☐ Radiochemistry ☐ Bioassay ☐ Other

6. Type: Material ☐ Process ☒ Product ☐

7. Instrument Type: Ion Chromatography

8. Quality Criteria: ☒ SOP ☐ QAP or QAPJP ☐ Client Contract ☐ Purchase Document ☐ Drawing ☐ Specifications ☐ Others

9. Supplier/Client Name & Code: WSRC 00497

10. Test/Method: Method 300

11. Numerical Reference Identification: (Batch Number, Sample Number, ID number)
Batch 156004; 9908434-01→15, and -17+18

12. Specifications and Requirements Nonconformance Description:

Item No.	
1	PM asked for total Halogens (F, Cl, Br) on TCLP Extracts. Has a major interference in Acetate.

14. NRG Disposition:

Item No.	
1	Samples were run according to PM instructions. Fluoride not reported.

RECEIVED
AUG 23 1999

13. Originator's Printed Name & Signature: Robert W. Sosa — Date: 08/14/99

15. NRG's Printed Name & Signature: Robert W. Sosa — Date: 08/14/99

List NRG Participants:

DEIDRE KELLY 8/16/99

Management Review ☒ or Management Approval ☐

Please review within 24 hours of receipt.

010213

NCR Review & Disposition Review or Approval:

16. Quality Review: — Date: 8/23/99

17. Originator's Director/Group Leader — Date:

Corrective Action Request and Approval: FI

18. CA Requested: Print Name and Sign — Date:

19. Corrective Action Approval & Number — Date:

GENERAL ENGINEERING LABORATORIES

Meeting today's needs with a vision for tomorrow.

Client: Westinghouse Savannah River Co.
Building 735-16A, Rm. 5
P.O. Box 616
Aiken, South Carolina 29802
Contact: Mr. Richard Groseclose
Project Description: Hazardous Waste Contract

cc: WSRC00497 Report Date: August 24, 1999

Sample ID	: TCLP 1
Lab ID	: 9908434-01
Matrix	: Soil
Date Collected	: 07/14/99
Date Received	: 08/12/99
Priority	: Rush
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Metals Analysis											
Silver	J	0.00522	0.00146	0.500	mg/l	2.0	MBL	08/21/99	1009	156112	N
Aluminum		1130	24.3	100	ug/l	2.0					
Arsenic	J	0.0116	0.00902	0.500	mg/l	2.0					
Boron		6890	5.82	100	ug/l	2.0					
Barium	J	0.0146	0.00102	10.0	mg/l	2.0					
Beryllium	U	0.0430	0.520	10.0	ug/l	2.0					
Calcium		725	129	200	ug/l	2.0					
Cadmium	U	0.000780	0.000880	0.0500	mg/l	2.0					
Cobalt	U	0.659	1.38	10.0	ug/l	2.0					
Chromium	J	0.187	0.00112	0.500	mg/l	2.0					
Copper	J	0.00489	0.00208	0.0100	mg/l	2.0					
Iron	U	65.8	85.2	100	ug/l	2.0					
Potassium		3360	37.4	200	ug/l	2.0					
Magnesium		136	10.6	20.0	ug/l	2.0					
Manganese	U	40.8	46.6	46.6	ug/l	2.0					
Molybdenum	U	1.50	2.48	20.0	ug/l	2.0					
Sodium		1440000	1100	1100	ug/l	10.					
Nickel		321	2.58	10.0	ug/l	2.0					
Lead	U	0.00200	0.00318	0.500	mg/l	2.0					
Antimony	U	3.41	7.88	20.0	ug/l	2.0					
Selenium	U	0.00403	0.00542	0.100	mg/l	2.0					
Tin	U	5.77	140	140	ug/l	2.0					
Strontium	J	5.02	0.580	10.0	ug/l	2.0					
Titanium	U	0.494	1.44	10.0	ug/l	2.0					
Uranium		1360	47.2	100	ug/l	2.0					
Vanadium	J	2.35	1.18	10.0	ug/l	2.0					
Zinc	J	0.0440	0.00318	0.0500	mg/l	2.0					
General Chemistry											
Total Halogens - 3 items											
HALOGENS-9056	SORRY ... NO PREP DATA FOUND!!										

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9908434-01

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Client: Westinghouse Savannah River Co.
Building 735-16A, Rm. 5
P.O. Box 616
Aiken, South Carolina 29802
Contact: Mr. Richard Groseclose
Project Description: Hazardous Waste Contract

cc: WSRC00497 Report Date: August 24, 1999

Sample ID : TCLP 1

arameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
romide	U	0.00	0.0152	0.0500	mg/l	1.0	RWS	08/13/99	2200	156004	1
HALOGENS-9056	SORRY ... NO PREP DATA FOUND!!										
hlorides	J	0.0490	0.0181	0.100	mg/l	1.0	RWS	08/13/99	2200	156004	1
itrogen, Nitrate		2.64	0.0127	0.0500	mg/l	1.0	RWS	08/13/99	2200	156004	2
itrogen, Ammonia	U	0.00	0.0241	0.100	MGL	1.0	THL	08/16/99	1335	156096	3

I = Method	Method-Description
1	EPA 9056
2	EPA 300.0
3	EPA 350.1

otes:
ie qualifiers in this report are defined as follows:
) indicates that the analyte was not detected at a concentration greater than the detection limit.
ndicates presence of analyte at a concentration less than the reporting limit (RL) and greater than the detection limit (DL).
indicates that the analyte was not detected at a concentration greater than the detection limit.
ndicates that a quality control analyte recovery is outside of specified acceptance criteria.

is data report has been prepared and reviewed
accordance with General Engineering Laboratories
ndard operating procedures. Please direct
y questions to your Project Manager, Stacy Griffin at 769-7376.

Stacy L. Griffin
viewed By

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9908434-01

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GENERAL ENGINEERING LABORATORIES

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Client: Westinghouse Savannah River Co.
Building 735-16A, Rm. 5
P.O. Box 616
Aiken, South Carolina 29802
Contact: Mr. Richard Groseclose
Project Description: Hazardous Waste Contract

cc: WSRC00497 Report Date: August 24, 1999

Sample ID	: TCLP 2
Lab ID	: 9908434-02
Matrix	: Soil
Date Collected	: 07/14/99
Date Received	: 08/12/99
Priority	: Rush
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Metals Analysis											
Silver	J	0.00537	0.00146	0.500	mg/l	2.0	MBL	08/21/99	1015	156112	N
Aluminum		1660	24.3	100	ug/l	2.0					
Arsenic	U	0.00760	0.00902	0.500	mg/l	2.0					
Boron		3180	5.82	100	ug/l	2.0					
Barium	J	0.0259	0.00102	10.0	mg/l	2.0					
Beryllium	U	-0.362	0.520	10.0	ug/l	2.0					
Calcium		1020	129	200	ug/l	2.0					
Cadmium	U	0.000375	0.000880	0.0500	mg/l	2.0					
Cobalt	J	3.89	1.38	10.0	ug/l	2.0					
Chromium	J	0.0130	0.00112	0.500	mg/l	2.0					
Copper	J	0.00809	0.00208	0.0100	mg/l	2.0					
Iron		1440	85.2	100	ug/l	2.0					
Potassium		1140	37.4	200	ug/l	2.0					
Magnesium		661	10.6	20.0	ug/l	2.0					
Manganese	U	36.8	46.6	46.6	ug/l	2.0					
Molybdenum	U	0.285	2.48	20.0	ug/l	2.0					
Sodium		1420000	1100	1100	ug/l	10.					
Nickel		353	2.58	10.0	ug/l	2.0					
Lead	J	0.00387	0.00318	0.500	mg/l	2.0					
Antimony	U	6.23	7.88	20.0	ug/l	2.0					
Selenium	J	0.00584	0.00542	0.100	mg/l	2.0					
Tin	U	6.30	140	140	ug/l	2.0					
Strontium	J	5.76	0.580	10.0	ug/l	2.0					
Titanium	J	6.11	1.44	10.0	ug/l	2.0					
Uranium		1390	47.2	100	ug/l	2.0					
Vanadium	J	2.18	1.18	10.0	ug/l	2.0					
Zinc		1.94	0.00318	0.0500	mg/l	2.0					
General Chemistry											
Total Halogens - 3 items											
HALOGENS-9056	SORRY ... NO PREP DATA FOUND!										

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9908434-02

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Building 735-16A, Rm. 5
P.O. Box 616
Aiken, South Carolina 29802
Contact: Mr. Richard Groseclose
Project Description: Hazardous Waste Contract

:c: WSRC00497 Report Date: August 24, 1999

Sample ID : TCLP 2

ırameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
·omide	U	0.00	0.0152	0.0500	mg/l	1.0	RWS	08/13/99	2213	156004	1
HALOGENS-9056	SORRY ... NO PREP DATA FOUND!!										
ılorides		0.179	0.0181	0.100	mg/l	1.0	RWS	08/13/99	2213	156004	1
itrogen, Nitrate		0.648	0.0127	0.0500	mg/l	1.0	RWS	08/13/99	2213	156004	2
itrogen, Ammonia	U	0.00	0.0241	0.100	MGL	1.0	THL	08/16/99	1335	156096	3

= Method	Method-Description
1	EPA 9056
2	EPA 300.0
3	EPA 350.1

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ıdicates presence of analyte at a concentration less than the reporting limit (RL) and greater than the detection limit (DL).
.ndicates that the analyte was not detected at a concentration greater than the detection limit.
ndicates that a quality control analyte recovery is outside of specified acceptance criteria.

is data report has been prepared and reviewed
accordance with General Engineering Laboratories
ndard operating procedures. Please direct
y questions to your Project Manager, Stacy Griffin at 769-7376.

viewed By

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GENERAL ENGINEERING LABORATORIES

Meeting today's needs with a vision for tomorrow.

Client: Westinghouse Savannah River Co.
Building 735-16A, Rm. 5
P.O. Box 616
Aiken, South Carolina 29802
Contact: Mr. Richard Groseclose
Project Description: Hazardous Waste Contract

cc: WSRC00497 Report Date: August 24, 1999

Sample ID	: TCLP 3
Lab ID	: 9908434-03
Matrix	: Soil
Date Collected	: 07/14/99
Date Received	: 08/12/99
Priority	: Rush
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Metals Analysis											
Silver	J	0.00648	0.00146	0.500	mg/l	2.0	MBL	08/21/99	1031	156112	N
Aluminum		1380	24.3	100	ug/l	2.0					
Arsenic	U	0.00552	0.00902	0.500	mg/l	2.0					
Boron		1910	5.82	100	ug/l	2.0					
Barium	J	0.00920	0.00102	10.0	mg/l	2.0					
Beryllium	U	-0.821	0.520	10.0	ug/l	2.0					
Calcium		427	129	200	ug/l	2.0					
Cadmium	U	0.000638	0.000880	0.0500	mg/l	2.0					
Cobalt	U	0.633	1.38	10.0	ug/l	2.0					
Chromium	J	0.0126	0.00112	0.500	mg/l	2.0					
Copper	U	0.00175	0.00208	0.0100	mg/l	2.0					
Iron		822	85.2	100	ug/l	2.0					
Potassium		665	37.4	200	ug/l	2.0					
Magnesium		370	10.6	20.0	ug/l	2.0					
Manganese	U	25.2	46.6	46.6	ug/l	2.0					
Molybdenum	U	-0.306	2.48	20.0	ug/l	2.0					
Sodium		1420000	1100	1100	ug/l	10.					
Nickel		358	2.58	10.0	ug/l	2.0					
Lead	J	0.00591	0.00318	0.500	mg/l	2.0					
Antimony	U	3.16	7.88	20.0	ug/l	2.0					
Selenium	J	0.00894	0.00542	0.100	mg/l	2.0					
Tin	U	6.76	140	140	ug/l	2.0					
Strontium	J	3.04	0.580	10.0	ug/l	2.0					
Titanium	J	5.99	1.44	10.0	ug/l	2.0					
Uranium		2170	47.2	100	ug/l	2.0					
Vanadium	J	2.14	1.18	10.0	ug/l	2.0					
Zinc		1.32	0.00318	0.0500	mg/l	2.0					
General Chemistry											
Total Halogens - 3 items											
HALOGENS-9056	SORRY ... NO PREP DATA FOUND!!										

9908434-03

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Contact: Mr. Richard Groseclose
Project Description: Hazardous Waste Contract

c: WSRC00497 Report Date: August 24, 1999

Sample ID : TCLP 3

rameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
omide	U	0.00	0.0152	0.0500	mg/l	1.0	RWS	08/13/99	2227	156004	1
IALOGENS-9056	SORRY ... NO PREP DATA FOUND!!										
ılorides		0.150	0.0181	0.100	mg/l	1.0	RWS	08/13/99	2227	156004	1
trogen, Nitrate		1.60	0.0127	0.0500	mg/l	1.0	RWS	08/13/99	2227	156004	2
trogen, Ammonia	U	0.00	0.0241	0.100	MGL	1.0	THL	08/16/99	1335	156096	3

= Method	Method-Description
1	EPA 9056
2	EPA 300.0
3	EPA 350.1

tes:
ɜ qualifiers in this report are defined as follows:
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ıdicates presence of analyte at a concentration less than the reporting limit (RL) and greater than the detection limit (DL).
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ıs data report has been prepared and reviewed
ıccordance with General Engineering Laboratories
ıdard operating procedures. Please direct
/ questions to your Project Manager, Stacy Griffin at 769-7376.

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Aiken, South Carolina 29802
Contact: Mr. Richard Groseclose
Project Description: Hazardous Waste Contract

cc: WSRC00497 Report Date: August 24, 1999

Sample ID	: TCLP 4
Lab ID	: 9908434-04
Matrix	: Soil
Date Collected	: 07/14/99
Date Received	: 08/12/99
Priority	: Rush
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Metals Analysis											
Silver	J	0.00632	0.00146	0.500	mg/l	2.0	MBL	08/21/99	1036	156112	N
Aluminum		1270	24.3	100	ug/l	2.0					
Arsenic	U	-0.00135	0.00902	0.500	mg/l	2.0					
Boron		1250	5.82	100	ug/l	2.0					
Barium	J	0.00713	0.00102	10.0	mg/l	2.0					
Beryllium	U	-0.930	0.520	10.0	ug/l	2.0					
Calcium		472	129	200	ug/l	2.0					
Cadmium	U	0.000155	0.000880	0.0500	mg/l	2.0					
Cobalt	U	-0.287	1.38	10.0	ug/l	2.0					
Chromium	J	0.00492	0.00112	0.500	mg/l	2.0					
Copper	U	0.000775	0.00208	0.0100	mg/l	2.0					
Iron		697	85.2	100	ug/l	2.0					
Potassium		679	37.4	200	ug/l	2.0					
Magnesium		229	10.6	20.0	ug/l	2.0					
Manganese	U	21.2	46.6	46.6	ug/l	2.0					
Molybdenum	U	-0.452	2.48	20.0	ug/l	2.0					
Sodium		1440000	1100	1100	ug/l	10.					
Nickel		191	2.58	10.0	ug/l	2.0					
Lead	J	0.00562	0.00318	0.500	mg/l	2.0					
Antimony	U	2.72	7.88	20.0	ug/l	2.0					
Selenium	J	0.00592	0.00542	0.100	mg/l	2.0					
Tin	U	8.10	140	140	ug/l	2.0					
Strontium	J	2.41	0.580	10.0	ug/l	2.0					
Titanium	J	5.24	1.44	10.0	ug/l	2.0					
Uranium		1200	47.2	100	ug/l	2.0					
Vanadium	J	1.70	1.18	10.0	ug/l	2.0					
Zinc		1.31	0.00318	0.0500	mg/l	2.0					
General Chemistry											
Total Halogens - 3 items											
HALOGENS-9056	SORRY ... NO PREP DATA FOUND										

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9908434-04

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Contact: Mr. Richard Groseclose
Project Description: Hazardous Waste Contract

:c: WSRC00497 Report Date: August 24, 1999

Sample ID : TCLP 4

arameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
romide	U	0.00	0.0152	0.0500	mg/l	1.0	RWS	08/13/99	2308	156004	1
HALOGENS-9056	SORRY ... NO PREP DATA FOUND!!										
hlorides	J	0.0510	0.0181	0.100	mg/l	1.0	RWS	08/13/99	2308	156004	1
itrogen, Nitrate		2.37	0.0127	0.0500	mg/l	1.0	RWS	08/13/99	2308	156004	2
itrogen, Ammonia	U	0.00	0.0241	0.100	MGL	1.0	THL	08/16/99	1335	156096	3

= Method	Method-Description
1	EPA 9056
2	EPA 300.0
3	EPA 350.1

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Aiken, South Carolina 29802
Contact: Mr. Richard Groseclose
Project Description: Hazardous Waste Contract

cc: WSRC00497 Report Date: August 24, 1999

Sample ID	: TCLP 5
Lab ID	: 9908434-05
Matrix	: Soil
Date Collected	: 07/14/99
Date Received	: 08/12/99
Priority	: Rush
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Metals Analysis											
Silver	J	0.00677	0.00146	0.500	mg/l	2.0	MBL	08/21/99	1042	156112	N
Aluminum		1080	24.3	100	ug/l	2.0					
Arsenic	U	0.00202	0.00902	0.500	mg/l	2.0					
Boron		1570	5.82	100	ug/l	2.0					
Barium	J	0.00750	0.00102	10.0	mg/l	2.0					
Beryllium	U	-0.908	0.520	10.0	ug/l	2.0					
Calcium		388	129	200	ug/l	2.0					
Cadmium	U	0.000448	0.000880	0.0500	mg/l	2.0					
Cobalt	U	0.135	1.38	10.0	ug/l	2.0					
Chromium	J	0.00413	0.00112	0.500	mg/l	2.0					
Copper	U	-0.00117	0.00208	0.0100	mg/l	2.0					
Iron		458	85.2	100	ug/l	2.0					
Potassium		904	37.4	200	ug/l	2.0					
Magnesium		264	10.6	20.0	ug/l	2.0					
Manganese	U	26.0	46.6	46.6	ug/l	2.0					
Molybdenum	U	-1.01	2.48	20.0	ug/l	2.0					
Sodium		1430000	1100	1100	ug/l	10.					
Nickel		200	2.58	10.0	ug/l	2.0					
Lead	J	0.00477	0.00318	0.500	mg/l	2.0					
Antimony	U	4.58	7.88	20.0	ug/l	2.0					
Selenium	U	0.00461	0.00542	0.100	mg/l	2.0					
Tin	U	7.22	140	140	ug/l	2.0					
Strontium	J	5.01	0.580	10.0	ug/l	2.0					
Titanium	J	2.48	1.44	10.0	ug/l	2.0					
Uranium		1170	47.2	100	ug/l	2.0					
Vanadium	J	1.63	1.18	10.0	ug/l	2.0					
Zinc		1.16	0.00318	0.0500	mg/l	2.0					
General Chemistry											
Total Halogens - 3 items											
HALOGENS-9056	SORRY ... NO PREP DATA FOUND!!!										

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Contact: Mr. Richard Groseclose
Project Description: Hazardous Waste Contract

cc: WSRC00497 Report Date: August 24, 1999

Sample ID : TCLP 5

arameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
romide	U	0.00	0.0152	0.0500	mg/l	1.0	RWS	08/13/99	2321	156004	1
HALOGENS-9056	SORRY ... NO PREP DATA FOUND!!										
hlorides		0.279	0.0181	0.100	mg/l	1.0	RWS	08/13/99	2321	156004	1
itrogen, Nitrate		9.44	0.0127	0.0500	mg/l	1.0	RWS	08/13/99	2321	156004	2
itrogen, Ammonia	U	0.00	0.0241	0.100	MGL	1.0	THL	08/16/99	1335	156096	3

= Method	Method-Description
1	EPA 9056
2	EPA 300.0
3	EPA 350.1

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Aiken, South Carolina 29802
Contact: Mr. Richard Groseclose
Project Description: Hazardous Waste Contract

cc: WSRC00497 Report Date: August 24, 1999

Sample ID	: TCLP 6
Lab ID	: 9908434-06
Matrix	: Soil
Date Collected	: 07/14/99
Date Received	: 08/12/99
Priority	: Rush
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Metals Analysis											
Silver	J	0.00764	0.00146	0.500	mg/l	2.0	MBL	08/21/99	1047	156112	N
Aluminum		1160	24.3	100	ug/l	2.0					
Arsenic	U	0.00223	0.00902	0.500	mg/l	2.0					
Boron		2660	5.82	100	ug/l	2.0					
Barium	J	0.0108	0.00102	10.0	mg/l	2.0					
Beryllium	U	-0.943	0.520	10.0	ug/l	2.0					
Calcium		474	129	200	ug/l	2.0					
Cadmium	U	0.000639	0.000880	0.0500	mg/l	2.0					
Cobalt	U	1.23	1.38	10.0	ug/l	2.0					
Chromium	J	0.00617	0.00112	0.500	mg/l	2.0					
Copper	U	0.00119	0.00208	0.0100	mg/l	2.0					
Iron		1190	85.2	100	ug/l	2.0					
Potassium		1200	37.4	200	ug/l	2.0					
Magnesium		373	10.6	20.0	ug/l	2.0					
Manganese	U	36.0	46.6	46.6	ug/l	2.0					
Molybdenum	U	-0.512	2.48	20.0	ug/l	2.0					
Sodium		1410000	1100	1100	ug/l	10.					
Nickel		413	2.58	10.0	ug/l	2.0					
Lead	J	0.00459	0.00318	0.500	mg/l	2.0					
Antimony	U	1.51	7.88	20.0	ug/l	2.0					
Selenium	U	0.00444	0.00542	0.100	mg/l	2.0					
Tin	U	7.48	140	140	ug/l	2.0					
Strontium	J	2.90	0.580	10.0	ug/l	2.0					
Titanium	J	2.71	1.44	10.0	ug/l	2.0					
Uranium		1370	47.2	100	ug/l	2.0					
Vanadium	J	2.17	1.18	10.0	ug/l	2.0					
Zinc		1.77	0.00318	0.0500	mg/l	2.0					
General Chemistry											
Total Halogens - 3 items											
HALOGENS-9056	SORRY ... NO PREP DATA FOUND!!!										

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Contact: Mr. Richard Groseclose
Project Description: Hazardous Waste Contract

c: WSRC00497 Report Date: August 24, 1999

Sample ID : TCLP 6

ırameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
omide	U	0.00	0.0152	0.0500	mg/l	1.0	RWS	08/13/99	2335	156004	1
HALOGENS-9056	SORRY ... NO PREP DATA FOUND!!										
ılorides		0.103	0.0181	0.100	mg/l	1.0	RWS	08/13/99	2335	156004	1
trogen, Nitrate		0.328	0.0127	0.0500	mg/l	1.0	RWS	08/13/99	2335	156004	2
trogen, Ammonia	U	0.00	0.0241	0.100	MGL	1.0	THL	08/16/99	1335	156096	3

= Method	Method-Description
1	EPA 9056
2	EPA 300.0
3	EPA 350.1

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Contact: Mr. Richard Groseclose
Project Description: Hazardous Waste Contract

cc: WSRC00497 Report Date: August 24, 1999

Sample ID	: TCLP 7
Lab ID	: 9908434-07
Matrix	: Soil
Date Collected	: 07/14/99
Date Received	: 08/12/99
Priority	: Rush
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Metals Analysis											
Silver	J	0.00282	0.00146	0.500	mg/l	2.0	MBL	08/21/99	1119	156112	N
Aluminum		971	24.3	100	ug/l	2.0					
Arsenic	U	0.00571	0.00902	0.500	mg/l	2.0					
Boron		1910	5.82	100	ug/l	2.0					
Barium	J	0.00660	0.00102	10.0	mg/l	2.0					
Beryllium	U	-0.0157	0.520	10.0	ug/l	2.0					
Calcium		396	129	200	ug/l	2.0					
Cadmium	U	0.000332	0.000880	0.0500	mg/l	2.0					
Cobalt	U	-0.445	1.38	10.0	ug/l	2.0					
Chromium	J	0.00323	0.00112	0.500	mg/l	2.0					
Copper	J	0.00429	0.00208	0.0100	mg/l	2.0					
Iron		351	85.2	100	ug/l	2.0					
Potassium		912	37.4	200	ug/l	2.0					
Magnesium		264	10.6	20.0	ug/l	2.0	MBL	08/23/99	1243	156112	N
Manganese	U	20.2	46.6	46.6	ug/l	2.0	MBL	08/21/99	1119	156112	N
Molybdenum	U	0.0681	2.48	20.0	ug/l	2.0					
Sodium		1400000	1100	1100	ug/l	10.	MBL	08/23/99	1243	156112	N
Nickel		213	2.58	10.0	ug/l	2.0	MBL	08/21/99	1119	156112	N
Lead	U	0.00246	0.00318	0.500	mg/l	2.0					
Antimony	U	1.00	7.88	20.0	ug/l	2.0					
Selenium	J	0.00657	0.00542	0.100	mg/l	2.0					
Tin	U	7.23	140	140	ug/l	2.0					
Strontium	J	4.23	0.580	10.0	ug/l	2.0					
Titanium	J	1.59	1.44	10.0	ug/l	2.0					
Uranium		887	47.2	100	ug/l	2.0					
Vanadium	U	0.876	1.18	10.0	ug/l	2.0					
Zinc		1.09	0.00318	0.0500	mg/l	2.0					
General Chemistry											
Total Halogens - 3 items											
HALOGENS-9056	SORRY ... NO PREP DATA FOUND										

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Contact: Mr. Richard Groseclose
Project Description: Hazardous Waste Contract

c: WSRC00497 Report Date: August 24, 1999

Sample ID : TCLP 7

rameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
omide	U	0.00	0.0152	0.0500	mg/l	1.0	RWS	08/13/99	2348	156004	1
IALOGENS-9056	SORRY ... NO PREP DATA FOUND!!										
ılorides		0.145	0.0181	0.100	mg/l	1.0	RWS	08/13/99	2348	156004	1
trogen, Nitrate		2.00	0.0127	0.0500	mg/l	1.0	RWS	08/13/99	2348	156004	2
trogen, Ammonia		0.100	0.0241	0.100	MGL	1.0	THL	08/16/99	1335	156096	3

)= Method	Method-Description
1	EPA 9056
2	EPA 300.0
3	EPA 350.1

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Contact: Mr. Richard Groseclose
Project Description: Hazardous Waste Contract

cc: WSRC00497 Report Date: August 24, 1999

Sample ID	: TCLP 8
Lab ID	: 9908434-08
Matrix	: Soil
Date Collected	: 07/14/99
Date Received	: 08/12/99
Priority	: Rush
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Metals Analysis											
Silver	J	0.00348	0.00146	0.500	mg/l	2.0	MBL	08/21/99	1128	156112	N
Aluminum		796	24.3	100	ug/l	2.0					
Arsenic	U	0.00389	0.00902	0.500	mg/l	2.0					
Boron		2240	5.82	100	ug/l	2.0					
Barium	J	0.0102	0.00102	10.0	mg/l	2.0					
Beryllium	J	0.814	0.520	10.0	ug/l	2.0					
Calcium		849	129	200	ug/l	2.0					
Cadmium	J	0.00145	0.000880	0.0500	mg/l	2.0					
Cobalt	U	0.959	1.38	10.0	ug/l	2.0					
Chromium	J	0.00536	0.00112	0.500	mg/l	2.0					
Copper	J	0.00890	0.00208	0.0100	mg/l	2.0					
Iron		1610	85.2	100	ug/l	2.0					
Potassium		1200	37.4	200	ug/l	2.0					
Magnesium		373	10.6	20.0	ug/l	2.0	MBL	08/23/99	1248	156112	N
Manganese	U	40.4	46.6	46.6	ug/l	2.0	MBL	08/21/99	1128	156112	N
Molybdenum	U	2.04	2.48	20.0	ug/l	2.0					
Sodium		1440000	1100	1100	ug/l	10.	MBL	08/23/99	1248	156112	N
Nickel		372	2.58	10.0	ug/l	2.0	MBL	08/21/99	1128	156112	N
Lead	J	0.00544	0.00318	0.500	mg/l	2.0					
Antimony	J	12.5	7.88	20.0	ug/l	2.0					
Selenium	U	0.00387	0.00542	0.100	mg/l	2.0					
Tin	U	8.00	140	140	ug/l	2.0					
Strontium	J	4.29	0.580	10.0	ug/l	2.0					
Titanium	U	1.24	1.44	10.0	ug/l	2.0					
Uranium		969	47.2	100	ug/l	2.0					
Vanadium	J	2.56	1.18	10.0	ug/l	2.0					
Zinc		1.47	0.00318	0.0500	mg/l	2.0					
General Chemistry											
Total Halogens - 3 items											
HALOGENS-9056	SORRY ... NO PREP DATA FOUND!!										

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Client: Westinghouse Savannah River Co.
Building 735-16A, Rm. 5
P.O. Box 616
Aiken, South Carolina 29802
Contact: Mr. Richard Groseclose
Project Description: Hazardous Waste Contract

cc: WSRC00497 Report Date: August 24, 1999

Sample ID : TCLP 8

arameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
romide	U	0.00	0.0152	0.0500	mg/l	1.0	RWS	08/14/99	0002	156004	1
HALOGENS-9056	SORRY ... NO PREP DATA FOUND!!										
hlorides		0.154	0.0181	0.100	mg/l	1.0	RWS	08/14/99	0002	156004	1
itrogen, Nitrate		0.132	0.0127	0.0500	mg/l	1.0	RWS	08/14/99	0002	156004	2
itrogen, Ammonia	U	0.00	0.0241	0.100	MGL	1.0	THL	08/16/99	1335	156096	3

1 = Method	Method-Description
1	EPA 9056
2	EPA 300.0
3	EPA 350.1

otes:
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ndard operating procedures. Please direct
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Aiken, South Carolina 29802
Contact: Mr. Richard Groseclose
Project Description: Hazardous Waste Contract

cc: WSRC00497 Report Date: August 24, 1999

Sample ID	: TCLP 9
Lab ID	: 9908434-09
Matrix	: Soil
Date Collected	: 07/14/99
Date Received	: 08/12/99
Priority	: Rush
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Metals Analysis											
Silver	J	0.00357	0.00146	0.500	mg/l	2.0	MBL	08/21/99	1133	156112	N
Aluminum		1410	24.3	100	ug/l	2.0					
Arsenic	U	0.00208	0.00902	0.500	mg/l	2.0					
Boron		2180	5.82	100	ug/l	2.0					
Barium	J	0.00767	0.00102	10.0	mg/l	2.0					
Beryllium	U	-0.0667	0.520	10.0	ug/l	2.0					
Calcium		992	129	200	ug/l	2.0					
Cadmium	U	0.000330	0.000880	0.0500	mg/l	2.0					
Cobalt	U	0.0968	1.38	10.0	ug/l	2.0					
Chromium	J	0.00510	0.00112	0.500	mg/l	2.0					
Copper	J	0.00619	0.00208	0.0100	mg/l	2.0					
Iron		543	85.2	100	ug/l	2.0					
Potassium		925	37.4	200	ug/l	2.0					
Magnesium		323	10.6	20.0	ug/l	2.0	MBL	08/23/99	1254	156112	N
Manganese	U	24.5	46.6	46.6	ug/l	2.0	MBL	08/21/99	1133	156112	N
Molybdenum	U	-0.694	2.48	20.0	ug/l	2.0					
Sodium		1460000	1100	1100	ug/l	10.	MBL	08/23/99	1254	156112	N
Nickel		367	2.58	10.0	ug/l	2.0	MBL	08/21/99	1133	156112	N
Lead	J	0.00596	0.00318	0.500	mg/l	2.0					
Antimony	U	6.00	7.88	20.0	ug/l	2.0					
Selenium	U	0.00217	0.00542	0.100	mg/l	2.0					
Tin	U	6.29	140	140	ug/l	2.0					
Strontium	J	2.80	0.580	10.0	ug/l	2.0					
Titanium	J	4.29	1.44	10.0	ug/l	2.0					
Uranium		924	47.2	100	ug/l	2.0					
Vanadium	J	1.60	1.18	10.0	ug/l	2.0					
Zinc		1.12	0.00318	0.0500	mg/l	2.0					
General Chemistry											
Total Halogens - 3 items											
HALOGENS-9056	SORRY ... NO PREP DATA FOUND!!										

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Aiken, South Carolina 29802
Contact: Mr. Richard Groseclose
Project Description: Hazardous Waste Contract

cc: WSRC00497 Report Date: August 24, 1999

Sample ID : TCLP 9

arameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
romide	U	0.00	0.0152	0.0500	mg/l	1.0	RWS	08/14/99	0015	156004	1
HALOGENS-9056	SORRY ... NO PREP DATA FOUND!!										
hlorides		0.290	0.0181	0.100	mg/l	1.0	RWS	08/14/99	0015	156004	1
itrogen, Nitrate		4.28	0.0127	0.0500	mg/l	1.0	RWS	08/14/99	0015	156004	2
itrogen, Ammonia	U	0.00	0.0241	0.100	MGL	1.0	THL	08/16/99	1335	156096	3

I = Method	Method-Description
I 1	EPA 9056
I 2	EPA 300.0
I 3	EPA 350.1

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	Aiken, South Carolina 29802
Contact:	Mr. Richard Groseclose
Project Description:	Hazardous Waste Contract

cc: WSRC00497 Report Date: August 24, 1999

Sample ID	: TCLP 9
Lab ID	: 9908434-10
Matrix	: Soil
Date Collected	: 07/14/99
Date Received	: 08/12/99
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Volatile Organics											
Trichlorotrifluoroethane	U	0.00	0.0113	0.0500	MGL	10.	RMB	08/18/99	1806	156361	1
The following prep procedures were performed:											
TCLP Extraction - Volatiles							JJ	08/15/99	1730	156060	N

Surrogate Recovery	Test	Percent%	Acceptable Limits
Bromofluorobenzene	FREON-113	97.1	(73.0 - 129.)
Dibromofluoromethane	FREON-113	89.7	(66.0 - 117.)
Toluene-d8	FREON-113	81.1	(73.0 - 122.)

M = Method	Method-Description
M 1	EPA 8260

Notes:
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J indicates presence of analyte at a concentration less than the reporting limit (RL) and greater than the detection limit (DL).
U indicates that the analyte was not detected at a concentration greater than the detection limit.
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Contact:	Mr. Richard Groseclose
Project Description:	Hazardous Waste Contract

cc: WSRC00497 Report Date: August 24, 1999

Sample ID : TCLP 9

1 = Method	Method-Description

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Contact: Mr. Richard Groseclose
Project Description: Hazardous Waste Contract

cc: WSRC00497 Report Date: August 24, 1999

Sample ID	: TCLP 10
Lab ID	: 9908434-11
Matrix	: Soil
Date Collected	: 07/14/99
Date Received	: 08/12/99
Priority	: Rush
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Metals Analysis											
Silver	J	0.00419	0.00146	0.500	mg/l	2.0	MBL	08/21/99	1139	156112	N
Aluminum		928	24.3	100	ug/l	2.0					
Arsenic	U	0.00689	0.00902	0.500	mg/l	2.0					
Boron		1760	5.82	100	ug/l	2.0					
Barium	J	0.00755	0.00102	10.0	mg/l	2.0					
Beryllium	U	-0.466	0.520	10.0	ug/l	2.0					
Calcium		398	129	200	ug/l	2.0					
Cadmium	U	0.000661	0.000880	0.0500	mg/l	2.0					
Cobalt	U	1.04	1.38	10.0	ug/l	2.0					
Chromium	J	0.00428	0.00112	0.500	mg/l	2.0					
Copper	J	0.00572	0.00208	0.0100	mg/l	2.0					
Iron		459	85.2	100	ug/l	2.0					
Potassium		794	37.4	200	ug/l	2.0					
Magnesium		286	10.6	20.0	ug/l	2.0	MBL	08/23/99	1259	156112	N
Manganese	U	21.5	46.6	46.6	ug/l	2.0	MBL	08/21/99	1139	156112	N
Molybdenum	U	-0.131	2.48	20.0	ug/l	2.0					
Sodium		1410000	1100	1100	ug/l	10.	MBL	08/23/99	1259	156112	N
Nickel		347	2.58	10.0	ug/l	2.0	MBL	08/21/99	1139	156112	N
Lead	J	0.0233	0.00318	0.500	mg/l	2.0					
Antimony	U	3.92	7.88	20.0	ug/l	2.0					
Selenium	U	0.00369	0.00542	0.100	mg/l	2.0					
Tin	U	46.1	140	140	ug/l	2.0					
Strontium	J	2.07	0.580	10.0	ug/l	2.0					
Titanium	U	1.43	1.44	10.0	ug/l	2.0					
Uranium		1030	47.2	100	ug/l	2.0					
Vanadium	J	2.65	1.18	10.0	ug/l	2.0					
Zinc		1.06	0.00318	0.0500	mg/l	2.0					
General Chemistry											
Total Halogens - 3 items											
HALOGENS-9056	SORRY ... NO PREP DATA FOUND!										

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Aiken, South Carolina 29802
Contact: Mr. Richard Groseclose
Project Description: Hazardous Waste Contract

cc: WSRC00497 Report Date: August 24, 1999

Sample ID : TCLP 10

arameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
romide	U	0.00	0.0152	0.0500	mg/l	1.0	RWS	08/14/99	0029	156004	1
HALOGENS-9056	SORRY ... NO PREP DATA FOUND!!										
hlorides		0.525	0.0181	0.100	mg/l	1.0	RWS	08/14/99	0029	156004	1
itrogen, Nitrate		2.48	0.0127	0.0500	mg/l	1.0	RWS	08/14/99	0029	156004	2
itrogen, Ammonia	U	0.00	0.0241	0.100	MGL	1.0	THL	08/16/99	1335	156096	3

[= Method	Method-Description
[1	EPA 9056
[2	EPA 300.0
[3	EPA 350.1

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Aiken, South Carolina 29802
Contact: Mr. Richard Groseclose
Project Description: Hazardous Waste Contract

cc: WSRC00497 Report Date: August 24, 1999

Sample ID	: TCLP 10
Lab ID	: 9908434-12
Matrix	: Soil
Date Collected	: 07/14/99
Date Received	: 08/12/99
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Volatile Organics											
Trichlorotrifluoroethane	U	0.00	0.0113	0.0500	MGL	10.	RMB	08/18/99	1731	156361	1
The following prep procedures were performed:											
TCLP Extraction - Volatiles							JJ	08/15/99	1730	156060	N

Surrogate Recovery	Test	Percent%	Acceptable Limits
Bromofluorobenzene	FREON-113	93.1	(73.0 - 129.)
Dibromofluoromethane	FREON-113	85.7	(66.0 - 117.)
Toluene-d8	FREON-113	78.7	(73.0 - 122.)

M = Method	Method-Description
M 1	EPA 8260

Notes:
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Contact:	Mr. Richard Groseclose
Project Description:	Hazardous Waste Contract

cc: WSRC00497 Report Date: August 24, 1999

Sample ID : TCLP 10

I = Method	Method-Description

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Contact: Mr. Richard Groseclose
Project Description: Hazardous Waste Contract

cc: WSRC00497 Report Date: August 24, 1999

Sample ID	: TCLP 11
Lab ID	: 9908434-13
Matrix	: Soil
Date Collected	: 07/14/99
Date Received	: 08/12/99
Priority	: Rush
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Metals Analysis											
Silver	J	0.00371	0.00146	0.500	mg/l	2.0	MBL	08/21/99	1144	156112	N
Aluminum		979	24.3	100	ug/l	2.0					
Arsenic	U	0.00246	0.00902	0.500	mg/l	2.0					
Boron		1980	5.82	100	ug/l	2.0					
Barium	J	0.00645	0.00102	10.0	mg/l	2.0					
Beryllium	U	-0.724	0.520	10.0	ug/l	2.0					
Calcium		412	129	200	ug/l	2.0					
Cadmium	U	0.000627	0.000880	0.0500	mg/l	2.0					
Cobalt	U	0.858	1.38	10.0	ug/l	2.0					
Chromium	J	0.00487	0.00112	0.500	mg/l	2.0					
Copper	J	0.00523	0.00208	0.0100	mg/l	2.0					
Iron		398	85.2	100	ug/l	2.0					
Potassium		535	37.4	200	ug/l	2.0					
Magnesium		317	10.6	20.0	ug/l	2.0	MBL	08/23/99	1305	156112	N
Manganese	U	24.1	46.6	46.6	ug/l	2.0	MBL	08/21/99	1144	156112	N
Molybdenum	U	-1.19	2.48	20.0	ug/l	2.0					
Sodium		1370000	1100	1100	ug/l	10.	MBL	08/23/99	1305	156112	N
Nickel		622	2.58	10.0	ug/l	2.0	MBL	08/21/99	1144	156112	N
Lead	J	0.00386	0.00318	0.500	mg/l	2.0					
Antimony	U	2.64	7.88	20.0	ug/l	2.0					
Selenium	U	0.00213	0.00542	0.100	mg/l	2.0					
Tin	U	4.14	140	140	ug/l	2.0					
Strontium	J	4.88	0.580	10.0	ug/l	2.0					
Titanium	J	3.61	1.44	10.0	ug/l	2.0					
Uranium		1660	47.2	100	ug/l	2.0					
Vanadium	J	1.49	1.18	10.0	ug/l	2.0					
Zinc		1.39	0.00318	0.0500	mg/l	2.0					
General Chemistry											
Total Halogens - 3 items											
HALOGENS-9056	SORRY ... NO PREP DATA FOUND										

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Aiken, South Carolina 29802
Contact: Mr. Richard Groseclose
Project Description: Hazardous Waste Contract

cc: WSRC00497 Report Date: August 24, 1999

Sample ID : TCLP 11

arameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
romide	U	0.00	0.0152	0.0500	mg/l	1.0	RWS	08/14/99	0042	156004	1
HALOGENS-9056	SORRY ... NO PREP DATA FOUND!!										
hlorides		0.141	0.0181	0.100	mg/l	1.0	RWS	08/14/99	0042	156004	1
itrogen, Nitrate		0.841	0.0127	0.0500	mg/l	1.0	RWS	08/14/99	0042	156004	2
itrogen, Ammonia	U	0.00	0.0241	0.100	MGL	1.0	THL	08/16/99	1335	156096	3

= Method	Method-Description
1	EPA 9056
2	EPA 300.0
3	EPA 350.1

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Contact: Mr. Richard Groseclose
Project Description: Hazardous Waste Contract

cc: WSRC00497 Report Date: August 24, 1999

Sample ID	: TCLP 12
Lab ID	: 9908434-14
Matrix	: Soil
Date Collected	: 07/14/99
Date Received	: 08/12/99
Priority	: Rush
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Metals Analysis											
Silver	J	0.00377	0.00146	0.500	mg/l	2.0	MBL	08/21/99	1149	156112	N
Aluminum		1130	24.3	100	ug/l	2.0					
Arsenic	U	0.00165	0.00902	0.500	mg/l	2.0					
Boron		2020	5.82	100	ug/l	2.0					
Barium	J	0.00673	0.00102	10.0	mg/l	2.0					
Beryllium	U	-0.891	0.520	10.0	ug/l	2.0					
Calcium		505	129	200	ug/l	2.0					
Cadmium	U	0.000271	0.000880	0.0500	mg/l	2.0					
Cobalt	U	0.143	1.38	10.0	ug/l	2.0					
Chromium	J	0.00663	0.00112	0.500	mg/l	2.0					
Copper	J	0.00258	0.00208	0.0100	mg/l	2.0					
Iron		1370	85.2	100	ug/l	2.0					
Potassium		573	37.4	200	ug/l	2.0					
Magnesium		354	10.6	20.0	ug/l	2.0	MBL	08/23/99	1310	156112	N
Manganese	U	38.1	46.6	46.6	ug/l	2.0	MBL	08/21/99	1149	156112	N
Molybdenum	U	0.111	2.48	20.0	ug/l	2.0					
Sodium		1430000	1100	1100	ug/l	10.	MBL	08/23/99	1310	156112	N
Nickel		339	2.58	10.0	ug/l	2.0	MBL	08/21/99	1149	156112	N
Lead	J	0.00546	0.00318	0.500	mg/l	2.0					
Antimony	U	2.07	7.88	20.0	ug/l	2.0					
Selenium	U	0.00506	0.00542	0.100	mg/l	2.0					
Tin	U	6.30	140	140	ug/l	2.0					
Strontium	J	3.60	0.580	10.0	ug/l	2.0					
Titanium	J	3.14	1.44	10.0	ug/l	2.0					
Uranium		1820	47.2	100	ug/l	2.0					
Vanadium	J	2.15	1.18	10.0	ug/l	2.0					
Zinc		1.49	0.00318	0.0500	mg/l	2.0					
General Chemistry											
Total Halogens - 3 items											
HALOGENS-9056	SORRY ... NO PREP DATA FOUND!!										

9908434-14

GENERAL ENGINEERING LABORATORIES

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Client: Westinghouse Savannah River Co.
Building 735-16A, Rm. 5
P.O. Box 616
Aiken, South Carolina 29802
Contact: Mr. Richard Groseclose
Project Description: Hazardous Waste Contract

cc: WSRC00497 Report Date: August 24, 1999

Sample ID : TCLP 12

arameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
romide	U	0.00	0.0152	0.0500	mg/l	1.0	RWS	08/14/99	0056	156004	1
HALOGENS-9056	SORRY ... NO PREP DATA FOUND!!										
hlorides		0.148	0.0181	0.100	mg/l	1.0	RWS	08/14/99	0056	156004	1
itrogen, Nitrate		1.62	0.0127	0.0500	mg/l	1.0	RWS	08/14/99	0056	156004	2
itrogen, Ammonia	U	0.00	0.0241	0.100	MGL	1.0	THL	08/16/99	1335	156096	3

) = Method	Method-Description
[1	EPA 9056
[2	EPA 300.0
[3	EPA 350.1

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Stacy L Griffin
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Aiken, South Carolina 29802
Contact: Mr. Richard Groseclose
Project Description: Hazardous Waste Contract

cc: WSRC00497 Report Date: August 24, 1999

Sample ID	: TCLP 13
Lab ID	: 9908434-15
Matrix	: Soil
Date Collected	: 07/14/99
Date Received	: 08/12/99
Priority	: Rush
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Metals Analysis											
Silver	J	0.00394	0.00146	0.500	mg/l	2.0	MBL	08/21/99	1155	156112	N
Aluminum		1040	24.3	100	ug/l	2.0					
Arsenic	U	0.00318	0.00902	0.500	mg/l	2.0					
Boron		1430	5.82	100	ug/l	2.0					
Barium	J	0.00492	0.00102	10.0	mg/l	2.0					
Beryllium	U	-0.918	0.520	10.0	ug/l	2.0					
Calcium		486	129	200	ug/l	2.0					
Cadmium	U	0.000161	0.000880	0.0500	mg/l	2.0					
Cobalt	U	0.465	1.38	10.0	ug/l	2.0					
Chromium	J	0.00666	0.00112	0.500	mg/l	2.0					
Copper	U	0.00142	0.00208	0.0100	mg/l	2.0					
Iron		546	85.2	100	ug/l	2.0					
Potassium		383	37.4	200	ug/l	2.0					
Magnesium		271	10.6	20.0	ug/l	2.0	MBL	08/23/99	1315	156112	N
Manganese	U	26.1	46.6	46.6	ug/l	2.0	MBL	08/21/99	1155	156112	N
Molybdenum	U	-0.192	2.48	20.0	ug/l	2.0					
Sodium		1400000	1100	1100	ug/l	10.	MBL	08/23/99	1315	156112	N
Nickel		281	2.58	10.0	ug/l	2.0	MBL	08/21/99	1155	156112	N
Lead	U	0.00315	0.00318	0.500	mg/l	2.0					
Antimony	U	2.96	7.88	20.0	ug/l	2.0					
Selenium	J	0.00555	0.00542	0.100	mg/l	2.0					
Tin	U	6.91	140	140	ug/l	2.0					
Strontium	J	4.69	0.580	10.0	ug/l	2.0					
Titanium	J	3.84	1.44	10.0	ug/l	2.0					
Uranium		1550	47.2	100	ug/l	2.0					
Vanadium	J	1.35	1.18	10.0	ug/l	2.0					
Zinc		1.10	0.00318	0.0500	mg/l	2.0					
General Chemistry											
Total Halogens - 3 items											
HALOGENS-9056	SORRY ... NO PREP DATA FOUND										

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Aiken, South Carolina 29802
Contact: Mr. Richard Groseclose
Project Description: Hazardous Waste Contract

cc: WSRC00497 Report Date: August 24, 1999

Sample ID : TCLP 13

arameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
romide	U	0.00	0.0152	0.0500	mg/l	1.0	RWS	08/14/99	0109	156004	1
HALOGENS-9056	SORRY ... NO PREP DATA FOUND!!										
hlorides		0.121	0.0181	0.100	mg/l	1.0	RWS	08/14/99	0109	156004	1
itrogen, Nitrate		0.284	0.0127	0.0500	mg/l	1.0	RWS	08/14/99	0109	156004	2
itrogen, Ammonia	U	0.00	0.0241	0.100	MGL	1.0	THL	08/16/99	1335	156096	3

= Method	Method-Description
1	EPA 9056
2	EPA 300.0
3	EPA 350.1

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Client: Westinghouse Savannah River Co.
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P.O. Box 616
Aiken, South Carolina 29802
Contact: Mr. Richard Groseclose
Project Description: Hazardous Waste Contract

cc: WSRC00497 Report Date: August 24, 1999

Sample ID	: TCLP 15
Lab ID	: 9908434-17
Matrix	: Soil
Date Collected	: 07/14/99
Date Received	: 08/12/99
Priority	: Rush
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Metals Analysis											
Silver	J	0.00425	0.00146	0.500	mg/l	2.0	MBL	08/21/99	1224	156112	N
Aluminum		1480	24.3	100	ug/l	2.0					
Arsenic	U	0.00491	0.00902	0.500	mg/l	2.0					
Boron		1640	5.82	100	ug/l	2.0					
Barium	J	0.00842	0.00102	10.0	mg/l	2.0					
Beryllium	U	-0.911	0.520	10.0	ug/l	2.0					
Calcium		1070	129	200	ug/l	2.0					
Cadmium	U	0.000438	0.000880	0.0500	mg/l	2.0					
Cobalt	U	1.02	1.38	10.0	ug/l	2.0					
Chromium	J	0.0116	0.00112	0.500	mg/l	2.0					
Copper	J	0.00611	0.00208	0.0100	mg/l	2.0					
Iron		1140	85.2	100	ug/l	2.0					
Potassium		446	37.4	200	ug/l	2.0					
Magnesium		334	10.6	20.0	ug/l	2.0					
Manganese	U	26.4	46.6	46.6	ug/l	2.0					
Molybdenum	U	-0.0689	2.48	20.0	ug/l	2.0					
Sodium		1400000	1100	1100	ug/l	10.					
Nickel		458	2.58	10.0	ug/l	2.0					
Lead	J	0.00530	0.00318	0.500	mg/l	2.0					
Antimony	U	2.23	7.88	20.0	ug/l	2.0					
Selenium	U	0.000698	0.00542	0.100	mg/l	2.0					
Tin	U	6.62	140	140	ug/l	2.0					
Strontium	J	4.77	0.580	10.0	ug/l	2.0					
Titanium	J	5.74	1.44	10.0	ug/l	2.0					
Uranium		1520	47.2	100	ug/l	2.0					
Vanadium	J	2.47	1.18	10.0	ug/l	2.0					
Zinc		1.20	0.00318	0.0500	mg/l	2.0					
General Chemistry											
Total Halogens - 3 items											
HALOGENS-9056	SORRY ... NO PREP DATA FOUND!!										

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Aiken, South Carolina 29802
Contact: Mr. Richard Groseclose
Project Description: Hazardous Waste Contract

:c: WSRC00497 Report Date: August 24, 1999

Sample ID : TCLP 15

arameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
romide	U	0.00	0.0152	0.0500	mg/l	1.0	RWS	08/14/99	0150	156004	1
HALOGENS-9056	SORRY ... NO PREP DATA FOUND!!										
hlorides		0.144	0.0181	0.100	mg/l	1.0	RWS	08/14/99	0150	156004	1
itrogen, Nitrate		3.12	0.0127	0.0500	mg/l	1.0	RWS	08/14/99	0150	156004	2
itrogen, Ammonia	U	0.00	0.0241	0.100	MGL	1.0	THL	08/16/99	1335	156096	3

= Method	Method-Description
1	EPA 9056
2	EPA 300.0
3	EPA 350.1

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P.O. Box 616
Aiken, South Carolina 29802
Contact: Mr. Richard Groseclose
Project Description: Hazardous Waste Contract

cc: WSRC00497 Report Date: August 24, 1999

Sample ID	: TCLP 16
Lab ID	: 9908434-18
Matrix	: Soil
Date Collected	: 07/14/99
Date Received	: 08/12/99
Priority	: Rush
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Metals Analysis											
Silver	J	0.00499	0.00146	0.500	mg/l	2.0	MBL	08/21/99	1230	156112	N
Aluminum		1420	24.3	100	ug/l	2.0					
Arsenic	U	0.00395	0.00902	0.500	mg/l	2.0					
Boron		1480	5.82	100	ug/l	2.0					
Barium	J	0.00621	0.00102	10.0	mg/l	2.0					
Beryllium	U	-0.915	0.520	10.0	ug/l	2.0					
Calcium		403	129	200	ug/l	2.0					
Cadmium	U	0.000357	0.000880	0.0500	mg/l	2.0					
Cobalt	U	-0.641	1.38	10.0	ug/l	2.0					
Chromium	J	0.0127	0.00112	0.500	mg/l	2.0					
Copper	J	0.00313	0.00208	0.0100	mg/l	2.0					
Iron		1320	85.2	100	ug/l	2.0					
Potassium		471	37.4	200	ug/l	2.0					
Magnesium		283	10.6	20.0	ug/l	2.0					
Manganese	U	24.6	46.6	46.6	ug/l	2.0					
Molybdenum	U	-0.602	2.48	20.0	ug/l	2.0					
Sodium		1370000	1100	1100	ug/l	10.					
Nickel		72.3	2.58	10.0	ug/l	2.0					
Lead	U	0.00168	0.00318	0.500	mg/l	2.0					
Antimony	U	3.76	7.88	20.0	ug/l	2.0					
Selenium	U	0.00466	0.00542	0.100	mg/l	2.0					
Tin	U	7.34	140	140	ug/l	2.0					
Strontium	J	2.40	0.580	10.0	ug/l	2.0					
Titanium		14.4	1.44	10.0	ug/l	2.0					
Uranium		193	47.2	100	ug/l	2.0					
Vanadium	J	1.50	1.18	10.0	ug/l	2.0					
Zinc		1.17	0.00318	0.0500	mg/l	2.0					
General Chemistry											
Total Halogens - 3 items											
HALOGENS-9056	SORRY ... NO PREP DATA FOUND										

9908434-18

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Contact: Mr. Richard Groseclose
Project Description: Hazardous Waste Contract

:c: WSRC00497 Report Date: August 24, 1999

Sample ID : TCLP 16

arameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
romide	U	0.00	0.0152	0.0500	mg/l	1.0	RWS	08/14/99	0204	156004	1
HALOGENS-9056	SORRY ... NO PREP DATA FOUND!!										
hlorides	J	0.0910	0.0181	0.100	mg/l	1.0	RWS	08/14/99	0204	156004	1
itrogen, Nitrate		0.440	0.0127	0.0500	mg/l	1.0	RWS	08/14/99	0204	156004	2
itrogen, Ammonia	U	0.00	0.0241	0.100	MGL	1.0	THL	08/16/99	1335	156096	3

= Method	Method-Description
1	EPA 9056
2	EPA 300.0
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QC Summary Report

Project Description: Hazardous Waste Contract

cc: WSRC00497 Lab. Sample ID: 9908434% Report Date: August 24, 1999

Sample/Parameter	Type	Batch	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Analyst	Date	Tim
Volatile Organics													
QC640135	BLANK	156361											
*Bromofluorobenzene									96.6	(73.0 - 129.)	RMB	08/18/99	104
*Dibromofluoromethane									89.5	(66.0 - 117.)			
*Toluene-d8									80.9	(73.0 - 122.)			
Trichlorotrifluoroethane						0.00	MGL						
QC640137	BLANK	156361											
*Bromofluorobenzene							MGL		91.4	(73.0 - 129.)	RMB	08/18/99	165
*Dibromofluoromethane							MGL		86.7	(66.0 - 117.)			
*Toluene-d8							MGL		78.9	(73.0 - 122.)			
Trichlorotrifluoroethane						0.00	MGL						
QC640136	LCS	156361											
*Bromofluorobenzene			50			43.1	UGL		86.1	(73.0 - 129.)	RMB	08/18/99	093
*Dibromofluoromethane			50			42.9	UGL		85.9	(66.0 - 117.)			
*Toluene-d8			50			39.4	UGL		78.8	(73.0 - 122.)			

* represent a surrogate.

QC Summary Report

Project Description: Hazardous Waste Contract

:c: WSRC00497 Lab. Sample ID: 9908434% Report Date: August 24, 1999

mple/Parameter	Type	Batch	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Analyst	Date	Time
tals Analysis													
639099	BLANK	156112											
luminum						91.5	ug/l				MBL	08/21/99	0952
ntimony						2.05	ug/l						
rsenic						0.00137	mg/l						
arium						0.000104	mg/l						
eryllium						-0.444	ug/l						
oron						0.758	ug/l						
admium						0.000280	mg/l						
alcium						-18.7	ug/l						
hromium						0.000651	mg/l						
obalt						-0.731	ug/l						
opper						-0.00150	mg/l						
on						26.5	ug/l						
ead						0.000234	mg/l						
agnesium						1.67	ug/l						
anganese						1.13	ug/l						
olybdenum						0.307	ug/l						
ickel						1.96	ug/l						
otassium						21.5	ug/l						
elenium						-0.00264	mg/l						
ilver						0.00606	mg/l						
odium						2890	ug/l						
trontium						0.215	ug/l						
in						4.51	ug/l						
itanium						-0.0221	ug/l						
ranium						-15.6	ug/l						
anadium						-0.0838	ug/l						
inc						0.00751	mg/l						
639100	BLANK	156112											
luminum						94.0	ug/l				MBL	08/21/99	0957
ntimony						2.79	ug/l						
rsenic						0.00699	mg/l						
arium						0.0000400	mg/l						
eryllium						-0.565	ug/l						
oron						0.223	ug/l						
admium						0.000240	mg/l						
alcium						-31.3	ug/l						
hromium						0.000962	mg/l						
obalt						-1.03	ug/l						

QC Summary Report

Project Description: Hazardous Waste Contract

cc: WSRC00497 Lab. Sample ID: 9908434% Report Date: August 24, 1999

Sample/Parameter	Type	Batch	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Analyst	Date	Time
Copper						-0.00225	mg/l				MBL	08/21/99	0957
Iron						26.0	ug/l						
Lead						0.000748	mg/l						
Magnesium						2.01	ug/l						
Manganese						0.999	ug/l						
Molybdenum						-0.939	ug/l						
Nickel						-0.293	ug/l						
Potassium						86.0	ug/l						
Selenium						0.00445	mg/l						
Silver						0.00483	mg/l						
Sodium						1390000	ug/l						
Strontium						0.313	ug/l						
Tin						7.11	ug/l						
Titanium						0.111	ug/l						
Uranium						-4.73	ug/l						
Vanadium						-0.284	ug/l						
Zinc						0.00756	mg/l						
QC639102	LCS	156112											
Antimony			2000			1990	ug/l		99.4	(89.8 - 111.)	MBL	08/21/99	1002
Arsenic			5			4.97	mg/l		99.4	(89.5 - 112.)			
Barium			10			10.2	mg/l		102	(90.7 - 111.)			
Beryllium			2000			2060	ug/l		103	(90.2 - 113.)			
Boron			(nom_conc = 0)			0.571	ug/l						
Cadmium			1			1.09	mg/l		109	(90.7 - 115.)			
Calcium			5000			5220	ug/l		104	(89.7 - 115.)			
Chromium			5			5.19	mg/l		104	(90.0 - 112.)			
Cobalt			2000			2080	ug/l		104	(91.1 - 113.)			
Copper			2			2.06	mg/l		103	(88.2 - 115.)			
Iron			2000			2080	ug/l		104	(91.8 - 114.)			
Lead			5			5.30	mg/l		106	(89.3 - 114.)			
Magnesium			2000			1980	ug/l		98.8	(86.6 - 113.)			
Manganese			2000			1990	ug/l		99.4	(87.9 - 112.)			
Molybdenum			2000			2130	ug/l		106	(80.0 - 120.)			
Nickel			2000			2200	ug/l		110	(91.3 - 115.)			
Potassium			5000			4950	ug/l		98.9	(85.3 - 114.)			
Selenium			1			0.931	mg/l		93.1	(87.2 - 109.)			
Sodium			(nom_conc = 0)			0.00	ug/l						
Strontium			1000			1090	ug/l		109	(80.0 - 120.)			
Tin			2000			1790	ug/l		89.7	(80.0 - 120.)			
Titanium			(nom_conc = 0)			0.0894	ug/l						

QC Summary Report

Project Description: Hazardous Waste Contract

c: WSRC00497 Lab. Sample ID: 9908434% Report Date: August 24, 1999

ıple/Parameter	Type	Batch	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Analyst	Date	Time
ranium			1000			1070	ug/l		107	(80.0 - 120.)	MBL	08/21/99	1002
anadium			2000			2080	ug/l		104	(89.8 - 113.)			
inc			2			2.14	mg/l		107	(92.4 - 113.)			
639104	9908434-18MS	156112											
luminum			5000	1420		6460	ug/l		101		MBL	08/21/99	1241
ntimony			2000	3.76		1970	ug/l		98.6				
rsenic			5	0.00395		5.02	mg/l		100				
arium			10	0.00621		9.78	mg/l		97.7				
eryllium			2000	-0.915		1980	ug/l		99.1				
oron			1	1480		1510	ug/l		n/a				
admium			1	0.000357		1.02	mg/l		102				
alcium			5000	403		5460	ug/l		101				
hromium			5	0.0127		5.02	mg/l		100				
obalt			2000	-0.641		1990	ug/l		99.6				
opper			2	0.00313		2.03	mg/l		101				
on			2000	1320		3310	ug/l		99.5				
ead			5	0.00168		5.06	mg/l		101				
lagnesium			2000	283		2170	ug/l		94.5				
langanese			2000	24.6		1970	ug/l		98.5				
lolybdenum			2000	-0.602		2050	ug/l		102				
ickel			2000	72.3		2100	ug/l		101				
otassium			5000	471		6450	ug/l		120				
elenium			1	0.00466		0.983	mg/l		98.3				
ilver			0.5	0.00499		0.513	mg/l		102				
odium			0	1370000		1340000	ug/l		n/a				
trontium			1000	2.41		1040	ug/l		103				
in			2000	7.34		1860	ug/l		93.1				
itanium			1	14.4		14.6	ug/l		n/a				
ranium			1000	193		1220	ug/l		102				
anadium			2000	1.50		2000	ug/l		100				
inc			2	1.17		3.18	mg/l		100				
639105	9908434-18MSD	156112											
luminum			5000	1420		6440	ug/l	0.373	100		MBL	08/21/99	1246
ntimony			2000	3.76		1970	ug/l	0.0483	98.6				
rsenic			5	0.00395		5.02	mg/l	0.0649	100				
arium			10	0.00621		9.74	mg/l	0.358	97.3				
eryllium			2000	-0.915		1980	ug/l	0.0302	99.1				
oron			0	1480		1510	ug/l		n/a				
admium			1	0.000357		1.02	mg/l	0.289	102				
alcium			5000	403		5410	ug/l	0.894	100				

QC Summary Report

Project Description: Hazardous Waste Contract

cc: WSRC00497 Lab. Sample ID: 9908434% Report Date: August 24, 1999

Sample/Parameter	Type	Batch	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Analyst	Date	Time
Chromium			5	0.0127		5.02	mg/l	0.0465	100		MBL	08/21/99	1246
Cobalt			2000	-0.641		1990	ug/l	0.168	99.4				
Copper			2	0.00313		2.02	mg/l	0.338	101				
Iron			2000	1320		3290	ug/l	0.848	98.6				
Lead			5	0.00168		5.07	mg/l	0.112	101				
Magnesium			2000	283		2170	ug/l	0.0125	94.5				
Manganese			2000	24.6		1960	ug/l	0.657	97.8				
Molybdenum			2000	-0.602		2050	ug/l	0.0618	102				
Nickel			2000	72.3		2100	ug/l	0.0152	101				
Potassium			5000	471		6410	ug/l	0.645	119				
Selenium			1	0.00466		0.978	mg/l	0.508	97.8				
Silver			0.5	0.00499		0.513	mg/l	0.0354	102				
Sodium			0	1370000		1400000	ug/l		n/a				
Strontium			1000	2.41		1030	ug/l	0.184	103				
Tin			2000	7.34		1860	ug/l	0.0968	93.2				
Titanium			0	14.4		14.4	ug/l		n/a				
Uranium			1000	193		1210	ug/l	0.762	102				
Vanadium			2000	1.50		2000	ug/l	0.0854	99.9				
Zinc			2	1.17		3.18	mg/l	0.128	101				
QC639103 9908434-18SERIAL		156112											
Aluminum				1420		1720	ug/l	19.4			MBL	08/21/99	1235
Antimony				3.76		2.42	ug/l	0.00					
Arsenic				0.00395		0.0114	mg/l	0.00					
Barium				0.00621		0.00566	mg/l	9.20					
Beryllium				-0.915		-4.76	ug/l	0.00					
Boron				1480		1470	ug/l	0.613					
Cadmium				0.000357		0.000932	mg/l	0.00					
Calcium				403		170	ug/l	200					
Chromium				0.0127		0.0160	mg/l	22.5					
Cobalt				-0.641		-2.51	ug/l	0.00					
Copper				0.00313		-0.0112	mg/l	200					
Iron				1320		1290	ug/l	2.24					
Lead				0.00168		0.0115	mg/l	0.00					
Magnesium				283		283	ug/l	0.0695					
Manganese				24.6		24.1	ug/l	0.00					
Molybdenum				-0.602		2.08	ug/l	0.00					
Nickel				72.3		76.6	ug/l	5.88					
Potassium				471		409	ug/l	14.1					
Selenium				0.00466		0.0169	mg/l	0.00					
Silver				0.00499		0.0260	mg/l	136					

QC Summary Report

Project Description: Hazardous Waste Contract

c: WSRC00497 Lab. Sample ID: 9908434% Report Date: August 24, 1999 Page 6 of 8

ıple/Parameter	Type	Batch	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Analyst	Date	Time
ɔdium				1370000		1350000	ug/l	1.76			MBL	08/21/99	1235
:rontium				2.41		2.07	ug/l	200					
in				7.34		18.5	ug/l	0.00					
itanium				14.4		15.0	ug/l	4.12					
ranium				193		177	ug/l	200					
anadium				1.50		-0.195	ug/l	200					
inc				1.17		1.17	mg/l	0.0102					

QC Summary Report

Project Description: Hazardous Waste Contract

cc: WSRC00497 Lab. Sample ID: 9908434% Report Date: August 24, 1999

Sample/Parameter	Type	Batch	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Analyst	Date	Tim
General Chemistry													
QC638678	BLANK	156004											
Bromide						0.00	mg/kg				RWS	08/13/99	211
Chlorides						0.00	mg/kg						
Nitrogen, Nitrate						0.00600	mg/kg						
QC638673	9908434-01DUP	156004											
Bromide				0.00		0.00	mg/kg	0.00			RWS	08/14/99	021
Chlorides				0.0490		0.0650	mg/kg	28.1					
Nitrogen, Nitrate				2.64		2.63	mg/kg	0.152					
QC638675	9908434-02DUP	156004											
Bromide				0.00		0.00	mg/kg	0.00			RWS	08/14/99	024
Chlorides				0.179		0.144	mg/kg	21.7					
Nitrogen, Nitrate				0.648		0.659	mg/kg	1.68					
QC638677	LCS	156004											
Bromide			5			4.65	mg/kg		93.0	(90.0 - 110.)	RWS	08/13/99	214
Chlorides			10			9.18	mg/kg		91.8	(90.0 - 110.)			
Nitrogen, Nitrate			5			4.58	mg/kg		91.5	(90.0 - 110.)			
QC638674	9908434-01PS	156004											
Bromide			5	0.00		4.89	mg/kg		97.7		RWS	08/14/99	023
Chlorides			10	0.0490		9.17	mg/kg		91.2				
Nitrogen, Nitrate			5	2.64		7.45	mg/kg		96.2				
QC638676	9908434-02PS	156004											
Bromide			5	0.00		4.87	mg/kg		97.4		RWS	08/14/99	025
Chlorides			10	0.179		9.27	mg/kg		91.0				
Nitrogen, Nitrate			5	0.648		5.39	mg/kg		94.8				
QC639035	BLANK	156096											
Nitrogen, Ammonia						0.0100	MGL				THL	08/16/99	133
QC639037	9908434-06DUP	156096											
Nitrogen, Ammonia				0.00		0.0200	MGL	0.00					
QC639039	9908434-17DUP	156096											
Nitrogen, Ammonia				0.00		0.00	MGL	0.00					
QC639036	LCS	156096											
Nitrogen, Ammonia			1			0.930	MGL		93.0	(-)			
QC639038	9908434-06PS	156096											
Nitrogen, Ammonia			1	0.00		1.07	MGL		107				
QC639040	9908434-17PS	156096											
Nitrogen, Ammonia			1	0.00		0.920	MGL		92.0				

QC Summary Report

Project Description: Hazardous Waste Contract

:c: WSRC00497 Lab. Sample ID: 9908434% Report Date: August 24, 1999 Page 8 of 8

nple/Parameter	Type	Batch	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Analyst	Date	Time

tes:
ɜ qualifiers in this report are defined as follows:
ıdicates presence of analyte < RL (Report Limit)
ndicates presence of analyte < DL (Detect Limit)

indicates that spike recovery limits do not apply when
ɜample concentration exceeds spike conc by a factor of 4 or more

FEDERAL SAMPLE RECEIPT REVIEW

Client WSRC Received by [illegible] Date 7/15/99

GEL COOLER___ GEL POLY COOLER___ CLIENT COOLER___ OTHER___

SAMPLE REVIEW CRITERIA	YES	NO	COMMENTS/QUALIFIERS
1. Were shipping containers received intact and sealed? If no, notify Project Manager	✓		
2. Was the Shipment screened following the radiochemistry survey procedure (EPI SOP S-007)?	✓		
Were the survey results negative? If no, notify Project Manager	✓		
Are any of the samples identified by the client as radioactive? If yes, did client provide RAD activity?	✓		
3. Were chain of custody documents included?	✓		
4. Were chain of custody documents completed correctly? (Ink, signed, match containers)	✓		
5. Were all sample containers properly labeled?	✓		
6. Were proper sample containers received?	✓		
7. Preserved samples checked for pH?	—	—	N/A
8. Were samples preserved correctly? If no, list samples & tests	—	—	N/A
9. Shipping container temperature checked?	—	—	Ambient
10. Was shipping container temperature within specifications (4°±2° C) If no, notify Project Manager	—	—	
11. Is temperature documented on the Chain of Custody?	—	—	
12. Were samples received within holding time? if No, notify Project Manger	✓		
13. Were VOA vials free of headspace?	—	—	
14. ARCOC# IF REQUIRED	—	—	
15. SDG# IF REQUIRED	✓		99,91

REVIEW [signature] DATE 7/15/99 SA - SEALS ATTACHED NSA - NO SEALS ATTACHED

Internal Chain Of Custody
Audit Trail by Container

84349 Printed: 08/25/99 13:46

01.01 - 500 ml/P
-99 20:05:23 Patricia Dover --> Main Cooler
-99 16:26:02 Buddy Sosa --> IC lab
-99 11:39:26 Tom Lewis --> TRAACS lab
-99 16:36:58 Patricia Dover --> Rad Cooler

02.01 - 250 ml/P
-99 20:05:13 Patricia Dover --> Main Cooler
-99 16:26:03 Buddy Sosa --> IC lab
-99 11:39:26 Tom Lewis --> TRAACS lab
-99 16:36:58 Patricia Dover --> Rad Cooler

03.01 - 250 ml/P
-99 20:05:13 Patricia Dover --> Main Cooler
-99 16:26:03 Buddy Sosa --> IC lab
-99 11:39:26 Tom Lewis --> TRAACS lab
-99 16:36:58 Patricia Dover --> Rad Cooler

04.01 - 250 ml/P
-99 20:05:13 Patricia Dover --> Main Cooler
-99 16:26:03 Buddy Sosa --> IC lab
-99 11:39:26 Tom Lewis --> TRAACS lab
-99 16:36:58 Patricia Dover --> Rad Cooler

05.01 - 250 ml/P
-99 20:05:13 Patricia Dover --> Main Cooler
-99 16:26:03 Buddy Sosa --> IC lab
-99 11:39:26 Tom Lewis --> TRAACS lab
-99 16:36:58 Patricia Dover --> Rad Cooler

06.01 - 250 ml/P
-99 20:05:13 Patricia Dover --> Main Cooler
-99 16:26:03 Buddy Sosa --> IC lab
-99 11:39:26 Tom Lewis --> TRAACS lab
-99 16:36:58 Patricia Dover --> Rad Cooler

07.01 - 500 ml/P
-99 20:05:22 Patricia Dover --> Main Cooler
-99 16:26:03 Buddy Sosa --> IC lab
-99 11:39:26 Tom Lewis --> TRAACS lab
-99 16:36:58 Patricia Dover --> Rad Cooler

08.01 - 250 ml/P
-99 20:08:05 Patricia Dover --> Rad Cooler
-99 16:26:03 Buddy Sosa --> IC lab
-99 11:39:26 Tom Lewis --> TRAACS lab
-99 16:36:58 Patricia Dover --> Rad Cooler

09.01 - 250 ml/P
-99 20:08:05 Patricia Dover --> Rad Cooler
-99 16:26:03 Buddy Sosa --> IC lab
-99 08:56:19 Julie Pfaff --> Consumed by Analysis
-99 11:39:26 Tom Lewis --> TRAACS lab
-99 16:36:58 Patricia Dover --> Rad Cooler

Internal Chain Of Custody
Audit Trail by Container

908434% Printed: 08/25/99 15:46

908434-10.01 - 250 ml/P
12-AUG-99 20:08:04 Patricia Dover --> Rad Cooler
15-AUG-99 16:51:47 Jermaine Jenkins --> TCLP Prep
16-AUG-99 08:53:51 Patricia Dover --> TCLP Prep
16-AUG-99 08:54:36 Jermaine Jenkins --> TCLP Prep
16-AUG-99 08:56:19 Julie Pfaff --> Consumed by Analysis

322520 - 1000 ml Plastic Bag
15-AUG-99 16:51:58 Jermaine Jenkins --> TCLP Prep
18-AUG-99 14:40:42 Richard Bomar --> VOA/MS lab
23-AUG-99 09:49:43 Unknown Employee - --> Rad Archive (GEL)

908434-11.01 - 250 ml/P
12-AUG-99 20:08:05 Patricia Dover --> Rad Cooler
13-AUG-99 16:26:03 Buddy Sosa --> IC lab
16-AUG-99 11:39:26 Tom Lewis --> TRAACS lab
16-AUG-99 11:55:44 Jermaine Jenkins --> Sample Receiving
16-AUG-99 12:24:36 Yolanda Jiles --> Rad Cooler
16-AUG-99 16:36:58 Patricia Dover --> Rad Cooler

908434-12.01 - 250 ml/P
12-AUG-99 20:08:05 Patricia Dover --> Rad Cooler
15-AUG-99 16:51:47 Jermaine Jenkins --> TCLP Prep
16-AUG-99 08:53:52 Patricia Dover --> TCLP Prep
16-AUG-99 08:54:36 Jermaine Jenkins --> TCLP Prep
16-AUG-99 11:55:44 Jermaine Jenkins --> Sample Receiving
16-AUG-99 12:24:36 Yolanda Jiles --> Rad Cooler

322519 - 1000 ml Plastic Bag
15-AUG-99 16:51:58 Jermaine Jenkins --> TCLP Prep
18-AUG-99 14:40:42 Richard Bomar --> VOA/MS lab
23-AUG-99 09:49:44 Unknown Employee - --> Rad Archive (GEL)

908434-13.01 - 250 ml/P
12-AUG-99 20:08:05 Patricia Dover --> Rad Cooler
13-AUG-99 16:26:03 Buddy Sosa --> IC lab
16-AUG-99 11:39:26 Tom Lewis --> TRAACS lab
16-AUG-99 16:36:58 Patricia Dover --> Rad Cooler

908434-14.01 - 1000 ml/P
12-AUG-99 20:08:13 Patricia Dover --> Rad Cooler
13-AUG-99 16:26:03 Buddy Sosa --> IC lab
16-AUG-99 11:39:26 Tom Lewis --> TRAACS lab
16-AUG-99 16:36:58 Patricia Dover --> Rad Cooler

908434-15.01 - 250 ml/P
12-AUG-99 20:08:05 Patricia Dover --> Rad Cooler
13-AUG-99 16:26:03 Buddy Sosa --> IC lab
16-AUG-99 11:39:26 Tom Lewis --> TRAACS lab
16-AUG-99 16:36:58 Patricia Dover --> Rad Cooler

Internal Chain Of Custody
Audit Trail by Container

Printed: 08/25/99 15:46

17.01 - 250 ml/P

-99 20:08:05	Patricia Dover	--> Rad Cooler
-99 16:26:03	Buddy Sosa	--> IC lab
-99 11:39:26	Tom Lewis	--> TRAACS lab
-99 16:36:58	Patricia Dover	--> Rad Cooler

18.01 - 250 ml/P

-99 20:08:05	Patricia Dover	--> Rad Cooler
-99 16:26:03	Buddy Sosa	--> IC lab
-99 11:39:26	Tom Lewis	--> TRAACS lab
-99 16:36:58	Patricia Dover	--> Rad Cooler

9901679 1 of 4

Job Number	Customer Name: Pickett, John	BN	Company: General Engineering Laboratory
99191	Customer Department: FDD		Ship to: Address: 2040 Savage Road
Contract Number AB93796N	Customer Address: 730-M 2 on Left		Charleston, South Carolina 29407
	Customer Phone: 5-3833 14956		Attention: Flora Ingram, Project Manager

Westinghouse Savannah River Company
Aiken, SC 29808

Environmental Monitoring Section
Environmental Geochemistry Group

Matrix Key: S=Soil, SO=Solid, SL=Sludge, O=Organic, A=Aqueous

Sample Analysis Requested	Sample ID: COMP-7	Sample ID: COMP-8	Sample ID: TCLP1	Sample ID: TCLP2	Sample ID: TCLP 3	Sample ID: TCLP 4
Collect Date	7/14/99	7/14/99	7/14/99	7/14/99	7/14/99	7/14/99
Collect Time	0830	0830	0830	0830	0830	0830
No. Containers	1/2L	1/2L	1/500mL	1/200mL	1/250mL	1/250mL
Matrix	Solid	Solid	S	S	S	S
Appendix IX (1) HGTOT 7471A	✓	✓				
Inductively Coupled Plasma Scan (39)	✓	✓	✓	✓	✓	✓
Total Halogens (336)	✓	✓	✓	✓	✓	✓
Ammonia/auto.phenate or electrode (205a)	✓	✓	✓	✓	✓	✓
Nitrate (as N) (237)	✓	✓	✓	✓	✓	✓
Halogenated Volatile Organics (75)	✓	✓				
EAV Isotopes (190)						
TCLP, FULL (Prep & Analysis) (18)			✓	✓	✓	✓
Arsenic (AA,Furnace Technique) (45a)	✓	✓				
~~Mercury in Solid Waste (manual Cold-vapor tech.) (61)~~ cancelled	✓	✓				
Ion Chromatography Scan (194) (need SO4 and PO4)	✓	✓				
F001-F005 Listed Solvents (10) (Need "Freon")	✓	✓	✓	✓	✓	✓
Multiple Extraction Procedure (MEP) plus Ni (33)				✓		

50 Day TAT Note, ICP Scan to include Al, B, Be, Ca, Cu, Fe, Li, Mg, Mn, Ni, Si, Na U, Zn, and Zr

STR Authorization RS Groseclose

1 Relinquished by:	Date/Time	Received by:	2 Relinquished by:	Date/Time	Received by:
(Print) D.B. Pickett	Date 7/14/99	(Print) M Gilchrist Sr	(Print) Charles M. Day	Date 7/15/99	(Print) A Van Dorey
(Sign)	Time 0900	(Sign)	(Sign)	Time 1238	(Sign)
3 Relinquished by:	Date/Time	Received by:	4 Relinquished by:	Date/Time	Received by:
(Print) A Van Dorey	7/15/99	(Print) Binge Francis	(Print)		(Print)
(Sign)	Time	(Sign)	(Sign)	Time	(Sign)

Job Number
99191
Contract Number
AB93796N

Customer Name: Pickett, John
Customer Department: FDD
Customer Address: 730-M
Customer Phone: 5-3833 14956

BN

Company: General Engineering Laboratory
Ship to: Address: 2040 Savage Road
Charleston, South Carolina 29407
Attention: Flora Ingram, Project Manager

Westinghouse Savannah River Company
Aiken, SC 29808

Environmental Monitoring Section
Environmental Geochemistry Group

Matrix Key: S=Soil, SO=Solid, SL=Sludge, O=Organic, A=Aqueous

Sample Analysis Requested

	Sample ID: TCLP 5	Sample ID: TCLP 6	Sample ID: TCLP 7	Sample ID: TCLP 8	Sample ID: TCLP 9	Sample ID: TCLP 10
Collect Date	7/14/99	7/14/99	7/14/99	7/14/99	7/14/99	7/14/99
Collect Time	0830	0830	0830	0830	0830	0830
No. Containers	1/250 mL	1/250 mL	1/500 mL	1/250 mL	1/250 mL	1/250 mL
Matrix	S .1	S .1	S .1	.1 S	.1 S .2	.1 S .2
Appendix IX (1)						
Inductively Coupled Plasma Scan (39)	✓	✓	✓	✓	✓	✓
Total Halogens (336)	✓	✓	✓	✓	✓	✓
Ammonia/auto.phenate or electrode (205a)	✓	✓	✓	✓	✓	✓
Nitrate (as N) (237)	✓	✓	✓	✓	✓	✓
Halogenated Volatile Organics (75)						
EAV Isotopes (190)						
TCLP, FULL (Prep & Analysis) (18)	✓	✓	✓	✓	✓	✓
Arsenic (AA,Furnace Technique) (45a)						
~~Mercury in Solid Waste (manual Cold-vapor tech.) (61)~~ cancelled						
Ion Chromatography Scan (194) (need SO4 and PO4)						
F001-F005 Listed Solvents (10) (Need "Freon")	✓	✓	✓	✓	✓	✓
ME P Plus Ni (33)				✓		

50 Day TAT Note, ICP Scan to include Al, B, Be, Ca, Cu, Fe, Li, Mg, Mn, Ni, Si, Na U, Zn, and Zr

STR Authorization RS Groseclose

1 Relinquished by:	Date/Time	Received by:	2 Relinquished by:	Date/Time	Received by:
(Print) J B Pickett	Date 7/14/99	(Print) M Gilchrist	(Print) Charles M. Day	Date 7/15/99	(Print) A VAN DOREN
(Sign)	Time 0830	(Sign)	(Sign)	Time 1235	(Sign)
3 Relinquished by:	**Date/Time**	**Received by:**	**4 Relinquished by:**	**Date/Time**	**Received by:**
(Print) A VAN DOREN	7/15/99	(Print) Bonnie Frances	(Print)		(Print)
(Sign)	Time 12	(Sign) B Frances	(Sign)	Time	(Sign)

New Chain

WSRC-TR-96-0244, Rev. 2; APPENDIX M-5, Extra Pages, 3 of 5

Job Number: 99191
Contract Number: AB93796N

Customer Name: Pickett, John
Customer Department: FDD
Customer Address: 730-M
Customer Phone: 5-3833 14956

BN

Ship to: Company: General Engineering Laboratory
Address: 2040 Savage Road
Charleston, South Carolina 29407
Attention: Flora Ingram, Project Manager

Westinghouse Savannah River Company
Aiken, SC 29808

Environmental Monitoring Section
Environmental Geochemistry Group

Matrix Key: S=Soil, SO=Solid, SL=Sludge, O=Organic, A=Aqueous

Sample Analysis Requested	Sample ID: TCLP 11	Sample ID: TCLP 12	Sample ID: TCLP 13	Sample ID: TCLP 14	Sample ID: TCLP 15	Sample ID: TCLP 16
Collect Date	7/14/99	7/14/99	7/14/99	7/14/99	7/14/99	7/14/99
Collect Time	0830	0830	0830	0830	0830	0830
No. Containers	1/250 AG	1/1L	1/250	1/250	1/250	1/250
Matrix	S.1	S.1	S.1	S.1	S.1	S.1
Appendix IX (1)						
Inductively Coupled Plasma Scan (39)	✓	✓	✓	✓	✓	✓
Total Halogens (336)	✓	✓	✓	✓	✓	✓
Ammonia/auto.phenate or electrode (205a)	✓	✓	✓	✓	✓	✓
Nitrate (as N) (237)	✓	✓	✓	✓	✓	✓
Halogenated Volatile Organics (75)						
EAV Isotopes (190)						
TCLP, FULL (Prep & Analysis) (18)	✓	✓	✓	✓	✓	✓
Arsenic (AA,Furnace Technique) (45a)						
~~Mercury in Solid Waste (manual Cold-vapor tech.) (61)~~ cancelled						
Ion Chromatography Scan (194) (need SO4 and PO4)						
F001-F005 Listed Solvents (10) (Need "Freon")	✓	✓	✓	✓	✓	✓
MEP + Ni (33)					✓	

50 Day TAT Note, ICP Scan to include Al, B, Be, Ca, Cu, Fe, Li, Mg, Mn, Ni, Si, Na U, Zn, and Zr

STR Authorization RS Groseclose

1 Relinquished by:	Date/Time	Received by:	2 Relinquished by:	Date/Time	Received by:
(Print) J.B. Pickett	Date 7/14/99	(Print) M Gilchrist	(Print) Charles M. Day	Date 7/15/99	(Print) A Van Doren
(Sign) J.B. Pickett	Time 0900	(Sign) M Gilchrist	(Sign) Charles M. Day	Time 1238	(Sign) A Van Doren
3 Relinquished by:	**Date/Time**	**Received by:**	**4 Relinquished by:**	**Date/Time**	**Received by:**
(Print) A Van Doren	7/15/99	(Print) Rome Francis	(Print)		(Print)
(Sign) A Van Doren	Time	(Sign) R Francis	(Sign)	Time	(Sign)

WSRC-TR-96-0244, Rev. 2; APPENDIX M-5, Extra Pages, 4 of 5

Job Number
99191
Contract Number
AB93796N

Customer Name: Pickett, John
Customer Department: FDD
Customer Address: 730-M
Customer Phone: 5-3833 14956

BN

Company: General Engineering Laboratory
Ship to: Address: 2040 Savage Road
Charleston, South Carolina 29407
Attention: Flora Ingram, Project Manager

Westinghouse Savannah River Company
Aiken, SC 29808

Environmental Monitoring Section
Environmental Geochemistry Group

Matrix Key: S=Soil, SO=Solid, SL=Sludge, O=Organic, A=Aqueous

Sample Analysis Requested	Sample ID: Comp. 1	Sample ID: Comp. 2	Sample ID: Comp. 3	Sample ID: Comp. 4	Sample ID: Comp. 5	Sample ID: Comp-6
Collect Date	7/14/99	7/14/99	7/14/99	7/14/99	7/14/99	7/14/99
Collect Time	0830	0830	0830	0830	0830	0830
No. Containers	1 / 1L	1 / 1L	1 / 1L	1 / 1L	1 / 1L	1 / 1L
Matrix	Solid	Solid	Solid	Solid	Solid	Solid
Appendix IX (1)	✓	✓	✓	✓	✓	✓
Inductively Coupled Plasma Scan (39)	✓	✓	✓	✓	✓	✓
Total Halogens (336)	✓	✓	✓	✓	✓	✓
Ammonia/auto.phenate or electrode (205a)	✓	✓	✓	✓	✓	✓
Nitrate (as N) (237)	✓	✓	✓	✓	✓	✓
Halogenated Volatile Organics (75)	✓	✓	✓	✓	✓	✓
EAV Isotopes (190)		✓		✓		✓
TCLP, FULL (Prep & Analysis) (18)						
Arsenic (AA,Furnace Technique) (45a)	✓	✓	✓	✓	✓	✓
~~Mercury in Solid Waste (manual Cold-vapor tech.) (61)~~ canceled	✓	✓	✓	✓	✓	✓
Ion Chromatography Scan (194) (need SO4 and PO4)	✓	✓	✓	✓	✓	✓
F001-F005 Listed Solvents (10) (Need "Freon")	✓	✓	✓	✓	✓	✓
Multiple Extraction Procedure (MEP) + Ni (33)						

50 Day TAT Note, ICP Scan to include Al, B, Be, Ca, Cu, Fe, Li, Mg, Mn, Ni, Si, Na U, Zn, and Zr

STR Authorization RS Groseclose

1 Relinquished by:	Date/Time	Received by:	2 Relinquished by:	Date/Time	Received by:
(Print) V.B. Pickett	Date 7/14/99	(Print) W D Joyce	(Print) Charles M. Day	Date 7 15 99	(Print) A Van Doren
(Sign)	Time 0900	(Sign)	(Sign)	Time 1238	(Sign)
3 Relinquished by:	Date/Time	Received by:	4 Relinquished by:	Date/Time	Received by:
(Print) A Van Doren	7 15 99	(Print) Bionne Frances	(Print)		(Print)
(Sign)	Time	(Sign)	(Sign)	Time	(Sign)

WSRC-TR-96-0244, Rev. 2; APPENDIX M-5, Extra Pages, 5 of 5

ndix M-6,
ɔle Extraction Procedure Results on 3 TCLP Grab Samples (No's 2, 8, and 15)
pp. 1 through 80

Environmental Geochemistry Group

EGG-RSG-99191

Date: October 20, 1999

To: John Pickett, 730-M

From: Richard S. Groseclose, 735-16A

Job 99191

Attached is the revised case narrative for TCLP Metals from General Engineering Laboratories for Job 99191 for TCLP samples TCLP 2, 8 and 15. Copies of pages from the GEL TCLP Extraction Log are also provided to report the pH values from the multiple extraction procedure, which you requested. I did not, however, see any reference to the simulated "acid rain" leachant which you mentioned.

If you have any questions or wish to discuss, please give me a call at 5-5687.

Reviewed by: RS Groseclose

Richard S. Groseclose, Environmental Geochemistry Group

Case Narrative for
WSRC
SDG 99191T
Metals Analysis by ICP
Mercury Analysis by CVAA

Sample Analysis and Sample Preparation

The following samples leached using EPA method 1311 ~~or 1312~~ or 1320 and were analyzed for metals using ICP Method EPA 6010B and for mercury using CVAA Method EPA 7470A:

Laboratory Number	Sample Description
9907679-04	TCLP 1
9907679-06	TCLP 2
9907679-08	TCLP 2 (1X)
9907679-09	TCLP 2 (2X)
9907679-10	TCLP 2 (3X)
9907679-11	TCLP 2 (4X)
9907679-12	TLCP 2 (5X)
9907679-13	TCLP 2 (6X)
9907679-14	TCLP 2 (7X)
9907679-15	TCLP 2 (8X)
9907679-16	TCLP 2 (9X)
9907679-18	TCLP 3
9907679-20	TCLP 4
9907679-22	TCLP 5
9907679-24	TCLP 6
9907679-26	TCLP 7
9907679-28	TCLP 8
9907679-30	TCLP 8 (1X)
9907679-31	TCLP 8 (2X)
9907679-32	TCLP 8 (3X)
9907679-33	TCLP 8 (4X)
9907679-34	TLCP 8 (5X)
9907679-35	TCLP 8 (6X)
9907679-36	TCLP 8 (7X)
9907679-37	TCLP 8 (8X)
9907679-38	TCLP 8 (9X)
9907679-40	TCLP 9
9907679-42	TCLP 10
9907679-44	TCLP 11
9907679-46	TCLP 12
9907679-48	TCLP 13
9907679-50	TCLP 14
9907679-52	TCLP 15
9907679-54	TCLP 15 (1X)

	9907679-55	TCLP 15 (2X)
	9907679-56	TCLP 15 (3X)
	9907679-57	TCLP 15 (4X)
	9907679-58	TCLP 15 (5X)
	9907679-59	TCLP 15 (6X)
	9907679-60	TCLP 15 (7X)
	9907679-61	TCLP 15 (8X)
	9907679-62	TCLP 15 (9X)
	9907679-64	TCLP 16
155258	QC635714-ICP	Preparation Blank (PB)
	QC635715-ICP	Preparation Blank #1 (TPB1)
	QC635716-ICP	Preparation Blank #2 (TPB2)
	QC635717-ICP	Laboratory Control Sample (LCS)
	QC635718-ICP	TCLP 15L-Serial Dilution (SD)
	QC635719-ICP	TCLP 15S-Matrix Spike (MS)
	QC635720-ICP	TCLP 15SD-Matrix Spike Duplicate (MSD)
154250	QC631615-ICP	Preparation Blank (PB)
	QC631616-ICP	TCLP Preparation Blank #1(TPB1)
	QC631617-ICP	Laboratory Control Sample (LCS)
	QC631618-ICP	TCLP 16L-Serial Dilution (SD)
	QC631619-ICP	TCLP 16S-Matrix Spike (MS)
	QC631620-ICP	TCLP 16SD-Matrix Spike Duplicate (MSD)
154346	QC632038-ICP	Preparation Blank
	QC632039-ICP	Preparation Blank #1 (TPB1)
	QC633212-ICP	Preparation Blank #2 (TPB2)
	QC633213-ICP	Preparation Blank #3 (TPB3)
	QC633214-ICP	Preparation Blank #4 (TPB4)
	QC632040-ICP	Laboratory Control Sample (LCS)
	QC632041-ICP	TCLP 15 (2X)L-Serial Dilution (SD)
	QC632042-ICP	TCLP 15 (2X)S-Matrix Spike (MS)
	QC632043-ICP	TCLP 15 (2X)SD-Matrix Spike Duplicate (MSD)
154873	QC634158-ICP	Preparation Blank
	QC634159-ICP	TCLP Preparation Blank #1 (TPB1)
	QC631461-ICP	TCLP Preparation Blank #2 (TPB2)
	QC634160-ICP	Laboratory Control Sample (LCS)
	QC634162-ICP	TCLP 15 (7X)L-Serial Dilution (SD)
	QC634163-ICP	TCLP 15 (7X)S-Matrix Spike (MS)
	QC634164-ICP	TCLP 15 (7X)SD-Matrix Spike Duplicate (MSD)
154977	QC634555-ICP	Preparation Blank
	QC634556-ICP	TCLP Preparation Blank #1 (TPB1)
	QC634557-ICP	TCLP Preparation Blank #2 (TPB2)
	QC634558-ICP	TCLP Preparation Blank #3 (TPB3)
	QC634559-ICP	Laboratory Control Sample (LCS)
	QC634560-ICP	TCLP 15 (9X)L-Serial Dilution (SD)
	QC634561-ICP	TCLP 15 (9X)S-Matrix Spike (MS)
	QC634562-ICP	TCLP 15 (9X)SD-Matrix Spike Duplicate (MSD)
155374	QC636156-CVAA	Preparation Blank
	QC636157-CVAA	TCLP Preparation Blank #1 (TPB1)

	QC636158-CVAA	Laboratory Control Sample (LCS)
154343	QC632020-CVAA	Preparation Blank
	QC632021-CVAA	TCLP Preparation Blank #1 (TPB1)
	QC632307-CVAA	Laboratory Control Sample (LCS)
	QC632022-CVAA	TCLP 1S-Matrix Spike (MS)
	QC632023-CVAA	TCLP 1SD-Matrix Spike Duplicate (MSD)
154526	QC632745-CVAA	Preparation Blank
	QC632746-CVAA	TCLP Preparation Blank #1 (TPB1)
	QC632747-CVAA	TCLP Preparation Blank #1 (TPB2)
	QC632748-CVAA	Laboratory Control Sample (LCS)
	QC632753-CVAA	TCLP 15 (3X)S-Matrix Spike (MS)
	QC632754-CVAA	TCLP 15 (3X)SD-Matrix Spike Duplicate (MSD)
	QC633216-CVAA	TCLP Preparation Blank #1 (TPB3)
154871	QC634146-CVAA	Preparation Blank
	QC634147-CVAA	TCLP Preparation Blank #1 (TPB1)
	QC634148-CVAA	TCLP Preparation Blank #1 (TPB2)
	QC634149-CVAA	Laboratory Control Sample (LCS)
	QC634150-CVAA	TCLP 15 (7X)S-Matrix Spike (MS)
	QC634151-CVAA	TCLP 15 (7X)SD-Matrix Spike Duplicate (MSD)
154974	QC634537-CVAA	Preparation Blank
	QC634538-CVAA	TCLP Preparation Blank #1 (TPB1)
	QC634539-CVAA	TCLP Preparation Blank #1 (TPB2)
	QC634540-CVAA	Laboratory Control Sample (LCS)
	QC634541-CVAA	TCLP 15 (9X)S-Matrix Spike (MS)
	QC634542-CVAA	TCLP 15 (9X)SD-Matrix Spike Duplicate (MSD)

System Configurations
ICP analysis was performed on a Thermo Jarrell Ash 61E Trace axial-viewing inductively coupled plasma atomic emission spectrometer. The instrument is equipped with a Meinhardt nebulizer, cyclonic spray chamber, and yttrium internal standard. Operating conditions for the Trace ICP were set at a power level of 950 watts, a peristaltic pump flow rate of 140 RPM (2.0 mL/min sample uptake rate), argon gas flows of 15 L/min and 0.5 L/min for the torch and auxiliary gases, and a nebulizer pressure setting of 26 PSI.

Mercury analysis was performed on a Perkin-Elmer Flow Injection Mercury System (FIMS-400) automated mercury analyzer. The instrument consists of a cold vapor atomic absorption spectrometer set to detect mercury at a wavelength of 254 nm. Sample introduction through the flow injection system is performed via a peristaltic pump at 9 mL/min and nitrogen carrier gas rate of 5 L/min.

Sample Preparation
All samples were prepared in accordance with the appropriate EPA SW846 procedures.

Instrument Calibration
The instruments were calibrated following the manufacturers' specifications.

Holding Time
All samples were analyzed within the required holding times.

Blanks
All quality control criteria were met for the ICP and CVAA preparation blanks.

Spike Analyses
Samples TCLP 16, TCLP 15 (2X), TCLP 15 (7X), and TCLP 15 (9X) were designated as the quality control samples for the ICP batches. Samples TCLP 1, TCLP 15 (3X), TCLP 15 (7X) and TCLP 15 (9X) were designated as the quality control samples for the CVAA batches. Each batch included a matrix spike and a matrix spike duplciate. The MS met the recommended quality control criteria for percent recovery (%R) for all analytes as established by in-house generated statistical process control (SPC) limits. The MS/MSD met the recommended quality control criteria for relative percent difference (RPD%) for all analytes.

Laboratory Control Samples
The laboratory control samples (LCSS) met the quality control acceptance criteria for %R and for all analytes.

Sample Dilutions

All ICP samples were diluted a 10X for all elements in all batches except batch 154346. These samples (TCLP 2 (1X), TCLP 2 (2X), TCLP 2 (3X), TCLP 2 (4X), TCLP 8 (1X), TCLP 8 (2X), TCLP 8 (3X), TCLP 8 (4X), TCLP 15 (1X), TCLP 15 (2X), TCLP 15 (3X), and TCLP 15 (4X)) were diluted a 5X. The CVAA samples were analyzed undiluted. All dilutions were made to bring over-ranged targets within the linear range of the instrument and/or to minimize sodium interference.

Nonconformance Reports
There were no Nonconformance Reports associated with this SDG.

General Comments
This Case Narrative has been reviewed using Batch Data Reports generated by the analysts and QC Summary Reports.

This package has been reviewed by: _____

Date: 10/19/99

GEL TCLP Extraction Log				
Laboratory ID No.:	990767 9 -08	990767 9 -30	990767 9 -54	Blank DC630983
Batch:	1 5 4 0 8 8			
Client:	WSRC			GEL
Test:	Multiple Extraction ①			
A1. Sample Description				
Number of Phases (5.3.1)				
1. Solid	✓	✓	✓	
2. Liquid				
a. Lighter than water				
b. water				
c. heavier than water				
A2. Percent Solid Phase (weight in grams) (volume in ml)				
1. Weight of filter (5.3.2.1)				
2. Weight of sample & beaker (5.3.3.1)				
3. Weight of beaker & residue (5.3.3.4)				
4. Weight of sample filtered (5.3.3.5)				
5. Weight of filtrate & beaker (5.3.5.1)				
6. Weight of empty beaker (5.3.2.2)				
7. Weight of liquid phase (5.3.5.2)				
8. Weight of solid phase (5.3.5.3)				
9. % wet solids (5.3.5.4)				
10. Weight of dry sample & filter (5.3.6.3)				
11. Weight of dry sample (5.3.6.4)				
12. % dried solids (5.3.6.5)				
A3. Volume of Liquid (volume in ml)				
1. Volume of oil filtrate				
2. Volume of water filtrate				
B. Extraction Fluid Determination				
1. Particle size reduction? yes/no				
2. If Particle size reduction, Homoginzation technique. See codes below				
3. Sample weight, √ if 5.0 ± 0.1 gram				
4. Volume of water, √ if 96.5 ± 1.0 mL added				
5. initial pH (after 5 minutes mixing)				
6. if pH > 5.0, √ if 3.5 mL 1N HCl added				
7. √ if heated and held at at 50°C for 10 minutes.				
8. secodary pH (at room temp)				
9. extraction fluid	# 1	# 1	# 1	# 1
Determination of sample size for leach testing.				
1. Particle size reduction? yes/no	NO	NO	NO	
2. Weight of sample required	100.0	100.0	100.0	
3. Weight of sample & container (5.6.3.2)				
4. Weight of container & residue (5.6.3.5)				
5. Weight of sample to filter (5.6.3.6)				
6. Weight of filtrate & container(5.6.3.10)				
7. Weight of container (5.6.3.1)				
8. Weight of filtrate (5.6.3.11)				

GEL TCLP Extraction Log Laboratory ID No.	9907679 -08	9907679 -30	9907679 -54	BC630983		
D. Determination of the amount of extraction fluid						
1. 20 x % wet solid x wt. sample	2L	2L	2L	0.5L		
E. Record of extraction test (18 ± 2 hours)						
1. extraction start date	07-23-99					
2. extraction start time		10:45				
3. starting room temperature		26 °C				
4. extraction stop date	07-24-99					
5. extraction stop time		10:30				
6. ending room temperature		23° C				
7. filtration complete time	07-24-99		11:00			
8. pH of filtrate	4.93	4.91	4.95	4.89		
9. volume of filtrate (mL)	1L	1L	1L	0.5L		
10. pH of filtrate <2 after preservation	~	~	~	~		
11. Type of preservation	HN	O3				
12. Volume of preservation (mL)	5	5	5	2.5		
13. Preservation lot number	27	04	14	10		
14. Bottle lot number	C9	10	90	1C		
15. Filter lot number	8	32	07	01		
F. Metals Spiking Solutions						
1. volume split from filtrate to be spiked						
2. Spiking Solution #1 Code						
3. Spiking Solution #2 Code						
4. Volume of #1 added						
5. Volume of #2 added						
G. Extraction Vessel Information (Volatiles Only)						
1. Extraction Vessel number						
2. Positive Pressure? yes/no						
H. Extraction Tumbler Rotation Speed (rpm)						
1. Tumbler number	1	(2)	3	4		
2. Tumbler speed		31				
Extraction Started By:	JL	JL	JL	JL		
Extraction Completed By:	JL	JL	JL	JL		

NOTES and MAINTENANCE:

fluid 1 lot #: 920119
(pH/Temperature): pH=4.89/21.5°C

07/24/99

fluid 2 lot #: _____
(pH/Temperature): _____

Particle Size Reduction Technique Codes:
C - cut: M - Crush with a mallet

LOGBOOK ID No.: IP-O-

PAGE #: 364

GEL TCLP Extraction Log				
Laboratory ID No.:	9907679 -09	9907679 -31	9907679 -55	Blank 0C630984
Batch:	1 5 4 0 8 9			
Client:	WSRC			GEL
Test:	Multiple Extraction (2)			
A1. Sample Description				
Number of Phases (5.3.1)				
1. Solid	✓	✓	✓	
2. Liquid				
a. Lighter than water				
b. water				
c. heavier than water				
A2. Percent Solid Phase (weight in grams) (volume in ml)				
1. Weight of filter (5.3.2.1)				
2. Weight of sample & beaker (5.3.3.1)				
3. Weight of beaker & residue (5.3.3.4)				
4. Weight of sample filtered (5.3.3.5)				
5. Weight of filtrate & beaker (5.3.5.1)				
6. Weight of empty beaker (5.3.2.2)				
7. Weight of liquid phase (5.3.5.2)				
8. Weight of solid phase (5.3.5.3)				
9. % wet solids (5.3.5.4)				
10. Weight of dry sample & filter (5.3.6.3)				
11. Weight of dry sample (5.3.6.4)				
12. % dried solids (5.3.6.5)				
A3. Volume of Liquid (volume in ml)				
1. Volume of oil filtrate				
2. Volume of water filtrate				
B. Extraction Fluid Determination				
1. Particle size reduction? yes/no				
2. If Particle size reduction, Homoginzation technique. See codes below				
3. Sample weight.√ if 5.0 ± 0.1 gram				
4. Volume of water, √ if 96.5 ± 1.0 mL added				
5. initial pH (after 5 minutes mixing)				
6. if pH > 5.0, √ if 3.5 mL 1N HCl added				
7. √ if heated and held at at 50°C for 10 minutes.				
8. secodary pH (at room temp)				
9. extraction fluid	#	#	#	#
C. Determination of sample size for leach testing.				
1. Particle size reduction? yes/no	NO	NO	NO	
2. Weight of sample required	100.0	100.0	100.0	
3. Weight of sample & container (5.6.3.2)				
4. Weight of container & residue (5.6.3.5)				
5. Weight of sample to filter (5.6.3.6)				
6. Weight of filtrate & container(5.6.3.10)				
7. Weight of container (5.6.3.1)				
8. Weight of filtrate (5.6.3.11)				

General Engineering Laboratories, Inc.
Rev. 6/98

GEL TCLP Extraction Log					
Laboratory ID No.	9907679 -09	9907679 -31	9907679 -55	0C63084	
D. Determination of the amount of extraction fluid					
1. 20 x % wet solid x wt. sample	2L	2L	2L	0.5	
E. Record of extraction test (18 ± 2 hours)					
1. extraction start date	07-24-99				
2. extraction start time	10:30				
3. starting room temperature	21°C				
4. extraction stop date	07-25-99				
5. extraction stop time	10:30				
6. ending room temperature	21°C				
7. filtration complete time	07-25-99			11:00	
8. pH of filtrate	4.92	4.94	4.95	4.89	
9. volume of filtrate (mL)	1L	1L	1L	0.5L	
10. pH of filtrate <2 after preservation	✓	✓	✓	✓	
11. Type of preservation	HNO3				
12. Volume of preservation (mL)	5	5	5	2.5	
13. Preservation lot number	27041410				
14. Bottle lot number	CQ10901C				
15. Filter lot number	832070 1				
F. Metals Spiking Solutions					
1. volume split from filtrate to be spiked					
2. Spiking Solution #1 Code					
3. Spiking Solution #2 Code					
4. Volume of #1 added					
5. Volume of #2 added					
G. Extraction Vessel Information (Volatiles Only)					
1. Extraction Vessel number					
2. Positive Pressure? yes/no					
H. Extraction Tumbler Rotation Speed (rpm)					
1. Tumbler number	1	(2)	3	4	
2. Tumbler speed		31			
Extraction Started By:	JL	JL	JL	JL	
Extraction Completed By:	JL	JL	JL	JL	

NOTES and MAINTENANCE:

fluid 1 lot #: 920119
(pH/Temperature): pH=4.89/21°C

07/24/99

fluid 2 lot #: /
(pH/Temperature): /

rticle Size Reduction Technique Codes:
: cut: M - Crush with a mallet

GBOOK ID No.: IP-0

Extraction Log

Laboratory ID No.:	4907679 -10	4907679 -32	4907679 -56	Blank QC610985
Batch:	1 5 4	0 9	0	
Client:	WSRIC			GEL
Test:	Multiple Extraction ③			
A1. Sample Description				
Number of Phases (5.3.1)				
1. Solid	✓	✓	✓	
2. Liquid				
a. Lighter than water				
b. water				
c. heavier than water				
A2. Percent Solid Phase (weight in grams) (volume in ml)				
1. Weight of filter (5.3.2.1)				
2. Weight of sample & beaker (5.3.3.1)				
3. Weight of beaker & residue (5.3.3.4)				
4. Weight of sample filtered (5.3.3.5)				
5. Weight of filtrate & beaker (5.3.5.1)				
6. Weight of empty beaker (5.3.2.2)				
7. Weight of liquid phase (5.3.5.2)				
8. Weight of solid phase (5.3.5.3)				
9. % wet solids (5.3.5.4)				
10. Weight of dry sample & filter (5.3.6.3)				
11. Weight of dry sample (5.3.6.4)				
12. % dried solids (5.3.6.5)				
A3. Volume of Liquid (volume in ml)				
1. Volume of oil filtrate				
2. Volume of water filtrate				
B. Extraction Fluid Determination				
1. Particle size reduction? yes/no				
2. If Particle size reduction, Homoginzation technicue. See codes below				
3. Sample weight √ if 5.0 ± 0.1 gram				
4. Volume of water, √ if 96.5 ± 1.0 mL added				
5. initial pH (after 5 minutes mixing)				
6. if pH > 5.0, √ if 3.5 mL 1N HCl added				
7. √ if heated and held at at 50°C for 10 minutes.				
8. secodary pH (at room temp)				
9. extraction fluid	#1	#1	#1	#1
Determination of sample size for leach testing.				
1. Particle size reduction? yes/no	NO	NO	NO	
2. Weight of sample required	100.0	100.0	100.0	
3. Weight of sample & container (5.6.3.2)				
4. Weight of container & residue (5.6.3.5)				
5. Weight of sample to filter (5.6.3.6)				
6. Weight of filtrate & container(5.6.3.10)				
7. Weight of container (5.6.3.1)				
8. Weight of filtrate (5.6.3.11)				

LOGBOOK ID No.: IP-O-

General Engineering Laboratories, Inc.
Rev. 6/98

GEL TCLP Extraction Log Laboratory ID No.:	9907679 -10	9907679 -32	9907679 -56	0C63985
D. Determination of the amount of extraction fluid				
1. 20 x % wet solid x wt. sample	2L	2L	2L	0.5L
E. Record of extraction test (18 ± 2 hours)				
1. extraction start date	07-25-99			
2. extraction start time	11:00			
3. starting room temperature	22 °C			
4. extraction stop date	07-26-99			
5. extraction stop time	10:45			
6. ending room temperature	25 °C			
7. filtration complete time	07-26-99 15:00			
8. pH of filtrate	4.89	4.91	4.93	4.89
9. volume of filtrate (mL)	1L	1L	1L	0.5L
10. pH of filtrate <2 after preservation	✓	✓	✓	✓
11. Type of preservation	HNO3			
12. Volume of preservation (mL)	5	5	5	2.5
13. Preservation lot number	2704	14	14	
14. Bottle lot number	C9	10	90	1C
15. Filter lot number	8	32	07	01
F. Metals Spiking Solutions				
1. volume split from filtrate to be spiked				
2. Spiking Solution #1 Code				
3. Spiking Solution #2 Code				
4. Volume of #1 added				
5. Volume of #2 added				
G. Extraction Vessel Information (Volatiles Only)				
1. Extraction Vessel number				
2. Positive Pressure? yes/no				
H. Extraction Tumbler Rotation Speed (rpm)				
1. Tumbler number	1	2	3	4
2. Tumbler speed		31		
Extraction Started By:	JL	JL	JL	JL
Extraction Completed By:	JL	JL	JL	JL

fluid 1 lot #: 920119
(pH/Temperature): pH=4.89/21.6°C

fluid 2 lot #: _____
(pH/Temperature): _____

NOTES and MAINTENANCE:

JL 07/27/99

Particle Size Reduction Technique Codes:
C - cut: M - Crush with a mallet

LOGBOOK ID No.: ID-2

al Engineering Laboratories, Inc.

LP Extraction Log	990679	990679	990679	Blank
Laboratory ID No.:	-11	-33	-57	QC630588
Batch:	1	54	92	
Client:	WSRC			GEL
Test:	Multiple Extraction (4)			
mple Description				
f Phases (5.3.1)				
d	✓	✓	✓	
iid				
ighter than water				
ater				
eavier than water				
rcent Solid Phase (weight in grams) (volume in ml)				
eight of filter (5.3.2.1)				
ant-of sample & beaker (5.3.3.1)				
ight of beaker & residue (5.3.3.4)				
eight of sample filtered (5.3.3.5)				
eight of filtrate & beaker (5.3.5.1)				
eight of empty beaker (5.3.2.2)				
ight of liquid phase (5.3.5.2)				
ight of solid phase (5.3.5.3)				
wet solids (5.3.5.4)				
eight of dry sample & filter (5.3.6.3)				
eight of dry sample (5.3.6.4)				
dried solids (5.3.6.5)				
lume of Liquid (volume in ml)				
lume of oil filtrate				
ume of water filtrate				
action Fluid Determination				
rticle size reduction? yes/no				
Particle size reduction, Homoginzation chnique. See codes below				
mple weight,√ if 5.0 ± 0.1 gram				
ume of water, 96.5 ± 1.0 mL added				
ial pH (after 5 minutes mixing)				
H > 5.0. √ if 3.5 mL 1N HCl added				
heated and held at 50°C for 10 minutes.				
condary pH (at room temp)				
traction fluid	#1	#1	#1	#1
termination of sample size for leach testing.				
article size reduction? yes/no	NO	NO	NO	
eight of sample required	100.0	100.0	100.0	
Weight of sample & container (5.6.3.2)				
eight of container & residue (5.6.3.5)				
eight of sample to filter (5.6.3.6)				
Weight of filtrate & container(5.6.3.10)				
7. Weight of container (5.6.3.1)				
8. Weight of filtrate (5.6.3.11)				

OOK ID No.: IP-O-

General Engineering Laboratories, Inc.
Rev. 6/98

GEL TCLP Extraction Log					
Laboratory ID No.	990679 -11	990679 -33	990679 -57	PC630938	
D. Determination of the amount of extraction fluid					
1. 20 x % wet solid x wt. sample	2L	2L	2L	0.5L	
E. Record of extraction test (18 ± 2 hours)					
1. extraction start date	07	7-26	7-26	9	
2. extraction start time	1	1 :	00	00	
3. starting room temperature		25°	C		
4. extraction stop date	07	7-27	7-28	9	
5. extraction stop time		10:	45		
6. ending room temperature	2	6°	C		
7. filtration complete time	0728	7-29	13:	30	
8. pH of filtrate	4.97	4.96	4.96	4.92	
9. volume of filtrate (mL)	900	900	900	500	
10. pH of filtrate <2 after preservation	—	✓	✓	✓	
11. Type of preservation	H	N	03		
12. Volume of preservation (mL)	5	5	5	2.5	
13. Preservation lot number	27	04	141	0	
14. Bottle lot number	CS	10	90	1C	
15. Filter lot number	8	32	070	1	
F. Metals Spiking Solutions					
1. volume split from filtrate to be spiked					
2. Spiking Solution #1 Code					
3. Spiking Solution #2 Code					
4. Volume of #1 added					
5. Volume of #2 added					
G. Extraction Vessel Information (Volatiles Only)					
1. Extraction Vessel number					
2. Positive Pressure? yes/no					
H. Extraction Tumbler Rotation Speed (rpm)					
1. Tumbler number	1	(2)	3	4	
2. Tumbler speed		31			
Extraction Started By:	JL	JL	JL	JL	
Extraction Completed By:	JL	JL	JL	JL	

fluid 1 lot #: 920119
(pH/Temperature): pH= 4.90/22.5C

fluid 2 lot #: ~~_____~~
(pH/Temperature): ~~_____~~

NOTES and MAINTENANCE:

07/27/99

Particle Size Reduction Technique Codes:
C - cut; M - Crush with a mallet

LOGBOOK ID No.: IP-O-

General Engineering Laboratories, Inc.

Rev. 6/98

GEL TCLP Extraction Log

Laboratory ID No.	440167 -12	440167 -34	440167 -58	Blank 0C63099
Batch	154094			
Client	WSRC			GEL
Test	Multiple Extraction (5)			
A1. Sample Description				
Number of Phases (5.3.1)				
1. Solid	✓	✓	✓	
2. Liquid				
a. Lighter than water				
b. water				
c. heavier than water				
A2. Percent Solid Phase (weight in grams) (volume in ml)				
1. Weight of filter (5.3.2.1)				
2. Weight of sample & beaker (5.3.3.1)				
3. Weight of beaker & residue (5.3.3.4)				
4. Weight of sample filtered (5.3.3.5)				
5. Weight of filtrate & beaker (5.3.5.1)				
6. Weight of empty beaker (5.3.2.2)				
7. Weight of liquid phase (5.3.5.2)				
8. Weight of solid phase (5.3.5.3)				
9. % wet solids (5.3.5.4)				
10. Weight of dry sample & filter (5.3.6.3)				
11. Weight of dry sample (5.3.6.4)				
12. % dried solids (5.3.6.5)				
A3. Volume of Liquid (volume in ml)				
1. Volume of oil filtrate				
2. Volume of water filtrate				
B. Extraction Fluid Determination				
1. Particle size reduction? yes/no				
2. If Particle size reduction, Homoginzation technique. See codes below				
3. Sample weight √ if 5.0 ± 0.1 gram				
4. Volume of water, √ if 96.5 ± 1.0 mL added				
5. initial pH (after 5 minutes mixing)				
6. If pH > 5.0, √ if 3.5 mL 1N HCl added				
7. √ if heated and held at at 50°C for 10 minutes.				
8. secodary pH (at room temp)				
9. extraction fluid	#1	#1	#1	#1
C. Determination of sample size for leach testing.				
1. Particle size reduction? yes/no	NO	NO	NO	
2. Weight of sample required	100.0	100.0	100.0	
3. Weight of sample & container (5.6.3.2)				
4. Weight of container & residue (5.6.3.5)				
5. Weight of sample to filter (5.6.3.6)				
6. Weight of filtrate & container(5.6.3.10)				
7. Weight of container (5.6.3.1)				
8. Weight of filtrate (5.6.3.11)				

Logbook ID No.: IP-O-

General Engineering Laboratories, Inc.
Rev. 6/98

GEL TCLP Extraction Log Laboratory ID No.	9907679 -12	9907679 -34	9907679 -58	00630991		
D. Determination of the amount of extraction fluid						
1. 20 x % wet solid x wt. sample	2L	2L	2L	0.5L		
E. Record of extraction test (18 ± 2 hours)						
1. extraction start date	07-27-99					
2. extraction start time	11:15					
3. starting room temperature	26°C					
4. extraction stop date	07-28-99					
5. extraction stop time	11:06					
6. ending room temperature	26°C					
7. filtration complete time	07-28-99	14:35				
8. pH of filtrate	4.97	4.96	4.98	4.94		
9. volume of filtrate (mL)	1000	1000	1000	500		
10. pH of filtrate <2 after preservation	✓	✓	✓	✓		
11. Type of preservation		HN	HN	O_3		
12. Volume of preservation (mL)	5	5	5	2.5		
13. Preservation lot number	27	04	141	0		
14. Bottle lot number	CS	10	90	1C		
15. Filter lot number	8	32	07	01		
F. Metals Spiking Solutions						
1. volume split from filtrate to be spiked						
2. Spiking Solution #1 Code						
3. Spiking Solution #2 Code						
4. Volume of #1 added						
5. Volume of #2 added						
G. Extraction Vessel Information (Volatiles Only)						
1. Extraction Vessel number						
2. Positive Pressure? yes/no						
H. Extraction Tumbler Rotation Speed (rpm)						
1. Tumbler number	1	2	3	4		
2. Tumbler speed		31				
Extraction Started By:	JL	JL	JL	JL		
Extraction Completed By:	JL	JL	JL	JL		

NOTES and MAINTENANCE:

fluid 1 lot #: 920708
(pH/Temperature): pH=4.93/23.8C

fluid 2 lot #: _____
(pH/Temperature): _____

08/02/99

Particle Size Reduction Technique Codes:
C - cut; M - Crush with a mallet

General Engineering Laboratories, Inc.

Rev. 6/98

CLP TCLP Extraction Log

Laboratory ID No.	9807678 -13	9807678 -35	9807678 -59	Blank 04630994
Batch	1	5 4 0		8 6
Client	WSRC			GEL
Test	Multiple Extraction (6)			
A1. Sample Description				
Number of Phases (5.3.1)				
1. Solid	✓	✓	✓	
2. Liquid				
a. Lighter than water				
b. water				
c. heavier than water				
A2. Percent Solid Phase (weight in grams) (volume in ml)				
1. Weight of filter (5.3.2.1)				
2. Weght of sample & beaker (5.3.3.1)				
3. Weight of beaker & residue (5.3.3.4)				
4. Weight of sample filtered (5.3.3.5)				
5. Weight of filtrate & beaker (5.3.5.1)				
6. Weight of empty beaker (5.3.2.2)				
7. Weight of liquid phase (5.3.5.2)				
8. Weight of solid phase (5.3.5.3)				
9. % wet solids (5.3.5.4)				
10. Weight of dry sample & filter (5.3.6.3)				
11. Weight of dry sample (5.3.6.4)				
12. % dried solids (5.3.6.5)				
A3. Volume of Liquid (volume in ml)				
1. Volume of oil filtrate				
2. Volume of water filtrate				
B. Extraction Fluid Determination				
1. Particle size reduction? yes/no				
2. If Particle size reduction, Homoginzation technique. See codes below				
3. Sample weight,√ if 5.0 ± 0.1 gram				
4. Volume of water, √ if 96.5 ± 1.0 mL added				
5. initial pH (after 5 minutes mixing)				
6. if pH > 5.0, √ if 3.5 mL 1N HCl added				
7. √ if heated and held at at 50°C for 10 minutes.				
8. secodary pH (at room temp)				
9. extraction fluid	#1	#1	#1	#1
C. Determination of sample size for leach testing.				
1. Particle size reduction? yes/no	NO	NO	NO	
2. Weight of sample required	100.0	100.0	100.0	
3. Weight of sample & container (5.6.3.2)				
4. Weight of container & residue (5.6.3.5)				
5. Weight of sample to filter (5.6.3.6)				
6. Weight of filtrate & container(5.6.3.10)				
7. Weight of container (5.6.3.1)				
8. Weight of filtrate (5.6.3.11)				

LOGBOOK ID No.: IP-O-

General Engineering Laboratories, Inc.
Rev. 6/98

GEL TCLP Extraction Log Laboratory ID No.	9907679 -13	9907679 -35	9907679 -59	DC630994		
D. Determination of the amount of extraction fluid						
1. 20 x % wet solid x wt. sample	2L	2L	2L	0.5L		
E. Record of extraction test (18 ± 2 hours)						
1. extraction start date	07-2	7-2	8-	99		
2. extraction start time	1	1:	2	0		
3. starting room temperature		26°	C			
4. extraction stop date	07-2	9-9	9	9		
5. extraction stop time	1	1:	1	0		
6. ending room temperature		26	°C			
7. filtration complete time	07-2	9-99	12:	10		
8. pH of filtrate	4.92	4.93	4.93	4.91		
9. volume of filtrate (mL)	1000	1000	1000	1000		
10. pH of filtrate <2 after preservation	✓	✓	✓	✓		
11. Type of preservation	H	N	O 3			
12. Volume of preservation (mL)	5	5	5	2.5		
13. Preservation lot number	2710	4	14	10		
14. Bottle lot number	C9	10	90	1C		
15. Filter lot number	8	32	07	01		
F. Metals Spiking Solutions						
1. volume split from filtrate to be spiked						
2. Spiking Solution #1 Code						
3. Spiking Solution #2 Code						
4. Volume of #1 added						
5. Volume of #2 added						
G. Extraction Vessel Information (Volatiles Only)						
1. Extraction Vessel number						
2. Positive Pressure? yes/no						
H. Extraction Tumbler Rotation Speed (rpm)						
1. Tumbler number	1	② 7/29/99	3	4		
2. Tumbler speed		31				
Extraction Started By:	JL	JL	JL	JL		
Extraction Completed By:	JL	JL	JL	JL		

NOTES and MAINTENANCE:

07/29/99

fluid 1 lot #: 920708
(pH/Temperature): pH=4.94/24.0°C

fluid 2 lot #: _____
(pH/Temperature): _____

Particle Size Reduction Technique Codes:
C - cut; M - Crush with a mallet

LOGBOOK ID No.: IP-O-

PAGE #: 2

General Engineering Laboratories, Inc.

Rev. 5/98

GEL TCLP Extraction Log				
Laboratory ID No.	990679 -14	990679 -36	990679 -60	Blank 0630995
Batch	1	54097		
Client	WSRC			GEL
Test	Multiple Extraction (7)			
A1. Sample Description				
Number of Phases (5.3.1)				
1. Solid	✓	✓	✓	
2. Liquid				
a. Lighter than water				
b. water				
c. heavier than water				
A2. Percent Solid Phase (weight in grams) (volume in ml)				
1. Weight of filter (5.3.2.1)				
2. Weght of sample & beaker (5.3.3.1)				
3. Weight of beaker & residue (5.3.3.4)				
4. Weight of sample filtered (5.3.3.5)				
5. Weight of filtrate & beaker (5.3.5.1)				
6. Weight of empty beaker (5.3.2.2)				
7. Weight of liquid phase (5.3.5.2)				
8. Weight of solid phase (5.3.5.3)				
9. % wet solids (5.3.5.4)				
10. Weight of dry sample & filter (5.3.6.3)				
11. Weight of dry sample (5.3.6.4)				
12. % dried solids (5.3.6.5)				
A3. Volume of Liquid (volume in ml)				
1. Volume of oil filtrate				
2. Volume of water filtrate				
B. Extraction Fluid Determination				
1. Particle size reduction? yes/no				
2. If Particle size reduction, Homoginzation technique. See codes below				
3. Sample weight,√ if 5.0 ± 0.1 gram				
4. Volume of water, √ if 96.5 ± 1.0 mL added				
5. initial pH (after 5 minutes mixing)				
6. if pH > 5.0, √ if 3.5 mL 1N HCl added				
7. √ if heated and held at at 50°C for 10 minutes.				
8. secodary pH (at room temp)				
9. extraction fluid	#1	#1	#1	#1
C. Determination of sample size for leach testing.				
1. Particle size reduction? yes/no	NO	NO	NO	
2. Weight of sample required	100.0	100.0	100.0	
3. Weight of sample & container (5.6.3.2)				
4. Weight of container & residue (5.6.3.5)				
5. Weight of sample to filter (5.6.3.6)				
6. Weight of filtrate & container(5.6.3.10)				
7. Weight of container (5.6.3.1)				
8. Weight of filtrate (5.6.3.11)				

LOGBOOK ID No.: IP-O-

General Engineering Laboratories, Inc.
Rev. 6/98

GEL TCLP Extraction Log Laboratory ID No.	990767 -1	990767 -36	990767 -60	QC630195		
D. Determination of the amount of extraction fluid						
1. 20 x % wet solid x wt. sample	2L	2L	2L	0.5L		
E. Record of extraction test (18 ± 2 hours)						
1. extraction start date	07	-2	9-	99		
2. extraction start time	1	1:	3	5		
3. starting room temperature		27°	C			
4. extraction stop date	07	-3	0-	99		
5. extraction stop time	1	1:	2	5		
6. ending room temperature		26	°C			
7. filtration complete time	01-3	0-9	9 1	3:30		
8. pH of filtrate	4.85	4.84	4.83	4.93		
9. volume of filtrate (mL)	1L	1L	1L	0.5L		
10. pH of filtrate <2 after preservation	L	—	—	—		
11. Type of preservation		HNO3				
12. Volume of preservation (mL)	5	5	5	2.5		
13. Preservation lot number	27	04	14	10		
14. Bottle lot number	C9	10	90	1C		
15. Filter lot number	8	32	07	01		
F. Metals Spiking Solutions						
1. volume split from filtrate to be spiked						
2. Spiking Solution #1 Code						
3. Spiking Solution #2 Code						
4. Volume of #1 added						
5. Volume of #2 added						
G. Extraction Vessel Information (Volatiles Only)						
1. Extraction Vessel number						
2. Positive Pressure? yes/no						
H. Extraction Tumbler Rotation Speed (rpm)						
1. Tumbler number	1	(2)	3	4		
2. Tumbler speed		31				
Extraction Started By:	JL	JL	JL	JL		
Extraction Completed By:	JL	JL	JL	JL		

NOTES and MAINTENANCE:

fluid 1 lot #: 920708
(pH/Temperature): pH = 4.93/24.4°C

99 08/02/99

fluid 2 lot #: _____
(pH/Temperature): _____

Particle Size Reduction Technique Codes:
C - cut; M - Crush with a mallet

8

General Engineering Laboratories, Inc.
Rev. 6/98

GEL TCLP Extraction Log					
Laboratory ID No.	QC633381	990767 9 -15	990767 9 -37	990767 9 -61	Blank QC630596
Batch	154684	1	5	4	8
Client	GEL	WSRC			GEL
Test	Semivolatiles	Multiple Extraction ②			
A1. Sample Description					
Number of Phases (5.3.1)		✓	✓	✓	
1. Solid					
2. Liquid					
a. Lighter than water					
b. water					
c. heavier than water					
A2. Percent Solid Phase (weight in grams) (volume in ml)					
1. Weight of filter (5.3.2.1)					
2. Weight of sample & beaker (5.3.3.1)					
3. Weight of beaker & residue (5.3.3.4)					
4. Weight of sample filtered (5.3.3.5)					
5. Weight of filtrate & beaker (5.3.5.1)					
6. Weight of empty beaker (5.3.2.2)					
7. Weight of liquid phase (5.3.5.2)					
8. Weight of solid phase (5.3.5.3)					
9. % wet solids (5.3.5.4)					
10. Weight of dry sample & filter (5.3.6.3)					
11. Weight of dry sample (5.3.6.4)					
12. % dried solids (5.3.6.5)					
A3. Volume of Liquid (volume in ml)					
1. Volume of oil filtrate					
2. Volume of water filtrate					
B. Extraction Fluid Determination					
1. Particle size reduction? yes/no					
2. If Particle size reduction, Homoginzation technique. See codes below					
3. Sample weight,√ if 5.0 ± 0.1 gram					
4. Volume of water, √ if 96.5 ± 1.0 mL added					
5. initial pH (after 5 minutes mixing)					
6. if pH > 5.0, √ if 3.5 mL 1N HCl added					
7. √ if heated and held at at 50°C for 10 minutes.					
8. secodary pH (at room temp)					
9. extraction fluid	#1	#1	#1	#1	#1
C. Determination of sample size for leach testing.					
1. Particle size reduction? yes/no		NO	NO	NO	
2. Weight of sample required		100.0	100.0	100.0	
3. Weight of sample & container (5.6.3.2)					
4. Weight of container & residue (5.6.3.5)					
5. Weight of sample to filter (5.6.3.6)					
6. Weight of filtrate & container(5.6.3.10)					
7. Weight of container (5.6.3.1)					
8. Weight of filtrate (5.6.3.11)					

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LOGBOOK ID No.: IP-O-

General Engineering Laboratories, Inc.
Rev. 6/98

GEL TCLP Extraction Log Laboratory ID No.	QC633381		9907679 -15	9907679 -27	9907679 -61	QC630896
D. Determination of the amount of extraction fluid						
1. 20 x % wet solid x wt. sample	1L		2L	2L	2L	0.5L
E. Record of extraction test (18 ± 2 hours)						
1. extraction start date	07-29-99		07-	30-	30-	99
2. extraction start time	15:50		11:	13:	13:	00
3. starting room temperature	25°C			26	°C	
4. extraction stop date	07-30-99		07-	31-	1-9	9
5. extraction stop time	08:00		11:	11:	11:	55
6. ending room temperature	25°C			25	°C	
7. filtration complete time	13:00		07-	31-9	9 12	:30
8. pH of filtrate	5		4.94	4.94	4.93	4.93
9. volume of filtrate (mL)	1L		1L	1L	1L	0.5L
10. pH of filtrate <2 after preservation			✓	✓	✓	✓
11. Type of preservation			HN		03	
12. Volume of preservation (mL)			5	5	5	2.5
13. Preservation lot number			2704		14	10
14. Bottle lot number			C	910	90	1C
15. Filter lot number	8320701		8	32	070	1
F. Metals Spiking Solutions						
1. volume split from filtrate to be spiked						
2. Spiking Solution #1 Code						
3. Spiking Solution #2 Code						
4. Volume of #1 added						
5. Volume of #2 added						
G. Extraction Vessel Information (Volatiles Only)						
1. Extraction Vessel number						
2. Positive Pressure? yes/no						
H. Extraction Tumbler Rotation Speed (rpm)						
1. Tumbler number	1	(2)	3	4		
2. Tumbler speed		31				
Extraction Started By:			JL	JL	JL	JL
Extraction Completed By:			JL	JL	JL	JL

fluid 1 lot #: 920804
(pH/Temperature): pH=4.92/24C

fluid 2 lot #: _____
(pH/Temperature): _____

NOTES and MAINTENANCE:

3.8 08/12/96

Particle Size Reduction Technique Codes:
C - cut; M - Crush with a mallet

General Engineering Laboratories, Inc.
Rev. 6/98

GEL TCLP Extraction Log						
Laboratory ID No.	880747 -32	880747 -41	880678 -16	880678 -38	880679 -62	Blank 630397
Batch	154	686	1	5	40	9
Client	LM	ES	WSRC			GEL
Test	Volatiles		Multiple Extraction ①			
A1. Sample Description						
Number of Phases (5.3.1)			✓	✓	✓	✓
1. Solid						
2. Liquid						
a. Lighter than water						
b. water	✓	✓				
c. heavier than water						
A2. Percent Solid Phase (weight in grams) (volume in ml)						
1. Weight of filter (5.3.2.1)						
2. Weight of sample & beaker (5.3.3.1)						
3. Weight of beaker & residue (5.3.3.4)						
4. Weight of sample filtered (5.3.3.5)						
5. Weight of filtrate & beaker (5.3.5.1)						
6. Weight of empty beaker (5.3.2.2)						
7. Weight of liquid phase (5.3.5.2)						
8. Weight of solid phase (5.3.5.3)						
9. % wet solids (5.3.5.4)						
10. Weight of dry sample & filter (5.3.6.3)						
11. Weight of dry sample (5.3.6.4)						
12. % dried solids (5.3.6.5)						
A3. Volume of Liquid (volume in ml)						
1. Volume of oil filtrate						
2. Volume of water filtrate						
B. Extraction Fluid Determination						
1. Particle size reduction? yes/no						
2. If Particle size reduction, Homoginzation technique. See codes below						
3. Sample weight, √ if 5.0 ± 0.1 gram						
4. Volume of water, √ if 96.5 ± 1.0 mL added						
5. initial pH (after 5 minutes mixing)						
6. if pH > 5.0, √ if 3.5 mL 1N HCl added						
7. √ if heated and held at at 50°C for 10 minutes.						
8. secodary pH (at room temp)			#1	#1	#1	#1
9. extraction fluid						
C. Determination of sample size for leach testing.						
1. Particle size reduction? yes/no			NO	NO	NO	
2. Weight of sample required			100.0	100.0	100.0	
3. Weight of sample & container (5.6.3.2)						
4. Weight of container & residue (5.6.3.5)						
5. Weight of sample to filter (5.6.3.6)						
6. Weight of filtrate & container(5.6.3.10)						
7. Weight of container (5.6.3.1)						
8. Weight of filtrate (5.6.3.11)						

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Rev. 6/98

GEL TCLP Extraction Log Laboratory ID No.	9907747 -32	9907747 -41	9907679 -16	9907679 -38	9907679 -62	DC630987
D. Determination of the amount of extraction fluid						
1. 20 x % wet solid x wt. sample			2L	2L	2L	0.5L
E. Record of extraction test (18 – 2 hours)						
1. extraction start date	07-31-99		08-03	08-03	08-04	99
2. extraction start time			11	11:30	11:35	
3. starting room temperature				25°C		
4. extraction stop date			08-04	08-04	08-04	99
5. extraction stop time			11	11:30	11:35	
6. ending room temperature				26°C		
7. filtration complete time	14:00		08-04-99	08-04-99	08-05-99	11:00
8. pH of filtrate			5.00/24.2C	5.00/24.8C	5.00/25.0C	4.96/24.5C
9. volume of filtrate (mL)	40	40	1L	1L	1L	0.5L
10. pH of filtrate <2 after preservation			✓	✓	✓	✓
11. Type of preservation			HN	HN	HN	
12. Volume of preservation (mL)			5	5	5	5
13. Preservation lot number			27041	27041	27041	
14. Bottle lot number	B508	301C	C910	C910	C910	1C
15. Filter lot number	8320701		8320701	8320701	8320701	1
F. Metals Spiking Solutions						
1. volume split from filtrate to be spiked						
2. Spiking Solution #1 Code						
3. Spiking Solution #2 Code						
4. Volume of #1 added						
5. Volume of #2 added						
G. Extraction Vessel Information (Volatiles Only)						
1. Extraction Vessel number						
2. Positive Pressure? yes/no						
H. Extraction Tumbler Rotation Speed (rpm)						
1. Tumbler number	1	(2)	3	4		
2. Tumbler speed		31				
Extraction Started By:			JL	JL	JL	JL
Extraction Completed By:			JL	JL	JL	JL

NOTES and MAINTENANCE:

fluid 1 lot #: 920804
(pH/Temperature): pH=4.96/24.9C

fluid 2 lot #: _____
(pH/Temperature): _____

08/02/99

Particle Size Reduction Technique Codes:
C - cut; M - Crush with a mallet

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Project Description: Hazardous Waste Contract

:: WSRC00497 Report Date: August 20, 1999 Page 1 of 1

Sample ID	: TCLP 2
Lab ID	: 9907679-07
Matrix	: TCLP
Date Collected	: 07/14/99
Date Received	: 07/15/99
Priority	: Routine
Collector	: Client

rameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M

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Project Description: Hazardous Waste Contract

cc: WSRC00497 Report Date: August 20, 1999

Sample ID	: TCLP 2 (1X)
Lab ID	: 9907679-08
Matrix	: TCLP
Date Collected	: 07/14/99
Date Received	: 07/15/99
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Metals Analysis											
Mercury	U	-0.000229	0.000350	0.0200	MGL	1.0	RMJ	07/29/99	1735	154526	1
Silver	U	0.00180	0.00365	0.500	MGL	5.0	AME	07/29/99	1128	154346	2
Arsenic	U	0.00631	0.0226	0.500	MGL	5.0					
Barium	J	0.0269	0.00255	10.0	MGL	5.0					
Cadmium	U	0.000990	0.00220	0.100	MGL	5.0					
Chromium	J	0.0202	0.00280	0.500	MGL	5.0					
Nickel		0.258	0.00645	0.0250	MGL	5.0	AME	07/29/99	1128	154346	3
Lead	J	0.0106	0.00795	0.500	MGL	5.0	AME	07/29/99	1128	154346	2
Selenium	U	0.00194	0.0136	0.100	MGL	5.0					

The following prep procedures were performed:

Mercury	ARD	07/28/99	1820	154526	4
TCLP Prep (Metals, Prep Only)	JL	07/23/99	1045	154088	4

M = Method	Method-Description
M 1	SW846 7470A
M 2	SW846 6010A
M 3	SW846 6010B
M 4	SW846 3010A

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:: WSRC00497 Report Date: August 20, 1999

Sample ID : TCLP 2 (1X)

= Method **Method-Description**

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cc: WSRC00497 Report Date: August 20, 1999

Sample ID : TCLP 2 (2X)
Lab ID : 9907679-09
Matrix : TCLP
Date Collected : 07/14/99
Date Received : 07/15/99
Priority : Routine
Collector : Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Metals Analysis											
Mercury	U	-0.000538	0.000350	0.0200	MGL	1.0	RMJ	07/29/99	1737	154526	1
Silver	U	-0.000415	0.00365	0.500	MGL	5.0	AME	07/29/99	1134	154346	2
Arsenic	U	0.00714	0.0226	0.500	MGL	5.0					
Barium	J	0.0184	0.00255	10.0	MGL	5.0					
Cadmium	U	0.000216	0.00220	0.100	MGL	5.0					
Chromium	J	0.0160	0.00280	0.500	MGL	5.0					
Nickel		0.256	0.00645	0.0250	MGL	5.0	AME	07/29/99	1134	154346	3
Lead	U	-0.000968	0.00795	0.500	MGL	5.0	AME	07/29/99	1134	154346	2
Selenium	U	-0.00230	0.0136	0.100	MGL	5.0					

The following prep procedures were performed:

Mercury	ARD	07/28/99	1820	154526	4
TCLP Prep (Metals, Prep Only)	JL	07/24/99	1030	154089	4

M = Method	Method-Description
M 1	SW846 7470A
M 2	SW846 6010A
M 3	SW846 6010B
M 4	SW846 3010A

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:: WSRC00497 Report Date: August 20, 1999 Page 2 of 2

Sample ID : TCLP 2 (2X)

= Method **Method-Description**

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Project Description: Hazardous Waste Contract

cc: WSRC00497 Report Date: August 20, 1999

Sample ID	: TCLP 2 (3X)
Lab ID	: 9907679-10
Matrix	: TCLP
Date Collected	: 07/14/99
Date Received	: 07/15/99
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Metals Analysis											
Mercury	U	-0.000448	0.000350	0.0200	MGL	1.0	RMJ	07/29/99	1739	154526	1
Silver	U	-0.000271	0.00365	0.500	MGL	5.0	AME	07/29/99	1949	154346	2
Arsenic	U	-0.0123	0.0226	0.500	MGL	5.0					
Barium	J	0.0198	0.00255	10.0	MGL	5.0					
Cadmium	U	0.00168	0.00220	0.100	MGL	5.0					
Chromium	J	0.0120	0.00280	0.500	MGL	5.0					
Nickel		0.237	0.00645	0.0250	MGL	5.0	AME	07/29/99	1949	154346	3
Lead	U	-0.000149	0.00795	0.500	MGL	5.0	AME	07/29/99	1949	154346	2
Selenium	U	-0.00295	0.0136	0.100	MGL	5.0					

The following prep procedures were performed:

Mercury	ARD	07/28/99	1820	154526 4
TCLP Prep (Metals, Prep Only)	JL	07/25/99	1100	154090 4

M = Method	Method-Description
M 1	SW846 7470A
M 2	SW846 6010A
M 3	SW846 6010B
M 4	SW846 3010A

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Sample ID : TCLP 2 (3X)

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Project Description: Hazardous Waste Contract

cc: WSRC00497 Report Date: August 20, 1999

Sample ID	: TCLP 2 (4X)
Lab ID	: 9907679-11
Matrix	: TCLP
Date Collected	: 07/14/99
Date Received	: 07/15/99
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Metals Analysis											
Mercury	U	-0.000425	0.000350	0.0200	MGL	1.0	RMJ	07/29/99	1741	154526	1
Silver	U	-0.00129	0.00365	0.500	MGL	5.0	AME	07/29/99	1955	154346	2
Arsenic	U	-0.00351	0.0226	0.500	MGL	5.0					
Barium	J	0.0175	0.00255	10.0	MGL	5.0					
Cadmium	U	-0.0000266	0.00220	0.100	MGL	5.0					
Chromium	J	0.0111	0.00280	0.500	MGL	5.0					
Nickel		0.225	0.00645	0.0250	MGL	5.0	AME	07/29/99	1955	154346	3
Lead	U	0.00769	0.00795	0.500	MGL	5.0	AME	07/29/99	1955	154346	2
Selenium	U	0.00194	0.0136	0.100	MGL	5.0					

The following prep procedures were performed:

Mercury	ARD	07/28/99	1820	154526 4
TCLP Prep (Metals, Prep Only)	JL	07/26/99	1100	154092 4

M = Method	Method-Description
M 1	SW846 7470A
M 2	SW846 6010A
M 3	SW846 6010B
M 4	SW846 3010A

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:: WSRC00497 Report Date: August 20, 1999

Sample ID : TCLP 2 (4X)

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Contact: Mr. Richard Groseclose
Project Description: Hazardous Waste Contract

cc: WSRC00497 Report Date: August 20, 1999

Sample ID	: TCLP 2 (5X)
Lab ID	: 9907679-12
Matrix	: TCLP
Date Collected	: 07/14/99
Date Received	: 07/15/99
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Metals Analysis											
Mercury	U	-0.000173	0.000350	0.0200	MGL	1.0	RMJ	08/06/99	1219	155374	1
Silver	U	0.00538	0.00730	0.500	MGL	10.	MBL	08/06/99	1120	155258	2
Arsenic	U	0.0177	0.0451	0.500	MGL	10.					
Barium	J	0.0337	0.00510	10.0	MGL	10.					
Cadmium	U	0.0000301	0.00440	0.100	MGL	10.					
Chromium	J	0.0189	0.00560	0.500	MGL	10.					
Nickel		0.218	0.0129	0.0500	MGL	10.	MBL	08/06/99	1120	155258	3
Lead	J	0.0178	0.0159	0.500	MGL	10.	MBL	08/06/99	1120	155258	2
Selenium	U	-0.0109	0.0271	0.100	MGL	10.					

The following prep procedures were performed:

Mercury	ARD	08/05/99	1830	155374 4
TCLP Prep (Metals, Prep Only)	JL	07/27/99	1115	154094 4

M = Method	Method-Description
M 1	SW846 7470A
M 2	SW846 6010A
M 3	SW846 6010B
M 4	SW846 3010A

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Sample ID : TCLP 2 (5X)

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cc: WSRC00497 Report Date: August 20, 1999

Sample ID : TCLP 2 (6X)
Lab ID : 9907679-13
Matrix : TCLP
Date Collected : 07/14/99
Date Received : 07/15/99
Priority : Routine
Collector : Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Metals Analysis											
Mercury	U	-0.000681	0.000350	0.0200	MGL	1.0	RMJ	08/02/99	1737	154871	1
Silver	U	0.00181	0.00730	0.500	MGL	10.	MBL	08/03/99	1809	154873	2
Arsenic	U	0.00501	0.0451	0.500	MGL	10.					
Barium	J	0.0339	0.00510	10.0	MGL	10.					
Cadmium	U	0.00423	0.00440	0.100	MGL	10.					
Chromium	J	0.0180	0.00560	0.500	MGL	10.					
Nickel		0.234	0.0129	0.0500	MGL	10.	MBL	08/03/99	1809	154873	3
Lead	U	0.0103	0.0159	0.500	MGL	10.	MBL	08/03/99	1809	154873	2
Selenium	J	0.0287	0.0271	0.100	MGL	10.					

The following prep procedures were performed:

Mercury	ARD	07/30/99	1845	154871	4
TCLP Prep (Metals, Prep Only)	JL	07/28/99	1120	154096	4

M = Method	Method-Description
M 1	SW846 7470A
M 2	SW846 6010A
M 3	SW846 6010B
M 4	SW846 3010A

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: WSRC00497 Report Date: August 20, 1999

Sample ID : TCLP 2 (6X)

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Contact: Mr. Richard Groseclose
Project Description: Hazardous Waste Contract

cc: WSRC00497 Report Date: August 20, 1999

Sample ID	: TCLP 2 (7X)
Lab ID	: 9907679-14
Matrix	: TCLP
Date Collected	: 07/14/99
Date Received	: 07/15/99
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Metals Analysis											
Mercury	U	-0.000807	0.000350	0.0200	MGL	1.0	RMJ	08/02/99	1745	154871	1
Silver	U	0.00282	0.00730	0.500	MGL	10.	MBL	08/03/99	1814	154873	2
Arsenic	U	0.00764	0.0451	0.500	MGL	10.					
Barium	J	0.0228	0.00510	10.0	MGL	10.					
Cadmium	J	0.00834	0.00440	0.100	MGL	10.					
Chromium	J	0.0145	0.00560	0.500	MGL	10.					
Nickel		0.240	0.0129	0.0500	MGL	10.	MBL	08/03/99	1814	154873	3
Lead	U	0.00475	0.0159	0.500	MGL	10.	MBL	08/03/99	1814	154873	2
Selenium	U	0.0177	0.0271	0.100	MGL	10.					

The following prep procedures were performed:

Mercury	ARD	07/30/99	1845	154871	4
TCLP Prep (Metals, Prep Only)	JL	07/29/99	1135	154097	4

M = Method	Method-Description
M 1	SW846 7470A
M 2	SW846 6010A
M 3	SW846 6010B
M 4	SW846 3010A

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Client: Westinghouse Savannah River Co.
Building 735-16A, Rm. 5
P.O. Box 616
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Contact: Mr. Richard Groseclose
Project Description: Hazardous Waste Contract

:: WSRC00497 Report Date: August 20, 1999 Page 2 of 2

Sample ID : TCLP 2 (7X)

= Method	Method-Description

es:
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questions to your Project Manager, Stacy Griffin at 769-7376.

Stacy L. Griffin

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Contact: Mr. Richard Groseclose
Project Description: Hazardous Waste Contract

cc: WSRC00497 Report Date: August 20, 1999

Sample ID	: TCLP 2 (8X)
Lab ID	: 9907679-15
Matrix	: TCLP
Date Collected	: 07/14/99
Date Received	: 07/15/99
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Metals Analysis											
Mercury	U	0.0000956	0.000350	0.0200	MGL	1.0	RMJ	08/03/99	1358	154974	1
Silver	U	-0.00321	0.00730	0.500	MGL	10.	MBL	08/03/99	1152	154977	2
Arsenic	U	0.00441	0.0451	0.500	MGL	10.					
Barium	J	0.0173	0.00510	10.0	MGL	10.					
Cadmium	U	0.00144	0.00440	0.100	MGL	10.					
Chromium	U	0.00479	0.00560	0.500	MGL	10.					
Nickel		0.248	0.0129	0.0500	MGL	10.	MBL	08/03/99	1152	154977	3
Lead	U	-0.00771	0.0159	0.500	MGL	10.	MBL	08/03/99	1152	154977	2
Selenium	J	0.0317	0.0271	0.100	MGL	10.					

The following prep procedures were performed:

Mercury	ARD	08/02/99	1715	154974 4
TCLP Prep (Metals, Prep Only)	JL	07/30/99	1130	154098 4

M = Method	Method-Description
M 1	SW846 7470A
M 2	SW846 6010A
M 3	SW846 6010B
M 4	SW846 3010A

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Contact: Mr. Richard Groseclose
Project Description: Hazardous Waste Contract

c: WSRC00497 Report Date: August 20, 1999

Sample ID : TCLP 2 (8X)

= Method	Method-Description

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Contact: Mr. Richard Groseclose
Project Description: Hazardous Waste Contract

cc: WSRC00497 Report Date: August 20, 1999

Sample ID	: TCLP 2 (9X)
Lab ID	: 9907679-16
Matrix	: TCLP
Date Collected	: 07/14/99
Date Received	: 07/15/99
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Metals Analysis											
Mercury	U	0.0000269	0.000350	0.0200	MGL	1.0	RMJ	08/03/99	1359	154974	1
Silver	J	0.00881	0.00730	0.500	MGL	10.	MBL	08/03/99	1158	154977	2
Arsenic	U	-0.0225	0.0451	0.500	MGL	10.					
Barium	J	0.0182	0.00510	10.0	MGL	10.					
Cadmium	U	0.00230	0.00440	0.100	MGL	10.					
Chromium	J	0.0138	0.00560	0.500	MGL	10.					
Nickel		0.251	0.0129	0.0500	MGL	10.	MBL	08/03/99	1158	154977	3
Lead	U	-0.000840	0.0159	0.500	MGL	10.	MBL	08/03/99	1158	154977	2
Selenium	U	0.0125	0.0271	0.100	MGL	10.					

The following prep procedures were performed:

Mercury	ARD	08/02/99	1715	154974	4
TCLP Prep (Metals, Prep Only)	JL	07/31/99	1135	154099	4

M = Method	Method-Description
M 1	SW846 7470A
M 2	SW846 6010A
M 3	SW846 6010B
M 4	SW846 3010A

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Contact: Mr. Richard Groseclose
Project Description: Hazardous Waste Contract

c: WSRC00497 Report Date: August 20, 1999 Page 2 of 2

Sample ID : TCLP 2 (9X)

= Method	Method-Description

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Contact: Mr. Richard Groseclose
Project Description: Hazardous Waste Contract

cc: WSRC00497 Report Date: August 20, 1999

Sample ID	: TCLP 8 (1X)
Lab ID	: 9907679-30
Matrix	: TCLP
Date Collected	: 07/14/99
Date Received	: 07/15/99
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Metals Analysis											
Mercury	U	-0.000505	0.000350	0.0200	MGL	1.0	RMJ	07/29/99	1743	154526	1
Silver	U	-0.00139	0.00365	0.500	MGL	5.0	AME	07/29/99	2001	154346	2
Arsenic	U	-0.00303	0.0226	0.500	MGL	5.0					
Barium	J	0.00915	0.00255	10.0	MGL	5.0					
Cadmium	U	0.000901	0.00220	0.100	MGL	5.0					
Chromium	J	0.00361	0.00280	0.500	MGL	5.0					
Nickel		0.215	0.00645	0.0250	MGL	5.0	AME	07/29/99	2001	154346	3
Lead	U	0.00777	0.00795	0.500	MGL	5.0	AME	07/29/99	2001	154346	2
Selenium	U	0.000405	0.0136	0.100	MGL	5.0					

The following prep procedures were performed:

Mercury	ARD	07/28/99	1820	154526 4
TCLP Prep (Metals, Prep Only)	JL	07/23/99	1045	154088 4

M = Method	Method-Description
M 1	SW846 7470A
M 2	SW846 6010A
M 3	SW846 6010B
M 4	SW846 3010A

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Project Description: Hazardous Waste Contract

c: WSRC00497 Report Date: August 20, 1999

Sample ID : TCLP 8 (1X)

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Contact: Mr. Richard Groseclose
Project Description: Hazardous Waste Contract

cc: WSRC00497 Report Date: August 20, 1999

Sample ID	: TCLP 8 (2X)
Lab ID	: 9907679-31
Matrix	: TCLP
Date Collected	: 07/14/99
Date Received	: 07/15/99
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Metals Analysis											
Mercury	U	-0.000359	0.000350	0.0200	MGL	1.0	RMJ	07/29/99	1744	154526	1
Silver	U	-0.000518	0.00365	0.500	MGL	5.0	AME	07/29/99	2006	154346	2
Arsenic	U	-0.00734	0.0226	0.500	MGL	5.0					
Barium	J	0.00676	0.00255	10.0	MGL	5.0					
Cadmium	U	0.000746	0.00220	0.100	MGL	5.0					
Chromium	J	0.00453	0.00280	0.500	MGL	5.0					
Nickel		0.201	0.00645	0.0250	MGL	5.0	AME	07/29/99	2006	154346	3
Lead	J	0.00894	0.00795	0.500	MGL	5.0	AME	07/29/99	2006	154346	2
Selenium	U	0.00380	0.0136	0.100	MGL	5.0					

The following prep procedures were performed:

Mercury	ARD	07/28/99	1820	154526 4
TCLP Prep (Metals, Prep Only)	JL	07/24/99	1030	154089 4

M = Method	Method-Description
M 1	SW846 7470A
M 2	SW846 6010A
M 3	SW846 6010B
M 4	SW846 3010A

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Contact: Mr. Richard Groseclose
Project Description: Hazardous Waste Contract

: WSRC00497 Report Date: August 20, 1999

Sample ID : TCLP 8 (2X)

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Contact: Mr. Richard Groseclose
Project Description: Hazardous Waste Contract

cc: WSRC00497 Report Date: August 20, 1999

Sample ID	: TCLP 8 (3X)
Lab ID	: 9907679-32
Matrix	: TCLP
Date Collected	: 07/14/99
Date Received	: 07/15/99
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Metals Analysis											
Mercury	U	-0.000692	0.000350	0.0200	MGL	1.0	RMJ	07/29/99	1750	154526	1
Silver	U	-0.0000132	0.00365	0.500	MGL	5.0	AME	07/29/99	2012	154346	2
Arsenic	U	0.000156	0.0226	0.500	MGL	5.0					
Barium	J	0.0113	0.00255	10.0	MGL	5.0					
Cadmium	U	0.000194	0.00220	0.100	MGL	5.0					
Chromium	J	0.00458	0.00280	0.500	MGL	5.0					
Nickel		0.203	0.00645	0.0250	MGL	5.0	AME	07/29/99	2012	154346	3
Lead	U	0.00379	0.00795	0.500	MGL	5.0	AME	07/29/99	2012	154346	2
Selenium	U	0.00917	0.0136	0.100	MGL	5.0					

The following prep procedures were performed:

Mercury	ARD	07/28/99	1820	154526 4
TCLP Prep (Metals, Prep Only)	JL	07/25/99	1100	154090 4

M = Method	Method-Description
M 1	SW846 7470A
M 2	SW846 6010A
M 3	SW846 6010B
M 4	SW846 3010A

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Contact: Mr. Richard Groseclose
Project Description: Hazardous Waste Contract

: WSRC00497 Report Date: August 20, 1999

Sample ID : TCLP 8 (3X)

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Contact: Mr. Richard Groseclose
Project Description: Hazardous Waste Contract

cc: WSRC00497 Report Date: August 20, 1999

Sample ID	: TCLP 8 (4X)
Lab ID	: 9907679-33
Matrix	: TCLP
Date Collected	: 07/14/99
Date Received	: 07/15/99
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Metals Analysis											
Mercury	U	-0.000636	0.000350	0.0200	MGL	1.0	RMJ	07/29/99	1752	154526	1
Silver	U	-0.000135	0.00365	0.500	MGL	5.0	AME	07/29/99	2018	154346	2
Arsenic	U	-0.00414	0.0226	0.500	MGL	5.0					
Barium	J	0.00803	0.00255	10.0	MGL	5.0					
Cadmium	U	-0.000216	0.00220	0.100	MGL	5.0					
Chromium	J	0.00488	0.00280	0.500	MGL	5.0					
Nickel		0.206	0.00645	0.0250	MGL	5.0	AME	07/29/99	2018	154346	3
Lead	J	0.0122	0.00795	0.500	MGL	5.0	AME	07/29/99	2018	154346	2
Selenium	U	0.00414	0.0136	0.100	MGL	5.0					

The following prep procedures were performed:

Mercury	ARD	07/28/99	1820	154526	4
TCLP Prep (Metals, Prep Only)	JL	07/26/99	1100	154092	4

M = Method	Method-Description
M 1	SW846 7470A
M 2	SW846 6010A
M 3	SW846 6010B
M 4	SW846 3010A

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:: WSRC00497 Report Date: August 20, 1999

Sample ID : TCLP 8 (4X)

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Contact: Mr. Richard Groseclose
Project Description: Hazardous Waste Contract

cc: WSRC00497 Report Date: August 20, 1999

Sample ID	: TCLP 8 (5X)
Lab ID	: 9907679-34
Matrix	: TCLP
Date Collected	: 07/14/99
Date Received	: 07/15/99
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Metals Analysis											
Mercury	U	-0.0000854	0.000350	0.0200	MGL	1.0	RMJ	08/06/99	1221	155374	1
Silver	U	0.00229	0.00730	0.500	MGL	10.	MBL	08/06/99	1126	155258	2
Arsenic	U	0.0197	0.0451	0.500	MGL	10.					
Barium	J	0.00822	0.00510	10.0	MGL	10.					
Cadmium	U	0.000461	0.00440	0.100	MGL	10.					
Chromium	U	0.00503	0.00560	0.500	MGL	10.					
Nickel		0.177	0.0129	0.0500	MGL	10.	MBL	08/06/99	1126	155258	3
Lead	U	0.000916	0.0159	0.500	MGL	10.	MBL	08/06/99	1126	155258	2
Selenium	U	0.00258	0.0271	0.100	MGL	10.					

The following prep procedures were performed:

Mercury	ARD	08/05/99	1830	155374 4
TCLP Prep (Metals, Prep Only)	JL	07/27/99	1115	154094 4

M = Method	Method-Description
M 1	SW846 7470A
M 2	SW846 6010A
M 3	SW846 6010B
M 4	SW846 3010A

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: WSRC00497 Report Date: August 20, 1999

Sample ID : TCLP 8 (5X)

= Method	Method-Description

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Contact: Mr. Richard Groseclose
Project Description: Hazardous Waste Contract

cc: WSRC00497 Report Date: August 20, 1999

Sample ID	: TCLP 8 (6X)
Lab ID	: 9907679-35
Matrix	: TCLP
Date Collected	: 07/14/99
Date Received	: 07/15/99
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Metals Analysis											
Mercury	U	-0.000880	0.000350	0.0200	MGL	1.0	RMJ	08/02/99	1747	154871	1
Silver	U	0.00633	0.00730	0.500	MGL	10.	MBL	08/03/99	1820	154873	2
Arsenic	U	0.000396	0.0451	0.500	MGL	10.					
Barium	J	0.00540	0.00510	10.0	MGL	10.					
Cadmium	U	0.00359	0.00440	0.100	MGL	10.					
Chromium	J	0.00710	0.00560	0.500	MGL	10.					
Nickel		0.185	0.0129	0.0500	MGL	10.	MBL	08/03/99	1820	154873	3
Lead	U	0.0000504	0.0159	0.500	MGL	10.	MBL	08/03/99	1820	154873	2
Selenium	U	0.0169	0.0271	0.100	MGL	10.					

The following prep procedures were performed:

Mercury	ARD	07/30/99	1845	154871 4
TCLP Prep (Metals, Prep Only)	JL	07/28/99	1120	154096 4

M = Method	Method-Description
M 1	SW846 7470A
M 2	SW846 6010A
M 3	SW846 6010B
M 4	SW846 3010A

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Contact: Mr. Richard Groseclose
Project Description: Hazardous Waste Contract

:: WSRC00497 Report Date: August 20, 1999

Sample ID : TCLP 8 (6X)

= Method **Method-Description**

es:
qualifiers in this report are defined as follows:
indicates that the analyte was not detected at a concentration greater than the detection limit.
dicates presence of analyte at a concentration less than the reporting limit (RL) and greater than the detection limit (DL).
ıdicates that the analyte was not detected at a concentration greater than the detection limit.
ıdicates that a quality control analyte recovery is outside of specified acceptance criteria.

s data report has been prepared and reviewed
ıccordance with General Engineering Laboratories
ıdard operating procedures. Please direct
' questions to your Project Manager, Stacy Griffin at 769-7376.

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GENERAL ENGINEERING LABORATORIES

Meeting today's needs with a vision for tomorrow.

Client: Westinghouse Savannah River Co.
Building 735-16A, Rm. 5
P.O. Box 616
Aiken, South Carolina 29802
Contact: Mr. Richard Groseclose
Project Description: Hazardous Waste Contract

cc: WSRC00497

Report Date: August 20, 1999

Sample ID	: TCLP 8 (7X)
Lab ID	: 9907679-36
Matrix	: TCLP
Date Collected	: 07/14/99
Date Received	: 07/15/99
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Metals Analysis											
Mercury	U	-0.000942	0.000350	0.0200	MGL	1.0	RMJ	08/02/99	1749	154871	1
Silver	U	0.00638	0.00730	0.500	MGL	10.	MBL	08/03/99	1825	154873	2
Arsenic	U	0.00663	0.0451	0.500	MGL	10.					
Barium	J	0.00651	0.00510	10.0	MGL	10.					
Cadmium	U	0.00345	0.00440	0.100	MGL	10.					
Chromium	U	0.00400	0.00560	0.500	MGL	10.					
Nickel		0.204	0.0129	0.0500	MGL	10.	MBL	08/03/99	1825	154873	3
Lead	U	0.00438	0.0159	0.500	MGL	10.	MBL	08/03/99	1825	154873	2
Selenium	U	0.0124	0.0271	0.100	MGL	10.					

The following prep procedures were performed:

Mercury	ARD	07/30/99	1845	154871	4
TCLP Prep (Metals, Prep Only)	JL	07/29/99	1135	154097	4

M = Method	Method-Description
M 1	SW846 7470A
M 2	SW846 6010A
M 3	SW846 6010B
M 4	SW846 3010A

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Client: Westinghouse Savannah River Co.
Building 735-16A, Rm. 5
P.O. Box 616
Aiken, South Carolina 29802
Contact: Mr. Richard Groseclose
Project Description: Hazardous Waste Contract

c: WSRC00497 Report Date: August 20, 1999

Sample ID : TCLP 8 (7X)

= Method	Method-Description

es:
: qualifiers in this report are defined as follows:
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ndard operating procedures. Please direct
' questions to your Project Manager, Stacy Griffin at 769-7376.

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Building 735-16A, Rm. 5
P.O. Box 616
Aiken, South Carolina 29802
Contact: Mr. Richard Groseclose
Project Description: Hazardous Waste Contract

cc: WSRC00497 Report Date: August 20, 1999

Sample ID	: TCLP 8 (8X)
Lab ID	: 9907679-37
Matrix	: TCLP
Date Collected	: 07/14/99
Date Received	: 07/15/99
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Metals Analysis											
Mercury	U	-0.0000259	0.000350	0.0200	MGL	1.0	RMJ	08/03/99	1401	154974	1
Silver	U	0.00618	0.00730	0.500	MGL	10.	MBL	08/03/99	1203	154977	2
Arsenic	U	0.00819	0.0451	0.500	MGL	10.					
Barium	J	0.00662	0.00510	10.0	MGL	10.					
Cadmium	U	0.00115	0.00440	0.100	MGL	10.					
Chromium	U	0.00441	0.00560	0.500	MGL	10.					
Nickel		0.198	0.0129	0.0500	MGL	10.	MBL	08/03/99	1203	154977	3
Lead	U	0.00503	0.0159	0.500	MGL	10.	MBL	08/03/99	1203	154977	2
Selenium	U	0.0143	0.0271	0.100	MGL	10.					

The following prep procedures were performed:

Mercury	ARD	08/02/99	1715	154974	4
TCLP Prep (Metals, Prep Only)	JL	07/30/99	1130	154098	4

M = Method	Method-Description
M 1	SW846 7470A
M 2	SW846 6010A
M 3	SW846 6010B
M 4	SW846 3010A

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Client:	Westinghouse Savannah River Co.
	Building 735-16A, Rm. 5
	P.O. Box 616
	Aiken, South Carolina 29802
Contact:	Mr. Richard Groseclose
Project Description:	Hazardous Waste Contract

c: WSRC00497 Report Date: August 20, 1999

Sample ID : TCLP 8 (8X)

= Method	Method-Description

tes:
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accordance with General Engineering Laboratories
ndard operating procedures. Please direct
y questions to your Project Manager, Stacy Griffin at 769-7376.

Stacy L Griffin
viewed By

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Meeting today's needs with a vision for tomorrow.

Client: Westinghouse Savannah River Co.
Building 735-16A, Rm. 5
P.O. Box 616
Aiken, South Carolina 29802
Contact: Mr. Richard Groseclose
Project Description: Hazardous Waste Contract

cc: WSRC00497 Report Date: August 20, 1999

Sample ID	: TCLP 8 (9X)
Lab ID	: 9907679-38
Matrix	: TCLP
Date Collected	: 07/14/99
Date Received	: 07/15/99
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Metals Analysis											
Mercury	U	-0.0000900	0.000350	0.0200	MGL	1.0	RMJ	08/03/99	1403	154974	1
Silver	U	-0.000260	0.00730	0.500	MGL	10.	MBL	08/03/99	1209	154977	2
Arsenic	U	-0.00374	0.0451	0.500	MGL	10.					
Barium	U	0.00457	0.00510	10.0	MGL	10.					
Cadmium	U	0.00151	0.00440	0.100	MGL	10.					
Chromium	U	-0.00121	0.00560	0.500	MGL	10.					
Nickel		0.195	0.0129	0.0500	MGL	10.	MBL	08/03/99	1209	154977	3
Lead	U	0.00468	0.0159	0.500	MGL	10.	MBL	08/03/99	1209	154977	2
Selenium	U	0.0188	0.0271	0.100	MGL	10.					

The following prep procedures were performed:

Mercury	ARD	08/02/99	1715	154974	4
TCLP Prep (Metals, Prep Only)	JL	07/31/99	1135	154099	4

M = Method	Method-Description
M 1	SW846 7470A
M 2	SW846 6010A
M 3	SW846 6010B
M 4	SW846 3010A

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	P.O. Box 616
	Aiken, South Carolina 29802
Contact:	Mr. Richard Groseclose
Project Description:	Hazardous Waste Contract

c: WSRC00497 Report Date: August 20, 1999

Sample ID : TCLP 8 (9X)

= Method	Method-Description

es:
qualifiers in this report are defined as follows:
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	Aiken, South Carolina 29802
Contact:	Mr. Richard Groseclose
Project Description:	Hazardous Waste Contract

cc: WSRC00497 Report Date: August 20, 1999 Page 1 of 1

Sample ID	: TCLP 15
Lab ID	: 9907679-53
Matrix	: TCLP
Date Collected	: 07/14/99
Date Received	: 07/15/99
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M

Notes:
The qualifiers in this report are defined as follows:
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Contact: Mr. Richard Groseclose
Project Description: Hazardous Waste Contract

c: WSRC00497 Report Date: August 20, 1999

Sample ID	: TCLP 15 (1X)
Lab ID	: 9907679-54
Matrix	: TCLP
Date Collected	: 07/14/99
Date Received	: 07/15/99
Priority	: Routine
Collector	: Client

rameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
tals Analysis											
ercury	U	-0.000705	0.000350	0.0200	MGL	1.0	RMJ	07/29/99	1754	154526	1
ver	U	-0.000345	0.00365	0.500	MGL	5.0	AME	07/29/99	2023	154346	2
senic	U	-0.00898	0.0226	0.500	MGL	5.0					
rium	J	0.00799	0.00255	10.0	MGL	5.0					
dmium	U	-0.000752	0.00220	0.100	MGL	5.0					
romium	J	0.0109	0.00280	0.500	MGL	5.0					
ckel		0.331	0.00645	0.0250	MGL	5.0	AME	07/29/99	2023	154346	3
ad	U	0.00645	0.00795	0.500	MGL	5.0	AME	07/29/99	2023	154346	2
lenium	U	0.00785	0.0136	0.100	MGL	5.0					

following prep procedures were performed:

ercury	ARD	07/28/99	1820	154526 4
LP Prep (Metals, Prep Only)	JL	07/23/99	1045	154088 4

= Method	Method-Description
1	SW846 7470A
2	SW846 6010A
3	SW846 6010B
4	SW846 3010A

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	Building 735-16A, Rm. 5
	P.O. Box 616
	Aiken, South Carolina 29802
Contact:	Mr. Richard Groseclose
Project Description:	Hazardous Waste Contract

cc: WSRC00497 Report Date: August 20, 1999

Sample ID : TCLP 15 (1X)

M = Method	Method-Description

Notes:
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P.O. Box 616
Aiken, South Carolina 29802
Contact: Mr. Richard Groseclose
Project Description: Hazardous Waste Contract

c: WSRC00497 Report Date: August 20, 1999

Sample ID	: TCLP 15 (2X)
Lab ID	: 9907679-55
Matrix	: TCLP
Date Collected	: 07/14/99
Date Received	: 07/15/99
Priority	: Routine
Collector	: Client

rameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
tals Analysis											
ercury	U	-0.000659	0.000350	0.0200	MGL	1.0	RMJ	07/29/99	1755	154526	1
lver	U	0.000170	0.00365	0.500	MGL	5.0	AME	07/29/99	2101	154346	2
rsenic	U	-0.00158	0.0226	0.500	MGL	5.0					
rium	J	0.00523	0.00255	10.0	MGL	5.0					
dmium	U	0.000914	0.00220	0.100	MGL	5.0					
romium	J	0.0123	0.00280	0.500	MGL	5.0					
ickel		0.342	0.00645	0.0250	MGL	5.0	AME	07/29/99	2101	154346	3
ad	U	0.00442	0.00795	0.500	MGL	5.0	AME	07/29/99	2101	154346	2
lenium	U	0.00213	0.0136	0.100	MGL	5.0					

e following prep procedures were performed:

ercury	ARD	07/28/99	1820	154526	4
CLP Prep (Metals, Prep Only)	JL	07/24/99	1030	154089	4

= Method	Method-Description
1	SW846 7470A
2	SW846 6010A
3	SW846 6010B
4	SW846 3010A

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	Building 735-16A, Rm. 5
	P.O. Box 616
	Aiken, South Carolina 29802
Contact:	Mr. Richard Groseclose
Project Description:	Hazardous Waste Contract

cc: WSRC00497 Report Date: August 20, 1999

Sample ID : TCLP 15 (2X)

M = Method	Method-Description

Notes:
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Client: Westinghouse Savannah River Co.
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P.O. Box 616
Aiken, South Carolina 29802
Contact: Mr. Richard Groseclose
Project Description: Hazardous Waste Contract

:: WSRC00497 Report Date: August 20, 1999

Sample ID	: TCLP 15 (3X)
Lab ID	: 9907679-56
Matrix	: TCLP
Date Collected	: 07/14/99
Date Received	: 07/15/99
Priority	: Routine
Collector	: Client

rameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
:als Analysis											
:rcury	U	-0.000523	0.000350	0.0200	MGL	1.0	RMJ	07/29/99	1757	154526	1
ver	U	-0.000451	0.00365	0.500	MGL	5.0	AME	07/29/99	2050	154346	2
senic	U	-0.0121	0.0226	0.500	MGL	5.0					
rium	J	0.00856	0.00255	10.0	MGL	5.0					
dmium	U	0.000814	0.00220	0.100	MGL	5.0					
romium	J	0.00976	0.00280	0.500	MGL	5.0					
ckel		0.294	0.00645	0.0250	MGL	5.0	AME	07/29/99	2050	154346	3
ad	U	0.00586	0.00795	0.500	MGL	5.0	AME	07/29/99	2050	154346	2
lenium	U	0.00120	0.0136	0.100	MGL	5.0					

following prep procedures were performed:

:rcury	ARD	07/28/99	1820	154526 4
:LP Prep (Metals, Prep Only)	JL	07/25/99	1100	154090 4

= Method	Method-Description
1	SW846 7470A
2	SW846 6010A
3	SW846 6010B
4	SW846 3010A

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	Aiken, South Carolina 29802
Contact:	Mr. Richard Groseclose
Project Description:	Hazardous Waste Contract

cc: WSRC00497 Report Date: August 20, 1999

Sample ID : TCLP 15 (3X)

M = Method	Method-Description

Notes:
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Contact: Mr. Richard Groseclose
Project Description: Hazardous Waste Contract

:: WSRC00497 Report Date: August 20, 1999

Sample ID	: TCLP 15 (4X)
Lab ID	: 9907679-57
Matrix	: TCLP
Date Collected	: 07/14/99
Date Received	: 07/15/99
Priority	: Routine
Collector	: Client

rameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
tals Analysis											
ercury	U	-0.000601	0.000350	0.0200	MGL	1.0	RMJ	07/29/99	1802	154526	1
ver	U	-0.000744	0.00365	0.500	MGL	5.0	AME	07/29/99	2055	154346	2
senic	U	0.00133	0.0226	0.500	MGL	5.0					
rium	J	0.00398	0.00255	10.0	MGL	5.0					
dmium	U	0.0000306	0.00220	0.100	MGL	5.0					
romium	J	0.00984	0.00280	0.500	MGL	5.0					
ckel		0.321	0.00645	0.0250	MGL	5.0	AME	07/29/99	2055	154346	3
ad	U	0.00351	0.00795	0.500	MGL	5.0	AME	07/29/99	2055	154346	2
lenium	U	0.00238	0.0136	0.100	MGL	5.0					

e following prep procedures were performed:

ercury	ARD	07/28/99	1820	154526 4
CLP Prep (Metals, Prep Only)	JL	07/26/99	1100	154092 4

= Method	Method-Description
1	SW846 7470A
2	SW846 6010A
3	SW846 6010B
4	SW846 3010A

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Contact:	Mr. Richard Groseclose
Project Description:	Hazardous Waste Contract

cc: WSRC00497 Report Date: August 20, 1999

Sample ID : TCLP 15 (4X)

M = Method	Method-Description

Notes:
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GENERAL ENGINEERING LABORATORIES

Meeting today's needs with a vision for tomorrow.

Client: Westinghouse Savannah River Co.
Building 735-16A, Rm. 5
P.O. Box 616
Aiken, South Carolina 29802
Contact: Mr. Richard Groseclose
Project Description: Hazardous Waste Contract

:: WSRC00497 Report Date: August 20, 1999

Sample ID	: TCLP 15 (5X)
Lab ID	: 9907679-58
Matrix	: TCLP
Date Collected	: 07/14/99
Date Received	: 07/15/99
Priority	: Routine
Collector	: Client

rameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
:als Analysis											
:rcury	U	-0.0000635	0.000350	0.0200	MGL	1.0	RMJ	08/06/99	1223	155374	1
ver	U	-0.000143	0.00730	0.500	MGL	10.	MBL	08/06/99	1131	155258	2
senic	U	0.0220	0.0451	0.500	MGL	10.					
rium	U	0.00492	0.00510	10.0	MGL	10.					
dmium	U	-0.00155	0.00440	0.100	MGL	10.					
romium	J	0.00747	0.00560	0.500	MGL	10.					
ckel		0.299	0.0129	0.0500	MGL	10.	MBL	08/06/99	1131	155258	3
ad	U	0.00882	0.0159	0.500	MGL	10.	MBL	08/06/99	1131	155258	2
lenium	U	-0.00742	0.0271	0.100	MGL	10.					

: following prep procedures were performed:

:rcury	ARD	08/05/99	1830	155374 4
:LP Prep (Metals, Prep Only)	JL	07/27/99	1115	154094 4

= Method	Method-Description
1	SW846 7470A
2	SW846 6010A
3	SW846 6010B
4	SW846 3010A

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Client:	Westinghouse Savannah River Co.
	Building 735-16A, Rm. 5
	P.O. Box 616
	Aiken, South Carolina 29802
Contact:	Mr. Richard Groseclose
Project Description:	Hazardous Waste Contract

cc: WSRC00497 Report Date: August 20, 1999

Sample ID : TCLP 15 (5X)

M = Method	Method-Description

Notes:
The qualifiers in this report are defined as follows:
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J indicates presence of analyte at a concentration less than the reporting limit (RL) and greater than the detection limit (DL).
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Aiken, South Carolina 29802
Contact: Mr. Richard Groseclose
Project Description: Hazardous Waste Contract

c: WSRC00497 Report Date: August 20, 1999

Sample ID	: TCLP 15 (6X)
Lab ID	: 9907679-59
Matrix	: TCLP
Date Collected	: 07/14/99
Date Received	: 07/15/99
Priority	: Routine
Collector	: Client

ırameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
tals Analysis											
ercury	U	-0.00100	0.000350	0.0200	MGL	1.0	RMJ	08/02/99	1750	154871	1
lver	U	0.00528	0.00730	0.500	MGL	10.	MBL	08/03/99	1830	154873	2
'senic	U	0.0138	0.0451	0.500	MGL	10.					
ırium	U	0.00389	0.00510	10.0	MGL	10.					
ıdmium	U	0.00342	0.00440	0.100	MGL	10.					
ıromium	J	0.00616	0.00560	0.500	MGL	10.					
ckel		0.308	0.0129	0.0500	MGL	10.	MBL	08/03/99	1830	154873	3
ad	U	0.00169	0.0159	0.500	MGL	10.	MBL	08/03/99	1830	154873	2
lenium	U	0.0208	0.0271	0.100	MGL	10.					

e following prep procedures were performed:

ercury	ARD	07/30/99	1845	154871 4
CLP Prep (Metals, Prep Only)	JL	07/28/99	1120	154096 4

= Method	Method-Description
1	SW846 7470A
2	SW846 6010A
3	SW846 6010B
4	SW846 3010A

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	Aiken, South Carolina 29802
Contact:	Mr. Richard Groseclose
Project Description:	Hazardous Waste Contract

cc: WSRC00497 Report Date: August 20, 1999

Sample ID : TCLP 15 (6X)

M = Method	Method-Description

Notes:
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Contact: Mr. Richard Groseclose
Project Description: Hazardous Waste Contract

: WSRC00497 Report Date: August 20, 1999

Sample ID	: TCLP 15 (7X)
Lab ID	: 9907679-60
Matrix	: TCLP
Date Collected	: 07/14/99
Date Received	: 07/15/99
Priority	: Routine
Collector	: Client

rameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
tals Analysis											
ercury	U	-0.000997	0.000350	0.0200	MGL	1.0	RMJ	08/02/99	1752	154871	1
ver	U	-0.00166	0.00730	0.500	MGL	10.	MBL	08/03/99	1847	154873	2
senic	U	-0.00445	0.0451	0.500	MGL	10.					
rium	J	0.00698	0.00510	10.0	MGL	10.					
dmium	U	0.00362	0.00440	0.100	MGL	10.					
romium	U	0.00466	0.00560	0.500	MGL	10.					
ckel		0.309	0.0129	0.0500	MGL	10.	MBL	08/03/99	1847	154873	3
ad	U	0.00982	0.0159	0.500	MGL	10.	MBL	08/03/99	1847	154873	2
lenium	U	0.0203	0.0271	0.100	MGL	10.					

e following prep procedures were performed:

ercury	ARD	07/30/99	1845	154871 4
CLP Prep (Metals, Prep Only)	JL	07/29/99	1135	154097 4

= Method	Method-Description
1	SW846 7470A
2	SW846 6010A
3	SW846 6010B
4	SW846 3010A

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Contact:	Mr. Richard Groseclose
Project Description:	Hazardous Waste Contract

cc: WSRC00497 Report Date: August 20, 1999

Sample ID : TCLP 15 (7X)

M = Method	Method-Description

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Contact: Mr. Richard Groseclose
Project Description: Hazardous Waste Contract

: WSRC00497 Report Date: August 20, 1999

Sample ID	: TCLP 15 (8X)
Lab ID	: 9907679-61
Matrix	: TCLP
Date Collected	: 07/14/99
Date Received	: 07/15/99
Priority	: Routine
Collector	: Client

rameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
als Analysis											
rcury	U	-0.0000726	0.000350	0.0200	MGL	1.0	RMJ	08/03/99	1405	154974	1
ver	U	-0.00239	0.00730	0.500	MGL	10.	MBL	08/03/99	1214	154977	2
senic	U	-0.0123	0.0451	0.500	MGL	10.					
rium	J	0.00768	0.00510	10.0	MGL	10.					
dmium	U	0.00194	0.00440	0.100	MGL	10.					
romium	U	0.00342	0.00560	0.500	MGL	10.					
ckel		0.331	0.0129	0.0500	MGL	10.	MBL	08/03/99	1214	154977	3
ad	U	-0.00308	0.0159	0.500	MGL	10.	MBL	08/03/99	1214	154977	2
lenium	U	0.0116	0.0271	0.100	MGL	10.					

following prep procedures were performed:

rcury	ARD	08/02/99	1715	154974	4
LP Prep (Metals, Prep Only)	JL	07/30/99	1130	154098	4

= Method	Method-Description
1	SW846 7470A
2	SW846 6010A
3	SW846 6010B
4	SW846 3010A

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Contact:	Mr. Richard Groseclose
Project Description:	Hazardous Waste Contract

cc: WSRC00497 Report Date: August 20, 1999

Sample ID : TCLP 15 (8X)

M = Method	Method-Description

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Contact: Mr. Richard Groseclose
Project Description: Hazardous Waste Contract

: WSRC00497 Report Date: August 20, 1999

Sample ID	: TCLP 15 (9X)
Lab ID	: 9907679-62
Matrix	: TCLP
Date Collected	: 07/14/99
Date Received	: 07/15/99
Priority	: Routine
Collector	: Client

rameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
als Analysis											
rcury	U	-0.0000936	0.000350	0.0200	MGL	1.0	RMJ	08/03/99	1407	154974	1
ver	U	0.00384	0.00730	0.500	MGL	10.	MBL	08/03/99	1220	154977	2
senic	U	0.0193	0.0451	0.500	MGL	10.					
rium	U	0.00460	0.00510	10.0	MGL	10.					
dmium	U	0.00111	0.00440	0.100	MGL	10.					
romium	U	0.00369	0.00560	0.500	MGL	10.					
kel		0.333	0.0129	0.0500	MGL	10.	MBL	08/03/99	1220	154977	3
ad	U	0.00877	0.0159	0.500	MGL	10.	MBL	08/03/99	1220	154977	2
enium	U	0.0114	0.0271	0.100	MGL	10.					

following prep procedures were performed:

rcury	ARD	08/02/99	1715	154974 4
LP Prep (Metals, Prep Only)	JL	07/31/99	1135	154099 4

= Method	Method-Description
1	SW846 7470A
2	SW846 6010A
3	SW846 6010B
4	SW846 3010A

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Aiken, South Carolina 29802

Contact: Mr. Richard Groseclose

Project Description: Hazardous Waste Contract

cc: WSRC00497

Report Date: August 20, 1999

Sample ID : TCLP 15 (9X)

M = Method **Method-Description**

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