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RCRA FACILITY INVESTIGATION / REMEDIAL INVESTIGATION REPORT WITH THE BASELINE RISK ASSESSMENT FOR THE 716-A MOTOR SHOPS SEEPAGE BASIN (U)

Westinghouse Savannah River Company
Savannah River Site
Aiken, South Carolina 29808

PREPARED FOR THE U. S. DEPARTMENT OF ENERGY
UNDER CONTRACT NO. DE-AC09-96SR18500

SAFETY • RESPONSIBILITY • SECURITY
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RCRA FACILITY INVESTIGATION / REMEDIAL INVESTIGATION REPORT WITH THE BASELINE RISK ASSESSMENT FOR THE 716-A MOTOR SHOPS SEEPAGE BASIN (U)

Prepared By

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This document was prepared in conjunction with work accomplished under Contract No. DE-AC09-96SR18500 with the U.S. Department of Energy.

DISCLAIMER

CERTIFICATION

RCRA Facility Investigation/Remedial Investigation (RFI/RI)
Report and Baseline Risk Assessment for the
716-A Motor Shops Seepage Basin (U)
WSRC-RP-97-134, REV.1
AUGUST, 1997

"I certify under the penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fines and imprisonment for knowing violations."

Date: 25AUG 97 Signature:

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Savannah River Operations

Date: August 25, 1997 Signature:

C. V. Anderson,
Director
Environmental Restoration Division
U.S. Department of Energy
Savannah River Field Office
Owner and Co-operator

ERRATA

The attached pages are provided in response to South Carolina Department of Health and Environmental Control (SCDHEC) and United States Environmental Protection Agency (EPA) comments on the RFI/RI/BRA for the 716-A Motor Shops Seepage Basin (U), WSRC-RP-97- 134, Revision 0, April 1997. These pages should be inserted into the RFI/RI/BRA for the 716-A Motor Shops Seepage Basin (U), WSRC-RP-97- 134, Revision 1, in the following manner:

Replace Revision 0 cover and spine with the Revision 1 cover and spine.

Insert certification page.

Errata sheet to be inserted after the "Disclaimer" page.

Table of Contents Changes

Replace Table of Contents pages i-iv and ix-x with the revised pages i-iv and ix-x, which depict the revised pages for the text and new tables 4-6 and 5-6.

Text Changes

Replace pages ES-5 and ES-6 with the revised pages ES-5 and ES-6.

Replace pages 4-1 through 4-12 with revised pages 4-1 through 4-12.

Replace pages 4-23 and 4-24 with revised pages 4-23 and 4-24.

Add new page 4-25 containing new Table 4-6.

Replace pages 5-1 through 5-14 with revised pages 5-1 through 5-14.

Replace page 5-19 with pages 5-19 and new page 5-20. Page 5-20 contains the new Table 5-6.

Replace pages 6.1-1 through 6.1-10 with the revised pages 6.1-1 through 6.1-10.

Replace pages 6.2-9 through 6.2-12 with the revised pages 6.2-9 through 6.2-12.

Replace pages 8-3, 8-4, 8-21, 8-22, and 8-23 with the revised pages 8-3, 8-4, 8-21, 8-22, and 8-23.

Appendix Changes

Replace Appendix C. 1 pages 1-5 with revised Appendix C. 1 pages 1-4.

Replace Appendix C.4 "List of Tables" page with revised Appendix C.4 "List of Tables" page.

Replace the last two pages of Appendix C.4 with the two revised pages, which include new Table C. 17B.

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LIST OF ACRONYMS AND ABBREVIATIONS

1,1,1-TCA	1,1,1-trichloroethane
95 UCL	95 Percent Upper Confidence Limit
ARAR	Applicable or Relevant and Appropriate Requirement
BAF	Bioaccumulation Factor
BCF	Bioconcentration Factor
bls	below land surface
BRA	Baseline Risk Assessment
BTEX	Benzene, Toluene, Ethylbenzene, and Xylenes
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
cm	centimeter
CMCOPC	Contaminant Migration Constituent of Potential Concern
COC	Constituent of Concern
COPC	Constituent of Potential Concern
CSF	Cancer Slope Factor
CSM	Conceptual Site Model
CTE	Central Tendency Exposure
DNAPL	Dense Nonaqueous Phase Liquid
DOE	United States Department of Energy
DQO	Data Quality Objective
DV	Dietary Value
ELCR	Excess Lifetime Cancer Risk
EN	Essential Nutrient
EPA	United States Environmental Protection Agency
ESV	Ecological Screening Value
FFA	Federal Facility Agreement
FS	Feasibility Study
ft	foot
gal	gallon
GSSL	Generic Soil Screening Level
HEAST	Health Effects Assessment Summary Tables
HI	Hazard Index
HIF	Human Intake Factor
HQ	Hazard Quotient

LIST OF ACRONYMS AND ABBREVIATIONS (continued)

HSWA	Hazardous and Solid Waste Amendments
in	inch
IRIS	Integrated Risk Information System
kg	kilogram
km	kilometer
l	liter
lb	pound
LGL	Lead Guidance Level
LOAEL	Lowest Observed Adverse Effects Level
m	meter
MCL	Maximum Contaminant Level
MDL	Method Detection Limit
mg	milligram
mi	mile
MLSSL	Mass Limit Soil Screening Level
msl	mean sea level
MSSB	7 16-A Motor Shops Seepage Basin
ND	Not Detected
NEPA	National Environmental Policy Act
NOAEL	No Observed Adverse Effects Level
NPDES	National Pollutant Discharge Elimination System
NPL	National Priorities List
OSWER	Office of Solid Waste and Emergency Response
PAH	Polynuclear Aromatic Hydrocarbon
PCB	Polychlorinated Biphenyl
PCE	Tetrachloroethylene
PDWS	Primary Drinking Water Standard
ppb	parts per billion
ppm	parts per million
PRG	Preliminary Remediation Goal
QA	Quality Assurance
QC	Quality Control
QCSR	Quality Control Summary Report
RAGS	Risk Assessment Guidance for Superfund

LIST OF ACRONYMS AND ABBREVIATIONS (continued)

RBA	Risk-Based Activity
RBC	Risk-Based Concentration
RCRA	Resource Conservation and Recovery Act
RDA	Recommended Daily Allowance
RfC	Reference Concentration
RfD	Reference Dose
RFI	RCRA Facility Investigation
RGO	Remedial Goal Option
RI	Remedial Investigation
RME	Reasonable Maximum Exposure
s	second
SAD1	Safe and Adequate Daily Intake
SCDHEC	South Carolina Department of Health and Environmental Control
SRFS	Savannah River Forest Station
SRS	Savannah River Site
SSL	Soil Screening Level
SVOA	Semivolatile Organic Analysis
svoc	Semivolatile Organic Compound
SWMU	Solid Waste Management Unit
TAL	Target Analyte List
TCE	Trichloroethylene
TCL	Target Compound List
TEF	Toxicity Equivalent Factor
TES	Threatened or Endangered Species
TIC	Tentatively Identified Compounds
TOC	Total Organic Carbon
TPH	Total Petroleum Hydrocarbons
TRV	Toxicity Reference Value
UF	Uncertainty Factor
UFF	Unit Foraging Factor
USC	Unit-Specific Constituent
VOA	Volatile Organic Analysis
voc	Volatile Organic Compound
WSRC	Westinghouse Savannah River Company

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METRIC TO ENGLISH UNIT CONVERSIONS

1 cm	=	0.39 in
lm	=	3.28 ft
1 km	=	0.621 mi
1 cm/s	=	2834 ft/day
1 ft/mi	=	0.189 m/km
11	=	0.26 gal
1 kg	=	2.2 lb

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EXECUTIVE SUMMARY

This document describes the RCRA Facility Investigation/Remedial Investigation/ Baseline Risk Assessment (RFI/RI/BRA) of the 716-A Motor Shops Seepage Basin (MSSB). It is comprised of eight sections in accordance with United States Environmental Protection Agency (EPA) guidance. Section 1 presents a history of the unit and the purpose and objectives of the characterization activities. Section 2 discusses the objectives of each sampling activity with respect to the conceptual site model (CSM) and presents the details associated with the field activities. Section 3 describes the unit's physical characteristics, including surface features, geology, hydrogeology, soil types, demography, and land use. Section 4 presents an evaluation of the nature and extent of contamination at the MSSB. Section 5 consists of an evaluation of the fate and transport mechanisms applicable to contaminants detected. Section 6 provides the human health and ecological BRA. Section 7 provides an evaluation of remedial goal options (RGOs) based on applicable or relevant and appropriate requirements (ARARs) and the results of the BRA and fate and transport (or contaminant migration). Section 8 presents a summary and conclusion of the results from the RFI/RI Unit Assessment and the BRA and recommendations for future action.

This RFI/RI was carried out in accordance with the Federal Facility Agreement (FFA) between the United States Department of Energy (DOE), the EPA, and the South Carolina Department of Health and Environmental Control (SCDHEC). The FFA coordinates clean-up activities at the SRS with one comprehensive strategy that fulfills the assessment, investigation, and response action requirements of the Resource Conservation and Recovery Act (RCRA), Section 3004(a), and the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA).

ES.1 Introduction

The Savannah River Site (SRS) is located in west-central South Carolina and occupies an area of approximately 777 square kilometers (300 square miles). The MSSB is located in the northwest quadrant of the SRS, approximately 2200 m (7200 ft) southeast of the nearest site boundary and 185 m (600 ft) southwest of the A-Area Coal Pile Runoff Containment Basin. The approximate SRS coordinates for the MSSB are N102,000, E50,600.

The MSSB was constructed in 1977 to receive liquid waste from the 714-A Motor Shops oil/water separator. While in use, the basin received effluent discharges from the Motor Shops that consisted of wastewater with trace amounts of engine oil, grease, kerosene, ethylene glycol, and detergent. The basin has not been closed or capped, but in 1983 all discharges to the basin were terminated and the influent lines from the Motor Shops were capped. At present, the basin collects rainwater during periods of heavy precipitation.

Previous investigations were conducted at the MSSB prior to 1996. These investigations included:

- Soil sampling and analysis
- Soil gas sampling and analysis
- Groundwater sampling and analysis

ES.2 Conceptual Site Model and Study Area Investigation

The CSM identifies the primary source of contamination: wastewater that was discharged into the MSSB via its associated process sewer lines. The CSM also identifies the primary and secondary release mechanisms for contamination from this source. The primary release mechanism for contamination associated with the MSSB is the deposition of wastewater onto surface soils in the basin and the infiltration and percolation of that water through basin surface soils. The secondary release mechanisms for contaminants in surface soil at the MSSB and process sewer lines are volatilization, fugitive dust generation, and biotic uptake; the secondary release mechanism for contaminants in subsurface soils at the unit is leaching or excavation/bioturbation.

Additionally, the CSM identifies the media impacted by contamination released from the unit. Surface soil and subsurface soil are the primary media impacted by contamination from the MSSB, while subsurface soil is the primary medium impacted by contamination from the process sewer lines. These media are also secondary sources of contamination and may undergo additional chemical constituent exchange by infiltration/percolation or excavation/bioturbation. The secondary media impacted by contamination via volatilization, fugitive dust generation, and biotic uptake include air (vapor and dust) and biota, while the secondary medium impacted by leaching is groundwater.

The CSM guided the RFI/RI at the MSSB. Phase I Unit Assessment activities included sampling and analyzing surface and subsurface soils to establish background conditions, and sampling surface and subsurface soils within the MSSB to identify the unit-specific constituents (USCs) for nature and extent (Section 4) and constituents of potential concern (COPCs) for the BRA (Section 6).

ES.3 Physical Characteristics of the Study Area

The MSSB is located in the northwest quadrant of the SRS at an elevation of approximately 107 m (350 ft) above mean sea level (msl). The surrounding area varies between 104-l 07 m (340-350 ft) above msl and slopes gently to the southeast. The basin is surrounded on all sides by a berm 2 m (6.6 ft) high, which is grown over with grass, weeds, and small trees. The basin is approximately 63.1 m (207 ft) long, 10.7 m (35 ft) wide, and 2 m (6.6 ft) deep.

The regional climate at the SRS is characterized by warm, humid summers and mild winters. The average annual temperature is 17.2°C (63°F). The average annual precipitation is approximately 112 cm (44 inches), predominantly in the form of rainfall with an occasional snowfall.

The MSSB is located in the Upper Three Runs watershed. The ground surface in the vicinity of the unit slopes gently to the southeast in the direction of Tims Branch. Tims Branch, the closest natural surface water drainage, is located approximately 1220 m (4000 ft) from the unit. There is no surface water connection between the MSSB and Tims Branch or any drainage feature in the area. Groundwater does not outcrop in the vicinity of the MSSB.

Soil types within and adjacent to the MSSB are classified as Blanton Sand, Udorthent-Urban Land Complex, and Udorthent soils of the Hawthorne/Barnwell Formations. Udorthent soils are soils that have been disturbed through construction work and/or pit filling operations. They show a wide composition variability consisting of gravels, sands, and clays, and typically have low available water capacity, low organic matter content, strong acidity, and moderately slow to rapid permeability.

Based on soil borings at and in the vicinity of the MSSB, the unit is underlain by Tertiary (Eocene) Age deposits of the Dry Branch and Santee formations which, at depth, comprise the M-Area aquifer zone (water table aquifer) of the Steed Pond Aquifer. In the

vicinity of the MSSB, the Dry Branch/Santee formations exhibit a wide variation of lithologic composition, both vertically and laterally, including sand, silty sand to sandy silt, clayey sand to sandy clay, and clay.

ES.4 Nature and Extent of Contamination

For the analysis of the nature and extent of contamination, sample results are presented per the CSM (source and pathways), as well as by depth intervals comparable to those used in the BRA. No Phase I soil samples from the MSSB are interpreted as representing the primary contaminant source (wastewater formerly discharged into the MSSB). All MSSB Phase I soil samples are used to characterize secondary sources of contamination (surface and subsurface soils). Depth intervals for presenting soil sample results are O-O.3 m (O-l ft) and O-l .2 m (O-4 ft) below land surface (bls). The O-l .2 m (O-4 ft) depth interval includes both the O-O.3 m (O-1 ft) and 0.3-l .2 m (l-4 ft) sample intervals.

Analytical results for MSSB Phase I soil samples are first screened against EPA risk-based concentrations (RBCs) or risk-based activities (RBAs) and then against unit-specific background levels. Constituents with detections exceeding both screening criteria are identified as USCs. The only USC identified for the MSSB is benzo(a)pyrene, which was detected in one of 12 soil samples at a concentration exceeding both its RBC and twice average background level.

PAHs can be derived from oil, coal, charcoal, or other similar substances and may be of anthropogenic or natural origin. They are not very mobile and tend to readily adsorb to soils. Based on the disposal history of the MSSB, this occurrence of benzo(a)pyrene may be unit related. However, the compound's limited frequency of detection in MSSB soils, together with the unit's proximity to a railroad known to carry coal, suggests another possible source for this contamination.

The CSM identifies soil, groundwater, air, and biota as possible exposure pathways for contamination from the MSSB. As previously stated, groundwater was not sampled during the Phase I investigation. Groundwater sampling was to be performed during Phase II; however, since only one USC was detected in Phase I unit soil samples, the Phase II investigation was deemed unwarranted. This is in accordance with the decision rules presented in the work plan for the MSSB (WSRC 1996c). Area groundwater is under evaluation as part of the overall groundwater remediation approach as presented in the

RCRA permit application - Corrective Action Plan for the A-014 outfall area (Volume III, M-Area H WMF, WSRC-IM-91-53). Biota and air also were not sampled during the Phase I investigation. Potential contaminant concentrations in biota and air are derived during the BRA based on constituent levels measured in surface and subsurface soils.

The soils along the process sewer line were also to be characterized during the Phase II investigation if warranted by Phase I results. The Phase I soil results represent the worst case scenario for the MSSB. Based on the low levels of contamination detected and the identification of only one USC, soil sampling along the process sewer line was also deemed unwarranted.

ES.5 Contaminant Fate and Transport

Contaminant fate and transport analyses are performed for the MSSB to predict the rate of contaminant migration and the concentration of contaminants at receptor locations in various media.

The fate and transport of inorganic compounds and organic compounds is a function of site characteristics and the physical and chemical interactions between the contaminants and the media. The physical and chemical properties of the contaminants that influence these interactions include, but are not limited to, their volatility, solubility in water, tendency to transform or degrade, and chemical affinity for solids or organic matter. The most important transport processes for inorganic compounds are adsorption to soil, transport with soil water, and uptake by biota, while those for organic compounds are volatilization, adsorption to soil, and transport with soil water.

The CSM illustrates the potential contaminant migration pathways and contaminant release mechanisms in various media for the MSSB. They include infiltration and percolation, leaching and transport through the subsurface flow system, and biotic uptake.

For the purpose of soil leachability analysis, contaminant migration constituents of potential concern (CMCOPCs) are defined as constituents detected in unit soils with a maximum concentration greater than twice their average background level. Two inorganic CMCOPCs (antimony and cadmium) and three organic CMCOPCs (benzo(a)anthracene, benzo(g,h,i)perylene, and phenanthrene) are retained for soil leachability equations.

Soil leachability calculations are performed using detailed, unit-specific equations in accordance with EPA soil screening guidance. The equations estimate the concentrations of the CMCOPCs at the base of the vadose zone. Groundwater concentrations are then calculated from these values by applying a groundwater dilution factor. The nature of the input data and the analytical equation assumptions are such that the estimates of groundwater concentrations are conservative.

Based on the results of the equations, none of the organic CMCOPCs are predicted to leach into groundwater and none of the inorganic CMCOPCs are estimated to reach maximum concentration within 1000 years. Therefore, none of the CMCOPCs calculated for the MSSB are likely to pose a future human health risk due to ingestion of groundwater.

ES.6 Baseline Risk Assessment

A BRA is conducted to assess the potential for adverse effects associated with exposure to contaminants likely to be present at the MSSB. Baseline risks are those risks that are present in the absence of any institutional controls or remedial actions for the unit. The BRA can be used to assist in determinin g the need for remedial action.

ES.6.1 Summary of Human Health Risk Assessment

ES.6.1.1 Current Land Use Results

Under the current land use scenario, carcinogenic risks and noncarcinogenic hazards are characterized for exposure of an on-unit worker to soil. Known on-unit workers are expected to be exposed to surface soils (0-0.3 m [0-1 ft]).

Noncarcinogenic Hazard

There are no noncarcinogenic hazard index (HI) values for the known on-unit worker exposure pathways because reference dose values for noncancer effects are not available for benzo(a)pyrene, the only unit COPC.

Carcinogenic Risk

All of the estimated total cancer risks are less than 1 x 10^{-6}, indicating that, under current conditions, carcinogenic risk is insignificant at the unit. For the O-O.3 m (O-l ft) soil interval, the total cancer risk for the known on-unit worker is 1 x 10^{-8}.

ES .6.1.2 Future Land Use Results

Both the future hypothetical on-unit residents and on-unit workers are assumed to be exposed to surface soils (O-O.3 m [O-l ft]) and subsurface soils (O-l.2 m [0-4 ft]). Hypothetical residents are also assumed to be exposed to homegrown produce.

Hypothetical On-Unit Industrial Worker

Under the future land use scenario, carcinogenic risks and noncarcinogenic hazards are calculated for exposure of the hypothetical on-unit resident (adult and child) to surface and redistributed subsurface soils, and homegrown produce. For the hypothetical on-unit worker, exposures are to surface soil and redistributed subsurface soil (but not produce).

Noncarcinogenic Hazard

There are no noncarcinogenic HIs for the hypothetical on-unit worker exposure pathways because reference dose values for noncancer effects are not available for benzo(a)pyrene, the only unit COPC.

Carcinogenic Risk

For the O-O.3 m (O-l ft) and the O-l .2 m (O-4 ft) soil intervals, the total cancer risk for the hypothetical on-unit industrial worker is 3 x 10^{-6}. The risk is from benzo(a)pyrene in the dermal contact pathway.

Hypothetical On-Unit Resident

Noncarcinogenic Hazard

There are no noncarcinogenic HIs for the hypothetical on-unit resident exposure pathways because reference dose values for noncancer effects are not available for benzo(a)pyrene, the only unit COPC.

Carcinogenic Risk

For the O-O.3 m (O-l ft) soil interval, the total cancer risk for the hypothetical on-unit resident is 1 x 1 0^{-5}. This is below 1 x 10^{-4}, but exceeds the initial level of concern for cancer risk (1 x 10^{-6}). Pathways with cancer risks of greater than 1 x 1 0^{-6} include soil ingestion (Excess Lifetime Cancer Risk [ELCR] = 3 x 1 0^{-6}), dermal contact (5 x 1 0^{-6}), and ingestion of produce (2 x 10^{-6}) grown in the soil. Benzo(a)pyrene, which is a secondary constituent of concern (COC), is the only COC identified for the O-O.3 m (O-l ft) soil interval.

For the O-l .2 m (O-4 ft) soil interval, the total cancer risk for the hypothetical on-unit resident is 1 x 10^{-5}. This is below 1 x 10^{-4}, but exceeds the initial level of concern for cancer risk (1 x 10^{-6}). Pathways with cancer risks of greater than 1 x 10^{-6} include soil ingestion (ELCR = 3 x 1 0^{-6}), dermal contact (5 x 1 0^{-6}), and ingestion of produce (2 x 1 0^{-6}) grown in the soil. Benzo(a)pyrene, which is a secondary COC, is the only COC identified for the 0- 1.2 m (O-4 ft) soil interval.

ES. 6.2 Summary of *Ecological Risk Assessment*

The purpose of the ecological risk assessment (ERA) component of the BRA is to evaluate the likelihood that adverse ecological effects may occur or are occurring as a result of exposure to unit-related constituents based on a weight-of-evidence approach. An ecological risk does not exist unless a given constituent has the ability to cause one or more adverse effects and it either co-occurs with, or is contacted by, an ecological receptor for a sufficient length of time or at a sufficient intensity to elicit the identified adverse effect(s) .

The assessment endpoint at the MSSB is the maintenance of the terrestrial ecosystem, with no loss of species or community alteration due to antimony or cadmium toxicity. The testable hypothesis is that the reasonable maximum exposure (RME) concentrations of antimony and cadmium present in surface and subsurface soils are not toxic to terrestrial animals at the unit. To verify or recant the testable hypothesis, a receptor species, the oldfield mouse, is selected to represent the assessment endpoint. Since it is unlikely that antimony bioaccumulates or cadmium biomagnifies in the food chain, direct measurement of antimony and cadmium concentrations in soil media, to be modeled to

concentrations in the oldfield mouse, is selected as the appropriate measurement endpoint.

The ERA confirms that the RME concentrations of antimony and cadmium present in soils at the unit are not toxic to terrestrial animals at the unit. No ecological COCs are identified at the MSSB waste unit. No hazard quotients (HQs) at the MSSB are greater than 1. The constituents detected in surface and subsurface soils at the unit do not pose unacceptable risk, do not threaten the assessment endpoint for the unit, and do not impact the policy goal applicable to the unit.

ES.7 Remedial Goal Options and Preliminary Remedial Alternatives

RGOs are designed to provide conservative, long-term targets for the selection and analysis of remedial alternatives. Preliminary COCs, which include primary and secondary human health COCs and ecological COCs with HQs greater than 1, are selected because they exceed risk-based criteria in the BRA or because they are projected to have the potential to leach to the groundwater at levels exceeding a maximum contaminant level (MCL) or RBC (Section 5).

Primary COCs in the human health risk assessment are defined as constituents that either individually produce or significantly contribute to risk estimates that exceed a 1×10^{-4} risk or an HI of 3 by selecting individual COCs exceeding a risk of 1×10^{-6} or an HQ of 1 in any pathway. If, for example, the risk estimate from exposure to surface soil were greater than 1×10^{-4} (or HI greater than 3), then all of the constituents significantly contributing to that risk/hazard would be identified as COCs. Each pathway (e.g., ingestion, inhalation, dermal contact, and ingestion of produce) would be investigated to determine the source of the most important constituents.

Secondary COCs in the human health risk assessment are individual COPCs that have a chemical-specific carcinogenic risk of at least 1×10^{-6} or a noncarcinogenic hazard of 0.1 that contributes to a pathway hazard of 1 or greater. Secondary COCs are those chemicals that are not identified as primary COCs for a particular receptor. If the level of a constituent in a given medium exceeds a Federal or state chemical-specific ARAR, that constituent is also included as a COC.

No contaminant migration COCs are identified at the MSSB; therefore, contaminant migration RGOs are not calculated.

In the current land use scenarios, the human health risk assessment evaluates surface soil exposures for known on-unit workers occasionally in close proximity to the MSSB. The one exposure unit for the MSSB is surface soils. No COCs are determined under current land use assumptions, only under hypothetical future assumptions.

Residential and industrial exposure scenarios are evaluated in the human health risk assessment under future land use assumptions. The surface and subsurface soil intervals are the soil exposure units applied to the future scenarios.

Benzo(a)pyrene is the only human health preliminary COC detected in the surface soils (O-O.3 m [O-l ft]) interval. It exceeds human health risk-based criteria (highest risk = 1 x 10^{-5} for the hypothetical adult/child receptor); the dermal pathway is the most significant risk contributor at 5 x 10^{-6}. Benzo(a)pyrene was not detected in the subsurface soils at depths greater than 0.3 m (1 ft). The use of 1 mg/cm^2 as the soil-to-skin adherence factor is high, which causes the risk to be high and very conservative in nature. The analyte was detected in one out of six surface soil samples and in one out of 12 subsurface soil samples (which includes the O-O.3 m [O-l ft] interval). Therefore, the frequency of detection is very low. Organics are not screened out based on background comparisons as part of the COPC selection process for the risk assessment. However, it is interesting to note that benzo(a)pyrene was detected two out of six times in the background samples for the surface soils. The maximum concentration (1.13 x 10^{-1} mg/kg) detected in the background sample is less than the unit concentration (4.10 x 10^{-1} mg/kg). Because benzo(a)pyrene is not associated with past unit practices, characterization indicates that it is not unit related, it was detected in only one of 12 samples, and it drives low risk via conservative risk methodology, benzo(a)pyrene is not a final COC. The preliminary COC benzo(a)pyrene is eliminated based on the uncertainty analysis; therefore, no human health RGOs are determined for this unit.

No ecological COCs are identified at the MSSB; therefore, ecological RGOs are not calculated.

1.0 INTRODUCTION

1.1 Report Organization

This document describes the RCRA Facility Investigation/Remedial Investigation/ Baseline Risk Assessment (RFI/RI/BRA) for the 716-A Motor Shops Seepage Basin (MSSB). It is comprised of eight sections in accordance with United States Environmental Protection Agency (EPA) guidance (EPA 1989a). Section 1 presents a history of the unit and the purpose and objectives of the characterization activities. Section 2 discusses the objectives of each sampling activity with respect to the Conceptual Site Model (CSM) and presents the details associated with the field activities. Section 3 describes the unit's physical characteristics, including surface features, geology, hydrogeology, soil types, demography, and land use. Section 4 presents an evaluation of the nature and extent of contamination at the MSSB. Section 5 consists of an evaluation of the fate and transport mechanisms applicable to contaminants detected. Section 6 provides the human health and ecological BRA. Section 7 provides an evaluation of Remedial Goal Options (RGOs) based on applicable or relevant and appropriate requirements (ARARs), and the results of the BRA. Section 8 presents a summary and conclusion of the results from the RFI/RI Unit Assessment and the BRA and recommendations for future action.

The report also includes the following supporting appendices:

- Appendix A: Field Summary Report (WSRC 1996a), provides a detailed description of Unit Assessment activities, together with soil boring logs and field notes.
- Appendix B : Analytical Data, provides laboratory analytical results for soil samples taken during RFI/RI field activities.
- Appendix C: Baseline Risk Assessment, provides the assumptions and calculations made in support of the BRA.
- Appendix D: Toxicity Profiles, provides information on fate and transport and human health and ecological effects.

1.2 RCRA Facility Investigation/Remedial Investigation/Baseline Risk Assessment Purpose

1.2.1 RCRA Facility Investigation Program

The United States Department of Energy (DOE) Savannah River Operations Office, Savannah River Site (SRS), Aiken, South Carolina, manages waste materials that are regulated under the Resource Conservation and Recovery Act (RCRA) of 1976, a comprehensive law requiring stringent management of hazardous waste. The Hazardous and Solid Waste Amendments (HSWA), passed in 1984, further augment the 1976 requirements. Certain activities conducted at some SRS waste units require compliance with operating or post-closure permits issued in accordance with RCRA. These regulated units are those surface impoundments, landfills, and waste piles (collectively termed "land disposal units") which have received hazardous waste since November 19, 1980, and which require RCRA operating or post-closure permits. The SRS has received a RCRA permit from the South Carolina Department of Health and Environmental Control (SCDHEC). Part V of the permit mandates that SRS establish and implement an RFI Program to fulfill the requirements of HS WA Section 3004 (u).

HSWA Section 3004 (u) mandates the investigation and corrective action at non-regulated units. These nonregulated units have been termed Solid Waste Management Units (SWMUs); they may include any activity where hazardous constituents remain uncontrolled and could potentially be released to the environment. Section V.A. 1 of the SRS RCRA Permit lists 65 SWMUs that were identified by EPA Region IV through the RCRA Facility Assessment process. The permit mandates that these 65 SWMUs be further investigated to determine the actual or potential impact of each unit on the environment. The MSSB is a SWMU that requires investigation in accordance with the RCRA permit. In addition, in 1994, SRS was directed by SCDHEC to process these SWMUs as integrated RCRA/Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) units.

1.2.2 CERCLA Remedial Investigation Program

On December 21, 1989, the SRS was included on the National Priorities List (NPL). A facility included on the NPL is subject to the provisions of CERCLA. In accordance with CERCLA, Section 120, the DOE has negotiated a Federal Facility Agreement (FFA) with

the EPA and SCDHEC to coordinate clean-up activities at SRS with one comprehensive strategy. Public participation requirements are listed in Sections 113 and 117 of CERCLA. These requirements include the establishment of an Administrative Record File that documents the selection of clean-up alternatives and provides for review and comment by the public of those alternatives.

The Public Involvement, A Plan for the Savannah River Site (DOE 1994) facilitates public involvement in the decision-making processes for permitting, closure, and the selection of remedial alternatives. It is available to the public in information repositories located in communities near the SRS. (The public also has access to the Administrative Record File through these repositories.) This plan addresses CERCLA, RCRA, and National Environmental Policy Act (NEPA) requirements. Unit-specific reports, such as this one, will be part of the Administrative Record File and will be available to the public. Information repositories have been established at DOE's Public Reading Room located at the University of South Carolina Aiken campus in Aiken, South Carolina, and the Thomas Cooper Library in Columbia, South Carolina. Additional repositories may be added or locations may be changed to better meet the needs of the public.

The RFI Program Plan (WSRC 1989) was developed by SRS to provide guidance and delineate standard procedures for facility investigations at the SRS. The RFI Program Plan was expanded to include CERCLA hazardous substances and has been retitled the *RCRA Facility Investigation/Remedial Investigation Program Plan* (WSRC 1993).

1.2.3 RFI/RI Objectives

The objectives of the RFI/RI are to investigate and evaluate the sources and extent of contamination and pathways of contaminant movement to support "an informed risk management decision regarding which remedy appears to be most appropriate for a given site" (EPA 1989a). The Unit Assessment includes the following planned activities:

- Evaluating unit-specific background levels of organic and inorganic constituents in all media of concern (Phase I)
- Collecting data to support the BRA (Phase I)
- Determining the nature and extent of contamination related to MSSB (Phase I)

- Determining the nature and extent of contamination related to process sewer lines (Phase II)
- Defining subsurface geology down to the first confining unit (Phase II)
- Determining depth to groundwater and groundwater flow direction in the water table aquifer (Phase II)
- Collecting data to support the FS (Phase II)

Previous investigations at the MSSB were conducted prior to 1996. These investigations included soil sampling, a soil gas survey, and groundwater sampling, as discussed in Section 1.3.3.

The Phase I Unit Assessment was conducted in 1996 as part of the RFI/RI for the MSSB. The investigation was performed in accordance with the work elements and protocols described in the work plan submitted to the regulatory agencies (WSRC 1996c). It included soil boring and soil sampling and is discussed in Section 2 of this document. Based on the results of the Phase I assessment of the MSSB, no Phase II assessment is required.

1.2.4 *Baseline Risk Assessment Objectives*

The BRA develops risk information necessary to assist in the decision-making process for remedial action at the MSSB (EPA 1989a). This risk assessment follows the EPA Risk Assessment Guidance for Superfund (RAGS) (EPA 1989b and 1989c). Objectives of the BRA are to provide:

- An analysis of baseline risks to determine whether or not there is a need for remedial action and aid the selection of the best remedy
- A basis for determining levels of contaminants that can remain in situ that are adequately protective of human health and the environment
- A basis for documenting and comparing potential human health and environmental impacts for current and hypothetical land uses and various remedial alternatives

- A consistent process for evaluating and documenting public health threats (EPA 1989a)

The BRA process provides information necessary to justify remedial actions at a unit and to select the best remedy for that unit: "It is important to recognize that information should be developed only to help the regulators determine what actions are necessary to reduce risks, and not to fully characterize site risks or eliminate all uncertainty from the analysis" (EPA 1989a).

The BRA also assesses risks that may result from a release of, and exposure to, contaminants under reasonable maximum exposure (RME) conditions for current and hypothetical future land use scenarios and receptors. The RME represents the highest exposure that is reasonably expected to occur at the unit.

Finally, the BRA evaluates primary contaminant sources and release mechanisms, environmental transport media, principal exposure points, and exposure routes/receptors. The potential human health risks and ecological impacts are documented for current and hypothetical future land uses without the assumption of remedial action, and compared for various remedial alternatives. Threats to public health can be consistently documented and evaluated in the framework of the BRA. The information from the BRA supports identification of areas where no further action or selected remedial actions may be warranted.

1.3 Unit Description

The SRS is located in west-central South Carolina and occupies an area of approximately 777 square kilometers (300 square miles) (Figure l-l). The SRS is owned by the DOE. Management and operating services are provided by Westinghouse Savannah River Company (WSRC). The SRS has traditionally produced tritium, plutonium, and other special nuclear materials for national defense. Chemical and radioactive wastes have been generated as by-products of these nuclear material production processes.

Figure 1-2 shows the locations of major SRS facilities. The A Area, located in the northwestern section of the SRS, has served as an administrative and research center in addition to housing the motor shops/motor pool facilities. The facilities for fabricating fuel and target elements for SRS reactors are located in the M Area. The Savannah River Technology Center, adjacent to A Area, is a process-development laboratory that

supports production operations. The A Area includes several RCRAKERCLA units, three of which are shown on the map in Figure l-3: the MSSB, the A-Area Rubble Pile, and the A-Area Coal Pile Runoff Containment Basin.

1.3.1 Unit *Characteristics and History*

The MSSB was constructed and placed in service in 1977 to receive liquid waste from the 716-A Motor Shops oil/water separator. The MSSB was designed and constructed as an unlined seepage basin. The basin measures 63.1 m (207.0 ft) long, 10.7 m (35.1 ft) wide, and 2.0 m (6.6 ft) deep (Huber et al. 1987). It is surrounded by a berm 2.0 m (6.6 ft) high. The wastewater flowed into the basin from the northwest through two influent pipes from the Motor Shop (Building 716-A) and seeped naturally into the soil beneath the basin. The basin has not been closed or capped, but all discharges to the basin were terminated in 1983 when the influent lines from the Motor Shops were capped (Huber et. al. 1987). Effluent discharges from the Motor Shops included wastewater with trace amounts of engine oil, grease, kerosenes, ethylene glycol, and soapy water. A ramp was built into the eastern end of the basin in 1988 (WSRC 1990a) to facilitate soil sampling. At present, the basin collects rainwater during periods of heavy precipitation. Figures l-4 through l-7 are photographs of the MSSB.

1.3.2 *Unit Setting*

The SRS is located in the Atlantic Coastal Plain, primarily on the Aiken Plateau (Figure l-8). The Aiken Plateau is bounded by the Piedmont Physiographic Province on the north and by the Savannah and Congaree Rivers on the west and east, respectively. The plateau slopes southward from elevation 198 m (650 ft) above mean sea level (msl) at the Fall Line to its southern boundary, which is marked by a regional break in slope at an approximate elevation of 76 m (250 ft) above msl. The surface of the Aiken Plateau is characterized by broad interfluvial areas dissected by narrow, steep-sided stream valleys.

Nearly all of the SRS lies within the Savannah River drainage basin, with the Savannah River forming the southwestern boundary of the SRS. Major southwestward flowing tributaries to the Savannah River include Upper Three Runs Creek, Tinker Creek, Fourmile Branch, Pen Branch, Steel Creek, and Lower Three Runs Creek (Figure l-9). Ground surface elevations at the SRS range from approximately 21 m (70 ft) above msl at

the mouth of Lower Three Runs Creek to over 122 m (400 ft) above msl on the plateau (WSRC 1995a).

The A Area is located in the northwestern comer of the SRS and serves as a main administrative hub for the site. The 7 16-A MSSB is located in A Area south of the railroad tracks near the automotive shop. The elevation varies between 104-107 m (340-350 ft) above msl and slopes gently to the southwest. A small drainage feature runs through the area approximately 91 m (300 ft) to the east of the MSSB. The headwater is a National Pollutant Discharge Elimination System (NPDES)-permitted outfall (A-01 1). This drainage feature turns southwest and discharges into a tributary of Tims Branch. Tims Branch discharges into the Upper Three Runs Creek located 5.6 km (3.5 mi) to the southeast. There is no surface water connection between the MSSB and the drainage feature. Groundwater is approximately 46 m (150 A) bls in the A Area and does not outcrop in the vicinity of the MSSB.

1.3.3 *Previous Investigations*

The first step to determine if a hazardous substance has been released from a RCRA/CERCLA unit is a preliminary unit evaluation. The primary goal of the preliminary evaluation is to determine if an unacceptable risk to human health and/or environment may exist at a unit and, if so, what course of action is appropriate to reduce these risks to an acceptable level. If the preliminary unit evaluation indicates that the potential for environmental contamination exists, then a unit screening must be performed. Section 1.3.3. I discusses the Preliminary Unit Evaluation and Section 1.3.3.2 describes the Unit Screening completed at the MSSB. Section 2 details the Unit Assessment conducted in 1996.

I .3.3.1 Preliminary Unit Evaluation

A review of existing literature and information from the MSSB was conducted and included, but is not limited to, the following:

- The unit disposal history and unit area characteristics
- Physical and chemical characteristics of the waste (hazardous and nonhazardous) known to be managed at the unit

- The general hydrogeologic conditions of the unit and the current environmental setting
- Any previous sampling and/or monitoring data for the unit

Existing Literature and Information

The documents listed below were reviewed during the Preliminary Unit Evaluation of the MSSB.

- Westinghouse Savannah River Company, 1990a. *RCRA Facility Investigation/ Remedial Investigation Plan for the 716-A Motor Shops Seepage Basin.* WSRC-RP-90-581.
- Pirkle, Robert J. and D. J. Masdea, 1993. *Soil Gas Investigations Near the A-Area MSSB, Including Areas 716A and 731-A, Savannah River Site.* Microseeps, University of Pittsburgh Applied Research Center.
- Westinghouse Savannah River Company, 1993. *RCRA Facility Investigation/ Remedial Investigation Program Plan.* WSRC-RP-89-994.

Once literature was reviewed, the "RCRAKERCLA Unit Literature Review Checklist" was completed. This checklist presents RCRA/CERCLA unit data and information that are specific to each individual environmental medium. Copies of the completed checklist appear in Appendix A. 1 of the *RFI/RI Work Plan for the MSSB* (WSRC 1996c).

Unit Reconnaissance

Following a review of existing data and information, a unit reconnaissance was performed. The unit reconnaissance (field observation and characterization) was conducted to further assess the following field conditions:

- Environmental setting
- Source characterization (unit conditions and waste characteristics)
- Waste release potential (for each environmental medium)

The completed "Unit Reconnaissance Field Data Sheets" list the unit-specific factors that were considered during the reconnaissance and provide appropriate written documentation of field observations. The "Unit Reconnaissance Field Data Sheets" for

the MSSB are provided in Appendix A.2 of the *RFI/RI Work Plan for the MSSB* (WSRC 1996c).

Based upon the information available for the Preliminary Unit Evaluation, it was concluded that the potential for environmental contamination exists at the MSSB.

1.3.3.2 Unit Screening

Because the Preliminary Unit Evaluation indicated hazardous materials were disposed of at the unit, a Unit Screening Program was initiated. It evaluated (through the collection and analysis of environmental samples) whether the wastewater disposed of in the MSSB had impacted soils within the seepage basin. The Unit Screening Program consisted of the following:

- Confirmation soils analysis
- Soil gas analysis
- Groundwater analysis

Confirmation Soils Analysis

The initial unit screening, performed at the MSSB in November 1988 (WSRC 1990a), consisted of confirmation soils analysis that screened for nonvolatile organic compounds, inorganic species, radioactivity, and volatile organic compounds (VOCs). Since there was no historic evidence of overflow of the basin, all sampling activities were conducted within the physical boundaries of the basin. Figure l-10 shows the sampling locations of the initial unit screening.

The soil samples were analyzed at the intervals and for the constituents indicated in Table 1-l. Overall, the quality control (QC) sample results indicate that the field sampling and laboratory handling met the quality assurance (QA) objectives (WSRC 1990a). Two constituents were detected in the laboratory method blanks, acetone and methylene chloride. Both are documented laboratory artifacts and laboratory contamination may account for their presence in unit soil samples.

Table 1-2 presents the results of the soil analyses. The concentrations listed are reported as "above detection limits;" however, the detection limits are not reported. VOCs, specifically acetone and methylene chloride, and metals are the primary hazardous

constituents detected in soil samples collected from the basin. As stated above, both acetone and methylene chloride were detected in the laboratory method blank; therefore, their presence in unit soil samples is suspect. Metals detected in the soils include antimony, arsenic, barium, cadmium, chromium, copper, lead, mercury, nickel, thallium, vanadium, and zinc. The following semivolatile organic compounds (SVOCs) were also detected: 2-methylnaphthalene, bis-(2-ethylhexyl)phthalate, ethylbenzene, fluoranthene, phenanthrene, pyrene, and xylenes. One sample was found to contain PCB 1254. Four samples from two boreholes were analyzed for radioactivity. One sample, from Boring 4 at 7.6-8.2 m (25-27 ft) below land surface (bls) has a gross beta concentration above the detection limit. No samples show gross alpha or radium above detection limits.

Soil Gas Investigation

A soil gas survey was performed for the MSSB in 1991 (Pirkle and Masdea 1993). In total, 188 locations in and near the seepage basin were sampled to determine the nature and extent of contamination in near-surface soil gases at the unit. Samples for VOCs and hydrocarbons analysis were collected from depths of 0.9-l .2 m (3-4 ft). Samples for mercury analysis were collected from 0.3-0.45 m (l-l .5 ft). The following compounds were detected: C_1-C_4 hydrocarbons; C_5-C_{10} normal paraffins; the aromatic hydrocarbons benzene, toluene, ethylbenzene and xylenes (BTEX); selected chlorinated hydrocarbons; and mercury. Table 1-3 summarizes the analytical results for the soil gas survey.

Mercury was detected only in minor amounts within the MSSB. One location in the northeastern corner of the A-Area Rubble Pile (73 1-6A) had a mercury reading of 2.9 µg/g, all other locations were one to three orders of magnitude lower. Only low levels of VOCs were found and no VOC was found in excess of 1.5 parts per million (ppm). Only tetrachloroethylene (PCE) had occurrence frequencies greater than 10 percent. The analytical results for the light hydrocarbons indicate that all analytes except the butanes have occurrence frequencies greater than 50 percent; however, only methane was detected in amounts greater than 10 ppm.

A large chlorinated hydrocarbon plume was detected to the west of the basin. The most significant contaminant in the plume is tetrachloroethylene. Other detected compounds include trichloroethylene, chloroform, carbon tetrachloride, 1,1,1-trichloroethane (1,1,1-TCA), and trans-1,2-dichloroethylene. The area1 extent of contamination was not determined in this study. The last samples, collected on the edge of the A-014 outfall,

had some of the highest readings taken. No samples were collected across the outfall or downstream.; therefore, the extent of contamination could not be defined.

The unit screening data indicated that hazardous materials had been managed at the MSSB and, in accordance with the RFI/RI Program Plan, additional investigations were required. Additional data were needed to determine the vertical and horizontal extent of contamination and for input to conduct the BRA.

A-Area and M-Area Regional Groundwater Quality

The A-Area and M-Area soil and groundwater contamination is a result of prior waste disposal practices previously considered acceptable. The primary source of area contamination was the M-Area Settling Basin, a 30.3-million-liter (8-million-gallon) impoundment that received effluent from the M-Area manufacturing facilities. The basin was constructed in 1958 to settle out and contain uranium and other heavy metals discharged from aluminum forming/metal finishing operations. Overflow from the settling basin was transported to a natural seepage area to a shallow depression (known locally as Lost Lake) via a drainage ditch. These structures comprise the M-Area Hazardous Waste Management Facility. The facility was removed from service in July 1983 and did not accept wastewater discharges after that date.

The effluent discharged to the unlined M-Area Settling Basin contained heavy metals and chlorinated solvents (PCE, trichloroethylene [TCE], and 1 ,1,1-TCA, used as degreasers). Most of the metals (aluminum, nickel, depleted uranium, and lead) were effectively captured in the basin's sediments. Approximately 0.91 million kilograms (2 'million pounds) of chlorinated solvents were also released into the basin. After the discovery of chlorinated solvent groundwater contamination below the settling basin in June 1981, SRS established a corrective action program that included extensive groundwater monitoring and groundwater recovery for treatment.

The M-Area Settling Basin was certified closed in 1991 per RCRA requirements. The closure and the groundwater remediation activities have been conducted in compliance with a hazardous waste permit from the SCDHEC. Groundwater cleanup was instituted voluntarily in 1983, and a full-scale pump-and-treat system began operating in 1985. Eleven groundwater recovery wells were installed; one, RMW6, is located southwest of the MSSB near NPDES outfall A-014. The MSSB is in the zone of capture from RMW6

and A-O 14. Since startup in 1985, the system has removed more than 130,000 kilograms (286,000 pounds) of solvents from more than 5.87 billion liters (1.55 billion gallons) of groundwater.

Another potential source of solvents to the groundwater in the A and M Areas is the A-0 14 outfall. The A-O 14 outfall is connected to the M-Area production facilities via an underground sewer line. Solvent wastes were disposed through the outfall from the 1950s until the mid- 1960s; however, the quantities and concentrations are unknown.

In 1990, a Vadose Zone Characterization Program was performed (WSRC 1990b), which included a soil gas investigation and soil boring installations. TCE and PCE were detected in the vadose zone near the A-O 14 outfall. Subsequently, a soil vapor extraction system was installed near the outfall.

Installation of assessment monitoring wells in A/M Area has been conducted in several stages under a RCRA, Part B, corrective action permit. Piezometers were used extensively as part of the groundwater investigation program. They were also used to aid in locating the monitoring wells. Monitoring wells, in addition to soil borings, cone penetrometers and piezometers, have all been used in the groundwater monitoring process. This has been a progressive, on-going, phased process emphasizing the delineation of the lateral and vertical extent of groundwater contamination.

The upper and lower "Lost Lake" aquifer zones have the greatest areal extent of TCE contamination. The highest concentrations are localized around the M-Area Basin, the A-014 outfall, the process sewer line to the M-Area Basin, and the solvent storage and handling areas. The "M-Area" aquifer zone, which is most likely to be affected by the MSSB, exhibits the next largest area1 extent of TCE contamination (Figure l-l 1). The highest concentration of TCE (3,000,000 parts per billion [ppb] at MSB-3D) was noted in the "M-Area" aquifer zone. This well, located at the junction of the M-Area Settling Basin and the process sewer line, is one of two sites with confirmed dense nonaqueous phase liquids (DNAPLs). DNAPLs have also been detected in Well MSB-22, Well AOB1, located near the MSSB and screened in the "M-Area" aquifer zone, was found to contain only 64 ppb of TCE (see Table l-4).

As with TCE, the greatest area1 extent of PCE contamination is in the upper "Lost Lake" aquifer zone. The "M-Area" aquifer zone has an almost equal areal extent (Figure 1-12).

The highest concentrations are noted around the M-Area Basin, the A-014 outfall, the process sewer line, and the storage and handling areas. As with TCE, MSB-3D noted the highest concentration of PCE (33,000,000 ppb). The deeper aquifers/aquifer zones (the "middle sand" of the Crouch Branch confining unit and the Crouch Branch aquifer) exhibit the least contamination. The general trend is for the contaminants to migrate both horizontally and vertically with the predominant groundwater flow direction. Well AOB1 was found to contain 47 ppb of PCE (see Table l-4).

Monitoring Well Data

Figure l-3 shows the locations of existing groundwater wells near the MSSB. Wells located in the immediate vicinity of the unit include AOB1; AOB2; AOB3; and one well cluster MSB35, which consists of three wells, MSB35A, MSB35B and MSB35TA. Groundwater wells in the A Area are sampled and analyzed for a wide range of parameters. The parameters analyzed include indicators of water quality (pH, specific conductivity, gross alpha, nonvolatile beta, etc.) and specific chemical constituents including organic compounds, specific radionuclides, and nonradiological inorganic species. Not all parameters were analyzed for in all quarters. Contamination in the groundwater can be divided into two categories, organic and inorganic. Table l-4 presents a list of constituents detected above the Primary Drinking Water Standards (PDWS) in groundwater (EPA 1995a).

Two organic constituents, dichloromethane and TCE, have been detected above PDWS at least once between the first quarter of 1991 and the last quarter of 1995. Both are chlorinated VOCs that have been used at the SRS. Two inorganic constituents have been detected above PDWS at least once during the same time period, antimony and mercury.

Dichloromethane and TCE were both detected at maximum levels in well AOB1, which is screened in the "M-Area" aquifer zone, Antimony was detected at maximum levels in well AOB2, which is also screened in the "M-Area" aquifer zone. Mercury was detected at maximum levels in well MSB35A, which is screened in the "Middle Sand" aquifer zone of the Crouch Branch confining unit.

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SECTION 1

FIGURES

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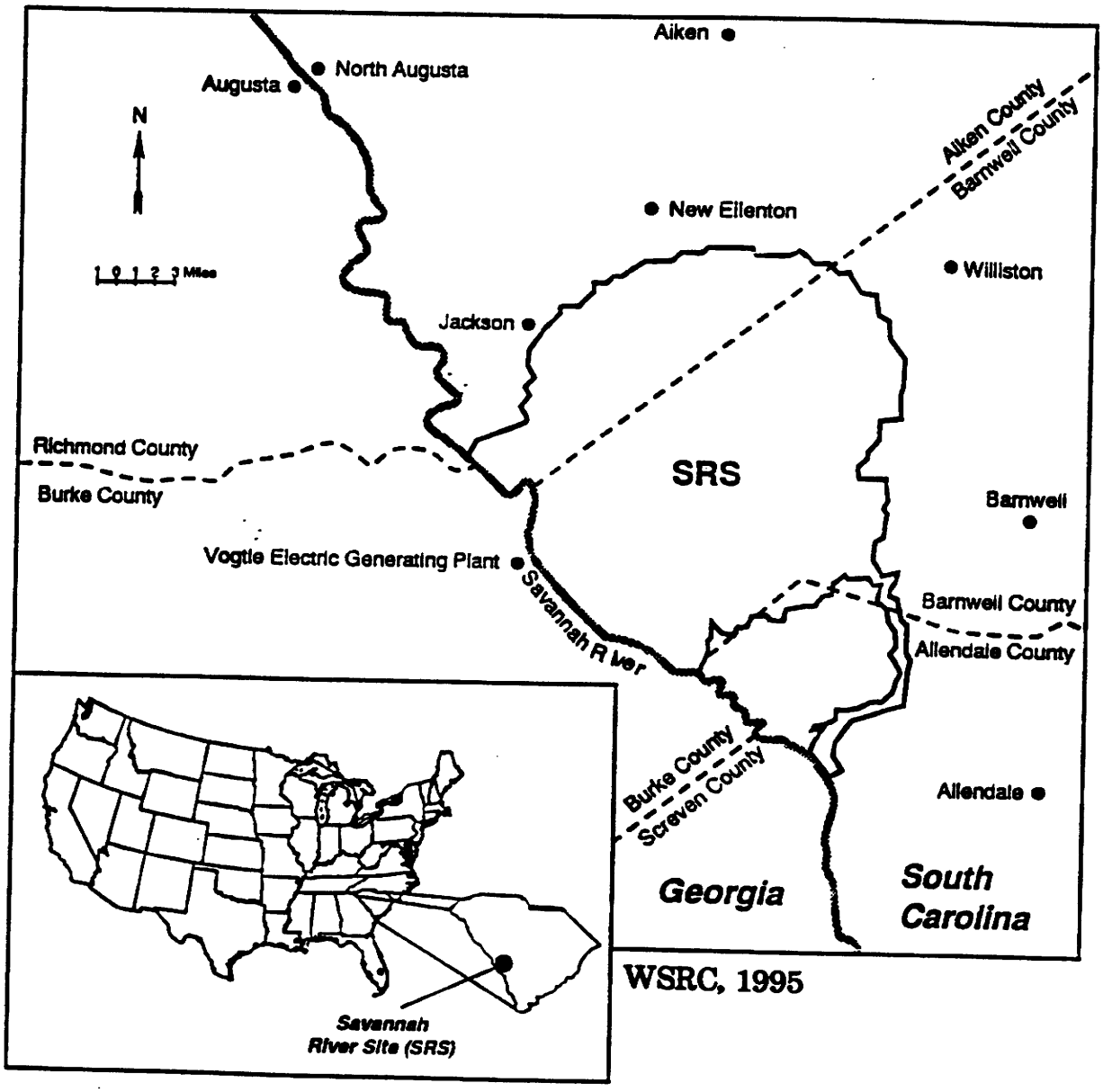

Figure 1-1. Location of Savannah River Site in West-Central South Carolina

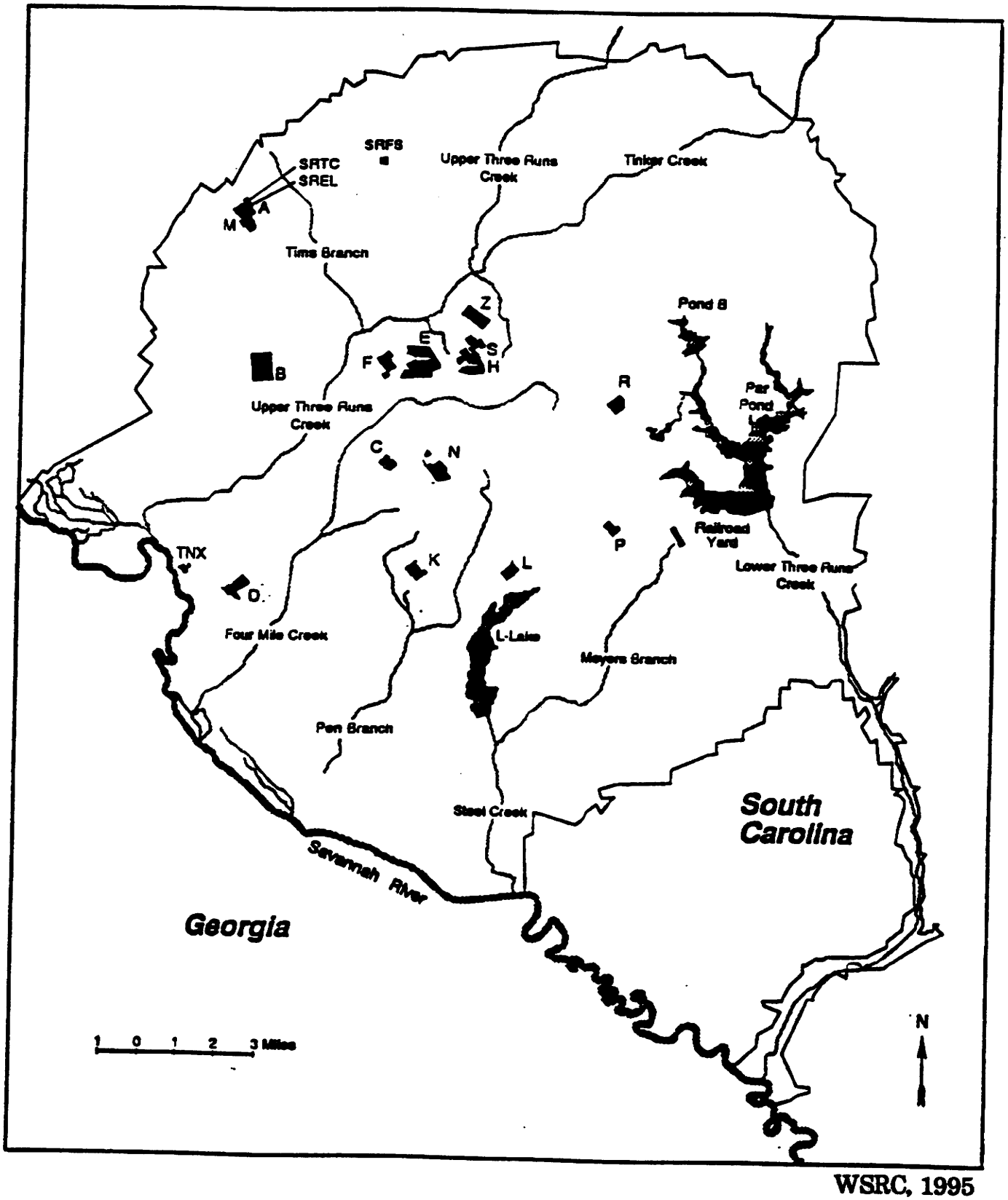

Figure 1-2. Location of Major Facilities at Savannah River Site

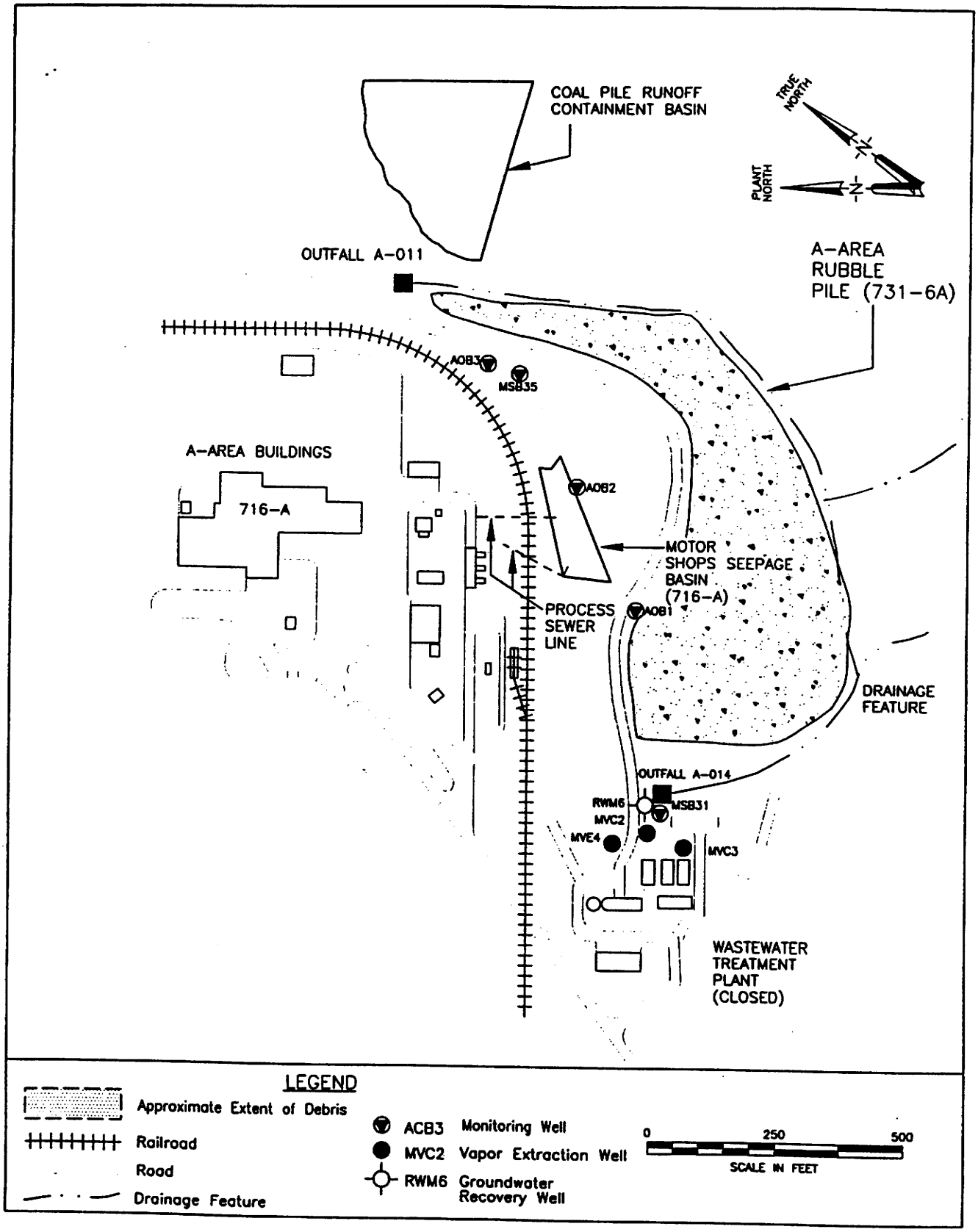

Figure 1-3. A-Area RCRA/CERCLA Units and Motor Shops Seepage Basin Monitoring Well Locations

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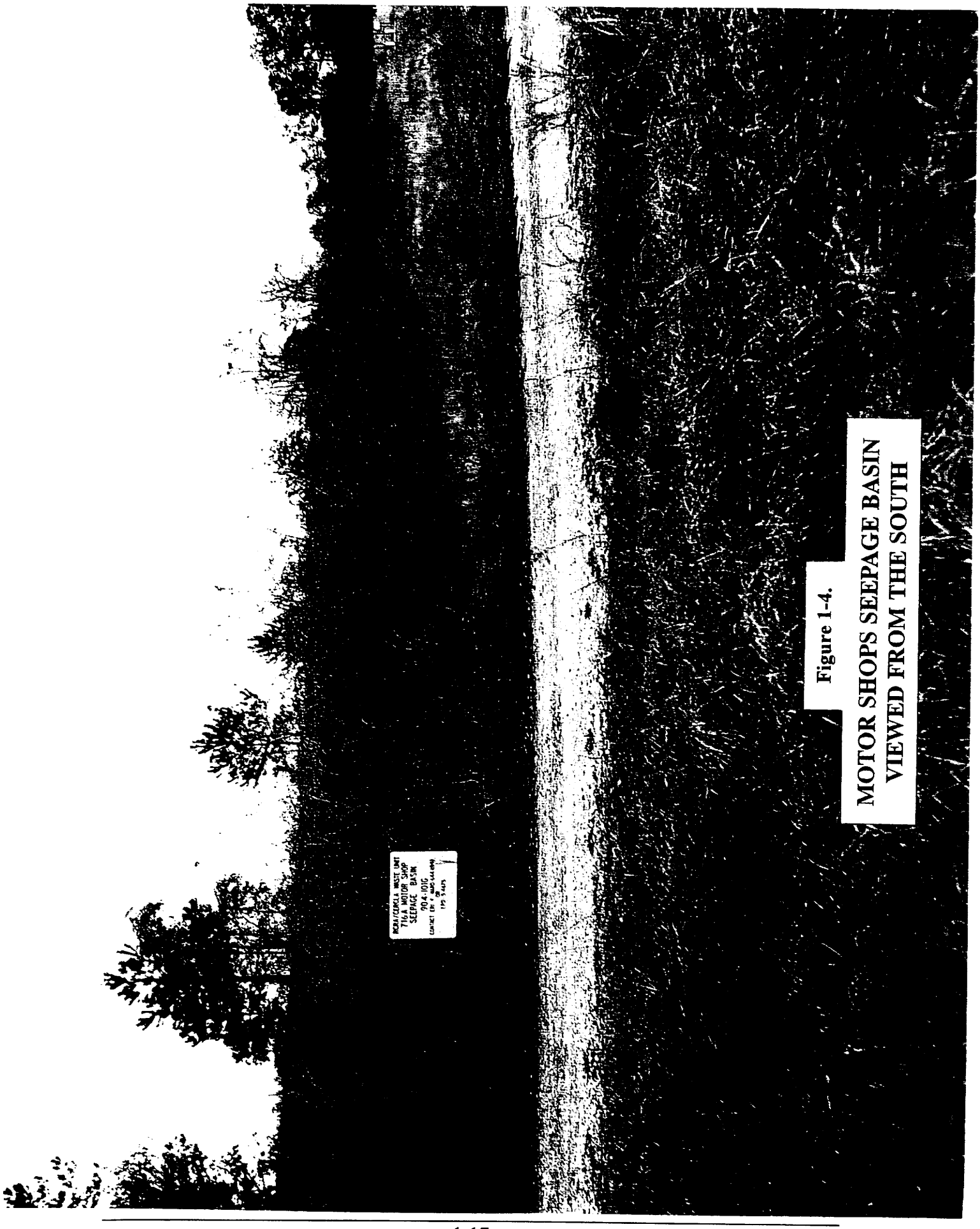


Figure 1-4. MOTOR SHOPS SEEPAGE BASIN VIEWED FROM THE SOUTH

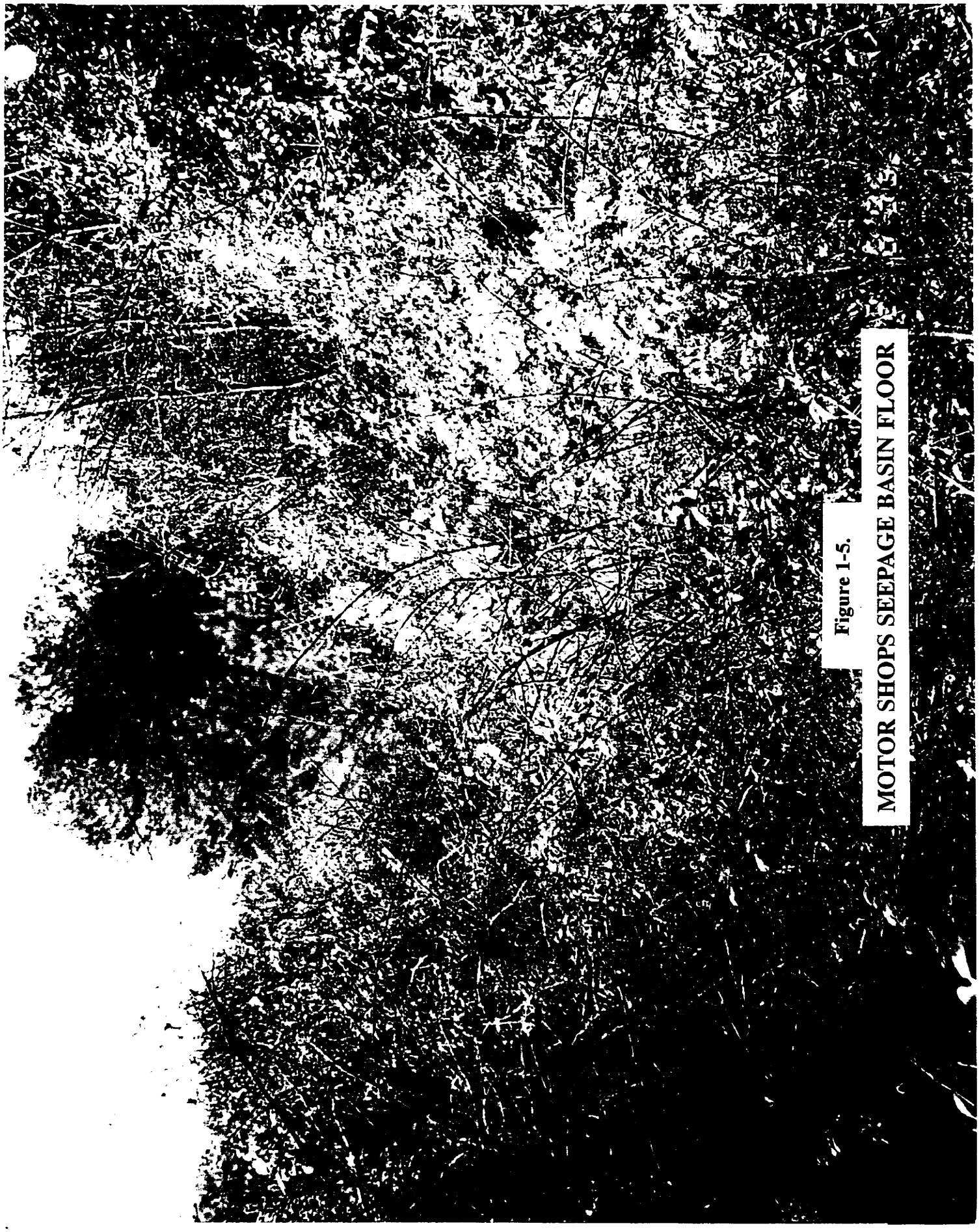


Figure 1-5. MOTOR SHOPS SEEPAGE BASIN FLOOR

Figure 1-6. MOTOR SHOPS SEEPAGE BASIN VIEWED FROM THE NORTH

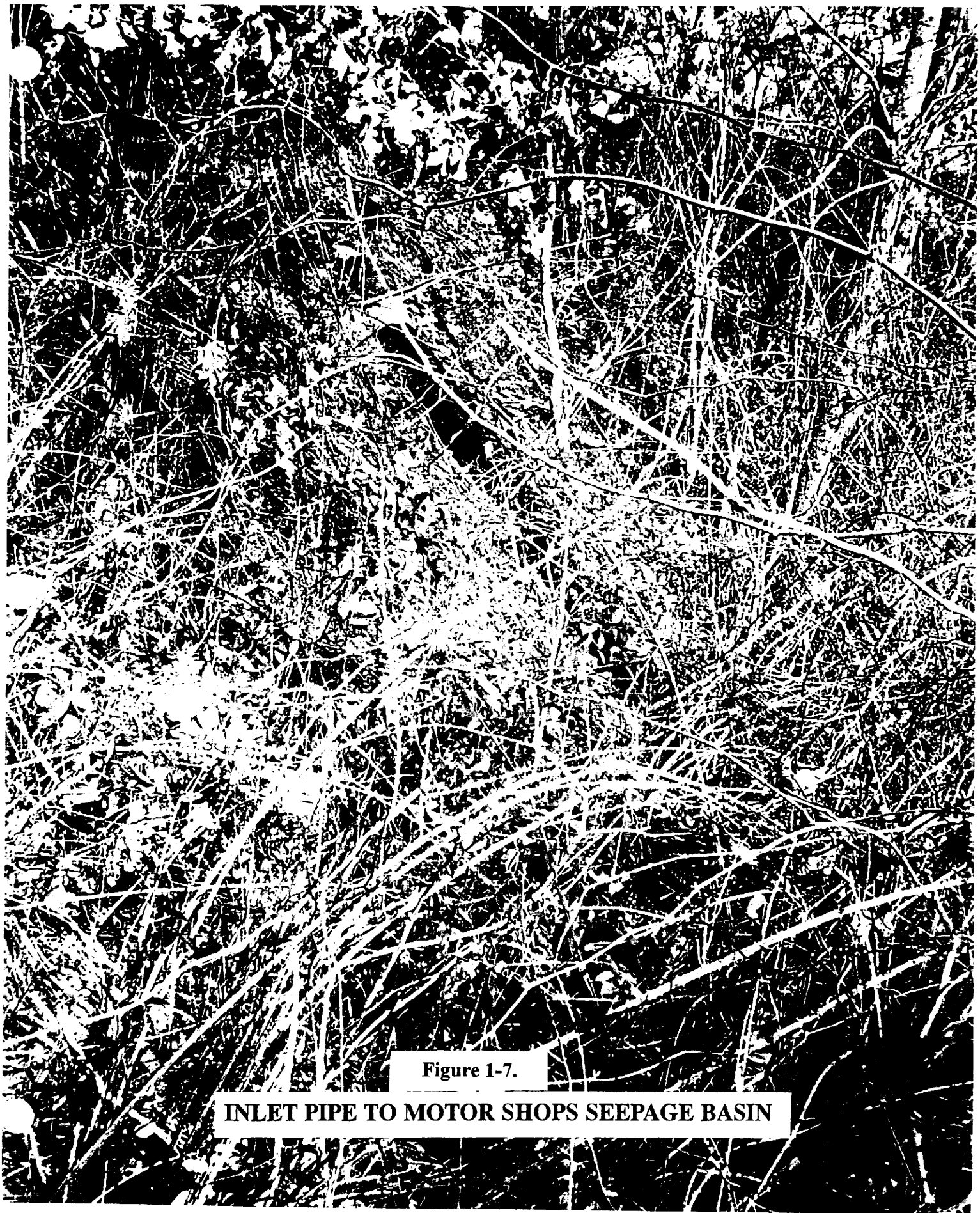


Figure 1-7.

INLET PIPE TO MOTOR SHOPS SEEPAGE BASIN

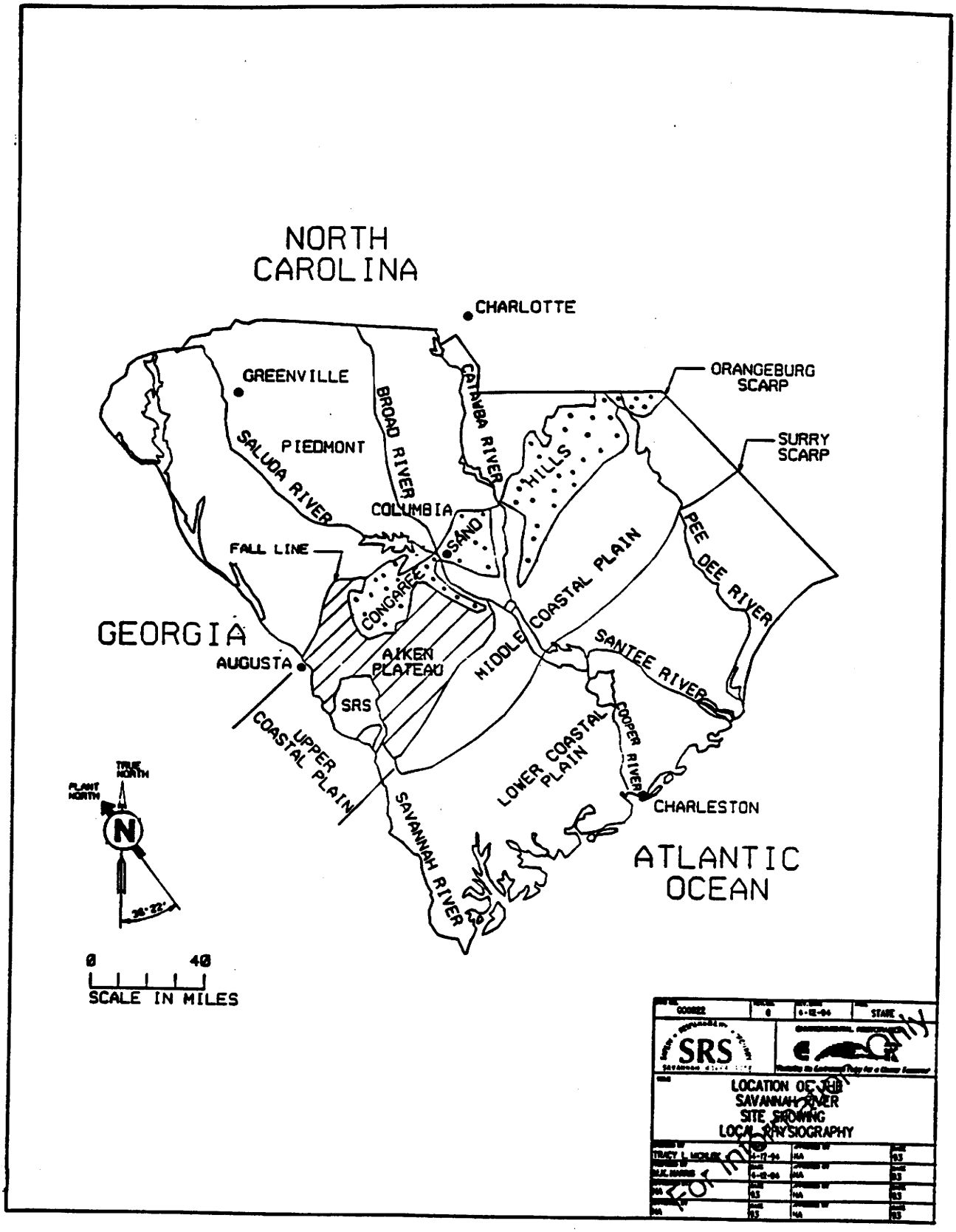


Figure 1-8. Physiographic Subprovices of the South Carolina Coastal Plain

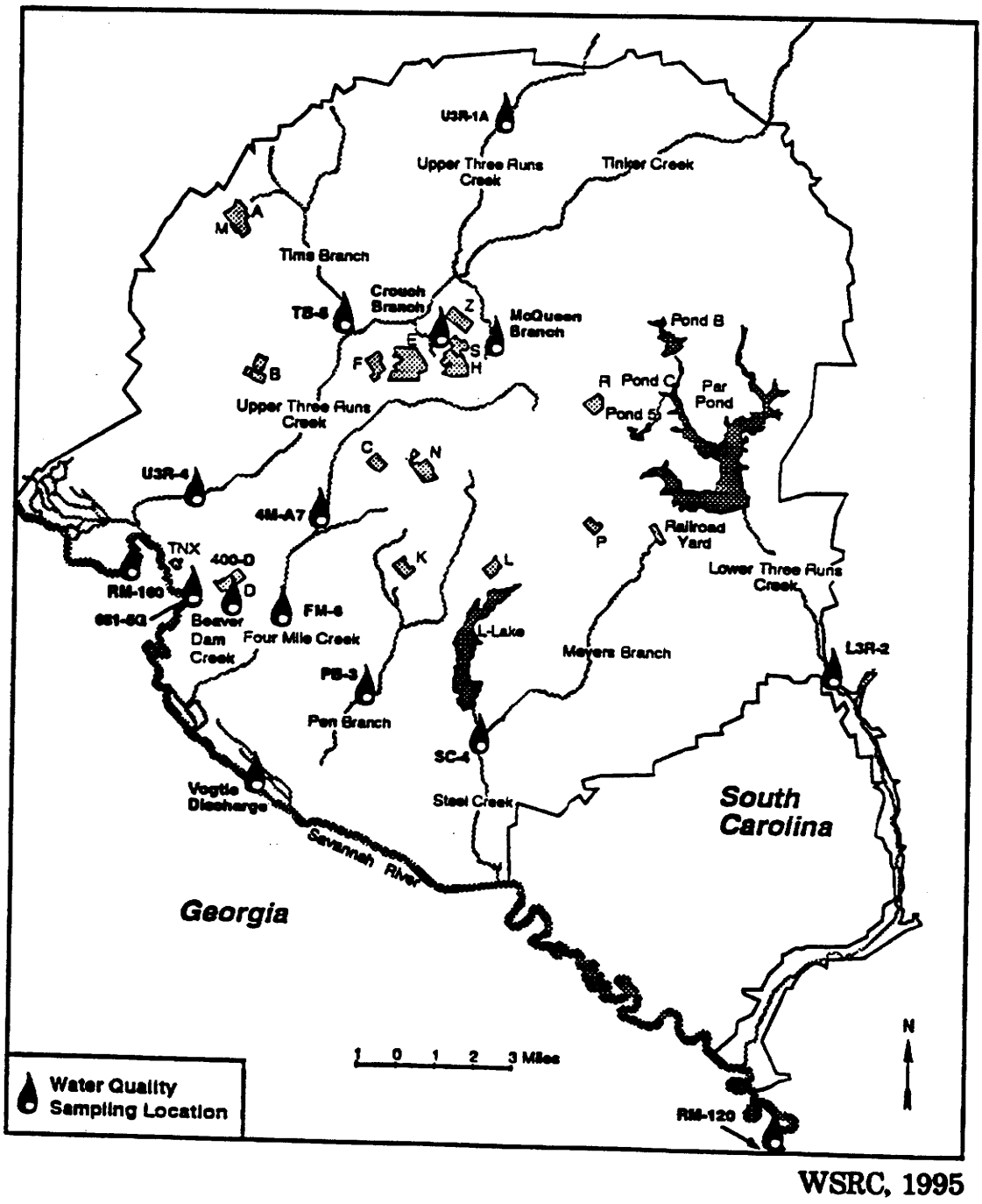
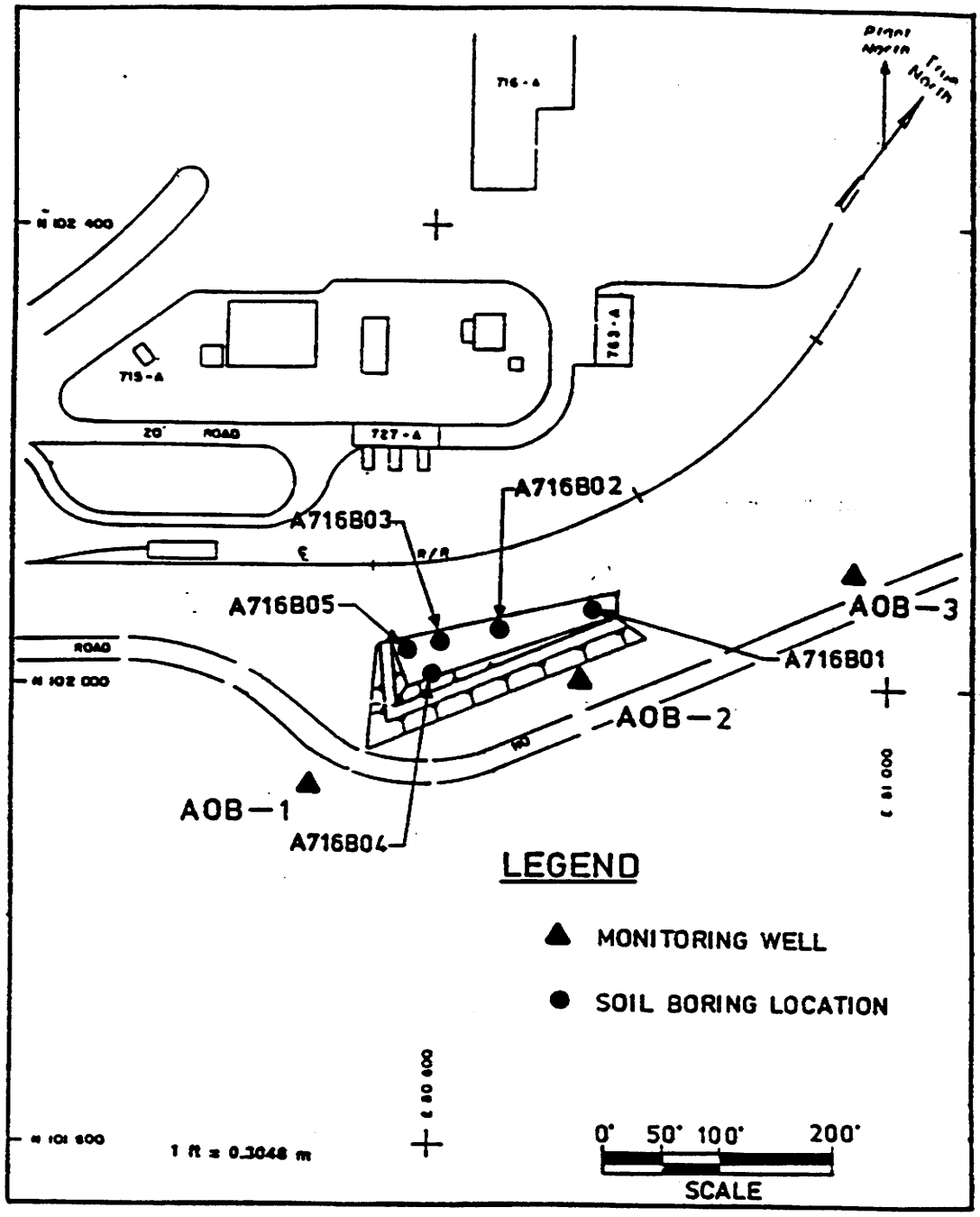


Figure 1-9. Major Tributaries to the Savannah River at the Savannah River Site



Source: Modified from DPST-85-701, E.I. duPont de Nemours and Co., March, 1987

Figure 1-10. Motor Shops Seepage Basin Soil Boring Locations From Previous Study

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SECTION 1

TABLES

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Table 1-1. Sampling Intervals and Constituents Analyzed 716-A Motor Shops Seepage Basin

Facility Number	Sampling Borehole Number	Sample Number	Sampling* Depth	Constituents Analyzed ***	QC Samples
A716B	01	01	0.2-0.5 feet	1	
A716B	01	02	26-27 feet	2, 3	
A716B	01	03	30.5-32.5 feet	2, 3	
A716B	02	01	2-4 feet	2, 3, 4	
A716B	02	02	2-4 feet	2, 3, 4	QC duplicate
A716B	02	03	20-21 feet	2	
A716B	03	01	2-4 feet	2, 3	
A716B	03	02	20-22 feet	2	QC** split
A716B	03	03	--	2	QC rinsate
A716B	04	01	2-4 feet	2, 3	
A716B	04	02	25-27 feet	2, 4	
A716B	04	03	--	2	QC rinsate
A716B	04	04	30-32 feet	2, 4	
A716B	05	01	0.1-0.7 feet	1	
A716B	05	02	--	2	QC rinsate
A716B	05	03	--	5	QC Field Blank
A716B	05	04	--	2	QC rinsate

From: WSRC 1990a

* Intervals referenced as depth beneath the basin bottom.

** Analyzed by the QC Laborator

*** Constituent analytical codes are as follows:

1) EPA Appendix VIII
2) Volatile organics, semi-volatile organics
3) EP toxicity metals
4) Radionuclide indicators (gross alpha, gross beta, total radium, tritium)
5) Volatile organics

Table 1-2. Chemical Analysis Results for Soils
716-A Motor Shops Seepage Basin

Sample ID	1-1*	1-2	2-1	2-2D	2-3	3-1	3-2	3-3S	4-1	4-2	5-1*
Depth (feet)	0.2-0.5	26-27	2-4	2-4	20-21	2-4	20-22	20-22	2-4	25-27	0.1-0.7
Organic Constituents µg/kg											
Acetone	54	54	53	160	43	57	30	100	45	ND	ND
Bis(2-Ethylhexyl)Phthalate	520	ND	ND	ND	ND	ND	ND	ND	ND	ND	6600
Ethylbenzene	ND	ND	ND	ND	ND	ND	ND	ND	7.0	ND	ND
Fluoranthene	40	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Methylene chloride	11	11	10	13	3	7	9	14	20	8	12
2-Methylnaphthalene	ND	ND	ND	ND	ND	ND	ND	ND	320	ND	ND
PCB 1254	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	1400
Phenanthrene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	250
Pyrene	60	ND	ND	ND	ND	ND	ND	ND	ND	ND	620
Xylenes	ND	ND	ND	ND	ND	ND	ND	ND	15	ND	ND
Metals mg/kg											
Antimony	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	10
Arsenic	1.1	NA	NA	NA	NA	NA	NA	NA	NA	NA	3.6
Barium	15	NA	NA	NA	NA	NA	NA	NA	NA	NA	34
Cadmium	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	1.7
Chromium	119	NA	NA	NA	NA	NA	NA	NA	NA	NA	68
Copper	4.3	NA	NA	NA	NA	NA	NA	NA	NA	NA	52
Lead	11	NA	NA	NA	NA	NA	NA	NA	NA	NA	73
Mercury	0.2	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.35
Nickel	55	NA	NA	NA	NA	NA	NA	NA	NA	NA	28
Thallium	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	1.0
Vanadium	7.4	NA	NA	NA	NA	NA	NA	NA	NA	NA	ND
Zinc	21	NA	NA	NA	NA	NA	NA	NA	NA	NA	51
Toxicity Results µg/l											
Barium	NA	29	152	115	NA	70	NA	NA	8.9	NA	NA
Chromium	NA	ND	19	ND	NA	ND	NA	NA	ND	NA	NA
Mercury	NA	0.33	0.46	0.44	NA	0.43	NA	NA	0.37	NA	NA
Radionuclides pCi/g	NA	NA	ND	ND	NA	NA	NA	NA	NA	9.5	NA
Common Ions mg/kg											
Chloride	1.9	NA	NA	NA	NA	NA	NA	NA	NA	NA	ND
Nitrate as Nitrogen	1.8	NA	NA	NA	NA	NA	NA	NA	NA	NA	1.2
Sulfate	12	NA	NA	NA	NA	NA	NA	NA	NA	NA	7.5

Notes: NA - Not-Analyzed
ND - Non-Detect
An "S" extension to the interval number indicates a split sample
A "D" extension to the interval number indicates a duplicate sample
*Appendix VIII analysis
Source: WSRC 1990a
Only samples with compounds detected above detection limits are reported

**Table 1-3. Soil Gas Survey Results
Motor Shops Seepage Basin (716-A)**

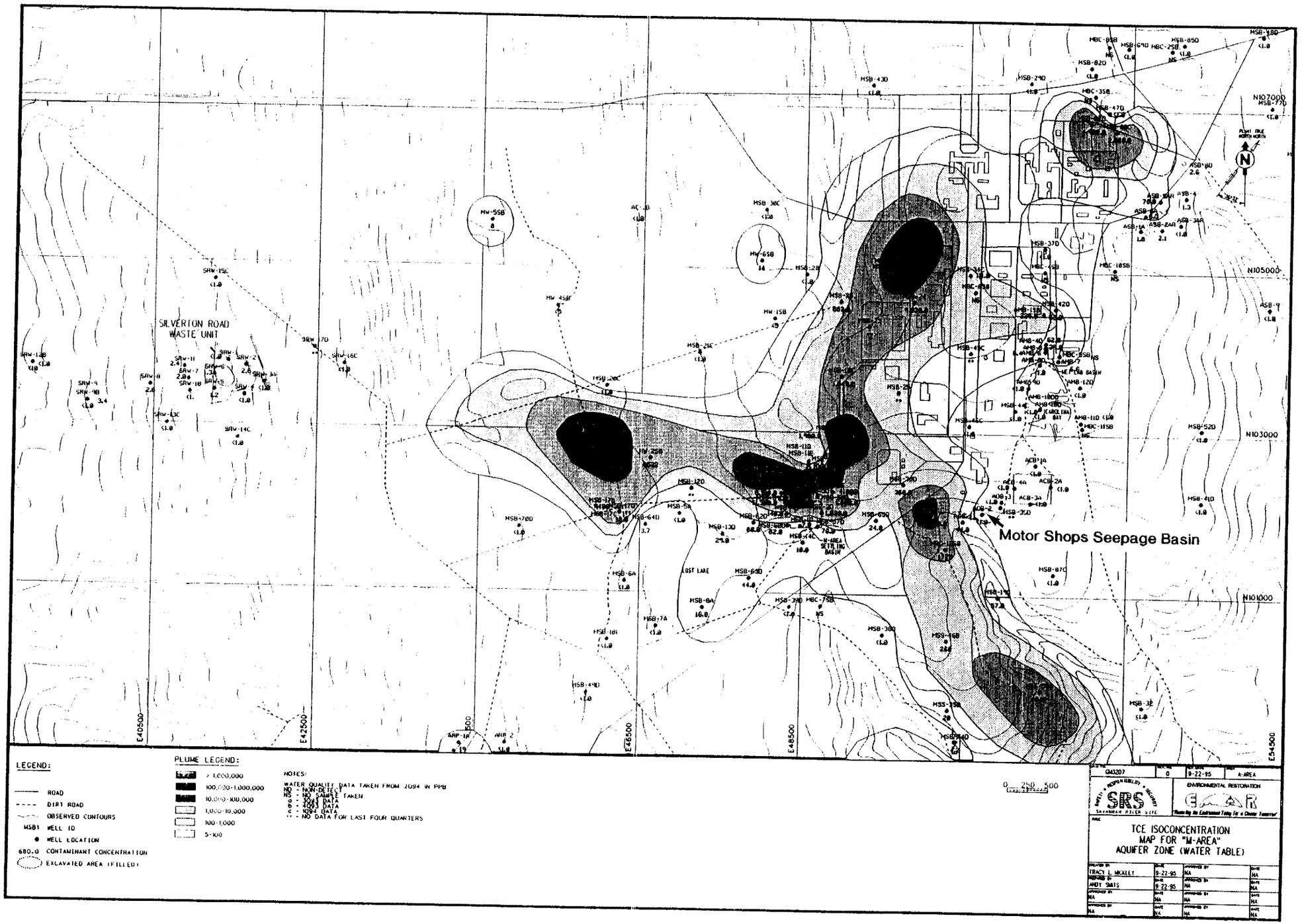
Chlorinated Hydrocarbons and Carbon-Chain Compounds (C_5 - C_{10}) (ppm)	Range	Frequency of Detection
Pentane	ND - 1.19	5/55
Hexane	ND	0/55
Heptane	ND - 0.64	1/55
Benzene	ND	0/55
Octane	ND	0/55
Toluene	ND	0/55
Nonane	ND	0/55
Ethylbenzene	ND	0/55
m and p-Xylenes	ND	0/55
o-Xylene	ND - 1.48	3/55
Decane	ND	0/55
Vinyl Chloride	ND	0/55
Methylene chloride	ND	0/55
trans-1,2-Dichloroethylene	ND	0/55
Chloroform	ND	0/55
1,1,1-Trichloroethane	ND - 0.008	1/55
Carbon tetrachloride	ND	0/55
Trichloroethylene	ND - 0.11	2/55
Tetrachloroethylene	ND - 0.123	9/55
Light Hydrocarbons (ppb)		
Methane	103 - 13,291	55/55
Ethane	9 - 495	55/55
Propane	ND - 160	48/55
i-Butane	ND - 13	1/55
n-Butane	ND - 116	18/55
Ethylene	5 - 273	55/55
Propylene	ND - 1515	50/55
Mercury (µg/g)	ND - 2.9	89/100

From: Pirkle and Masdea 1993
ND - Not Detected
C - Carbon
ppm - parts per million
ppb - parts per billion
µg/g - micrograms (10^{-6}) per gram

Table 1-4. List of Constituents Detected Above the Primary Drinking Water Standards in Groundwater During at Least One Quarter Between the First Quarter of 1991 and the Fourth Quarter of 1995

Constituent	Maximum Contaminant Level[(1)] (mg/L)	Amount Detected (mg/L)	Well	Aquifer
Organic				
Dichloromethane	.005	.0358	AOB1	"M-Area" Aquifer Zone
Tetrachloroethylene	.005	.0470	AOB1	"M-Area" Aquifer Zone
Trichloroethylene	.005	.0641	AOB1	"M-Area" Aquifer Zone
Inorganic				
Antimony	.006	.0085	AOB2	"M-Area" Aquifer Zone
Mercury	.002	.0039	MSB35 A	"Middle Sand" Aquifer Zone of the Crouch Branch Confining Unit

(1) Source: EPA drinking water regulations and health advisories, May 1995
Wells Included: AOB1, AOB2, AOB3, AND MSB35 (A, B, and TA)



RFI/RI/BRA for the
716-A Motor Shops Seepage Basin

Figure 1-11.

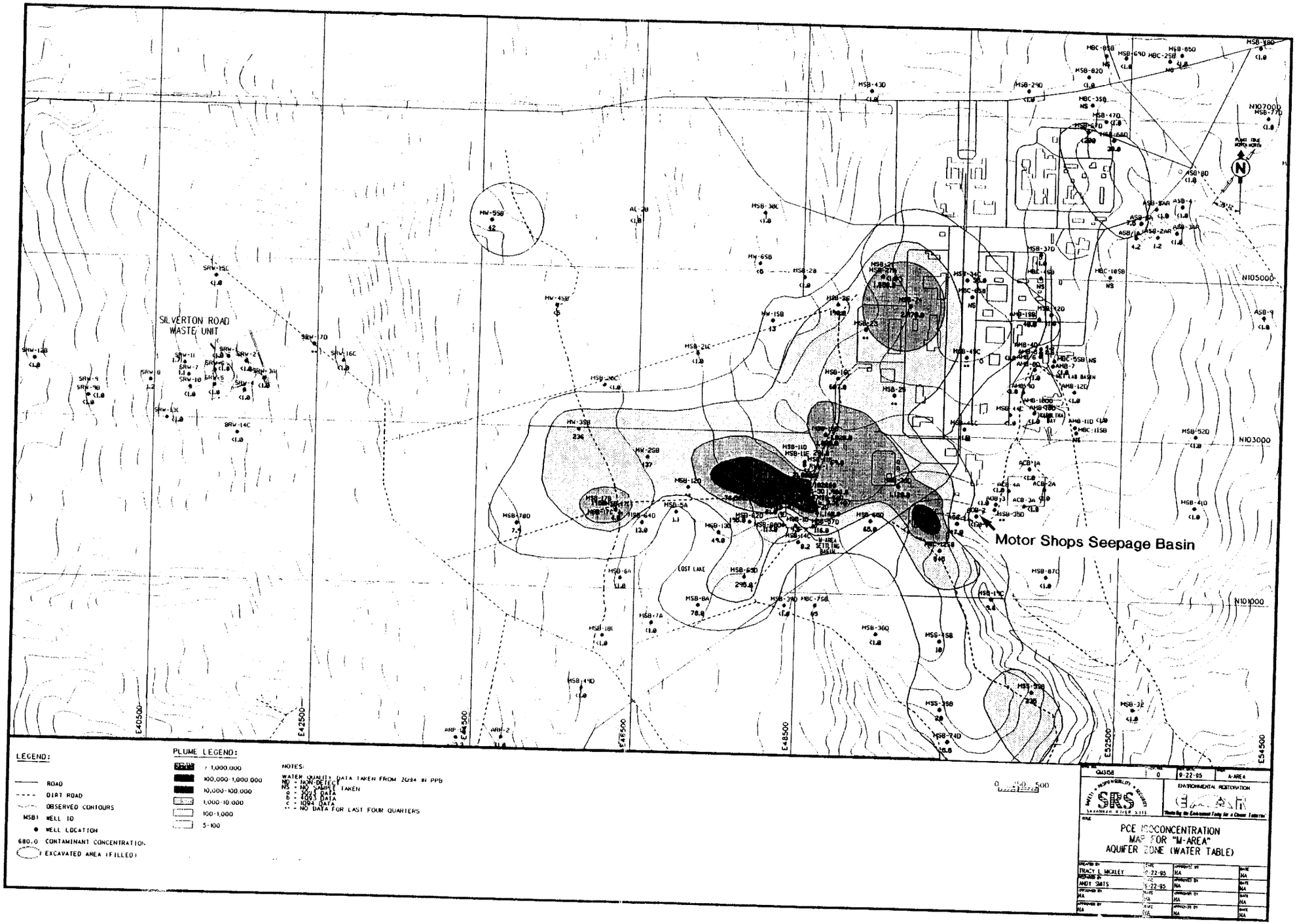

SILVERTON ROAD
WASTE UNIT
Motor Shops Seepage Basin
LOST LAKE
LEGEND:
ROAD
DIRT ROAD
OBSERVED CONTOURS
MSB1 WELL ID
WELL LOCATION
680.0 CONTAMINANT CONCENTRATION
EXCAVATED AREA (FILLED)
PLUME LEGEND:
> 1,000,000
100,000-1,000,000
10,000-100,000
1,000-10,000
100-1,000
5-100
NOTES:
WATER QUALITY DATA TAKEN FROM 2Q94 IN PPB
ND - NON-DETECT
NS - NO SAMPLE TAKEN
2Q93 DATA
3Q93 DATA
1Q94 DATA
- NO DATA FOR LAST FOUR QUARTERS
0 250 500
PCE ISOCONCENTRATION MAP FOR "M-AREA" AQUIFER ZONE (WATER TABLE)
TRACY L MCKLEY
ANDY SMITS
9-22-95
A-AREA
ENVIRONMENTAL RESTORATION

Figure 1-12.

2.0 CONCEPTUAL SITE MODEL AND STUDY AREA INVESTIGATION

The conceptual site model (CSM) guided the RCRA Facility Investigation/Remedial Investigation (RFI/RI) at the 716-A Motor Shops Seepage Basin (MSSB) by identifying the source of contamination, release mechanisms, the media of concern, and the receptors of interest. This section provides the CSM for the MSSB and discusses the field activities as they pertain to the CSM.

2.1 Conceptual Site Model Application

Figure 2-l is a graphical presentation of the mechanisms for release of contaminants from the primary source at the MSSB. The emphasis is on pathways through which contaminants could migrate from the source to receptors. The CSM identifies the source of contaminants, release mechanisms, the media of concern, and the receptors of interest for the unit. The CSM outlines the pathways to potential human and ecological receptors. Each of the seven generic components of the CSM is described below.

Primary Sources of Contamination

The primary source of contamination from within the MSSB is wastewater received through discharge pipes from the process sewer lines after it passed through an oil/water separator. The effluent included trace amounts of engine oil, grease, kerosene, ethylene glycol, detergents, and fuels (petroleum).

Primary Release Mechanisms of Source Contamination

Hazardous wastes may have been released from the primary source of contamination by:

- Deposition of wastewater on the surface soils in the seepage basin
- Infiltration and percolation of wastewater through the seepage basin soils into subsurface soils

Secondary Source of Contamination

Environmental media impacted by release of source contamination may include:

- Surface soil in the seepage basin

- Subsurface soils beneath the seepage basin via infiltration, percolation, and leaching
- Surface soil in the seepage basin via excavation or bioturbation bringing subsurface soils to the surface

Secondary Environmental Release Mechanisms

Environmental media may serve both as a reservoir via chemical bonding and biotic uptake and as a secondary release mechanism for contaminants from the seepage basin. Secondary environmental release mechanisms may include:

- Fugitive dust and/or volatile emissions from surface soils
- Biotic uptake occurring in the seepage basin
- Leaching of contaminants from subsurface soils into the groundwater

Path ways of Exposure

Contact with contaminated environmental media creates the points of exposure evaluated in the Baseline Risk Assessment (BRA). The environmental media to be evaluated include:

- Soil
- Windblown dust and volatile emissions from soils at the seepage basin
- Groundwater (used as potential future domestic water, human health only)
- Biota

Exposure Routes

Exposure routes for human and ecological receptors include:

- Ingestion of contaminated media
- Inhalation of windblown dust and volatile emissions
- Dermal contact with contaminated media

Receptors

Human and ecological receptors are identified below.

Human receptors evaluated include:

- Known on-unit workers
- Hypothetical future on-unit residents
- Hypothetical future industrial on-unit workers

Ecological receptors may include:

- Terrestrial ecological receptors

Aquatic receptors are not considered due to the ephemeral nature of water in the seepage basin and the lack of other aquatic points of exposure.

2.2 Investigation Objectives

The unit history and data collected in 1988 as part of the unit screening did not fully define the nature and extent of contamination at the MSSB. Consequently, a Unit Assessment Plan was designed to address data gaps identified as part of the data quality objective (DQO) process and to determine the nature and extent of contamination that might be harmful to human health and the environment (WSRC 1996c). The data collection was implemented to achieve the following objectives:

- Determine unit-specific background or reference levels for organics and inorganics in soils
- Determine if any unit-specific constituents (USCs) in the evaluation of nature and extent of contamination (Section 4) or constituents of potential concern (COPCs) evaluated in the BRA (Section 6) were present
- Collect data needed to support the human health and ecological BRA
- Collect data to support the treatability/feasibility study

2.3 Unit Assessment Investigation

The Phase I Unit Assessment included installing and sampling six soil borings outside the unit to characterize background constituent concentrations for the area. Six soil borings were also sampled inside the unit to determine the extent of soil contamination and to identify USCs and COPCs (if present). Surface (O-O.3 m [O-l A]) and subsurface (0.3-l .2 m [1-4 R]) samples were collected at each boring. No confining units were penetrated and no groundwater samples were collected during the investigation.

Sampling activities followed the guidelines for soil boring investigations as detailed in Section 6 of the *Hydrogeologic Data Collection* Manual (WSRC 1992). The Unit Assessment activities are described in detail in Appendix A.

The samples were analyzed for the following (EMS 1996):

- Target Compound List (TCL) volatiles
- TCL semivolatiles
- TCL pesticides/polychlorinated biphenyls (PCBs)
- Target Analyte List (TAL) inorganics
- Gross alpha
- Nonvolatile beta
- Cation exchange capacity
- Total Petroleum Hydrocarbons (TPH)
- Total Organic Carbon (TOC)
- Tentatively Identified Compounds (TICs)

Hand auger drilling techniques were used for background and unit sample collection. Prior to sample collection, the soil was removed from the hand auger and visually examined and lithologically described in the field. The lithologic description included grain size, sorting, color, major sediment type, texture, sedimentary structures, and accessory minerals. Geologic logs were prepared in the field and are provided in Appendix A. Quality assurance and sample handling (with associated decontamination) procedures were followed according to the *Hydrogeologic Data Collection* Manual (WSRC 1992).

2.3.1 Background Investigation

The DQO process (described in Section 2.2) recognized background soil data as a data gap. Because the CSM identified surface and subsurface soils as potential secondary sources, six soil borings (ABK-SB1 through ABK-SB6) were installed to obtain unit-specific reference data for soil background characterization (see Appendix A). Figure 2-2 shows the boring locations. The soils at these sampling locations were presumed to be unaffected by unit activities. The soils were analyzed for organic and inorganic constituents, as discussed in Section 4. Analytical data from soils within the MSSB are compared to background soils data to determine USCs and COPCs. The background data from these samples are also used during the BRA to support the human health and ecological risk evaluations.

2.3.2 Primary Source Investigation

According to the CSM, the primary source of contamination from within the MSSB is wastewater received through discharge pipes from the process sewer lines after it passed through an oil/water separator. The effluent included trace amounts of engine oil, grease, kerosene, ethylene glycol, detergents, and fuels (petroleum). All discharges to the basin were terminated in 1983 and the influent lines from the Motor Shops were capped (Huber et al. 1987). The primary environmental media impacted by the release of source contamination include surface and subsurface soils within the MSSB. One data gap identified by the DQO process was whether COPCs or USCs were present in surface and subsurface soils from within the MSSB. Therefore the investigation included analysis of these media.

2.3.3 *Secondary Source Investigation*

Surface and subsurface soils constitute the potential secondary source of contamination within the MSSB. Data gaps identified during the DQO process include (1) analytical data to determine whether COPCs or USCs are present in soils from within the MSSB, (2) data to support the BRA, and (3) data to support the treatability/feasibility study. During the field investigation, six soil borings were installed within the MSSB at the locations shown in Figure 2-3. (The sampling techniques used are described in Appendix A). In each boring, soil samples were collected from O-O.3 m (O-l ft) for the surface

interval and from 0.3-l .2 m (l-4 ft) for the subsurface interval. The soil samples were analyzed for organic and inorganic constituents; the data are discussed in Section 4.

2.3.4 *Exposure Pathway Investigation*

Exposure pathways for potential receptors at the MSSB include soil, air, biota, and groundwater. Surface and subsurface soils were investigated as described in Section 2.3.3. The results of the soils investigation indicate that no further investigation is warranted.

2.3.5 *Physical Characteristics Investigation*

Regional information about the Savannah River Site (SRS) was reviewed to develop a more complete environmental setting of the MSSB. This information was obtained from existing documents that describe geologic and hydrogeologic properties within specific areas of the SRS. The unit-specific environmental setting is presented in Section 1.3.2.

Piezometric cone penetrometer technology tests and field hydraulic permeability tests (slug tests) to determine the physical characteristics of unit aquifer and confining layers were planned as part of the Phase II Unit Assessment. Based on the results of Phase I, however, the Phase II assessment is not required.

SECTION 2

FIGURES

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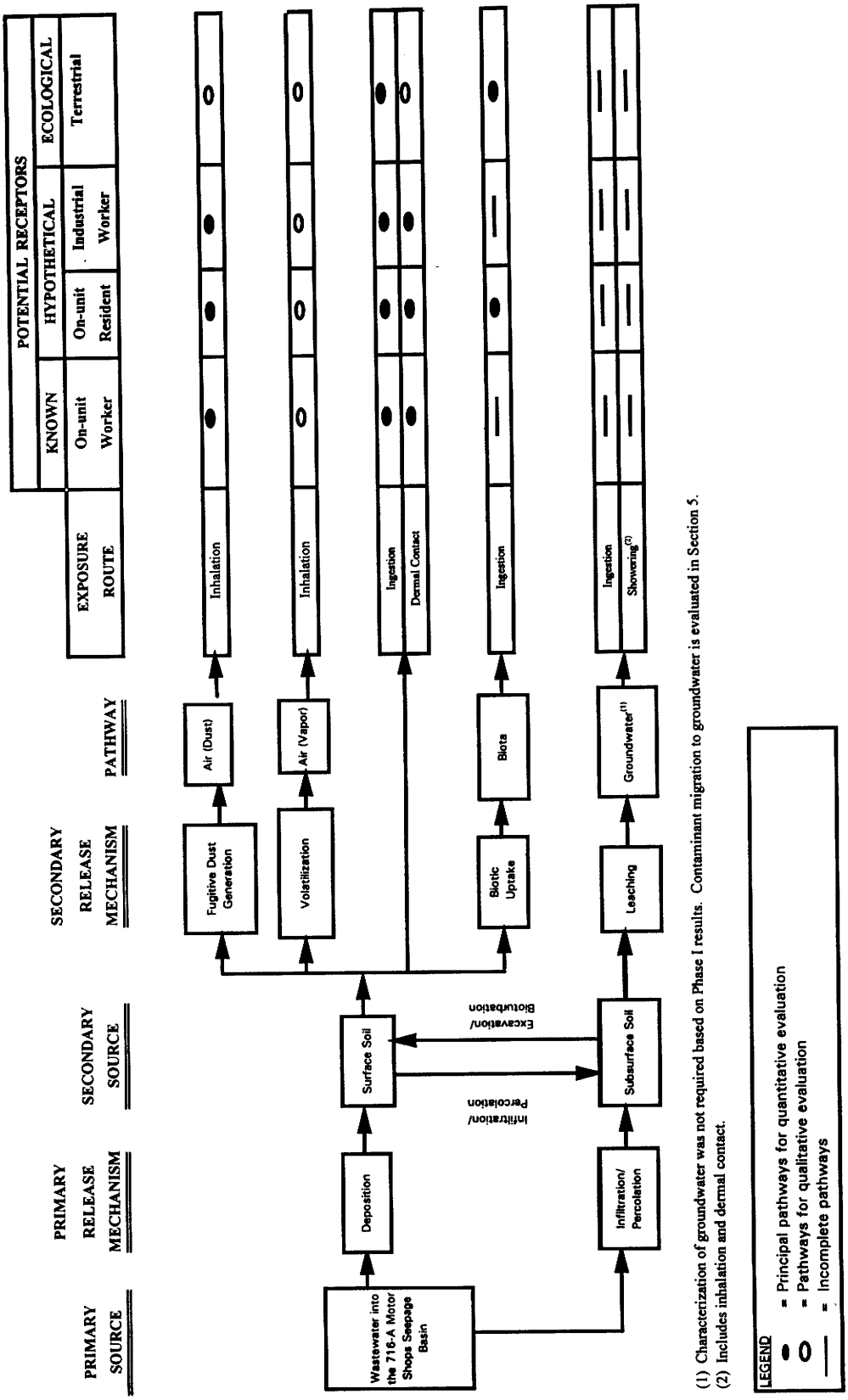

Figure 2-1. Conceptual Site Model: 716-A Motor Shops Seepage Basin

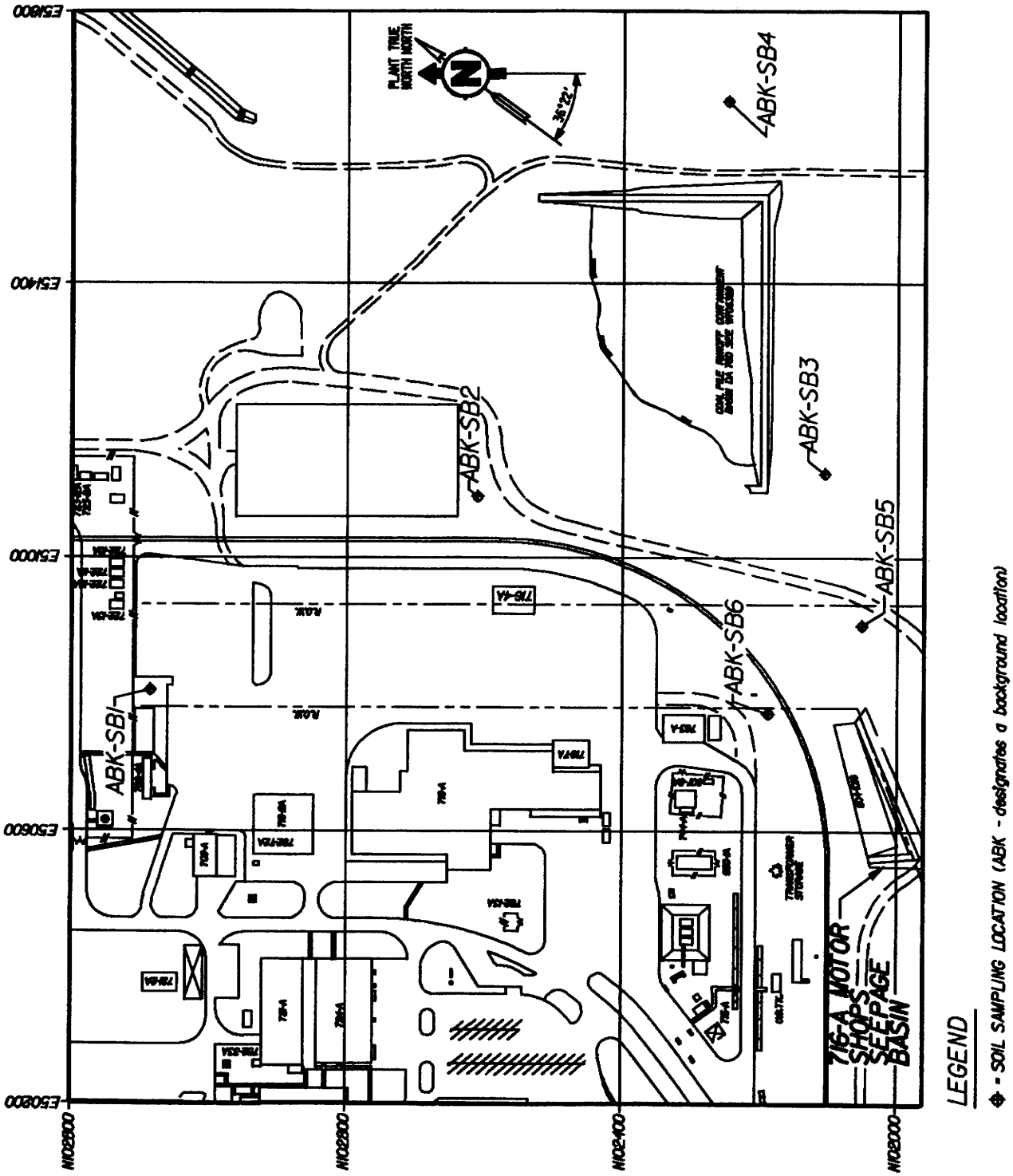

Figure 2-2. 716-A Motor Shops Seepage Basin Background Characterization Locations

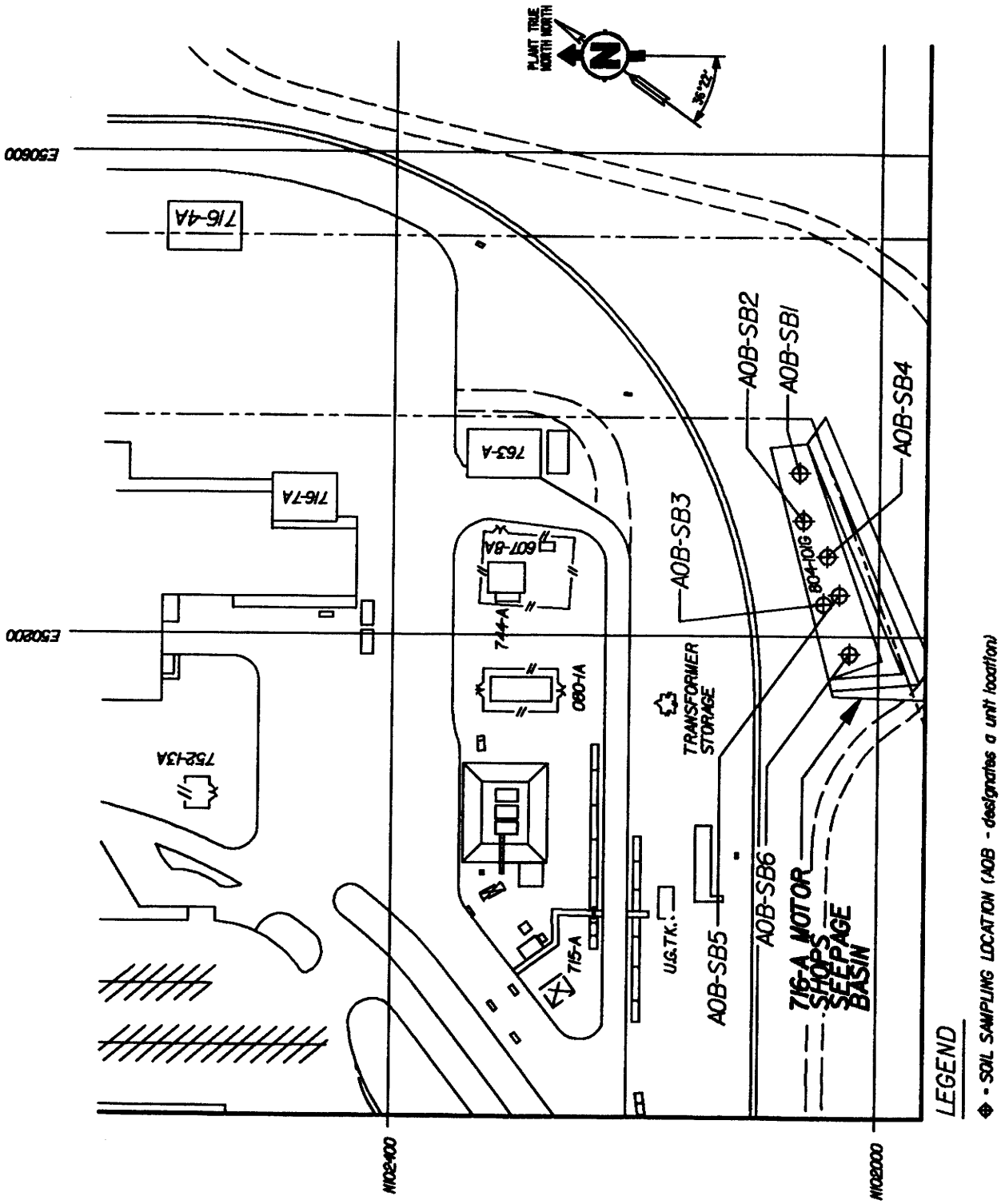

Figure 2-3. 716-A Motor Shops Seepage Basin Characterization Locations

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3.0 PHYSICAL CHARACTERIZATION OF THE STUDY AREA

3.1 **Surface** Features

The 716-A Motor Shops Seepage Basin (MSSB) is located at an elevation of approximately 107 m (350 ft) above mean sea level (msl) on the side of a steep man-made slope. The surrounding area varies in elevation between 104-107 m (340-350 ft) above msl and slopes gently to the southeast. The basin measures 63.1 m (207.0 ft) long, 10.7 m (35.1 ft) wide, and 2.0 m (6.6 ft) deep (Huber et al. 1987), with a total operational capacity of approximately 12 18 m^3 (43,000 ft^3). The seepage basin is surrounded by a berm 2.0 m (6.6 ft) high. The berm of the basin is grown over with grass, weeds, and small trees. A ramp was built into the eastern end of the basin in 1988 (WSRC 1990a) to facilitate soil sampling. At present, the basin collects rainwater during periods of heavy precipitation.

3.2 **Meteorology**

The Savannah River Site (SRS) maintains a system of seven meteorological towers located adjacent to each production area and at the WJBF-TV tower about 9 miles north of the site. Data from these various sources have been compiled and published in several documents including the *SRS Environmental Report for 1995* (WSRC 1996b). Generally, the SRS region has a temperate climate with short, mild winters and long, humid summers. The average annual temperature is 17.2°C (63°F), with daily temperatures ranging from 21-33°C (70-92°F) in the summer, and 3.9-15°C (39-59°F) in the winter. Average annual precipitation is approximately 111.7 cm (44 in), predominantly in the form of rainfall with an occasional snowfall. The average annual wind speed is approximately 11.25 km/hr (7 mph), generally to the southeast or northwest.

3.3 **Surface Water Hydrology**

The MSSB is located in the Upper Three Runs watershed. The ground surface in the vicinity of the MSSB slopes to the southeast in the direction of Tims Branch, approximately 1220 m (4000 ft) away, which is the closest natural surface water drainage. There is no surface water connection between the MSSB and Tims Branch or any drainage feature in the area.

3.4 Unit Soils

The soil types in and adjacent to the MSSB have been identified as Blanton Sand, Udorthent-Urban Land Complex, and Udorthent soils of the Hawthorne/Barnwell Formations (United States Soil Conservation Service 1990). Udorthent soils generally include other standard soil series that have been disturbed through construction work and/or pit filling operations. Udorthent soils show a wide compositional variability consisting of gravels, sands, and clays. They typically have low available water capacity, low organic matter content, strong acidity, and moderately slow to rapid permeability.

Sediments encountered during a previous investigation (WSRC 1990a) consist of yellowish-brown to orange-pink to reddish-brown, fine-grained sand with clay. The sands are generally well sorted and subangular.

3.5 Geology

3.5.1 *Regional Geology*

Figure 3-*1* shows the stratigraphic sequence at the SRS. The SRS is underlain by a seaward-thickening wedge of unconsolidated and semiconsolidated fluvial, deltaic, and marine sediments. The sedimentary wedge thickens from approximately 198 m (650 ft) at the northern boundary of SRS to approximately 366 m (1200 ft) at the southern boundary. These sediments range in age from Late Cretaceous to Holocene. The Late Cretaceous sediments rest directly on saprolite derived from underlying crystalline basement rocks of Precambrian/Paleozoic age or on Triassic-age sediments, which occupy the fault-bounded Dunbarton Basin.

3.5.1.1 Paleozoic and Triassic

Data from a few deep wells and coreholes indicate that the Paleozoic crystalline basement rock is composed of chlorite-hornblende schist, hornblende gneiss, and lesser amounts of other types of crystalline rock. The Triassic Dunbarton Basin sediments are composed of poorly sorted conglomerate and sand and clay; they are generally dark red in color.

3.5.1.2 Cretaceous

The Cretaceous sediments comprise the Lumbee Group, which includes four formations. In ascending order, these are the Cape Fear, Middendorf, Black Creek, and Steel Creek Formations. The dip of the upper surface of the Lumbee Group is to the southeast at approximately 4 m/km (21 ft/mile) across the SRS. The Cape Fear Formation nonconformably overlies the weathered and eroded surface of the basement complex, and consists of a heterogeneous sequence of clays, sandy clays, and clayey sands. The Middendorf Formation unconformably overlies the Cape Fear Formation and consists of medium- to coarse-grained, poorly sorted, angular, tan to yellow sands. The Black Creek Formation consists of clay laminae interbedded with layers of fine-grained clayey sand. The Steel Creek Formation consists of medium to coarse, yellow to gray sand interbedded with clay.

3.5.1.3 Paleocene and Early Eocene

Paleocene and Early Eocene sediments of the Black Mingo Group overlie the Cretaceous sediments. The upper surface dips to the southeast at about 3 m/km (16 ft/mile) across the SRS. At the SRS, the Black Mingo Group consists of the Lang Syne/Sawdust Landing and the Snapp and Fourmile Formations. The Lang Syne/Sawdust Landing Formation is composed of two dark gray to black, fining upward, sand-to-clay sequences. It is unconformably overlain by the Snapp Formation in the southern part of the SRS; however, in the A/M Area, the Snapp Formation is not present. In the A/M Area the Lang Syne/Sawdust Landing Formation is overlain by the Fourmile Formation. The Fourmile Formation consists of white to brown, moderately well sorted, coarse- to fine-grained sands.

3.5.1.4 Eocene

Eocene sediments of the Orangeburg Group overlie the Black Mingo Group. The Orangeburg Group consists of the lower Middle Eocene Congaree Formation and the Upper/Middle Eocene Warley Hill and Santee Formations. Sediments of the Orangeburg Group are exposed at lower elevations in many places on and near the SRS. The sediments thicken from approximately 30.5 m (100 ft) at the northwestern SRS boundary to 49 m (160 ft) near the southeastern boundary. The dip of the upper surface of the

Orangeburg sediments is about 2.2 m/km (12 ft/mile) to the southeast of the site. Downdip at the coast, the Orangeburg Group is about 99 m (325 ft) thick.

Sediments of the Congaree Formation consist predominantly of well sorted, fine to coarse quartz sand. Thin, discontinuous clay layers occur locally near the middle and bottom of the formation. The sands are typically poorly sorted and vary in color from yellow to orange, tan, and green.

Fining upward sands of the Warley Hill Formation unconformably overlie the Congaree Formation. Silt and clay content increases and glauconite is more common in the Warley Hill Formation. The Santee Formation overlies the Warley Hill and is composed of sands, calcareous sands, clays, and limestone. The calcareous portion of the Santee Formation is absent in the A/M Area. "Green clay" beds in the interval are referred to in many SRS reports.

The Upper Eocene Bamwell Group, which overlies the Santee Formation, is subdivided into the Clinchfield, Dry Branch, and Tobacco Road Formations. The Clinchfield Formation is not present in the A/M Area. The Dry Branch Formation is subdivided into three members: the Griffins Landing Member, which is also not present in the A/M Area; the Irwinton Sand Member, which consists of moderately sorted sand with locally abundant clay layers; and the Twiggs Clay Member, which is present at various stratigraphic intervals within the Dry Branch Formation but it is not continuous over long distances. The Twiggs Clay Member, called the "tan clay" in many SRS reports, consists of thin, laminated clays and clayey sand.

The uppermost Eocene unit is the Tobacco Road Formation, which consists of clayey, very fine- to medium-grained sands and sandy clays. The Miocene Upland Unit Formation was deposited in swales eroded into the underlying Bamwell Group. The Upland Unit consists of clayey, poorly sorted, feldspathic, angular, coarse-grained sand and sandy pebble zones. Cross-bedding is evident in outcrops.

3.5.2 *Unit-Specific Geology*

The unit-specific geology of the A/M Area indicates the following (Huber et al. 1987):

- The Lumbee Group (also known as the "Tuscaloosa" section) is similar to that for the central SRS

- The Lang Syne/Sawdust Landing Formation is mostly a gray clayey sand or sandy clay with mica and marcasite or gypsum
- The Congaree Formation is generally a clayey sand with fewer separate lenses of clay and sand than for the central SRS
- The calcareous zone of the Santee Formation is absent
- The Green Clay is discontinuous
- The Clinchfield Formation is absent
- The Griffins Landing Member of the Dry Branch Formation is absent
- The Twiggs Clay Member of the Dry Branch Formation is about 1 m (3.3 A) thick and lies in the unsaturated zone

3.6 Hydrogeology

3.6.1 Regional Hydrogeology

Two hydrogeologic provinces have been identified at the SRS, the Southeastern Coastal Plain hydrogeologic province and the underlying Piedmont hydrogeologic province (Aadland and Bledsoe 1990). The Southeastern Coastal Plain hydrogeologic province has been divided into three aquifer systems separated by two confining systems (WSRC 1995b) (Figure 3-2). The hydrogeologic units of interest to this investigation are contained within the Southeastern Coastal Plain hydrogeologic province, a multilayered hydrologic system, which consists of unconsolidated Coastal Plain sediments of Late Cretaceous and Tertiary age.

The Southeastern Coastal Plain hydrogeologic province is separated from the underlying Piedmont hydrogeologic province by the Appleton Confining System. The Appleton Confining System correlates generally with the Cape Fear Formation (Figure 3-l) and represents the bottom of the Cretaceous section at the SRS. Because of its fine-grained and clayey character, the Cape Fear Formation is an effective confining unit separating the water-bearing units of the Cretaceous section from the basement complex, which contains water of poor quality in Paleozoic crystalline rocks and Triassic-age sediments.

In descending order, the aquifer systems at the SRS include the Floridan aquifer system, the Dublin aquifer system, and the Midville aquifer system. The Floridan aquifer system

is separated from the underlying Dublin aquifer system by the Meyers Branch Confining System. The Dublin aquifer system is separated from the underlying Midville aquifer system by the Allendale Confining System.

In the northern portion of the SRS (Ah4 Area), however, the Meyers Branch and Allendale confining systems are discontinuous, forming the Floridan-Midville aquifer system. The Floridan-Midville aquifer system is also divided into three aquifers, which are separated by two confining units (Figure 3-2). In descending order, the Steed Pond aquifer is underlain by the Crouch Branch confining unit, which separates the Steed Pond aquifer from the Crouch Branch aquifer. The Crouch Branch aquifer is separated from the underlying McQueen Branch aquifer by the McQueen Branch confining unit.

Within the A Area, approximately 30 percent of precipitation (38.5 cm/yr [15 in/yr]) enters the groundwater system (Cahill 1982). Recharge for the A Area predominantly infiltrates and recharges the Steed Pond Aquifer, which discharges as surface water to Tims Branch, Upper Three Runs Creek, and the Southwest Swamps (Marine and Bledsoe 1984). The Crouch Branch Aquifer receives recharge from an outcrop area approximately 4 km (2.5 miles) north of the A Area and from the overlying Steed Pond Aquifer through the Crouch Branch confining unit. Discharge from the Crouch Branch Aquifer occurs to the southwest along the Savannah River (Lewis and Aadland 1992).

Because of an apparent overall strong potential for vertical movement of groundwater throughout the A Area, the thickness, horizontal continuity, and extent of the local confining units and zones control the overall velocity and direction of groundwater within the A-Area. Hydrostratigraphic interpretations indicate that the “green clay” confining zone, which separates the M-Area Aquifer zone and the Lost Lake Aquifer zone, thins in a northerly direction. In addition, the Crouch Branch Confining Unit thins in a similar fashion toward the northern portion of the A Area. This hydrostratigraphic condition allows groundwater to penetrate deeper into the underlying units.

As indicated in Figure 3-2, the confining units thin out in the northern portion of the SRS (which includes the A/M Area) and the three aquifer systems coalesce to form one aquifer system, called the Floridan-Midville aquifer system.

3.6.2 Unit-Specific Hydrogeology

In the A/M Area the Floridan-Midville aquifer system is *170* m (557 ft) thick and extends from the water table to the Appleton Confining System (WSRC 1995b). The aquifer system is divided into three aquifers separated by two confining units (Figure 3-3). For the purposes of this investigation, the Steed Pond and Crouch Branch aquifers are of greatest interest. Both of these aquifers and the Crouch Branch confining unit are described in detail below based upon information contained in WSRC (1995b). Unit-specific hydrogeologic parameters were assessed in WSRC (1995b) using hydrologic data, including aquifer tests, potentiometric maps, and laboratory analyses of undisturbed samples.

Steed Pond Aquifer

The Steed Pond aquifer is 29.5 m (97 ft) thick and is divided into two zones in the A/M Area, the "M-Area" aquifer zone and the "Lost Lake" aquifer zone. The two zones are separated by the "green clay" confining zone as shown in Figure 3-3. Porosity and calculated permeability values for Steed Pond aquifer sands range from 25 to 41 percent (average 34 percent) and 0.7-149 m/d (2.4-489 ft/d) (mean 23 m/d [75.6 ft/d]), respectively (WSRC 1995b).

"M-Area" Aquifer Zone

In the A/M Area, the "M-Area" aquifer zone extends from the water table (approximately 46 m [150 ft] bls) to the "green clay" confining zone and consists of sands of the Santee and Dry Branch Formations. The thickness (saturated interval) of the "M-Area" aquifer zone is 6.1 m (20 ft) (WSRC 1996c). Recharge enters the "M-Area" aquifer through precipitation and infiltration. A potentiometric surface map of the "M-Area" aquifer zone in the A/M Area, shown in Figure 3-4, indicates that the groundwater flow direction is to the west-northwest for the aquifer zone in the vicinity of the MSSB. Hydraulic conductivity values, based upon slug tests, range from 0.003-3.31 m/d (0.01-10.87 ft/d) (average 0.67 m [2.19 ft/d]) (WSRC 1995b). Horizontal hydraulic gradients for the aquifer zone have been calculated between 0.001-0.002 m/m (0.0034-0.0068 ft/ft).

"Green Clay" Confining Zone

The "green clay" confining zone separates the "M-Area" aquifer from the underlying "Lost Lake" aquifer zone and ranges from 2.4-8.2 m (8-27 ft) thick (average 5.2 m [17 ft]) in the vicinity of the MSSB (WSRC 1995b). The confining zone is composed of sands, silts, and clays of the Warley Hill Formation (Fallaw and Price 1994).

"Lost Lake" Aquifer Zone

The "Lost Lake" aquifer zone is composed of undifferentiated sands of the Congaree and Four-mile Formations. The aquifer zone ranges from 17-26 m (55-86 ft) in thickness (average 18.3 m [60 ft]). A potentiometric map of the lower "Lost Lake" aquifer zone, shown in Figure 3-5, indicates that the groundwater flow direction is to the southwest in the vicinity of the MSSB.

Based upon slug test data, hydraulic conductivity estimates for the "Lost Lake" aquifer zone range from 0.4-23.7 m/d (1.3-77.7 ft/d) (average 5.8 m/d [18.9 ft/d]) (WSRC 1995b). Horizontal hydraulic gradients for the aquifer zone in the vicinity of the MSSB have been determined to be 0.0008 m/m (0.0027 ft/ft) (WSRC 1995b).

Crouch Branch Confining Unit

The Crouch Branch confining unit separates the Steed Pond aquifer from the underlying Crouch Branch aquifer. In the A/M Area the confining unit ranges in thickness from O-24.7 m (0 to 81 ft) and is composed of clays, silts, and sands of the Steel Creek, Lang Syne/Sawdust Landing, and Snapp Formations.

In the A/M Area, the Crouch Branch confining unit is composed of three zones, the "upper clay" confining zone, the "middle sand" aquifer zone, and the "lower clay" confining zone.

"Middle Sand" Aquifer Zone

The "middle sand" aquifer zone ranges in thickness from 3.7 to 20.7 m (12 to 68 ft) (average 11 m [33 ft]) in the A/M Area and is composed of sands, silts, and clays of the Lang Syne/Sawdust Landing Formation. The potentiometric surface of the aquifer zone, shown in Figure 3-6, indicates that the groundwater flow direction is to the southwest in

the vicinity of the MSSB. Hydraulic gradients are estimated to be 0.0015 m/m (0.005 ft/ft) and hydraulic conductivity estimates, based upon slug test data, range from 1.25-24.5 m/d (4.10-80.51 ft/d) (average 14.5 m/d [47.4 ft/d]) (WSRC 1995b).

Crouch Branch Aquifer

The Crouch Branch aquifer ranges in thickness from 46.3-55 m (152-180 ft) in the Ah4 Area and is composed of sands of the Black Creek and Steel Creek Formations. It is the principal water-producing aquifer at the SRS.

The potentiometric surface of the Crouch Branch aquifer, shown in Figure 3-7, indicates that the groundwater flow direction in the vicinity of the MSSB is to the southwest. The horizontal hydraulic gradient for the aquifer is 0.003 m/m (0.001 ft/ft) in the A/M Area and the hydraulic conductivity is estimated as 8.5 m/d (28 ft/d) (WSRC 1995b).

3.7 Demography and Land Use

3.7.1 *Demographics*

The SRS is located approximately 40 km (25 miles) southeast of Augusta, Georgia, and 32 km (20 miles) south of Aiken, South Carolina. Table 3-l presents the average population densities for the surrounding counties.

The population within these eight counties was 460,079 persons in 1990; the projected population in the year 2000, according to the Georgia Office of Planning and Budget and South Carolina State Budget and Control Board, will be 528,329.

Six area counties provide 90 percent of the SRS work force: Columbia and Richmond Counties in Georgia; and Aiken, Allendale, Bamberg, and Barnwell counties in South Carolina (DOE 1994). Demographic data indicate that between 1980 and 1990, the population of these six counties increased by 13 percent from 376,000 to 425,658. It is expected to increase to 493,8 12 by the year 2000.

3.7.2 *Land Use*

Land in the vicinity of the SRS is predominantly rural and undeveloped. Less than 5 percent of the land within an 80.5-km (50-mile) radius of the SRS is presently devoted to

urban and developed uses. Most urbanized development is in and around the cities of Augusta, Georgia, and Aiken, South Carolina (DOE 1990). Agriculture accounts for approximately 24 percent of the total land use; while forests, wetlands, water bodies, and unclassified land that is predominantly rural account for approximately 70 percent of the total land use.

Less than 5 percent of the total SRS land area is used by facilities engaged or formerly engaged in the production of special nuclear materials. Reservoirs and ponds comprise approximately 12.9 km^2 (5 mi^2) of the SRS. The remainder of the more than 777 km^2 (300 mi^2) is comprised of natural vegetation and pine plantations. The proposed future land use for the SRS is expected to remain industrial. A 2 percent increase in the development of urban land surrounding the SRS is projected by the year 2000.

SECTION 3

FIGURES

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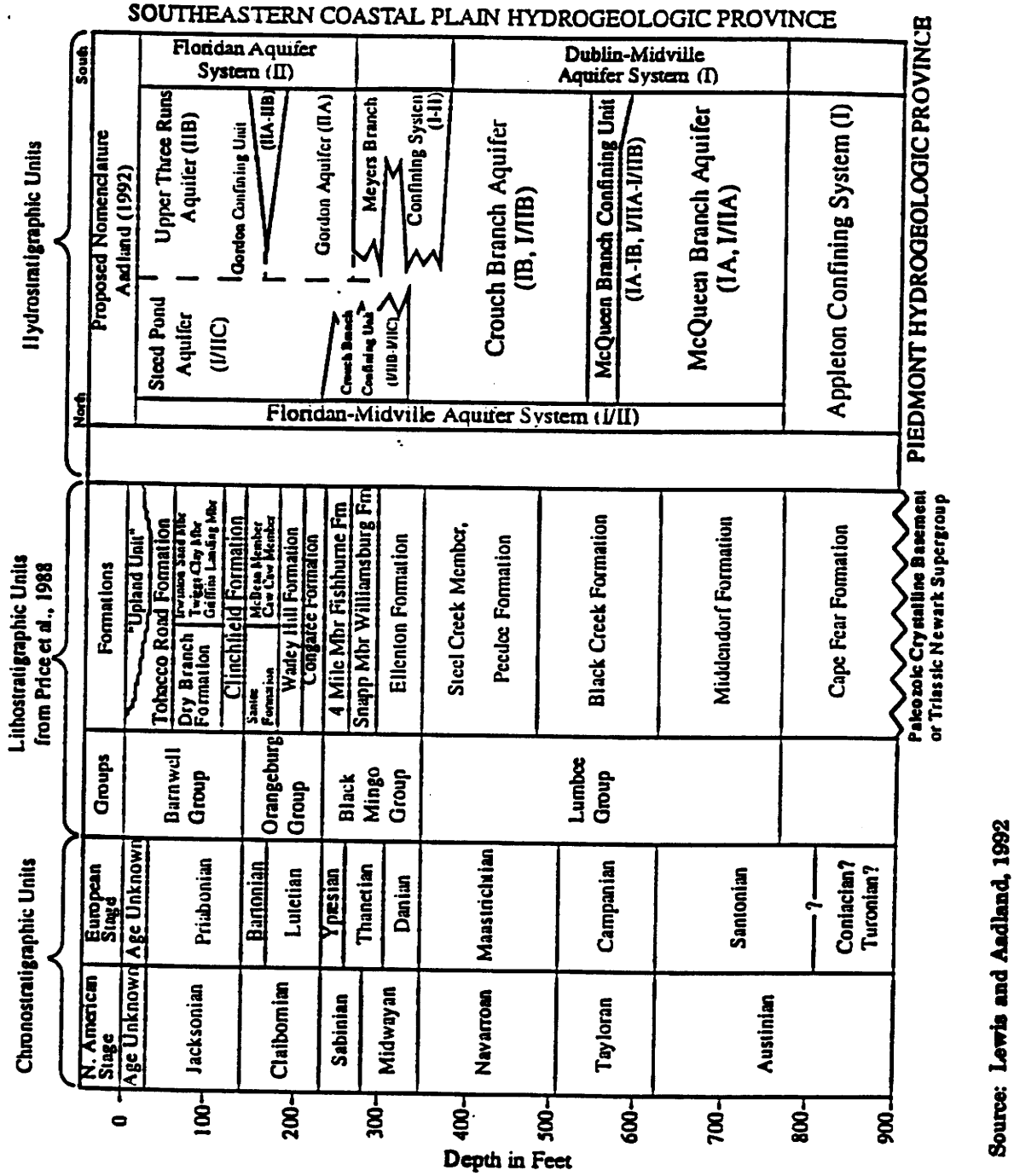


Figure 3-1. Comparison of Chronostratigraphic, Lithostratigraphic, and Hydrostratigraphic Units at the Savannah River Site

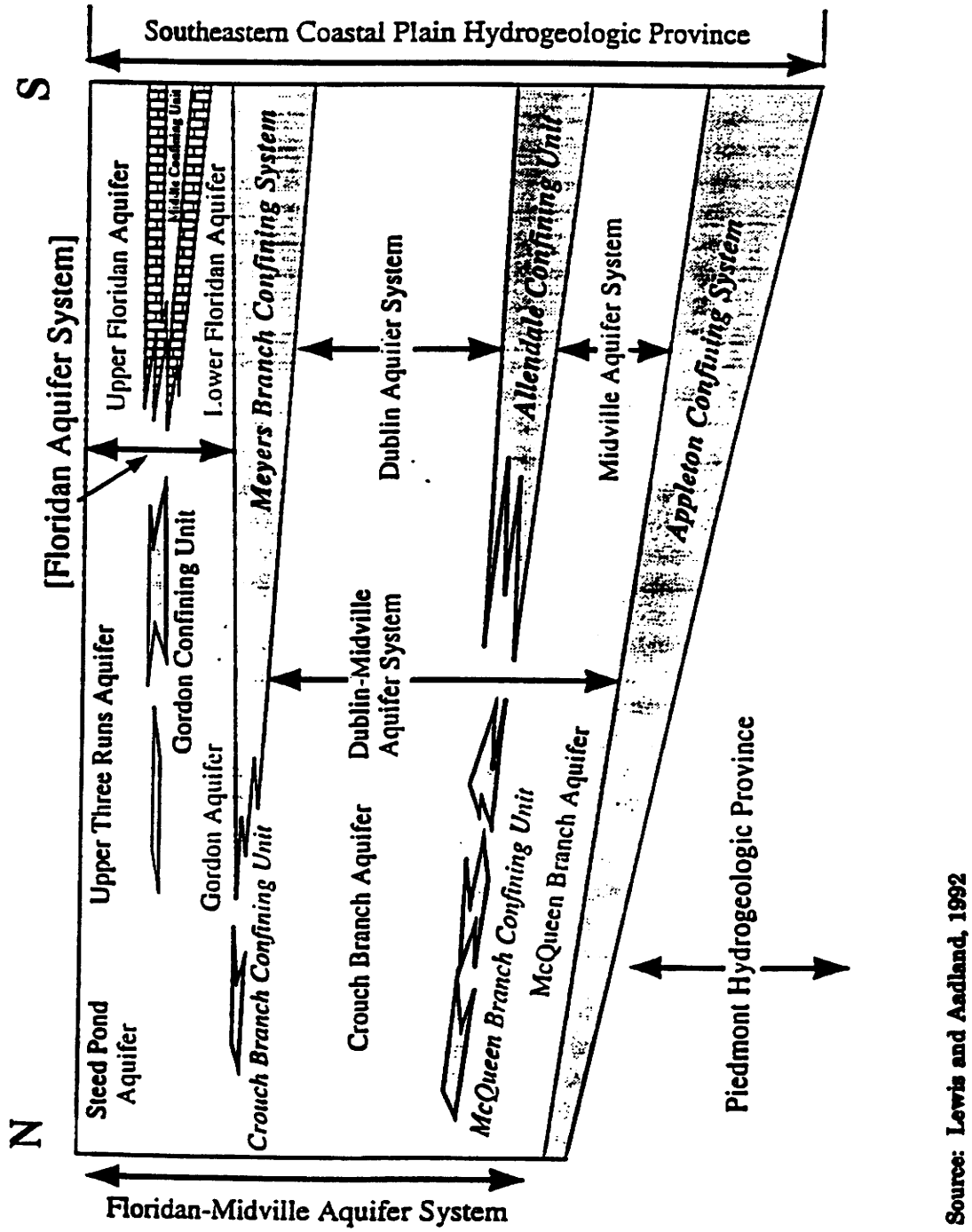
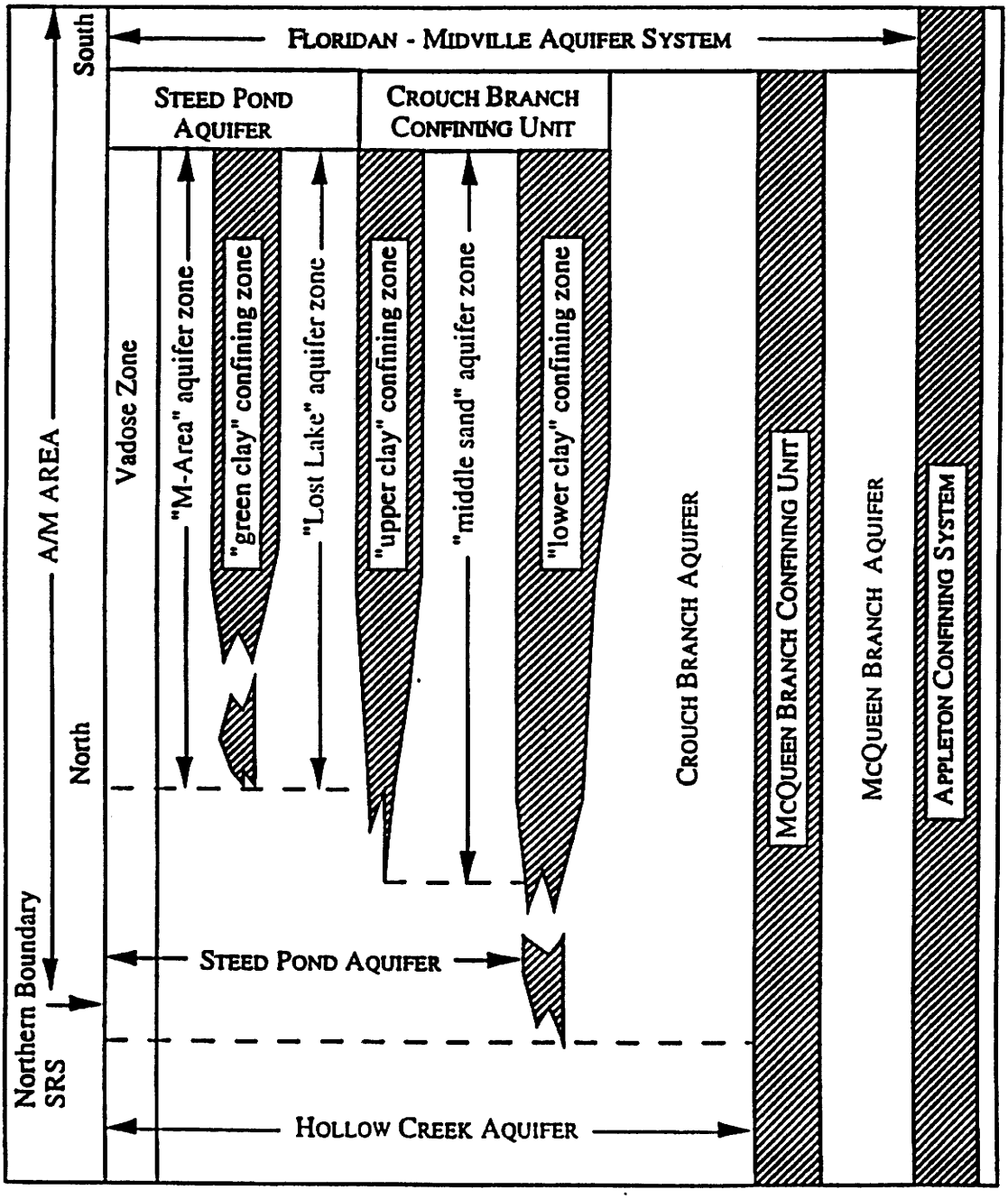


Figure 3-2. Hydrogeologic Nomenclature for the Savannah River Site



Source: Lewis and Aadland, 1992

Figure 3-3. Hydrostratigraphic Chart for the A/M-Area

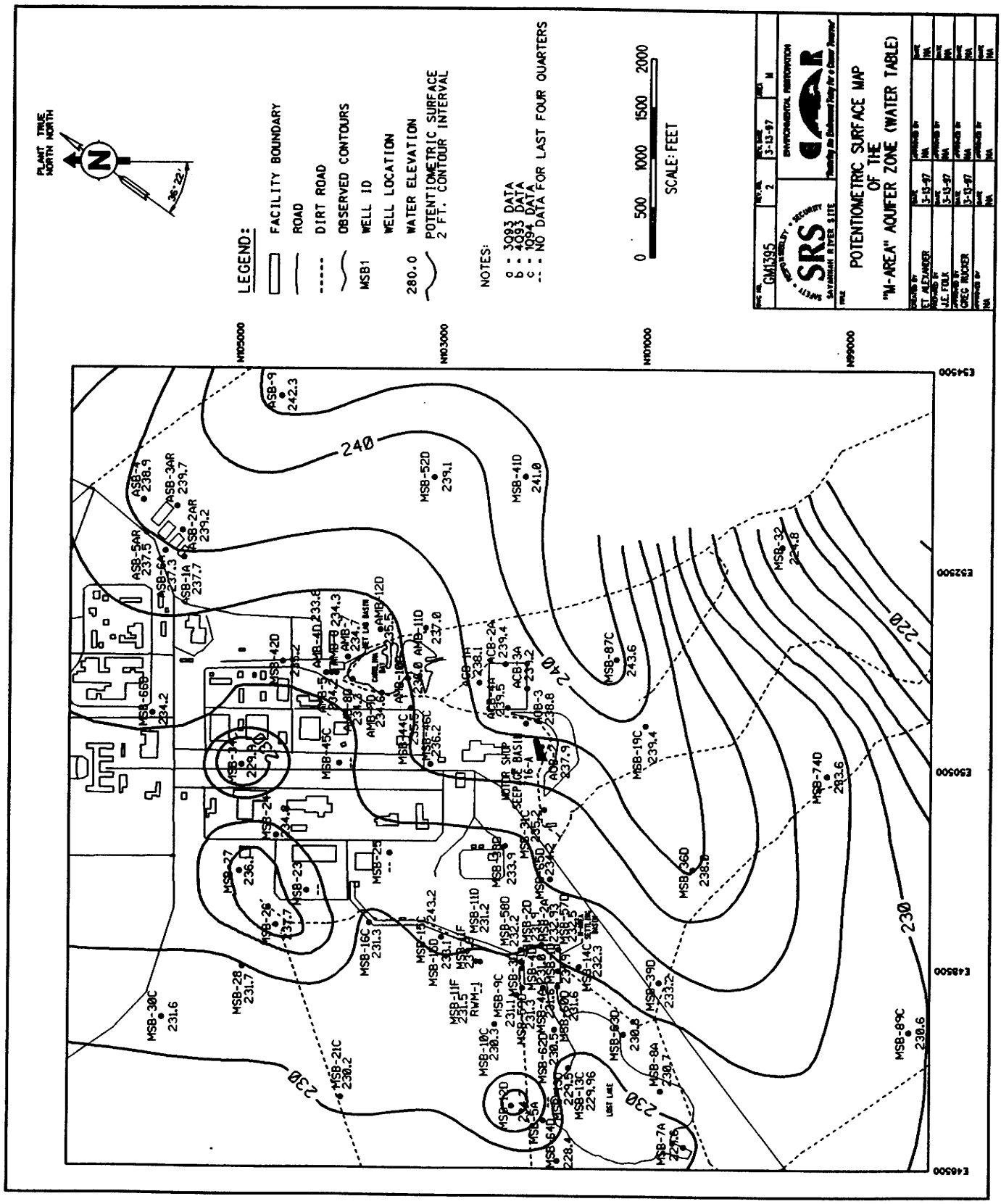


Figure 3-4. Potentiometric Surface of the "M-Area" Aquifer Zone

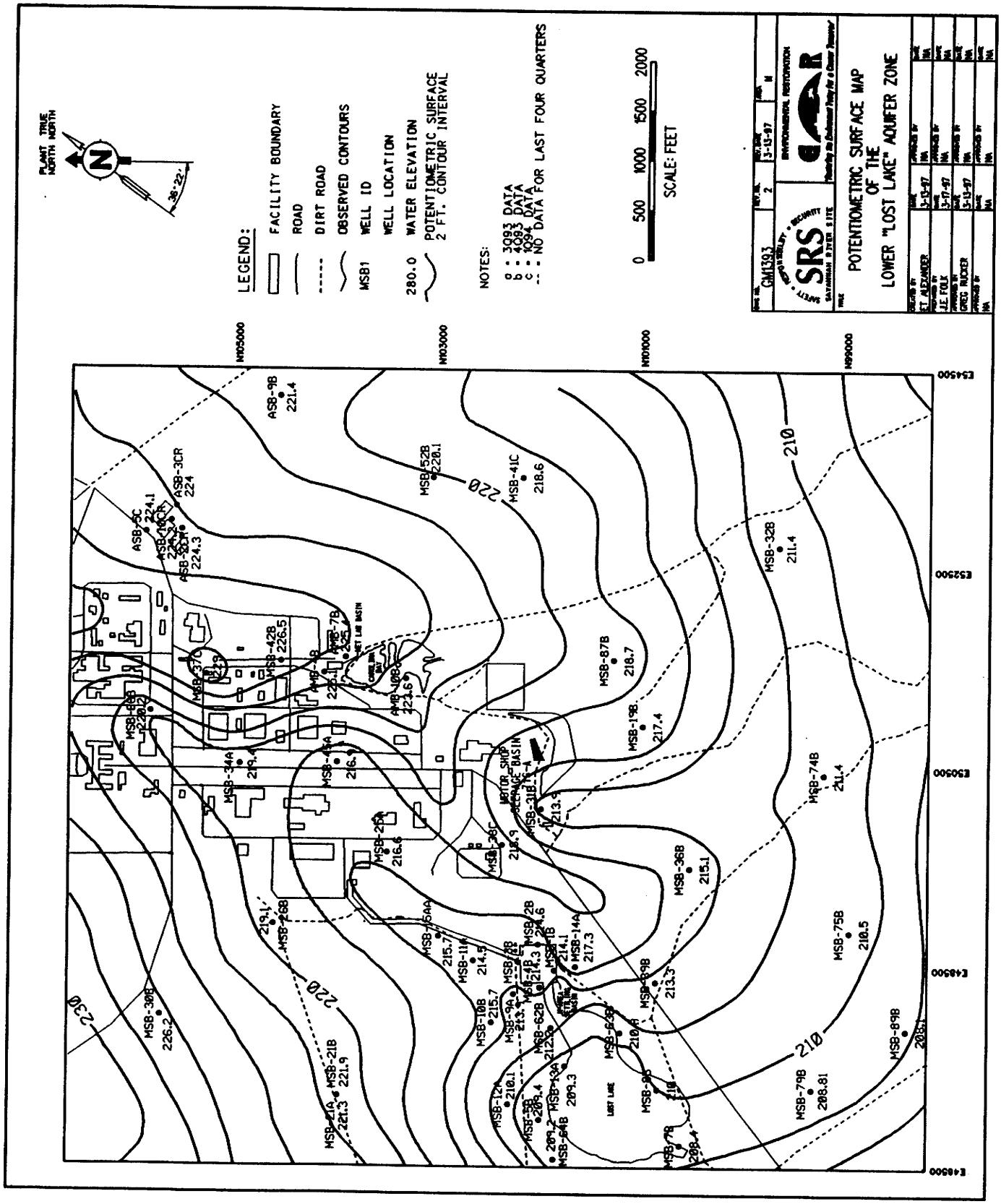


Figure 3-5. Potentiometric Surface of the Lower "Lost Lake" Aquifer Zone

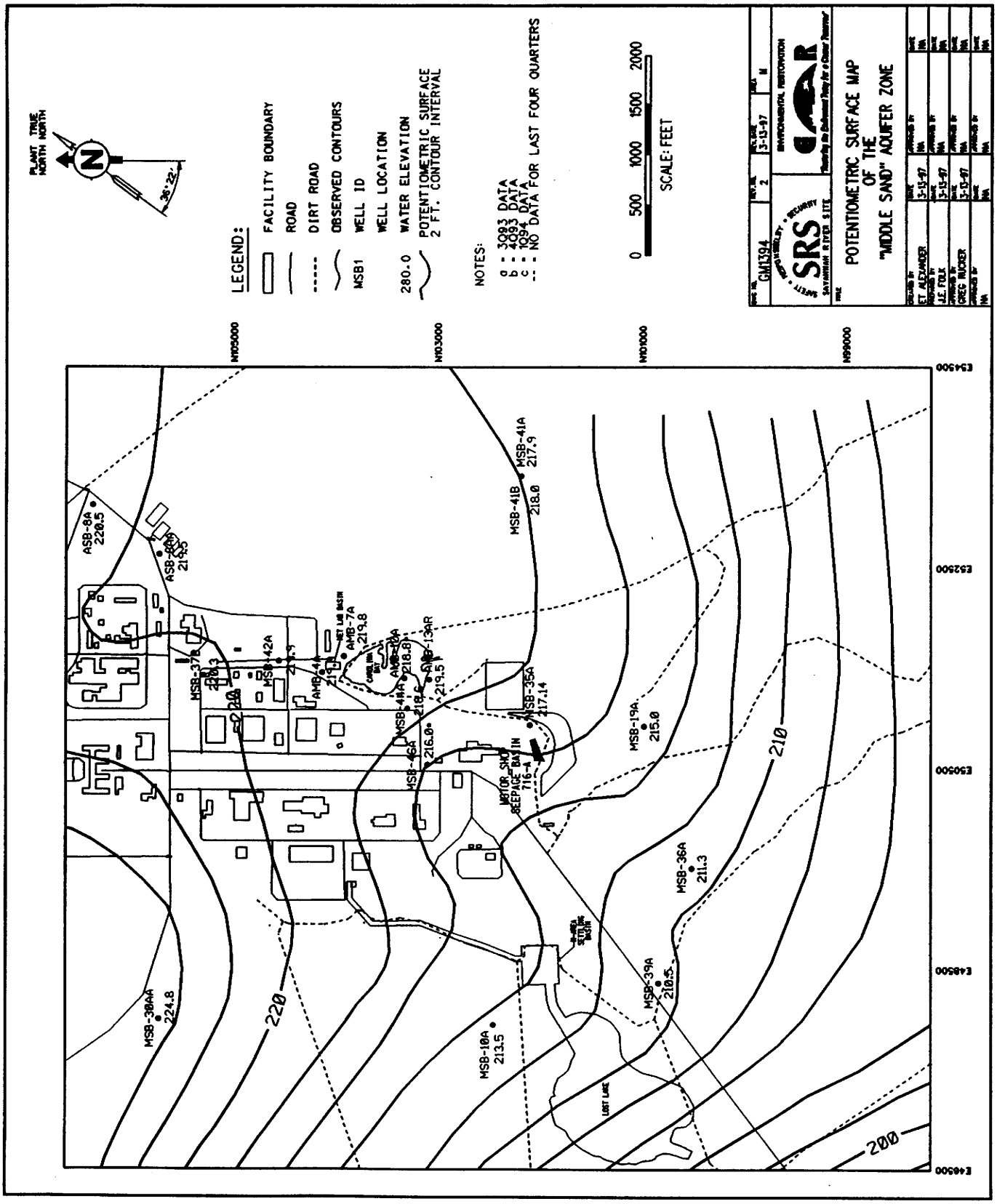


Figure 3-6. Potentiometric Surface of the "Middle Sand" Aquifer Zone

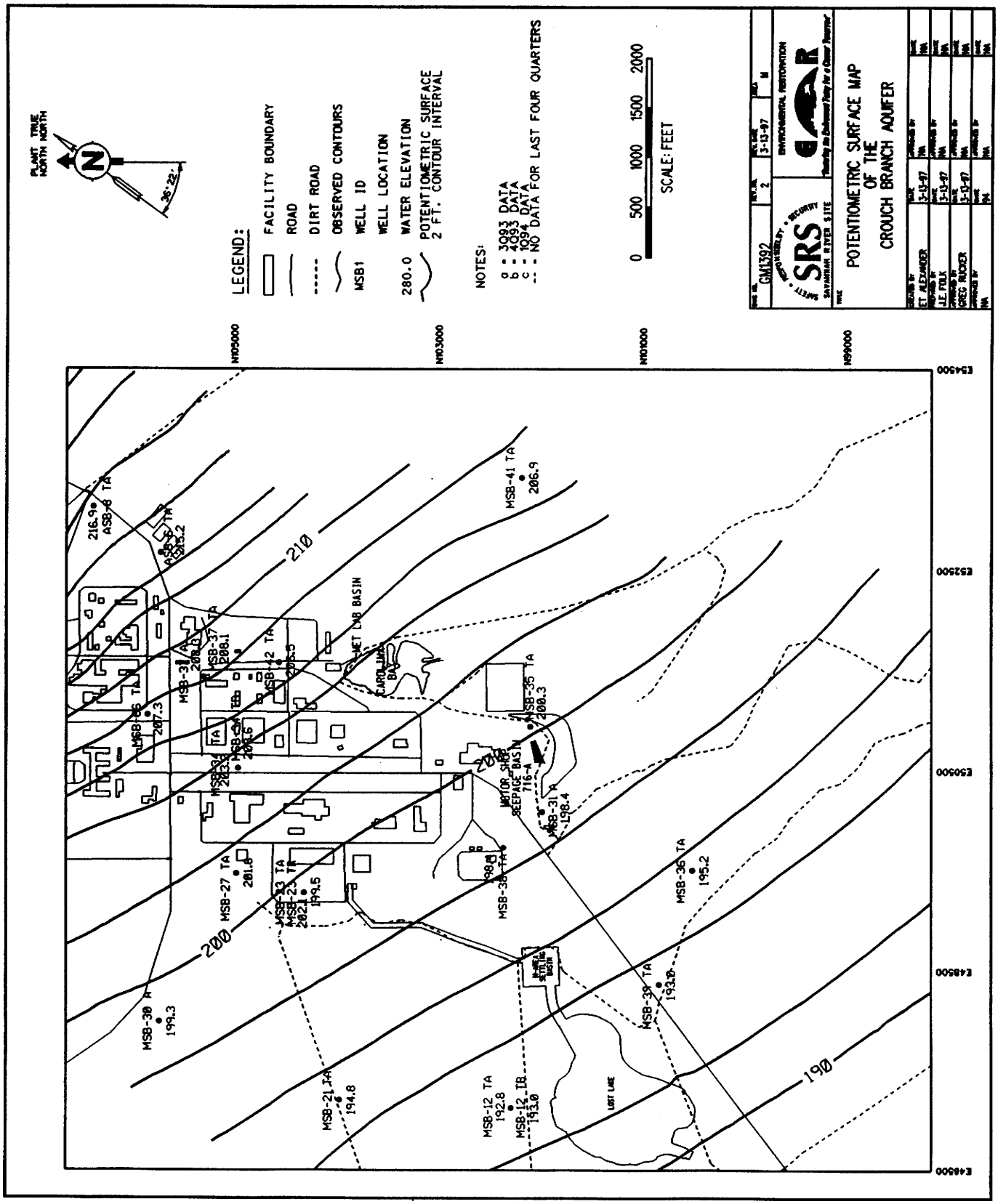


Figure 3-7. Potentiometric Surface of the Crouch Branch Aquifer

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SECTION 3

TABLES

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Table 3-1. Populations for Counties in the Vicinity of the SRS

Persons per Square Mile	County
25	Burke, GA
228	Columbia, GA
586	Richmond, GA
21	Screven, GA
113	Aiken, SC
29	Allendale, SC
43	Bamberg, SC
37	Barnwell, SC

Source: U.S. Bureau of Census, 1991a and 1991b.

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4.0 NATURE AND EXTENT OF CONTAMINATION

This section provides an assessment of unit-related contaminant concentrations and patterns of contaminant distributions in the vicinity of the 716-A Motor Shops Seepage Basin (MSSB). The assessment is organized by location (background and MSSB) and by media (surface and subsurface soils), as well as by the type of contaminant (organic, inorganic, and radiological constituents). Figure 4-1 shows the locations of Phase I sampling activities.

Sections 1 and 2 of this report discuss environmental investigations conducted in the vicinity of the MSSB. Several documents from these investigations were used to prepare this section, including the *RCRA Facility Investigation/Remedial Investigation Work Plan for the 716-A Motor Shops Seepage Basin* (WSRC 1996c); the *Field Report for the 716-A Motor Shops Seepage Basin Phase I Characterization Sampling* (WSRC 1996a); the *Quality Control Summary Report for the A-Area Motor Shops Seepage Basin, Phase I* (EMS 1996); and the *Statistical Data Summary Report for the 716-A Motor Shops Seepage Basin* (WSRC 1997a). Additionally, all analytical data used for determining the nature and extent of contamination are provided in Appendix B. 1 of this report. Although the RFI/RI Work Plan (WSRC 1996c) was submitted for regulatory review and comments were received from both SCDHEC and EPA, the document approval process was not completed based on the Phase I investigation results (no final COCs associated with the uni). However, the document is referenced throughout this section.

The secondary source media identified in the conceptual site model (CSM) for the MSSB (Figure 2-1) include surface and subsurface soils, while exposure pathways include groundwater, air, and biota. Surface and subsurface soils were sampled during the Phase I RCRA Facility Investigation/Remedial Investigation (RFI/RI). Deep soils, process sewer line soils, and groundwater were to be sampled during the Phase II investigation, however, based on the Phase I (worst case) results, Phase II is not required. Potential concentrations in air and biota are derived during the Baseline Risk Assessment (BRA) (Section 6) based on constituent levels measured in surface and subsurface soils. The remainder of this section discusses the characteristics of source media investigated during the Phase I RFI/RI.

For the analysis of the nature and extent of unit contamination, sample results are presented per the CSM (sources and pathways), as well as by sample groups similar to those used in the BRA (Section 6). No samples from the MSSB are interpreted as representing the primary source. All MSSB soil samples are used to characterize

secondary sources of contamination. Depth intervals for presenting soil sample results are 0-0.3 m (0-1 ft) and 0-1.2 m (0-4 ft) below land surface (bls). The 0-1.2 m (0-4 ft) depth interval includes both the 0-0.3 m [0-1 ft] and 0.3-1.2 m [1-4 ft] bls sample intervals. These samples were considered to be grab samples, as they were collected from specific intervals in areas most likely to have the highest level of potential contamination. A 0.9 m (3 ft) interval was used in the collection of the subsurface sample (0.3-1.2 m [1-4 ft]) to provide the proper volume of soil required to fill all sample containers.

Detected levels of organic and inorganic constituents found in soil samples from the MSSB are compared to EPA Region III residential risk-based concentrations (RBCs) for soil ingestion at a risk level of 1×10^{-6} or hazard quotient (HQ) of 0.1. The screening for constituents with only noncarcinogenic effects is performed against an HQ level of 0.1, accomplished by multiplying the Region III RBC screening values for noncarcinogenic effects by 0.1 (RBC screening levels for Region III are based on hazard level of 1.0 rather than 0.1). For radionuclides, risk-based activities (RBAs) are taken from Nix (1996). It should be noted that the contaminant screening processes used in Sections 4, 5, and 6 are independent of one another. Although the RBC screen is used in Section 4 to determine which constituents to plot, these constituents are not used as the starting point for the screening processes in Sections 5 (Contaminant Fate and Transport) and 6 (Baseline Risk Assessment).

Constituents that exceed an RBC or RBA are then compared to two times the average background concentration. To avoid potential bias of the data, the average background concentration for organics and inorganics is calculated using the detected concentrations, as well as a surrogate value of one-half the laboratory method detection limit (MDL) for nondetected values. If an analyte has no detects in the background samples, one-half the MDL is used to calculate the average background concentration. Constituents that exceed both RBC/RBA values and two times the average background concentration are identified as unit-specific constituents (USCs).

Analytical results for samples taken during the Phase I RFI/RI are listed in the data summary tables (Tables 4-2 through 4-5). Table 4-1 lists the various data qualifier codes used in these tables.

4.1 Background Characterization

Background samples for surface and subsurface soils were collected from areas in the vicinity of the MSSB that were presumed to be unaffected by unit activities. Background

samples for groundwater were not required because no groundwater samples were collected during the Phase I RFI/RI. The comparisons made to background concentration used throughout this section are twice the average concentration levels for constituents detected in these samples.

4.1.1 Soil Background

Hand-augered soil borings were made at locations ABK-SB1 through ABK-SB6 (Figure 4-1) during the Phase I investigation (see Section 2.3.1) to establish background conditions for unit soils. These locations are topographically and hydraulically upgradient from the MSSB. The samples were collected from udorthent soils at sample depths corresponding to the depth of samples collected from the basin. Two soil samples were collected at each location at depth intervals of 0-0.3 m (0-1 ft) and 0.3-1.2 m (1-4 ft) bls. Background soil sample locations were carefully selected and are spread out over a large area due to the presence of existing buildings, roads, and other facilities. The sampling locations were in areas considered to be unaffected by potential contamination from the MSSB.

Table 4-2 presents the background data summary for constituents detected in surface soil (0-0.3 m [0-1 ft] bls) samples. Background values are calculated by averaging the constituent concentrations detected in all six surface soil samples. If an analyte was not detected in background surface soil samples but was detected in unit surface soil samples, a value of one-half the MDL is substituted for the analyte concentration for calculating the average background value. The twice average concentration levels presented in this table are then compared to detections in unit surface soil samples as a screening level (Table 4-4).

Table 4-3 presents the background data summary for constituents detected in subsurface soil (0- 1.2 m [0-4 ft] bls) samples. Background values for subsurface soils are calculated similarly to surface soils, except that all 12 samples are used (i.e., six samples from 0-0.3 m [0-1 ft] and six samples from 0.3- 1.2 m [1-4 ft] bls). The twice average concentration levels presented in this table are then used for comparisons to unit subsurface soil sample detections (Table 4-5).

4.1.1.1 Volatile Organic Compounds in Background Soil

Background soil samples were analyzed for 34 volatile organic compounds (VOCs), of which four (1, 1,1 -trichloroethane [1,1,1 -TCA], tetrachloroethylene [PCE], toluene, and total xylenes) were detected. Each of these four VOCs was detected in both surface and

subsurface soils, while total xylenes was also found in laboratory method blanks. The compounds 1,1,1 -TCA and PCE were detected in eight of 11 and 11 of 11 background soil samples, respectively, indicating their widespread distribution in the study area. Although there were 12 background samples collected, there are only 11 results for some analytical parameters due to QA/QC issues (see Appendix B, page D-50).

Because 1,1,1-TCA and PCE are known constituents of the M-Area and the A-014 Outfall groundwater plume that exists below the MSSB, a possibility exists for these analytes to partition from the groundwater plume into the soil column because of equilibrium partitioning. Compounds such as PCE, which are both volatile and have high K_{ow} values, would be expected to both volatilize from contaminated groundwater and partition from the gas phase to soil particles further up the column. This phenomenon could explain low, widespread concentrations of volatiles in unsaturated soils where there is no history of solvent spills. This may explain the widespread occurrence of 1,1,1-TCA and PCE found at the MSSB.

Three volatile organic analysis (VOA) tentatively identified compounds (TICs) were also detected in background soils in samples ABK-SB4-01 and ABK-SB4-02. All three of these TICs are unknowns.

4.1.1.2 Semivolatile Organic Compounds in Background Soil

Background soil samples were analyzed for 64 semivolatile organic compounds (SVOCs), of which 11 were detected. These compounds are anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, chrysene, fluoranthene, indeno(1 ,2,3 -c,d)pyrene, phenanthrene, and pyrene. All 11 SVOCs are polynuclear aromatic hydrocarbons (PAHs) and were detected in only two of 12 background soil samples (ABK-SB2-01 and ABK-SB6-01). PAHs are a common component of highway runoff and internal combustion engine exhaust; they are derivatives of oil, coal, and charcoal. PAHs can be both anthropogenic and naturally occurring.

Several semivolatile organic analysis (SVOA) TICs were also detected in background soils, including an aldol condensate, several terpenes, and some unknowns. At least one SVOA TIC was detected in each of the 12 background soil samples.

4.1.1.3 Pesticides and PCBs in Background Soil

Background soil samples were analyzed for 27 pesticides and polychlorinated biphenyls (PCBs), of which two were detected. These compounds are p,p'-DDE and p,p'-DDT.

They were detected in only one background surface soil sample (ABK-SB6-01). Both detections were below the analytical laboratory detection limit and "J" qualified, indicating uncertainty in the reported concentration.

4.1.1.4 TAL Inorganic Constituents in Background Soil

Background soil samples were analyzed for 24 Target Analyte List (TAL) inorganic constituents (metals plus cyanide), of which 20 were detected. There are aluminum, antimony, arsenic, barium, beryllium, cadmium, calcium, chromium, cobalt, copper, iron, lead, magnesium, manganese, mercury, nickel, potassium, sodium, vanadium, and zinc. All 20 were detected in both surface and subsurface soil samples.

Neither the presence of metals in the background soil samples nor the concentrations at which they occur are necessarily due to contamination from unit activities. The Savannah River Site (SRS) is located within the Upper Coastal Plain adjacent to the Carolina Piedmont, which is known to contain relatively high concentrations of metals (Tockman and Cherrywell 1993). The Tobacco Road and Dry Branch Formations were deposited in marginal marine, coastal environments. Sediments deposited in these near-shore environments are subject to localized variations in lithology and mineral content. Sediments eroded from the nearby land mass, in this case the terrain of the Carolina Piedmont, may be interbedded with sediments deposited or reworked in a more marine setting.

The metals mobilized within the Piedmont Province are the result of mineralization associated with metamorphism, hydrothermal alteration, and granitic intrusions. Hydrothermal fluids associated with metamorphism are the chief sources of metal deposits, containing such metals as arsenic, barium, cadmium, chromium copper, gold, lead, manganese, molybdenum, nickel, silver, vanadium, and zinc (Tockman and Cherrywell 1993).

4.1.1.5 Radiological Indicators in Background Soil

Background soil samples were analyzed for gross alpha and gross nonvolatile beta; radiological speciation was not to be performed on Phase I samples (WSRC 1996a). Gross alpha and gross nonvolatile beta were detected in both surface and subsurface background soil samples. Detections in three background samples (ABK-SB2-02, ABK-SB4-02, and ABK-SB6-01) were positive (greater than 20 pCi/g) for gross alpha. These levels are consistent with other site-wide studies reporting background radionuclide levels (DuPont, 1953; Fay and Pickett, 1987).

4.2 Primary Source Investigation Results

The CSM for the MSSB (Figure 2-1) identifies wastewater formerly discharged into the basin as the primary source of contamination for this unit. However, no wastewater remains in the basin; it has been dry since 1985. Any residual contaminants from the wastewater would have percolated into surface and subsurface soils, the secondary sources of contamination for the MSSB.

4.3 Secondary Source Investigation Results

The CSM for the MSSB (Figure 2-1) identifies the surface and subsurface soils within the unit as secondary sources of contamination. All 12 soil samples taken from borings AOB-SB 1 through AOB-SB6 are interpreted as representing secondary source material. This section is organized to present the nature and extent of contamination within the unit (i.e., the results of the Phase I investigation) by media.

All detected analytes are screened against an RBC, provided an RBC is available, and twice the average background level (Tables 4-4 and 4-5). For inorganic and organic analytes, the concentrations listed in the RBC table (EPA 1996a) are used. RBCs for noncarcinogenic, inorganic, and organic analytes are adjusted to incorporate a hazard index (HI) factor of 0.1. As indicated previously, RBAs for radiological constituents are taken from Nix (1996).

4.3.1 Surface Soil Data Presentation and Interpretation

Six surface (0-0.3 m [0-1 ft] bls) soil samples were collected at the MSSB. Table 4-4 lists the constituents that were detected in surface soil samples from the MSSB and also identifies USCs. Figure 4-2 shows the aerial distribution of MSSB USCs; Figure 4-3 shows the vertical distribution.

Several TAL inorganics and radiological indicators were detected in MSSB surface (0-0.3 m [0-1 ft] bls) soils at levels exceeding their RBCs/RBAs (or for which there are no RBCs/RBAs) (Table 4-4). However, none of these detections also exceed their twice average background levels. No VOCs or pesticides/PCBs were detected in MSSB surface soils at concentrations exceeding their RBCs. The only USC identified in MSSB surface soils is the SVOC and PAH benzo(a)pyrene (Table 4-4).

Several TICs were also detected during analysis of MSSB surface soil samples for VOCs and SVOCs. These include an unknown VOA TIC, several unknown SVOA TICs, an

aromatic SVOA TIC, and aldol condensates (SVOA TICs). VOA and SVOA TICs detected in MSSB surface soil samples are included in Appendix B.1.

4.3.1.1 Semivolatile Organic Compounds

One SVOC was detected in surface (0-0.3 m [0-1 ft] bls) soil samples from the MSSB at a concentration exceeding its RBC. The PAH benzo(a)pyrene was detected in one of six MSSB surface soil samples. The detection (4.10×10^{-1} mg/kg in AOB-SB2-01) exceeds both the RBC (8.80×10^{-2} mg/kg) and twice the average background level (7.11×10^{-2} mg/kg), making benzo(a)pyrene a USC for the MSSB (Figures 4-2 and 4-3).

As previously stated, PAHs can be derived from oil, coal, and charcoal and may be of anthropogenic or natural origin. Based on the disposal history of the MSSB, this occurrence of benzo(a)pyrene may be unit related. However, benzo(a)pyrene's limited frequency of detection, together with the unit's proximity to a railroad known to carry coal, suggests another possible source for this contamination.

4.3.1.2 TAL Inorganic Constituents

TAL inorganics detected in surface (0-0.3 m [0-1 ft] bls) soil samples from the MSSB at concentrations exceeding RBCs are comprised of the metals arsenic, beryllium, and iron (Table 4-4). However, none of these metals are considered to be USCs, since no detections exceed twice background levels.

As previously stated, the presence of metals in unit soils is not necessarily the result of unit or site activities. Arsenic, beryllium, and iron were all detected in background soils at comparable levels (Tables 4-2 and 4-4). Moreover, the presence all three metals can be explained in terms of a number of geologic processes (i.e. weathering, metamorphism, hydrothermal alteration, and granitic intrusion) known to have occurred in the vicinity of the SRS.

4.3.1.3 Radiological Indicators

Available historical records for the MSSB do not indicate a disposal history of radioactive materials. For this reason, radiological speciation was not performed on Phase I surface soil samples, which were only analyzed for radiological indicators (gross alpha and nonvolatile beta). Radiological speciation was planned for Phase II soil samples if results from Phase I exceeded 20 pCi/g for gross alpha or 50 pCi/g for nonvolatile beta. However, as indicated in the following paragraphs, Phase I samples do not exceed these trigger levels.

Gross alpha activity was detected in three of six MSSB surface soil samples (Table 4-4). No RBA could be established for gross alpha activity and none of the detected activities exceed twice the average background level (2.54×10^1 pCi/g). Detections range from 5.81×10^0 pCi/g in AOB-SB5-01 to 1.46×10^1 pCi/g in AOB-SB2-01.

Nonvolatile beta activity was detected in three of six MSSB surface soil samples (Table 4-4). No RBA could be established for nonvolatile beta activity and none of the detected activities exceed twice the average background level (2.01×10^1 pCi/g). Detections range from 6.35×10^0 pCi/g in AOB-SB4-01 to 1.59×10^1 pCi/g in AOB-SB2-01.

4.3.1.4 Miscellaneous Analytes

Due to the disposal history of the unit, total petroleum hydrocarbons (TPH) concentrations are also determined for surface (0-0.3 m [0-1 ft] bls) soil samples from the MSSB. TPH was detected in five of six MSSB surface soil samples (Table 4-4). No RBC has been established for TPH, but three of the detections exceed the twice average background level (4.69×10^1 mg/kg). Detections range from 2.41×10^1 mg/kg in AOB-SB3-01 to 5.30×10^2 mg/kg in AOB-SB4-01.

TPH measures the combined concentrations of petroleum hydrocarbons, including BTEX (benzene, toluene, ethylbenzene, and xylenes), PAHs, and gasoline and diesel range VOCs. Many of these compounds are individually analyzed in MSSB soils and determined to be insignificant. Neither the United States Environmental Protection Agency (EPA) nor the South Carolina Department of Health and Environmental Control (SCDHEC) has established clean-up standards for TPH. Therefore, TPH is not considered a USC for the MSSB.

4.3.2 Subsurface Soil Data Presentation and Interpretation

Twelve subsurface soil (0-1.2 m [0-4 ft] bls) samples were collected at the MSSB, including six 0-0.3m (0-1 ft) and six 0.3- 1.2 m (1-4 ft) bls samples. Table 4-5 lists the constituents that were detected in subsurface soil samples from the MSSB and identifies USCs. Figure 4-2 shows the aerial distribution of MSSB USCs; Figure 4-3 shows the vertical distribution.

Several TAL inorganics and radiological indicators were detected in MSSB subsurface (0-1.2 m [0-4 ft] bls) soils at levels exceeding their RBCs/RBAs (or for which there are no RBCs/RBAs) (Table 4-5). However, none of these detections also exceed their twice average background levels. No VOCs or pesticides/PCBs were detected in MSSB

subsurface soils at concentrations exceeding their RBCs. The only USC identified in MSSB subsurface soils is the SVOC and PAH benzo(a)pyrene (Table 4-5).

Several TICs were also detected during analysis of MSSB subsurface soil samples for SVOCs. These include aldol condensates and several unknown SVOA TICs. SVOA TICs detected in MSSB subsurface soil samples are included in Appendix B.1.

4.3.2.1 Semivolatile Organic Compounds

One SVOC (benzo(a)pyrene) was detected in subsurface (0-1.2 m [0-4 ft] bls) soil samples from the MSSB at a concentration exceeding its RBC (Table 4-5). The detection (4.10×10^{-1} mg/kg in AOB-SB2-01) is from the 0-0.3 m (0-1 ft) sample interval of the 0-1.2 m (0-4 ft) depth interval and exceeds both its RBC (8.80×10^{-2} mg/kg) and twice average background level (4.76×10^{-2} mg/kg), making benzo(a)pyrene a USC (Figures 4-2 and 4-3).

As previously stated, this occurrence may be unit related based on the disposal history of the MSSB. However, benzo(a)pyrene's limited frequency of detection, together with the unit's proximity to a railroad known to carry coal, suggests another possible source for this contamination. A schematic diagram on Figure 1-3 and photographs on Figures 1-6 and 6.3-1 indicate that the railroad is contiguous with the north berm of the seepage basin. The bed of the railroad and the north berm of the basin are one in the same, with the seepage basin located at the foot of the railroad bed. PAHs were detected in the two surface soil background samples located closest to the railroad. Therefore, PAHs attributable to either coal carried by a train or exhaust or soot from a locomotive could likely have found their way into the seepage basin.

4.3.2.2 TAL Inorganic Constituents

TAL inorganic constituents detected in subsurface (0-1.2 m [0-4 ft] bls) soil samples from the MSSB at concentrations exceeding RBCs are comprised of the metals aluminum, arsenic, beryllium, and iron (Table 4-5). However, none of these metals are considered to be USCs, since no detections exceed twice background levels. Although there were 12 subsurface samples collected for TAL inorganics analysis, results for lead were only reported by the laboratory for 11 samples (see Appendix B.2, page D-70).

The presence of metals in unit soils is not necessarily the result of unit or site activities. Aluminum, arsenic, beryllium, and iron were all detected in background soils at comparable levels (Tables 4-2 and 4-5). Moreover, the presence all four metals can be explained in terms of a number of geologic processes (i.e. weathering, metamorphism,

hydrothermal alteration, and granitic intrusion) known to occur (or having occurred) in the vicinity of the SRS.

4.3.2.3 Radiological Indicators

As previously stated, available historical records for the MSSB do not indicate a disposal history of radioactive materials. Therefore, radiological speciation was not performed on Phase I subsurface soil samples.

Gross alpha activity was detected in eight of 12 MSSB subsurface soil samples (Table 4-6), including three 0-0.3m (0-1 ft) samples and five 0.3-1.2 m (1-4 ft) samples. No RBA could be established for gross alpha activity, and none of the detected activities exceed twice the average background level (2.49×10^{1} pCi/g). Detections range from 5.81×10^{0} pCi/g in AOB-SB5-01 to 1.46×10^{1} pCi/g in AOB-SB2-01.

Nonvolatile beta activity was detected in six of 12 MSSB surface soil samples (Table 4-6), including three 0-0.3m (0-1 ft) samples and three 0.3-1.2 m (1-4 ft) samples. No RBA could be established for nonvolatile beta activity and none of the detected activities exceed twice the average background level (1.98×10^{1} pCi/g). Detections range from 6.35×10^{0} pCi/g in AOB-SB4-01 to 1.59×10^{1} pCi/g in AOB-SB2-01.

4.3.2.4 Miscellaneous Analytes

Due to the disposal history of the unit, TPH concentrations are also determined for subsurface (0-1.2 m [0-4 ft] bls) soil samples from the MSSB. TPH was detected in nine of 12 MSSB subsurface soil samples (Table 4-5), including five 0-0.3m (0-1 ft) samples and four 0.3- 1.2 m (1-4 ft) samples. No RBC has been established for TPH, but four of the detections exceed the twice average background level (3.30×10^{1} mg/kg). Detections range from 1.09×10^{1} mg/kg in AOB-SB5-02 to 5.30E+02 mg/kg in AOB-SB4-01.

As previously stated, TPH measures the combined concentrations of petroleum hydrocarbons, including BTEX, PAHs, and gasoline and diesel range VOCs. Many of these compounds are individually analyzed in MSSB soils and determined to be insignificant. Neither the EPA nor the SCDHEC has established clean-up standards for TPH. Therefore, TPH is not considered a USC for the MSSB.

4.3.3 Uncertainty of Secondary Source Investigation Results

Twenty-four soil samples (12 from the 0-0.3 m [0-1 ft] and 12 from the 0.3-1.2 m [1-4 ft] bls depth intervals) were collected from 12 soil borings at and around the MSSB and used

to characterize background and unit soils. Unit surface and subsurface soils are characterized as secondary sources of contamination.

Two VOCs (1,1 ,1-TCA and PCE) were detected in soil samples from the MSSB. However, detected levels are well below RBC screening criteria (Tables 4-4 and 4-5). Most detections are qualified as estimated ("J" qualified), indicating some uncertainty in the reported concentration. Both compounds are also widespread in background soil indicating that their source is likely outside the unit. The VOCs acetone, dichloromethane, ethylbenzene, styrene, and total xylenes were detected in laboratory method blanks but not in unit soil samples (EMS 1996).

Fourteen SVOCs (all PAHs) were detected in MSSB soils, but all detections are from two soil samples (AOB-SB2-01 and AOB-SB3-01) (Table 4-4). All but three of the SVOCs detected in unit soils were also detected in background samples (Tables 4-2 and 4-3). One of these compounds (benzo(a)pyrene) exceeds both its RBC and twice background level and is designated a USC. The PAH, pyrene, was also detected in laboratory method blanks (EMS 1996).

Benzo(a)pyrene was detected in one of 12 MSSB Phase I soil samples. PAHs are not highly mobile and tend to readily adsorb to soils. As previously stated, PAHs can be derived from oil, coal, and charcoal; they may be of anthropogenic or natural origin, and were also detected in unit-specific background samples. This occurrence may be unit related based on the disposal history of the MSSB. However, the unit's proximity to a railroad known to carry coal suggests another possible source for this contamination.

Twenty-one TAL inorganics were detected in MSSB soil samples (Tables 4-4 and 4-5), but only four metals (aluminum, arsenic, beryllium, and iron) occur at levels above RBCs. Occurrences of metals can often be explained in terms of the varying lithology and weathering characteristics of natural soils rather than environmental contamination. High concentrations of iron and aluminum, for example, can occur in subtropical climates due to residual accumulations from more soluble components leaching out of the soil. Detections of beryllium and arsenic at levels above their RBCs but less than twice their average background levels suggest that geologic anomalies are likely responsible for those occurrences. Additionally, the method of comparison (twice the average background level) may not be sufficient to determine the natural variability of metal concentrations. Cyanide and the metals aluminum, beryllium, calcium, iron, mercury, and zinc were also detected in laboratory method blanks (EMS 1996).

Gross alpha and nonvolatile beta do not have established RBAs and are screened against a level of 0.00 pCi/g. Detected activities for both constituents do not exceed either unit-specific twice average background levels or sitewide background levels established for them. Gross alpha was also detected in laboratory method blanks (EMS 1996).

4.4 Exposure Pathway Investigation Results

The CSM identifies groundwater, air, and biota as possible exposure pathways for contamination from the MSSB (Figure 2-1). As previously stated, groundwater was not sampled during the Phase I investigation. Groundwater sampling was to be performed during Phase II; however, since only one USC was detected in Phase I unit soil samples, the Phase II investigation was deemed unwarranted. This is in accordance with the decision rules presented in the work plan for the MSSB (WSRC 1996c). In addition, no USCs were detected in the 0.3-1.2 m (1-4 ft) sampling interval. According to the CSM, this would constitute an incomplete pathway from the secondary source (basin soils) to the groundwater. All USCs are evaluated for their leachability to groundwater. No migration potential is demonstrated for any USC.

Table 4-6 presents results from the initial unit screening performed at the MSSB in November 1988 (WSRC 1990a). Acetone and methylene chloride were detected in the laboratory method blank; therefore, their presence in unit soils is suspect. No other organics were detected in samples below 1.2 m (4 ft) in depth. Total metals were not analyzed below a depth of 1.2 m (4 ft). The Extraction Procedure toxicity tests do not exceed any action levels. These data provide additional justification for not performing the Phase II investigation.

Area groundwater is under evaluation as part of the overall groundwater remediation approach as presented in the RCRA permit application - Corrective Action Plan for the A-014 outfall area (Volume III, M-Area HWMF, WSRC-IM-91-53). Biota and air were also not sampled during the Phase I investigation. Potential contaminant concentrations in biota and air are derived during the BRA (see Section 6) based on constituent levels measured in surface and subsurface soils.

The Phase I soil results represent the worst case scenario for the MSSB. Based on the level of contamination detected, soil sampling along the process sewer line to determine the impact of possible wastewater leakage is also deemed unwarranted.

SECTION 4

FIGURES

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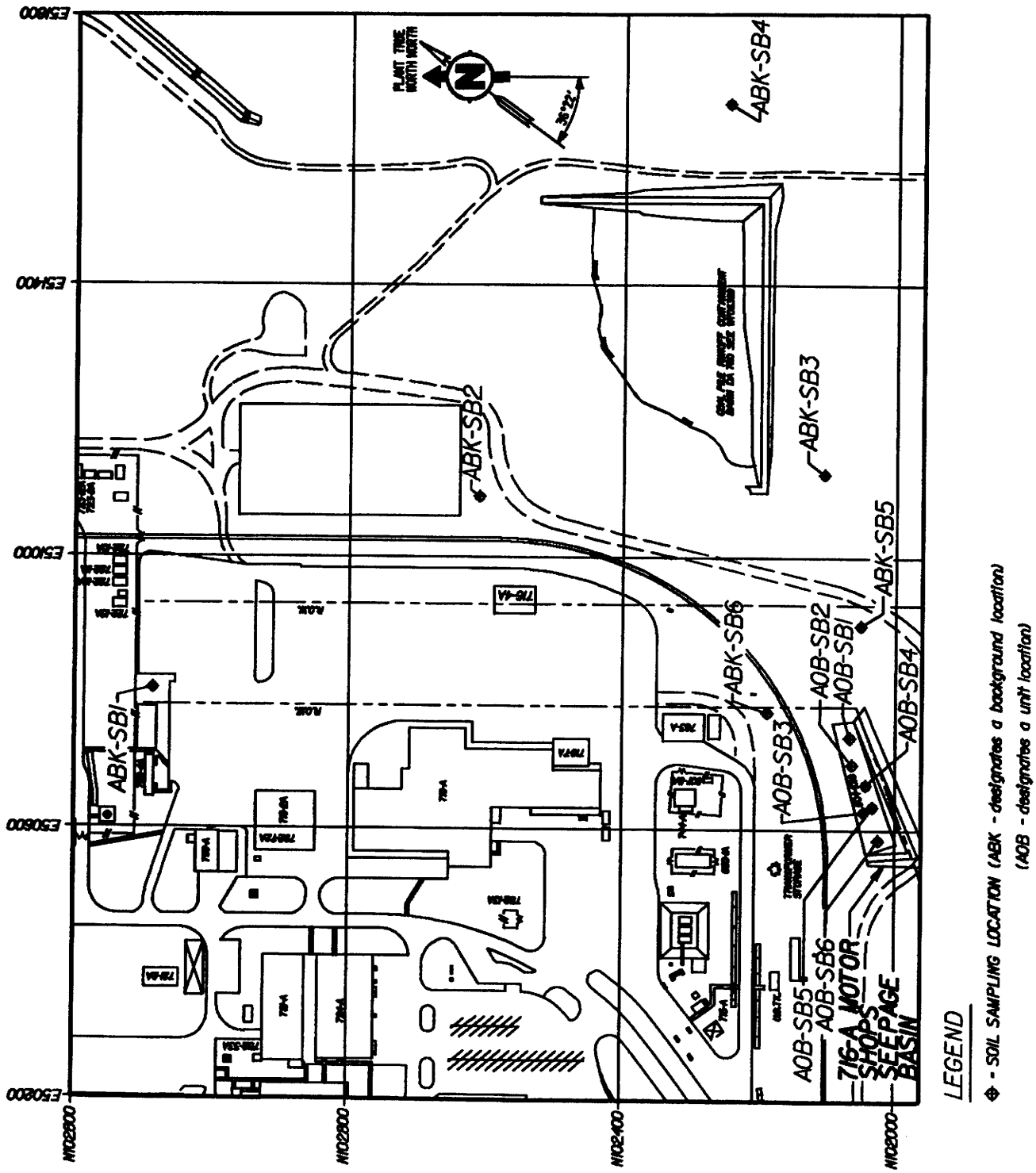

Figure 4-1. 716-A Motor Shops Seepage Basin Unit and Background Characterization Locations

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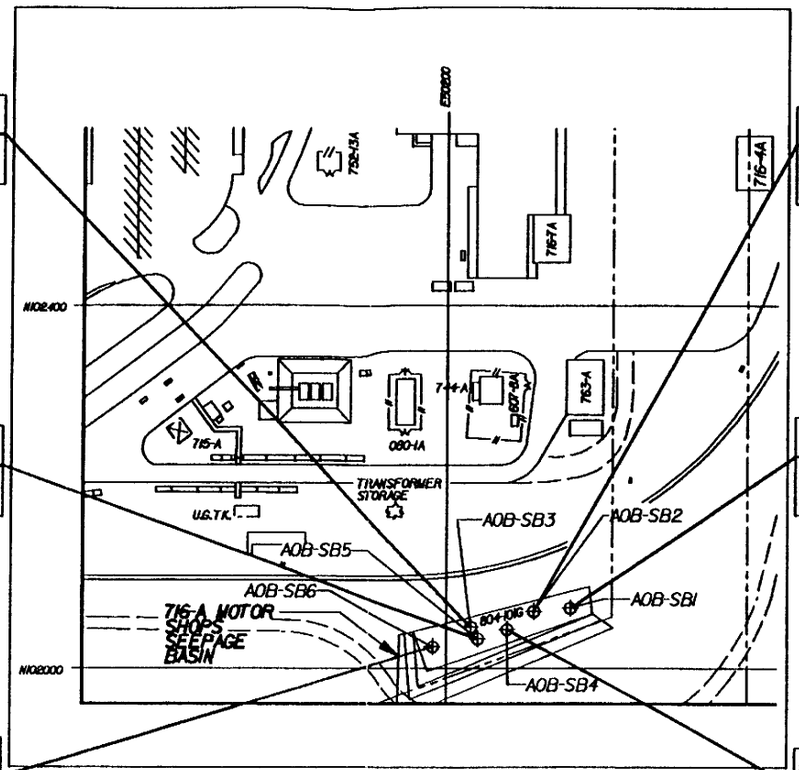
Location	Depth	Analyte	Result	Units
A0B-SB3	Not detected at this location.			

Location	Depth	Analyte	Result	Units
A0B-SB5	Not detected at this location.			

Location	Depth	Analyte	Result	Units
A0B-SB6	Not detected at this location.			



Location	Depth	Analyte	Result	Units
A0BSB0201	0-1	Benzo(a)pyrene	4.10E-01	mg/kg

Location	Depth	Analyte	Result	Units
A0B-SB1	Not detected at this location.			

Location	Depth	Analyte	Result	Units
A0B-SB4	Not detected at this location.			

Analyte	2 x Average Background 0 - 1 ft	0 - 4 ft	RBC	Units
Benzo(a)pyrene	7.11E-02	4.76E-02	8.80E-02	mg/kg

LEGEND

◆ = SOIL SAMPLING LOCATION (A0B - designates a unit location)

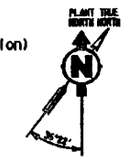


Figure 4-2. Distribution of USC Benzo(a)pyrene at the 716-A Motor Shops Seepage Basin

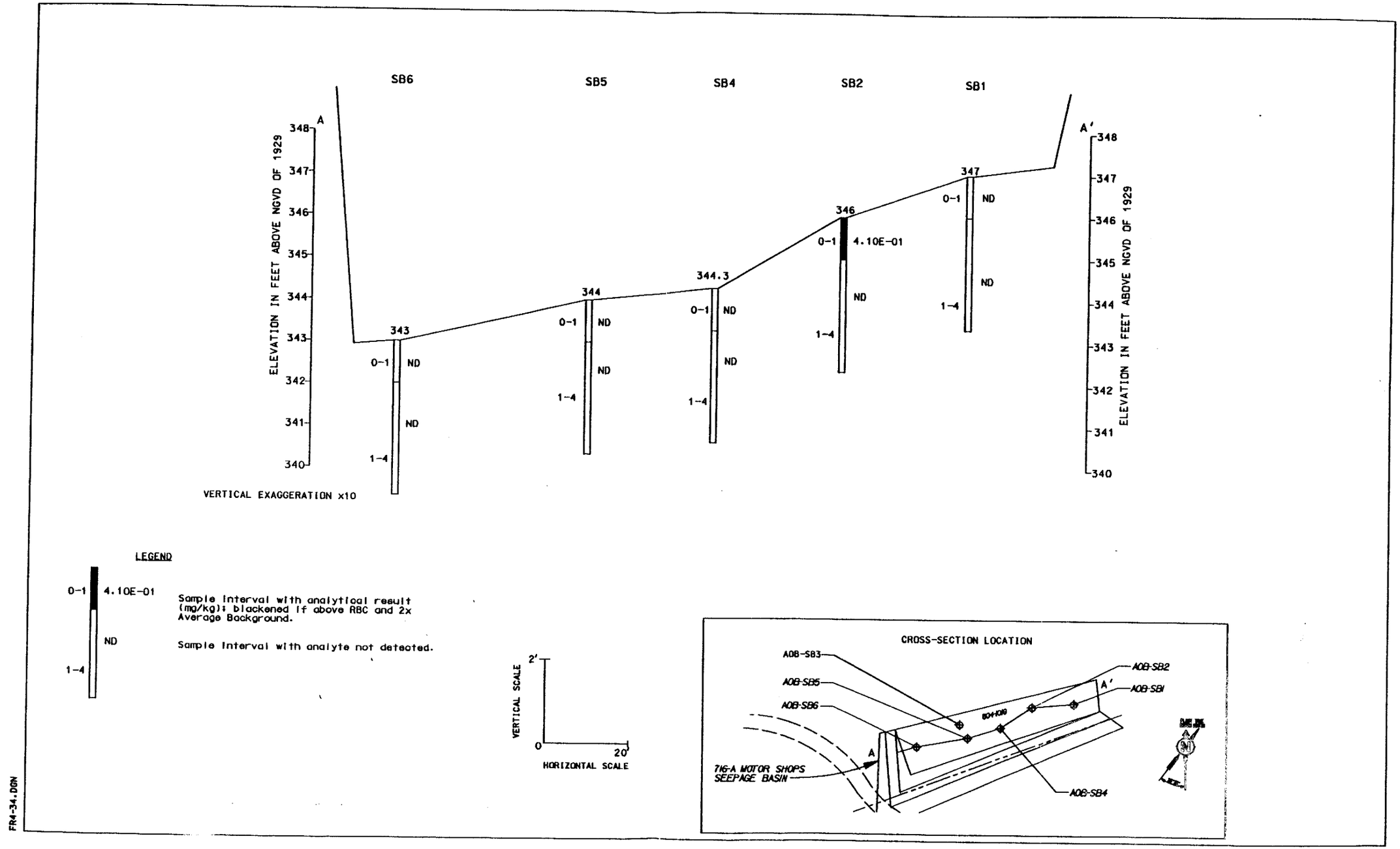


Figure 4-3. Benzo(a)pyrene Concentrations Along Cross-Section A-A' 716-A Motor Shops Seepage Basin

SECTION 4

TABLES

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Table 4-1
Data Quality Flags

Qualifier	Meaning
J	Estimated result
U	Analyte not detected. Result is the laboratory method detection limit.
UJ	Analyte not detected. Result is the laboratory method detection limit.
UI	Analyte not detected. Result is the instrument reading.
UIJ	Analyte not detected. Result is an estimated instrument reading.

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Table 4-2. Summary of Analytes Detected in Background Surface (0-0.3 m [0-1 ft]) Soil Samples for 716-A Motor Shops Seepage Basin

Analyte Class	Analyte	Frequency of Detection	Units	Maximum Detection	Average Detection	2x Average Detection
Volatiles	1,1,1-Trichloroethane	5 / 5	mg/kg	1.13E-02	6.62E-03	1.32E-02
	Tetrachloroethene	5 / 5	mg/kg	1.30E-02	1.04E-02	2.07E-02
	Toluene	1 / 5	mg/kg	2.23E-03	1.03E-03	2.05E-03
	Xylenes (total)	2 / 5	mg/kg	3.50E-03	1.40E-03	2.81E-03
Semivolatiles	Anthracene	1 / 6	mg/kg	3.68E-02	1.28E-02	2.56E-02
	Benzo(a)anthracene	2 / 6	mg/kg	1.17E-01	3.45E-02	6.91E-02
	Benzo(a)pyrene	2 / 6	mg/kg	1.13E-01	3.56E-02	7.11E-02
	Benzo(b)fluoranthene	2 / 6	mg/kg	1.04E-01	3.46E-02	6.91E-02
	Benzo(g,h,i)perylene	1 / 6	mg/kg	6.98E-02	1.83E-02	3.66E-02
	Benzo(k)fluoranthene	2 / 6	mg/kg	1.08E-01	3.74E-02	7.48E-02
	Chrysene	2 / 6	mg/kg	1.58E-01	4.64E-02	9.27E-02
	Fluoranthene	2 / 6	mg/kg	2.49E-01	6.70E-02	1.34E-01
	Indeno(1,2,3-c,d)pyrene	1 / 6	mg/kg	6.61E-02	1.85E-02	3.70E-02
	Phenanthrene	1 / 6	mg/kg	1.72E-01	3.49E-02	6.98E-02
	Pyrene	2 / 6	mg/kg	2.04E-01	5.85E-02	1.17E-01
Pesticides/PCBs	p,p'-DDE	1 / 6	mg/kg	5.88E-03	1.36E-03	2.71E-03
	p,p'-DDT	1 / 6	mg/kg	4.78E-03	1.26E-03	2.51E-03
TAL Inorganics	Aluminum	6 / 6	mg/kg	9.99E+03	5.78E+03	1.16E+04
	Antimony	2 / 6	mg/kg	7.24E-01	3.47E-01	6.94E-01
	Arsenic	4 / 6	mg/kg	5.00E+00	2.25E+00	4.50E+00
	Barium	6 / 6	mg/kg	2.47E+01	1.76E+01	3.52E+01
	Beryllium	5 / 6	mg/kg	2.74E-01	1.63E-01	3.26E-01
	Cadmium	6 / 6	mg/kg	9.72E-01	3.27E-01	6.55E-01
	Calcium	6 / 6	mg/kg	2.81E+03	6.37E+02	1.27E+03
	Chromium	6 / 6	mg/kg	2.55E+01	1.04E+01	2.09E+01
	Cobalt	6 / 6	mg/kg	1.30E+00	9.69E-01	1.94E+00
	Copper	6 / 6	mg/kg	4.00E+00	2.42E+00	4.83E+00
	Iron	6 / 6	mg/kg	2.07E+04	7.87E+03	1.57E+04
	Lead	6 / 6	mg/kg	1.30E+01	6.72E+00	1.34E+01

Table 4-2. Summary of Analytes Detected in Background Surface (0-0.3 m [0-1 ft]) Soil Samples for 716-A Motor Shops Seepage Basin (continued)

Analyte Class	Analyte	Frequency of Detection	Units	Maximum Detection	Average Detection	2x Average Detection
TAL Inorganics (continued)	Sodium	5 / 6	mg/kg	3.95E+01	2.01E+01	4.02E+01
	Vanadium	6 / 6	mg/kg	5.01E+01	1.99E+01	3.98E+01
	Zinc	6 / 6	mg/kg	3.09E+01	1.22E+01	2.44E+01
Radiological Indicators	Gross Alpha	5 / 6	pCi/g	2.72E+01	1.27E+01	2.54E+01
	Nonvolatile Beta	3 / 6	pCi/g	1.85E+01	1.00E+01	2.01E+01
Miscellaneous	Total petroleum hydrocarbons	4 / 6	mg/kg	7.56E+01	2.34E+01	4.69E+01

Table 4-3. Summary of Analytes Detected in Background Subsurface (0-1.2 m [0-4 ft]) Soil Samples for 716-A Motor Shops Seepage Basin

Analyte Class	Analyte	Frequency of Detection	Units	Maximum Detection	Average Detection	2x Average Detection
Volatiles	1,1,1-Trichloroethane	8 / 11	mg/kg	1.13E-02	4.03E-03	8.06E-03
	Tetrachloroethene	11 / 11	mg/kg	1.30E-02	7.10E-03	1.42E-02
	Toluene	2 / 11	mg/kg	2.23E-03	9.58E-04	1.92E-03
	Xylenes (total)	3 / 11	mg/kg	3.50E-03	1.25E-03	2.49E-03
Semivolatiles	Anthracene	1 / 12	mg/kg	3.68E-02	1.04E-02	2.08E-02
	Benzo(a)anthracene	2 / 12	mg/kg	1.17E-01	2.23E-02	4.45E-02
	Benzo(a)pyrene	2 / 12	mg/kg	1.13E-01	2.38E-02	4.76E-02
	Benzo(b)fluoranthene	2 / 12	mg/kg	1.04E-01	2.30E-02	4.61E-02
	Benzo(g,h,i)perylene	1 / 12	mg/kg	6.98E-02	1.32E-02	2.63E-02
	Benzo(k)fluoranthene	2 / 12	mg/kg	1.08E-01	2.42E-02	4.84E-02
	Chrysene	2 / 12	mg/kg	1.58E-01	2.79E-02	5.59E-02
	Fluoranthene	2 / 12	mg/kg	2.49E-01	3.83E-02	7.65E-02
	Indeno(1,2,3-c,d)pyrene	1 / 12	mg/kg	6.61E-02	1.38E-02	2.75E-02
	Phenanthrene	1 / 12	mg/kg	1.72E-01	2.12E-02	4.24E-02
	Pyrene	2 / 12	mg/kg	2.04E-01	3.45E-02	6.90E-02
Pesticides/PCBs	p,p'-DDE	1 / 12	mg/kg	5.88E-03	9.03E-04	1.81E-03
	p,p'-DDT	1 / 12	mg/kg	4.78E-03	9.03E-04	1.81E-03
TAL Inorganics	Aluminum	12 / 12	mg/kg	1.62E+04	7.87E+03	1.57E+04
	Antimony	5 / 12	mg/kg	9.49E-01	3.74E-01	7.48E-01
	Arsenic	9 / 12	mg/kg	5.90E+00	2.56E+00	5.13E+00
	Barium	12 / 12	mg/kg	4.39E+01	2.17E+01	4.35E+01
	Beryllium	11 / 12	mg/kg	4.07E-01	2.10E-01	4.21E-01
	Cadmium	11 / 12	mg/kg	9.72E-01	3.27E-01	6.54E-01
	Calcium	12 / 12	mg/kg	2.81E+03	4.46E+02	8.92E+02
	Chromium	12 / 12	mg/kg	2.74E+01	1.18E+01	2.36E+01
	Cobalt	12 / 12	mg/kg	2.00E+00	1.15E+00	2.30E+00
	Copper	12 / 12	mg/kg	4.00E+00	2.62E+00	5.23E+00
	Iron	12 / 12	mg/kg	2.38E+04	9.31E+03	1.86E+04
	Lead	12 / 12	mg/kg	1.30E+01	6.60E+00	1.32E+01

Table 4-3. Summary of Analytes Detected in Background Subsurface (0-1.2 m [0-4 ft]) Soil Samples for 716-A Motor Shops Seepage Basin (continued)

Analyte Class	Analyte	Frequency of Detection	Units	Maximum Detection	Average Detection	2x Average Detection
TAL Inorganics (continued)	Magnesium	12 / 12	mg/kg	4.67E+02	1.47E+02	2.95E+02
	Manganese	12 / 12	mg/kg	2.39E+02	8.28E+01	1.66E+02
	Mercury	10 / 12	mg/kg	8.30E-02	3.37E-02	6.73E-02
	Nickel	12 / 12	mg/kg	4.00E+00	2.18E+00	4.36E+00
	Potassium	12 / 12	mg/kg	1.91E+02	9.43E+01	1.89E+02
	Sodium	11 / 12	mg/kg	7.16E+01	2.43E+01	4.85E+01
	Vanadium	12 / 12	mg/kg	5.98E+01	2.29E+01	4.58E+01
	Zinc	12 / 12	mg/kg	3.09E+01	8.69E+00	1.74E+01
Radiological Indicators	Gross Alpha	9 / 12	pCi/g	2.72E+01	1.24E+01	2.49E+01
	Nonvolatile Beta	8 / 12	pCi/g	1.85E+01	9.89E+00	1.98E+01
Miscellaneous	Total petroleum hydrocarbons	6 / 12	mg/kg	7.56E+01	1.65E+01	3.30E+01

Table 4-4. Summary of Analytes Detected in 716-A Motor Shops Seepage Basin Surface (0-0.3 m [0-1 ft]) Soils

Analyte Class	Analyte	Frequency of Detection	Units	Maximum Detection	Average Detection	RBC[2]	2 x Average Background[1]	Retained as USC[3] (Y/N)
Volatiles	1,1,1-Trichloroethane	4 / 5	mg/kg	1.03E-02	5.16E-03	2.70E+02	1.32E-02	N
	Tetrachloroethene	5 / 5	mg/kg	1.31E-02	6.97E-03	1.20E+01	2.07E-02	N
Semivolatiles	***Acenaphthene***	1 / 6	mg/kg	1.00E-01	2.29E-02	4.70E+02	1.50E-02	N
	Anthracene	1 / 6	mg/kg	2.30E-01	4.50E-02	2.30E+03	2.56E-02	N
	Benzo(a)anthracene	1 / 6	mg/kg	5.03E-01	9.22E-02	8.80E-01	6.91E-02	N
	Benzo(a)pyrene	1 / 6	mg/kg	4.10E-01	7.83E-02	8.80E-02	7.11E-02	Y
	Benzo(b)fluoranthene	2 / 6	mg/kg	4.10E-01	8.70E-02	8.80E-01	6.91E-02	N
	Benzo(g,h,i)perylene[4]	1 / 6	mg/kg	2.67E-01	5.12E-02	2.30E+02	3.66E-02	N
	Benzo(k)fluoranthene	2 / 6	mg/kg	3.66E-01	7.57E-02	8.80E+00	7.48E-02	N
	Chrysene	2 / 6	mg/kg	5.34E-01	1.05E-01	8.80E+01	9.27E-02	N
	Dibenzofuran	1 / 6	mg/kg	5.98E-02	1.66E-02	3.10E+01	1.60E-02	N
	Fluoranthene	2 / 6	mg/kg	1.10E+00	1.98E-01	3.10E+02	1.34E-01	N
	Fluorene	1 / 6	mg/kg	1.02E-01	2.37E-02	3.10E+02	1.60E-02	N
	Indeno(1,2,3-c,d)pyrene	1 / 6	mg/kg	2.22E-01	4.45E-02	8.80E-01	3.70E-02	N
	Phenanthrene[5]	1 / 6	mg/kg	9.48E-01	1.64E-01	3.10E+02	6.98E-02	N
	Pyrene	2 / 6	mg/kg	8.95E-01	1.63E-01	2.30E+02	1.17E-01	N
Pesticides/PCBs	***Aroclor 1260***[6]	2 / 6	mg/kg	6.76E-02	2.39E-02	8.30E-02	1.10E-02	N
TAL Inorganics	Aluminum	6 / 6	mg/kg	4.27E+03	3.64E+03	7.80E+03	1.16E+04	N
	Arsenic	2 / 6	mg/kg	1.70E+00	8.87E-01	4.30E-01	4.50E+00	N
	Barium	6 / 6	mg/kg	3.49E+01	1.84E+01	5.50E+02	3.52E+01	N
	Beryllium	4 / 6	mg/kg	2.30E-01	9.28E-02	1.50E-01	3.26E-01	N
	Cadmium	6 / 6	mg/kg	1.50E+00	4.69E-01	3.90E+00	6.55E-01	N
	Calcium	6 / 6	mg/kg	2.71E+02	1.09E+02	EN[7]	1.27E+03	N
	Chromium	6 / 6	mg/kg	7.20E+00	4.97E+00	3.90E+01	2.09E+01	N
	Cobalt	6 / 6	mg/kg	7.74E-01	6.08E-01	4.70E+02	1.94E+00	N
	Copper	6 / 6	mg/kg	1.21E+01	5.08E+00	3.10E+02	4.83E+00	N
	Cyanide	1 / 6	mg/kg	2.70E-01	7.83E-02	1.60E+02	8.00E-02	N
	Iron	6 / 6	mg/kg	3.50E+03	2.17E+03	2.30E+03	1.57E+04	N

Table 4-4. Summary of Analytes Detected in 716-A Motor Shops Seepage Basin Surface (0-0.3 m [0-1 ft]) Soils (continued)

Analyte Class	Analyte	Frequency of Detection	Units	Maximum Detection	Average Detection	RBC[2]	2 x Average Background[1]	Retained as USC[3] (Y/N)
TAL Inorganics (Continued)	Lead	6 / 6	mg/kg	1.30E+01	7.80E+00	4.00E+02	1.34E+01	N
	Magnesium	6 / 6	mg/kg	1.15E+02	7.31E+01	EN	3.09E+02	N
	Manganese	6 / 6	mg/kg	6.99E+01	2.54E+01	1.80E+02	2.36E+02	N
	Mercury	6 / 6	mg/kg	5.60E-02	2.77E-02	2.30E+00	4.18E-02	N
	Nickel	6 / 6	mg/kg	2.40E+00	1.65E+00	1.60E+02	3.57E+00	N
	Potassium	6 / 6	mg/kg	1.41E+02	7.48E+01	EN	1.77E+02	N
	Sodium	4 / 6	mg/kg	2.43E+01	1.57E+01	EN	4.02E+01	N
	Vanadium	6 / 6	mg/kg	8.10E+00	5.98E+00	5.50E+01	3.98E+01	N
	Zinc	6 / 6	mg/kg	6.46E+01	1.94E+01	2.30E+03	2.44E+01	N
Radiological Indicators	Gross Alpha	3 / 6	pCi/g	1.46E+01	6.75E+00	NR[8]	2.54E+01	N
	Nonvolatile Beta	3 / 6	pCi/g	1.59E+01	8.81E+00	NR	2.01E+01	N
Miscellaneous	Total petroleum hydrocarbons	5 / 6	mg/kg	5.30E+02	1.81E+02	NA[9]	4.69E+01	N

Notes

1) A value equal to 2 X one-half the laboratory method detection limit is used for constituents not detected in the background population. Analytes not detected in background samples are shown in italics.
2) (a) Risk Based Concentrations for residential soil are from EPA Region III, April 1996. Values for radiological indicators are from Nix (1996). Value for total recoverable lead is EPA Region IV action limit.
   (b) A value of zero is used for essential nutrients and analytes with no reported RBC.
3) USC for unit-specific contaminant (exceeds both twice average background and RBC).
4) RBC for Pyrene used as a surrogate value.
5) RBC for Fluorene used as a surrogate value.
6) RBC for Polychlorinated Biphenyl (PCB) used as surrogate value.
7) EN = Essential nutrient
8) NR = Not reported
9) NA = Not applicable

Table 4-5. Summary of Analytes Detected in 716-A Motor Shops Seepage Basin Subsurface (0-1.2 m [0-4 ft]) Soils

Analyte Class	Analyte	Frequency of Detection	Units	Maximum Detection	Average Detection	RBC[2]	2 x Average Background[1]	Retained as USC[3] (Y/N)
Volatiles	1,1, 1-Trichloroethane	8 / 11	mg/kg	1.03E-02	3.58E-03	2.70E+02	8.06E-03	N
	Tetrachloroethene	11 / 11	mg/kg	1.3 1E-02	5.83E-03	1.20E+01	1.42E-02	N
Semivolatiles	*Acenaphthene*	1 / 12	mg/kg	1.00E-01	1.52E-02	4.70E+02	1.50E-02	N
	Anthracene	1 / 12	mg/kg	2.30E-01	2.65E-02	2.30E+03	2.08E-02	N
	Benzo(a)anthracene	1 / 12	mg/kg	5.03E-01	5. 11E-02	8.80E-01	4.45E-02	N
	Benzo(a)pyrene	1 / 12	mg/kg	4.1 0E-01	4.52E-02	8.80E-02	4.76E-02	Y
	Benzo(b)fluoranthene	2 / 12	mg/kg	4. 10E-01	4.93E-02	8.80E-01	4.61E-02	N
	Benzo(g,h,i)pery lene [4]	1 / 12	mg/kg	2.67E-01	2.96E-02	2.30E+02	2.63E-02	N
	Benzo(k)fluoranthene	2 / 12	mg/kg	3.66E-01	4.34E-02	8.80E+00	4.84E-02	N
	Chrysene	2 / 12	mg/kg	5.34E-01	5.73E-02	8.80E+01	5.59E-02	N
	Dibenzofuran	1 / 12	mg/kg	5.98E-02	1.23E-02	3.10E+01	1.60E-02	N
	Fluoranthene	2 / 12	mg/kg	1.10E+00	1.04E-01	3.10E+02	7.65E-02	N
	Fluorene	1 / 12	mg/kg	1.02E-01	1.58E-02	3.10E+02	1.60E-02	N
	Indeno(1,2,3-c,d)pyrene	1 / 12	mg/kg	2.22E-01	2.68E-02	8.80E-01	2.75E-02	N
	Phenanthrene [5]	1 / 12	mg/kg	9.48E-01	8.59E-02	3.10E+02	4.24E-02	N
	Pyrene	2 / 12	mg/kg	8.95E-01	8.67E-02	2.30E+02	6.90E-02	N
Pesticides/PCBs	*Aroclor 1260*[6]	2 / 12	mg/kg	6.76E-02	1.47E-02	8.30E-02	1.10E-02	N
TAL Inorganics	Aluminum	12 / 12	mg/kg	8.51E+03	4.62E+03	7.80E+03	1.57E+04	N
	Antimony	2 / 12	mg/kg	2.00E+00	3.81E-01	3.10E+00	7.48E-01	N
	Arsenic	6 / 12	mg/kg	2.20E+00	1.07E+00	4.30E-01	5.13E+00	N
	Barium	12 / 12	mg/kg	3.49E+01	1.98E+01	5.50E+02	4.35E+01	N
	Beryllium	9 / 12	mg/kg	3.52E-01	1.49E-01	1.50E-01	4.21E-01	N
	Cadmium	11 / 12	mg/kg	1.50E+00	3.23E-01	3.90E+00	6.54E-01	N
	Calcium	12 / 12	mg/kg	2.71E+02	1.00E+02	EN[7]	8.92E+02	N
	Chromium	12 / 12	mg/kg	7.20E+00	5.00E+00	3.90E+01	2.36E+01	N
	Cobalt	12 / 12	mg/kg	1.50E+00	7.97E-01	4.70E+02	2.30E+00	N
	Copper	12 / 12	mg/kg	1.21E+01	3.70E+00	3.10E+02	5.23E+00	N
	Cyanide	2 / 12	mg/kg	2.70E-01	6.50E-02	1.60E+02	8.00E-02	N

Table 4-5. Su mary of Analytes Detected in 716-A Motor Shops Seepage Basin Subsurface (0-1.2 m [0-4 ft]) Soils (continued)

Analyte Class	Analyte	Frequency of Detection	Units	Maximum Detection	Average Detection	RBC[2]	2 x Average Background[1]	Retained as USC[3] (Y/N)
TAL Inorganics (Continued)	Iron	12 / 12	mg/kg	4.80E+03	2.59E+03	2.30E+03	1.86E+04	N
	Lead	11 / 12	mg/kg	1.30E+01	6.54E+00	4.00E+02	1.32E+01	N
	Magnesium	12 / 12	mg/kg	1.15E+02	7.88E+01	EN	2.95E+02	N
	Manganese	12 / 12	mg/kg	6.99E+01	2.52E+01	1.80E+02	1.66E+02	N
	Mercury	12 / 12	mg/kg	5.60E-02	2.99E-02	2.30E+00	6.73E-02	N
	Nickel	12 / 12	mg/kg	2.60E+00	.85E+00	1.60E+02	4.36E+00	N
	Potassium	12 / 12	mg/kg	.41E+02	8.28E+01	EN	1.89E+02	N
	Sodium	9 / 12	mg/kg	2.70E+01	.68E+01	EN	4.85E+01	N
	Vanadium	12 / 12	mg/kg	1.25E+01	6.95E+00	5.50E+01	4.58E+01	N
	Zinc	12 / 12	mg/kg	6.46E+01	1.45E+0	2.30E+03	1.74E+01	N
Radiological Indicators	Gross Alpha	8 / 12	pCi/g	1.46E+01	7.66E+00	NR[8]	2.49E+01	N
	Nonvolatile Beta	6 / 12	pCi/g	1.59E+01	8.41E+00	NR	1.98E+01	N
Miscellaneous	Total petroleum hydro arbons	9 / 12	mg/kg	5.30E+02	.03E+02	NA[9]	3.30E+01	N

Notes

1) A value equal to 2 X one-half the laboratory method detection limit is used for constituents not detected in the background population. Analytes not detected in background samples are shown in italics.
2) (a) Risk Based Concentrations for residential soil are from EPA Region III, April 1996. Values for radiological indicators are from Nix (1996). Value for total recoverable lead is EPA Region IV action limit.
   (b) A value of zero is used for essential nutrients and analytes with no reported RBC.
3) USC for unit-specific contaminant (exceeds both twice average background and RBC).
4) RBC for Pyrene used as a surrogate value.
5) RBC for Fluorene used as a surrogate value.
6) RBC for Polychlorinated Biphenyl (PCB) used as surrogate a u
7) EN = Essential nutrient
8) NR = Not reported
9) NA = Not applicable

Table 4-6. Chemical Analysis Results for Soils
716-A Motor Shops Seepage Basin

Sample ID	1-1*	1-2	2-1	2-2D	2-3	3-1	3-2	3-3S	4-1	4-2	5-1*
Depth (feet)	0.2-0.5	26-27	2-4	2-4	20-21	2-4	20-22	20-22	2-4	25-27	0.1-0.7
Organic Constituents µg/kg											
Acetone	54	54	53	160	43	57	30	100	45	ND	ND
Bis(2-Ethylhexyl)Phthalate	520	ND	ND	ND	ND	ND	ND	ND	ND	ND	6600
Ethylbenzene	ND	ND	ND	ND	ND	ND	ND	ND	7.0	ND	ND
Fluoranthene	40	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Methylene chloride	11	11	10	13	3	7	9	14	20	8	12
2-Methylnaphthalene	ND	ND	ND	ND	ND	ND	ND	ND	320	ND	ND
PCB 1254	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	1400
Phenanthrene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	250
Pyrene	60	ND	ND	ND	ND	ND	ND	ND	ND	ND	620
Xylenes	ND	ND	ND	ND	ND	ND	ND	ND	15	ND	ND
Metals mg/kg											
Antimony	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	10
Arsenic	1.1	NA	NA	NA	NA	NA	NA	NA	NA	NA	3.6
Barium	15	NA	NA	NA	NA	NA	NA	NA	NA	NA	34
Cadmium	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	1.7
Chromium	119	NA	NA	NA	NA	NA	NA	NA	NA	NA	68
Copper	4.3	NA	NA	NA	NA	NA	NA	NA	NA	NA	52
Lead	11	NA	NA	NA	NA	NA	NA	NA	NA	NA	73
Mercury	0.2	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.35
Nickel	55	NA	NA	NA	NA	NA	NA	NA	NA	NA	28
Thallium	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	1.0
Vanadium	7.4	NA	NA	NA	NA	NA	NA	NA	NA	NA	ND
Zinc	21	NA	NA	NA	NA	NA	NA	NA	NA	NA	51
Toxicity Results µg/l											
Barium	NA	29	152	115	NA	70	NA	NA	8.9	NA	NA
Chromium	NA	ND	19	ND	NA	ND	NA	NA	ND	NA	NA
Mercury	NA	0.33	0.46	0.44	NA	0.43	NA	NA	0.37	NA	NA
Radionuclides pCi/g	NA	NA	ND	ND	NA	NA	NA	NA	NA	9.5	NA
Common Ions mg/kg											
Chloride	1.9	NA	NA	NA	NA	NA	NA	NA	NA	NA	ND
Nitrate as Nitrogen	1.8	NA	NA	NA	NA	NA	NA	NA	NA	NA	1.2
Sulfate	12	NA	NA	NA	NA	NA	NA	NA	NA	NA	7.5

Notes: NA - Not-Analyzed
ND - Non-Detect
An "S" extension to the interval number indicates a split sample
A "D" extension to the interval number indicates a duplicate sample
* Appendix VIII analysis

Source: WSRC 1990a

Only samples with compounds detected above detection limits are reported

SECTION 5

TABLES

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5.0 CONTAMINANT FATE AND TRANSPORT

This section describes the potential migration pathways and mechanisms for transport of chemical substances found in soil at the 716-A Motor Shops Seepage Basin (MSSB). Based on the information presented in previous sections, contaminant fate and transport analyses are performed to evaluate the potential for soil constituents to adversely impact human health and the environment. Soil screening methods and simple analytical methods are used to evaluate potential contaminant movement from source areas to receptor locations.

Section 5.1 discusses the persistence, mobility, and other physical and chemical properties of the organic and inorganic compounds found at the MSSB. Section 5.2 identifies potential contaminant migration pathways and describes contaminant release mechanisms in various media. Section 5.3 describes the methods and results of the soil leachability screening analysis. Section 5.4 discusses the results of soil leachability calculations. Section 5.5 summarizes the conclusions drawn from the results of the analyses.

5.1 Physical and Chemical Properties of Contaminants

The fate and transport of organic and inorganic compounds are functions of site characteristics and the physical and chemical interactions between the contaminants and the media. The physical and chemical properties of the contaminants that influence these interactions include, but are not limited to solubility in water, tendency to transform or degrade, and chemical affinity for solids or organic matter. The tendency to transform or degrade is described by a half-life in a given medium. Affinity for solids or organic matter is represented by a partitioning coefficient such as the distribution coefficient (K_d), organic carbon partition coefficient (K_{oc}), or octanol/water partition coefficient (K_{ow}). The effect of these physical and chemical properties on the behavior of the contaminant migration constituents of potential concern (CMCOPCs) at the MSSB is described below.

5.1.1 Identification of Contaminant Migration Constituents of Potential Concern

For the purpose of soil leachability analysis, CMCOPCs are defined as constituents with a maximum detected soil concentration greater than two-times the average background soil concentration for subsurface soil (depth interval 0-1.2 m [0-4 ft]). The average background concentration is calculated from all data at sampling locations ABKSB01

through ABKSB06. For non-detected values, a surrogate of one-half the method detection limit (MDL) is used to calculate average background concentrations.

Table 5-1 shows the screening of the maximum detected concentrations at the MSSB against two times the average background concentrations and identifies the CMCOPCs. The data set for the MSSB combines surface and subsurface soil samples (depth interval 0-1.2 m [0-4 ft]) at locations AOBSB01 through AOBSB06.

5.1.2 Inorganic Compounds

The mobility of inorganic compounds in the environment is affected by a number of factors, such as the tendency to sorb to particles, biotransform, react, or volatilize. Inorganic compounds can be transported through the atmosphere if they form volatile compounds, such as methyl mercury. In soil, inorganic compounds are found in one or more of the following states:

- Dissolved in soil water solution
- Occupying exchange sites on inorganic soil constituents
- Adsorbed on soil mineral constituents
- Associated with insoluble soil organic matter
- Precipitated as pure or mixed solids
- Present in the structure of the secondary minerals
- Present in structure of the primary minerals

In situations where metals have been introduced into the environment through human activity, metals are associated with the first five states. Inorganic compounds do not degrade in the environment; however, some inorganic compounds (e.g., arsenic and chromium) can be transformed to other oxidation states in soil, thus reducing their mobility and toxicity.

Inorganic compounds in soil may be transported through the vadose zone to the water table by either dissolving in soil water or adsorbing to suspended particles in soil water. Inorganic compounds may also react with soils or other solid surfaces by ion exchange, adsorption, precipitation, or complexation. The extent to which contaminant movement in soil is retarded by these reactions is described by a retardation factor (R). The retardation factor is computed from the distribution coefficient for a given constituent. The distribution coefficient may vary up to several orders of magnitude for a constituent

because it is a complex function of pH, oxidation-reduction conditions, solubility, and the type and amount of organic matter, clay, and hydrous oxides present. Table 5-2 lists the distribution coefficients for the inorganic CMCOPCs.

The dissolved condition and its equilibrium fraction are of primary importance to the migration potential of inorganic compounds in soil since the dissolved fraction is more mobile and bioavailable. Soluble compounds are transported in aqueous forms and are subject to retardation. Insoluble compounds remain as precipitate and limit the overall dissolution of metal. Inorganic solubility is largely controlled by the constituent species present. Constituent speciation, however, is very complex and difficult to distinguish in routine laboratory analysis. Of the common inorganic compounds, the chloride, nitrate, and nitrite species are the most soluble. Sulfate, carbonate, and hydroxide species have low to moderate solubility.

For the inorganic CMCOPCs at the MSSB, volatilization should not be an important transport process. The most important transport processes for these compounds are adsorption to soil, transport with soil water, and uptake by biota.

5.1.3 Organic Compounds

The organic CMCOPCs for the MSSB include volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), and polychlorinated biphenyls (PCBs). Like inorganic compounds, the transport of organic compounds in the environment is affected by their volatility, adsorption to particles, solubility, and tendency to biotransform or react. VOCs have lower molecular weights and tend to be more volatile and less likely to adsorb to soil and organic matter. SVOCs, pesticides, and PCBs have higher molecular weights and a greater tendency to adsorb to soil and organic matter in the environment. They also typically have a lower solubility in water and are less volatile than VOCs.

Organic compounds may be degraded in the environment by various processes, including hydrolysis, oxidation-reduction, photolysis, and aerobic or anaerobic biodegradation. The rate of biological decay for organic compounds typically decreases with increasing molecular weight, decreasing aromaticity, and increasing halogenation. The rate of decay is described by an environmental half-life ($t_{1/2}$) in a specific medium, which can vary from minutes to years depending on the compound and on environmental conditions.

Water solubility and the tendency to sorb to particles or organic matter can be used to predict retardation in groundwater transport for organic compounds. Constituents with

relatively high water solubility and low adsorption coefficients (e.g., acetone, 4-methyl-2-pentanone, dichloromethane) are expected to remain primarily in the dissolved phase and be transported at approximately the same rate as groundwater. Constituents with relatively low water solubility and high adsorption coefficients (e.g., PCBs, polynuclear aromatic hydrocarbons [PAHs], and pesticides) are expected to remain primarily adsorbed to the soil surface, thus retarding the rate of transport in groundwater.

For the organic CMCOPCs at the MSSB, the important transport processes are volatilization, adsorption to soil, and transport with soil water. Table 5-2 presents the physical and chemical constants that describe these processes.

5.2 Contaminant Migration

The identification of potential contaminant migration pathways and a description of contaminant release mechanisms in various media is included below. These pathways are illustrated in the conceptual site model (CSM) presented in Section 6. The CSM is a statement of known or expected unit conditions that serves as a basis for interpreting the data. A good CSM incorporates the most important characteristics of a unit that constitute the problem being addressed, such as hydrogeologic features, contaminants and their properties, and potential human and ecological exposure scenarios. The predictive function of the CSM, which is of primary importance to contaminant fate and transport analyses, relies on known information and informed assumptions about the unit. The better the information and the greater the accuracy of the assumptions, the more accurately the CSM describes the unit. The expected unit conditions and release mechanisms at the MSSB consist of the following elements:

- Infiltration and percolation
- Leaching
- Volatilization and fugitive dust generation
- Biotic uptake

Infiltration and Percolation

Rainfall at the MSSB can either infiltrate the soil or evapotranspire. A portion of the total rainfall evaporates at the soil surface; the remainder percolates into the soil where it can either be absorbed by vegetation, remain as soil moisture in the vadose zone, or recharge the saturated zone. The amount of rainfall lost to evapotranspiration depends largely on the

extent and type of vegetative cover. The MSSB is vegetated with bushes and grasses, and retains water after rainfall (WSRC 1996b).

Leaching

The subsurface flow system consists of the vadose zone and the saturated zone. The vadose zone and upper saturated zone at the MSSB are composed of silt, sand, and clay sediments from the Tobacco Road, Dry Branch, and Santee Formations. At the MSSB, groundwater is encountered at approximately 45.7 m (150 ft) below land surface in the "M-Area" aquifer zone. The "M-Area" aquifer zone overlies the "green clay" confining zone and has an average thickness of approximately 6 m (20 ft) (WSRC 1996b). The sediments of the "M-Area" aquifer zone exhibit a wide variation in lithologic composition both vertically and laterally.

As infiltrating water moves vertically through the MSSB source area, contaminants can enter into solution and be transported with the water. As infiltration proceeds vertically through the vadose zone, the contaminant concentration in the infiltrating water is attenuated by adsorption of contaminants onto the surface of soil particles and by decay of the contaminants. As infiltration encounters the saturated zone, contaminant concentrations are diluted by mixing with a relatively large amount of "clean" groundwater flowing horizontally in the saturated zone. The final element of the CSM for the subsurface flow system is a hypothetical water supply well located at the boundary of the MSSB. The hypothetical water supply well is the means by which receptors may potentially be exposed to groundwater contaminants.

Volatilization and Fugitive Dust Generation

Volatilization of organic contaminants from soil and soil water is a potentially important transport process discussed further in Section 6. Fugitive dust generation is not likely to be an important potential transport process under current conditions due to the vegetation at the MSSB.

Biotic Uptake

Biota at the MSSB could assimilate organic and inorganic soil contaminants. Consumption of biota by ecological and human receptors, which may be a potential exposure pathway, is discussed further in Section 6.

5.3 Soil Screening Analysis

United States Environmental Protection Agency (EPA) Soil Screening Guidance (EPA 1996b) establishes a methodology for calculating Generic Soil Screening Levels (GSSLs) for several contaminant migration pathways utilizing standardized exposure assumptions for future residential land use and default assumptions for hydrogeologic parameters. These assumptions have been selected conservatively so that the GSSLs are protective of human health for a wide range of unit conditions. Unit-specific information can be substituted for the default assumptions to estimate soil screening levels (SSLs). In general, contaminant concentrations below the SSL do not warrant further study as long as the conditions and assumptions associated with the SSL are met. Contaminant concentrations which exceed the SSL may warrant further study or investigation, but do not necessarily indicate a need for action.

5.3.1 Comparison of Soil Contaminant Data to Soil Screening Levels

The soil screening analysis for the migration to groundwater pathway consists of three steps:

- Calculate a standard SSL for each CMCOPC from the maximum contaminant level (MCL) and the unit-specific dilution factor. If the MCL is not available, use the EPA Region III risk-based concentration (RBC) for tap water.
- Calculate a mass-limit SSL (MLSSL) for each CMCOPC from the MCL and the unit-specific dilution factor. If the MCL is not available, use the RBC for tap water.
- Compare the RME concentration for each CMCOPC to the greater of the SSL and the MLSSL. Eliminate CMCOPCs with reasonable maximum exposure (RME) concentrations less than the SSL or the MLSSL from further soil leachability analysis. (Comparisons to GSSLs were also completed but were not used to remove any CMCOPCs from consideration.) Retain CMCOPCs for soil leachability equations if neither an MCL nor an RBC is available.

The standard SSL calculation assumes an infinite source of contaminants. However, the MLSSL calculation limits the amount of contamination that is assumed to leach to groundwater based on the area and depth of soil contamination. Both should be protective of human health as long as the assumptions and conditions associated with the calculation are met.

5.3.2 *Input Data and Assumptions*

To conduct the soil screening analysis, the SSLs, MLSSLs, and unit-specific dilution factor are calculated. The SSL and MLSSL calculations for the migration to groundwater pathway are based on the following major assumptions:

- Contamination is uniformly distributed throughout the vadose zone
- Contaminants are not subject to adsorption, biodegradation, or chemical degradation
- The aquifer material is unconsolidated, and the aquifer is unconfined, homogeneous, and isotropic

As mentioned previously, the SSL and MLSSL differ in that the SSL assumes an infinite source of contaminants and the MLSSL estimates a maximum amount of contaminant available for leaching based on the volume of the soil source. The assumptions for the SSL and MLSSL calculations are presented in detail in EPA (1996b).

The organic compound distribution coefficients used in the SSL calculation are estimated from the organic carbon partition coefficient (K_{oc}), as described by EPA (1996b), using a soil organic carbon fraction (f_{oc}) of 0.0015. This is obtained from the central tendency exposure-point concentration for total organic carbon (TOC) in subsurface soil (depth interval 0-1.2 m [0-4 ft]) at the MSSB (WSRC 1997a). Inorganic distribution coefficients are for sandy soil from Sheppard and Thibault (1990) except for antimony and cyanide, which are from EPA (1996b). Table 5-3 presents the unit-specific data used for the other parameters in the SSL calculation and their references.

The depth of contamination for the MLSSL is conservatively assumed to extend to the water table (45.7 m [150 ft]) due to the lack of soil data for depths greater than 1.2 m (4 ft). The exposure duration for this calculation is the default of 70 years (EPA 1996b). Table 5-3 presents the unit-specific data used for the other parameters in the MLSSL calculation and their references.

The RME soil concentrations for the CMCOPCs are the lesser of the maximum detected concentration and the 95 percent upper confidence limit (95 UCL) obtained from WSRC (1997a). Table 5-4 presents the relevant soil statistics.

The unit-specific dilution factor is calculated using aquifer parameters described for the "M-Area" aquifer zone in WSRC (1996b), as shown in Table 5-3. The source length

parallel to groundwater flow is conservatively assumed to be the maximum length of the MSSB (63 m [207 ft]).

5.3.3 Method and Calculations

The SSLs are calculated using the following equation:

$$SSL = DF * C_{GW} * K_d$$

where:

C_{gw} is the target groundwater concentration (mg/L) based on the MCL from EPA (1996b) or, if the MCL is not available, the RBC

DF is the dilution factor (unitless)

K_d is the distribution coefficient (L/kg)

The volatilization of chemicals is ignored in the above SSL equation, as most volatilization at the MSSB has already occurred because discharges were discontinued in 1983. Incorporating volatilization would only slightly increase the SSL. Table 5-2 shows CMCOPC parameters such as K_d and MCL or RBC. Table 5-4 provides the estimated SSLs.

The MLSSLs are calculated by:

$$MLSSL = \frac{C_{gw} * DF * I * ED}{\rho_b * d_s}$$

where:

I is the infiltration rate (ft/yr)

ED is the exposure duration (yr)

d_s is the depth of the source (ft)

The exposure duration is assumed to be the EPA default of 70 years and the depth of the source is assumed to extend to the water table (45.7 m [150 ft]). The infiltration rate is estimated to be 1.42 ft/yr (Flach et al. 1996). Table 5-4 shows the MLSSLs.

The unit-specific dilution factor is estimated by (EPA 1996b):

$$DF = 1 + \frac{Kid}{IL}$$

where:

K is the horizontal hydraulic conductivity (ft/yr)

i is the hydraulic gradient (ft/ft)

d is the mixing zone depth (ft)

I is the infiltration rate (ft/yr)

L is the source length parallel to groundwater flow (ft)

The mixing zone depth (d) is estimated by EPA (1996b):

$$d = (0.0112*L^2)^{0.5} + d_a(1-EXP((-LI)/(Kid_a))$$

where:

d_a is the aquifer thickness

Table 5-3 shows the values for these unit-specific parameters and their references. The mixing zone depth (d) is estimated at 12.6 m (41.36 ft); however, the mixing zone depth cannot exceed the actual aquifer thickness (d_a) of 6 m (20 ft). Therefore, the actual aquifer thickness is used in the dilution factor calculation, resulting in an estimated dilution factor of 1.28.

The soil leachability screening analysis is performed by entering the RME concentration data, SSLs, and MLSSLs into a Microsoft Excel® spreadsheet programmed to complete the comparisons described in Subsection 5.3.1.

5.3.4 Results of Comparison to Soil Screening Levels

Table 5-4 shows the soil statistics and soil leachability screening results for the MSSB. Three organic CMCOPCs are retained for further soil leachability calculations. Only benzo(a)anthracene exceeds the soil screening levels. Benzo(g,h,i)perylene and phenanthrene are retained because MCLs or RBCs do not exist for these compounds; consequently, SSLs cannot be calculated. The inorganic compounds antimony and cadmium are also retained. All of the organic CMCOPCs and antimony were detected in less than 20 percent of the samples. Cadmium was detected in 11 out of 12 samples, but

the mean concentration for cadmium is equal to the average background concentration (Tables 5-1 and 5-2).

The background screening also identifies total petroleum hydrocarbons (TPH) as a CMCOPC. However, TPH is not retained in the soil screening analysis because it is a generic measurement of a class of organic compounds. TPH analysis measures the total combined concentration of benzene, toluene, ethylbenzene, xylene, PAHs, and other hydrocarbons. It is used as an indication of the potential for groundwater contamination by the lighter, more mobile hydrocarbons. Neither the EPA nor the South Carolina Department of Health and Environmental Control (SCDHEC) have identified a clean-up standard for TPH. The SCDHEC explicitly prefers chemical-specific soil data over TPH analysis. Because the components of TPH are analyzed on a chemical-specific basis for the MSSB, further evaluation of TPH for leachability to groundwater is not considered necessary.

5.4 Detailed Unit-Specific Equations

Soil leachability calculations are performed for the remaining CMCOPCs using an analytical equation programmed into a Microsoft Excel® spreadsheet. These detailed unit-specific equations estimate the concentration of each CMCOPC at the base of the vadose zone, and predicts the maximum groundwater concentration at the receptor location and the time that it occurs by applying a groundwater dilution factor. The nature of the input data and the analytical equation assumptions are such that the estimated groundwater concentrations are conservative. CMCOPCs with maximum groundwater concentrations predicted to occur within 1000 years are then compared to MCLs, or RBCs if a MCL is not available (WSRC 1997b). The input data, analytical equation assumptions, and calculation results are discussed in the following sections.

5.4.1 Input Data and Assumptions

The soil leachability equations assume that steady one-dimensional flow in the vadose zone represents average flow conditions over the period of interest, and that there is an infinite source of contaminants. Dispersion is not incorporated into the vadose zone flow estimate because it does not affect the maximum groundwater concentration or the time that it occurs unless the contamination is the result of a point source. Reversible, equilibrium adsorption of contaminants is represented in the soil leachability equations through the distribution coefficient (K_d) estimated as described in Section 5.3.2. First-order decay of organic CMCOPCs is incorporated into the soil leachability equations by

utilizing published environmental half-lives for biological reactions. The assumption of first-order decay results in daughter products not being considered in the calculation. Environmental half-life values are available for organic compounds in various media. The environmental half-lives chosen for this study are the conservative aerobic values reported for soil. Aerobic half-lives are typically two to 20 times less than those in groundwater because oxygen is more readily available and mobile in soil. Inorganic CMCOPCs are assumed not to undergo any nonadsorptive type reactions, which is reasonable and slightly conservative. As with the SSL calculation, volatilization is not incorporated into the soil leachability equations because the bulk of potential volatilization has likely already occurred at the MSSB and because not incorporating volatilization is slightly more conservative.

The RME soil concentrations are used to represent the concentration of soil contaminants subject to leaching, and the pH of the soil water is assumed to be approximately 5. As explained previously in Subsection 5.3.2, the dilution factor is estimated to be 1.28. Table 5-3 shows additional hydrogeological parameters used for the soil leachability equations and their references. Table 5-5 shows the chemical-specific input parameters such as RME concentration, distribution coefficient, and half-life.

5.4.2 Method and Calculations

Based on the above assumptions, the equation that describes the groundwater concentration at the hypothetical water well is given by:

$$C_w = \frac{C_s * EXP(-0.693 * T_{max}/t_{1/2})}{K_d * DF}$$

where:

C_w is the groundwater concentration at the hypothetical water well at the time of maximum concentration (T_{max}) (mg/L)

C_s is the RME soil concentration (mg/kg)

K_d is the distribution coefficient (L/kg)

T_{max} is the time (years) that the maximum soil water concentration occurs at the water table surface

$t_{1/2}$ is the environmental half-life of the CMCOPC (years)

DF is the groundwater dilution factor (unitless)

T_{max} is estimated for each CMCOPC by the following equation:

$$T_{max} = \frac{L_v * R}{V}$$

where:

L_v is the distance from the source to the water table (ft) determined for each CMCOPC by measuring from the bottom of the deepest sampling interval in which the contaminant was detected to the top of the water table, assuming the water table is 150 feet below ground surface (WSRC 1996b).

V is the soil water velocity in the vadose zone (ft/year)

R is the retardation coefficient (unitless)

V is estimated to be 14.2 ft/year from the recharge rate, effective porosity, and average percent saturation as follows (Table 5-3):

$$V = \frac{I}{n_e * S_w}$$

where:

I is the recharge rate (ft/year)

n_e is the effective porosity (unitless)

S_w is the average percent water saturation (unitless)

The retardation coefficient is calculated for each CMCOPC as (Marsily 1986):

$$R = 1 + (K_d * \rho_b / n_T)$$

where:

K_d is the distribution coefficient (L/kg)

ρ_b is the bulk soil density (kg/L)

n_T is the total porosity (unitless)

Table 5-5 shows the chemical-specific values calculated for the retardation coefficient, T_{max}, and distance from the source to the water table (L_v).

5.4.3 *Results of Unit-Specific Equations*

Table 5-5 presents the results of the soil leachability calculations for the MSSB. The organic CMCOPCs are predicted not to leach to groundwater, which is expected for these higher molecular weight compounds with low volatility and low water solubility.

No inorganic CMCOPCs, with the exception of antimony, are estimated to reach maximum concentration within 1000 years and exceed MCLs. The travel time for antimony to reach the water table is predicted to be 1537 years at a maximum concentration of 11.5 µg/L (see Table 5-5). The equations used to model contaminant transport only predict a maximum concentration as a slug flow and a maximum break-through time based upon the distance to the water table. Therefore, the maximum concentration in groundwater will always coincide with the break-through time and the contaminant will not enter the water table until the break-through time.

Because antimony is predicted to exceed its MCL beyond 1000 years, a further attempt to quantify its significance to leach is undertaken. The unit-specific equations applied in the previous evaluation utilize a default K_d from EPA guidance. This K_d is not unit-specific and is conservative. In an attempt to tailor a more unit-specific analysis the K_d parameter used within the equations is re-evaluated.

The soil-water distribution coefficient, K_d, is an empirical parameter that lumps all operating retention mechanisms into one value. The K_d parameter assumes that the liquid and solid phases are at equilibrium and that there is linear relationship between solute concentration in the solid (C_s) and liquid (C_l) phases, as expressed by the equation:

$$K_d = C_s/C_l$$

This equation is used as the basis to calculate a unit-specific K_d, the MSSB soils data, and the AOB wells series groundwater data. The average detected values for antimony in background soils is used to calculate C_s, and the average detected values for total recoverable antimony in groundwater are used to calculate C_l. The resultant unit-specific K_d for antimony at the MSSB is then calculated to be 118.5 L/Kg.

$$K_d = .652 \text{ mg/kg} / 0055 \text{ mg/L}$$

$$K_d = 118.5 \text{ L/Kg}$$

The calculated K_d for antimony compares very favorably with the values reported in the literature (Sheppard and Thibault 1990).

When the site-specific K_d is then input back into the unit-specific equations and the transport output is re-calculated, break-through time increases from 1537 years to 4123 years (see Table 5-6). The maximum concentration of antimony in groundwater decreases from 11.5 µg/L to 4.37 µg/L, which is less than the MCL of 6 µg/L. The extended evaluation of antimony indicates that it will not migrate to the water and exceed its MCL at any time in the future.

5.5 Conclusions of Fate and Transport

The SSLs and MLSSLs for the MSSB are calculated using conservative assumptions to ensure that the these levels are protective of human health for the migration to groundwater pathway. Similarly, the soil leachability model tends to overestimate the predicted groundwater concentrations and underestimate the time to maximum concentration due to the conservative assumptions inherent in the analytical equations, and the purposeful selection of conservative input parameters. As a result, CMCOPCs eliminated during the soil screening and soil leachability analysis are unlikely to pose a future human health risk due to ingestion of groundwater. There are no remaining CMCOPCs; therefore, there are no contaminant migration constituents of concern.

Table 5-1. Background Soil Screening for the MSSB

Detected Compound	Frequency of Detection	Maximum Concentration	Two Times Average Background Concentration	Retained as CMCOPC
Volatile Organic Compounds (mg/kg)				
1,1,1-Trichloroethane	8 / 11	1.03E-02	8.06E-03	CMCOPC
Tetrachloroethene	11 / 11	1.31E-02	1.42E-02	no
Semivolatile Organic Compounds (mg/kg)				
Acenapthene	1 / 12	1.00E-01	nd	CMCOPC
Aldol condensate	6 / 6	7.00E-01	1.13E+00	
Anthracene	1 / 12	2.30E-01	2.08E-02	CMCOPC
Benzo(a)anthracene	1 / 12	5.03E-01	4.45E-02	CMCOPC
Benzo(a)pyrene	1 / 12	4.10E-01	4.76E-02	CMCOPC
Benzo(b)fluoranthene	2 / 12	4.10E-01	4.61E-02	CMCOPC
Benzo(g,h,i)perylene	1 / 12	2.67E-01	2.63E-02	CMCOPC
Benzo(k)fluoranthene	2 / 12	3.66E-01	4.84E-02	CMCOPC
Chrysene	2 / 12	5.34E-01	5.59E-02	CMCOPC
Dibenzofuran	1 / 12	5.98E-02	nd	CMCOPC
Fluoranthene	2 / 12	1.10E+00	7.65E-02	CMCOPC
Fluorene	1 / 12	1.02E-01	nd	CMCOPC
Indeno(1,2,3-c,d)pyrene	1 / 12	2.22E-01	2.75E-02	CMCOPC
Phenanthrene	1 / 12	9.48E-01	4.24E-02	CMCOPC
Pyrene	2 / 12	8.95E-01	6.90E-02	CMCOPC
Total Petroleum Hydrocarbons	9 / 12	5.30E+02	3.30E+01	CMCOPC
PCBs (mg/kg)				
Aroclor 1260	2 / 12	6.76E-02	nd	CMCOPC
Inorganic Compounds (mg/kg)				
Aluminum	12 / 12	8.51E+03	1.57E+04	no
Antimony	2 / 12	2.00E+00	7.48E-01	CMCOPC
Arsenic	6 / 12	2.20E+00	5.13E+00	no
Barium	12 / 12	3.49E+01	4.35E+01	no
Beryllium	9 / 12	3.52E-01	4.21E-01	no
Cadmium	11 / 12	1.50E+00	6.54E-01	CMCOPC
Calcium	12 / 12	2.71E+02	8.92E+02	no
Chromium	12 / 12	7.20E+00	2.36E+01	no
Cobalt	12 / 12	1.50E+00	2.30E+00	no
Copper	12 / 12	1.21E+01	5.23E+00	CMCOPC
Cyanide	2 / 12	2.70E-01	nd	CMCOPC
Iron	12 / 12	4.80E+03	1.86E+04	no
Lead	11 / 11	1.30E+01	1.32E+01	no
Magnesium	12 / 12	1.15E+02	2.95E+02	no
Manganese	12 / 12	6.99E+01	1.66E+02	no
Mercury	12 / 12	5.60E-02	6.73E-02	no
Nickel	12 / 12	2.60E+00	4.36E+00	no
Potassium	12 / 12	1.41E+02	1.89E+02	no
Sodium	9 / 12	2.70E+01	4.85E+01	no
Vanadium	12 / 12	1.25E+01	4.58E+01	no
Zinc	12 / 12	6.46E+01	1.74E+01	CMCOPC
Radionuclide Indicators (pCi/gm)				
Gross Alpha	8 / 12	1.46E+01	2.49E+01	no
Nonvolatile Beta	6 / 12	1.59E+01	1.98E+01	no

nd = not detected

Table 5-2. Chemical-Specific Parameters for Soil Leachability CMCOPCs at the MSSB

Chemical	Mol. Wt.	Solubility in Water (mg/L)[1]	Temp. of Solubility (C)	Vapor Pressure (mm Hg)	Temp. of Vapor Pressure (C)	Henry's Constant (atm-m³/mol)	Temp. of Henry's Constant (C)	Log K_{oc}[1]	K_d[2]	K_d[2]	Environmental Half-life (years)	MCL or RBC for tap water[4] (µg/L)
Volatile Organic Compounds												
1,1,1-Trichloroethane	133.40	1.25E+03	23-24	100	20	1.13E-02	18.2	2.49		1.10E+02	1.65E-01	7.48E-01	**2.00E+02**
Semivolatile Organic Compounds													
Acenapthene	154.21	4.16E+00	25	2.30E-03	25	6.36E-05	25	3.92		7.08E+03	1.06E+01	2.79E-01	2.20E+03
Anthracene	178.24	4.10E-02	20	5.17E-04	25	1.93E-05	25	4.45		2.95E+04	4.43E+01	1.26E+00	1.10E+04
Benzo(a)anthracene	228.30	9.44E-02	25	3.05E-08	25	8.00E-06	na	5.91		3.98E+05	5.97E+02	1.86E+00	9.20E-02
Benzo(a)pyrene	252.32	1.60E-03	25	5.43E-07	25	1.60E-03	25	6.00		1.02E+06	1.53E+03	1.45E+00	**2.00E-01**
Benzo(b)fluoranthene	252.32	1.20E-03	25	5.00E-07	20	5.03E-07	20	6.40		1.23E+06	1.85E+03	1.67E+00	9.20E-02
Benzo(g,h,i)perlyene	276.34	2.60E-04	25	1.01E-10	25	2.66E-07	20	7.10	6.89	7.76E+06	1.16E+04	1.78E+00	**na**
Benzo(k)fluoranthene	252.32	5.50E-04	25	9.59E-11	25	4.24E-07	20	6.40		1.23E+06	1.85E+03	5.86E+00	9.20E-01
Chrysene	228.30	2.10E-03	23	6.30E-07	20	7.26E-20	20	5.60		3.98E+05	5.97E+02	2.74E+00	9.20E+00
Dibenzofuran	168.20	4.22E+00	25	2.63E-03	25	5.82E-05	25	4.17	3.91	8.13E+03	1.22E+01	7.67E-02	1.50E+02
Fluoranthene	202.26	1.77E-01	25	7.16E-05	25	6.32E-06	20	5.16		1.07E+05	1.61E+02	1.21E+00	1.50E+03
Fluorene	166.22	2.23E+00	25	3.55E-03	25	6.30E-05	25	4.18		1.38E+04	2.07E+01	1.64E-01	1.50E+03
Indeno(1,2,3-c,d)pyrene	276.34	6.20E-02	na	1.01E-10	25	2.86E-07	20	5.97		3.47E+06	5.21E+03	2.00E+00	9.20E-02
Phenanthrene	178.24	1.00E+00	25	4.20E-04	25	2.35E-05	25	4.45	6.12	1.32E+06	1.98E+03	5.48E-01	**na**
Pyrene	202.26	1.07E-01	25	5.64E-05	25	1.09E-05	na	5.18		1.05E+05	1.58E+02	5.21E+00	1.10E+03
PCBs													
Aroclor 1260	370.00	1.44E-02	20	6.31E-06	20	1.70E-04	20	6.91	6.42	2.63E+06	3.95E+03	1.00E+99	8.70E-03
Inorganic Compounds													
Antimony											4.50E+01		**6.00E+00**
Cadmium											8.00E+01		**5.00E+00**
Copper											4.00E+01		**1.00E+03**
Cyanide											9.90E+00		**2.00E+02**
Zinc											2.00E+02		1.10E+04

Source: Montgomery 1996 unless specifically noted otherwise.

1 EPA 1996a. Log K_{oc} (from Montgomery 1996) is only given where it was used to calculate K_{oc}.

2 K_ds for organic CMCOPCs are calculated as $K_{oc}*f_{oc}$ where f_{oc}=.0015. K_ds for inorganic CMCOPCs are from Sheppard and Thibault (1990), except that antimony and cyanide are from EPA 1996b.

3 Howard 1991. Value for PCB is estimated. Environmental degradation of inorganic compounds is not considered; therefore, half-lives are not included.

4 MCLs appear in **bold**, and are from EPA 1996b. Copper is secondary MCL. NA indicates that neither an MCL nor an RBC is available.

Table 5-3. Hydrogeological Parameters for the MSSB

	PARAMETER	VALUE	UNITS	DATA SOURCE
K	Horizontal saturated hydraulic conductivity	800	ft/yr	WSRC 1996c
I	Infiltration rate	1.42	ft/yr	Flach et al. 1996
i	Hydraulic gradient	0.005 1	unitless	WSRC 1996c
d_a	Aquifer thickness	20	ft	WSRC 1996c
L	Source length parallel to groundwater flow	207	ft	WSRC 1996c
r_b	Bulk Soil Density	1.65	kg/L	Looney et al. 1987
n_T	Total Porosity	0.5	unitless	Looney et al. 1987
n_e	Effective Porosity	0.2	unitless	Looney et al. 1987
S_w	Average Percent Saturation	0.5	unitless	Flach et al. 1996
V	Soil Water Velocity	14.2	ft/yr	calculated as $V=I/(n_e * S_w)$ Flach et al. 1996

Calculated mixing zone depth, d =41.4
Actual mixing zone depth is the lesser of water table thickness (6 m) and calculated mixing zone depth
Estimated dilution factor, DF, is 1.28.

Table 5-4. Comparison of MSSB Soil Data to Soil Screening Levels

CMCOPC	Frequency of Detection	Maximum Concentration	Mean	95% UCL	RME Concentration	Generic SSL (DF=1)	SSL (DF=28)	MLSSL (DF=28)	Retained as CMCOPC ?
Volatile Organic Compounds (mg/kg)									
1,1,1-Trichloroethane	8 / 11	1.03E-02	3.58E-03	5.39E-03	5.39E-03	0.1	**4.22E-02**	**1.03E-01**	no
Semivolatile Organic Compounds (mg/kg)									
Acenapthene	1 / 12	1.00E-01	1.52E-02	2.91E-02	2.91E-02	29	2.99E+01	1.13E+00	no
Anthracene	1 / 12	2.30E-01	2.65E-02	5.97E-02	5.97E-02	590	6.23E+02	5.65E+00	no
Benzo(a)anthracene	1 / 12	5.03E-01	5.11E-02	1.25E-01	1.25E-01	0.08	7.03E-02	4.73E-05	CMCOPC
Benzo(a)pyrene	1 / 12	4.10E-01	4.52E-02	1.05E-01	1.05E-01	0.4	3.92E-01	**1.03E-04**	no
Benzo(b)fluoranthene	2 / 12	4.10E-01	4.93E-02	1.09E-01	1.09E-01	0.2	2.17E-01	4.73E-05	no
Benzo(g,h,i)perylene	1 / 12	2.67E-01	2.96E-02	6.83E-02	6.83E-02	na	na	na	CMCOPC
Benzo(k)fluoranthene	2 / 12	3.66E-01	4.34E-02	9.63E-02	9.63E-02	2	2.17E+00	4.73E-04	no
Chrysene	2 / 12	5.34E-01	5.73E-02	1.35E-01	1.35E-01	8	7.03E+00	4.73E-03	no
Dibenzofuran	1 / 12	5.98E-02	1.23E-02	2.01E-02	2.01E-02	na	2.34E+00	7.71E-02	no
Fluoranthene	2 / 12	1.10E+00	1.04E-01	2.66E-01	2.66E-01	210	3.08E+02	7.71E-01	no
Fluorene	1 / 12	1.02E-01	1.58E-02	2.99E-02	2.99E-02	28	3.97E+01	7.71E-01	no
Indeno(1,2,3-c,d)pyrene	1 / 12	2.22E-01	2.68E-02	5.86E-02	5.86E-02	0.7	6.13E-01	4.73E-05	no
Phenanthrene	1 / 12	9.48E-01	8.59E-02	2.27E-01	2.27E-01	na	na	na	CMCOPC
Pyrene	2 / 12	8.95E-01	8.67E-02	2.19E-01	2.19E-01	210	2.22E+02	5.65E-01	no
PCBs (mg/kg)									
Aroclor 1260	2 / 12	6.76E-02	1.47E-02	2.60E-02	2.60E-02	na	4.39E-02	4.47E-06	no
Inorganic Compounds (mg/kg)									
Antimony	2 / 12	2.00E+00	3.81E-01	6.63E-01	6.63E-01	0.3	**3.46E-01**	**3.08E-03**	CMCOPC
Cadmium	11 / 12	1.50E+00	3.23E-01	5.34E-01	5.34E-01	0.4	**5.12E-01**	**2.57E-03**	CMCOPC
Copper	12 / 12	1.21E+01	3.70E+00	5.24E+00	5.24E+00	na	5.12E+01	5.14E-01	no
Cyanide	2 / 12	2.70E-01	6.50E-02	1.00E-01	1.00E-01	2	**2.53E+00**	**1.03E-01**	no
Zinc	12 / 12	6.46E+01	1.45E+01	2.33E+01	2.33E+01	620	2.82E+03	5.65E+00	no

Notes:

RME concentration is compared to the greater of the SSL and the MLSSL. Generic SSLs (EPA 1996c) are included for reference only.

RME concentration is the lesser of the maximum detected value and the 95% UCL.

SSLs and MSSLs in bold are based on the MCL.

Table 5-5. Soil Leachability Modeling Results for the MSSB

Contaminant	RME Concentration (mg/kg)	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Organic Compounds									
Benzo(a)anthracene	1.25E-01	5.97E+02	1.86E+00	149	1.97E+03	20683	0.00E+00	0.00E+00	9.20E-02
Benzo(g,h,i)perylene	6.83E-02	1.16E+04	1.78E+00	149	3.84E+04	403194	0.00E+00	0.00E+00	na
Phenanthrene	2.27E-01	1.98E+03	5.48E-01	149	6.53E+03	68481	0.00E+00	0.00E+00	na
Inorganic Compounds									
Antimony	6.63E-01	4.50E+01	na	146	1.50E+02	1537	1.47E+01	1.15E+01	6.00E+00
Cadmium	5.34E-01	8.00E+01	na	146	2.65E+02	2725	6.68E+00	5.22E+00	5.00E+00

CMCOPCs with T_{max} greater than 1000 years or modeled maximum groundwater concentrations less than the MCL (or RBC if there is no MCL) are eliminated from further analysis.

1 Measured from the bottom of the deepest sampling interval in which the contaminant was detected, assuming the water table is 150 feet below ground surface.
2 Based on DF = 1.28. Concentration of zero essentially indicates that the contaminant is decayed before it reaches water table.
na = not applicable
3 MCLs appear in bold, and are from EPA 1996b.

Table 5-6. Estimated Concentration of Antimony in Groundwater From Soil Leachability at the MSSB

Average soil water velocity, (ft/yr)	14.17
Approximate Distance from bottom of pits to groundwater (ft)	149.00
Percent Water Saturation	0.50
Maximum Recharge Rate (ir/yr)	7.00
Bulk Density (gm/cm^3)	1.65
Total Porosity	0.5
Dilution Factor (MSSB)	.28
Effective Porosity	0.20

Contaminant						
Antimony	1.19E+02	392.05	6.63E-01	4,123	5.595E+00	4.37E+00

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6.0 BASELINE RISK ASSESSMENT

The baseline risk assessment (BRA) assesses the potential for adverse effects associated with exposure to constituents present at the 716-A Motor Shops Seepage Basin (MSSB). Baseline risks are those risks to human health and the environment that can be anticipated to be present in the absence of any institutional controls or remedial actions for the MSSB. The BRA provides the basis for determining whether or not remedial action is necessary and the justification for performing remedial actions.

6.1 Selection of Constituents of Potential Concern and Exposure Groups

The objective of constituent identification is to screen the available information on hazardous substances at the waste unit, identify constituents of potential concern (COPCs), and focus subsequent efforts in the risk assessment process. COPCs are defined as constituents that are potentially unit related and are present at concentrations that may impact human health and/or the environment. COPCs are selected (Section 6.1.2) in accordance with the *Savannah River Site Federal Facility Agreement Implementation Plan* (WSRC 1996d) and guidance from United States Environmental Protection Agency (EPA) Headquarters (EPA 1989b), EPA Region IV (EPA 1995b and 1995c), and South Carolina Department of Health and Environmental Control (SCDHEC), and are quantitatively carried through the risk assessment.

Based on the results of the risk assessment, COPCs that contribute significantly to a pathway having a significant human cancer risk or human noncarcinogenic hazard, or that are determined to pose unacceptable ecological risk are designated constituents of concern (COCs). For human health, COCs are substances associated with risks or hazards exceeding targets for the protection of human health, as defined in the National Contingency Plan and under Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). For ecological resources, a weight-of-evidence approach is conducted to identify ecological COCs. The COCs become the basis of and the focus for remediation.

Figure 6.1-1 is a graphical presentation of the overall steps in the COPC selection process. This process is developed for COPC screening and subsequently eliminating incomplete exposure pathways. The conceptual site models (CSMs) for the MSSB summarize the establishment of credible exposure scenarios that identify exposure pathways and media

of potential concern for both human and ecological receptors (see Sections 6.2.2.2 and 6.3.1.5).

6.1.1 Media of Potential Concern

Media of potential concern are defined as any medium through which human or ecological receptors may be exposed to constituents or through which constituents may be transported to potential receptors. During the unit investigation, constituent concentrations were determined for the soil medium. The data for the soil medium are sorted and grouped to provide a set of values for further processing. Sediment and surface water are not present at the MSSB and groundwater was not evaluated during this investigation per the MSSB work plan (WSRC 1996c). As identified in the MSSB work plan (WSRC 1996c), no biological samples were collected; instead, data from abiotic media will be modeled to estimate concentrations in biota. The soils along the process sewer line were to be characterized during the Phase II investigations if any unit-specific constituents (USCs) were identified during Phase I sampling. However, the Phase II investigation was deemed unwarranted. Therefore, since only soil data were collected, the available data were assigned to a soil data grouping. A data grouping is a set of data for a given medium (e.g., soil from 0-0.3 m [0-1 ft] below land surface [bls]). An exposure area is a geographical area in which receptors are likely to average their exposure (e.g., around a basin). The exposure area is defined on the basis of observed or assumed patterns of receptor behavior and the nature and extent of contamination. The combination of a data grouping and an exposure area is referred to as an exposure group.

For soils, the data are divided into two exposure groups based on location (exposure area) and depth (data grouping). An exposure group consisting of data for the 0-0.3 m (0-1 ft) soil interval is used to represent actual conditions, and an exposure group for the 0-1.2 m (0-4 ft) soils interval is established to account for a hypothetical scenario in which subsurface soil are excavated and brought to the surface. Generally, 1.2 m (4 ft) is considered a reasonable depth for excavation of a footing to support a small structure. The 0-1.2 m (0-4 ft) interval is also appropriate for use in evaluating risks to burrowing animals in the vicinity of the MSSB.

For the MSSB, the following exposure groups are identified for human and ecological receptors:

- Surface soil from 0-0.3 m (0-1 ft) at the basin
- Subsurface soils from 0-1.2 m (0-4 ft) at the basin

The soil intervals sampled and analyses performed are in compliance with the work plan for the RFI/RI activities at the unit (WSRC 1996c).

Appendix C. 1 provides all the environmental data used in the risk assessment including the sample interval, sample location, and sample identification numbers.

6.1.2 COPC Selection Process Description

The following information details the process applied to determine media exposure groups and COPCs for use in the BRA. Note that a somewhat different process for determining unit-related constituents is used in the earlier sections of the RCRA Facility Investigation (RFI)/Remedial Investigation (RI)/BRA for the purpose of documenting the nature and extent of contamination. For Sections 6.1.2.1, 6.1.2.2, and 6.1.2.3, individual steps are annotated alphabetically to correspond with Figure 6.1-1.

6.1.2.1 Initial COPC and Exposure Route Processing Steps (Step A)

A.1 Sort and group the data for the detected constituents by medium and exposure group as described in Section 6.1.1 (e.g., an exposure group is soil data from 0-0.3 m (0-1 ft) at the basin or soil data from 0-1.2 m [0-4 ft] at the basin). Identify the appropriate set of background data for each medium and exposure group (e.g., for the soil exposure groups, only background samples corresponding to the same depth interval are used to calculate average background concentrations). Evaluate data that have qualifiers to determine whether the qualified data should be retained and how it should be treated.

All qualifiers are addressed before the constituent is used or deleted from the quantitative risk assessment. Qualifiers used by the laboratory may differ from those used in the data validation process in both identity and meaning. Therefore, definitions for all qualifiers are reviewed in the June 1996 *Quality Control Summary Report (QCSR) for the A-Area Motor Shops Seepage Basin, Phase I* (EMS 1996) (Appendix B.2) prior to data evaluation.

A.2 For each constituent in each medium or exposure group, eliminate constituents that have no detects.

A.3 For each constituent in each medium and exposure group, determine the following parameters:

a. Maximum detected concentration

b. Frequency of detection

c. Arithmetic average background concentration

Appendix C.1 provides a statistical summary of all data evaluated for the risk assessment. A detailed description of the statistical methods used in evaluation of the data also is provided in Appendix C.1.

6.1.2.2 Human Health COPC and Exposure Route Processing Steps (Step B)

(Note: Since soil is the only medium evaluated and only nonradionuclide constituents were detected at this unit, only soil-related screening steps for nonradionuclides are discussed below.)

B.1 Screen against the most current EPA Region III risk-based concentration (RBC) levels by comparing the maximum detected concentration of each soil analyte to its relevant screening value. Retain the constituent as a COPC if it exceeds the screening level or if a screening level is not available.

In accordance with EPA Region IV guidance (EPA 1995b), residential soil RBCs are used in the selection of COPCs rather than industrial soil RBCs for soil analytes at a risk level of 1×10^{-6} or a hazard quotient (HQ) of 0.1. Tables 6.1-1 and 6.1-2 present the RBCs for soil used to conduct the screen.

In accordance with EPA Region IV guidance (EPA 1995b), the screening is performed against a HQ level of 0.1, which is accomplished by multiplying the Region III RBC screening value for noncarcinogenic effects by 0.1. (RBC screening levels for Region III are based on hazard level of 1.0 rather than 0.1.) Noncarcinogenic constituents are retained as COPCs if they exceed the 0.1 screening level.

B.2 The following is a list of human health essential nutrients detected at the unit that are not considered to be toxic and do not have health based limits:

- calcium
- magnesium
- potassium

- sodium

For the constituents listed above, determine the essential nutrient screening criterion by converting the recommended dietary allowance (RDA) or the safe and adequate daily intake (SADI) (National Research Council 1989) to a concentration in soil (mg/kg). Eliminate the constituent as a COPC if the maximum detected concentration is below the screening criterion based on the RDA or SADI (Tables 6.1-1 through 6.1-2). To perform this step, screening criteria for essential nutrients are calculated by dividing the RDA or SADI by an ingestion rate of 200 mg/day for soil. All four essential nutrients are eliminated based on this step.

B.3 For the naturally occurring and anthropogenic inorganics that exceed a screening level in steps B. 1 or B.2, compare the maximum concentration to twice the average against background concentration. The comparison is made for each exposure group. Since the majority of organic compounds are manmade, organics are not screened against background concentrations. To avoid potential bias of the data, the average background concentration for organics and inorganics is calculated using the detected concentrations as well as a surrogate value of one-half the laboratory method detection limit (MDL) for nondetected values. If a constituent was not detected in the unit background sample and it was detected in the unit sample once (as a minimum), then it is not screened based on unit background. If an analyte has no detects in the background samples, the analyte is reported as not detected (ND). Eliminate the constituent as a COPC in each medium in which its maximum concentration is less than twice the average background concentration (Tables 6.1-1 through 6.1-2).

Background risk is calculated for any constituent that exceeds the 1×10^{-6} RBC screening level or the 0.1 HQ level, but is eliminated if the maximum unit value is less than twice its average background concentration (Appendix C.6).

B.4 Consider previously eliminated constituents, media, or exposure groups for re-inclusion based on historical information or considerations such as mobility, bioaccumulation, persistence, or toxicity.

B.5 For each medium and/or exposure group, determine whether any COPCs remain. If no COPCs remain, remove the medium and/or exposure group from further consideration in the human health risk assessment.

B.6 The constituents and exposure groups that are retained after the application of this process are the starting point of the human health risk assessment analysis. Table 6.1-5 presents the human health-related COPCs identified as a result of this screening process.

6.1.2.3 Ecological COPC and Exposure Route Processing Steps (Step C)

(Note: Since soil is the only medium evaluated and only nonradionuclide constituents were detected at this unit, only soil-related screening steps for nonradionuclides are discussed below.)

EPA guidance (EPA 1994) describes an initial screening step in an ecological risk assessment (ERA), preliminary problem formulation, in which the following are determined:

- Environmental setting and constituents at the unit
- Fate and transport of constituents
- Ecotoxicity and potential receptors
- Complete exposure pathways

Sampling and analysis of potentially contaminated media were conducted as part of the remedial investigation and are described in Sections 1 through 4 of this document (along with the environmental setting and history of the unit). Fate and transport of the detected constituents are discussed in Section 5. Toxicity profiles are presented in Appendix D and a more detailed discussion of the ecological characteristics of the unit and the potential receptors is presented in Section 6.3.1.2. Complete exposure pathways are identified in the CSM (Figure 6.3-2).

Sampling and analysis indicate that the unit soils have detectable concentrations of certain constituents. Unit visits to characterize the ecological communities in the vicinity indicate that potential receptors are currently exposed to surface soil at the unit and may be exposed to subsurface soil in the future if construction were to result in subsurface soil being brought to the surface.

According to EPA guidance (EPA 1994), the next step in the screening process is the evaluation of ecological effects associated with the constituents at the unit and development of a toxicity profile and screening ecotoxicity value for those constituents. The toxicity profile, gathered from information in the scientific literature, describes the

toxic mechanisms of action for the exposure route evaluated and the dose that causes a specified adverse effect. Using this information, a screening-level ecotoxicity value, or benchmark, is developed. The highest exposure level at which no adverse effects have been demonstrated is appropriate for the initial screening assessment to ensure that risk is not underestimated.

C.1 Identify the appropriate ecological receptors for the screening process, as discussed below. Consistent with EPA guidance, the constituent maximum detected concentration is compared to the appropriate ecological screening value for each receptor. Potential exposure pathways, media, and receptors are described in detail in Section 6.3.1. As explained in that section, soil is the only medium in which constituent concentrations are evaluated for possible effects on ecological receptors. Surface water does not stand within the basin except immediately after major rainfall events, and there is no likely route for exposure of ecological receptors to unit-related groundwater contaminants. Ecological screening criteria used for COPC screening of soil include the following:

Soil screening of nonradionuclides using no observed adverse effect levels (NOAELs) for wildlife species (based on dietary exposure)

Tables 6.1-3 and 6.1-4 show the maximum concentrations of the detected soil analytes. The maximum concentration of each analyte detected in each soil exposure group is incorporated into a dietary intake equation and is then compared to a risk-based dietary benchmark, or ecological screening value (ESV). The screening intake equation, based on EPA Region IV guidance (EPA 1995c), conservatively assumes that the entire diet of the receptor consists of soil, all of which contains the maximum detected concentration of the analyte. Receptors are not unit specific, but instead, are the animals used in the analyte-specific toxicity studies, as shown in Tables 6.1-3 through 6.1-4. The screening intake equation is:

$$SI = (CS_{max})\ (F)\ (1/BW)$$

where:

SI	=	screening intake (mg/kg body weight/day)
CS_{max}	=	maximum soil concentration (mg/kg soil)
F	=	feeding rate of test animal [assume kg food/day = kg soil/d (dry weight)]

BW = body weight of test animal (kg body weight)

Toxicity benchmarks reflecting a dietary no observed adverse effects level (NOAEL) are sought for ESVs in the soil screening. For conservatism, toxicity tests using species of both mammals and birds are sought, and the lower of the toxicological benchmarks for mammals and birds is used. Where NOAEL tests cannot be found, other tests with endpoints of lowest observed adverse effect level (LOAEL) or lethal dose for 50 percent of the test animals (LD_{50}) are used, with an appropriate uncertainty factor (UF) used to equate the benchmark to a NOAEL. In estimating a NOAEL from a LOAEL, a UF of 1/1 0 typically is applied; in estimating a NOAEL from an LD_{50}, a UF of 1/100 typically is applied.

Tables 6.1-3 and 6.1-4 show the toxicity tests and test endpoints used to develop the preliminary screening values for soil constituents, feeding rates and body weights of the species used in the toxicity tests, and results of the toxicity screening.

C.2 For the naturally occurring and anthropogenic inorganics that exceed a screening level in Step C. 1, compare the maximum concentration to twice the average background concentration. The comparison is made for each medium and exposure group. Since the majority of organic compounds are manmade, organics are not screened against background concentrations. To avoid potential bias of the data, the average background concentration for organics and inorganics is calculated using the detected concentrations as well as a surrogate value of one-half the laboratory MDL for nondetected values. If a constituent was not detected in the unit background sample and it was detected in the unit sample once (as a minimum), then it is not screened based on unit background. If an analyte has no detects in the background samples, the analyte is reported as ND. The constituent is eliminated as a COPC in each medium in which its maximum concentration is less than twice the average background concentration (Tables 6.1-3 and 6.1-4).

C.3 Evaluate previously eliminated constituents, media, or exposure groups to determine whether they should be re-included based on historical information or considerations such as mobility, bioaccumulation, persistence, or toxicity. Considerations of bioaccumulation are discussed below.

Bioaccumulation is the process of absorption and retention of a substance by an organism due to both uptake from water (or other surrounding medium) and uptake from ingested residues in food, soil, and/or sediment. It is quantified by the calculation of a bioaccumulation factor (BAF). Bioconcentration is a component of bioaccumulation, accounting only for the process of uptake from the surrounding medium (i.e., water for aquatic organisms, soil for terrestrial plants and burrowing invertebrates such as earthworms). It is quantified by the calculation of a bioconcentration factor (BCF). Both BAFs and BCFs are proportionality constants relating the constituent concentration in the tissues of an organism to the concentration in the surrounding environment and/or the concentration in an animal's diet (Amdur et al. 1991, EPA 1989c).

Professional judgment is used to evaluate the relative biological persistence, mobility, and bioaccumulation of the COPCs and their potential to pose ecological risk based on their propensity to persist, mobilize, and/or bioaccumulate. Based on these considerations, COPCs may be re-included for further evaluation in the ecological risk assessment. Due to their characteristics and the consistently conservative approach used in their evaluation, none of the eliminated constituents warrant re-inclusion as COPCs.

C.4 For each medium and/or exposure group, determine whether there are any COPCs remaining. If no COPCs remain, the medium and/or exposure group is dropped from further consideration in the ecological risk assessment. No exposure groups are eliminated on this basis.

C.5 The constituents and exposure routes that are retained after the application of this process are then selected for use as the starting point of the ERA. Table 6.1-5 summarizes these COPCs.

6.1.2.4 Human Health and Ecological COPC Summaries

Table 6.1-5 summarizes the human health and ecological COPCs in soil. Detailed statistical summary tables are included in Appendix C. 1. The constituents and exposure routes that are retained after the application of the screening process are then selected for use as the starting point of the human health and ecological risk assessment analyses in Sections 6.2 and 6.3, respectively. If no ecological and/or human health-related COPCs or exposure routes remain upon completion of the screening process, the development of Section 6.2 and/or Section 6.3 is not warranted, the assessment of the lack of potential

adverse effects associated with exposure to unit-related constituents is complete, and the justification for no further action is established. Human health and ecological COPCs are identified as a result of the screening process; therefore, the human health and ecological risk assessment processes are continued in Sections 6.2 and 6.3, respectively.

6.1.2.5 Elimination of PAHs from the COPC Selection Process

Multiple PAHs were detected at the unit, including benzo(a)pyrene, benzo(a)anthracene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, and indeno(1,2,3-cd)pyrene. Benzo(a)pyrene is the only PAH with an established toxicity value; Region 4 has established toxicity equivalent factors (TEFs) for the remaining carcinogenic PAHs, as shown below. These TEFs are based on the relative potency of each compound relative to that of benzo(a)pyrene.

Constituent	Max. Conc. (mg/kg)	TEF Value	RBC Value (mg/kg)
Benzo(a)pyrene	0.41	1.0	0.088
Benzo(a)anthracene	0.50	0.1	0.88
Benzo(b)fluoranthene	0.41	0.1	0.88
Benzo(k)fluoranthene	0.37	0.01	8.80
Chrysene	0.53	0.001	88
Indeno(1,2,3-cd) pyrene	0.22	0.10	0.88

As shown above, the TEF value for each constituent is considered in the determination of the RBC value and, with the exception of benzo(a)pyrene, none of the constituents exceed their RBC value. Therefore, if they were considered in the overall risk for any pathway/media/receptor, their contribution would be insignificant (as compared to benzo(a)pyrene). To further demonstrate that PAHs do not increase the risk significantly, risk determinations are completed for each constituent (Appendix C.4, Table C. 17B). The receptor considered for the soil media is the adult/child. The total risk for the adult/child receptor and the soil medium increases from 7E-06 to 9E-06.

SECTION 6.1

FIGURES

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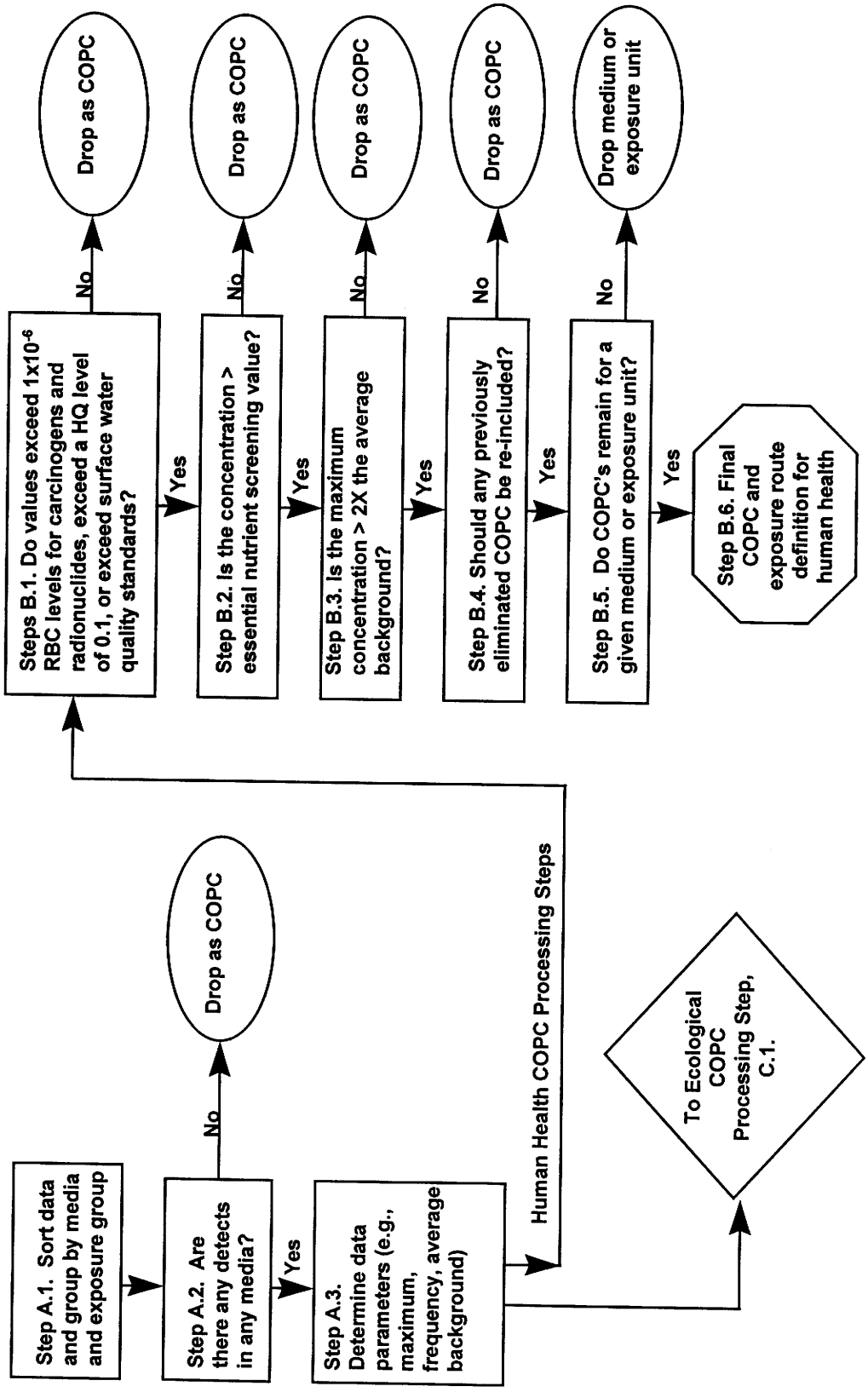

Figure 6.1-1. Baseline Risk Assessment COPC and Exposure Route Selection Process

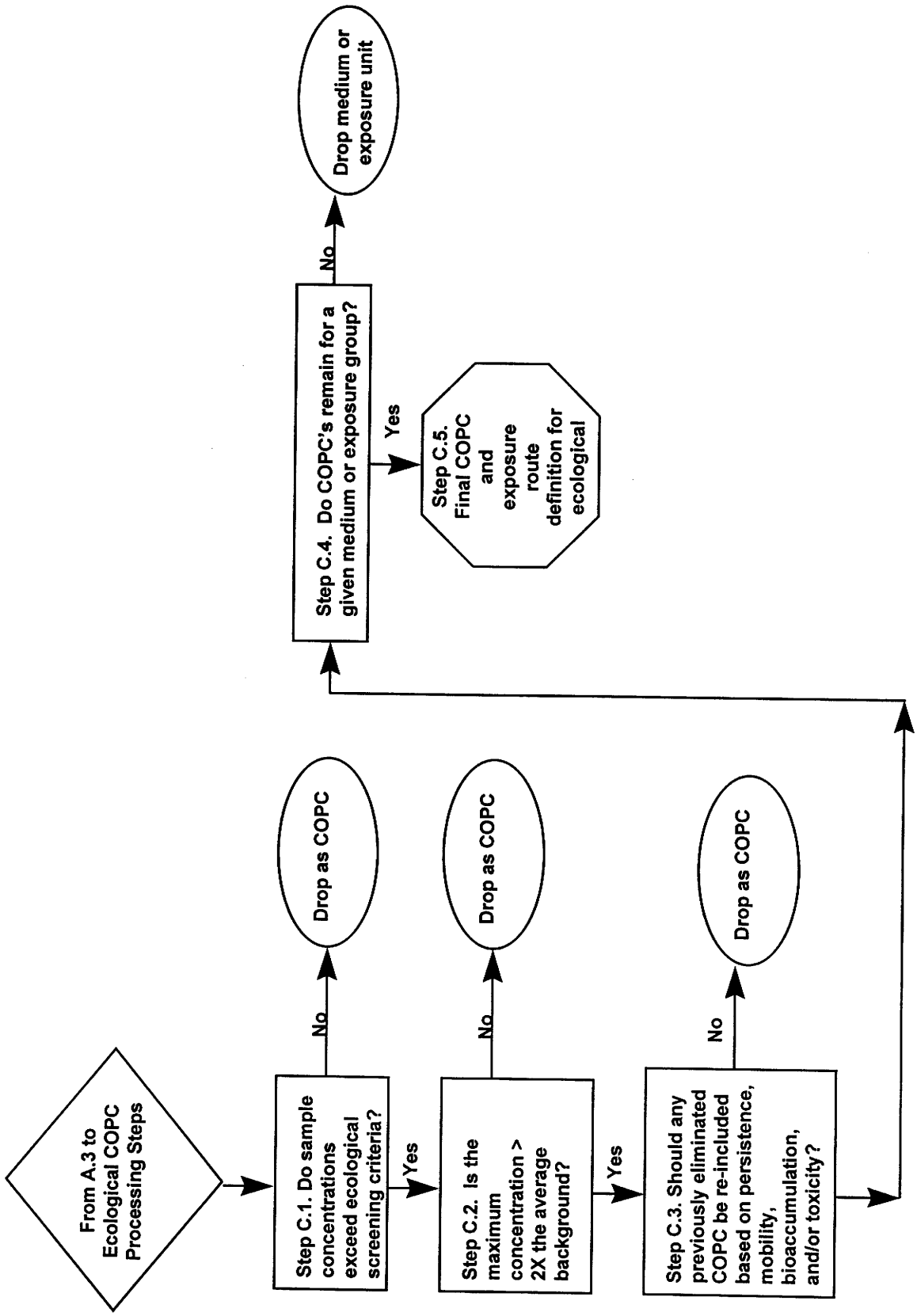

Figure 6.1-1 (Continued). Baseline Risk Assessment COPC and Exposure Route Selection Process

SECTION 6.1

TABLES

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Table 6.1-1.
Selection of Human Health COPCs
Surface Soil (Depth 0-0.3 m [0-1 ft])
716-A Motor Shops Seepage Basin

Constituent	Maximum Detected Concentration	EPA Region III Risk-Based Concentration for Soil - Residential [1]		Essential Nutrient RDA/SADI [2] (mg/kg)	2X Average Background [3] Concentration	Retained as COPC? (Y/N)	Criterion for Exclusion as COPC
Volatiles (mg/kg)							
1,1,1-Trichloroethane	1.03E-02	2.70E+02	(a)	NA	1.32E-02	N	RBC
Tetrachloroethene	1.31E-02	1.20E+01		NA	2.07E-02	N	RBC
Semivolatiles (mg/kg)							
Acenapthene	1.00E-01	4.70E+02	(a)	NA	ND	N	RBC
Anthracene	2.30E-01	2.30E+03	(a)	NA	2.56E-02	N	RBC
Benzo(a)anthracene	5.03E-01	8.80E-01		NA	6.91E-02	N	RBC
Benzo(a)pyrene	4.10E-01	8.80E-02		NA	7.11E-02	Y	NA
Benzo(b)fluoranthene	4.10E-01	8.80E-01		NA	6.91E-02	N	RBC
Benzo(g,h,i)perylene	2.67E-01	2.30E+02	(d)	NA	3.66E-02	N	RBC
Benzo(k)fluoranthene	3.66E-01	8.80E+00		NA	7.48E-02	N	RBC
Chrysene	5.34E-01	8.80E+01		NA	9.27E-02	N	RBC
Dibenzofuran	5.98E-02	3.10E+01	(a)	NA	ND	N	RBC
Fluoranthene	1.10E+00	3.10E+02	(a)	NA	1.34E-01	N	RBC
Fluorene	1.02E-01	3.10E+02	(a)	NA	NA	N	RBC
Indeno(1,2,3-cd)pyrene	2.22E-01	8.80E-01		NA	3.70E-02	N	RBC
Phenanthrene	9.48E-01	3.10E+02	(d)	NA	6.98E-02	N	RBC
Pyrene	8.95E-01	2.30E+02	(a)	NA	1.17E-01	N	RBC
Pesticides/PCBs (mg/kg)							
Aroclor-1260	6.76E-02	8.30E-02		NA	ND	N	RBC
Metals (mg/kg)							
Aluminum	4.27E+03	7.80E+03	(a)	NA	1.16E+04	N	RBC
Arsenic	1.70E+00	4.30E-01		NA	4.50E+00	N	BKG (c)
Barium	3.49E+01	5.50E+02	(a)	NA	3.52E+01	N	RBC

Table 6.1-1. (continued)
Selection of Human Health COPCs
Surface Soil (Depth 0-0.3 m [0-1 ft])
716-A Motor Shops Seepage Basin

Constituent	Maximum Detected Concentration	EPA Region III Risk-Based Concentration for Soil - Residential [1]	Essential Nutrient RDA/SADI [2] (mg/kg)	2X Average Background [3] Concentration	Retained as COPC? (Y/N)	Criterion for Exclusion as COPC
Beryllium	2.30E-01	1.50E-01	NA	3.26E-01	N	BKG (c)
Cadmium	1.50E+00	3.90E+00	NA	6.55E-01	N	RBC
Calcium	2.71E+02	NR	4.00E+06	1.27E+03	N	EN
Chromium	7.20E+00	3.90E+01 (a)	NA	2.09E+01	N	RBC
Cobalt	7.74E-01	4.70E+02 (a)	NA	1.94E+00	N	RBC
Copper	1.21E+01	3.10E+02 (a)	NA	4.83E+00	N	RBC
Cyanide	2.70E-01	1.60E+02 (a)	NA	ND	N	RBC
Iron	3.50E+03	2.30E+03 (a)	NA	1.57E+04	N	BKG (c)
Lead	1.30E+01	4.00E+02 (b)	NA	1.34E+01	N	LGL
Magnesium	1.15E+02	NR	6.00E+05	3.09E+02	N	EN
Manganese	6.99E+01	1.80E+02 (a)	NA	2.36E+02	N	RBC
Mercury	5.60E-02	2.30E+00 (a)	NA	4.18E-02	N	RBC
Nickel	2.40E+00	1.60E+02 (a)	NA	3.57E+00	N	RBC
Potassium	1.41E+02	NR	8.00E+06	1.77E+02	N	EN
Sodium	2.43E+01	NR	2.00E+06	4.02E+01	N	EN
Vanadium	8.10E+00	5.50E+01 (a)	NA	3.98E+01	N	RBC
Zinc	6.46E+01	2.30E+03 (a)	NA	2.44E+01	N	RBC

COPC = Constituent of Potential Concern; NR = Not reported; NA = Not Applicable: ND = Not detected.
(1) Risk-based concentration (RBC) comparisons were performed using the following criteria:
Cancer risk of 1E-06 and Hazard Index of 0.1; noncarcinogen RBC multiplied by 0.1.
(2) The essential nutrient (EN) screen was performed by dividing the essential nutrient benchmark (RDA or SADI) by a conservative ingestion rate of 200 mg/day of soil
Refer to Appendix C, Table C.3-6 for nutrient benchmarks and screening levels.
(3) The background screen was performed for inorganics only. Concentrations of organics in background samples are reported for information only.
(a) Noncarcinogen RBC adjusted to Hazard Quotient of 0.1.
(b) EPA Lead Guidance Level (LGL) of 400 mg/kg.
(c) Background risk will be calculated for those constituents that were screened out for comparison to background but exceed an RBC value.
(d) RBC value for pyrene used as surrogate for benzo(g,h,i) perylene; RBC value for fluorene used for phenanthrene.

Table 6.1-2.
Selection of Human Health COPCs
Subsurface Soil (Depth 0-1.2 m [0-4 ft])
716-A Motor Shops Seepage Basin

Constituent	Maximum Detected Concentration	EPA Region III Risk-Based Concentration for Soil - Residential [1]		Essential Nutrient RDA/SADI [2] (mg/kg)	2X Average Background [3] Concentration	Retained as COPC? (Y/N)	Criterion for Exclusion as COPC
Volatiles (mg/kg)							
1,1,1-Trichloroethane	1.03E-02	2.70E+02	(a)	NA	8.06E-03	N	RBC
Tetrachloroethene	1.31E-02	1.20E+01		NA	1.42E-02	N	RBC
Semivolatiles (mg/kg)							
Acenapthene	1.00E-01	4.70E+02	(a)	NA	ND	N	RBC
Anthracene	2.30E-01	2.30E+03	(a)	NA	2.08E-02	N	RBC
Benzo(a)anthracene	5.03E-01	8.80E-01		NA	4.45E-02	N	RBC
Benzo(a)pyrene	4.10E-01	8.80E-02		NA	4.76E-02	Y	NA
Benzo(b)fluoranthene	4.10E-01	8.80E-01		NA	4.61E-02	N	RBC
Benzo(g,h,i)perylene	2.67E-01	2.30E+02	(d)	NA	2.63E-02	N	RBC
Benzo(k)fluoranthene	3.66E-01	8.80E+00		NA	4.84E-02	N	RBC
Chrysene	5.34E-01	8.80E+01		NA	5.59E-02	N	RBC
Dibenzofuran	5.98E-02	3.10E+01	(a)	NA	ND	N	RBC
Fluoranthene	1.10E+00	3.10E+02	(a)	NA	7.65E-02	N	RBC
Fluorene	1.02E-01	3.10E+02	(a)	NA	ND	N	RBC
Indeno(1,2,3-cd)pyrene	2.22E-01	8.80E-01		NA	2.75E-02	N	RBC
Phenanthrene	9.48E-01	3.10E+02	(d)	NA	4.24E-02	N	RBC
Pyrene	8.95E-01	2.30E+02	(a)	NA	6.90E-02	N	RBC
Pesticides/PCBs (mg/kg)							
Aroclor-1260	6.76E-02	8.30E-02		NA	ND	N	RBC
Metals (mg/kg)							
Aluminum	8.51E+03	7.80E+03	(a)	NA	1.57E+04	N	BKG (c)
Antimony	2.00E+00	3.10E+00	(a)	NA	7.48E-01	N	RBC
Arsenic	2.20E+00	4.30E-01		NA	5.13E+00	N	BKG (c)
Barium	3.49E+01	5.50E+02	(a)	NA	4.35E+01	N	RBC

Table 6.1-2. (continued)
Selection of Human Health COPCs
Subsurface Soil (Depth 0-1.2 m [0-4 ft])
716-A Motor Shops Seepage Basin

Constituent	Maximum Detected Concentration	EPA Region III Risk-Based Concentration for Soil - Residential [1]		Essential Nutrient RDA/SADI [2] (mg/kg)	2X Average Background [3] Concentration	Retained as COPC? (Y/N)	Criterion for Exclusion as COPC
Beryllium	3.52E-01	1.50E-01		NA	4.21E-01	N	BKG (c)
Cadmium	1.50E+00	3.90E+00		NA	6.54E-01	N	RBC
Calcium	2.71E+02	NR		4.00E+06	8.92E+02	N	EN
Chromium	7.20E+00	3.90E+01	(a)	NA	2.36E+01	N	RBC
Cobalt	1.50E+00	4.70E+02	(a)	NA	2.30E+00	N	RBC
Copper	1.21E+01	3.10E+02	(a)	NA	5.23E+00	N	RBC
Cyanide	2.70E-01	1.60E+02	(a)	NA	ND	N	RBC
Iron	4.80E+03	2.30E+03	(a)	NA	1.86E+04	N	BKG (c)
Lead	1.30E+01	4.00E+02	(b)	NA	1.32E+01	N	LGL
Magnesium	1.15E+02	NR		6.00E+05	2.95E+02	N	EN
Manganese	6.99E+01	1.80E+02	(a)	NA	1.66E+02	N	RBC
Mercury	5.60E-02	2.30E+00	(a)	NA	6.73E-02	N	RBC
Nickel	2.60E+00	1.60E+02	(a)	NA	4.36E+00	N	RBC
Potassium	1.41E+02	NR		8.00E+06	1.89E+02	N	EN
Sodium	2.70E+01	NR		2.00E+06	4.85E+01	N	EN
Vanadium	1.25E+01	5.50E+01	(a)	NA	4.58E+01	N	RBC
Zinc	6.46E+01	2.30E+03	(a)	NA	1.74E+01	N	RBC

COPC = Constituent of Potential Concern; NR = Not reported; NA = Not Applicable: ND = Not detected.

(1) Risk-based concentration (RBC) comparisons were performed using the following criteria:
Cancer risk of 1E-06 and Hazard Index of 0.1; noncarcinogen RBC multiplied by 0.1.

(2) The essential nutrient (EN) screen was performed by dividing the essential nutrient benchmark (RDA or SADI) by a conservative ingestion rate of 200 mg/day of s
Refer to Appendix C, Table C.3-6 for nutrient benchmarks and screening levels.

(3) The background screen was performed for inorganics only. Concentrations of organics in background samples are reported for information only.

(a) Noncarcinogen RBC adjusted to Hazard Quotient of 0.1.

(b) EPA Lead Guidance Level (LGL) of 400 mg/kg.

(c) Background risk will be calculated for those constituents that were screened out for comparison to background but exceed an RBC value.

(d) RBC value for pyrene used as surrogate for benzo(g,h,i) perylene; RBC value for fluorene used for phenanthrene.

Table 6.1-3.
Selection of Ecological COPCs
Surface Soil (Depth 0-0.3 m [0-1 ft])
716-A Motor Shops Seepage Basin

Constituent	Csmax (Maximum Concentration) (mg/kg)	Ecological Screening Value[a] (ESV) (mg/kg-d)		Test Species	BW (Body Weight)[a] (g)	F (Feeding Rate)[b] (g/d)	SI (Screening Intake)[c] (mg/kg-d)	2X Average Background Concentration[d] (mg/kg)	Ecological COPC[e] ?	Basis for Exclusion as COPC
Volatiles										
1,1,1-Trichloroethane	1.03E-02	1.00E+03		mouse	3.00E+01	4.20E+00	1.44E-03	1.32E-02	N	ESV
Tetrachloroethene	1.31E-02	1.40E+00		mouse	3.00E+01	4.20E+00	1.83E-03	2.07E-02	N	ESV
Semivolatiles										
Acenapthene	1.00E-01	3.50E+01	A	mouse	3.00E+01	4.20E+00	1.40E-02	ND	N	ESV
Anthracene	2.30E-01	1.00E+00	B	mouse	3.00E+01	4.20E+00	3.22E-02	2.56E-02	N	ESV
Benzo(a)anthracene	5.03E-01	1.50E+02	C	rat	3.50E+02	1.69E+01	2.43E-02	6.91E-02	N	ESV
Benzo(a)pyrene	4.10E-01	1.00E+00		mouse	3.00E+01	4.20E+00	5.74E-02	7.11E-02	N	ESV
Benzo(b)fluoranthene	4.10E-01	1.00E+00	B	mouse	3.00E+01	4.20E+00	5.74E-02	6.91E-02	N	ESV
Benzo(g,h,i)perylene	2.67E-01	1.00E+00	B	mouse	3.00E+01	4.20E+00	3.74E-02	3.66E-02	N	ESV
Benzo(k)fluoranthene	3.66E-01	1.00E+00	B	mouse	3.00E+01	4.20E+00	5.12E-02	7.48E-02	N	ESV
Chrysene	5.34E-01	1.00E+00	B	mouse	3.00E+01	4.20E+00	7.48E-02	9.27E-02	N	ESV
Dibenzofuran	5.98E-02	1.25E+01	D	rat	3.50E+02	1.69E+01	2.43E-02	ND	N	ESV
Fluoranthene	1.10E+00	1.50E+02	C	rat	3.50E+02	1.69E+01	5.31E-02	1.34E-01	N	ESV
Fluorene	1.02E-01	2.50E+01	A	mouse	3.00E+01	4.20E+00	1.43E-02	ND	N	ESV
Indeno(1,2,3-c,d)pyrene	2.22E-01	1.00E+00	B	mouse	3.00E+01	4.20E+00	3.11E-02	3.70E-02	N	ESV
Phenanthrene	9.48E-01	1.00E+00	B	mouse	3.00E+01	4.20E+00	1.33E-01	6.98E-02	N	ESV
Pyrene	8.95E-01	1.00E+00	B	mouse	3.00E+01	4.20E+00	1.25E-01	1.17E-01	N	ESV
Pesticides/PCBs										
Aroclor-1260	6.76E-02	5.00E-01	E	rat	3.50E+02	1.69E+01	3.26E-03	ND	N	ESV

Table 6.1-3. (continued)
Selection of Ecological COPCs
Surface Soil (Depth 0-0.3 m [0-1 ft])
716-A Motor Shops Seepage Basin

Constituent	Csmax (Maximum Concentration) (mg/kg)	Ecological Screening Value[a] (ESV) (mg/kg-d)		Test Species	BW (Body Weight)[a] (g)	F (Feeding Rate)[b] (g/d)	SI (Screening Intake)[c] (mg/kg d)	2X Average Background Concentration[d] (mg/kg)	Ecological COPC[e] ?	Basis for Exclusion as COPC
Metals										
Aluminum	4.27E+03	1.93E+00		mouse	3.00E+01	4.20E+00	5.98E+02	1.16E+04	N	BKG
Arsenic	1.70E+00	1.26E-01		mouse	3.00E+01	4.20E+00	2.38E-01	4.50E+00	N	BKG
Barium	3.49E+01	5.10E+00		rat	3.50E+02	1.69E+01	1.69E+00	3.52E+01	N	ESV
Beryllium	2.30E-01	6.60E-01		rat	3.50E+02	1.69E+01	1.11E-02	3.26E-01	N	ESV
Cadmium	1.50E+00	8.00E-03		rat	3.50E+02	1.69E+01	7.24E-02	6.55E-01	Y	NA
Calcium	2.71E+02	NR		NA	NA	NA	NA	1.27E+03	N	BKG
Chromium	7.20E+00	1.00E+00		black duck	1.25E+03	6.72E+01	3.87E-01	2.09E+01	N	ESV
Cobalt	7.74E-01	5.00E+00	F	rat	3.50E+02	1.69E+01	3.74E-02	1.94E+00	N	ESV
Copper	1.21E+01	1.17E+01		mink	1.00E+03	3.06E+01	3.70E-01	4.83E+00	N	ESV
Cyanide	2.70E-01	6.87E+01		rat	3.50E+02	1.69E+01	1.30E-02	ND	N	ESV
Iron	3.50E+03	3.00E+01	G	rat	3.50E+02	1.69E+01	1.69E+02	1.57E+04	N	BKG
Lead	1.30E+01	1.13E+00		Jap. quail	1.50E+02	1.69E+01	1.46E+00	1.34E+01	N	BKG
Magnesium	1.15E+02	NR		NA	NA	NA	NA	3.09E+02	N	BKG
Manganese	6.99E+01	8.80E+01		rat	3.50E+02	1.69E+01	3.38E+00	2.36E+02	N	ESV
Mercury	5.60E-02	6.40E-03		mallard	1.00E+03	5.82E+01	3.26E-03	4.18E+02	N	ESV
Nickel	2.40E+00	4.00E+01		rat	3.50E+02	1.69E+01	1.16E-01	3.57E+00	N	ESV
Potassium	1.41E+02	7.00E-01	H	mouse	3.00E+01	4.20E+00	1.97E+01	1.77E+02	N	BKG
Sodium	2.43E+01	NR		NA	NA	NA	NA	4.02E+01	N	BKG
Vanadium	8.10E+00	2.10E-01		rat	3.50E+02	1.70E+01	3.93E-01	3.98E+01	N	BKG
Zinc	6.46E+01	1.45E+01		chicken	1.77E+03	8.40E+01	3.07E+00	2.44E+01	N	ESV

Table 6.1-3. (continued)
Selection of Ecological COPCs
Surface Soil (Depth 0-0.3 m [0-1 ft])
716-A Motor Shops Seepage Basin

a From Opresko et al. (1995) unless noted otherwise.

b Feeding rate (g/day) calculated as: $0.621\ (BW)^{0.564}$ for rodents or $0.648\ (BW)^{0.651}$ for birds, where BW = body weight in g (EPA 1993).

c SI = (Csmax) x (F) x (1/BW).

d Background values for organics are presented for comparative purposes only.

e Constituent is considered to be an ecological COPC if the SI value is greater than the ESV and the Cs is greater than 2X average background concentration.

A Criterion is derived from LOAEL (IRIS, 1994). LOAEL divided by 10 to derive a NOAEL equivalent value.

B Benzo(a)pyrene used as surrogate.

C ATSDR (1993).

D Criterion is a NOAEL (Region III RBC Tables: April 1996) upon which the provisional RfD value is derived (with no uncertainty values applied).

E Criterion is derived from LOAEL (ATSDR 1991b). LOAEL divided by 10 to derive a NOAEL equivalent value.

F ATSDR (1992).

G Criterion is derived from LD50 (RTECS 1996). LD50 divided by 100 to derive a NOAEL equivalent value.

H Criterion is derived from LD50 (RTECS 1996). LD50 divided by 100 to derive a NOAEL equivalent value.

NA Not applicable.

ND Not detected.

NR Not reported.

Table 6.1-4.
Selection of Ecological COPCs
Subsurface Soil (Depth 0-1.2 m [0-4 ft])
716-A Motor Shops Seepage Basin

Constituent	Csmax (Maximum Concentration) (mg/kg)	Ecological Screening Value[a] (ESV) (mg/kg-d)		Test Species	BW (Body Weight)[a] (g)	F (Feeding Rate)[b] (g/d)	SI (Screening Intake)[c] (mg/kg-d)	2X Average Background Concentration[d] (mg/kg)	Ecological COPC[e] ?	Basis for Exclusion as COPC
Volatiles										
1,1,1-Trichloroethane	1.03E-02	1.00E+03		mouse	3.00E+01	4.20E+00	1.44E-03	8.06E-03	N	ESV
Tetrachloroethene	1.31E-02	1.40E+00		mouse	3.00E+01	4.20E+00	1.83E-03	1.42E-02	N	ESV
Semivolatiles										
Acenapthene	1.00E-01	3.50E+01	A	mouse	3.00E+01	4.20E+00	1.40E-02	ND	N	ESV
Anthracene	2.30E-01	1.00E+00	B	mouse	3.00E+01	4.20E+00	3.22E-02	2.08E-02	N	ESV
Benzo(a)anthracene	5.03E-01	1.50E+02	C	rat	3.50E+02	1.69E+01	2.43E-02	4.45E-02	N	ESV
Benzo(a)pyrene	4.10E-01	1.00E+00		mouse	3.00E+01	4.20E+00	5.74E-02	4.76E-02	N	ESV
Benzo(b)fluoranthene	4.10E-01	1.00E+00	B	mouse	3.00E+01	4.20E+00	5.74E-02	4.61E-02	N	ESV
Benzo(g,h,i)perylene	2.67E-01	1.00E+00	B	mouse	3.00E+01	4.20E+00	3.73E-02	2.63E-02	N	ESV
Benzo(k)fluoranthene	3.66E-01	1.00E+00	B	mouse	3.00E+01	4.20E+00	5.12E-02	4.84E-02	N	ESV
Chrysene	5.34E-01	1.00E+00	B	mouse	3.00E+01	4.20E+00	7.48E-02	5.59E-02	N	ESV
Dibenzofuran	5.98E-02	1.25E+01	D	rat	3.50E+02	1.69E+01	2.43E-02	ND	N	ESV
Fluoranthene	1.10E+00	1.50E+02	C	rat	3.50E+02	1.69E+01	5.31E-02	7.65E-02	N	ESV
Fluorene	1.02E-01	2.50E+01	A	mouse	3.00E+01	4.20E+00	1.43E-02	ND	N	ESV
Indeno(1,2,3-c,d)pyrene	2.22E-01	1.00E+00	B	mouse	3.00E+01	4.20E+00	3.11E-02	2.75E-02	N	ESV
Phenanthrene	9.48E-01	1.00E+00	B	mouse	3.00E+01	4.20E+00	1.33E-01	4.24E-02	N	ESV
Pyrene	8.95E-01	1.00E+00	B	mouse	3.00E+01	4.20E+00	1.25E-01	6.90E-02	N	ESV
Pesticides/PCBs										
Aroclor-1260	6.76E-02	5.00E-01	E	rat	3.50E+02	1.69E+01	3.26E-03	ND	N	ESV

Table 6.1-4. (continued)
Selection of Ecological COPCs
Subsurface Soil (Depth 0-1.2 m [0-4 ft])
716-A Motor Shops Seepage Basin

Constituent	Csmax (Maximum Concentration) (mg/kg)	Ecological Screening Value[a] (ESV) (mg/kg-d)		Test Species	BW (Body Weight)[a] (g)	F (Feeding Rate)[b] (g/d)	SI (Screening Intake)[c] (mg/kg-d)	2X Average Background Concentration[d] (mg/kg)	Ecological COPC[e] ?	Basis for Exclusion as COPC
Metals										
Aluminum	8.51E+03	1.93E+00		mouse	3.00E+01	4.20E+00	1.19E+03	1.57E+04	N	BKG
Antimony	2.00E+00	1.25E-01		mouse	3.00E+01	4.20E+00	2.80E-01	7.48E-01	Y	NA
Arsenic	2.20E+00	1.36E-01		mouse	3.00E+01	4.20E+00	3.08E-01	5.13E+00	N	BKG
Barium	3.49E+01	5.10E+00		rat	3.50E+02	1.69E+01	1.69E+00	4.35E+01	N	ESV
Beryllium	3.52E-01	6.60E-01		rat	3.50E+02	1.69E+01	1.70E-02	4.21E-01	N	ESV
Cadmium	1.50E+00	8.00E-03		rat	3.50E+02	1.69E+01	7.24E-02	6.54E-01	Y	NA
Calcium	2.71E+02	NR		NA	NA	NA	NA	8.92E+02	N	BKG
Chromium	7.20E+00	1.00E+00		black duck	1.25E+03	6.72E+01	3.87E-01	2.36E+01	N	ESV
Cobalt	1.50E+00	5.00E+00	F	rat	3.50E+02	1.69E+01	7.24E-02	2.30E+00	N	ESV
Copper	1.21E+01	1.17E+01		mink	1.00E+03	3.06E+01	3.70E-01	5.23E+00	N	ESV
Cyanide	2.70E-01	6.87E+01		rat	3.50E+02	1.69E+01	1.30E-02	ND	N	ESV
Iron	4.80E+03	3.00E+01	G	rat	3.50E+02	1.69E+01	2.32E+02	1.86E+04	N	BKG
Lead	1.30E+01	1.13E+00		Jap. quail	1.50E+02	1.69E+01	6.28E-01	1.32E+01	N	ESV
Magnesium	1.15E+02	NR		NA	NA	NA	NA	2.95E+02	N	BKG
Manganese	6.99E+01	8.80E+01		rat	3.50E+02	1.69E+01	3.38E+00	1.66E+02	N	ESV
Mercury	5.60E-02	6.40E-03		mallard	1.00E+03	5.82E+01	3.26E-03	6.73E-02	N	ESV
Nickel	2.60E+00	4.00E+01		rat	3.50E+02	1.69E+01	1.26E-01	4.36E+00	N	ESV
Potassium	1.41E+02	7.00E-01	H	mouse	3.00E+01	4.20E+00	1.97E+01	1.89E+02	N	BKG
Sodium	2.70E+01	NR		NA	NA	NA	NA	4.85E+01	N	BKG
Vanadium	1.25E+01	2.10E-01		rat	3.50E+02	1.70E+01	6.07E-01	2.29E+01	N	BKG
Zinc	6.46E+01	1.45E+01		chicken	1.77E+03	8.40E+01	3.07E+00	2.44E+01	N	ESV

Table 6.1-4. (continued)
Selection of Ecological COPCs
Subsurface Soil (Depth 0-1.2 m [0-4 ft])
716-A Motor Shops Seepage Basin

a From Opresko et al. (1995) unless noted otherwise.

b Feeding rate (g/day) calculated as: $0.621\ (BW)^{0.564}$ for rodents or $0.648\ (BW)^{0.651}$ for birds, where BW = body weight in g (EPA 1993).

c SI = (Csmax) x (F) x (1/BW).

d Background values for organics are presented for comparative purposes only.

e Constituent is considered to be an ecological COPC if the SI value is greater than the ESV and the Cs is greater than 2X average background concentration.

A Criterion is derived from LOAEL (IRIS, 1994). LOAEL divided by 10 to derive a NOAEL equivalent value.

B Benzo(a)pyrene used as surrogate.

C ATSDR (1993).

D Criterion is a NOAEL (Region III RBC Tables: April 1996) upon which the provisional RfD value is derived (with no uncertainty values applied).

E Criterion is derived from LOAEL (ATSDR 1991b). LOAEL divided by 10 to derive a NOAEL equivalent value.

F ATSDR (1992).

G Criterion is derived from LD50 (RTECS 1996). LD50 divided by 100 to derive a NOAEL equivalent value.

H Criterion is derived from LD50 (RTECS 1996). LD50 divided by 100 to derive a NOAEL equivalent value.

NA Not applicable.

ND Not detected.

NR Not reported.

Table 6.1-5.
Summary of Human Health and Ecological COPCs
716-A Motor Shops Seepage Basin

COPC	Soil	
	Surface	Subsurface
Semivolatiles		
Benzo(a)pyrene	H	H
Metals		
Antimony		E
Cadmium	E	E

H Human health COPC
E Ecological COPC

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SECTION 6.2

FIGURES

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6.2 Human Health Risk Assessment

The human health risk assessment characterizes both the potential risk from exposure to carcinogenic substances and adverse health effects from noncarcinogens to human receptors exposed to unit-related constituents under current and future land use conditions. The United States Environmental Protection Agency (EPA) Risk Assessment Guidance for Superfund (RAGS) (EPA 1989b) and Region IV Supplemental Guidance to RAGS (EPA 1995b) are used as primary guidance for the human health risk assessment and the risk assessment is developed in accordance with the *Savannah River Site Federal Facility Agreement Implementation Plan* (WSRC 1996d). Using this process, the human health risk assessment is organized into the following sections:

- Human Health Constituents of Potential Concern and Exposure Pathways (Section 6.2.1)
- Exposure Assessment (Section 6.2.2)
- Toxicity Assessment (Section 6.2.3)
- Risk Characterization (Section 6.2.4)
- Summary of the Human Health Risk Characterization (Section 6.2.5)
- Uncertainty (Section 6.2.6)

6.2.1 Human Health Constituents of Potential Concern and Exposure Pathways

The human health constituent of potential concern (COPC) selection process described in Step B of Section 6.1.2 is used to screen the initial COPCs identified in each exposure group. A summary of the selection process and the human health COPCs remaining from the selection process are identified below.

Data for each exposure group are evaluated with respect to the data qualifiers identified in the June 1996 *Quality Control Summary Report (QCSR) for the A-Area Motor Shops Seepage Basin, Phase I* (EMS 1996) (Appendix B.2). A description of the relevant data qualifiers and their associated interpretation for use in the risk assessment is also provided in the QCSR. Tables 6.1-1 and 6.1-2 list constituents eliminated because their maximum concentrations are less than risk-based concentration (RBC) levels. Developed by the EPA, the RBCs include constituent concentrations in soil that produce threshold risk (i.e., cancer risk of 1×10^{-6} or a hazard quotient [HQ] of I). An HQ of 0.1 is used in

the screening process to account for potential additive effects of noncarcinogenic constituents.

Tables 6.1-l and 6.1-2 also list essential nutrients that are eliminated because their maximum concentration is less than the recommended daily allowance (RDA) or safe and adequate daily intake (SADI). Daily intakes for essential nutrients are calculated based on an ingestion rate of 200 mg/kg soil.

The maximum concentration of naturally occurring and anthropogenic inorganics that exceed the RBC and essential nutrient screens is compared to twice the average background concentration. A constituent is eliminated as a COPC if the maximum concentration is less than twice the background average concentration in each medium. If a constituent was not detected in the unit background sample and it was detected in the unit sample once (as a minimum), then it is not screened based on unit background. If the constituent was detected at least once either in the unit or the background samples, one-half the method detection limit (MDL) is used as a surrogate value for all non-detects to calculate the average background concentration.

Tables 6. l-l and 6.1-2 list all constituents that are eliminated because the maximum detected concentration is less than twice the average unit background concentrations. As a result of the screening process, only one semivolatile (benzo(a)pyrene remained as a COPC for soil to be used in the human health risk assessment. Tables in Appendix C.l provide the statistical summary information, including frequency of detection, maximum detected value, 95% upper confidence limit (95 UCL), and exposure concentration for all constituents detected in 716-A Motor Shops Seepage Basin (MSSB) soil.

6.2.2 *Exposure Assessment*

The objective of the exposure assessment is to estimate the type and magnitude of the potential human exposures to the COPCs identified in Section 6.2.1. For a given receptor group (i.e., workers, residents), this result is an estimate of chronic daily intake or dose that may occur from exposure to the COPCs in the soil. In identifying primary pathways of exposure, current and future land uses of the unit and surrounding area are considered.

The exposure assessment, in conjunction with the subsequent toxicity assessment (discussed in Section 6.2.3), supports the characterization of potential risks to human health (discussed in Section 6.2.4). Information developed in this section includes land

use assumptions, potential receptors, exposure pathways, concentrations of the COPCs at points of human exposure, and receptor intakes (doses). The reasonable maximum exposure (RME) estimate is presented for chemical intakes within each scenario. Uncertainties of the exposure assessment are discussed in Section 6.2.6.

6.2.2.1 Land Use Assumptions and Potentially Exposed Receptors

This section describes land uses at the MSSB and the human receptors that may be exposed to unit-related constituents. Potential receptors are expected to differ for the current and future land use scenarios. The possible receptor under the current land use scenario includes the known on-unit worker. The possible receptors under the future land use scenario include the hypothetical on-unit industrial worker and the hypothetical on-unit resident (adult and child).

6.2.2.1.1 Current Land Use

The MSSB was formerly an overflow area that received discharges from the 716-A Motor Shops facility. Discharges to the MSSB were discontinued in 1983 and the basin is currently inactive. The basin is unfenced and heavily vegetated. Although access to the Savannah River Site (SRS) is controlled by the Department of Energy (DOE), access to the MSSB is not restricted once within the SRS boundaries. Paved roads exist near the MSSB, and access on foot is easy and unrestricted. The surrounding area is partially developed and wooded areas are located nearby. Because the area is developed, there is human activity in the area (e.g., grass is mowed; there are nearby structures and roads). Based on a recent unit visit, there is no evidence to suggest any appreciable activity or potential for exposure within the MSSB area itself. Signs of casual trespassing (e.g., people, litter) were not observed during the unit visit.

Groundwater in the vicinity of the MSSB is not currently being used for consumption by on-unit workers. The potentially exposed receptors that are evaluated for the current land use scenario are known on-unit workers. Known on-unit workers are defined as SRS-related individuals who visit the unit under actual land use conditions on an infrequent or occasional basis. An on-unit worker may be a researcher, a groundwater sampler, or a person in close proximity to the unit. These receptors may be involved in the excavation or collection of contaminated media, but would be using SRS procedures and protocols for sampling at hazardous waste units. A visitor scenario is not evaluated separately for

this unit because the on-unit worker assessment is more conservative and will include the evaluation of individuals who visit the unit on an occasional basis.

6.2.2.1.2 Future Land Use

According to the *Savannah River Site: Future Use Project Report* (DOE 1996), "residential uses of SRS land should be prohibited." In this report, the MSSB is identified as a "current industrial (with buffer)" area. The future use recommendation contained in the *Future Use Project Report* is for "future industrial (non-nuclear)." This unit is most likely to remain as it is currently: an open grassy area. No future residential use of the MSSB is anticipated.

If land use conditions remain industrial, the only future human receptors are considered to be industrial workers. However, until deed notifications are established, the possibility exists that new buildings could be constructed and that the area at or near the MSSB could be converted to residential use in the future. Although residential development is unlikely, a hypothetical residential exposure scenario for both adults and children is presented for comparative purposes. However, the future use of the land is not likely to change from current use.

Because institutional controls preventing the excavation of contaminated soils cannot be guaranteed, the future scenario assumes the possible excavation of soils from depths of O-I .2 m (O-4 ft) and subsequent spreading of those soils on the surface as the result of construction activities. Approximately 1.2 m (4 ft) is considered a reasonable depth for a residential contractor to excavate during typical construction in the SRS area.

The potentially exposed receptors that are evaluated for the future land use scenario include:

- Hypothetical on-unit industrial worker
- Hypothetical on-unit resident (age adjusted adult/child)

Hypothetical On-Unit Industrial Worker

The hypothetical on-unit industrial exposure scenario addresses long-term risks to workers who are exposed to unit-related constituents while working within an industrial

setting. The hypothetical on-unit industrial worker is an adult who works in an outdoor industrial setting for the majority of the time.

Hypothetical On-Unit Resident (Adult and Child)

The hypothetical on-unit resident exposure scenario evaluates long-term risks to individuals expected to have unrestricted use of the unit. It assumes that residents live on unit and are chronically exposed (both indoors and outdoors) to unit-related constituents. The hypothetical on-unit resident includes adults and children who are exposed to all the contaminated media.

6.2.2.2 Identification *of* Potential Human Exposure Pathways

Exposure pathways describe "the course a chemical or physical agent takes from the source to the exposed individual" (EPA 1989b). Four components comprise an exposure pathway:

- A source and mechanism of constituent release
- A retention or transport medium (or media)
- A point of potential human contact with the contaminated medium (the exposure point)
- An exposure route (e.g., ingestion, dermal contact, and inhalation)

If any of these elements are missing, the pathway is incomplete and is not considered further in the risk assessment. A pathway is complete when all four elements are present to permit potential exposure of a receptor to a source of contamination. Quantification of some potentially complete pathways may not be warranted because of minimal contribution to risk relative to other major pathways. The dominant pathways from constituent sources and exposure media to human receptors potentially exposed to COPCs at the unit are presented in a graphical form as a conceptual site model (CSM) (Figure 6.2-l). As shown in the model, only soil and produce pathways are considered in the human health risk assessment. Based on the results of the Phase I screening and soil leachability analysis, further evaluation of the groundwater is not warranted. This is in accordance with the decision rules presented in the work plan for the MSSB (WSRC 1996c). Area groundwater is under evaluation as part of the overall groundwater remediation approach as presented in the RCRA permit application - Corrective Action Plan for the A-014 outfall area (Volume III, M-Area HWMF, WSRC-IM-91-53).

The primary source of contamination from the MSSB is soil contaminated from wastewater discharge from the 716-A Motor Shops. The potential on-unit exposure points for soil constituents are surface soil or subsurface soil that has been excavated and redistributed onto the surface. Constituents may be released from the soil via windblown dust and vegetative uptake. The potential for leaching to groundwater is considered to be minimal, as discussed in Section 5. Volatile emissions from soil are not evaluated further, since there are no volatile COPCs in the soil at the MSSB. As noted, there are no surface water or sediment features at or in the immediate vicinity of the MSSB, and groundwater is not included in this investigation.

6.2.2.2.1 Known On-Unit Worker

The following is the primary pathway evaluated for exposures to the known on-unit worker:

- Exposure via direct contact with contaminated soils through ingestion, dermal contact, and inhalation of windblown dust

6.2.2.2.2 Hypothetical On-Unit Industrial Worker

The primary pathway evaluated for exposures to the hypothetical on-unit industrial worker includes:

- Exposure via direct contact with contaminated soils through ingestion, dermal contact, and inhalation of windblown dust

6.2.2.2.3 Hypothetical On-Unit Resident (Adult and Child)

The primary pathway evaluated for the hypothetical on-unit resident includes:

- Exposure via direct contact with contaminated soils through ingestion, dermal contact, inhalation of windblown dust, and ingestion of homegrown produce

6.2.2.3 Derivation of Exposure Concentrations

Exposure concentrations are the concentrations of constituents in a given medium to which human receptors are exposed at the point of contact. Exposure concentrations are used to calculate the constituent intakes or doses for human receptors based on methodology

provided in EPA risk assessment guidance (EPA 1989b and 1991). The calculation of constituent intakes or doses for the human receptors is discussed in Section 6.2.2.4.

Because of the uncertainty associated with any estimate of exposure concentration, the 95 UCL of the mean or the maximum constituent concentration (whichever is lower) is used to determine the exposure concentration in each medium (EPA 1989b). This exposure concentration is the RME concentration. Appendix C.l presents the procedure and summary statistics for calculating the 95 UCL and the RME concentrations for each medium. Tables in Appendix C. 1 present the statistical data used to evaluate the COPCs in the risk assessment.

6.2.2.4 Development of Constituent Intakes

Human intake factors (HIFs) are calculated based on the RME concentrations for each principal complete pathway. The RME concentrations represent the highest exposure that is reasonably expected to occur in a small, but definable "high-end" segment of the potentially exposed population. Constituent-specific intakes, or doses, are calculated for the receptors and exposure pathways identified for quantitative evaluation in Sections 6.2.2.1 and 6.2.2.2, respectively. The development of constituent intakes is based on EPA methodology presented in EPA's *Risk Assessment Guidance for Superfund* (EPA 1989b) and the Office of Solid Waste and Emergency Response (OSWER) Directive 9285.6-03 (EPA 1991).

Under the current and future land use scenarios, estimated intakes are calculated for the known on-unit worker, hypothetical on-unit industrial worker, and hypothetical on-unit resident for exposure to the constituents in the soil previously described in Section 6.2.2.2. The constituent-specific intakes are developed for the principal complete exposure pathways (EPA 1992b) and are presented with risk calculations for the basin in Appendix C.4. RME exposure point concentrations upon which the intake and dose are based are presented in Appendix C. 1. The exposure parameters and intake equations are discussed below and are provided in Appendix C.3.

6.2.2.4.1 Exposure Equations

Appendix C.4 presents the equations used to calculate constituent-specific RME intakes or doses. The appendix includes equations for exposure to soil (dermal contact,

ingestion, and inhalation of particulates) and ingestion of homegrown produce grown in unit soil.

6.2.2.4.2 Exposure Parameters

The RME intakes or doses are calculated by using parameters that represent the 95th percentile for a population or by using best professional judgment in the absence of unit-specific data (EPA 1995b). Exposure parameters are provided for each complete exposure pathway as defined above. Appendix C.3 presents the values used for the exposure parameters and the technical basis on which parameter values are based. Additional input parameters required to calculate intake or dose include the RME concentrations that are described in Section 6.2.2.3 are presented in Appendix C.3 (e.g., dermal permeability coefficients and soil-to-plant transfer factors).

6.2.3 *Toxicity Assessment*

The toxicity assessment presents and discusses constituent-specific quantitative dose-response data for the COPCs identified in Section 6.2.1. The objectives of the toxicity assessment are to evaluate the inherent toxicity of the substances under investigation and to identify and select toxicity values for use in the risk characterization. For the assessment of human health risks from exposure to chemicals and radionuclides, the following toxicity values are of principal importance:

- Reference doses (RfDs) for oral exposure; i.e., acceptable intake values for chronic exposure (noncancer effects)
- Reference concentrations (RfCs) for inhalation exposure; i.e., acceptable intake values for chronic exposure (noncancer effects) (these are converted to inhalation RfDs by multiplying by 20 m^3/day and dividing by 70 kg)
- Cancer slope factors (CSFs) for oral and inhalation exposure routes

Toxicity information is preferably obtained from the Integrated Risk Information System (IRIS 1996). If values are not available from IRIS, the Health Effects Assessment Summary Tables (HEAST) (EPA 1995d) or provisional toxicity values developed by the EPA's Superfund Health Risk Technical Support Center-National Center for Environmental Assessment are used.

Appendix D presents the toxicological data used in the risk assessment for the COPCs, and abbreviated toxicity profiles for COPCs. Appendix D includes a table of toxicity values that briefly summarizes carcinogenic toxicity data for each of the COPCs, including weight-of-evidence classifications, CSFs, and target organs.

6.2.3.1 Chemical Toxicity

6.2.3.1.1 Noncarcinogens

The one COPC identified for surface and subsurface soil, benzo(a)pyrene, is not a toxicant that is assigned an RfD for evaluating noncancer effects. An RfD, reported as a chemical intake (mg/kg-day), is the toxicity value used most often in evaluating noncarcinogenic effects. RfDs are developed and verified for specific chemicals by the EPA, and are defined as "an estimate of a daily exposure level for the human population, including sensitive subpopulations, that is likely to be without an appreciable risk of deleterious effects during a lifetime" (EPA 1989b). RfCs, which are reported as a concentration in air (in mg/m^3), are also used to evaluate noncarcinogenic effects. Derivation and/or conversion from an RfC (concentration) to an RfD (dose) is employed. The uncertainty introduced by the lack of an RfD for these constituents is discussed in Section 6.2.6.

6.2.3.1.2 Carcinogens

One COPC, benzo(a)pyrene, was identified in both surface soil and subsurface soil at the MSSB as a potential carcinogen with a CSF value assigned to it by the EPA. Benzo(a)pyrene is classified as a type B2 carcinogen and is considered to be a probable human carcinogen.

6.2.3.2 Constituents Without Toxicity Values

EPA toxicity values are available only for the oral and inhalation routes. As discussed below for the dermal contact route, it is sometimes necessary to convert the administered dose toxicity value to an absorbed dose to calculate risk for the dermal pathway. In addition, when a constituent has no chronic toxicity values, the toxicity value of a constituent that is related both chemically and toxicologically may be used. Two polynuclear aromatic hydrocarbons (PAHs) identified for surface and subsurface soils, benzo(ghi)perylene and phenanthrene, do not have noncancer or cancer toxicity values.

However, benzo(ghi)perylene and phenanthrene were screened out in the COPC selection process by using surrogate toxicity values from pyrene and fluorene, respectively. PAHs are classified according to molecular weight and members within a group behave similarly in the environment. Therefore, pyrene and fluorene were designated as surrogates because these constituents are members of the same group as the substituted PAH.

In accordance with RAGS (EPA 1989b), absorbed-dose toxicity values are derived from the oral administered-dose toxicity values to estimate risk associated with the dermal contact route. Adjustment of the oral administered-dose toxicity values from absorbed-dose toxicity values requires sufficient data from the principal laboratory studies on oral absorption efficiency (i.e., gastrointestinal absorption factors) in the species on which the toxicity values are based.

Using these data, the administered-dose toxicity value is multiplied (if it is an RfD) or divided (if it is a CSF) by a gastrointestinal absorption factor to derive a toxicity value based on the absorbed dose. In cases where constituent-specific absorption factors are not available, EPA Region IV provides default absorption factors of 80 percent for volatile organic compounds (VOCs), 50 percent for semivolatile organic compounds (SVOCs), and 20 percent for inorganic substances (EPA 1995a). Appendix D presents the dermal permeability coefficients, dermal absorption factors, and gastrointestinal absorption factors used in this risk assessment.

6.2.4 Risk Characterization

Risk characterization combines the exposure intake values and toxicity assessment values to determine a quantitative risk for all human receptors defined in the human health risk assessment. The objective of the human health risk characterization is to determine whether exposure to constituents associated with the unit poses risks that exceed target levels for human health effects. The results of the human health BRA support the determination of need for unit remediation.

Cancer risk and hazard index (HI) estimates are presented for each COPC having available toxicity values. Cancer risks are estimated as the incremental probability of an individual developing cancer over a 70-year lifetime from exposure to carcinogenic contaminants. To interpret the risk characterization results, a risk of less than one excess cancer in one million people (1×10^{-6}) is not considered a potential human health concern by the EPA. Risks

greater than 1×10^{-6} typically represent risks that will require risk management decisions. Accordingly, those COPCs contributing significantly to risk (risk greater than 1×10^{-6} for a pathway with a total risk greater than 1×10^{-4}) are identified as primary COCs. In addition, any COPC with a risk level of 1×10^{-6} or greater is considered as a secondary COC. Primary and secondary COCs are evaluated for uncertainty in Section 7 before becoming final COCs.

This section presents the human health cancer risks and constituent hazard estimates for the current land use and hypothetical scenarios for the unit. Quantitative evaluations of exposure pathways for human receptors include a known on-unit worker, a hypothetical on-unit (industrial) worker, and a hypothetical on-unit resident. Appendix C.4 presents constituent-specific RME risks for each receptor and pathway. Figures 6.2-2 through 6.2-6 summarize risks and hazards across pathways and media for nonradiological chemicals.

6.2.4.1 EPA Methods for Risk Characterization

This risk characterization presents a separate evaluation of noncancer and cancer effects. EPA methods distinguish cancer from noncancer effects because organisms typically respond differently following exposure to noncarcinogenic or carcinogenic agents. The outcome of this comparison is used to determine whether the constituent concentrations detected in environmental media at the unit may be associated with adverse effects on the health of humans potentially exposed to unit-related constituents.

The risk characterization requires that the potentially toxic effects associated with exposures to each of the COPCs be combined across environmental media and exposure pathways. As described in the exposure assessment, the current and/or future receptors could be concurrently exposed to the COPCs through direct contact exposure to unit soils (i.e., ingestion, dermal contact, and inhalation of dust). In the case of the resident, the soil exposures could also be combined with ingestion exposure to produce grown in unit soil. In general, the hazards and risks are combined across exposure pathways to develop a reasonable total risk estimate for each receptor.

The potential noncarcinogenic hazards and carcinogenic risks are assessed quantitatively by evaluating exposure estimates with respect to available toxicity values for the COPCs.

6.2.4.1.1 Evaluation of Noncarcinogenic Hazards

The risk of adverse noncarcinogenic effects from constituent exposure is expressed in terms of the HQ. The HQ is the ratio of the estimated chronic daily intake of a COPC to the RfD (RfDs are described in Section 6.2.3).

To evaluate exposure from more than one noncarcinogen, the constituent-specific HQs are summed for each environmental medium and exposure pathway to obtain the HI. After individual pathway risks are calculated, HIs may be combined across pathways to estimate total unit risk for each receptor. An HI greater than 3 has been defined as a primary COC for adverse noncarcinogenic health effects.

6.2.4.1.2 Evaluation of Carcinogenic Risks

Cancer risks are estimated as the incremental excess probability of an individual developing cancer over a lifetime as a result of pathway-specific exposure to radionuclides and chemical carcinogens (i.e., incremental or excess individual lifetime risk over the course of a 70-year lifetime for chemicals and a 50-year lifetime for radionuclides). This value is calculated by multiplying the average daily intake over a lifetime by the CSF for the constituent. To account for simultaneous exposure to multiple carcinogens through a given pathway, the risks calculated for each individual carcinogen in that medium are summed to obtain an estimate of the total cancer risk for the pathway.

Cancer risks are evaluated using the EPA target range of 1×10^{-4} to 1×10^{-6} for incremental cancer risk. Cancer risks less than 1×10^{-6} are considered to be adequately protective of human health. Cancer risks greater than 1×10^{-6} are generally considered to represent exposure levels requiring a risk management decision regarding the need for remediation.

6.2.4.2 Interpretation of Human Health Risk Assessment Results

Primary COCs in the human health risk assessment are defined as constituents that either individually produce or significantly contribute to risk estimates that exceed a 1×10^{-4} risk or an HI of 3 by selecting individual COCs exceeding a risk of 1×10^{-6} or an HQ of 1 in any media. If, for example, the risk estimate from exposure to surface soil were greater than 1×10^{-4} (or HI greater than 3), then all of the constituents significantly contributing to that risk/hazard would be identified as primary COCs. Each pathway

(e.g., ingestion, inhalation, dermal contact, ingestion of produce) would be investigated to determine the source of the most important constituents.

Secondary COCs are individual COPCs that have a chemical-specific carcinogenic risk of at least 1 x 10^{-6}, or noncarcinogenic HQ of 0.1 that contributes to a pathway HQ of 1 or greater (i.e., those chemicals not identified as primary COCs for a particular receptor). If the level of a constituent in a given medium exceeds a state or Federal chemical-specific applicable or relevant and appropriate requirement (ARAR), that constituent is also included as a COC (EPA 1995b).

6.2.5 *Summary of the Human Health Risk Characterization*

To evaluate the risks to human receptors due to the contamination at the MSSB, unit-specific analytical data are used to identify COCs. RME concentrations are determined for each COC to estimate the potential exposure for various receptors and exposure scenarios. Receptors are selected based on one current land use (known on-unit worker) and two potential future land use scenarios (hypothetical on-unit industrial worker and hypothetical on-unit resident).

Following the selection of individual receptors, chemical cancer risks and health hazards are estimated for each COC for pathway/receptor combinations based on EPA guidance (EPA 1989b). Carcinogenic risks and noncarcinogenic hazards are summed across pathways and media for each receptor at the MSSB. For example, the risks to the known on-unit worker resulting from the ingestion of, dermal contact with, and inhalation of soil COCs are combined to estimate a total risk for nonradioactive carcinogens from soil. The totals for each medium are then summed to obtain a total risk value that includes all reasonable pathways for each receptor.

The RME risk estimates for current and future land use for human receptors at the MSSB are discussed in Sections 6.2.5.1 and 6.2.5.2. Summaries of unit-related carcinogenic risk and noncarcinogenic hazard for the COPCs identified for quantitative evaluation are presented in Tables 6.2-l through 6.2-3 and Figures 6.2-2 through 6.2-6 for each human receptor and pathway.

To assess the significance of the COPC screening process, the hazards and risks are evaluated for the constituents that are eliminated during the screening process. The hazards and risks for those unit constituents that are less than twice average background

concentrations but exceed an RBC value are evaluated in Appendix C.5 and are presented in the discussion of uncertainties (Section 6.2.6.3). Note that for the O-O.3 m (O-l ft) soil interval, arsenic, beryllium, and iron are screened out in the comparison to background. For the O-l .2 m (O-4 ft) soil interval, aluminum, arsenic, beryllium, and iron are screened out in the background comparison. Tables 6.2-4 through 6.2-5 present summaries of unit-related carcinogenic risk and noncarcinogenic hazard for the screened constituents. To help ascertain the significance of the hazard and risk estimates, the background hazards and risks for the unit COPCs and screened constituents are evaluated in Appendix C.6. Tables 6.2-6 and 6.2-7 present summaries of unit-related carcinogenic risk and noncarcinogenic hazards for background constituents. Table 6.2-8 presents a comparison of the risk and hazard evaluations for the screened constituents and background constituents.

6.2.5.1 Results for Current Land Use

Under the current land use scenario, carcinogenic risks and noncarcinogenic hazards are characterized for exposure of an on-unit worker to soil.

6.2.5.1.1 Known On-Unit Worker

Noncarcinogenic Hazard

There are no noncarcinogenic HIs for the known on-unit worker exposure pathways because RfD values for noncancer effects are not available for benzo(a)pyrene.

Carcinogenic Risk

Figure 6.2-2 summarizes estimates of total risk by pathway for nonradioactive carcinogens for the known on-unit worker. All of the estimated total cancer risks are less than 1 x 10^{-6}, indicating that, under current conditions, carcinogenic risk is insignificant at the unit. Carcinogenic risk for the known on-unit worker exposure pathways are presented in Tables 6.2-l through 6.2-2 and Figure 6.2-2.

O-O.3 m (0- 1 ft) Soil Interval

- For the O-O.3 m (O-l ft) soil interval, the total site cancer risk for the known on-unit worker is 1 x 10^{-8}.

- By comparison, exposures to the O-O.3 m (O-l ft) soil interval in the background also resulted in a total cancer risk for the known on-unit worker of 1×10^{-8}.

6.2.5.2 Results for Future Land Use

Under the future land use scenario, carcinogenic risks and noncarcinogenic hazards are calculated for exposure of the hypothetical on-unit resident (adult and child) to surface and redistributed subsurface soils, and homegrown produce. For the hypothetical on-unit worker, exposures are calculated for surface soil and redistributed subsurface soil (but not produce).

6.2.5.2.1 Hypothetical On-Unit Industrial Worker

Noncarcinogenic Hazard

There are no noncarcinogenic HIs for the hypothetical on-unit worker exposure pathways because RfD values for noncancer effects are not available for benzo(a)pyrene.

Carcinogenic Risk

Estimates of total risk by pathway for carcinogens are summarized for the hypothetical on-unit industrial worker in Tables 6.2-l through 6.2-2 and Figures 6.2-3 through 6.2-4.

O-O.3 m (O-l ft) Soil Interval

For the O-O.3 m (O-l ft) soil interval, the total cancer risk for the hypothetical on-unit industrial worker is 3×10^{-6}. The risk is due to the dermal contact pathway and the risk driver is benzo(a)pyrene.

By comparison, exposures to the O-O.3 m (O-l ft) soil interval in the background also result in a cancer risk of 3×10^{-6} for the hypothetical on-unit industrial worker. An appreciable cancer risk in the background is most likely due to natural variation in the concentration of metals (i.e., arsenic and beryllium) in soil.

o-1.2 m (0-4 ft) Soil Interval

- For the O-l .2 m (O-4 ft) soil interval, the total cancer risk for the hypothetical on-unit industrial worker is 3 x 10^{-6}. This is due to the dermal contact pathway and the risk driver is benzo(a)pyrene.

- By comparison, exposures to the O-l.2 m (O-4 A) soil interval in the background also result in a cancer risk of 3 x 10^{-6} for the hypothetical on-unit industrial worker. An appreciable cancer risk in the background is most likely due to natural variation in the concentration of metals (i.e., arsenic, beryllium, and iron) in soil.

6.2.5.2.2 Hypothetical On-Unit Resident

Noncarcinogenic Hazard

There are no noncarcinogenic HIs for the hypothetical on-unit resident exposure pathways because MD values for noncancer effects are not available for benzo(a)pyrene.

Carcinogenic Risk

Estimates of total risk by pathway for nonradioactive carcinogens are summarized for the hypothetical on-unit resident in Tables 6.2-l through 6.2-2 and Figures 6.2-5 through 6.2-6.

O-O.3 m (O-1 ft) Soil Interval

- For this soil interval, the total cancer risk for the hypothetical on-unit resident is 1 x 1 0^{-5}. This is below 1 x 10^{-4}, but exceeds the initial level of concern for cancer risk (1 x 10^{-6}). Pathways with cancer risks of greater than 1 x 1 0^{-6} include soil ingestion (Excess Lifetime Cancer Risk [ELCR] = 3 x 10^{-6}), dermal contact (5 x 10^{-6}), and ingestion of produce (2 x 10^{-6}) grown in the soil. Benzo(a)pyrene, which is a secondary COC, is the only COC identified for the O-O.3 m (O-l ft) soil interval.

- By comparison, exposures to the same soil interval in the background results in a higher total cancer risk for the hypothetical on-unit resident (2 x 10^{-5}). A higher cancer risk in the background is most likely due to natural variation in the concentration of metals (i.e., arsenic and beryllium) in soil.

0-1.2 m (O-4 ft) Soil Interval

- For this soil interval, the total cancer risk for the hypothetical on-unit resident is 1 x 10^{-5}. This is below 1 x 10^{-4}, but exceeds the initial level of concern for cancer risk (1 x 1 0^{-6}). Pathways with cancer risks of greater than 1 x 10^{-6} include soil ingestion (ELCR = 3 x 10^{-6}), dermal contact (5 x 10^{-6}), and ingestion of produce (2 x 10^{-6}) grown in the soil. Benzo(a)pyrene, which is a secondary COC, is the only COC identified for the O-1.2 m (O-4 Et) soil interval.

- By comparison, exposures to the O-l .3 m (O-4 A) soil interval in the background result in a total cancer risk for the hypothetical on-unit resident of 2 x 10^{-5}. The cancer risk in the background is attributable to arsenic and beryllium in the soil.

6.2.5.3 Constituents of Concern

- No primary COCs are identified for the MSSB. Table 6.2-3 provides a summary of the single human health COC, benzo(a)pyrene, which is a secondary COC.
- There are no ARAR-driven COCs.

6.2.6 *Uncertainty*

Uncertainty will always be associated with estimates of environmental concentrations at waste units. Uncertainty in the analytical data may be linked to sample density and distribution, collection procedures in the field, seasonal fluctuations, and accuracy of the sample analyses.

Sample collection procedures are established to reduce uncertainty in the sample results. Standard quality assurance/quality control (QA/QC) measures (e.g., proper decontamination of equipment and collection of trip blanks, field blanks, and matrix spike/matrix spike duplicates) are followed to reduce uncertainty associated with the analytical data. The uncertainty associated with sample collection procedures has the potential to either overestimate or underestimate risks to receptors.

Uncertainty also may be introduced at the laboratory. Standardized procedures are followed by the laboratory to reduce this uncertainty. For example, surrogate spikes are used to monitor constituent recovery, internal standards monitor instrument sensitivity, and laboratory blanks are used to determine whether laboratory preparation has introduced

contamination to the sample. These measures are explained in the QCSR for the MSSB (Appendix B.2).

The frequency of detection for benzo(a)pyrene is one out of 12 detections, which demonstrates a level of uncertainty in the risk for this unit. The low frequency of detection for the benzo(a)pyrene has a tendency to overestimate the risk, since the only detection is used as the exposure point concentration.

6.2.6.1 Provisional Toxicity Value for Aluminum and Iron

Aluminum and iron are not designated as COPCs or COCs for the MSSB; however, they are included in the risk evaluation of screened constituents in Appendix C.5. Both constituents were detected at the unit and in the background samples and were eliminated from the unit evaluation during the COPC screening process. There is no EPA-verified toxicity value for iron or aluminum; therefore, provisional toxicity values for the oral reference dose are used for both constituents to estimate the risks and hazards. The provisional toxicity values were developed for use by the EPA but are not included in either IRIS or HEAST because the value has not been verified by the EPA Reference Dose Workgroup personnel. Conclusions based on the use of the provisional toxicity value should be cautiously viewed in light of the weakness of the available provisional toxicity value.

Note that the United States Food and Drug Administration dietary value (DV) for iron is 18 mg/day, which for a 70 kg adult corresponds to a recommended daily dose of 0.26 mg/kg/day. This is the daily dose of iron that is recommended as part of a healthy diet. To ingest this amount of iron from soil, the concentration of iron in the soil would have to be very high approximately 180,000 mg/kg. This assumes 350 days per year of exposure at a rate of 100 mg/day for 30 years for a 70 kg adult who receives his/her dietary iron intake from the soil (which is unlikely). The concentrations in soil at the MSSB are typically an order of magnitude lower than 180,000 mg/kg, indicating that iron in the soil is very unlikely to be of concern at the MSSB. This explanation is very basic since there are other important sources of iron, particularly in the diet. However the comparison serves to demonstrate that there is a large discrepancy between the findings based on the provisional toxicity value for iron versus the findings based on the DV.

6.2.6.2 Constituents Without Toxicity Values

Only one COPC, benzo(a)pyrene, is included in the investigation of the MSSB. Benzo(ghi)perylene and phenanthrene are screened out in the COPC selection process by using surrogates such as pyrene and fluorene. Pyrene is substituted for benzo(g,h,i)perylene and fluorene is substituted for phenanthrene. PAHs are further classified according to molecular weight and members within a group that behave similarly in the environment. Therefore, designated surrogates are used because these constituents belong to the same group as the substituted PAH.

COPCs are evaluated in both the surface O-O.3 m (O-l ft) soil and in the subsurface O-l .2 m (0-4 ft) soil intervals; however, benzo(a) pyrene was not detected in the latter interval. In addition, benzo(a)pyrene does not have EPA-verified toxicity RfD value, which also tends to underestimate the noncancer effects.

The EPA has provided interim guidance for the evaluation of some PAHs that are known to cause cancer (EPA 1995b). In this interim guidance, the EPA recommends using relative potency values (orders of magnitude) for a select group of carcinogenic PAHs to that of benzo(a)pyrene. These toxicity equivalent factors (TEFs) are used to convert each PAH concentration to an equivalent concentration of benzo(a)pyrene and are based on well-conducted studies that used complete carcinogenesis after repeated dermal exposure to mice. Although benzo(ghi)perylene and phenanthrene are in the PAH class, TEF values are not provided for these constituents. As previously explained, surrogate values are used to screen these constituents from further evaluation.

6.2.6.3 Uncertainty in the Toxicity Data

Although the EPA provides toxicity values that are point estimates, a significant amount of uncertainty is inherent within the toxicity assessment. Uncertainty is primarily caused by differences in study design, species, sex, routes of exposure, or dose-response relationships. A major source of uncertainty involves the use of toxicity values based on experimental studies that substantially differ from typical human exposure scenarios. The derivation of the toxicity values must take into account such differences as using dose-response information from animal studies to predict effects in humans, using dose-response information from high-dose studies to predict adverse health effects from low doses, using

data from short-term studies to predict long-term (chronic) effects, and extrapolating from specific populations to general populations.

The CSFs in particular are based on studies that may differ greatly from realistic situations. Experimental cancer bioassays typically expose animals to very high levels of chemicals (i.e., the maximum tolerated dose) for their entire lifetime. After the appropriate studies have been identified, the slope factor is calculated as the 95 UCL of the slope of the dose-response curve. This introduces conservatism into the risk assessment.

The derivation of RfDs generally involves the use of animal studies. Uncertainty factors ranging from 1 to 10,000 are incorporated into the RfD to provide an extra level of public health protection. The factors used depend on the type of study from which the value has been derived (e.g., animal or human, long-term or short-term). The scientific basis for this practice is somewhat uncertain. In general, high uncertainty factors are meant to bias results conservatively so that exposures at the RfD level will not result in adverse health effects.

Toxicity values are not available from the EPA for the dermal route. Therefore, oral toxicity values have been adjusted for the dermal pathway by using chemical-specific gastrointestinal absorption factors to adjust the oral toxicity value from an administered value to an absorbed value. Once adjusted to an absorbed value, the value then may appropriately be used to evaluate dermally absorbed doses. Since in such cases the toxicologic study was not based on the dermal pathway, the adjustment of the toxicity value from an oral to a dermal value introduces uncertainty into the risk assessment that could result in overestimating or underestimating risk.

No adjustments have been made for the medium of exposure. For example, the medium of exposure at the exposure unit may be soil, whereas the medium of exposure used by the laboratory study may be corn oil. This could be a source of uncertainty in risk estimates for soil derived from the laboratory-based toxicity values.

Many chemicals exist for which no toxicity value is known and for which little information is available. Therefore, a quantitative risk estimate cannot be calculated for these chemicals. For example, many chemicals are not evaluated for the inhalation pathway because of limited inhalation-based toxicological information. The lack of toxicity information for some chemicals may contribute to the underestimation of risks.

6.2.6.4 Uncertainty in the COPC Selection Process

There is inherently some uncertainty introduced by screening constituents out before the risk assessment. The screening consists of a health-based screening and a background comparison. The health-based screen is very conservative and, for this reason, it is unlikely to result in appreciable uncertainty in the risk estimates for the remaining constituents. The background comparison is important, since it is designed to identify and eliminate constituents detected at naturally occurring levels from the risk assessment. Naturally occurring levels of constituents may, however, represent significant hazards or cancer risks.

The bias introduced by screening out constituents before the risk assessment would always underestimate the hazard or risk, since the screened constituents are not included in the risk assessment. To assess the significance of the screening process, risk estimates are calculated for the chemicals that are screened out in the COPC selection process. Tables 6.2-4 through 6.2-8 provide summaries of the unit risk/hazard and the background risk/hazard for the future industrial worker and the future adult/child receptors. Risk/hazard determinations are performed for four metals, aluminum, arsenic, beryllium, and iron, because these constituents are screened based on a comparison to their twice average background concentrations. The results of the background risk/hazard are greater than the unit risk/hazard overall for both receptors. However, both the unit risk estimates, based on background screen, and background risk estimates are within the same order of magnitude.

These findings indicate that there is minimal uncertainty in the risk estimates that may be attributable to the COPC selection process. In the case of the highest hazards or risks for the screened constituents (e.g., the cancer risk of 1×10^{-5}) and the background constituents (e.g., 3×10^{-5}), the estimates appear to be entirely attributable to naturally occurring levels of aluminum, arsenic, beryllium, and iron in the soil. Note that the background comparison used in the COPC selection process is very conservative, resulting in a high degree of confidence that unit-related constituents have not been incorrectly screened out as COPCs.

6.2.6.5 Exposure Assessment

Different types of uncertainty have been identified regarding the exposure assessment:

- Scenario Uncertainty, in which information needed to define the exposure scenario or pathway is missing or incomplete
- Parameter Uncertainty, in which not enough information exists to quantify an exposure variable or parameter

Scenario uncertainty arises when pathways were not included in or were eliminated from the assessment. The pathways that have been included in the human health risk assessment and the corresponding rationale are presented in Section 6.2.2. A future residential scenario has been evaluated, although residential conversion of the unit is unlikely and has been specifically excluded in the future use of the SRS. Therefore, the inclusion of the residential scenario is most likely conservative.

Assumptions about the future land uses are speculative. In attempting to predict future exposures, assumptions must be made concerning contaminant fate and transport, future site activities, and receptor behavior. In particular, it was conservatively assumed that contaminant concentrations will be the same in the future as they are at present,

Parameter uncertainty results partly because many of the exposure parameters (i.e., exposure factors) used in the risk assessment are default values recommended by the EPA. These default parameters, which are generally conservative, do not necessarily reflect actual behavior and have been used in the absence of site-specific information.

Exposure parameters are commonly treated as single point estimates and used in the exposure equations to calculate a single estimate for exposure and risk. These parameters are usually represented by single values, but are actually based on averages, best estimates, or high-end estimates taken from a range of values. For example, some individuals in a population may be more active than others, and some may have greater body weights than others. Individual estimates selected from the variable distribution may thus be uncertain.

Another potential pathway identified in the exposure assessment, the ingestion of homegrown produce by the hypothetical future on-unit residents, contains a higher degree of uncertainty than most of the other exposure pathways. This is due to the additional

uncertainty resulting from the estimation of organic and inorganic contaminant uptake from soils to plants. There is a high uncertainty in the models used to project the uptake of contaminants in soil into plants.

6.2.6.6 Uncertainty in Multiple Chemical Exposures

Uncertainties in any phase of the risk analysis are reflected in the risk estimates. Some uncertainty is associated with the summation of risks and HQs for multiple chemical contaminants. As stated in the EPA's previous human health risk assessment guidance documents (EPA 1989b), "The assumption of dose additivity ignores possible synergisms or antagonisms among chemicals, and assumes similarity in mechanisms of action and metabolism."

Cancer and noncancer risks are summed in the risk characterization process (separately for carcinogens and noncarcinogens) to estimate potential risks associated with simultaneous exposure to multiple chemicals. In the case of carcinogens, this approach gives chemicals that are probable human carcinogens (based on animal data or on limited human data) the same weight as chemicals that are known human carcinogens. It also weighs CSFs derived from animal data equally with those derived from human data. Uncertainties in the combined risks also are compounded because RfDs and CSFs do not have equal accuracy or levels of confidence and are not based on the same severity of effect. These methods may overestimate or underestimate the actual risk.

6.2.6.7 Uncertainty in Detection Limits that are Higher than Some Detects

In some cases, the detection limit in some soil samples may be greater than the reported value in other samples. In these cases, the detection limit may be higher than is desirable to characterize risks, since one-half the detection limit is often used. Relatively high detection limits can occur as a result of moisture variations in the soil sample, or from the need to dilute highly concentrated samples. In some cases it may be appropriate to eliminate very high detection limits from the data set used in the risk assessment, but outside of such special occasions, variable detection limits are usually included in the data set. The overall effect on uncertainty is unclear, since the true concentration of a relatively high nondetect could be either higher or lower than the average of the data set.

6.2.6.8 Uncertainty in Central Tendency Exposure Estimates

In accordance with EPA Region IV guidance (EPA 1995b), risks are calculated for both RME and Central Tendency Exposure (CTE) risk scenarios. CTE risk estimates are, by definition, representative of more likely exposures than are the RME estimates. The CTE estimates are typically not used as the basis for determining the need for remediation. They are presented to provide information regarding the significance of the risk estimates, which should be useful in the decision-making process for the MSSB.

The CTE estimates differ from the RME estimates in that the exposure assumptions (e.g., exposure frequency, exposure duration, and ingestion rate) that are used result in an exposure estimate that is generally mid-range rather than from the high end of possible exposures. For the CTE risk estimates, only the average exposure concentration is changed, while the other default parameters remain the same as the RME estimates. In comparing the CTE results to the RME results, the combined CTE risk estimates are approximately an order of magnitude lower than the RME estimates for both the industrial worker and the adult/child receptors. The results of the CTE estimates are shown below and are provided in Appendix C.7:

Risk Characterization Summary
Surface Soils (Depth O-O.3 m [0 to 1 ft])
716-A Motor Shops Seepage Basin

Medium	Exposure Route	Future Industrial Worker RME	Future Industrial Worker CTE	Future Adult/Child RME	Future Adult/Child CTE
Soil	Ingestion	5E-07	1 E-07	3E-06	5E-07
	Dermal Contact	2E-06	3E-07	SE-06	9E-07
	Inhalation	2E-11	4E-12	3E-11	6E-12
Produce	Ingestion	NA	NA	2E-06	4E-07
Combined Cancer Risk:		**3E-06**	**4E-07**	**1E-05**	**2E-06**

Risk Characterization Summary
Subsurface Soils (Depth 0-1.2 m [0 to 4 ft])
716-A Motor Shops Seepage Basin

Medium	Exposure Route	Future Industrial Worker RME	Future Industrial Worker CTE	Future Adult/Child RME	Future Adult/Child CTE
Soil	Ingestion	5E-07	6E-08	3E-06	3E-07
	Dermal Contact	2E-06	2E-07	5E-06	5E-07
	Inhalation	2E-11	2E-12	3E-11	4E-12
Produce	Ingestion	NA	NA	2E-06	2E-07
Combined Cancer Risk:		**3E-06**	**3E-07**	**1E-05**	**1E-06**

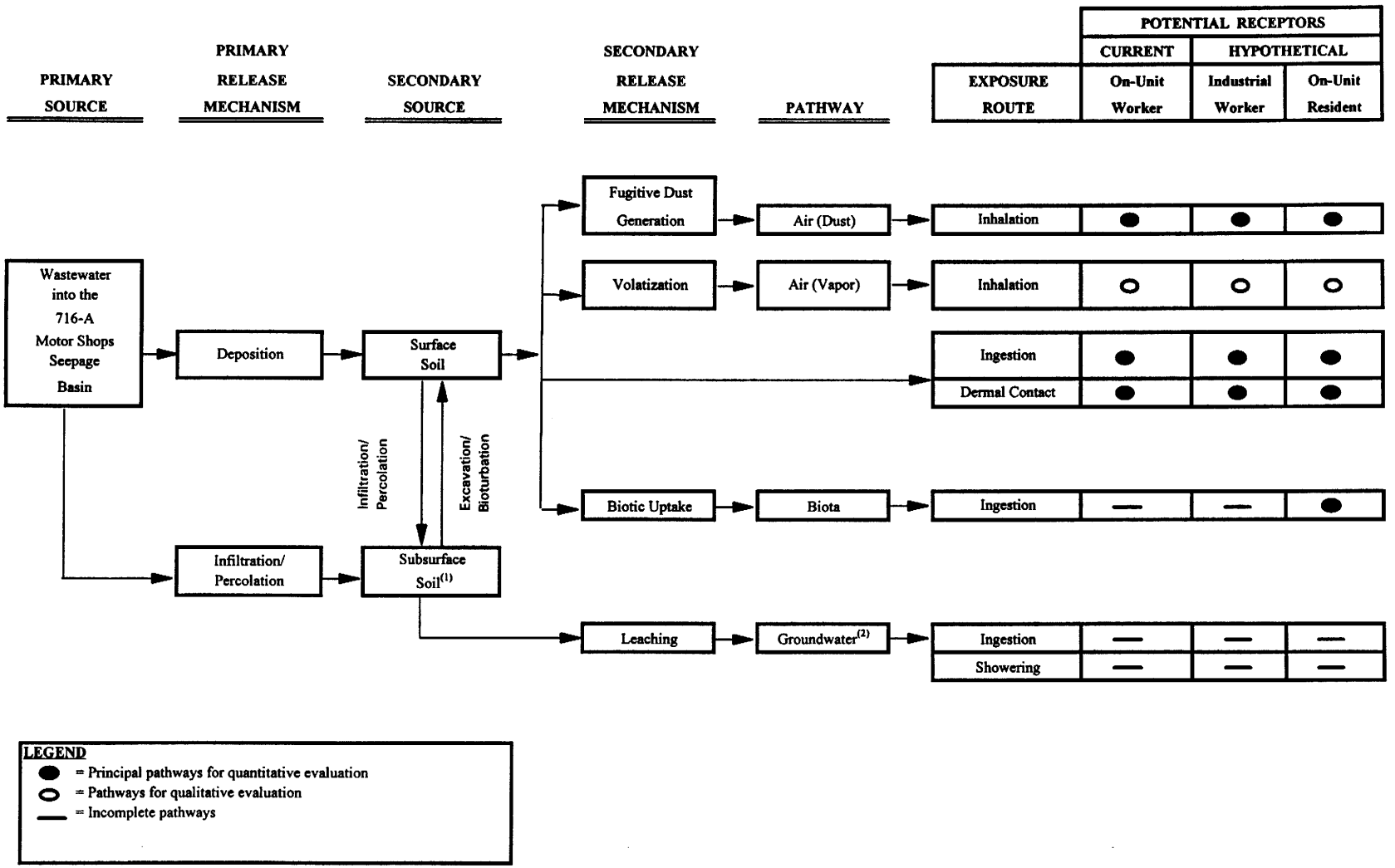
6.2.6.9 Uncertainty in Adherence Factors

In accordance with EPA Region IV guidance (EPA 1995b), the soil to skin adherence factors have been modified from 0.2 mg/cm^2 to 1.0 mg/cm^2. It also states that the value of 1.0 mg/cm^2 should be considered for the evaluation of RME intake assumptions. Since the soil intervals evaluated have been characterized as medium to coarse sands, the risk estimates are compared using an adherence factor of 0.2 mg/cm^2. The risk estimate for dermal contact using an adherence factor of 0.2 mg/cm^2 is five times lower than the risk using a factor of 1.0 mg/cm^2 for both the industrial worker and the adult/child receptors. The results of the risk estimates for both the future adult/child and the industrial worker are shown below and are provided in Appendix C.8. Since the exposure point concentration is the same for both the surface and the subsurface soils and all other default parameters are the same, only the surface soil interval results are provided.

Risk Characterization Summary
Surface Soils (Depth 0-0.3 m [0 to 1 ft])
716-A Motor Shops Seepage Basin

Medium	Exposure Route	Future Industrial Worker 1.0 (mg/cm^2)	Future Industrial Worker 0.2 (mg/cm^2)	Future Adult/Child 1.0 (mg/cm^2)	Future Adult/Child 0.2 (mg/cm^2)
Soil	Ingestion	5E-07	5E-07	3E-06	3E-07
	Dermal Contact	2E-06	3E-07	5E-06	9E-07
	Inhalation	2E-11	2E-11	3E-11	3E-11
Produce	Ingestion	NA	NA	2E-06	4E-07
Combined Cancer Risk:		**3E-06**	**8E-07**	**1E-05**	**2E-06**

Figure 6.2-1. Human Health Conceptual Site Model for the 716-A Motor Shops Seepage Basin



(1) Surface soil pathways also apply to the excavation of subsurface soil for hypothetical receptors. Subsurface soils are not evaluated for the current on-unit worker.

(2) Characterization of groundwater was not required based on Phase I results. Contaminant migration to groundwater is evaluated in Section 5.

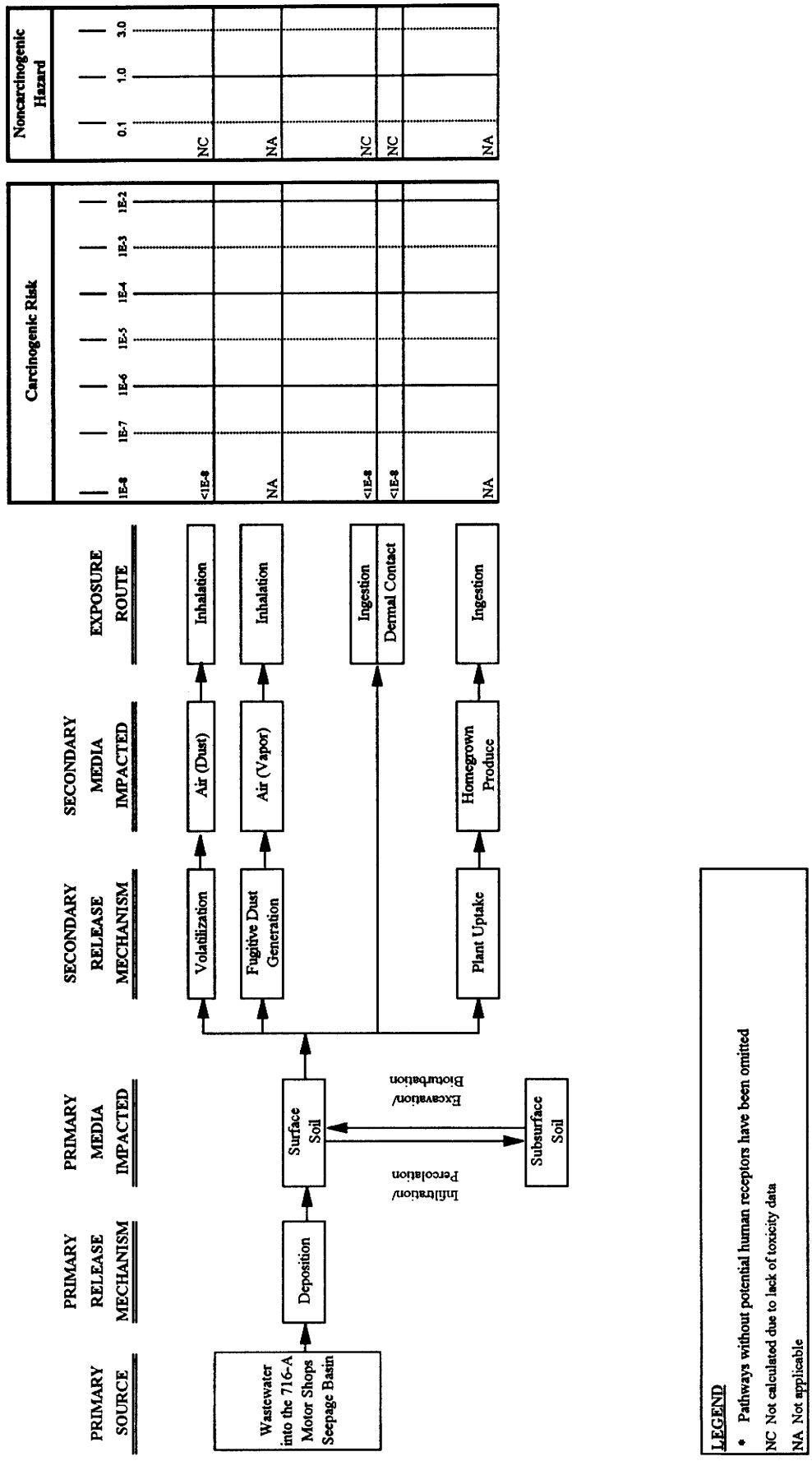


Figure 6.2-2. Summary of Risks and Hazards for the 716-A Motor Shops Seepage Basin Surface Soil (0-0.3 m) Pathway for the Known On-Unit Worker*

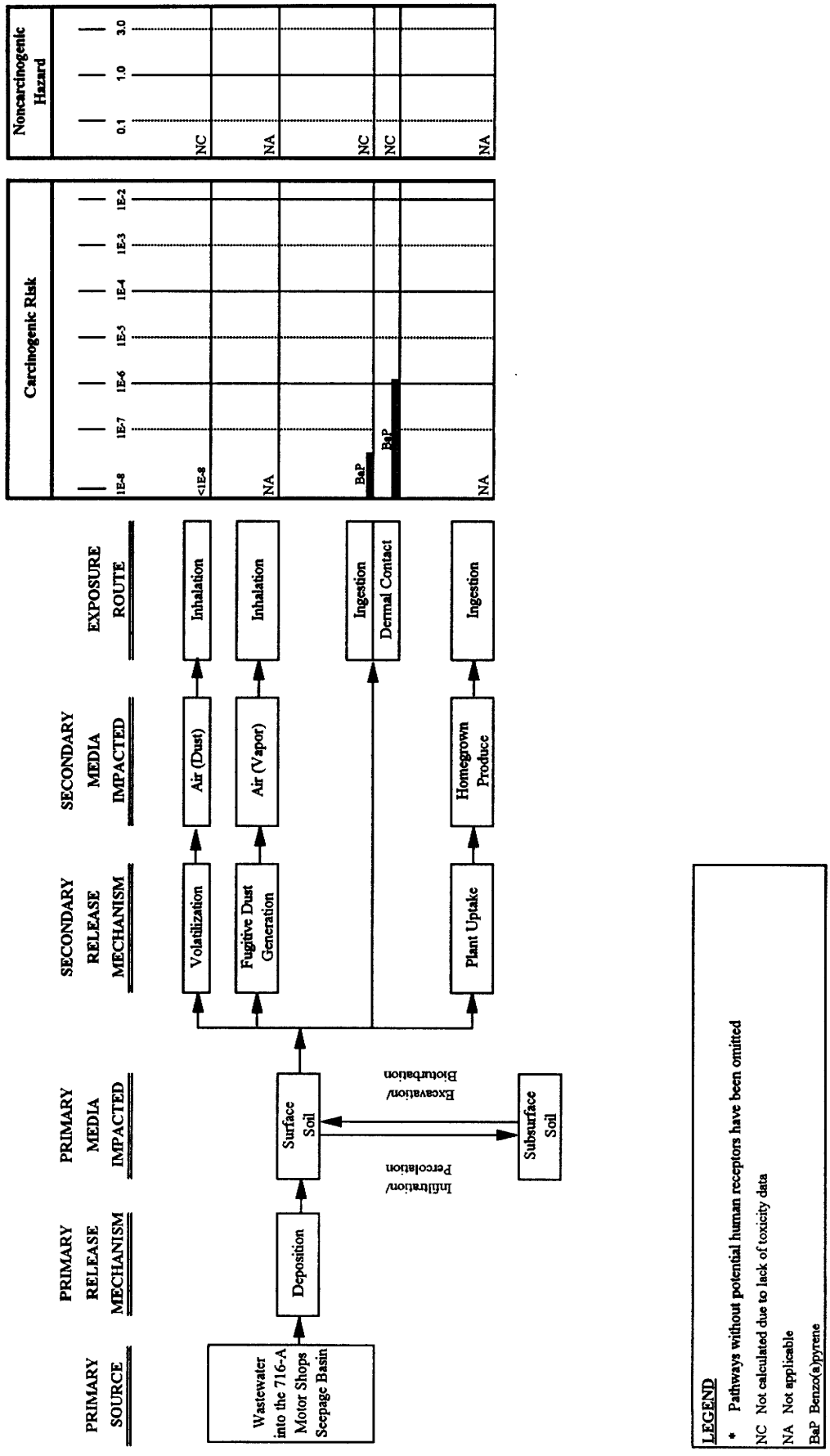


Figure 6.2-3. Summary of Risks and Hazards for the 716-A Motor Shops Seepage Basin Surface Soil (0-0.3 m) Pathway for the Hypothetical Industrial Worker*

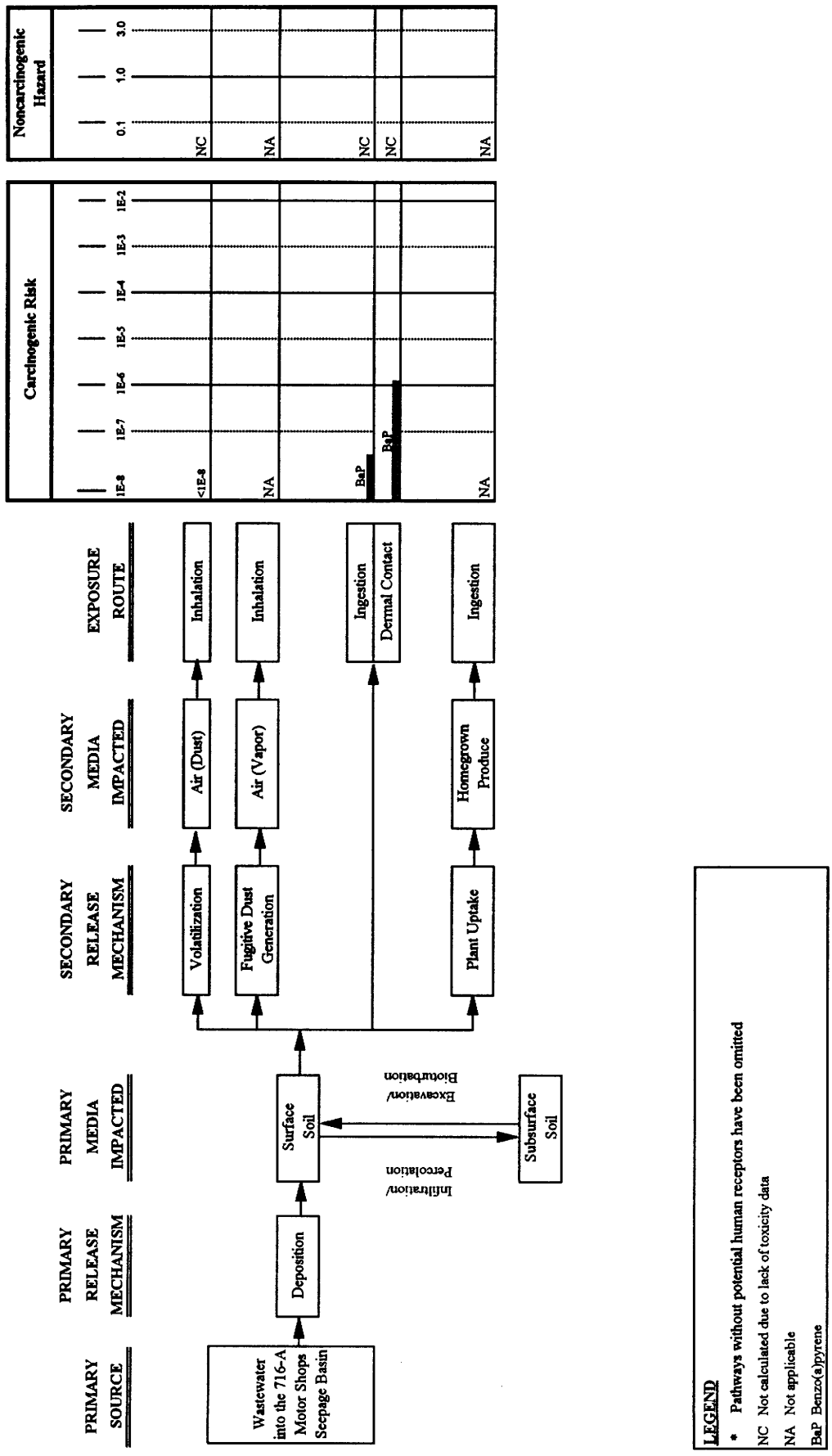
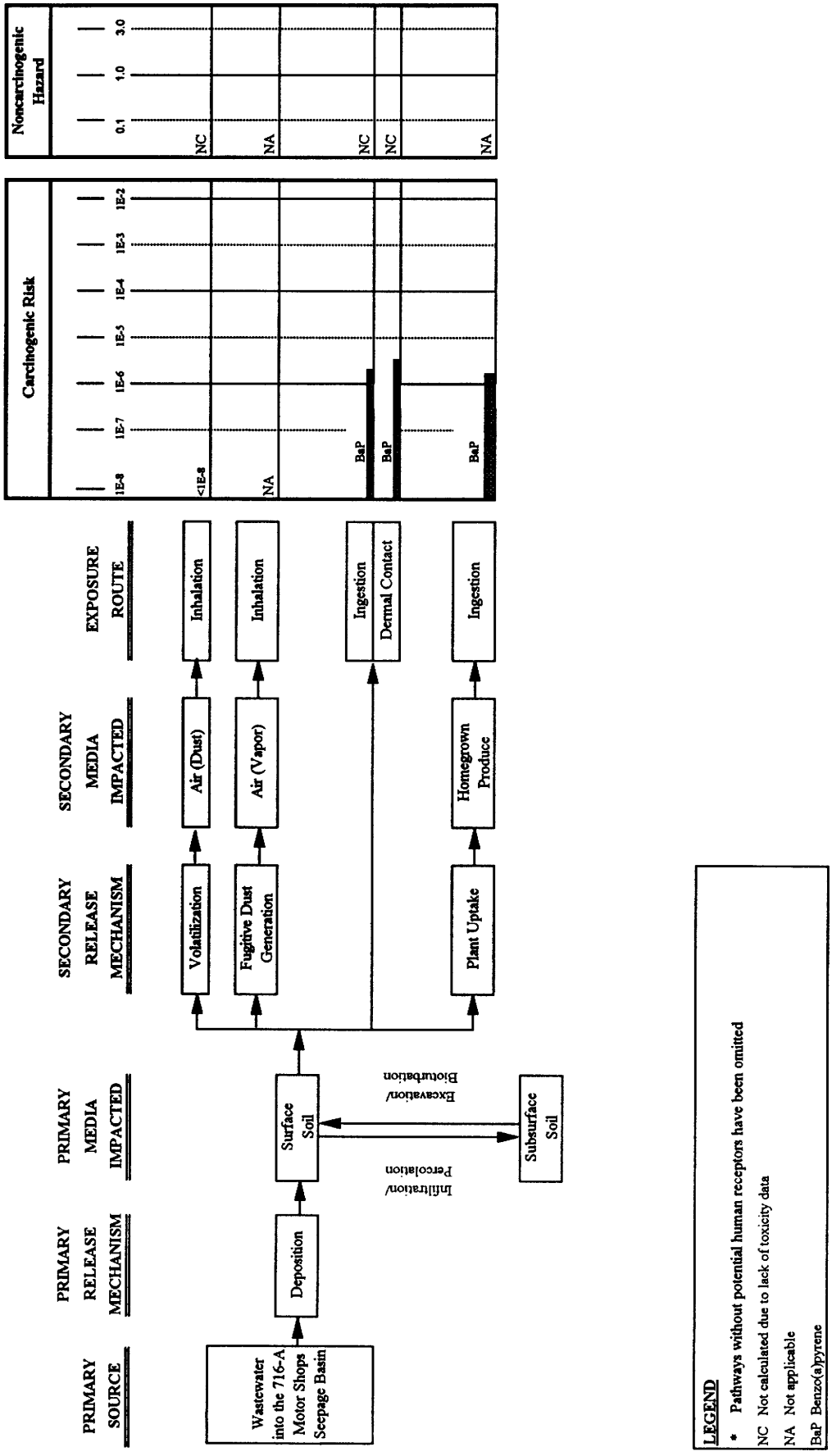


Figure 6.2-4. Summary of Risks and Hazards for the 716-A Motor Shops Seepage Basin Subsurface Soil (0-1.2 m) Pathway for the Hypothetical Industrial Worker*

Figure 6.2-5. Summary of Risks and Hazards for the 716-A Motor Shops Seepage Basin Surface Soil (0-0.3 m) Pathway for the Hypothetical Adult/Child Resident*



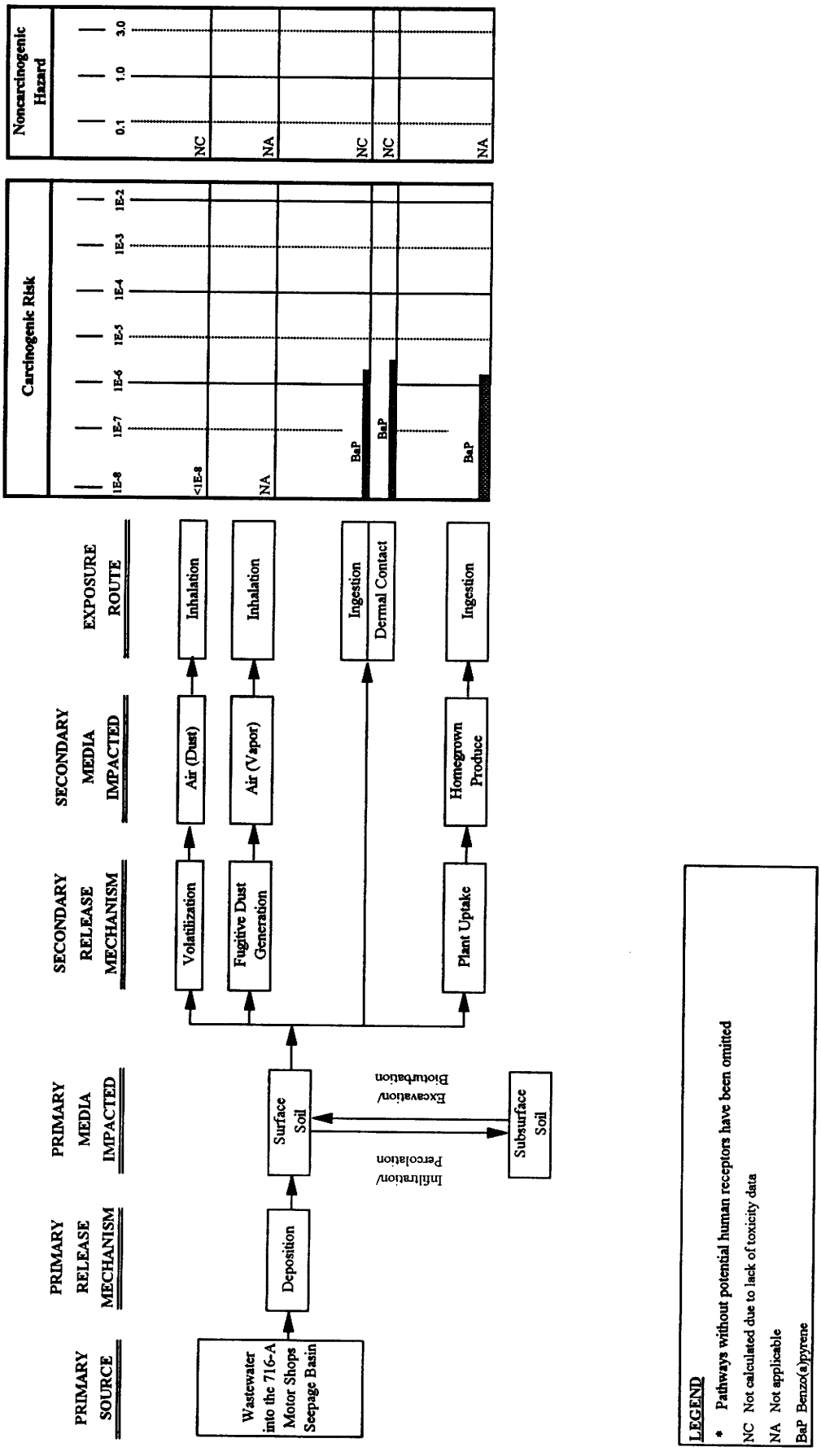


Figure 6.2-6. Summary of Risks and Hazards for the 716-A Motor Shops Seepage Basin Subsurface Soil (0-1.2 m) Pathway for the Hypothetical Adult/Child Resident*

SECTION 6.2

TABLES

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Table 6.2-1.
RME Risk Characterization Summary
Surface Soil (Depth 0-0.3 m [0 to 1 ft])
716-A Motor Shops Seepage Basin

Medium	Exposure Route	Current		Future			
		Noncancer HI	Cancer Risk	Noncancer HI		Cancer Risk	
		On-Unit Worker	On-Unit Worker	Resident	Industrial Worker	Resident	Industrial Worker
Soil	Ingestion	0E+00	3E-09	0E+00	0E+00	3E-06 B	5E-07
	Dermal Contact	0E+00	8E-09	0E+00	0E+00	5E-06	2E-06 B
	Inhalation	0E+00	1E-14	0E+00	0E+00	3E-11	2E-11
Produce	Ingestion	NA	NA	0E+00	NA	2E-06 B	NA
Combined Hazard Index:		0E+00		0E+00	0E+00		
Combined Cancer Risk:			1E-08			1E-05 B	3E-06 B

NA - pathway not evaluated
0E+00 - pathway evaluated but no risks could be calculated due to lack of EPA-approved toxicity values
B - HI = 1 or ELCR = 1E-04 for chemical risks
E - HI > 1 or ELCR > 1E-04 for chemical risks

Table 6.2-2.
RME Risk Characterization Summary
Subsurface Soil (Depth 0-1.2 m [0 to 4 ft])
716-A Motor Shops Seepage Basin

Medium	Exposure Route	Current		Future			
		Noncancer HI	Cancer Risk	Noncancer HI		Cancer Risk	
		On-Unit Worker	On-Unit Worker	Resident	Industrial Worker	Resident	Industrial Worker
Soil	Ingestion	NA	NA	0E+00	0E+00	3E-06 B	5E-07
	Dermal Contact	NA	NA	0E+00	0E+00	5E-06	2E-06 B
	Inhalation	NA	NA	0E+00	0E+00	3E-11	2E-11
Produce	Ingestion	NA	NA	0E+00	NA	2E-06 B	NA
Combined Hazard Index:		0E+00 B		0E+00	0E+00		
Combined Cancer Risk:			0E+00			1E-05 B	3E-06 B

NA - pathway not evaluated
0E+00 - pathway evaluated but no risks could be calculated due to lack of EPA-approved toxicity values
B - HI = 1 or ELCR = 1E-04 for chemical risks
E - HI > 1 or ELCR > 1E-04 for chemical risks

Table 6.2-3.
Health-Based COCs for Soil and Produce
716-A Motor Shops Seepage Basin

Exposure Pathway	0-0.3 m (0- ft) Soil Interval	0-1.2 m (0-4 ft) Soil Interval
Soil Ingestion		
Current On-Unit Worker	--	--
Hypothetical Industrial Worker		
Hypothetical On-Unit Resident	Benzo(a)pyrene (COCc; 3E-06)	Benzo(a)pyrene (COCc; 3E-06)
Soil Dermal Contact		
Current On-Unit Worker	--	--
Hypothetical Industrial Worker	Benzo(a)pyrene (COCc; 2E-06)	Benzo(a)pyrene (COCc; 2E-06)
Hypothetical Resident	Benzo(a)pyrene (COCc; 5E-06)	Benzo(a)pyrene (COCc; 5E-06)
Produce Ingestion by Hypothetical Resident	Benzo(a)pyrene (COCc; 2E-06)	Benzo(a)pyrene (COCc; 2E-06)

No Constituents of Concern are identified based on exceedances of ARARs.
COCn - Constituent of Concern based on noncancer effects
Constituent individually or in combination results in HI > 1
COCc - Constituent of Concern based on cancer effects
Constituent individually or in combination results in HI > 1, or ELCR > 1 x 10^{-6}
RDn - Risk Driver based on noncancer effects
Constituent (if not already a COC) individually results in HI > 0.1
The constituent-specific hazard quotient is presented immediately following the designation of a COCn or RDn.
The constituent-specific cancer risk is presented immediately following the designation of a COCc or RDc.

Table 6.2-4.
RME Risk Calculations for Screened Unit Constituents > RBC Values
Surface Soil (Depth 0-0.3 m [0 to 1 ft])
716-A Motor Shops Seepage Basin

Medium	Exposure Route	Current		Future					
		Noncancer HI	Cancer Risk	Noncancer HI			Cancer Risk		
		On-Unit Worker	On-Unit Worker	Resident		Industrial Worker	Resident		Industrial Worker	
Soil	Ingestion	NA	NA	2E-01	B	8E-03	3E-06	B	6E-07	
	Dermal Contact	NA	NA	7E-03		2E-03	3E-06	B	1E-06	B
	Inhalation	NA	NA	0E+00		0E+00	2E-09		4E-09	
Produce	Ingestion	NA	NA	3E-02		NA	3E-06	B	NA	
Combined Hazard Index:		NA		2E-01	B	1E-02				
Combined Cancer Risk:			NA				9E-06	B	2E-06	B

NA - pathway not evaluated
0E+00 - pathway evaluated but no risks could be calculated due to lack of EPA-approved toxicity values
B - HI = 1 or ELCR = 1E-04 for chemical risks
E - HI > 1 or ELCR > 1E-04 for chemical risks

Table 6.2-5.
RME Risk Calculations for Screened Unit Constituents > RBC Values
Subsurface Soil (Depth 0-1.2 m [0 to 4 ft])
716-A Motor Shops Seepage Basin

Medium	Exposure Route	Current		Future					
		Noncancer HI	Cancer Risk	Noncancer HI			Cancer Risk		
		On-Unit Worker	On-Unit Worker	Resident		Industrial Worker	Resident		Industrial Worker
Soil	Ingestion	NA	NA	3E-01	B	1E-02	3E-06	B	7E-07
	Dermal Contact	NA	NA	3E-02		7E-03	5E-06	B	2E-06 B
	Inhalation	NA	NA	0E+00		0E+00	2E-09		4E-09
Produce	Ingestion	NA	NA	3E-02		NA	3E-06	B	NA
Combined Hazard Index:		NA		4E-01	B	2E-02			
Combined Cancer Risk:			NA				1E-05	B	3E-06 B

NA - pathway not evaluated
0E+00 - pathway evaluated but no risks could be calculated due to lack of EPA-approved toxicity values
B - HI = 1 or ELCR = 1E-04 for chemical risks
E - HI > 1 or ELCR > 1E-04 for chemical risks

Table 6.2-6.
RME Risk Calculations for Background Values
Surface Soil (Depth 0-0.3 m [0 to 1 ft])
716-A Motor Shops Seepage Basin

Medium	Exposure Route	Current		Future					
		Noncancer HI	Cancer Risk	Noncancer HI			Cancer Risk		
		On-Unit Worker	On-Unit Worker	Resident		Industrial Worker	Resident		Industrial Worker
Soil	Ingestion	NA	NA	1E+00	E	4E-02	7E-06	B	2E-06 B
	Dermal Contact	NA	NA	4E-02		1E-02	4E-06	B	1E-06 B
	Inhalation	NA	NA	0E+00		0E+00	6E-09		1E-08
Produce	Ingestion	NA	NA	7E-02		NA	8E-06	B	NA
Combined Hazard Index:		NA		1E+00	B	5E-02			
Combined Cancer Risk:			NA				2E-05	B	3E-06 B

NA - pathway not evaluated
0E+00 - pathway evaluated but no risks could be calculated due to lack of EPA-approved toxicity values
B - HI = 1 or ELCR = 1E-04 for chemical risks
E - HI > 1 or ELCR > 1E-04 for chemical risks

Table 6.2-7.
RME Risk Calculations for Background Values
Subsurface Soil (Depth 0-1.2 m [0 to 4 ft])
716-A Motor Shops Seepage Basin

Medium	Exposure Route	Current		Future					
		Noncancer HI	Cancer Risk	Noncancer HI			Cancer Risk		
		On-Unit Worker	On-Unit Worker	Resident		Industrial Worker	Resident		Industrial Worker
Soil	Ingestion	NA	NA	1E+00	E	6E-02	1E-05	B	2E-06 B
	Dermal Contact	NA	NA	1E-01		3E-02	6E-06	B	2E-06 B
	Inhalation	NA	NA	0E+00		0E+00	7E-09		1E-08
Produce	Ingestion	NA	NA	1E-01	B	NA	1E-05	B	NA
Combined Hazard Index:		NA		1E+00	B	9E-02			
Combined Cancer Risk:			NA				3E-05	B	4E-06 B

NA - pathway not evaluated
0E+00 - pathway evaluated but no risks could be calculated due to lack of EPA-approved toxicity values
B - HI = 1 or ELCR = 1E-04 for chemical risks
E - HI > 1 or ELCR > 1E-04 for chemical risks

Table 6.2-8.
Comparison of Screened Constituents and Background for Soil and Produce
716-A Motor Shops Seepage Basin

Exposure Pathway	Unit Risk/Hazard (Screened Constituents)	Background Risk/Hazard
	0-0.3 m (0-1 ft) Soil Interval	**0-0.3 m (0-1 ft) Soil Interval**
Soil Ingestion		
Hypothetical Industrial Worker	As (4E-07)	As (1.3E-06)
Hypothetical On-Unit Resident	As (2E-06); Be (2E-06)	As (6E-06); Be (2E-06)
Soil Dermal Contact		
Hypothetical Industrial Worker	As (1E-07); Be(1E-07)	As (4E-07); Be(1E-07)
Hypothetical Resident	As (4E-07)	As (1E-06)
Produce Ingestion by Hypothetical Resident	As (3E-06)	As (8E-06)
	0-1.2 m (0-4 ft) Soil Interval	**0-1.2 m (0-4 ft) Soil Interval**
Soil Ingestion		
Hypothetical Industrial Worker	As (4E-07); Be (5E-07)	As (1.5E-06); Be (6E-07)
Hypothetical On-Unit Resident	As (2E-06); Be (2E-06); Fe (HQ<0.1)	As(7E-06); Be (3E-06); Fe (HQ<0.1)
Soil Dermal Contact		
Hypothetical Industrial Worker	As (1E-07); Be (2E-07)	As (5E-07); Be (2E-07)
Hypothetical Resident	As (4E-07), Be (4E-07)	As (1E-06); Be (5E-07)
Produce Ingestion by Future Resident	As (3E-06)	As (9E-06)

As = Arsenic; Be = Beryllium; Fe = Iron
No Constituents of Concern are identified based on exceedances of ARARs.
COCn - Constituent of Concern based on noncancer effects.
Constituent individually or in combination results in HI > 1.
COCc - Constituent of Concern based on cancer effects.
Constituent individually or in combination results in HI > 1, or ELCR > 1 x 10^{-6}.
RDn - Risk Driver based on noncancer effects.
Constituent (if not already a COC) individually results in HI > 0.1.
The constituent-specific hazard quotient is presented immediately following the designation of a COCn or RDn.
The constituent-specific cancer risk is presented immediately following the designation of a COCc or RDc.

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6.3 Ecological Risk Assessment

The purpose of the ecological risk assessment (ERA) component of the baseline risk assessment (BRA) is to evaluate the likelihood that adverse ecological effects may occur or are occurring as a result of exposure to unit-related constituents based on a weight-of-evidence approach. An ecological risk does not exist unless a given constituent has the ability to cause one or more adverse effects and it either co-occurs with, or is contacted by, an ecological receptor for a sufficient length of time, or at a sufficient intensity to elicit the identified adverse effect(s) (EPA 1994).

The methodology used in this assessment is developed in accordance with the *Savannah River Site Federal Facility Agreement Implementation Plan* (WSRC 1996d), which is based on and complies with the intent of the *Risk Assessment Guidance for Superfund (RAGS), Volume II, Environmental Evaluation Manual* (EPA 1989c); *Framework for Ecological Risk Assessment* (EPA 1992a); the draft *Ecological Risk Assessment Guidance for Super-find: Process for Designing and Conducting Ecological Risk Assessments* (EPA 1994); the draft *Supplemental Guidance to RAGS: Region 4 Bulletins, Ecological Risk Assessment* (EPA 1995c); and the *Proposed Guidelines for Ecological Risk Assessment* (EPA 1996d). These documents do not provide a detailed step-by-step approach to ERAs. Instead, they discuss an overall approach to considering ecological effects and identify sources of information for ERAs. Thus, professional knowledge and experience are important in ERAs to compensate for limited specific guidance and established methods.

According to the *Ecological Risk Assessment Guidance for Superfund* (EPA 1994) and the United States Environmental Protection Agency (EPA) Region IV *Supplemental Guidance to RAGS* (EPA 1995c), the ERA process begins with a preliminary evaluation to identify those unit-related constituents that are of concern regarding their potential to pose ecological risk. The methodology used in this ERA describes this preliminary phase as the identification of ecological constituents of potential concern (COPCs) (Section 6.1). In accordance with the above referenced documents, the methodology followed in the subsequent phase of the ERA, the evaluation of ecological risk from the identified COPCs, consists of four interrelated steps: problem formulation (Section 6.3.1), exposure assessment (Section 6.3.2), effects assessment (Section 6.3.3), and risk characterization (Section 6.3.4). Although the first three steps are discussed in the above

order, they are performed simultaneously and in an iterative manner. For example, the species present, their potential for exposure, and their susceptibility to effects are among the many factors considered in problem formulation when selecting endpoints and receptors.

The ERA includes a decision regarding the need to conduct additional field studies to complete the assessment. This decision is based on the quality of information about the unit already available from previous studies, including the COPCs identified; the ecological, physical, and other characteristics of the unit; the ability to estimate exposures of assessment endpoints; and the ability to predict possible effects on assessment endpoints that may result from such exposures. This decision is discussed in Section 6.3.4.1.3.

6.3.1 Problem Formulation

Problem formulation establishes the goals, breadth, and focus of the ERA through the following:

- Identification of the ecological COPCs
- Characterization of ecological communities
- Selection of assessment endpoints
- Presentation of an ecological conceptual site model (CSM)
- Selection of an analysis plan (including measures of effects)

6.3.1.1 Identification of Ecological Constituents *of* Potential Concern

Table 6.3-l identifies the ecological COPCs for each exposure group following qualification and evaluation of analytical data and comparison to ecologically risk-based screening values and unit-specific background concentrations (as described in Section 6.1.2). Tables 6.1-3 and 6.1-4 present the selection and identification of COPCs, along with the analytes' maximum detected concentrations, risk-based screening values, and whether the analyte is a COPC (including its basis for exclusion).

Tables 6.1-3 and 6.1-4 present the toxicity data and derivation of toxicity screening benchmarks used to screen constituents detected in soil. Soil screening is done by

calculating a screening intake dose, as described in Section 6.1.2.3. As shown in Tables 6.1-3 and 6.1-4, the intake dose is compared to the toxicity screening benchmark.

Concentrations of constituents in unit samples are compared to background (upgradient) concentrations for the soil media of concern (as shown in Tables 6.1-3 and 6.1-4).

The ecological COPCs identified through this screening process serve as the constituents for quantitative ecological risk assessment for soil. Appendix C.l contains detailed summary statistics for all the constituents evaluated. Tables 6.1-5 and 6.3-1 present the ecological COPCs remaining from the selection process. The only constituents remaining upon completion of the COPC screening process are antimony in the subsurface soil exposure group and cadmium in both surface and subsurface soil exposure groups.

6.3.1.2 Characterization of Ecological Communities

The following paragraphs discuss the methods for ecological characterization of the exposure groups, including field reconnaissance and habitat mapping. The ecosystem potentially at risk is the basin, which comprises approximately 0.07 hectare (0.17 acres) (Figure 6.3-l). The 716-A Motor Shops Seepage Basin (MSSB) measures approximately 63.1 m (207 ft) long, 10.7 m (35.1 ft) wide, and 2.0 m (6.6 ft) deep. The seepage basin is surrounded by a berm 2.0 m (6.6 ft) high on three sides. The fourth side (the northwest side) is also 2.0 m (6.6 ft) high and faces a railroad track. At present, the basin collects rainwater during periods of heavy precipitation. The presence of the high berms precludes any historical discharge of surface water overflow into the surrounding area.

Soils in and adjacent to the MSSB are identified as Blanton Sand, Udorthent-Urban Land Complex, and Udorthent soils of the Hawthorne&unwell Formations (USDA 1990). The presence of Udorthent-related soils indicates that the natural soil profile has been disturbed or removed by construction activities. The Blanton soils in undisturbed areas near the unit are somewhat excessively drained, moderately permeable, very low in water capacity, and low in organic matter (USDA 1990). Additional details of the physical characteristics of the study area, including topography, climate, soils, hydrology, and geology, are provided in Section 3.

The MSSB is an unlined, bermed seepage basin. Two inlet pipes (extending from the 716-A Motor Shops facility) are located on the northwest side of the basin. The basin has

not been closed or capped, but all discharges to the basin were terminated in 1983 and the influent lines from the Motor Shops were capped (Huber et al. 1987). The basin is typically dry, collecting rainwater only during periods of heavy precipitation. The only significant surface water features in the general vicinity of the unit are the National Pollutant Discharge Elimination System (NPDES) outfalls (A-O 11 and A-O 14) that discharge into an unnamed tributary of Tims Branch. The outfall sourcing from A-01 1 is located northeast of the MSSB. The outfall sourcing from A-014 is located south of the MSSB and discharges to the A-01 1 outfall southeast of the MSSB. The A-01 1 outfall is located approximately 150 m (500 ft) north-northeast of the MSSB; the A-014 outfall is located approximately 150 m (500 ft) southwest of the MSSB (Figure 6.3-l). However, the presence of the high berms precludes any historical discharge of surface water overflow into the surrounding area. Groundwater associated with the MSSB does not discharge into these outfall streams.

6.3.1.2.1 Vegetation

Based on field observations and literature review, major vegetative community types are identified within the study area. As noted in a previous study that describes the major plant communities of the Savannah River Site (SRS) (Workman and McLeod 1990), vegetative community type patterns depend on topography, soil type, moisture, and degree of disturbance. The land surrounding the MSSB offers habitats supportive of a limited diversity of flora and fauna. The MSSB is located at the periphery of an active, industrialized area. The surrounding areas are characterized by old field and early successional forest communities. A field survey of areas within and adjacent to the basin was conducted in January 1997 to characterize existing habitats and identify species inhabiting the area. Dominant plant species were identified in each major vegetative stratum (herbaceous, shrub, and overstory). Observations of animal species and evidence of their presence (e.g., tracks, feces, etc.) at or near the unit also were noted. Scientific and common names of plant species used in this characterization are those described by Radford et al. (1968). Three plant community types were identified in the vicinity of the unit and are mapped on Figure 6.3-l.

Community Type No. 1: Old Field Community. This community type encompasses the basin and surrounding area. It includes areas of transportation and utility rights-of-way that are periodically mowed, providing habitats that range from grass to more weedy cover. Dominant herbaceous species in this old field community include numerous

unidentifiable grass species, goldenrod (*Solidago* sp.), sericea lespedeza (*Lespedeza cuneata),* rabbit tobacco *(Gnaphalium obtusifolium),* Japanese honeysuckle *(Lonicera japonica),* and blackberry (*Rubus* sp). Upland woody species such as pines (*Pinus* spp.) and oaks (*Quercus* spp.) present in the basin suggest that the basin has not held runoff for long periods in the recent past. Typically such species are not tolerant of long-term inundation.

Community Type No. 2: Industrialized Area. This area is located adjacent to the MSSB and is comprised of the Motor Shops area that includes buildings, railroad tracks, and limited areas of maintained grass.

Community Type No. 3: Mixed Pine/Hardwood Forest Community. This community type is dominated by pines with some hardwoods in the understory. Vegetation includes pines, various shrubs, woody vines such as poison ivy (*Rhus radicans*), briars (*Smilax* spp.), grape (*Vitis* spp.), blackberry, ferns, and grasses. Ground cover is sparse over portions of the area, consisting mainly of pine needles.

6.3.1.2.2 Wildlife

Observations of animal species inhabiting the unit and surrounding study area were made during two ecological surveys conducted during work plan development and in January 1997. The study area has been subject to physical disturbance, which has impacted the character of the habitats available to wildlife in the vicinity of the MSSB. The principal disturbed areas, including the basin, its berms, and the surrounding old field community, provide habitat for small mammals and, to a limited extent, their mammalian, avian, and reptilian predators. These areas also provide habitat for birds that feed on insects and seeds at ground level, and insectivorous birds that feed on the wing. The mixed pine/hardwood forest community provides habitat for species that feed and/or nest in pine/hardwood canopies, such as songbirds and squirrels. The closed canopy in this community has resulted in limited understory growth of vegetation, which restricts habitat for rodents, songbirds, and white-tailed deer (*Odocoileus virginianus).*

Mammals. Based on observations made during the field reconnaissance of the unit, it is likely that high densities of small rodents are present in the immediate area of the MSSB. Mammals that are likely to inhabit the area include white-tailed deer, raccoon *(Procyon lotor),* opossum *(Didelphis marsupialis),* feral cat (*Felis domestica),* squirrel *(Sciurus*

carolinensis), red fox (*Vulpes vulpes*), oldfield mouse (*Peromyscus polionotus),* eastern harvest mouse *(Reithrodontomys humulis*), hispid cotton rat *(Sigmodon hispidus),* cottontail rabbit (*Sylvilagus floridanus*), and southeastern shrew (*Sorex longirostris*).

Avifauna. Bird species potentially present in the basin vicinity include the common bobwhite quail (*Colinus virginianus),* mockingbird (*Mimus polyglottos*), eastern meadowlark (*Sturnella magna),* Carolina wren (*Thryothorus ludovicianus*), field sparrow (*Spizella pusilla*), and American crow (Corvus *brachyrhynchos).* Other bird species that are native to the region and that may potentially utilize the habitats of the study area include American robin (*Turdus migratorius*), eastern bluebird (*Sialia sialis), American* goldfinch (*Carduelis tristis*), and mourning dove *(Zenaida macroura). These* species are non-migratory, principally inhabit open fields and woodland edges, and are likely to be permanent residents in the region. Migratory birds may utilize the area only temporarily or seasonally. These may include species such as indigo bunting *(Passerina cyanea),* eastern kingbird (*Tyrannus tyrannus*), and purple martin *(Progne subis*) in summer, or northerly breeding species such as song sparrow (*Melospiza melodia*) and white-throated sparrow (*Zonotrichia albicollis*) in winter.

Herpetofauna. Reptiles that typically inhabit open fields are likely to occur in the study area, including snakes such as the southern black racer (*Coluber constrictor priapus*) and lizards such as the six-lined racerunner *(Cnemidophorus sexlineatus*). Toads are terrestrial and may occur anywhere in the area. The likelihood of aquatic species or semi-aquatic species (amphibians) being present in the basin is minimal given the infrequent occurrence and very short duration of standing water in the basin. No aquatic vegetation or amphibians were observed in the MSSB during the field reconnaissance.

Aquatic Life. Due to the infrequent nature of standing water in the basin, aquatic life is absent from the MSSB.

6.3.1.2.3 Threatened and Endangered Species

A threatened and endangered species (TES) and sensitive species survey was conducted at the unit by the Savannah River Forest Station (SRFS) of the United States Forest Service in February 1997 (Imm 1997). SRFS files were examined to determine past or present occurrences of any TES at or in the vicinity of the unit. Records reviewed include aerial photographs, vegetative stand data, soils information, and existing TES

records. This review was followed by a field survey for any plant or animal TES determined to potentially occur at the unit, based on recorded observations or the presence of required habitat elements.

The survey (Imm 1997) found that the existing vegetation at the MSSB includes species that are considered to be early to mid-successional invasive species. The dense ground coverage of vegetation, rapid growth of woody species, and the likelihood of high small rodent densities creates unfavorable soil surface conditions for the establishment of new species. Most of the TES plant species associated with early successional conditions are intolerant of shade and the establishment of these species in the area is unlikely to occur if current conditions are maintained. If the vegetation cover were drastically altered, the smooth purple coneflower *(Echinacea laevigata),* striped garlic *(Allium cuthbertii),* sandhills milk-vetch *(Astragalus michauxii),* milk-vetch *(Astragalus villosus),* American nailwort *(Paronychia americana),* and wild-indigo *(Baptisia lanceolata)* could become established in areas of better drainage. In poorly drained areas, flaxleaf gerardia *(Agalinis linifolia),* southeastern tickseed *(Coreopsis helianthoides),* Elliott's croton *(Croton elliottii),* little bur-head *(Echinodorus tenellus),* spatulate seedbox *(Ludwigia spathulata),* and stalkless yellowcress *(Rorippa sessiliflora)* could potentially become established. However, it is important to note that none of these species are known to occur within the immediate or general vicinity of the A Area; thus, due to seed source limitations, the likelihood of establishment is minimal even with the creation of appropriate habitat conditions.

Habitat conditions, or the potential for habitat conditions, appropriate for the establishment of federally protected wildlife species such as the red-cockaded woodpecker *(Picoides borealis),* American alligator *(Alligator mississippiensis),* bald eagle *(Haliaeetus leucocephalus),* wood stork *(Mycteria americana),* or shortnose sturgeon *(Acipenser brevirostrum)* do not exist in the MSSB area. Sensitive species such as Bachman's sparrow *(Aimophila aestivalis),* Henslow's sparrow *(Ammodramus henslowii),* common ground dove *(Columbina passerina),* loggerhead shrike *(Lanius ludovicianus),* southern hognose snake *(Heterodon simus),* Florida pine snake *(Pituophis melanoleucus mugitus),* Carolina gopher frog *(Rana areolata capito),* or eastern woodrat *(Neotoma floridana floridana)* could potentially locate in this area if the habitat were altered.

6.3.1.3 Ecological Assessment Endpoint(s)

The ERA for the MSSB assesses whether ecological resources of the unit are being protected. The protection of ecological resources, such as habitats and species of plants and animals, is a principal motivation for conducting ERAs. Key aspects of ecological protection are presented as policy goals, which are general goals established by legislation or agency policy based on the need for protection of certain environmental resources. For example, environmental protection is mandated by a variety of legislation and government agency policies (e.g., the Comprehensive Environmental Response, Compensation and Liability Act [CERCLA], the National Environmental Policy Act [NEPA]). Other legislation includes the Endangered Species Act (16 U.S.C. 1531-1544, 1993, as amended) and the Migratory Bird Treaty Act (16 U.S.C. 703-711, 1993, as amended). Table 6.3-2 shows the policy goals established for the unit.

To determine whether these protection goals are met at the unit, ecological endpoints are selected. An ecological endpoint is a characteristic of an ecological component that may be affected by exposure to a stressor (e.g., a constituent). Assessment endpoints are "explicit expressions of the actual environmental value that is to be protected" (EPA 1992a). Assessment endpoints often reflect environmental values that are protected by law, that provide critical resources, or that provide an ecological function that would be significantly impaired if the resource were altered (EPA 1996d). Unlike the human health risk assessment process, which focuses on individual receptors, the ERA focuses on populations or groups of interbreeding nonhuman, nondomesticated receptors. Accordingly, assessment endpoints generally refer to characteristics of populations and ecosystems. In the ERA process, the risks to individuals are assessed only if they are protected under the Endangered Species Act, or if the species is a candidate for protection or is considered rare.

Given the diversity of the biological world and the multiple values placed on it by society, there is no universally applicable list of assessment endpoints. Therefore, the EPA (EPA 1996d) has suggested three criteria to be used in selecting assessment endpoints suitable for a specific ecological risk assessment. These criteria are:

- Ecological Relevance: Ecologically relevant endpoints reflect important characteristics of the ecological system and are functionally related to other endpoints. Ecologically relevant endpoints help sustain the natural structure, function, and

biodiversity of an ecosystem. For example, ecologically relevant endpoints may contribute to the food base, provide habitat, or reflect the structure of the community or ecosystem (EPA 1996d).

- Susceptibility to the Stressor: Ecological receptors are considered susceptible when they are sensitive to a human-induced stressor to which they are exposed (EPA 1996d). In determining exposure, important considerations include the fate and transport characteristics of the stressor, the proximity of an ecological resource to the stressor, the timing of exposure (both frequency and duration), and the intensity of exposure during sensitive life stages. If a species is unlikely to be exposed, it is inappropriate as an assessment endpoint. Sensitivity refers to how readily an ecological receptor is affected by a particular stressor (EPA 1996d). Assessment endpoints should be chosen that are likely to be exposed to COPCs, either directly or indirectly (e.g., through the food chain), and they should be sensitive enough that such exposure may elicit an adverse response. Ideally, this sensitivity should be at such a level that other unit-related receptors of potential concern are adequately protected at the response threshold of the selected endpoint.

- Representation of Policy/Management Goals: Policy/management goals relevant to an ERA often are legally established by governmental regulatory programs designed to protect species and organisms that the public deems valuable. Ideally, an assessment endpoint should represent these goals and should be valued by the public and decision makers, while also maintaining the scientific validity of the ERA (EPA 1996d). However, due to its subjective nature, this criterion is given lesser consideration than the other selection criteria.

In addition, if the response of the assessment endpoint cannot be directly measured, it may be predicted from responses of surrogate species or similar ecological entities (i.e., data relevant to the assessment endpoint should be available for use in predicting responses to unit-related constituents) (EPA 1996d). Also, the assessment endpoint should be clearly definable and its definition should consist of two elements: an ecological entity of concern (e.g., a wildlife population) and a characteristic of the entity that is important to protect and potentially at risk (e.g., the fecundity of the population) (EPA 19964).

In addition to the criteria identified above, the EPA's draft *Ecological Risk Assessment Guidance for Superfund: Process for Designing and Conducting Ecological Risk Assessments* (EPA 1994) states that the selection of assessment endpoints depends on the following:

- Constituents present and their concentrations
- Mechanisms of toxicity to different groups of organisms
- Potential species present
- Potential complete exposure pathways

The constituents and their concentrations are discussed in detail in Section 4 and they are also presented in Table 6.3-l. Mechanisms of toxicity are evaluated conceptually in the analysis plan in Section 6.3.1.6 and in the Toxicological Profiles (Appendix D). They are also discussed below for the two COPCs (antimony and cadmium) remaining after the COPC selection process described in Section 6.3.1.1.

- Antimony and its compounds occur naturally in the earth's crust in association with minerals, particularly the sulfides. It is often combined with lead, copper, and silver (ATSDR 1990). It is insoluble in water. Antimony is released to the environment by natural sources such as windblown dust, forest fires, and biogenic sources (ATSDR 1990). In soils, antimony may bind to organic and inorganic matter, depending on the particular antimony compound. Antimony in minerals does not adsorb to soil (ATSDR 1990). Most studies have revealed that antimony is not mobile in soils and tends to concentrate in the upper layers (Tmovsky et al. 1988, Foster 1989, and Ainsworth 1988); however, several studies have presented conflicting data (Gerritse et al. 1982, Rai et al. 1984). Ainsworth (1988) found that antimony uptake by plants in contaminated soils is minimal and is probably restricted to the soluble or exchangeable species of antimony. Examination of small mammals living near a smelter indicated that, while these animals ingested large amounts of antimony deposited on the surfaces of plants, only small amounts were stored in their organs (Ainsworth 1988).

- Cadmium is a naturally occurring element that occurs in nature in association with other metals such as zinc and lead; it is usually not found in its pure form. Cadmium and cadmium compounds do not readily vaporize but may be suspended as particles in air. Terrestrial organisms bioaccumulate cadmium (Callahan et al. 1979). However, because cadmium accumulates in kidney and liver rather than muscle and because

intestinal absorption of cadmium is low, one would expect a low amount of biomagnification of cadmium in the food chain (ATSDR 1991 a).

Potential species present at the MSSB are discussed in Section 6.3.1.2 and receptor selection is presented in Section 6.3.1.4. Potential complete exposure pathways are part of the ecological CSM discussed in Section 6.3.1 .5.

As shown in Table 6.3-2, the assessment endpoint relevant to the achievement of the policy goals that apply at this unit is the maintenance of the terrestrial ecosystem, with no loss of species or community alteration due to antimony or cadmium toxicity. The testable hypothesis is that the reasonable maximum exposure (RME) concentrations of antimony and cadmium present in surface and subsurface soils are not toxic to terrestrial animals. To verify or recant the testable hypothesis, a receptor species is selected to represent the assessment endpoint, as described in Section 6.3.1.4. Selection of measurement endpoints, or measures of effects, is discussed in Section 6.3.1.6.

6.3.1.4 Receptor Selection

Potential receptor species likely to be exposed to unit-related constituents are judged by the criteria identified in Section 6.3.1.3 as part of the assessment endpoint selection process. Receptors are selected to represent assessment endpoints based principally on:

- The constituents present at the MSSB and their concentrations
- Mechanisms of constituent toxicity
- Potential species present
- Potential complete exposure pathways
- A receptor's importance in the community food web
- A receptor's susceptibility (through exposure and sensitivity) to the unit-related constituents
- The amount of available data describing a receptor's potential for exposure
- The toxicological effects that may result from exposure
- The extent to which receptors are protected by policy/management goals

At this unit, the invertebrate species present are not a principal component of the food web and are not **TES.** Therefore, invertebrates at this unit are not considered appropriate receptors on which to focus this evaluation. Instead, vertebrate receptors are more appropriate based on the above criteria. More specifically, the results of this analysis indicate that the most appropriate assessment endpoint species is the oldfield mouse.

The oldfield mouse is representative of herbivorous terrestrial wildlife species (primary consumers at the second trophic level of the food web) that may be significantly exposed to antimony and cadmium. This species has a high potential for exposure to antimony and cadmium in soil due to its small home range and its burrowing habits, which likely result in extensive contact with soil. The oldfield mouse consumes mainly vegetation, especially seeds and berries. It typically inhabits fields, particularly where soils are sandy and facilitate its burrowing (Whitaker 1980, Burt and Grossenheider 1976). Small rodents such as the oldfield mouse typically are prolific and comprise a major dietary component of predators. Accordingly, the oldfield mouse is an appropriate receptor to represent the assessment endpoint in evaluating ecological risk from surface and subsurface soils at the unit. The oldfield mouse is potentially exposed to antimony and cadmium in soil through incidental soil ingestion during burrowing, grooming, feeding, and through ingestion of vegetation that has taken up antimony and cadmium from contaminated soil.

6.3.1.5 Ecological Conceptual Site Model

The ecological CSM presents the ecological receptors at the unit that are potentially exposed to hazardous substances in soil across several pathways (Figure 6.3-2). A complete exposure pathway consists of the following four elements:

- A source and mechanism of constituent release to the environment
- An environmental transport mechanism for the released constituents
- A point of contact with the contaminated medium
- A route of constituent entry into the receptor at the exposure point

If any of these elements are missing, the pathway is incomplete and is not considered further in the ERA. A pathway is complete when all four elements are present to permit potential exposure of a receptor to a source of contamination. Quantification of some potentially complete pathways may not be warranted because of minimal contribution to

risk relative to other major pathways. Figure 6.3-2 presents the dominant pathways from constituent sources and exposure media through the food web to ecological receptors potentially exposed to ecological COPCs at the unit.

The original, primary source of contamination at the unit was the wastewater discharged to the MSSB from the 716-A Motor Shops facility. The primary release mechanism for contaminants in this wastewater was deposition within the basin. Given the height of the surrounding berms, wastewater would not have overflowed the basin. The primary media impacted were: (1) surface soil within the basin and (2) subsurface soil in the basin, impacted by leaching of contaminants from surface soil.

Receptors may be directly exposed to COPCs in soil via ingestion of soil and dermal contact. For the receptors and constituents of this unit, ingestion is the exposure route of greatest potential importance. Dermal contact is expected to be of minimal importance because COPCs are in a soil matrix and because oldfield mice are covered by fur, which minimizes soil contact with the skin.

COPCs in surface soils are potentially released to the surrounding environment via particulate (dust) generation, volatilization, and uptake by biota. Inhalation of dust is of minimal importance as a release mechanism for exposure of ecological receptors because the unit is vegetated with grasses and woody vegetation and there is little exposed soil. Inhalation of dust by burrowing receptors and volatilization is a potentially complete exposure pathway. However, inhalation and volatilization exposures are not quantitatively evaluated because they are expected to be of less importance than ingestion. Data for their quantification and toxicity evaluation are also generally unavailable. In addition, volatile emissions from soil are not evaluated further, since there are no volatile COPCs in the soil at the MSSB.

The unit is vegetated and the basin berms prevent contaminant transport by stormwater runoff to the surface water bodies (NPDES outfalls) in the vicinity, so contaminant transport by stormwater runoff is not a significant release mechanism at this unit. Groundwater beneath and downgradient from the unit is not a potential medium through which ecological receptors could be exposed to unit-related COPCs because there is no exposure point where groundwater discharges in the vicinity of the unit.

The exposure pathways discussed above for surface soil under current conditions also may exist for subsurface soil if, under future conditions, these soils are excavated and distributed on the surface. Therefore, the exposure pathways that are potentially complete for surface soils at the basin are also potentially complete under a future excavation scenario for subsurface soils at the basin.

The exposure routes that are likely to be of principal importance to ecological receptors and that warrant quantitative evaluation are: (1) ingestion of soil incidentally during feeding, grooming, and/or burrowing and (2) ingestion of soil contaminants that have entered the food chain.

6.3.1.6 Analysis Plan

The analysis plan is the final stage of problem formulation. In this step the risk hypotheses, presented in Section 6.3.1.4 and displayed in the CSM, are evaluated to determine how they will be assessed using unit-specific data. The analysis plan includes three categories of measures to evaluate the risk hypotheses identified in the CSM: measures of effect (also termed measurement endpoints), measures of exposure, and measures of ecosystem and receptor characteristics.

Since the identified assessment endpoint is the maintenance of the terrestrial ecosystem with no loss of species or community alteration due to antimony or cadmium toxicity, the possibility of directly measuring the condition of the terrestrial communities is evaluated. Collecting field data at the community level would likely be an insensitive measure of existing and potential future effects, as well as labor intensive. Measuring the small mammal community or body burdens of small mammals would also be unsuitable due to the physically disturbed nature of the unit. Since it is unlikely that antimony bioaccumulates or cadmium biomagnifies in the food chain, direct measurements of antimony and cadmium concentrations in soil media, to be modeled to concentrations in the oldfield mouse, is selected as the appropriate measurement endpoint. Measurement endpoints are discussed in greater detail below.

6.3.1.6.1 Measures of Effect

Measurement endpoints are measurable responses to a stressor that are related to the valued characteristics chosen as assessment endpoints (EPA 1992a). Assessment endpoints generally refer to characteristics of populations and ecosystems; however, it is

usually impractical to measure changes in these characteristics as part of an assessment. Consequently, measurement endpoints are selected that can be measured and extrapolated to predict effects on assessment endpoints (EPA 1992a). The most appropriate measurement endpoints relating to the assessment endpoint are chronic lowest observed adverse effects levels (LOAELs) derived for antimony and cadmium based on toxicity studies in species similar to the wildlife receptors in the area of the unit. These toxicity values are used to estimate potential effects of antimony and cadmium on wildlife populations that may be exposed at the unit and, thereby, to predict effects on the assessment endpoint: the species composition of the ecological community at the unit.

Reliable measures of effects are not available for each exposure route for each constituent. Effects from exposure through inhalation and dermal contact are not well developed for ecological receptors; consequently, these exposure routes are analyzed qualitatively.

The measures of ecosystem and receptor characteristics include such characteristics as the behavior and location of a receptor and the distribution of a constituent, both of which may affect a receptor's exposure to the constituent. The typical foraging area of the receptor, as well as the quality of the habitat in the unit, are considered in the estimation of exposure, as discussed in Sections 6.3.2.2 and 6.3.2.3.

6.3.1.6.2 Measures of Exposure

Measures of exposure are the amounts, in dosage or concentration, that the receptors are hypothesized to receive. These include concentrations of constituents in the impacted media (presented in Table 6.3-l and summarized in Section 6.3.2.1) and concentrations or dosages of the constituents to which the receptor is exposed (discussed in Section 6.3 2.3).

Decision rules are specified for evaluating effects on the assessment endpoints. Table 6.3-2 shows the decision rules that describe the logical basis for choosing among alternative actions for the assessment endpoints based on the results of the measurement endpoints. Together, the assessment endpoint, measurement endpoint, and decision rules define the following:

- An entity (e.g., the terrestrial community)
- A characteristic of the entity (e.g., health of the individuals in a population)

- An acceptable amount of change in the entity
- A decision whether the policy goal is met

The decision rules of the assessment are presented in terms of hazard quotients (HQs). The HQ is the ratio of the measured or predicted concentration of an ecological COPC to which the receptors are exposed in an environmental medium, and the measured concentration that adversely affects an organism based on a toxicity threshold. If the measured concentration or estimated dose is less than the concentration or dose expected to have the potential to produce an adverse effect (i.e., the ratio of the two is less than 1), the risk is considered acceptable (protective of the ecological receptor). Any HQ greater than or equal to 1 indicates that the ecological COPC warrants further evaluation to determine the actual likelihood of harm. Constituents of concern (COCs) are selected only after an additional weight-of-evidence evaluation of the conservatism of the exposure assumptions, toxicity values, and uncertainties is conducted.

6.3.1.6.3 Measures of Ecosystem and Receptor Characteristics

Section 6.1.2.3 discusses the measured concentrations of ecological COPCs. Section 6.3.3 discusses the toxicity values associated with these COPCs. Endpoints, stated in terms of specific ecological receptors or exposure classes (groups of species exposed by similar pathways), often require data on the processes that increase or decrease the exposure concentration below or above the measured or predicted environmental concentration. As a result, some HQs incorporate exposure factors (e.g., dietary soil fractions and bioaccumulation factors). Section 6.3.2 discusses exposure factors for the unit.

6.3.2 *Exposure Assessment*

The exposure assessment evaluates potential exposures of ecological receptors to unit-related constituents and consists of the following:

- Description of the spatial distribution of COPCs (Section 6.3.2. I)
- Description of the spatial and temporal distribution of ecological receptors (Section 6.3.2.2)
- Quantification of receptor exposures that may result from overlap of these distributions (Section 6.3.2.3)

6.3.2.1 Constituent Distribution

The area of the basin is approximately 0.07 ha (0.17 ac) and comprises the total area in which COPCs are detected.

The magnitude of the constituent exposures that may be experienced by ecological receptors is affected by the degree of their spatial and temporal associations with the unit, as discussed in Sections 6.3.2.2 and 6.3.2.3. RME concentrations are shown in Table 6.3-1 and a discussion of their development is presented in Appendix C. 1.

6.3.2.2 Receptor Distribution

The MSSB area and vicinity are characterized in terms of ecological communities and receptors that could potentially be exposed to unit-related constituents (see Section 6.3.1.2 and Figure 6.3-1). Of the plant communities identified, the old field community type overlaps the areas of contamination identified at the unit. This community supports a limited diversity of flora and fauna. It has been physically impacted by past activities and surrounding areas are maintained in a condition of limited biodiversity and productivity by periodic mowing and/or chemical treatment of the powerline right-of-ways. Animal species that use this community as habitat are terrestrial species (as described in Section 6.3.1.2.2).

A variety of factors may affect the extent and significance of potential exposures. Receptor exposures are affected by the degree of spatial and temporal association with the unit. For example, the receptors' mobility may significantly affect their potential exposures to unit-related constituents. Many species may only inhabit the study area during seasonal periods (e.g., breeding season, nonmigratory periods). Nonmigratory species may remain in the vicinity throughout the year. These species, particularly those with longer life spans (and usually larger home ranges), have the greatest potential duration of exposure. However, species with small home range sizes have the greatest potential frequency of exposure. Other factors affecting exposures include habitat preference, behavior (e.g., burrowing, rooting, foraging), individual home range size (larger home ranges correspond to far less frequent use of study area), and diet. Diet is of particular importance in exposure as related to (1) food source availability (larger amounts of preferred food sources equal a greater potential for receptor usage) and (2) bioaccumulative constituents. Constituents that bioaccumulate may also tend to

biomagnify in the food chain. As a result, predatory species at higher trophic levels may receive their most significant exposures through their prey. However, the possibility of a population, or even an individual predator, utilizing the unit as a primary source of food is considered extremely remote.

The indicator receptor species at the MSSB, the oldfield mouse, has a typical home range of approximately 2 ha (5 ac) (Burt and Grossenheider 1976). The basin area of approximately 0.07 ha (0.17 ac) could constitute 3.5 percent of the home range of the oldfield mouse.

6.3.2.3 Quantification of Exposure

Evaluation of the degree to which constituent and receptor distributions (described in the previous two sections) coincide at the unit indicate that the oldfield mouse is the receptor likely to have the greatest potential exposures to COPCs in soil and vegetation.

To quantify exposures of terrestrial receptors to each COPC, a daily intake of each constituent is calculated. Conversion of the environmental concentration of each COPC to an estimated daily intake for a receptor at the unit is necessary prior to evaluation of potentially toxic effects. Exposure rates for the oldfield mouse are based upon ingestion of constituents in soil, consumption of other organisms, and consumption of plants. The ecological risk assessment does not attempt to measure potential risk from dermal and/or inhalation exposure pathways given the insignificance of these pathways relative to the major exposure pathways (e.g., ingestion) and the scarcity of data available for these pathways.

The first step in measuring exposure rates for terrestrial wildlife is to calculation of food ingestion rates for the receptor, the oldfield mouse. The EPA's *Wildlife Exposure Factors Handbook* (EPA 1993) includes a variety of exposure information for a number of avian, herptile, and mammalian species. Information regarding body weights, food ingestion rates, and dietary composition is available for many species. The food intake rate for the oldfield mouse is estimated from data presented in the *Wildlife Exposure Factors Handbook* (EPA 1993) for a similar species, the deer mouse (*Peromyscus maniculatus*), *so an* allometric equation is not used.

The *Wildlife Exposure Factors Handbook* (EPA 1993) also presents average values for intake of animal matter, plant matter, and incidental soil ingestion for various ecological

receptors. Based on these data and information about the composition of the diets of the oldfield mouse, values are estimated for percent animal material in the diet, percent plant material in the diet, and percent soil incidentally ingested in the diet. Table 6.3-3 shows these percentages of dietary composition. Based on these percentages, the food ingestion rate of the receptor, and the receptor's body weight, ingestion rates for plant material, animal material, and soil in kg/day are calculated. Table 6.3-4 lists the soil-to-plant uptake factors (BCFs) and plant-to-animal bioaccumulation factors (BAFs) used in estimating COPC ingestion rates through the food chain. These ingestion rates are calculated for the oldfield mouse in Tables 6.3-5 and 6.3-6.

A unit-specific exposure dose (intake) of each constituent is calculated using a food chain uptake model consistent with EPA Region IV guidance (EPA 199%). This algorithm accounts for exposure via incidental ingestion of contaminated soil, ingestion of plants grown in contaminated soil, and ingestion of lower trophic level animals associated with contamination. The exposure dose equation for receptors exposed to soil COPCs is as follows:

$$ED_{soil} = [(CS \times SP \times CF \times IRP) + (CP \times BAF \times IRA) + (CS \times IRS)] \times UFF / BW$$

where:

ED_{soil}	=	Soil exposure dose for terrestrial receptor (mg/kg BW-day)
c s	=	RME concentration in soil (mg/kg)
SP	=	Soil-to-plant uptake factor (unitless)
CF	=	Plant wet-weight-to-dry-weight conversion factor (unitless)
	=	0.2 (used for SP values based on plant dry weight), based on NRC (1992) value for leafy vegetables
IRP	=	Receptor-specific ingestion rate of plant material (kg/day)
CP	=	Concentration in plants (mg/kg dry weight) = (CSxSPxCF)
BAF	=	Constituent-specific plant-to-animal bioaccumulation factor (unitless)
IRA	=	Receptor-specific ingestion rate of animal material (kg/day)
IRS	=	Receptor-specific ingestion rate of soil (kg/day)
UFF	=	Unit foraging factor (unitless) (see explanation below)
BW	=	Body weight (kg)

Daily exposures of small mammals to COPCs are calculated using the RME exposure concentration at each exposure group to represent CS in the above equation. Tables 6.3-5 and 6.3-6 present the daily exposures of small mammals (oldfield mouse) to antimony and cadmium (ED_{soil}) at each exposure group.

Bioaccumulation is the process by which constituents are absorbed from ingested soil, food, and water and retained in tissues. It is quantified by the calculation of a BAF, which is a proportionality constant relating the constituent concentration in tissue to the concentration in the exposure medium (Amdur et al. 1991, EPA 1989c). Bioaccumulation may be a significant component of receptor exposure to COPCs. For terrestrial receptors, bioaccumulation is evaluated by means of specific soil-to-plant BCFs and plant-to-animal BAFs.

Terrestrial soil-to-plant uptake factors (BCFs) and plant-to-animal BAFs for inorganic COPCs are obtained from NRC (1992) (Table 6.3-4). Plant-to-animal BAFs from NRC (1992) are multiplied by a factor of 8 to adjust for the feeding rate.

Tables 6.3-5 and 6.3-6 show the application of soil-to-plant BCFs and plant-to-animal BAFs in the calculation of daily intakes of COPCs from soil and biota by the oldfield mouse.

A unit foraging factor (UFF) is calculated to account for the reasonably expected use of an exposure area. Because the total area of potential soil contamination associated with the MSSB is smaller than the home range of the potential receptor being evaluated, the UFF is used to reduce the estimated maximum intakes based on the proportion of a receptor's time likely to be spent at each exposure area at the unit. Constituent and receptor distributions are discussed in Sections 6.3.2.1 and 6.3.2.2, respectively. Table 6.3-3 presents the receptor home range, exposure areas, and the resulting UFFs.

6.3.3 *Effects Assessment*

The effects assessment defines and evaluates the potential ecological response to ecological COPCs in terms of the selected assessment and measurement endpoints. The effects assessment includes the derivation of toxicity reference values (TRVs) that are the basis of the evaluation, Section 6.3.4 uses the results of the effects assessment to identify ecological COCs and characterize ecological risk.

6.3.3.1 Methodology

This section describes the methodology used in assessing the COPCs' potentially toxic effects to ecological receptors. Different assessment methodologies are followed for intake of nonradioactive COPCs and external and internal exposure to radiation due to their different mechanisms of toxicity. The assessment of nonradioactive and radioactive constituents are discussed in the Sections 6.3.3.1.1 and 6.3.3.1.2, respectively.

6.3.3.1.1 Nonradioactive Constituents

The methodology for assessing the potentially toxic effects of nonradioactive COPCs is based on the derivation of a TRV for each COPC in each medium. The TRVs are derived to represent conservative estimates of the constituent concentrations that, if exceeded in an environmental medium, may produce toxic effects in ecological receptors exposed to that medium. Ideally, TRVs are based on unit-specific toxicity data. However, in the absence of unit-specific data, toxicity data from the literature are used by establishing data selection criteria such that TRVs are as relevant as possible to assessment endpoints at the unit. Furthermore, the conservativeness of the TRVs is reinforced by using the lowest available, appropriate toxicity values and modifying them by uncertainty factors when necessary. Table 6.3-7 shows the derivation of TRVs for COPCs in soil for the oldfield mouse.

Toxicity values used as the basis for the TRVs are selected as described below. The source for toxicity values used as TRVs is *Toxicological Benchmarks for Wildlife* (Opresko et al. 1995). The Opresko et al. data base is a compilation of various sources, including primary literature, EPA review documents, and secondary sources such as the Integrated Risk Information System (IRIS). The uncertainties associated with the Opresko et al. data base are discussed in Section 6.3.4.1.3.

The order of taxonomic preference when choosing TRVs is data from studies using (1) native species potentially present at the unit or (2) proxy species, such as commonly studied laboratory species. The preferred toxicity test endpoint is the lowest appropriate chronic LOAEL for nonlethal or reproductive effects. LOAELs are appropriate for evaluating the risk to populations that are not threatened or endangered (Suter et al. 1994). When values are not available for these effects, LOAELs for lethal toxic effects or no observed adverse effects levels (NOAELs) are used, as available. Values based on

chronic studies are preferred. Studies are considered to provide chronic toxicity data if conducted for a minimum duration of 1 year in mammals, 10 weeks in birds (Opresko et al. 1995), or 7 days in fish or invertebrates. Studies longer than acute but shorter than chronic are considered subchronic. Studies shorter than 90 days in mammals, 18 days in birds, and 2 days in fish or invertebrates are considered acute. If LOAEL data are not available for a constituent, the next preferred form of toxicity data for use in deriving a TRV is a median lethal dose (LD_{50}) (or a median lethal concentration [LC_{50}]). In estimating an LOAEL from an LD_{50}, an uncertainty factor (UF) of l/l 0 typically is applied.

The TRV based on the test species is adjusted for the body weight of the wildlife species being evaluated, as shown in the following equation modified from Opresko et al. (1995):

$$TRV_w = TRV_t \left(\frac{bw_t}{bw_w} \right)^{1/3}$$

where:

TRV,	=	TRV adjusted for wildlife species
TRV_t	=	TRV for the test species
bw_w	=	body weight of the wildlife species
bw_t	=	body weight of the test species

The ERA uses body size scaling to account for the effects of body size on toxicity. The toxic effects of a given dose are related to body size based on the toxicological principle that smaller animals generally have higher metabolic rates and rates of detoxification of chemicals than larger animals (EPA 1957-FR24152 and Chappell 1992). The adjusted value is used as the TRV for evaluating risk to the wildlife species chosen to represent the assessment endpoint.

6.3.3.1.2 Radioactive Constituents

No radionuclide COPCs were detected at this unit; therefore, radionuclides are not further addressed.

6.3.4 Risk Characterization

Risk characterization integrates exposures and effects on receptors using HQs (ratios of exposure and effect concentrations). The resulting data are used to define the magnitude of risk from ecological COPCs at each exposure group and to assess the risk to ecological receptors. Risk characterization includes two main steps: risk estimation and risk description. Risk estimation (Section 6.3.4.1) uses the results of the exposure and effects assessments to calculate an HQ for each COPC. The HQs are based on relevant measurement endpoints and are indicative of the COPCs' potential to pose ecological risk to receptors. Risk assessment related uncertainties are also analyzed and discussed. Risk description (Section 6.3.4.2) summarizes the conclusions of the risk estimation and discusses confidence in the risk estimates based on a weight-of-evidence evaluation. In Section 6.3, ecological COCs are identified from among those COPCs with HQs greater than 1. In Section 7, Selection of Constituents of Concern and Development of Remedial Goal Options, the COCs remaining at the completion of the ERA undergo an uncertainty analysis based on weight of evidence to develop the final list of COCs.

6.3.4.1 Risk Estimation

Estimation of a COPC's potential to pose significant risk to receptors is based on the magnitude of the HQ value calculated for each constituent, as well as other factors such as the bioaccumulation/biomagnification potential, mechanism of toxicity, physicochemical characteristics, environmental fate, and ecological relevance of each constituent. Table 6.3-8 presents the calculation of HQs for COPCs in each exposure group and medium for the oldfield mouse. An HQ is a ratio of the estimated exposure dose of a constituent to the TRV. Generally, the greater this ratio or quotient, the greater the likelihood of an effect. A quotient of one is considered the threshold level at which effects may occur. The TRVs on which the HQs are based are derived to be conservative and representative of chronic exposures, as described previously in Section 6.3.3.

The calculated HQs are used to assess the potential that toxicological effects will occur among the unit's receptors. The likelihood that the assessment endpoint – the maintenance of the terrestrial ecosystem, with no loss of species or community alteration – could be significantly impacted by the toxicological effects produced by a given COPC is a major factor in the subsequent determination (in Section 6.3.4.2) of whether that constituent should be classified as an ecological COC.

Although the HQ is not a linear measure of potential adverse effects, the magnitude of the HQ provides important information regarding the probability of ecological effects. An HQ is interpreted in terms of probability and uncertainty. For many reasons, including uncertainties regarding TRVs, the documented low bioavailability of many soil-bound contaminants, and possible compensatory reproductive effects among stressed receptor populations, there is a high level of uncertainty that adverse ecological effects will occur when the HQ equals 1. If there were no uncertainty about both the concentration to which receptors are exposed and the effects-threshold concentration, then an HQ greater than or equal to 1 would mean that the effect associated with the threshold concentration will occur with a probability equal to 1. However, since uncertainties regarding exposure and effects threshold concentrations do exist in any ERA, there is a range of HQ values above and below 1 for which there is some degree of uncertainty about the actual risk to the receptor. Due to uncertainties, HQs slightly greater than 1 may indicate risk when it is possible that there is no risk. An HQ much greater than 1 indicates almost certain adverse ecological effects; whereas, an HQ much less than 1 indicates risk is almost certainly acceptable. The magnitude of this uncertainty regarding HQs near 1 varies among waste units, ecological COPCs, and receptors because of the different sources and magnitudes of uncertainty in the exposure and effects estimates.

Because of these uncertainties, the exposure and effects assessments in the ERA are designed to minimize the probability of falsely concluding that there is no risk when in fact there is risk, or vice versa. As a result, ecological COPCs with HQs less than 1 are unlikely to cause risk to the endpoint receptors and are not discussed further. The focus of the risk characterization is on those COPCs with HQs greater than 1. The risk characterization, especially the weight-of-evidence analysis, evaluates in greater depth the exposure estimates and effects thresholds for the COPCs with HQs greater than 1. In Section 6.3, ecological COCs are identified from among those COPCs with HQs greater than 1. In Section 7, Selection of Constituents of Concern and Development of Remedial Goal Options, the COCs remaining at the completion of the ERA undergo an uncertainty analysis based on weight of evidence to develop the final list of COCs.

Ecological risk from constituents is characterized for both current and potential future land use conditions at the unit (Sections 6.3.4.1 .1 and 6.3.4.1.2, respectively). Under current conditions, ecological receptors are unlikely to be exposed to soils deeper than 0.3 m (1 ft). Therefore, soil data from the surface down to this depth are used in characterizing current risk at the waste unit. Under hypothetical future land uses

involving excavation, deeper (subsurface) soils could be excavated and distributed on the surface where ecological receptors might then be exposed. Therefore, soil data from the surface down to a depth of 1.2 m (4 ft) at the basin are used in characterizing risk associated with the waste unit under future conditions.

6.3.4.1.1 Current Land Use

The only COPC in surface soil at the basin is cadmium. The HQ calculated for cadmium in surface soil within the basin (Table 6.3-8) does not exceed a value of 1 for the oldfield mouse (HQ = 0.0558). Accordingly, cadmium in surface soil is not considered to pose ecological risk at this waste unit and does not warrant classification as a COC.

6.3.4.1.2 Future Land Use

The only COPCs in subsurface soil at the basin are antimony and cadmium. The HQs calculated for antimony and cadmium in subsurface soil (Table 6.3-8) do not exceed a value of 1 for the oldfield mouse (HQs = 0.0002 18 and 0.04 19, respectively). Accordingly, antimony and cadmium in surface soil are not considered to pose ecological risk at this waste unit and do not warrant classification as a COCs.

6.3.4.1.3 Uncertainty

Uncertainty is inherent in each step of the ERA process. Major factors contributing to uncertainty in this risk assessment are discussed qualitatively in the following sections.

COPC Selection

COPC selection has an inherent degree of uncertainty because sampling data may not accurately represent the overall distribution of contamination at the unit, which could result in either overestimation or underestimation of potential risk. However, the use of maximum detected concentrations for comparison to conservative ecological screening values (ESVs) in COPC selection ensures that any chemical present at deleterious concentrations is included in the ERA. In addition, the screening intake equation conservatively assumes that the entire diet of the receptor consists of soil, all of which contains the maximum detected concentration of the analyte. There is uncertainty associated with not including bioaccumulation as part of the screening intake equation; however, previously eliminated constituents are reevaluated in the screening process to

determine whether any constituents should be re-included based on considerations such as mobility, bioaccumulation, persistence, or toxicity.

Exposure Assessment

Uncertainty in the exposure assessment is minimized by conducting unit-specific ecological characterizations and utilizing data from previous field surveys for TES evaluations. Nevertheless, the receptor species listed as potentially present at the unit are a limited subset of the species that may utilize the area to some extent for at least a portion of the year. The species evaluated in the ERA are considered to provide a conservative representation of the range of exposures that may be experienced by other species not evaluated.

In calculating constituent intakes, conservative exposure factors are assumed in order to be protective of all potential receptors. Low-end estimates of body weights and high-end estimates of ingestion rates are assumed in order to model the highest potential dose to the receptor. Conservatism also is employed in estimating UFFs, bioavailability, and percent contaminated plant and contaminated animal materials in the diet. The conservative exposure factors and exposure concentrations used provide confidence that the calculated intakes are reasonably conservative estimates for the receptor populations. Intakes from dermal and inhalation exposures are not quantifiable for ecological receptors. However, this does not significantly increase the uncertainty of the estimated total intake because, for most receptors, intakes via these routes are likely to be minimal relative to intakes via ingestion.

Toxicity Assessment

There is uncertainty associated with ESVs used in this ERA because the toxicity data are not unit-specific. Opresko et al. (1995) toxicity values are utilized in this assessment. Limitations in toxicity values from the Opresko et al. data base are common to most other toxicity data sources. These limitations include variations in physiological or biochemical factors that may exist among species, behavioral and ecological parameters that may make a species' sensitivity to a contaminant different from that of the test organism, and limited information on long-term effects on natural populations.

To minimize this uncertainty, NOAELs are selected or derived for screening purposes based on a standard protocol. NOAELs are the lowest available, appropriate toxicity

values that are relevant to the receptors. The resulting ESVs are very conservative and, in some instances, may dramatically overestimate the toxic potential of COPCS at the unit. In addition, most laboratory studies use highly bioavailable forms of chemicals during NOAEL derivations. Since most chemicals in nature are bound or associated with inorganic matrices or organics, many are not as bioavailable as the forms used in the laboratory studies. The combination of maximum intakes and conservative ESVs provide confidence that the COPCs resulting from screening are conservative.

Risk Characterization

Uncertainty in the risk characterization is a direct result of the methodology employed in the preceding sections of the ERA. The conservative methodology and assumptions used in the COPC selection, exposure assessment, and toxicity assessment are expected to overestimate, rather than underestimate, the potential for COPCs to pose risk to assessment endpoints. By overestimating risk, the actual risk of deleterious effects is likely to be less than indicated by the calculated ecological quotients. Thus, a list of COPCs having HQs greater than 1 is conservative and is reviewed using professional judgment to reduce uncertainty regarding which COPCs actually pose ecological risk to assessment endpoints and thereby warrant designation as final COCs in Section 7.

Determination of Need for Additional Studies

Based on the results of the evaluation, including the (1) nature of the waste unit, (2) ecosystem of the study area, (3) conservatism of the evaluation, and (4) minimal degree of uncertainty in the underestimating risk results, additional site-specific field studies are not necessary to adequately determine the ecological risk posed by the unit. The unit occupies a small area, is not near sensitive ecological receptors or communities, and, based on a conservative quantitative evaluation, does not pose risk to the species selected to represent the greatest potentials for exposure. Therefore, additional studies would likely provide data of only marginal utility in refining the risk evaluation and predicting effects on the assessment endpoint.

6.3.4.2 Risk Description

The risk description has two main elements: (1) the ecological risk summary, which summarizes the results of the risk estimation and uncertainty analysis and assesses confidence in the risk estimates based on the weight-of-evidence, and (2) the

interpretation of ecological significance, which describes the magnitude of the identified risks to the assessment endpoint(s).

6.3.4.2.1 Ecological Risk Summary

The risk estimation step results in the identification of a subset of COPCs for each exposure group and medium for both current and hypothetical future conditions. These subsets of COPCs include those constituents estimated to have the potential to pose adverse effects to the assessment endpoint selected in Section 6.3.1.4.

In this section, these COPCs are further evaluated based on the weight-of-evidence and a determination is made as to the likelihood of unacceptable risk to the receptor analyzed for this risk assessment or the ecological community that encompasses the study area. However, no ecological COPCs generated an HQ greater than 1; therefore, the COPCs identified in soils at the unit do not pose unacceptable risk to the ecological assessment endpoint and no further evaluation of these constituents is required.

6.3.4.2.2 Interpretation of Ecological Significance

The assessment endpoint at the MSSB is the maintenance of the terrestrial ecosystem, with no loss of species or community alteration due to antimony or cadmium toxicity. The testable hypothesis is that the RME concentrations of antimony and cadmium present in surface and subsurface soils are not toxic to terrestrial animals at the unit. To verify or recant the testable hypothesis, a receptor species, the oldfield mouse, is selected to represent the assessment endpoint. Since it is unlikely that antimony bioaccumulates or cadmium biomagnifies in the food chain, direct measurement of antimony and cadmium concentrations in soil media, modeled to represent concentrations in the oldfield mouse, is selected as the appropriate measurement endpoint.

The ERA confirms that the RME concentrations of antimony and cadmium present in soils at the unit are not toxic to terrestrial animals at the unit. No ecological COCs are identified at the MSSB waste unit. No HQs at the MSSB are greater than 1. The risk posed by constituents detected in surface and subsurface soils at the unit is not unacceptable, does not threaten the assessment endpoint for the unit, and does not impact the policy goal applicable to the unit.

SECTION 6.3

FIGURES

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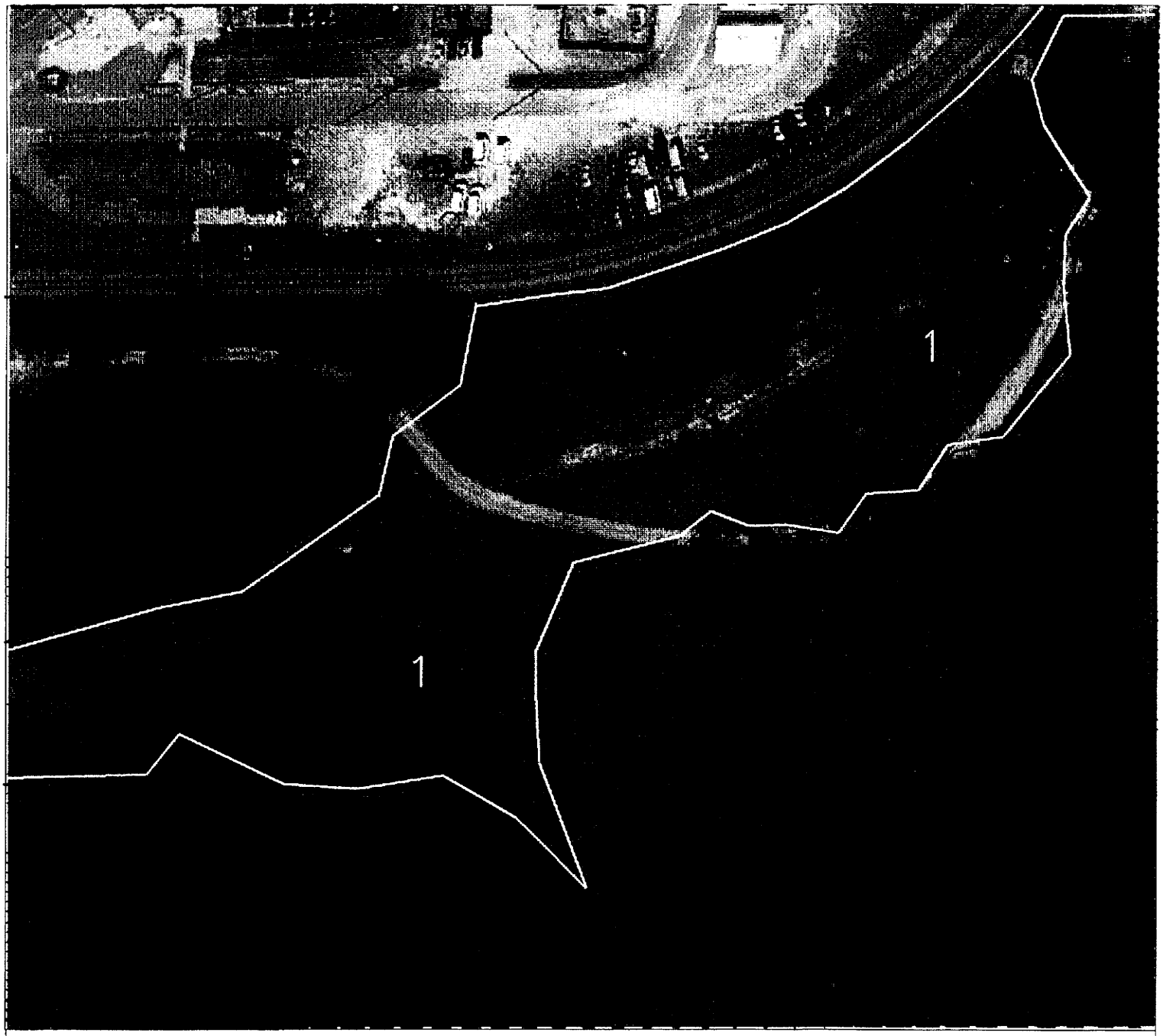

LEGEND

2 = Industrialized Area
3 = Mixed Pine/Hardwood Forest Community

Figure 6.3-1
Community Type Delination of 716-A Motor Shops
Seepage Basin Vicinity

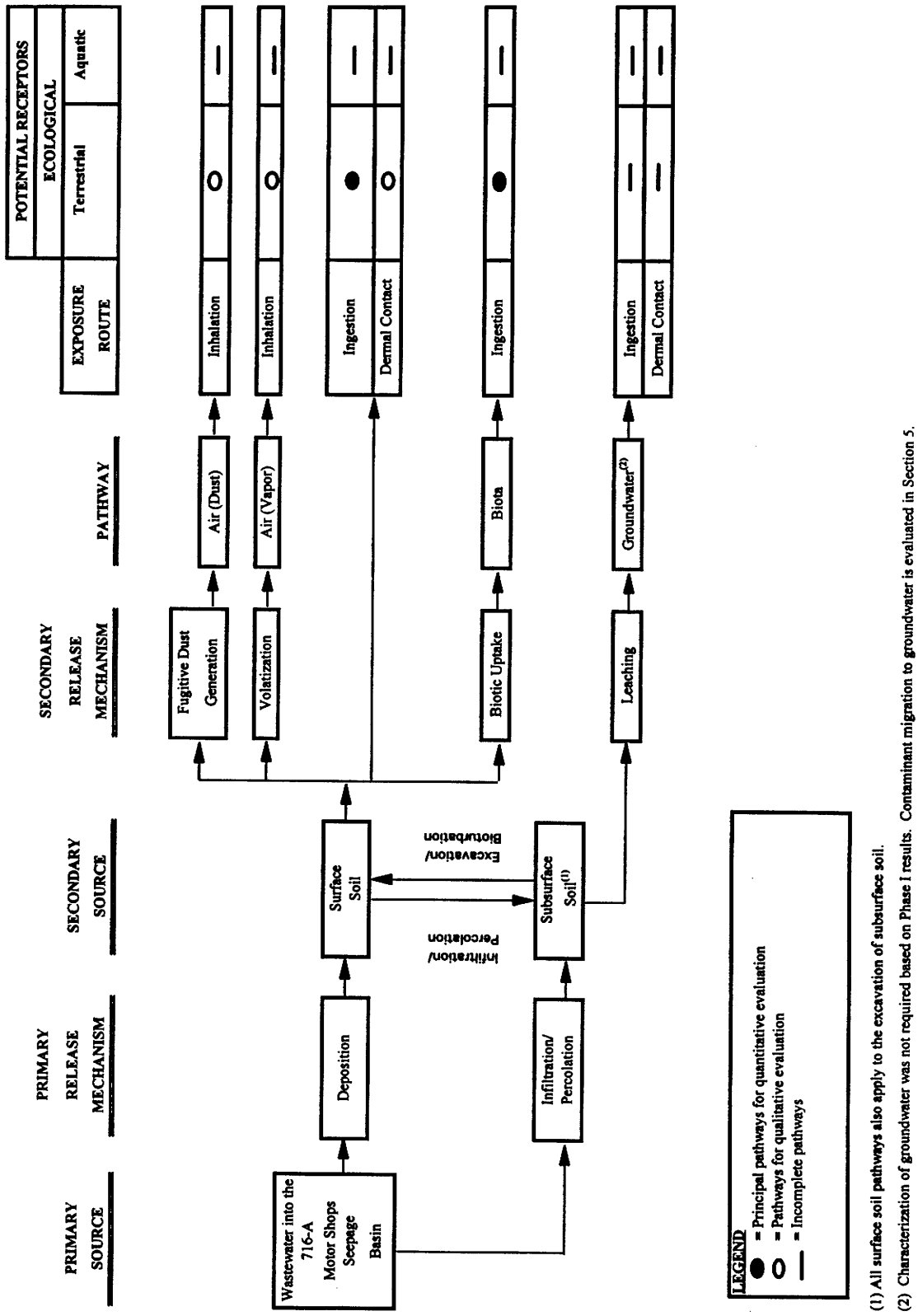

Figure 6.3-2. Ecological Conceptual Site Model for the 716-A Motor Shops Seepage Basin

(1) All surface soil pathways also apply to the excavation of subsurface soil.

(2) Characterization of groundwater was not required based on Phase I results. Contaminant migration to groundwater is evaluated in Section 5.

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SECTION 6.3

TABLES

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Table 6.3-1.
RME Exposure Point Concentrations (Ecological)
Surface Soil (Depth 0-0.3 m [0-1 ft]) and Subsurface Soil (Depth 0-1.2 m [0-4 ft])
716-A Motor Shops Seepage Basin

COPCs	Units	Frequency of Detection	Maximum Detected Value	RME Concentration
SURFACE				
Metals				
Cadmium	mg/kg	6/6	1.50E+00	1.50E+00
SUBSURFACE				
Metals				
Antimony	mg/kg	2/12	2.00E+00	2.00E+00
Cadmium	mg/kg	11/12	1.50E+00	1.09E+00

Table 6.3-2.
Ecological Policy Goals, Assessment Endpoints, Measures, and Decision Rules
716-A Motor Shops Seepage Basin

Policy Goal	Assessment Endpoint	Measures	Decision Rule
1) Protection of the environment (CERCLA)	1) Maintenance of the terrestrial ecosystem, with no loss of species or community alteration due to antimony or cadmium toxicity	Measures of Effect: 1) Chronic LOAELs applicable to wildlife receptors based on laboratory studies of similar species Measures of Exposure: 1) Modeled COPC concentrations in the food chain Measures of Receptor Characteristics: 1) Estimates of receptor home range area, body weight, feeding rate, and dietary composition based on published studies of the endpoint species or similar species	1) Calculate HQs for each COPC as the ratio of COPC intake to TRV for representative herbivore species. If HQ > 1 for a given COPC, potential for reductions in populations at the 2nd trophic level (primary consumer level) of the community and higher.

Table 6.3-3.
Ecological Exposure Factors
716-A Motor Shops Seepage Basin

Receptor/Exposure Area	Body Weight (kg)	Food Ingestion Rate (g/g-day)	Home Range (ha)	UFF (%)	% Plant Material in Diet	% Animal Material in Diet	% Soil in Diet
Oldfield Mouse Basin	0.0115 a	0.26 b	2 c	3.5 d	98 e	0 e	2 f

a - Midrange value for oldfield mouse, from Whitaker (1980).
b - Average value from studies of adult deer mouse (EPA 1993, p. 2-295).
c - Conservative estimate based on Burt and Grossenheider (1976).
d - Unit foraging factor (UFF) = (exposure area)/(home range). Exposure area: basin (0.07 ha).
e - Assumed 100% herbivorous; 98% plant intake reflects 2% incidental soil ingestion.
f - Upper-end value for white-footed mouse (EPA 1993, p. 4-20).

Table 6.3-4.
Physical Constants, Soil-to-Plant BCFs, and Plant-to-Animal BAFs
for Ecological COPCs
716-A Motor Shops Seepage Basin

COPC	CAS Number	Soil-to-Plant BCF (SP)		Plant-to-Animal BAF	
Metals					
Antimony	7440-36-0	1.30E-4	a	8.00E-3	a
Cadmium	7440-43-9	5.50E-1	a	4.40E-3	a

a - Source: NRC (1992)

Table 6.3-5.
Ecological Intake Calculation
Ingestion of COPCs by Oldfield Mouse
Surface Soil (Depth 0-0.3 m [0-1 ft]) and Vegetation
716-A Motor Shops Seepage Basin

COPC	CS (mg/kg)	SP	CF	IRP (kg/day)	CP (mg/kg)	BAF	IRA (kg/day)	IRS (kg/day)	UFF	BW (kg)	ED_{soil} (mg/kg -day)
Metals											
Cadmium	1.50E+0	5.5E-1	2.0E-1	2.9E-3	1.7E-1	4.4E-3	0	6.0E-5	3.50E-02	1.15E-02	1.7E-3

ED_{soil} = [(CS x SP x CF x IRP) + (CP x BAF x IRA) + (CS x IRS)] x UFF / BW

where:

ED_{soil} = soil exposure dose for terrestrial animal (mg/kg bw-day)
CS = RME concentration in soil (mg/kg)
SP = soil-to-plant uptake factor from Table 6.3-4 (unitless)
CF = Plant wet-weight-to-dry-weight conversion factor (unitless)
IRP = ingestion rate of plant material (kg PT/day)
= (food ingestion rate x body wt. x % vegetation in diet)
CP = concentration in plants (mg/kg PT) = CS x SP x CF
BAF = plant-to-animal bioaccumulation factor from Table 6.3-4 (unitless)
IRA = ingestion rate of animal material (kg/day)
= (food ingestion rate x body wt. x % animal in diet)
IRS = ingestion rate of soil (kg/day)
= (food ingestion rate x body wt. x % soil in diet)
UFF = unit foraging factor from Table 6.3-3 (unitless)
BW = body weight (kg) (see Table 6.3-3)
PT = plant tissue

Exposure Factors[#]	
Receptor	Oldfield Mouse
Food ingestion rate (kg/kg-day)	0.26
Body wt (g)	11.5
UFF (%)	3.5
% soil in diet	2
% vegetation in diet	98
% animal in diet	0

[#] See Table 6.3-3 for exposure factor sources.

Table 6.3-6.
Ecological Intake Calculation
Ingestion of COPCs by Oldfield Mouse
Subsurface Soil (Depth 0-1.2 m [0-4 ft]) and Vegetation
716-A Motor Shops Seepage Basin

COPC	CS (mg/kg)	SP	CF	IRP (kg/day)	CP (mg/kg)	BAF	IRA (kg/day)	IRS (kg/day)	UFF	BW (kg)	ED_{soil} (mg/kg -day)
Metals											
Antimony	2.00E+0	1.3E-4	2.0E-1	2.9E-03	5.2E-5	8.0E-3	0	6.0E-5	3.5E-2	1.15E-02	3.7E-04
Cadmium	1.09E+0	5.5E-1	2.0E-1	2.9E-03	1.2E-1	4.4E-3	0	6.0E-5	3.5E-2	1.15E-02	1.3E-03

ED_{soil} = [(CS x SP x CF x IRP) + (CP x BAF x IRA) + (CS x IRS)] x UFF / BW

where:

ED_{soil} = soil exposure dose for terrestrial animal (mg/kg bw-day)
CS = RME concentration in soil (mg/kg)
SP = soil-to-plant uptake factor from Table 6.3-4 (unitless)
CF = Plant wet-weight-to-dry-weight conversion factor (unitless)
IRP = ingestion rate of plant material (kg PT/day)
= (food ingestion rate x body wt. x % vegetation in diet)
CP = concentration in plants (mg/kg PT) = CS x SP x CF
BAF = plant-to-animal bioaccumulation factor from Table 6.3-4 (unitless)
IRA = ingestion rate of animal material (kg/day)
= (food ingestion rate x body wt. x % animal in diet)
IRS = ingestion rate of soil (kg/day)
= (food ingestion rate x body wt. x % soil in diet)
UFF = unit foraging factor from Table 6.3-3 (unitless)
BW = body weight (kg) (see Table 6.3-3)
PT = plant tissue

Exposure Factors#	
Receptor	Oldfield Mouse
Food ingestion rate (kg/kg-day)	0.26
Body wt (g)	11.5
UFF (%)	3.5
% soil in diet	2
% vegetation in diet	98
% animal in diet	0

See Table 6.3-3 for exposure factor sources.

Table 6.3-7.
Ecological TRVs for Soil
Oldfield Mouse
716-A Motor Shops Seepage Basin

COPC	TRV (mg/kg-day)	Basis (test species, duration, level, effect)	Source*	Test Species Body Weight[A] (kg)	Adjusted TRV[B] for Oldfield Mouse (mg/kg-day)
Metals					
Antimony	1.25E+00	mouse, >1y, LOAEL, reprod.	1	3.0E-2	1.7E+0
Cadmium	1.00E-02	rat, >1y, LOAEL, reprod.	1	3.5E-1	3.1E-2

* Source

1 Opresko et al. (1995)

A - Test species body weights from Opresko et al. (1995).

B - TRV adjusted based on ratio of body weights for oldfield mouse (0.0115 kg) and test species:

Adjusted TRV for oldfield mouse = (test species TRV) x (test species body weight / 0.0115 kg)$^{1/3}$

Table 6.3-8.
Hazard Quotient Calculations
Oldfield Mouse
716-A Motor Shops Seepage Basin

COPC	Total Intake (ED) by Exposure Group (mg/kg-day)		Toxicity Reference Value[3] (mg/kg-day)	HQ by Exposure Group	
	Basin*			Basin*	
	Surface Soil[1]	Subsurface Soil[2]		Surface Soil	Subsurface Soil
Metals					
Antimony	NA	3.70E-04	1.70E+00	NA	2.18E-04
Cadmium	1.73E-03	1.30E-03	3.10E-02	5.58E-02	4.19E-02

*Intakes and HQs based on surface soil for current conditions and on subsurface soil for future conditions.

1 From Table 6.3-5
2 From Table 6.3-6
3 From Table 6.3-7

HQ = ED / TRV
where:
HQ = hazard quotient
ED = exposure dose (total intake)
TRV = toxicity reference value
NA = Not applicable

7.0 SELECTION OF CONSTITUENTS OF CONCERN AND DEVELOPMENT OF REMEDIAL GOAL OPTIONS

Remedial goal options (RGOs) are concentration goals for individual chemicals for specific medium and land use combinations. They are designed to provide conservative, long-term targets for the selection and analysis of remedial alternatives. The final step in the risk assessment process, which is the determination of constituents of concern (COCs), serves as the starting point for the determination of RGOs. Human health RGOs are estimates of protective clean-up levels for COCs based on risk to human receptors. In a similar manner, ecological RGOs are based on risks to ecological receptors. Final clean-up levels for the COCs, which will be selected by risk managers, are to be protective of both human and ecological health, as well as comply with Federal and state applicable or relevant and appropriate requirements (ARARs). If remediation is found to be necessary, remedial activity at the unit will be conducted to meet the final clean-up levels.

Preliminary COCs, which include primary and secondary human health COCs and ecological COCs with HQs greater than 1, are selected because they exceed risk-based criteria in the baseline risk assessment (BRA) or because they are projected to have the potential to leach to the groundwater at levels exceeding a maximum contaminant level (MCL) or risk-based concentration (RBC) (Section 5).

Primary COCs in the human health risk assessment are defined as constituents that either individually produce or significantly contribute to risk estimates that exceed a 1×10^{-4} risk or an hazard index (HI) of 3 by selecting individual COCs exceeding a risk of 1×10^{-6} or an hazard quotient (HQ) of 1 in any pathway. If, for example, the risk estimate from exposure to surface soil were greater than 1×10^{-4} (or HI greater than 3), then all of the constituents significantly contributing to that risk/hazard would be identified as COCs. Each pathway (e.g. ingestion, inhalation, dermal contact, and ingestion of produce) would be investigated to determine the source of the most important constituents.

Secondary COCs in the human health risk assessment are individual constituents of potential concern (COPCs) that have a chemical-specific carcinogenic risk of at least 1×10^{-6} or a noncarcinogenic hazard of 0.1 that contributes to a pathway hazard of 1 or greater. Secondary COCs are those chemicals that are not identified as primary COCs for a particular receptor. If the level of a constituent in a given medium exceeds a Federal or state chemical-specific ARAR, that constituent is also included as a COC (EPA 1995b).

Table 7-l lists all preliminary human health COCs and the basis for their qualification as such. These preliminary COCs are evaluated for uncertainty in Section 7.2 and the final COCs are selected. Chemical-specific RGOs are developed for the final contaminant migration, human health, and ecological COCs in Sections 7.3, 7.4 and 7.5, respectively. From the RGOs, the risk manager chooses remedial levels for the final COCs. There are two general sources of chemical-specific RGOs: (1) concentration based on ARARs and (2) concentration based on risk (EPA 1995b) and these are discussed below.

7.1 ARAR-Based Preliminary Constituents of Concern

The following provides a preliminary screening of COPCs detected in soil at the 716-A Motor Shops Seepage Basin (MSSB). The COPCs are screened according to chemical-specific ARARs. If the concentration of a COPC in a given medium exceeds a chemical-specific ARAR, that chemical is considered a COC unless it is eliminated during the uncertainty analysis in Section 7.2.

7.1.1 *Soil*

The only nonradiological chemical-specific ARARs for soils under Federal and South Carolina regulations are for polychlorinated biphenyls (PCBs). ARARs for PCBs are governed by the Toxic Substances Control Act (40 CFR Part 761). For a nonrestricted access area (e.g., residential), the PCB clean-up standard is 10 mg/kg by weight, provided that the soil is excavated to a minimum depth of 25 cm (10 in) and that the excavated soil is replaced with clean soil (i.e., soil containing less than 1 mg/kg PCBs). One PCB, aroclor-1260, was detected twice in the surface soil interval at a concentration of 6.76E-02 mg/kg. This concentration is below both the ARAR and RBC criteria.

7.2 Evaluation of Uncertainty

Each major step (category) in selection of a preliminary COC is evaluated for a high degree of uncertainty (Table 7-2). A high degree of uncertainty associated with the COC selection process indicates a low level of confidence that the constituent should be considered as a COC. Uncertainty is evaluated for the following categories:

- **Site History - COCs are** evaluated for their potential to have resulted from past unit activities and disposal practices. If a COC is associated with past practices it is assigned a high degree of confidence.

- **Background Comparison -** Concentrations of COCs are compared to background concentrations for the same medium. If a COC is not present in the background data it is assigned a high degree of confidence.

- Analytical - COC concentrations are reviewed for laboratory qualifiers that indicate uncertainty in their reported concentrations ("J" or "B" flags). If several of the detected concentrations for a COC contain these qualifiers, the COC is assigned a low degree of confidence.

- **Distribution -** Characterization results are reviewed for COCs. If the nature and extent evaluation of this report determined that the COC is not unit related based on its distribution, it is assigned a low degree of confidence. COC data are also reviewed for a low frequency of detection. Based on best professional judgment, a COC with a frequency of detection below 10 percent is assigned a low degree of confidence.

- **Toxicity -** Toxicity factors are used to determine the human health carcinogenic risk and noncarcinogenic hazard and ecological risk for each COC. If the toxicity values for a specific COC were provisional, surrogates, and/or based on uncertain data, the COC is given a low degree of confidence.

- **Risk Assessment -** Many uncertainties are present in the risk assessment process, particularly for the inhalation, human ingestion of produce, and dermal pathways. If a constituent is included as a COC because of the contribution to the risk/hazard level from another constituent in the same exposure pathway, it is assigned a low degree of confidence based on risk/hazard. In addition, a low degree of confidence is assigned for final COC selection if the constituent is designated a COC based on an exposure pathway with high uncertainty.

Uncertainties of preliminary COCs are discussed below and final COCs are selected based on these uncertainties.

Soil COCs

- Benzo(a)pyrene is the only human health preliminary COC detected in surface soils (0-0.3 m [O-l ft]) interval. Benzo(a)pyrene exceeds human health risk based criteria for the hypothetical adult/child receptor (total risk = 1×10^{-5}) from dermal contact with soil (5×10^{-6}), ingestion of soil (3×10^{-6}), and ingestion of homegrown produce (2×10^{-6}).

Benzo(a)pyrene also exceeds the risk criterion for the industrial worker through dermal contact with soil (2×10^{-6}). Benzo(a)pyrene was not detected in the subsurface soils at depths greater than 0.3 m (1 ft). The use of 1 mg/cm^2 as the soil-to-skin adherence factor is high, which causes the risk to be high and very conservative in nature. The analyte was detected one out of six times in the surface soils and one out of 12 in the subsurface soils (which includes the O-O.3 m [O-l A] interval). Therefore, the frequency of detection is very low. Although organics are not screened out based on background comparisons as part of the COPC selection process for the risk assessment, benzo(a)pyrene was detected two out of six times in the background samples for the surface soils. The maximum concentration (1.13×10^{-1} mg/kg) detected in the background sample is less than the unit concentration (4.10×10^{-1} mg/kg).

In accordance with EPA Region IV guidance (EPA 1995b), the soil to skin adherence factors have been changed from 0.2 mg/cm^2 to 1.0 mg/cm^2. It also states that the value of 1.0 mg/cm^2 should be considered for the evaluation of RME intake assumptions. Since the soil intervals evaluated have been characterized as being medium to coarse sands, the risk estimates are evaluated using an adherence factor of 0.2 mg/cm^2. The risk estimate for dermal contact using an adherence factor of 0.2 mg/cm^2 is five times lower than the risk using a factor of 1.0 mg/cm^2 for both the industrial worker and the adult/child receptors. Since the exposure point concentration is the same for both the surface and the subsurface soils and all other default parameters are the same, only the surface soil interval results are reported. The future adult/child combined risk result is 1×10^{-5} while using 1 .O mg/cm^2 as the adherence factor and it is $2 \times 1\ 0^{-6}$ for the 0.2 mg/cm^2 adherence factor.

In accordance with United States Environmental Protection Agency (EPA) Region IV guidance (EPA 1995b), risks are calculated for both RME and Central Tendency Exposure (CTE) risk scenarios. CTE risk estimates are, by definition, representative of more likely exposures than are the RME estimates. The CTE estimates are typically not used as the basis for determining the need for remediation. They are presented to provide information regarding the significance of the risk estimates, which should be useful in the decision-making process for the MSSB.

The CTE estimates differ from the RME estimates in that the exposure assumptions (e.g., exposure frequency, exposure duration, and ingestion rate) that are used result in an exposure estimate that is generally mid-range rather than from the high end of

possible exposures. For the CTE risk estimates, only *the* average exposure concentration is changed, while the other default parameters remain the same as the RME estimates. In comparing the CTE results to the RME results, the combined CTE risk estimates are an order of magnitude lower than the RME estimates for both the industrial worker and the adult/child receptors. For example, the combined RME risk estimate for the resident adult/child is 1 x 10^{-5}, while the CTE combined risk estimate is 2 x 10^{-6}. The results for the future industrial worker receptor are on the same order of magnitude: the RME risk estimate is 3 x 10^{-6} and the CTE combined risk estimate is 4 x 1 0^{-7}. All results are for the O-3 m (O-l ft) soil interval, and the 0- 1.2 m (O-4 ft) soil risk estimates are in the same range.

In summary, because benzo(a)pyrene was detected in only one out of 12 samples, risks are probably significantly overestimated by using the RME value and a high soil adherence factor. Risks associated with benzo(a)pyrene are acceptable.

7.3 Development of Contaminant Migration Remedial Goal Options for Soil

No contaminant migration COCs are identified at the MSSB; therefore, contaminant migration RGOs are not calculated.

7.4 Development of Human Health Remedial Goal Options for Soil

7.4.1 *Introduction*

The EPA has published guidance (EPA 199 1) on the determination of preliminary remedial goals (PRGs) for human health. PRGs are similar to human health RGOs, except that they are normally determined during the project scoping. They are calculated using an equation, similar to the risk equation, that sets the noncancer HI or cancer risk to the appropriate target and solves the equation for the concentration term.

Federal guidance is not available for the determination of human health RGOs. However, EPA Region IV has provided guidance (EPA 1995b) that can be used in conjunction with the guidance for the determination of PRGs to develop human health RGOs. In accordance with EPA Region IV guidance, human health RGOs are calculated using noncancer target HIs of 0.1, 1, and 3 and target cancer risks of 1 x 10^{-6}, 1 x 10^{-5}, and 1 x 10". Therefore, multiple human health RGOs are calculated for a given receptor and medium.

Determining multiple human health RGOs for a single medium provides the risk manager with a range of possible risk-based cleanup levels. This range also provides flexibility in the determination of remedial alternatives. The risk manager will select the final remediation level, which will be presented in the Record of Decision for the MSSB.

7.4.2 *Exposure Units and Exposure Scenarios*

In the current land use scenarios, the risk assessment evaluates surface soil exposures for known on-unit workers occasionally in close proximity to the MSSB. One exposure unit for surface soils is defined for the MSSB unit. No COCs are determined under current land use assumptions, only under hypothetical future assumptions.

Residential and industrial exposure scenarios are evaluated in the human health risk assessment under future land use assumptions. The soil exposure units and surface and subsurface soil intervals are applied to the future scenarios. Based on the uncertainty analysis conducted for the preliminary COC benzo(a)pyrene, no human health RGOs are determined for this unit.

7.5 Development of Ecological Remedial Goal Options for Soil

No ecological COCs are identified at the MSSB; therefore, ecological RGOs are not calculated.

SECTION 7

TABLES

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Table 7-1.
Summary of Preliminary Human Health Constituents of Concern

Preliminary COC Name	Basis	Receptor	Significant Risk or Hazard Value	Pathways
Primary Soil COCs: NA	NA	NA	NA	NA
Secondary Soil COCs: Benzo(a)pyrene	Exceeds risk criterion	Resident/Child	5E-06 3E-06 2E-06	Dermal contact with soil (0-1', 0-4') Ingestion of soil (0-1', 0-4') Ingestion of homegrown produce (0-1', 0-4')
		Industrial Worker	2E-06	Dermal contact with soil (0-1', 0-4')

NA - Category does not apply because no primary COCs were determined.

Table 7-2.
Uncertainty Matrix for Human Health Constituents of Concern

	LEVEL OF UNCERTAINTY*								
Constituent Name	**Unit History**	**Background Comparison**	**Analytical**	**Unit-Related Distribution**	**Toxicity**	**Risk Assessment**	**Exceed ARAR?**	**Overall Level of Uncertainty**	**Retain as Final COC?**
Benzo(a)pyrene	Low	High	Low	High	Low	High	High	High	No

* Uncertainty = "Low" uncertainty indicates that this analyte could be a final COC based solely on the indicated category.
* Uncertainty = "High" indicates that this analyte could not be a final COC based solely on the indicated category.

8.0 SUMMARY AND CONCLUSIONS

This section sumrnarizes the results of the RCRA Facility Investigation/Remedial Investigation/Baseline Risk Assessment (RFI/RI/BRA) for the 716-A Motor Shops Seepage Basin (MSSB). Phase I investigative activities were undertaken at the MSSB based on the conceptual site model (CSM). The preliminary CSM includes contaminant sources, primary and secondary release mechanisms, primary and secondary media impacted, exposure routes, and potential receptors.

The CSM identifies the primary source of contamination: wastewater that was formerly discharged into the MSSB via its associated process sewer line (Figure 2-l). The CSM also identifies the primary and secondary release mechanisms for contamination from these source areas. The primary release mechanisms for contamination associated with the MSSB are the deposition of wastewater onto basin surface soils (discontinued in 1983) and the infiltration and percolation of surface runoff through potential contamination within the pit and into subsurface soil. Secondary release mechanisms for contaminants in surface soil at the MSSB are volatilization, fugitive dust generation, direct contact, and biotic uptake. The secondary release mechanisms for contaminants in subsurface soils at the MSSB are leaching and excavation/bioturbation.

Additionally, the CSM identifies the media impacted by contamination released from the unit. The primary media impacted by contamination from the MSSB are surface soil in the basin and subsurface soil beneath the basin. These media are also secondary sources of contamination and may undergo chemical constituent exchange via infiltration/ percolation or excavation/bioturbation. The secondary media impacted by contamination via volatilization, fugitive dust generation, and biotic uptake include air (vapor and dust) and biota, while the secondary medium impacted via leaching is groundwater.

A phased approach was planned for conducting the RFI/RI of the MSSB (WSRC 1996c). Surface and subsurface soils were sampled during the Phase I RFI/RI. Deep soils and groundwater were to be sampled during the Phase II investigation; however, this was deemed unnecessary based on the Phase I results. This is in accordance with the decision rules presented in the work plan for the MSSB (WSRC 1996c). Area groundwater is under evaluation as part of the overall groundwater remediation approach as presented in the RCRA permit application - Corrective Action Plan for the A-O 14 outfall area (Volume III, M-Area HWMF, WSRC-IM-91-53). Potential concentrations in air and biota are derived

as part the BRA (Section 6) based on constituent levels measured in surface and subsurface soils.

The subsurface and deep soils along the process sewer line were also to be characterized during the Phase II investigation if deemed warranted by Phase I results. The Phase I soil results represent the worst case scenario for contamination at the MSSB. Based on the low levels of contaminants detected in Phase I soil samples, Phase II soil sampling along the process sewer line was also deemed unwarranted.

To determine the nature and extent of contamination, all analytes detected in MSSB soil samples are screened against a risk-based concentration (RBC) or risk-based activity (RBA), provided a value is available. The remaining constituents are screened against two times the average background concentration (Tables 4-4 and 4-5). Constituents remaining after both screening steps are identified as unit-specific constituents (USCs).

In the BRA, constituents exceeding human health RBCs/RBAs/essential nutrient criteria, ecological screening values, and twice the average background concentrations are considered COPCs and are further evaluated with respect to human health and ecological risk.

8.1 Summary of Primary Sources

For the analysis of the nature and extent of soil contamination, soil sample results are presented per the CSM (sources and pathways), as well as by depth intervals comparable to those used in the BRA (presented in Section 6). The CSM for the MSSB (Figure 2-1) identifies wastewater within the basin as the primary source of contamination for this unit. However, the discharge of wastewater to the MSSB was discontinued in 1983. Based on geologic logs (see Appendix A) for unit soil borings AOB-SB1 through AOB-SB6, none of the soil samples collected from these borings are interpreted as representing primary source material. All 12 soil samples taken from borings AOB-SB1 through AOB-SB6 are interpreted as representing secondary source material.

8.2 Summary of Secondary Sources

As previously stated, secondary sources of contamination for the MSSB include surface and subsurface soils. Phase I soil samples for characterizing these secondary sources are comprised of samples from the O-O.3 m (O-l ft) and O-l .2 m (O-4 ft) depth intervals in

borings AOB-SB 1 through AOB-SB6 (Figure 4-1). The 0-1.2 m (0-4 ft) depth interval includes the 0-0.3 m (0-1 ft) and 0.3-1.2 m (1-4 ft) sample intervals.

Analytical results for MSSB Phase I soil samples are first screened against United States Environmental Protection Agency (EPA) Region III RBCs for residential soils (EPA 1996a) or RBAs (Nix 1996), and then against unit-specific background levels (Tables 4-2 and 4-3). Constituents with detections exceeding both screening criteria are identified as USCs. The only USC identified for the MSSB is the polynuclear aromatic hydrocarbon (PAH) benzo(a)pyrene, which was detected in one of 12 soil samples at a concentration exceeding both its RBC and twice average background level (Tables 4-4 and 4-5).

PAHs can be derived from oil, coal, charcoal, or other similar substances and may be of anthropogenic or natural origin. They are not very mobile and tend to readily adsorb to soils. Based on the disposal history of the MSSB, this occurrence of benzo(a)pyrene may be unit related. However, the compound's limited frequency of detection in MSSB soils, together with the unit's proximity to a railroad known to carry coal, suggests another possible source for this contamination.

8.3 Summary of Exposure Pathways

8.3.1 Summary of Exposure Pathways Investigation Results

The CSM identifies soil, groundwater, air, and biota as possible exposure pathways for contamination from the MSSB (Figure 2-1). Results of Phase I soil sampling and analysis are presented in Section 8.2. As previously stated, groundwater and process sewer line soils were not sampled during the Phase I investigation. These media were to be sampled during Phase II; however, since only one USC was detected in Phase I unit soil samples and these samples represent the worst case for the MSSB, the Phase II investigation was deemed unwarranted. Biota and air also were not sampled during the Phase I investigation. Potential contaminant concentrations in biota and air are derived for the BRA (see Section 6) based on constituent levels measured in surface and subsurface soils.

The fate and transport of inorganic compounds and organic compounds is a function of site characteristics and the physical and chemical interactions between the contaminants and the media. The physical and chemical properties of the contaminants that influence these interactions include, but are not limited to, their volatility, solubility in water,

tendency to transform or degrade, and chemical affinity for solids or organic matter. The most important transport processes for inorganic compounds are adsorption to soil, transport with soil water, and uptake by biota, while those for organic compounds are volatilization, adsorption to soil, and transport with soil water.

The CSM illustrates the potential contaminant migration pathways and contaminant release mechanisms in various media for the MSSB. They include infiltration and percolation, leaching and transport through the subsurface flow system, and biotic uptake.

For the purpose of soil leachability analysis, contaminant migration constituents of potential concern (CMCOPCs) are defined as constituents detected in unit soils with a maximum concentration greater than twice their average background level. Table 5-1 shows the screening of the maximum detected concentrations at the MSSB against twice the average background concentrations and identifies the CMCOPCs.

Following this initial screening, a soil screening analysis is performed to determine which CMCOPCs might warrant soil leachability equations and further investigation. Table 5-4 provides the soil statistics and screening results. Two inorganic CMCOPCs (antimony and cadmium) and three organic CMCOPCs (benzo(a)anthracene, benzo(g,h,i)perylene, and phenanthrene) are retained for soil leachability calculations.

Soil leachability calculations are performed using detailed, unit-specific equations in accordance with EPA soil screening guidance (EPA 1996b). The equations estimate the concentrations of the CMCOPCs at the base of the vadose zone. Groundwater concentrations are then calculated from these values by applying a groundwater dilution factor. The nature of the input data and the analytical equation assumptions are such that the estimates of groundwater concentrations are conservative.

Based on the results of the equations (Table 5-5), none of the organic CMCOPCs are predicted to leach into groundwater and none of the inorganic CMCOPCs are estimated to reach maximum concentration within 1000 years. Therefore, none of the CMCOPCs calculated for the MSSB are likely to pose a future human health risk due to ingestion of groundwater.

8.3.2 *Summary of Exposure Pathways with Respect to Risk*

Exposure pathways describe "the course a constituent or physical agent takes from the source to the exposed individual" (EPA 1989b). Four components comprise an exposure pathway:

- A source and mechanism of constituent release
- A retention or transport medium (or media)
- A point of potential human contact with the contaminated medium (the exposure point)
- An exposure route (e.g., ingestion, dermal contact, and inhalation)

The CSM presents the exposure pathways evaluated in the risk assessment for the MSSB in a graphical form (Figures 6.2-l and 6.3-2). As shown in the model, soil and food chain pathways are considered in the human health and ecological risk assessment. Figures 6.2-l and 6.3-2 present the exposure pathways evaluated for each of the human and ecological receptors, respectively. A complete pathway exists when a receptor could be exposed to a contaminant source through one of the potential exposure routes. An incomplete pathway occurs when any pathway component is missing. Even though a complete exposure pathway may exist for a particular receptor, quantification of risk for the pathway may not be practicable due to the lack of toxicity factors or may not be warranted because of the expected minimal contribution to risk relative to other major pathways. Consequently, some pathways are only qualitatively evaluated.

The primary source of contamination from the MSSB is prior wastewater discharges released as a result of past disposal practices. Surface soil is a potential exposure point for soil constituents. Contaminants may be released from the surface soil via infiltration/percolation to subsurface soils, windblown dust, volatilization, and biotic uptake.

The following paragraphs describe exposure pathways that are applicable to the human and ecological receptors evaluated in the BRA. Current human receptors include on-unit workers. Hypothetical human receptors include potential on-unit residents and workers. Current and future ecological receptors are terrestrial organisms.

Known On-Unit Worker

The pathway identified for the quantitative evaluation of the known on-unit worker is:

- Exposure to contaminated soils through ingestion, dermal contact, and inhalation of particulates in air.

Hypothetical On-Unit Industrial Worker

The primary pathway evaluated for the hypothetical on-unit industrial worker is:

- Exposure to soils through incidental ingestion, inhalation of windblown dust in air, and dermal contact.

Hypothetical On-Unit Resident (Adult and Child)

The primary pathway evaluated for the hypothetical on-unit resident is:

- Exposure to contaminated soils through incidental ingestion, inhalation of windblown dust in air, dermal contact, and ingestion of homegrown produce.

8.4 Summary of Human Health Risk Assessment

The BRA evaluates risks to human and ecological receptors at the MSSB. This section summarizes the results of the human health risk assessment.

As discussed above in Section 8.3, both known and hypothetical receptors are quantitatively evaluated in the human health BRA as follows:

- Known on-unit workers are expected to be exposed to surface soils (O-O.3 m [O-l ft]).
- Both the future hypothetical on-unit residents and on-unit workers are assumed to be exposed to surface soils (O-O.3 m [O-l ft]) and subsurface soils (O-l .2 m [0-4 ft]). Hypothetical residents are also assumed to be exposed to homegrown produce.

Following the selection of individual receptors, cancer risk and health hazards are estimated for each constituent of potential concern (COPC) for pathway/receptor combinations based on EPA Guidance (EPA 1989b).

The reasonable maximum exposure (RME) risk estimates for current land use and future land use for human receptors at the MSSB are discussed in the following sections. Tables 6.2-l through 6.2-8 and Figures 6.2-2 through 6.2-6 provide quantitative evaluation summaries of carcinogenic risk and noncarcinogenic hazard for the pathways and receptors identified. The criteria used to evaluate potential impacts to human health are cancer risk above 1 x 1 0^{-6} and an hazard index (HI) of 1.

8.4.1 *Results for Current Land Use*

Under the current land use scenario, carcinogenic risks and noncarcinogenic hazards are characterized for exposure of a known on-unit worker to surface soil and for exposure through incidental ingestion, inhalation of windblown dust, and dermal contact.

8.4.1.1 Known On-Unit Workers

Under the current land use scenario, carcinogenic risks and noncarcinogenic hazards are characterized for exposure of an on-unit worker to soil.

Noncarcinogenic Hazard

There are no noncarcinogenic HIs for the known on-unit worker exposure pathways because reference dose (RfD) values for noncancer effects are not available for benzo(a)pyrene.

Carcinogenic Risk

Figure 6.2-2 summarizes the total risk by pathway for nonradioactive carcinogens for the known on-unit worker. All of the estimated total cancer risks are less than 1 x 10^{-6}, indicating that, under current conditions, carcinogenic risk is insignificant at the unit. Tables 6.2-l through 6.2-2 and Figure 6.2-2 present carcinogenic risks for the known on-unit worker exposure pathways.

O-O.3 m (O-l ft) Soil Interval

- For the O-O.3 m (O-l ft) soil interval, the total site cancer risk for the known on-unit worker is 1 x 1 0^{-8}.

- By comparison, exposures to the O-O.3 m (O-l ft) soil interval in the background also resulted in a total cancer risk for the known on-unit worker of 1 x 10^{-8}.

8.4.2 Results for Future Land Use

Under the future land use scenario, carcinogenic risks and noncarcinogenic hazards associated with COPCs are calculated for exposure of the hypothetical on-unit worker to surface and subsurface soils and for exposure through ingestion, inhalation of windblown dust, and dermal contact. COPCs for the same factors, plus homegrown produce, are then calculated for the on-unit resident (adult and child).

8.4.2.1 Hypothetical On-Unit Industrial Worker

Noncarcinogenic Hazard

There are no noncarcinogenic HIs for the hypothetical on-unit worker exposure pathways because RfD values for noncancer effects are not available for benzo(a)pyrene.

Carcinogenic Risk

Tables 6.2-l through 6.2-2 and Figures ***6.2-3*** through 6.2-4 summarize the estimates of total risk by pathway for carcinogens for the hypothetical on-unit industrial worker.

O-O.3 m (0-1 ft) Soil Interval

- For the O-O.3 m (O-l ft) soil interval, the total cancer risk for the hypothetical on-unit industrial worker is 3 x 10^{-6}. The risk is due to the dermal contact pathway and the risk driver is benzo(a)pyrene.
- By comparison, exposures to the O-O.3 m (O-l ft) soil interval in the background also result in a cancer risk of 3 x 10^{-6} for the hypothetical on-unit industrial worker. An appreciable cancer risk in the background is most likely due to natural variation in the concentration of metals (i.e., arsenic and beryllium) in soil.

0- 1.2 m (0-4 ft) Soil Interval

- For the 0- 1.2 m (O-4 ft) soil interval, the total cancer risk for the hypothetical on-unit industrial worker is 3 x 10^{-6}. This is due to the derrnal contact pathway and the risk driver is benzo(a)pyrene.

- By comparison, exposures to the O-l .2 m (O-4 ft) soil interval in the background also result in a cancer risk of 3 x 10^{-6} for the hypothetical on-unit industrial worker. An appreciable cancer risk in the background is most likely due to natural variation in the concentration of metals (i.e., arsenic and beryllium) in soil.

8.4.2.2 Hvnothetical On-Unit Resident

Noncarcinogenic Hazard

There are no noncarcinogenic HIs for the hypothetical on-unit resident exposure pathways because RfD values for noncancer effects are not available for benzo(a)pyrene.

Carcinogenic Risk

Tables 6.2-l through 6.2-2 and Figures 6.2-5 through 6.2-6 summarize the estimates of total risk by pathway for nonradioactive carcinogens for the hypothetical on-unit resident.

O-O.3 m (O-1 ft) Soil Interval

- For this soil interval, the total cancer risk for the hypothetical on-unit resident is 1 x 1 0^{-5}. This is below 1 x 1 0^{-4}, but exceeds the initial level of concern for cancer risk (1 x 1 0^{-6}). Pathways with cancer risks of greater than 1 x 10^{-6} include soil ingestion (Excess Lifetime Cancer Risk [ELCR] = 3 x 1 0^{-6}), dermal contact (5 x 10^{-6}), and ingestion of produce (2 x 10^{-6}) grown in the soil. Benzo(a)pyrene, which is a secondary constituent of concern (COC), is the only COC identified for the O-O.3 m (O-l ft) soil interval.

- By comparison, exposures to the same soil interval in the background result in a higher total cancer risk for the hypothetical on-unit resident (2 x 1 0^{-5}). A higher cancer risk in the background is most likely due to natural variation in the concentration of metals (i.e., arsenic and beryllium) in soil.

O-l .2 m (0-4 ft) Soil Interval

- For this soil interval, the total cancer risk for the hypothetical on-unit resident is 1 x 10^{-5}. This is below 1 x 10^{-4}, but exceeds the initial level of concern for cancer risk (1 x 1 0^{-6}). Pathways with cancer risks of greater than 1 x 10^{-6} include soil ingestion

(ELCR = 3 x 10^{-6}), dermal contact (5 x 10^{-6}), and ingestion of produce (2 x 10^{-6}) grown in the soil. Benzo(a)pyrene, which is a secondary COC, is the only COC identified for the O-O.3 m (O-4 ft) soil interval.

- By comparison, exposures to the 0- 1.2 m (O-4 ft) soil interval in the background result in a total cancer risk for the hypothetical on-unit resident of 2 x 10^{-5}. The cancer risk in the background is attributable to arsenic and beryllium in the soil.

8.5 Summary of Ecological Risk Assessment

The purpose of the ecological risk assessment (ERA) component of the BRA is to evaluate the likelihood that adverse ecological effects may occur or are occurring as a result of exposure to unit-related constituents based on a weight-of-evidence approach. An ecological risk does not exist unless a given constituent has the ability to cause one or more adverse effects and it either co-occurs with, or is contacted by, an ecological receptor for a sufficient length of time or at a sufficient intensity to elicit the identified adverse effect(s) (EPA 1994).

The assessment endpoint at the MSSB is the maintenance of the terrestrial ecosystem, with no loss of species or community alteration due to antimony or cadmium toxicity. The testable hypothesis is that the RME concentrations of antimony and cadmium present in surface and subsurface soils are not toxic to terrestrial animals at the unit. To verify or recant the testable hypothesis, a receptor species, the oldfield mouse, is selected to represent the assessment endpoint. Since it is unlikely that antimony bioaccumulates or cadmium biomagnifies in the food chain, direct measurement of antimony and cadmium concentrations in soil media, to be modeled to concentrations in the oldfield mouse, is selected as the appropriate measurement endpoint.

The ERA confirms that the RME concentrations of antimony and cadmium present in soils at the unit are not toxic to terrestrial animals at the unit. No ecological COCs are identified at the MSSB waste unit. No hazard quotients (HQs) at the MSSB are greater than 1. The constituents detected in surface and subsurface soils at the unit do not pose unacceptable risk, do not threaten the assessment endpoint for the unit, and do not impact the policy goal applicable to the unit.

8.6 Summary of Uncertainty

Uncertainty will always be associated with estimates of environmental concentrations at waste units. Uncertainty in the analytical data may be linked to sample density and distribution, collection procedures in the field, seasonal fluctuations, and accuracy of the sample analyses.

Sample collection procedures are established to reduce uncertainty in the sample results. Standard quality assurance/quality control (QA/QC) measures (e.g., proper decontamination of equipment and collection of trip blanks, field blanks, and matrix spike/matrix spike duplicates) are followed to reduce uncertainty associated with the analytical data. The uncertainty associated with sample collection procedures has the potential to either overestimate or underestimate risks to receptors.

Uncertainty also may be introduced at the laboratory. Standardized procedures are followed by the laboratory to reduce this uncertainty. For example, surrogate spikes are used to monitor constituent recovery, internal standards monitor instrument sensitivity, and laboratory blanks are used to determine whether laboratory preparation has introduced contamination to the sample. These measures are explained in the QCSR for the MSSB (Appendix B.2).

The frequency of detection for benzo(a)pyrene is one out of 12 detections, which demonstrates a level of uncertainty in the risk for this unit. The low frequency of detection for the benzo(a)pyrene has a tendency to overestimate the risk, since the only detection is used as the exposure point concentration..

8.6. I *Uncertainty in the Nature and Extent of Contamination*

Two volatile organic compounds (VOCs) (1 ,1,- 1 -trichloroethane [1 , 1,1-TCA] and tetrachloroethylene [PCE]) were detected in soil samples from the MSSB. All detections are at levels below RBCs. Most detections are qualified as estimated ("J" qualified), indicating some uncertainty in the reported concentration. Both compounds are also widespread in background soil indicating that their source is likely outside the unit.

Fourteen semivolatile organic compounds (SVOCs) (all PAHs) were detected in MSSB soils (Tables 4-4 and 4-5). All but three of these SVOCs were also detected in the background samples and one (pyrene) was also detected in laboratory method blanks. Only one SVOC (benzo(a)pyrene) was detected at a level exceeding its RBC. This

detection also exceeded the twice average background level, identifying benzo(a)pyrene as the unit's only USC.

Benzo(a)pyrene was detected in one of 12 MSSB Phase I soil samples. As previously stated, PAHs can be derived from oil, coal, charcoal, and other related substances, and may be of anthropogenic or natural origin. PAHs are not highly mobile and tend to readily adsorb to soils. The occurrence of benzo(a)pyrene may be unit related based on the disposal history of the MSSB. However, its localized occurrence at the MSSB and the unit's proximity to a railroad known to carry coal suggests another possible source for this compound.

Twenty-one TAL inorganics were detected in MSSB soil samples (Tables 4-4 and 4-5), but only four metals (aluminum, arsenic, beryllium, and iron) occur at levels above RBCs. Occurrences of metals can often be explained in terms of the varying lithology and weathering characteristics of natural soils rather than environmental contamination. High concentrations of iron and aluminum can occur in subtropical climates due to residual accumulations, where more soluble components leach out of the soil. The detections of beryllium and arsenic at levels above their RBCs but less than twice their average background levels suggest that geologic anomalies are likely responsible for these occurrences. Additionally, the method of comparison (twice the average background level) may not be sufficient to determine the natural variability of metal concentrations. Cyanide and the metals aluminum, beryllium, calcium, iron, mercury, and zinc were also detected in laboratory method blanks (EMS 1996).

Gross alpha and nonvolatile beta do not have established RBAs and are screened against a level of 0.00 pCi/g. The detected activities for both of these radiological indicators do not exceed either unit-specific twice average background levels or sitewide background levels established for them. Gross alpha was also detected in laboratory method blanks (EMS 1996).

8.6.2 Uncertainty in Fate and Transport Modeling

There are several sources of uncertainty associated with the estimation of leachability of contaminants from soil to groundwater. The major sources of uncertainty are associated with delineation of the contaminants and with uncertainly in the distribution coefficients. The uncertainly regarding the distribution of contaminants leads to a conservation assumption that the contaminants are uniformly distributed at the RME concentration. In

reality, the contaminants are not uniformly distributed and are usually sporadically distributed in the soil. The distribution coefficient is a complex function of soil chemistry (aluminum and iron oxides, organics carbon, etc.), pH, total dissolved ions, etc. As a result, distribution coefficients can range over several orders of magnitude. The distribution coefficients are best estimates based upon published values at site conditions. Other site factors such as total porosity, effective porosity, hydraulic conductivity, recharge, and bulk soil density are better known and are subject to less uncertainty. For the soil leachability analysis, conservation values are typically utilized in estimations. Despite the conservatism, no contaminant migration constituents of concern are identified.

8.6.3 *Uncertainty in the Human Health Risk Assessment*

8.6.3.1 Uncertainty in Provisional Toxicity Values for Aluminum and Iron

Aluminum and iron are not designated as COPCs or COCs for the MSSB; however, they are included in the risk evaluation of screened constituents in Appendix C.5. Both constituents were detected at the unit and in the background samples and were eliminated from the unit evaluation during the COPC screening process. There is no EPA-verified toxicity value for iron or aluminum; therefore, provisional toxicity values for the oral reference dose are used for both constituents to estimate the risks and hazards. The provisional toxicity values were developed for use by the EPA but are not included in either IRIS or HEAST because the value has not been verified by the EPA Reference Dose Workgroup personnel. Conclusions based on the use of the provisional toxicity value should be cautiously viewed in light of the weakness of the available provisional toxicity value.

Note that the United States Food and Drug Administration dietary value (DV) for iron is 18 mg/day, which for a 70 kg adult corresponds to a recommended daily dose of 0.26 mg/kg/day. This is the daily dose of iron that is recommended as part of a healthy diet. To ingest this amount of iron from soil, the concentration of iron in the soil would have to be very high, approximately 180,000 mg/kg. This assumes 350 days per year of exposure at a rate of 100 mg/day for 30 years for a 70 kg adult who receives his/her dietary iron intake from the soil (which is unlikely). The concentrations in soil at the MSSB are typically an order of magnitude lower than 180,000 mg/kg, indicating that iron in the soil is very unlikely to be of concern at the MSSB. This explanation is very basic since there are other important sources of iron, particularly in the diet. However the comparison serves to

demonstrate that there is a large discrepancy between the findings based on the provisional toxicity value for iron versus the findings based on the DV.

8.6.3.2 Uncertainty in Constituents Without Toxicity Values

Only one COPC, benzo(a)pyrene, is included in the investigation of the MSSB. Benzo(ghi)perylene and phenanthrene are screened out in the COPC selection process by using surrogates such as pyrene and fluorene. Pyrene is substituted for benzo(g,h,i)perylene and fluorene is substituted for phenanthrene. PAHs are further classified according to molecular weight and members within a group that behave similarly in the environment. Therefore, designated surrogates are used because these constituents belong to the same group as the substituted PAH.

COPCs are evaluated in both the surface O-O.3 m (O-l ft) soil and in the subsurface O-l .2 m (O-4 ft) soil intervals; however, benzo(a) pyrene was not detected in the latter interval. In addition, benzo(a)pyrene does not have EPA-verified toxicity RfD value, which also tends to underestimate the noncancer effects.

The EPA has provided interim guidance for the evaluation of some PAHs that are known to cause cancer (EPA 1995b). In this interim guidance, the EPA recommends using relative potency values (orders of magnitude) for a select group of carcinogenic PAHs to that of benzo(a)pyrene. These toxicity equivalent factors (TEFs) are used to convert each PAH concentration to an equivalent concentration of benzo(a)pyrene and are based on well-conducted studies that used complete carcinogenesis after repeated dermal exposure to mice. Although benzo(ghi)perylene and phenanthrene are in the PAH class, TEF values are not provided for these constituents. As previously explained, surrogate values are used to screen these constituents from further evaluation.

8.6.3.3 Uncertainty in the Toxicity Data

Although the EPA provides toxicity values that are point estimates, a significant amount of uncertainty is inherent within the toxicity assessment. Uncertainty is primarily caused by differences in study design, species, sex, routes of exposure, or dose-response relationships. A major source of uncertainty involves the use of toxicity values based on experimental studies that substantially differ from typical human exposure scenarios. The derivation of the toxicity values must take into account such differences as using dose-response information from animal studies to predict effects in humans, using dose-response

information from high-dose studies to predict adverse health effects from low doses, using data from short-term studies to predict long-term (chronic) effects, and extrapolating from specific populations to general populations.

The CSFs in particular are based on studies that may differ greatly from realistic situations. Experimental cancer bioassays typically expose animals to very high levels of chemicals (i.e., the maximum tolerated dose) for their entire lifetime. After the appropriate studies have been identified, the slope factor is calculated as the 95 UCL of the slope of the dose-response curve. This introduces conservatism into the risk assessment.

The derivation of RfDs generally involves the use of animal studies. Uncertainty factors ranging from 1 to 10,000 are incorporated into the RfD to provide an extra level of public health protection. The factors used depend on the type of study from which the value has been derived (e.g., animal or human, long-term or short-term). The scientific basis for this practice is somewhat uncertain. In general, high uncertainty factors are meant to bias results conservatively so that exposures at the RfD level will not result in adverse health effects.

Toxicity values are not available from the EPA for the derrnal route. Therefore, oral toxicity values have been adjusted for the dermal pathway by using chemical-specific gastrointestinal absorption factors to adjust the oral toxicity value from an administered value to an absorbed value. Once adjusted to an absorbed value, the value then may appropriately be used to evaluate dermally absorbed doses. Since in such cases the toxicologic study was not based on the dermal pathway, the adjustment of the toxicity value from an oral to a dermal value introduces uncertainty into the risk assessment that could result in overestimating or underestimating risk.

No adjustments have been made for the medium of exposure. For example, the medium of exposure at the exposure unit may be soil, whereas the medium of exposure used by the laboratory study may be corn oil. This could be a source of uncertainty in risk estimates for soil derived from the laboratory-based toxicity values.

Many chemicals exist for which no toxicity value is known and for which little information is available. Therefore, a quantitative risk estimate cannot be calculated for these chemicals. For example, many chemicals are not evaluated for the inhalation pathway because of limited inhalation-based toxicological information. The lack of toxicity information for some chemicals may contribute to the underestimation of risks.

8.6.3.4 Uncertainty in the COPC Selection Process

There is inherently some uncertainty introduced by screening constituents out before the risk assessment. The screening consists of a health-based screening and a background comparison. The health-based screen is very conservative and, for this reason, it is unlikely to result in appreciable uncertainty in the risk estimates for the remaining constituents. The background comparison is important, since it is designed to identify and eliminate constituents detected at naturally occurring levels from the risk assessment. Naturally occurring levels of constituents may, however, represent significant hazards or cancer risks.

The bias introduced by screening out constituents before the risk assessment would always underestimate the hazard or risk, since the screened constituents are not included in the risk assessment. To assess the significance of the screening process, risk estimates are calculated for the chemicals that are screened out in the COPC selection process. Tables 6.2-4 through 6.2-8 provide summaries of the unit risk/hazard and the background risk/hazard for the future industrial worker and the future adult/child receptors. Risk/hazard determinations are performed for four metals, aluminum, arsenic, beryllium, and iron, because these constituents are screened based on a comparison to their twice average background concentrations. The results of the background risk/hazard are greater than the unit risk/hazard overall for both receptors. However, both the unit risk estimates, based on background screen, and background risk estimates are within the same order of magnitude.

These findings indicate that there is minimal uncertainty in the risk estimates that may be attributable to the COPC selection process. In the case of the highest hazards or risks for the screened constituents (e.g., the cancer risk of 1×10^{-5}) and the background constituents (e.g., 3×10^{-5}), the estimates appear to be entirely attributable to naturally occurring levels of aluminum, arsenic, beryllium, and iron in the soil. Note that the background comparison used in the COPC selection process is very conservative, resulting in a high degree of confidence that unit-related constituents have not been incorrectly screened out as COPCs.

8.6.3.5 Uncertainty in the Exposure Assessment

Different types of uncertainty have been identified regarding the exposure assessment:

- Scenario Uncertainty, in which information needed to define the exposure scenario or pathway is missing or incomplete

- Parameter Uncertainty, in which not enough information exists to quantify an exposure variable or parameter

Scenario uncertainty arises when pathways were not included in or were eliminated from the assessment. The pathways that have been included in the human health risk assessment and the corresponding rationale are presented in Section 6.2.2. A future residential scenario has been evaluated, although residential conversion of the unit is unlikely and has been specifically excluded in the future use of the SRS. Therefore, the inclusion of the residential scenario is most likely conservative.

Assumptions about the future land uses are speculative. In attempting to predict future exposures, assumptions must be made concerning contaminant fate and transport, future site activities, and receptor behavior. In particular, it was conservatively assumed that contaminant concentrations will be the same in the future as they are at present.

Parameter uncertainty results partly because many of the exposure parameters (i.e., exposure factors) used in the risk assessment are default values recommended by the EPA. These default parameters, which are generally conservative, do not necessarily reflect actual behavior and have been used in the absence of site-specific information.

Exposure parameters are commonly treated as single point estimates and used in the exposure equations to calculate a single estimate for exposure and risk. These parameters are usually represented by single values, but are actually based on averages, best estimates, or high-end estimates taken from a range of values. For example, some individuals in a population may be more active than others, and some may have greater body weights than others. Individual estimates selected from the variable distribution may thus be uncertain.

Another potential pathway identified in the exposure assessment, the ingestion of homegrown produce by the hypothetical future on-unit residents, contains a higher degree of uncertainty than most of the other exposure pathways. This is due to the additional uncertainty resulting from the estimation of organic and inorganic contaminant uptake from soils to plants. There is a high uncertainty in the models used to project the uptake of contaminants in soil into plants.

8.6.3.6 Uncertainty in Multiple Chemical Exposures

Uncertainties in any phase of the risk analysis are reflected in the risk estimates. Some uncertainty is associated with the summation of risks and HQs for multiple chemical

contaminants. As stated in the EPA's previous human health risk assessment guidance documents (EPA 1989b), "The assumption of dose additivity ignores possible synergisms or antagonisms among chemicals, and assumes similarity in mechanisms of action and metabolism."

Cancer and noncancer risks are summed in the risk characterization process (separately for carcinogens and noncarcinogens) to estimate potential risks associated with simultaneous exposure to multiple chemicals. In the case of carcinogens, this approach gives chemicals that are probable human carcinogens (based on animal data or on limited human data) the same weight as chemicals that are known human carcinogens. It also weighs CSFs derived from animal data equally with those derived from human data. Uncertainties in the combined risks also are compounded because RfDs and CSFs do not have equal accuracy or levels of confidence and are not based on the same severity of effect. These methods may overestimate or underestimate the actual risk.

8.6.3.7 Uncertainty in Detection Limits that are Higher than Some Detects

In some cases, the detection limit in some soil samples may be greater than the reported value in other samples. In these cases, the detection limit may be higher than is desirable to characterize risks, since one-half the detection limit is often used. Relatively high detection limits can occur as a result of moisture variations in the soil sample, or from the need to dilute highly concentrated samples. In some cases it may be appropriate to eliminate very high detection limits from the data set used in the risk assessment, but outside of such special occasions, variable detection limits are usually included in the data set. The overall effect on uncertainty is unclear, since the true concentration of a relatively high nondetect could be either higher or lower than the average of the data set.

8.6.3.8 Uncertainty in Central Tendency Exposure Estimates

In accordance with EPA Region IV guidance (EPA 1995b), risks are calculated for both RME and Central Tendency Exposure (CTE) risk scenarios. CTE risk estimates are, by definition, representative of more likely exposures than are the RME estimates. The CTE estimates are typically not used as the basis for determining the need for remediation. They are presented to provide information regarding the significance of the risk estimates, which should be useful in the decision-making process for the MSSB.

The CTE estimates differ from the RME estimates in that the exposure assumptions (e.g., exposure frequency, exposure duration, and ingestion rate) that are used result in an exposure estimate that is generally mid-range rather than from the high end of possible exposures. For the CTE risk estimates, only the average exposure concentration is changed, while the other default parameters remain the same as the RME estimates. In comparing the CTE results to the RME results, the combined CTE risk estimates are approximately an order of magnitude lower than the RME estimates for both the industrial worker and the adult/child receptors.

8.6.3.9 Uncertainty in Adherence Factors

In accordance with EPA Region IV guidance (EPA 1995b), the soil to skin adherence factors have been modified from 0.2 mg/cm^2 to 1 .0 mg/cm^2. It also states that the value of 1.0 mg/cm^2 should be considered for the evaluation of RME intake assumptions. Since the soil intervals evaluated have been characterized as medium to coarse sands, the risk estimates are compared using an adherence factor of 0.2 mg/cm^2. The risk estimate for dermal contact using an adherence factor of 0.2 mg/cm^2 is lower by a factor of five than the risk using a factor of 1 .0 mg/cm^2 for both the industrial worker and the adult/child receptors.

8.6.4 *Uncertainty in the Ecological Risk Assessment*

Uncertainty is inherent in each step of the ERA process. Major factors contributing to uncertainty in this risk assessment are discussed qualitatively in the following sections.

8.6.4.1 Uncertainty in COPC Selection

COPC selection has an inherent degree of uncertainty because sampling data may not accurately represent the overall distribution of contamination at the unit, which could result in either overestimation or underestimation of potential risk. However, the use of maximum detected concentrations for comparison to conservative ecological screening values (ESVs) in COPC selection ensures that any chemical present at deleterious concentrations is included in the ERA. In addition, the screening intake equation conservatively assumes that the entire diet of the receptor consists of soil, all of which contains the maximum detected concentration of the analyte. There is uncertainty associated with not including bioaccumulation as part of the screening intake equation; however, previously eliminated constituents are reevaluated in the screening process to

determine whether any constituents should be re-included based on considerations such as mobility, bioaccumulation, persistence, or toxicity.

8.6.4.2 Uncertainty in the Exposure Assessment

Uncertainty in the exposure assessment is minimized by conducting unit-specific ecological characterizations and utilizing data from previous field surveys for TES evaluations. Nevertheless, the receptor species listed as potentially present at the unit are a limited subset of the species that may utilize the area to some extent for at least a portion of the year. The species evaluated in the ERA are considered to provide a conservative representation of the range of exposures that may be experienced by other species not evaluated.

In calculating constituent intakes, conservative exposure factors are assumed in order to be protective of all potential receptors. Low-end estimates of body weights and high-end estimates of ingestion rates are assumed in order to model the highest potential dose to the receptor. Conservatism also is employed in estimating UFFs, bioavailability, and percent contaminated plant and contaminated animal materials in the diet. The conservative exposure factors and exposure concentrations used provide confidence that the calculated intakes are reasonably conservative estimates for the receptor populations. Intakes from dermal and inhalation exposures are not quantifiable for ecological receptors. However, this does not significantly increase the uncertainty of the estimated total intake because, for most receptors, intakes via these routes are likely to be minimal relative to intakes via ingestion.

8.6.4.3 Uncertainty in the Toxicity Assessment

There is uncertainty associated with ESVs used in this ERA because the toxicity data are not unit-specific. Opresko et al. (1995) toxicity values are utilized in this assessment. Limitations in toxicity values from the Opresko et al. data base are common to most other toxicity data sources. These limitations include variations in physiological or biochemical factors that may exist among species, behavioral and ecological parameters that may make a species' sensitivity to a contaminant different from that of the test organism, and limited information on long-term effects on natural populations.

To minimize this uncertainty, NOAELs are selected or derived for screening purposes based on a standard protocol. NOAELs are the lowest available, appropriate toxicity

values that are relevant to the receptors. The resulting ESVs are very conservative and, in some instances, may dramatically overestimate the toxic potential of COPCs at the unit. In addition, most laboratory studies use highly bioavailable forms of chemicals during NOAEL derivations. Since most chemicals in nature are bound or associated with inorganic matrices or organics, many are not as bioavailable as the forms used in the laboratory studies. The combination of maximum intakes and conservative ESVs provide confidence that the COPCs resulting from screening are conservative.

8.6.4.4 Uncertainty in Risk Characterization

Uncertainty in the risk characterization is a direct result of the methodology employed in the preceding sections of the ERA. The conservative methodology and assumptions used in the COPC selection, exposure assessment, and toxicity assessment are expected to overestimate, rather than underestimate, the potential for COPCs to pose risk to assessment endpoints. By overestimating risk, the actual risk of deleterious effects is likely to be less than indicated by the calculated ecological quotients. Thus, a list of COPCs having HQs greater than 1 is conservative and is reviewed using professional judgment to reduce uncertainty regarding which COPCs actually pose ecological risk to assessment endpoints and thereby warrant designation as final COCs in Section 7.

8.7 Remedial Goal Options and Preliminary Remedial Alternatives

Remedial goal options (RGOs) are designed to provide conservative, long-term targets for the selection and analysis of remedial alternatives. Preliminary COCs, which include primary and secondary COCs, are selected because they exceed risk-based criteria in the BRA or because they are projected to have the potential to leach to the groundwater at levels exceeding an MCL or RBC (Section 5). Primary COCs in the human health risk assessment are defined as constituents that either individually produce or significantly contribute to risk estimates that exceed a 1×10^{-4} risk or an HI of 3 by selecting individual COCs exceeding a risk of 1×10^{-6} or an HQ of 1 in any pathway. If, for example, the risk estimate from exposure to surface soil were greater than 1×10^{-4} (or HI greater than 3), then all of the constituents significantly contributing to that risk/hazard would be identified as COCs. Each pathway (e.g. ingestion, inhalation, dermal contact, and ingestion of produce) would be investigated to determine the source of the most important constituents

Secondary COCs in the human health risk assessment are individual COPCs that have a chemical-specific carcinogenic risk of at least 1×10^{-6} or a noncarcinogenic hazard of 0.1 that contributes to a pathway hazard of 1 or greater. Secondary COCs are those chemicals that are not identified as primary COCs for a particular receptor. If the level of a constituent in a given medium exceeds a Federal or state chemical-specific ARAR, that constituent is also included as a COC (EPA 1995b).

In the current land use scenarios, the risk assessment evaluates surface soil exposures for known on-unit workers occasionally in close proximity to the MSSB. The one exposure unit defined for the MSSB is surface soils. No COCs are determined under current land use assumptions, only under hypothetical future assumptions.

Residential and industrial exposure scenarios are evaluated in the human health risk assessment under future land use assumptions. The soil exposure units and surface and subsurface soil intervals are applied to the future scenarios.

Benzo(a)pyrene is the only human health preliminary COC detected in surface soils (0-0.3 m [0-1 ft] interval). It exceeds human health risk-based criteria (highest risk = 1×10^{-5} for the hypothetical adult/child receptor); the dermal pathway is the most significant risk contributor, 5×10^{-6}. Benzo(a)pyrene was not detected in the subsurface soils greater than 0.3 m (1 ft). Although benzo (a)pyrene exceeds human health risk-based criteria, it is eliminated from further consideration as a COC for the following reasons:

- The use of 1 mg/cm^2 as the soil-to-skin adherence factor is high, which causes the risk to be high and very conservative in nature.

- When comparing CTE risk estimates to RME estimates, the combined CTE estimates are an order of magnitude lower than the RME estimates for both the industrial worker and the adult/child receptors. Risks are probably significantly overestimated by using the RME value and a high soil adherence factor. The CTE risk estimates are, by definition, representative of more likely exposures than are the RME estimates.

- Benzo(a)pyrene was detected in one out of six surface soil samples and in one out of 12 subsurface soil samples (which includes the 0-0.3 m [0-1 ft] interval). Therefore, the frequency of detection is very low.

- Benzo(a)pyrene was detected two out of six times in the background samples for the surface soils. Organics are not screened out based on background comparisons as part of the COPC selection process for the risk assessment.

- Benzo(a)pyrene is probably not associated with past unit practices and characterization indicates that it is probably not unit related.

Since benzo(a)pyrene is eliminated from further consideration as a COC, no human health RGOs are determined for this unit.

No ecological COCs are identified at the MSSB; therefore, ecological RGOs are not calculated. No contaminant migration COCs are identified at the MSSB; therefore, contaminant migration RGOs are not calculated.

Preliminary remedial alternatives for the MSSB may include (1) no action or (2) the placement of institutional controls. The no action alternative would involve leaving the basin in its current condition with no additional controls. Since the basin no longer receives wastewater from the process sewer line, the only source of influent to the basin is stormwater. The institutional controls alternative would provide for additional signage to warn site workers and visitors and mandate future deed restrictions or notifications (as appropriate) to limit future activity to exclusively industrial use (if the land were transferred from Federal ownership).

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APPENDIX A

FIELD REPORT FOR THE 716-A MOTOR SHOPS SEEPAGE BASIN PHASE I CHARACTERIZATION SAMPLING

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FIELD REPORT
FOR THE
716-A MOTOR SHOPS SEEPAGE BASIN
PHASE 1 CHARACTERIZATION SAMPLING

FINAL

JULY **1996**

Prepared For:

Westinghouse Savannah River Company

Savannah River Site

Aiken, South **Carolina**

Prepared **By:**

Rust **Environment &** Infrastructure

33 Varden Drive

Aiken, South Carolina

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LIST OF ACRONYMS

ACGIH	American Conference of Governmental Industrial Hygienists
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
cm	centimeter
CNS	Central Nervous System
CVS	Card&Vascular System
COC	chain of Custody
EMS	Environmental Monitoring Section
EPD	Environmental Protection Department
ft	feet
HNU	Trace Gas Analyzer
HSO	Health and Safety Officer
ID	identification
IDLH	Immediately Dangerous to Life and Health
in.	inch
km	kilometer
m	-meter
mi	mile
msl	mean sea level
MSSB	Motor Shops Seepage Basin
NIOSH	National Institute for Occupational Safety and Health
NPDES	National Pollution Discharge Elimination System
OVA	organic vapor analyzer
PEL	Permissible Exposure Limit
ppb	parts per billion
ppm	parts per million
RCRA	Resource Conservation and Recovery Act
RFI	Remedial Facility Investigation

LIST OF ACRONYMS (continued)

RI	Remedial Investigation
Rust E&I	Rust Environment and Infrastructure Inc.
SRS	Savannah River Site
STEL	Short Term Exposure Limit
TAL	Target Analyte List
TCL	Target Compound List
TIC	Tentatively Identified Compounds
TLV	Threshold Limit Value
TOC	Total Organic Carbon
TPH	Total Petroleum Hydrocarbons
TSD	Treatment, Storage, Disposal
TWA	Time Weighted Average
WSRC	Westinghouse Savannah River Company

1.0 INTRODUCTION

1.1 summary

Soil sampling was performed at the 716-A Motor Shops Seepage Basin (MSSB) as part of the Remedial Facility Investigation o/Remedial Investigation (RI) Phase 1 Characterization. Six soil borings (ABK-SB1 through ABK-SB6) outside the unit were sampled to characterize background chemical concentrations for the area. Six soil borings (AOB-SB1 through AOB-SB6) were sampled inside the unit to determine the extent of soil contamination. Surface [0 to 0.3 m (0 to 1 ft] and subsurface [0.3 m to 1.2 m (1 to 4 ft)] samples were collected at each boring. No confining units were penetrated. Groundwater samples were not collected during this task

The Sample Collection Croup of the Environmental Monitoring Section (EMS) of Westinghouse Savannah River Company (WSRC) collected and pa&aged the soil samples according to WSRC Guidance Document 3Q5. The samples were subsequently forwarded to an analytical laboratory with completed Chain-of-Custody (COC) forms. Rust Environment & Infrastructure (Rust E&I) provided technical oversight to ensure the implementation of the sampling plan, reviewed the Site-Specific Health and Safety Plan (SSHASP), and supplied the designated project Health and Safety Officer (HSO). Field screening for volatile organic compounds was performed. The borings were abandoned according to WSRC 3Q5.

1.2 Project Scope and Objectives

The Scope of Work, as described in WSRC TOAD ER 39-093, Rev. 0, requested technical oversight and HSO support for field work, oversight of sampling plan implementation, and production of a written report summarizing all field activities associated with the 7 16-A Motor Shops Seepage Basin Phase 1 Characterization.

The project objective was to collect soil samples for background and unit characterization. Six soil borings (ABK-SB1 through ABK-SB6) were installed for the background characterization to

obtain unit-specific reference data for soil. The soils at the sampling locations were presumed to be unaffected by unit activities, and will be used for statistical comparisons between the background data and the unit data to determine the level and extent of contamination present. The sample intervals were proposed to also support human health and ecological risk evaluation.

Six soil borings (AOB-SB1 through AOB-SB6) were installed in the unit to determine the presence of hazardous substances and, if so, whether contamination had spread beyond the basin boundaries due to overflow or other mechanisms. Comparisons will be made between the unit samples and the background samples. Background samples were collected from environments and soil horizons that are geochemically and/or ecologically similar to the unit and that are exposed to the same gross environmental conditions as soils within the unit. Therefore, any differences between the two sets of soils can be attributed to site activities.

A description of the site and its location is provided in Section 1.3. A brief description of the geologic setting and soils encountered during this project is provided in Section 1.4. The EMS sampling crew collected., packaged, and shipped the samples as described in Section 2.1. Rust E&I assumed the role of HSO (Section 2.2) and provided technical oversight of the sampling activities.

1.3 Site Description and Location

The 716-A MSSB was constructed and placed in service in 1977 to receive liquid waste from the 716-A Motor Shops oil/water separator. The 716-A MSSB was designed and constructed as an unlined seepage basin. The basin measures 63.1 m (207.0 ft) long, 10.7 m (35.1 ft) wide, and 2.0 m (6.6 ft) deep, (Huber et al., 1987) with total operational capacity of approximately 1218 m^3 (43,000 ft^3). The seepage basin is completely surrounded by a berm 2.0 m (6.6 ft) high. The northwest side is adjacent to a railroad track. Wastewater flowed into the basin from the northwest through an influent pipe from the Motor Shop (Building 716-A). A second influent pipe (from the northwest) was discovered during a site visit conducted during the development of

the RFI/RI Work Plan. Motor Shops wash water and waste passed through an oil/water separator before being discharged to the basin. Liquid wastes seeped naturally into the soil beneath the basin. The basin has not been closed, but all discharges to the basin were terminated in 1983 and the influent lines from the Motor Shops were capped (Huber et al., 1987). Effluent discharges from the Motor Shops included wastewater with trace amounts of engine oil, grease, kerosenes, ethylene glycol, and soapy water. A ramp was built into the eastern end of the basin in 1988 (WSRC, 1990) to facilitate soil sampling. The basin currently acts as a wet-weather pond, which contains water after rainfalls and is covered with natural vegetation, including shrubs and grasses.

The 716-A MSSB is located in the A Area of the Savannah River Site (SRS) (Figure 1). The A Area is located in the northwestern corner of the SRS, and serves as a main administrative area and research center for the site, It is located atop a wide, flat ridge within the Savannah River drainage basin. The 716-A MSSB is located in A Area south of the railroad tracks near the automotive shop (Figure 2). The elevation varies between 103.7 to 106.8 m (340 to 350 ft) msl and slopes gently to the southwest. A small drainage feature runs through the area approximately 91.5 m (300 ft) to the east of the MSSB. The headwater is permitted as a National Pollution Discharge Elimination System (NPDES) outfall (A-011). This drainage feature turns southwest and discharges into a tributary of Tims Branch. Tims Branch discharges into the Upper Three Runs Creek located 5.6 km (35 mi) to the southeast. There is no surface water connection between the MSSB and the drainage feature. The A Area includes several Resource Conservation and Recovery Act/Comprehensive Environmental Response, Compensation, and Liability Act (RCRA/CERCLA) units. Three such areas are shown in Figure 2, and includes the MSSB, the A-Area Rubble Pile, and the A-Area Coal Pile Runoff Containment Basin.

1.4 Geologic Framework

SRS is located in the Upper Coastal Plain physiographic province. The northwestern boundary is approximately 32 km (20 mi) southeast of the fall line, where the Coastal Plain sedimentary

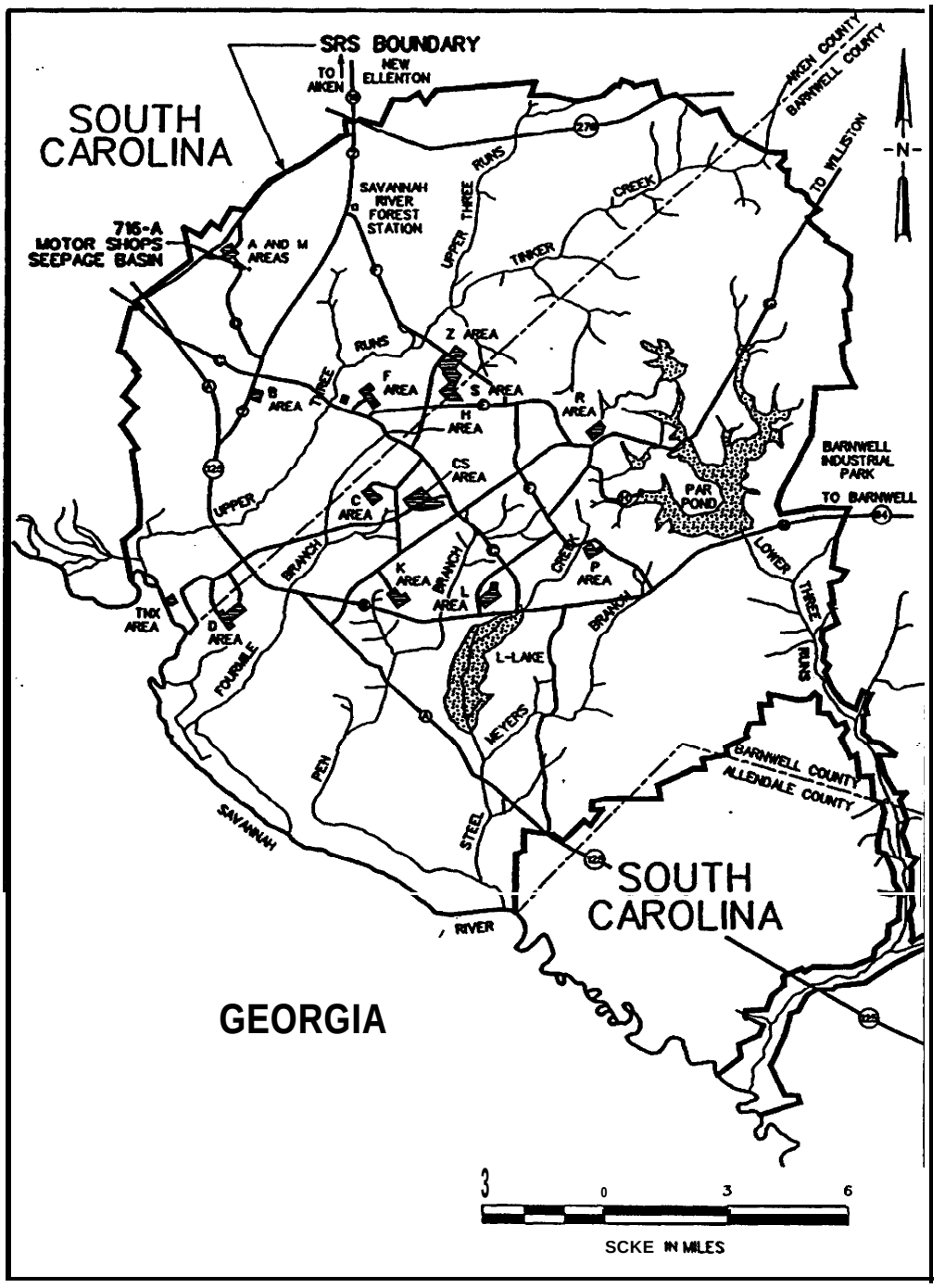

Figure 1. Location of the 716-A **Motor Shop Seepage Basin in Relation to Major SRS Facilities**

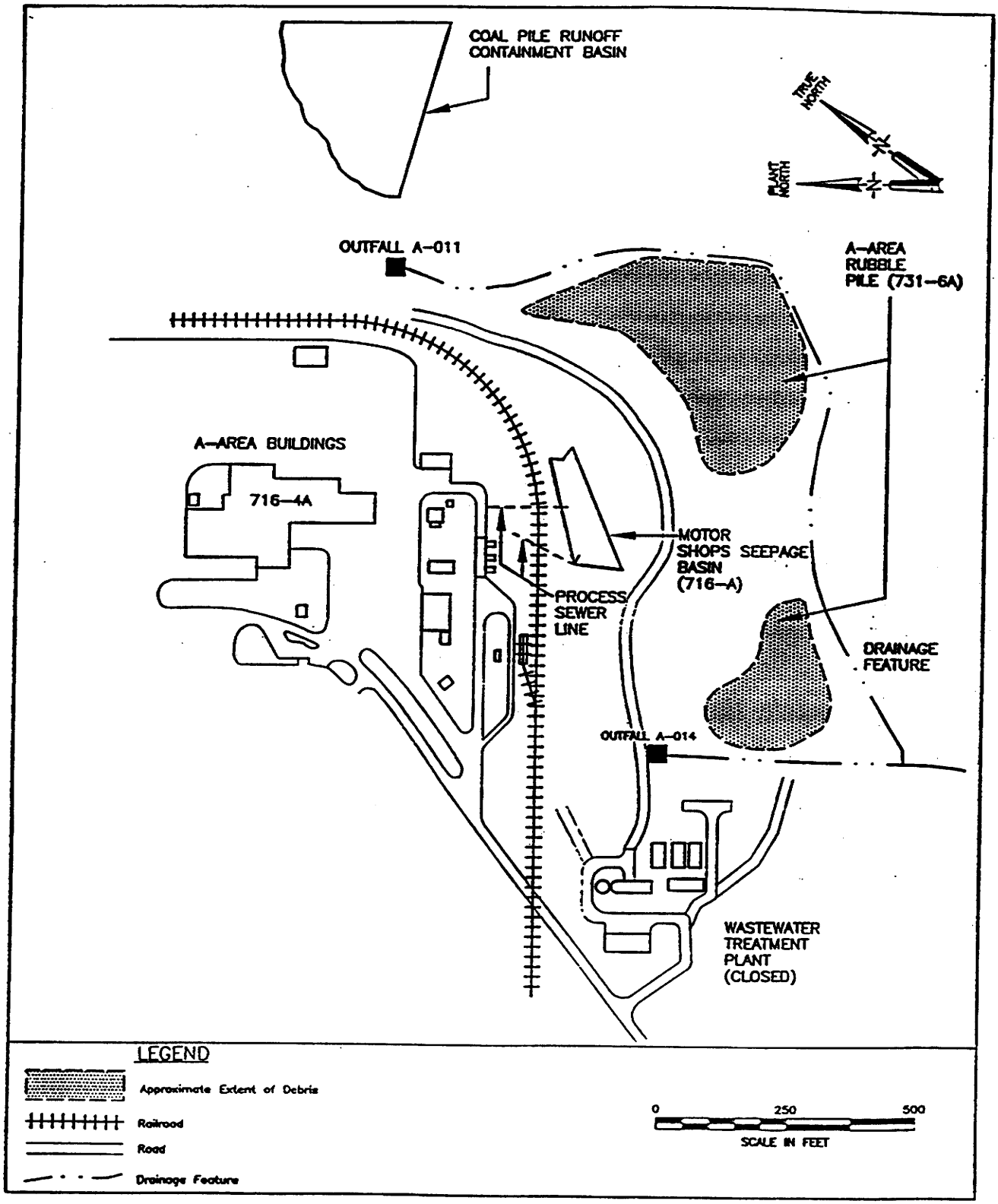

Figure 2. **Motor Shops Seepage Basin Location Map**

wedge thins to zero over the crystalline **rocks** of the Piedmont **physiographic** province. This wedge of Tertiary and **Cretaceous** strata thickens from about 213 to 427 m (700 to **1400** ft) at SRS. The **fluvial** to marine sedimentary wedge consists of alternating sand and clay, with **common** tidal and shelf **carbonates common** in the **downdip** Tertiary **section.** The carbonates become more common in far **downdip** areas. Carbonates are present beneath the SRS, and past drilling and sampling investigations have been hampered by lost circulation zones within the calcareous material. The discussion of geology and stratigraphy in this report include only the "upland unit" (Tertiary sediments) near the surface because the sampling intervals are shallow. The hydrogeology is not discussed because the field investigation for this project is limited to the vadose zone. The geology and **hydrogeology** for the unit are discussed in detail in the **RFI/RI** Work Plan for the Motor Shops Seepage Basin **(WSRC, 1996a).**

1.4.1 *"Upland Unit"/Hawthorn Formation*

Exposures of the "Upland unit" **occur** at land **surface** at higher elevations over much of the **SRS. In** general, deposits are thicker in the northern and northwestern portion of the site. Although age **determination** is incomplete, **Nystrom** and others (1986) **discuss evidence** that the unit is of Miocene age. **The** unit is comprised of poorly sorted, silty, **clayey,** pebbly sand and conglomerates. Weathered feldspar is abundant in **places.** The **color** is variable, and **facies** changes are **abrupt.** The environment of **deposition appears** to be **fluvial.** Thickness is **highly** variable due to the channeling of the underlying Tobacco Road during deposition of the "Upland unit", and subsequent erosion of the "Upland unit" itself.

2.0 **FIELD** METHODS

2.1 Geologic Sampling

Field work for this project was conducted between April 19 and April 23, 1996. Field activities included hand augering, soil description, sample collection, sample handling, Chain-of-Custody maintenance, and sample shipment. **Sampling** services were provided by WSRC EMS. Rust

E&I provided technical oversight services to WSRC and ensured compliance with requirements specified in WSRC 3Q5. Rust E&I also served as the project HSO. Records collected by Rust E&I personnel 'for each borehole included daily activity reports, daily sign&/sign-out logs, atmospheric monitoring logs, soil boring reports, and field geologic logs. Borehole records are combined and arranged according to borehole number and are presented in Appendices A through D.

Six background sampling locations (ABK-SB1 through ABK-SB6) were chosen to characterize the background soil chemistry for the area (Figure 3). The coordinates and elevations of these sample locations are presented in Table 1. In each boring, soil samples were collected from 0-0.3 m (0-1 ft) for the surface interval and 0.3-1.2 m (1-4 ft) for the subsurface interval, Six sampling locations (AOB-SB1 through AOBSB6) inside the unit were chosen to characterize the basin (Figure 4). As presented in Table 2, the samples were analyzed for the following

- TCL Volatiles
- TCL Semivolatiles
- TCL Pesticides/PCBs
- TAL Inorganics
- Gamma PHA
- Alpha Speciation
- Beta Speciation
- pH
- T P H
- TOC

Hand auger drilling techniques were used for background and unit sample collection. A stainless steel 3-in. diameter hand auger was used in each borehole to collect the soil samples and advance the borehole. The soil was removed from the hand auger and visually examined and lithologically described in the field by the technical oversight. The soil (except for VOC sample)

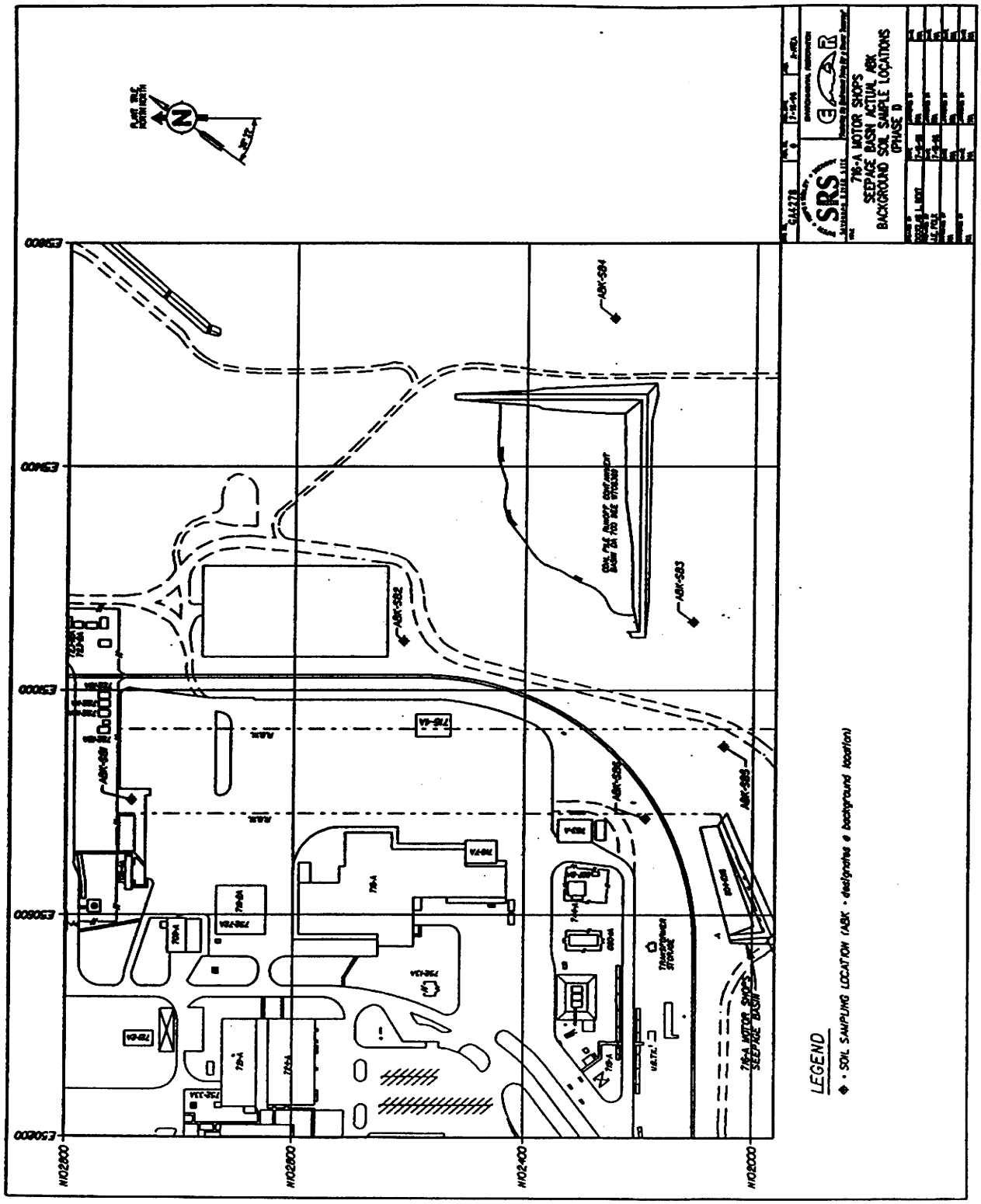

Figure 3. Motor Shops Seepage Basin Background Characterization Locations

Table 1

Sampling Location Coordinates and Elevations

Sample Location	Coordinates		Elevation
	North	East	
ABK-SB1	103085.1858	50805.5177	370.022
ABK-SB2	102610.6556	51088.5867	364.845
ABK-SB3	102105.7719	51122.0048	348.616
ABK-SB4	102247.6605	51666.2536	344.152
ABK-SB5	102051.0021	50900.1169	346.759
ABK-SB6	102187.9218	50771.7249	362.975
AOB-SB1	102066.4036	50735.5085	346.969
AOB-SB2	102062.9654	50695.9178	346.036
AOB-SB3	102045.8522	50626.5856	344.649
AOB-SB4	102042.8769	50666.4054	344.344
AOB-SB5	102032.7514	50634.2496	344.078
AOB-SB6	102024.0570	50585.2434	343.104

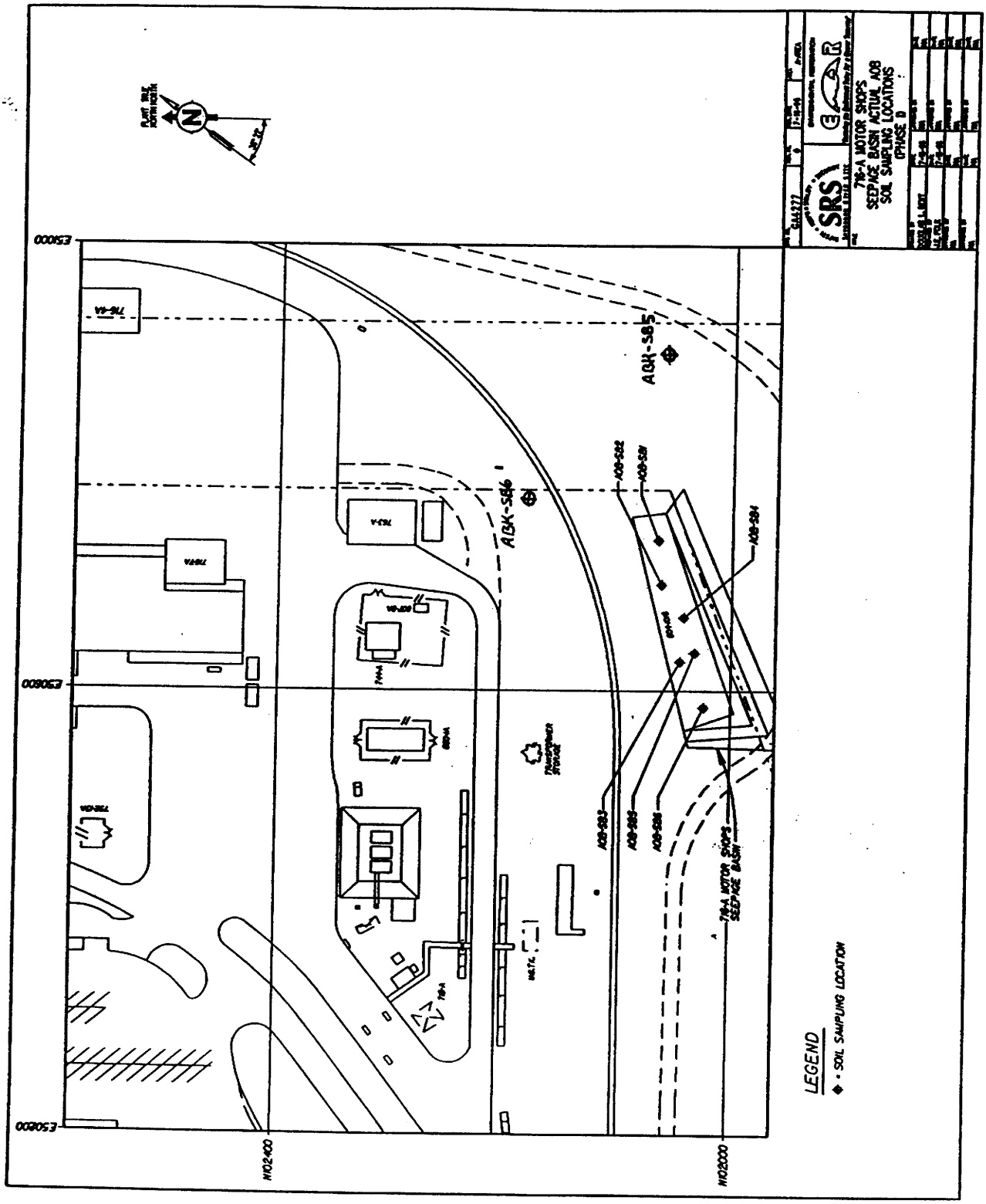

Figure 4. **Motor Shops Seepage Basin Sample Locations**

Table 2

Summary of Samples and Constituents Analyzed

Sample Number	Sampling Instrument	Sample Type	Sample Location	Sampling Interval (ft)	Constituents for Analysis (*)
ABK-SB1-1	Hand Auger	Soil	Background	0-1	1,2,3,4,5,6
ABK-SB1-2	Hand Auger	Soil	Background	1-4	1,2,3,4,5,6
ABK-SB2-1	Hand Auger	Soil	Background	0-1	1,2,3,4,5,6
ABK-SB2-2	Hand Auger	Soil	Background	1-4	1,2,3,4,5,6
ABK-SB3-1	Hand Auger	Soil	Background	0-1	1,2,3,4,5,6
ABK-SB3-2	Hand Auger	Soil	Background	1-4	1,2,3,4,5,6
ABK-SB4-1	Hand Auger	Soil	Background	0-1	1,2,3,4,5,6
ABK-SB4-2	Hand Auger	Soil	Background	1-4	1,2,3,4,5,6
ABK-SB5-1	Hand Auger	Soil	Background	0-1	1,2,3,4,5,6
ABK-SB5-2	Hand Auger	Soil	Background	1-4	1,2,3,4,5,6
ABK-SB6-1	Hand Auger	Soil	Background	0-1	1,2,3,4,5,6
ABK-SB6-2	Hand Auger	Soil	Background	1-4	1,2,3,4,5,6
AOB-SB1-1	Hand Auger	Soil	On-Unit	0-1	1,2,3,4,5,6
AOB-SB1-2	Hand Auger	Soil	On-Unit	1-4	1,2,3,4,5,6
AOB-SB2-1	Hand Auger	Soil	On-Unit	0-1	1,2,3,4,5,6
AOB-SB2-2	Hand Auger	Soil	On-Unit	1-4	1,2,3,4,5,6
AOB-SB3-1	Hand Auger	Soil	On-Unit	0-1	1,2,3,4,5,6
AOB-SB3-2	Hand Auger	Soil	On-Unit	1-4	1,2,3,4,5,6
AOB-SB4-1	Hand Auger	Soil	On-Unit	0-1	1,2,3,4,5,6
AOB-SB4-2	Hand Auger	Soil	On-Unit	1-4	1,2,3,4,5,6
AOB-SB5-1	Hand Auger	Soil	On-Unit	0-1	1,2,3,4,5,6
AOB-SB5-2	Hand Auger	Soil	On-Unit	1-4	1,2,3,4,5,6
AOB-SB6-1	Hand Auger	Soil	On-Unit	0-1	1,2,3,4,5,6
AOB-SB6-2	Hand Auger	Soil	On-Unit	1-4	1,2,3,4,5,6

* Constituents for Analysis as follows:

1. Target Compound List (TCL) and Tentatively Identified Compounds (TIC)
2. Target Analyte List (TAL)
3. Radiological Analytes
4. pH
5. Total Petroleum Hydrocarbons (TPH)
6. Total Organic Carbon (TOC)

was gently homogenized to ensure a representative composite sample over the depth of the sample interval. Each sample was placed in appropriate laboratory-supplied containers and stored in iced coolers onsite until prepared for offsite shipment. Boring ABK-SB2 had 0.1 m (0.3 ft) of "crush-and-run" rock at surface. The rock was removed and sampling continued. The remaining borings were sampled without problems.

An HNu Trace Gas Analyzer (HNu) was used to monitor for volatile organics that could possibly emanate from the borehole. Elevated readings (10-20 ppm) were detected from boring ABK-SB4. The EMS samplers recalled that herbicides/pesticides were recently sprayed on foliage adjacent to the boring, and may be responsible for the detections. A visual inspection of the surrounding area and foliage supported this theory.

Geologic logs were prepared by the field geologist in the field. The field logs are included in Appendix A and are arranged by borehole number. Grain-size classification was based upon a modified Wentworth Scale in accordance with WSRC 3Q5. A summary of grain size classification is as follows:

Grain Size Classification	Diameter (mm)
Pebbles	4-64
Granules (very fine pebbles)	2-4
Very Coarse Sand	1-2
Coarse Sand	1/2 - 1
Medium Sand	1/4 - 1/2
Fine Sand	1/8 - 1/4
Very Fine Sand	1/16 - 1/8
silt	1/256 - 1/16
Clay	<1/256

Size fraction percentages were based upon visual inspection and comparison with percentage charts. The degree of sorting present in the sample was based upon visual analysis. The following sorting classification system was used:

Well Sorted	**90%** of sample within two sand size classes
Moderately Sorted	90% of sample within three sand size classes
Poorly sorted	90% of sample within four sand size classes
Very Poorly Sorted	90% of sample within more than four size classes

Color descriptions were based upon comparisons with a standard Munsell™ color chart. The features described on the logs consisted primarily of major sediment type, texture, color, sedimentary structures, and accessory minerals. In general, grain sizes, percentages, color, and roundness were described by comparison with charts.

Sample handling procedures and associated decontamination, and quality control procedures were followed as specified in WSRC 3Q5. All down-hole equipment (hand auger buckets, stems) and sampling quipment was properly decontaminated prior to use and between sampling intervals to prevent cross contamination between sampling locations.

Preparation for soil sample collection included decontamination of the soil sampling equipment. Sampling equipment (split-spoons, stainless steel bowls, spatulas, etc.) was decontaminated prior to use in accordance with the following cleaning procedures:

- cleaned with deionized water and phosphate-free laboratory detergent, (Alconox™) using a brush if necessary to remove particulate matter and surface films
- rinsed thoroughly with deionized water
- rinsed with pesticide-grade isopropanol solvent
- rinsed thoroughly with deionized water, and allowed to air dry before use
- wrapped completely with aluminum foil to prevent contamination if stored or transported

Clean, disposable gloves were worn while handling sampling equipment or downhole tools during decontamination. Deionized water was stored in dedicated plastic containers and applied from plastic pump sprayers or decanted directly from the storage container.

Preparation for sample collection included pre-printed COC forms, pre-printed labels with bar code identification system, and receipt of required laboratory containers (including laboratory trip

blanks). Sample container and documentation kits were then prepared (containers for each interval at each sampling location). A pair of identical bar codes were attached to the sample containers prior to shipment to SRS. When the sample was collected in the field, one bar code was placed on the appropriate section of the COC forms. The other bar code was placed in the Environmental Protection Department (EPD)/EMS Soil Sample Logbook under the sample identification (ID) numbers for that specific sampled interval in that specific soil boring. The EMS sampling group recorded the required documentation in the EPD/EMS Soil Sample Logbook

2.2 Site-Specific Health and Safety Objectives

Rust E&I served as the HSO for the Phase I field characterization of the 716-A MSSB. WSRC generated a Site-Specific Health and Safety Plan for the field work (WSRC, 1996b). The Rust E&I Regional Health and Safety Officer reviewed and approved this plan prior to field activities. The Rust E&I HSO held a site-specific Health and Safety Briefing for all Personnel who required access inside the work zone (Appendix E). The HSO assured compliance with all H&S requirements outlined in the SSHASP and was present during all field activities. Listed below ate the specific duties of the HSO as outlined in the SSHASP:

- Assure that all site personnel and authorized visitors sign an entry/exit log.
- Assure that all site personnel and authorized visitors provide appropriate documentation of medical clearance and OSHA training. (If documentation is not available or outdated, the HSO must escort the unauthorized individual(s) from the work area.)
- Verify that the personal protective equipment specified in the SSHASP is used.
- Routinely monitor the ambient air for contaminants as specified in the SSHASP.
- Monitor personnel and equipment decontamination activities.
- Conduct pre-entry briefings for all personnel entering the work area and periodic safety briefings (as required).

- Monitor the performance of all personnel to assure that required work practices are followed,
- Assist with coordination of any emergency response activities.

2.2.1 Exposure *Routes*

Initial unit screening was performed at the 716-A MSSB in November 1988 (WSRC, 1990). A list of the contaminants identified is presented in Table 3. The routes of exposure for each contaminant are also listed. The breathing zone and work zone were monitored with an HNu to ensure personnel safety. Routes of exposure include ingestion, inhalation, dermal contact and skin absorption. These are addressed under the general Health and Safety Measures and Hazard Prevention sections of the SSHASP (Sections 8.3 and 3.2, respectively). Requirements listed below were followed by all field personnel as precautionary measures designed to minimize hazards associated with this task and reduce the risks of inadvertent or accidental chemical exposure or injury during field operations:

- Review the list of contaminants suspected to be onsite and perform air monitoring as required.
- Conduct a thorough underground utilities search before the commencement of drilling.
- Wear hard hats at all times when working in areas with overhead hazards.
- secure loose clothing.
- Wear proper protective clothing, including gloves and tyvek suits (as required), to minimize contact with contaminated materials.
- Follow procedures outlined in Section 3.1.2 of the SSHASP for heat stress.
- Stop sampling operations upon the first sign of severe weather that may produce lightning or other conditions creating hazards to personnel or equipment. Personnel must move away from the sampling equipment that may attract lightning.

Table 3

Contaminants Identified in the 716-A MSSB

Chemical (Ionization Potential)	Exposure Limits	Routes of Exposure	Symptoms/ Target Organs	Media/Maximum Concentration
Tetrachloroethylene (9.32)	PEL: 100 ppm TLV: 25 ppm, A3 STEL: 100 ppm, A3	Inhalation Contact Ingestion	Eye, Nose, throat irritant; nausea; flush face & neck; vertigo; dizziness; incoherence; headache; skin erythemia; liver damage/liver, kidneys, eyes upper respiratory system CNS	Groundwater/ 47 ppb
Trichloroethylene (9.45)	PEL: 100 ppm TLV: 50 ppm, A5 STEL: 100 ppm, A5 IDLH: Ca (1000 ppm)	Inhalation Contact Ingestion	Headache, tremors, nausea, vomiting, eye irritant, dermatitis, vertigo, visual disturbance, arrhythmias/Respiratory system, heart, liver, kidneys, CNS, skin	Groundwater/ 44 ppb
Acetone	PEL: 750 ppm TLV: 750 ppm STEL: 1000 ppm IDLH: 20,000 ppm	Inhalation Ingestion Contact	Irritates eyes, nose, throat; headache, dizziness; dermatitis/Respiratory system, skin	Soils/ 160 ppb
Methylene Chloride	PEL: 500 ppm, C1000 ppm, 2000 ppm (5-min max peak in any 2 hrs.) TLV: 50 ppm, A2 IDLH: Ca (5000 ppm)	Inhalation Ingestion Contact	Fatigue, weak, sleepiness, light headedness; limbs numb, tingle; nausea; irritation eyes, skin; carcinogen/Skin, CVS, eyes, CNS	Soils/ 20 ppb
Chlorodiphenyl (54% chlorine)	PEL: 0.5 mg/m^3 (skin) TLV: 0.5 mg/m^3 IDLH: Ca (5 mg/m^3)	Inhalation Skin absorption Ingestion Contact	Irritation eyes, skin; acne-form dermatitis; carcinogen; in animals: liver damage/Skin, eyes, liver	Soils/ 1400 ppb
Arsenic	PEL: 0.01 mg/m^3 TLV: 0.01 mg/m^3	Inhalation Skin absorption Ingestion Contact	Ulceration of nasal septum, dermatitis, GI disturbances, peripheral neuropathy, respiratory irritation, hyperpigmentation of skin; carcinogen; Liver, kidneys, skin, lungs, lymphatic system	Soils/3.6 mg/kg
Mercury	PEL: 0.01 mg/m^3 TLV: 0.01 mg/m^3 STEL: 0.03 mg/m^3 (skin) IDLH: 10 mg/m^3	Inhalation Skin absorption Ingestion Contact	Paresthesia; ataxia, dysarthria; vision, hearing disturbance; spastic, jerky; dizziness; salivation; lacrimation; nausea, vomiting, diarrhea, constipation; skin burns; emotional disturbance/CNS, kidneys, eyes, skin	Soils/ 0.35 mg/kg 0.46 ug/l
Coal tar pitch volatiles (Pyrene)	PEL: 0.2 mg/m^3 TLV: 0.2 mg/m^3, A1 IDLH: Ca (700 mg/m^3)	Inhalation Contact	Dermatitis, bronchitis, carcinogen	Soils/ 620 ppb

Table 3 (continued)

Contaminants Identified in the 716-A MSSB

Notes and Abbreviations:

- Source: WSRC, 1990
- Ionization **potential is from the NIOSH Pocket Guide to Chemical Hazards in electron volts (eV).**
- **PEL:** Permissible Exposure Limit fiom **OSHA** 1910 Time Weighted Average **[TWA** unless indicated by c **(Ceiling)]**
- **TLV: Threshold** Limit **Value** set by the American Conference **of** Governmental Industrial Hygienists **(ACGIH) 1993/1994;** Tii Weighted Average (TWA).
- Al: **Confirmed** Human Carcinogen by the ACGIH
- **A2:** Suspected Human Carcinogen by the **ACGIH**
- A3: Animal **Carcinogen** by the ACGIH
- AS: Not suspected as a Human Carcinogenic by the **ACGIH**
- **STEL:** Short term **Exposure** Limit by the ACGIH
- **IDLH: Immediately** Dangerous to **Life and Health in the NIOSH Pocket Guide to Chemical Hazards**
- **ppb: part per billion**
- ppm: partpermillion
- CNS: Central Nervous System
- **CVS: Cardio Vascular System**

- Use proper lifting (pre-lift weight assessment, use of legs, multiple personnel) techniques to prevent back strain; slow easy motions when shoveling, augering, and digging will decreasemuscle strain.
- Eating, drinking, chewing gum or tobacco or any practice that increases the probability of hand-to-mouth transfer and ingestion of material will be prohibited in the vicinity of cone/drill rig area; transport vehicles will be acceptable rest/lunch areas, provided workers have a means of washing their faces and hands prior to eating.
- Smoking will not be allowed at any time in the vicinity of the sampling activities.
- Contact lenses will not be worn during sampling activities.
- Hands and faces will be thoroughly washed upon leaving the work area.
- Whenever decontamination procedures for outer garments are in effect., the entire body will be thoroughly washed as soon as possible after the protective garment is removed
- Contact with contaminated or suspected contaminated surfaces will be avoided; avoid walking through puddles, pools, mud, etc.; avoid kneeling or sitting on the ground.
- Medicine and alcohol can exacerbate the effects of heat stress and exposure to hazardous chemicals. Alcoholic beverage intake is prohibited at SRS and should be minimized or avoided on off-work hours during field operations. Prescribed drugs should not be taken by personnel during field operations where the potential for absorption, inhalation, or ingestion of toxic substances exists unless specifically approved by a qualified physician. Do not work when ill.
- Personnel will work in pairs (buddy system).

2.3 Disposition of Soil

The volume of soil extracted from each boring was greater than the volume required for sample analyses. Disposition of soil for the background borings required the excess soil to be placed back in the boring. A grout mixture was installed to cap the boring at surface.

The excess soil for each individual boring inside the basin was placed in a plastic bag, labeled, and secured in a 55-gallon drum. The drum was placed in a Satellite Accumulation Area until analysis of the samples could be completed. Cleated samples will be returned to the basin. Contaminated samples will be disposed of according to the WSRC Investigation-Derived Waste Management Plan (WSRC, 1994) following an evaluation of the analyses.

Hazardous/mixed waste may be accumulated onsite without a permit or interim status in one of two ways. The first of these is called a satellite area, where up to 55 gallons of hazardous waste can be accumulated at or near the point of generation. The second is called a staging area and allows storage of containerized waste (or in tanks) for up to 90 days from the time the waste is first generated. Certain training, inspection, and emergency preparedness contingency plan conditions are required for this storage.

Hazardous/mixed wastes accumulated initially in a satellite area can either be transferred to a staging area or directly to an onsite or offsite Treatment Storage Disposal (TSD) facility. Notification is to be made to EPD when opening or closing a satellite or staging area.

One satellite area was sufficient for the amount of cuttings generated+ Generators may accumulate up to 55 gallons of hazardous or mixed waste (or one quart of acutely hazardous waste) at or near the point of generation for au unlimited amount of time, without a permit, provided the following conditions are met:

- The accumulation area is at or near the point of waste generation.
- The accumulation area is under the control of the operator of the process generating the waste.
- The area around the containers shall be chained/roped off, or otherwise barricaded.
- A sign states the following, "HAZARDOUS WASTE SATELLITE ACCUMULATION AREA." The sign must list the name of the Satellite Accumulation Area.

contain the names of the custodian and his alternate as well as their work phone numbers. The sign must have black, one inch high letters on a yellow background.

- A "NO SMOKING" sign is posted (if storing ignitable substances).
- Containers are clearly marked either with the words "HAZARDOUS WASTE" or with other words that identify the contents of the container.
- Containers used to accumulate waste must be in good condition (e.g., no severe rusting or apparent structural defects). A container that begins to leak must immediately have its contents either transferred to another container, or the leaking container must be overpacked in a salvage drum.
- The waste being placed in the container must be compatible with the container.
- A container holding hazardous or mixed waste must always be closed during storage, except when it is necessary to add or remove waste.
- If the 55-gallon limit is exceeded at any satellite accumulation area, the container holding the excess waste must be dated when the excess waste began accumulating. The generator has three days to transfert he excess waste to either another staging area (90day accumulation area) or a TSD facility.
- All satellite areas are inspected weekly.

Rust E&I provided oversight for waste soil disposition in the satellite area. WSRC was responsible for transfer to a staging area or to an offsite TSD facility. Water generated from the decontamination of sampling equipment used inside the basin was returned to the basin.

Additional debris was observed in the basin during sampling activities. Assorted trash has settled among the vegetation. Two railroad ties are clearly visible along the northern boundary of the basin. Two to three ties are partially visible along the northwest comer.

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Appendix A

Daily Activity Logs

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OSR 30-2 (Rev 12-90)

DAILY ACTIVITIES REPORT

PROJECT: 716-A Motor Shop Seepage Basin	DRILLING SUBCONTRACTOR: N/A
	DRILLER: N/A
WELL NUMBER: ABKSB-3,-5,-6,-4 / TECHNICAL OVERSIGHT: W.O. Joyce	OVERSIGHT FIRM: RUST E and I
LOCATION	DATE: 4/22/96 / PAGE: 1 of 2

START	STOP	DESCRIPTION OF ACTIVITIES; REMARKS
07:00		W.O. Joyce (WOJ) arrives at the RUST Aiken office, loads equipment (HNu recharged overnight) and begins paperwork
07:30		WOJ departs the Aiken office.
08:00		WOJ arrives at the EMS trailer and meets up w/ with the sampling group (Janelle Jeansen, Gary Harris and Judy Morris). Group is lining out to sample.
08:20		WOJ conducts site specific HASP meeting with Gary, Judy and Margie Batten.
08:45		Meeting is over - complete loading up.
08:50		WOJ and group depart for the site. Gary to come out later
09:00		Arrive at site ABK-SB3. Set up to sample.
09:10		WOJ calibrates HNu to 54 ppm calibration gas - okay.
09:25		WOJ departs to get ice for the samples.
09:45		WOJ returns - crew begins to sample.
10:00		Sampling is completed. Mobilize to location ABK-SB5.
10:10		Arrive at location - set up to sample.
10:18		Begin to sample ABK-SB5. See atmospheric monitoring log for all HNu measurements.
10:35		Sampling is completed. Janelle departs - Gary is on site to relieve her. Make up the sample bottles and mobilize to ABK-SB6.
11:10		Begin to sample ABK-SB6.
11:20		Sampling is completed. Mobilize to ABK-SB4. Set up to sample.
11:45		Team is missing some sample bottles - decide to break for lunch to pick up the bottles.
11:55		Team at wellbuilding - eat lunch - prepare sample bottles.
13:30		Team departs wellbuilding for site.

TECHNICAL OVERSIGHT SIGNATURE: Willie Joyce DATE: 4/22/96

XSR 30-3 (Rev 12-88)

DAILY ACTIVITIES REPORT

PROJECT: 716-A Motor Shop Seepage Basin	DRILLING SUBCONTRACTOR: N/A
	DRILLER: N/A
WELL NUMBER: ABKSB-3,-5,-6,-4	TECHNICAL OVERSIGHT: W.O. Joyce
	OVERSIGHT FIRM: RUST E and I
LOCATION	DATE: 4/22/96
	PAGE: 2 of 2

START	STOP	DESCRIPTION OF ACTIVITIES; REMARKS
13:40		Return to ABK-SB4. Set up to sample.
13:45		Begin to sample. The HNu is picking up elevated readings. The vegetation surrounding the boring suggests that pesticides/herbicides had been sprayed in the area. This would impact the HNu. Breathing zone readings are normal - continue to sample.
14:10		Sampling is completed. Gary and Judy depart the site - will continue to sample tomorrow.
14:20		WDJ calls and updates Jan Folk.
14:30		WDJ grouts to surface the borings sampled today.
15:25		Grouting is completed. WDJ departs SRS.
16:00		WDJ arrives at RUST - unloads truck - updates Bill Lhiss.

4/22/96

TECHNICAL OVERSIGHT SIGNATURE W. O. Joyce DATE 4/22/96

OSR 30-2 (Rev 12-88)

DAILY ACTIVITIES REPORT

PROJECT: 716-A Motor Shops Seepage Basin	DRILLING SUBCONTRACTOR: N/A
	DRILLER: N/A
WELL NUMBER and ABRSB-1 AOBSB-2,-1,-3,-4,-5,-6 / TECHNICAL OVERSIGHT: W.O. Joyce	OVERSIGHT FIRM: RUST E and I
LOCATION	DATE: 4-23-96 / PAGE: 1 of 2

START	STOP	DESCRIPTION OF ACTIVITIES; REMARKS
07:00		W.O. Joyce (WOJ) arrives at the RUST Aiken office, loads
		equipment and initiates daily paperwork.
07:30		WOJ departs the Aiken office.
08:00		WOJ arrives at the EMS trailer and coordinates with
		the sampling group (Janelle Jansson, Judy Morris, Gary
		Harris) who are d-conning and loading up to sample.
08:40		Sampling team depart the EMS trailer.
08:50		Team arrives at site, rigs down the barricades at the
		locations sampled yesterday and sets up basin barricades.
09:40		WOJ calibrates HNu to 54 ppm calibration gas - okay.
		HNu readings documented on atmospheric monitoring log
09:50		Begin to sample AOB-SB2.
10:15		Sampling is completed - mobilize. Gary and Judy are
		sampling - Janelle is preparing the samples/sample kits.
10:30		Begin to sample AOB-SB1.
10:45		Sampling is completed - mobilize.
10:50		Begin to sample AOB-SB3.
11:00		Sampling is completed - mobilize.
11:05		Begin to sample AOB-SB4.
11:15		Sampling is completed - mobilize.
11:20		Begin to sample AOB-SB5.
11:30		Sampling is completed - mobilize.
11:35		Begin to sample AOB-SB6
11:50		Sampling is completed. Janelle departs. Crew secures the site.
12:05		Team departs the site for lunch.
13:15		WOJ calls and updates Jan Folk - she will be coming out
		today to set up a satellite area for the cuttings.
13:20		WOJ departs the well building.

TECHNICAL OVERSIGHT SIGNATURE W. O. Joyce DATE 4/23/96

OSR 30-2 (Rev 12-88)

DAILY ACTIVITIES REPORT

PROJECT: 716-A Motor Shops Seepage Basin	DRILLING SUBCONTRACTOR: N/A
	DRILLER: N/A
WELL NUMBER and ABKSB-1	TECHNICAL OVERSIGHT: W.D. Joyce
LOCATION: ABKSB-2, -3, -4, -5, -6	OVERSIGHT FIRM: RUST E and I
	DATE: 4-23-96
	PAGE: 2 of 2

START	STOP	DESCRIPTION OF ACTIVITIES; REMARKS
13:30		WDJ arrives at the seepage basin and begins to grout to surface the borings sampled this morning.
13:50		Sampling team on site - collect a rinsate sample.
14:00		Jan and the RCRA trained personnel are on site to set up the satellite area - WDJ updates Jan. The grout has run out.
14:10		Team mobilizes to and sets up on ABK-SB1.
14:20		Begin to sample ABK-SB1.
14:40		Sampling is completed. All the sampling is completed. Team begins to d-con equipment. WDJ departs to wellbuilding for grout.
15:15		WDJ returns to basin - could only locate a bag of concrete - will grout with it. Finish grouting the sample borings to surface.
15:55		Sampling team completes d-conning - departs site.
16:10		WDJ completes grouting up all the borings - depart to wellbuilding.
16:20		WDJ at wellbuilding - unloads remaining bag of concrete.
16:40		WDJ departs wellbuilding and SRS
17:10		WDJ arrives at RUST and unloads truck.

4-23-96

TECHNICAL OVERSIGHT SIGNATURE William Joyce DATE 4-23-96

Appendix B

Atmospheric Monitoring Logs

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ATMOSPHERIC MONITORING LOG
FIELD HEALTH AND SAFETY

Page 1 of 1
Date 4/19/96
Circle: Sun Mon Tue Wed Thu (Fri) Sat

Site: ABKSB-2 Project No.: 37190.100
Health and Safety Officer: W.D. Joyce
Action Levels: D ✓ ' C __ ' B __ ' (Stop work, call in for instructions)
(check box and write in levels for upgrade)
Task/Equipment: Monitor Volatile Organics / HNu
Weather: Cloudy, presently 70°, high of 80°, 20% chance of late showers

Time	HNu OVA PPM	DUST mg/m³	RAD	NOISE dB		Comments: Duration of Readings, Upgrades, Location, etc.
11:05	Calibration	—	—	—	—	Calibrated HNu to 54 ppm calibration gas - okay
11:18	0.0 ppm	—	—	—	—	Auger interval 0.0'-1.0'
11:50	0.0 ppm	—	—	—	—	Auger interval 1.0'-4.0'

4/19/96

Additional Comments: _____

Signature: William D Joyce 4-19-96

ATMOSPHERIC MONITORING LOG
FIELD HEALTH AND SAFETY

Page 1 of 1
Date 4/22/96
Circle: Sun (Mon) Tue Wed Thu Fri Sat

Site: ABKSB-3 -5 -6 -4 Project No.: 37190.100
Health and Safety Officer: W.D. Joyce
Action Levels: D✓ 'C__ 'B__ ' (Stop work, call in for instructions)
(check box and write in levels for upgrade)
Task/Equipment: Monitor Volatile Organics / HNU
Weather: Sunny, presently 58° (09:00), high of 90°, No chance of rain

Time	HNU OVA PPM	DUST mg/m³	RAD	NOISE dB		Comments: Duration of Readings, Upgrades, Location, etc.
09:10	Calibration	—	—	—	—	Cal. to read HNU to 54 ppm calibration gas - okay
SB-3 09:45	0.0 ppm	—	—	—	—	Auger interval 0.0'-1.0'
10:00	0.2 ppm	—	—	—	—	Auger interval 1.0'-4.0' Trace organics
SB-5 10:20	0.0 ppm	—	—	—	—	Auger interval 0.0'-1.0'
10:35	0.0 ppm	—	—	—	—	Auger interval 1.0'-4.0'
SB-6 11:15	0.0 ppm	—	—	—	—	Auger interval 0.0'-1.0'
11:20	0.0 ppm	—	—	—	—	Auger interval 1.0'-4.0'
SB-4 13:50	10-20 ppm	—	—	—	—	Auger interval 0.0'-1.0'. Appears herbicide pesticides had been sprayed in area
14:05	5-10 ppm	—	—	—	—	Auger interval 1.0'-4.0'. Same boring - pesticides probable cause and herbicides

Additional Comments: Vegetation surrounding boring ABKSB-4 suggests that pesticides/herbicides had been sprayed in the area and probably impacted the HNU readings. Readings from boring - readings 0.0 ppm in breathing zone.

Signature: Lillian O Joyce 4-22-96

ATMOSPHERIC MONITORING LOG
FIELD HEALTH AND SAFETY

Page 1 of 2
Date 4/23/96
Circle: Sun Mon (Tue) Wed Thu Fri Sat

Site: AOBSB-2,-1,-3,-4,-5,-6;ABKSB-1 Project No.: 37190.100
Health and Safety Officer: W.O. Joyce
Action Levels: D ✓ ' C __ ' B __ ' (Stop work, call in for instructions)
(check box and write in levels for upgrade)
Task/Equipment: Monitor Volatile Organics / HNu
Weather: Mostly cloudy, presently 65° (09:30), high of 85°, rain/showers late today

	Time	HNu ~~OVA~~ PPM	DUST mg/m³	RAD	NOISE dB		Comments: Duration of Readings, Upgrades, Location, etc.
	09:40	Calibration	—	—	—	—	Calibrated HNu to 54 ppm calibration gas - okay
SB-2	10:10	0.0 ppm	—	—	—	—	Auger interval 0.0'-1.0'
	10:15	0.0 ppm	—	—	—	—	Auger interval 1.0'-4.0'
SB-1	10:35	0.0 ppm	—	—	—	—	Auger interval 0.0'-1.0'
	10:45	0.0 ppm	—	—	—	—	Auger interval 1.0'-4.0'
SB-3	10:55	0.2 ppm	—	—	—	—	Auger interval 0.0'-1.0'
	11:00	0.3 ppm	—	—	—	—	Auger interval 1.0'-4.0' Some burnt material present
SB-4	11:05	0.0 ppm	—	—	—	—	Auger interval 0.0'-1.0'
	11:10	0.0 ppm	—	—	—	—	Auger interval 1.0'-4.0'
B-5	11:20	0.2 ppm	—	—	—	—	Auger interval 0.0'-1.0'
	11:25	0.1 ppm	—	—	—	—	Auger interval 1.0'-4.0'
-6	11:40	0.0 ppm	—	—	—	—	Auger interval 0.0'-1.0'
	11:50	0.6 ppm	—	—	—	—	Auger interval 1.0'-4.0'

Additional Comments: _____

Signature: W. Allen O Joyce 4-23-96

ATMOSPHERIC MONITORING LOG
FIELD HEALTH AND SAFETY

Page 2 of 2
Date 4/23/96
Circle: Sun Mon (Tue) Wed Thu Fri Sat

Site: AOISB-2, -1, -3, -4, -5, -6; ABKSB-1 Project No.: 37190.100
Health and Safety Officer: U.O. Joyce
Action Levels: D ☑ → C ☐ → B ☐ → (Stop work, call in for instructions)
(check box and write in levels for upgrade)
Task/Equipment: Monitor Volatile Organics/ HNu
Weather: Mostly cloudy, presently 65° (09:30), high of 85°, rain/showers late today

Time	~~OVA~~ HNu PPM	DUST mg/m^3	RAD	NOISE dB		Comments: Duration of Readings, Upgrades, Location, etc.
KSB-1 14:25	0.0 ppm	—	—	—	—	Auger interval 0.0'-1.0'
14:40	0.0 ppm	—	—	—	—	Auger interval 1.0'-4.0'

4-23-96

Additional Comments: _____

Signature: Ulleen O Joyce 4-23-96

Revised from: RUST Environment & Infrastructure
Corporate Health & Safety Program

Appendix C

Soil Boring Reports

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SOIL BORING INSTALLATION REPORT

SRS

Boring Number (AAA, BBB, AA): ABK | SB | 1

GENERAL INFORMATION

Project Name	Project Manager	Department
716-A Motor Shops Seepage Basin	Jan Folk	Environmental Restoration

Boring Purpose	County	Location Description
Discrete Soil Sampling	Aiken	Northeast of the Seepage Basin

SRS North Grid Coordinate	SRS East Grid Coordinate	Latitude (decimal degrees)	Longitude (decimal degrees)	Ground Elevation
103085.1858	50805.5177	N/A	N/A	370.022 msl

DRILLING & SAMPLING INFORMATION

Total Drilled Depth	Static Water Level	Drilling Start Date	Drilling Completion Date	Drilling Method
4.0'	N/A	4-23-96	4-23-96	Hand Auger (3")

Sample Type	Sampling Interval	Sample Type	Sampling Interval
Hand Auger (3")	0.0'-4.0'		

Drilling & Sampling Comments (include drilling muds used, source of water, lost circulation zones, etc.)

Dry surface samples.
Sampled 0.0'-1.0'
1.0'-4.0'

Drilling Company	Driller (last name, first initial)	Oversight Company	Oversight (last name, first initial)
N/A	N/A	RUST E and I	Joyce, W.

Disposition of Samples: Shipped to lab - deposited back in the boring.

ABANDONMENT

Method of Abandonment	Materials Used in Abandonment
Grout to surface	Neat cement and potable water

APPROVALS

Abandonment Verified By	Date	Boring Installation Report Prepared By	Date
William Joyce (William Joyce)	4-23-96	William Joyce (William Joyce)	4-25-96

SRS SOIL BORING INSTALLATION REPORT

Boring Number (AA,###,##): ABK | SB | 2

GENERAL INFORMATION

Project Name	Project Manager	Department
716-A Motor Shops Seepage Basin	Jan Folk	Environmental Restoration

Boring Purpose	County	Location Description
Discrete Soil Sampling	Aiken	Northeast of the Seepage Basin

SRS North Grid Coordinate	SRS East Grid Coordinate	Latitude (decimal degrees)	Longitude (decimal degrees)	Ground Elevation
102610.6556	51088.5867	N/A	N/A	364.845 msl

DRILLING & SAMPLING INFORMATION

Total Drilled Depth	Static Water Level	Drilling Start Date	Drilling Completion Date	Drilling Method
4.0'	N/A	4-19-96	4-19-96	Hand Auger (3")

Sample Type	Sampling Interval	Sample Type	Sampling Interval
Hand Auger (3")	0.0'-4.0'		

Drilling & Sampling Comments (include drilling muds used, source of water, lost circulation zones, etc.)

Dry surface samples.
Sampled 0.0'-1.0'
1.0'-4.0'

Drilling Company	Driller (last name, first initial)	Oversight Company	Oversight (last name, first initial)
N/A	N/A	RUST E and I	Joyce, W.

Disposition of Samples: Shipped to Lab - deposited back in the boring.

ABANDONMENT

Method of Abandonment	Materials Used in Abandonment
Grout to surface	Neat cement and potable water

APPROVALS

Abandonment Verified By	Date	Boring Installation Report Prepared By	Date
William Joyce	4-19-96	William Joyce	4-25-96
(William Joyce)		(William Joyce)	

SOIL BORING INSTALLATION REPORT

SRS

Boring Number (AAA,####,AA): ABK | SB | 3

GENERAL INFORMATION

Project Name: 716-A Motor Shops Seepage Basin	Project Manager: Jan Folk	Department: Environmental Restoration	
Boring Purpose: Discrete Soil Sampling	County: Aiken	Location Description: East of the Seepage Basin	
SRS North Grid Coordinate: 102105.7719	SRS East Grid Coordinate: 51122.0048	Latitude (decimal degrees): N/A	Longitude (decimal degrees): N/A	Ground Elevation: 348.616 msl

DRILLING & SAMPLING INFORMATION

Total Drilled Depth	Static Water Level	Drilling Start Date	Drilling Completion Date	Drilling Method
4.0'	N/A	4-22-96	4-22-96	Hand Auger (3")

Sample Type	Sampling Interval	Sample Type	Sampling Interval
Hand Auger (3")	0.0'-4.0'		

Drilling & Sampling Comments (include drilling muds used, source of water, lost circulation zones, etc.)

Dry surface samples.
Sampled 0.0'-1.0'
1.0'-4.0'

Drilling Company	Driller (last name, first initial)	Oversight Company	Oversight (last name, first initial)
N/A	N/A	RUST E and I	Joyce, W.

Disposition of Samples: Shipped to lab - deposited back in the boring.

ABANDONMENT

Method of Abandonment	Materials Used in Abandonment
Grout to surface	Neat cement and potable water

APPROVALS

Abandonment Verified By	Date	Boring Installation Report Prepared By	Date
William Joyce	4-22-96	William Joyce	4-25-96
(William Joyce)		(William Joyce)	

SOIL BORING INSTALLATION REPORT

SRS

Boring Number (AAA,###,AA): ABK | SB | 4

GENERAL INFORMATION

Project Name: 716-A Motor Shops Seepage Basin	Project Manager: Jan Folk	Department: Environmental Restoration	
Boring Purpose: Discrete Soil Sampling	County: Aiken	Location Description: Northeast of the Seepage Basin	
SRS North Grid Coordinate: 102247.6605	SRS East Grid Coordinate: 51666.2536	Latitude (decimal degrees): N/A	Longitude (decimal degrees): N/A	Ground Elevation: 344.152 msl

DRILLING & SAMPLING INFORMATION

Total Drilled Depth	Static Water Level	Drilling Start Date	Drilling Completion Date	Drilling Method
4.0'	N/A	4-22-96	4-22-96	Hand Auger (3")

Sample Type	Sampling Interval	Sample Type	Sampling Interval
Hand Auger (3")	0.0'-4.0'		

Drilling & Sampling Comments (Include drilling muds used, source of water, lost circulation zones, etc.):

Dry surface samples.
Sampled 0.0'-1.0'
1.0'-4.0'

Drilling Company	Driller (last name, first initial)	Oversight Company	Oversight (last name, first initial)
N/A	N/A	RUST E and I	Joyce, W.

Disposition of Samples: Shipped to lab - deposited back in the boring.

ABANDONMENT

Method of Abandonment	Materials Used in Abandonment
Grout to surface	Neat cement and potable water

APPROVALS

Abandonment Verified By	Date	Boring Installation Report Prepared By	Date
William Joyce (William Joyce)	4-22-96	William Joyce (William Joyce)	4-25-96

SOIL BORING INSTALLATION REPORT

Boring Number (AAA,###,AA): ABK | SB | 5

GENERAL INFORMATION

Project Name: 716-A Motor Shops Seepage Basin		Project Manager: Jan Folk	Department: Environmental Restoration
Boring Purpose: Discrete Soil Sampling	County: Aiken	Location Description: East of the Seepage Basin	

SRS North Grid Coordinate: 102051.0021	SRS East Grid Coordinate: 50900.1169	Latitude (decimal degrees): N/A	Longitude (decimal degrees): N/A	Ground Elevation: 346.759 msl

DRILLING & SAMPLING INFORMATION

Total Drilled Depth: 4.0'	Static Water Level: N/A	Drilling Start Date: 4-22-96	Drilling Completion Date: 4-22-96	Drilling Method: Hand Auger (3")

Sample Type	Sampling Interval	Sample Type	Sampling Interval
Hand Auger (3")	0.0'-4.0'		

Drilling & Sampling Comments (include drilling muds used, source of water, lost circulation zones, etc.):

Dry surface samples.
Sampled 0.0'-1.0'
1.0'-4.0'

Drilling Company: N/A	Driller (last name, first initial): N/A	Oversight Company: RUST E and I	Oversight (last name, first initial): Joyce, W.

Disposition of Samples: Shipped to lab - deposited back in the boring.

ABANDONMENT

Method of Abandonment: Grout to surface	Materials Used in Abandonment: Neat cement and potable water

APPROVALS

Abandonment Verified By: William Joyce (William Joyce)	Date: 4-22-96	Boring Installation Report Prepared By: William Joyce (William Joyce)	Date: 4-25-96

SRS SOIL BORING INSTALLATION REPORT

Boring Number (AAA,###,AA): ABK | SB | 6

GENERAL INFORMATION

Project Name	Project Manager	Department
716-A Motor Shops Seepage Basin	Jan Folk	Enviromental Restoration

Boring Purpose	County	Location Description
Discrete Soil Sampling	Aiken	North of the Seepage Basin

SRS North Grid Coordinate	SRS East Grid Coordinate	Latitude (decimal degrees)	Longitude (decimal degrees)	Ground Elevation
102187.9218	50771.7249	N/A	N/A	362.975 msl

DRILLING & SAMPLING INFORMATION

Total Drilled Depth	Static Water Level	Drilling Start Date	Drilling Completion Date	Drilling Method
4.0'	N/A	4-22-96	4-22-96	Hand Auger (3")

Sample Type	Sampling Interval	Sample Type	Sampling Interval
Hand Auger (3")	0.0'-4.0'		

Drilling & Sampling Comments (include drilling muds used, source of water, lost circulation zones, etc.)

Dry surface samples.
Sampled 0.0'-1.0'
1.0'-4.0'

Drilling Company	Driller (last name, first initial)	Oversight Company	Oversight (last name, first initial)
N/A	N/A	RUST E and I	Joyce, W.

Disposition of Samples: Shipped to lab - deposited back in the boring.

ABANDONMENT

Method of Abandonment	Materials Used in Abandonment
Grout to surface	Neat cement and potable water

APPROVALS

Abandonment Verified By	Date	Boring Installation Report Prepared By	Date
William Joyce (William Joyce)	4-22-96	William Joyce (William Joyce)	4-25-96

SOIL BORING INSTALLATION REPORT

SRS

Boring Number (AAA,NNN,AA): AOB | SB | 1

GENERAL INFORMATION

Project Name	Project Manager	Department
716-A Motor Shops Seepage Basin	Jan Folk	Environmental Restoration

Boring Purpose	County	Location Description
Discrete Soil Sampling	Aiken	East Side of Seepage Basin

SRS North Grid Coordinate	SRS East Grid Coordinate	Latitude (decimal degrees)	Longitude (decimal degrees)	Ground Elevation
102066.4036	50735.5085	N/A	N/A	346.969 msl

DRILLING & SAMPLING INFORMATION

Total Drilled Depth	Static Water Level	Drilling Start Date	Drilling Completion Date	Drilling Method
4.0'	N/A	4-23-96	4-23-96	Hand Auger (3")

Sample Type	Sampling Interval	Sample Type	Sampling Interval
Hand Auger (3")	0.0'-4.0'		

Drilling & Sampling Comments
(Include drilling muds used, source of water, lost circulation zones, etc.

Dry surface samples.
Sampled 0.0'-1.0'
1.0'-4.0'

Drilling Company	Driller (last name, first initial)	Oversight Company	Oversight (last name, first initial)
N/A	N/A	RUST E and I	Joyce, W.

Disposition of Samples: Shipped to lab - onsite satellite storage area.

ABANDONMENT

Method of Abandonment	Materials Used in Abandonment
Grout to surface	Concrete and potable water

APPROVALS

Abandonment Verified By	Date	Boring Installation Report Prepared By	Date
William Joyce (William Joyce)	4-23-96	William Joyce (William Joyce)	4-25-96

SOIL BORING INSTALLATION REPORT

SRS

Boring Number (AAA,###,AA): AOB | SB | 2

GENERAL INFORMATION

Project Name: 716-A Motor Shops Seepage Basin		Project Manager: Jan Folk	Department: Environmental Restoratio.
Boring Purpose: Discrete Soil Sampling	County: Aiken	Location Description: Northeast Side of Seepage Basin	

SRS North Grid Coordinate: 102062.9654	SRS East Grid Coordinate: 50695.9178	Latitude (decimal degrees): N/A	Longitude (decimal degrees): N/A	Ground Elevation: 346.036 msl

DRILLING & SAMPLING INFORMATION

Total Drilled Depth: 4.0'	Static Water Level: N/A	Drilling Start Date: 4-23-96	Drilling Completion Date: 4-23-96	Drilling Method: Hand Auger (3")

Sample Type	Sampling Interval	Sample Type	Sampling Interval
Hand Auger (3")	0.0'-4.0'		

Drilling & Sampling Comments (include drilling muds used, source of water, lost circulation zones, etc.):

Dry surface samples.
Sampled 0.0'-1.0'
1.0'-4.0'

Drilling Company: N/A	Driller (last name, first initial): N/A	Oversight Company: RUST E and I	Oversight (last name, first initial): Joyce, W.

Disposition of Samples: Shipped to lab - onsite satellite storage area.

ABANDONMENT

Method of Abandonment: Grout to surface	Materials Used in Abandonment: Concrete and potable water

APPROVALS

Abandonment Verified By: William Joyce (William Joyce)	Date: 4-23-96	Boring Installation Report Prepared By: William Joyce (William Joyce)	Date: 4-25-96

SOIL BORING INSTALLATION REPORT

SRS

Boring Number (AAA,###,AA): AOB | SB | 3

GENERAL INFORMATION

Project Name	Project Manager	Department
716-A Motor Shops Seepage Basin	Jan Folk	Environmental Restoration

Boring Purpose	County	Location Description
Discrete Soil Sampling	Aiken	Northwest Side of Seepage Basin

SRS North Grid Coordinate	SRS East Grid Coordinate	Latitude (decimal degrees)	Longitude (decimal degrees)	Ground Elevation
102045.8522	50626.5856	N/A	N/A	344.649 msl

DRILLING & SAMPLING INFORMATION

Total Drilled Depth	Static Water Level	Drilling Start Date	Drilling Completion Date	Drilling Method
4.0'	N/A	4-23-96	4-23-96	Hand Auger (3")

Sample Type	Sampling Interval	Sample Type	Sampling Interval
Hand Auger (3")	0.0'-4.0'		

Drilling & Sampling Comments (include drilling muds used, source of water, lost circulation zones, etc.)

Dry surface samples.
Sampled 0.0'-1.0'
1.0'-4.0'

Drilling Company	Driller (last name, first initial)	Oversight Company	Oversight (last name, first initial)
N/A	N/A	RUST E and I	Joyce W.

Disposition of Samples: Shipped to lab - onsite satellite storage area.

ABANDONMENT

Method of Abandonment	Materials Used in Abandonment
Grout to surface	Neat cement and potable water

APPROVALS

Abandonment Verified By	Date	Boring Installation Report Prepared By	Date
William Joyce (William Joyce)	4-23-96	William Joyce (William Joyce)	4-25-96

SOIL BORING INSTALLATION REPORT

SRS

Boring Number (AAA,###(.AA)): AOB | SB | 4

GENERAL INFORMATION

Project Name	Project Manager	Department
716-A Motor Shops Seepage Basin	Jan Folk	Environmental Restoration

Boring Purpose	County	Location Description
Discrete Soil Sampling	Aiken	Center of Seepage Basin

SRS North Grid Coordinate	SRS East Grid Coordinate	Latitude (decimal degrees)	Longitude (decimal degrees)	Ground Elevation
102042.8769	50666.4054	N/A	N/A	344.344 msl

DRILLING & SAMPLING INFORMATION

Total Drilled Depth	Static Water Level	Drilling Start Date	Drilling Completion Date	Drilling Method
4.0'	N/A	4-23-96	4-23-96	Hand Auger (3")

Sample Type	Sampling Interval	Sample Type	Sampling Interval
Hand Auger (3")	0.0'-4.0'		

Drilling & Sampling Comments (include drilling muds used, source of water, lost circulation zones, etc.):

Dry surface samples.
Sampled 0.0'-1.0'
1.0'-4.0'

Drilling Company	Driller (last name, first initial)	Oversight Company	Oversight (last name, first initial)
N/A	N/A	RUST E and I	Joyce, W.

Disposition of Samples: Shipped to lab - onsite satellite storage area.

ABANDONMENT

Method of Abandonment	Materials Used in Abandonment
Grout to surface	Concrete and potable water

APPROVALS

Abandonment Verified By	Date	Boring Installation Report Prepared By	Date
William Joyce	4-23-96	William Joyce	4-25-96
(William Joyce)		(William Joyce)	

SOIL BORING INSTALLATION REPORT

SRS

Boring Number (AAA,###,AA): AOB | SB | 5

GENERAL INFORMATION

Project Name: 716-A Motor Shops Seepage Basin	Project Manager: Jan Folk	Department: Environmental Restoration	
Boring Purpose: Discrete Soil Sampling	County: Aiken	Location Description: Southwest Side of Seepage Basin	
SRS North Grid Coordinate: 102032.7514	SRS East Grid Coordinate: 50634.2496	Latitude (decimal degrees): N/A	Longitude (decimal degrees): N/A	Ground Elevation: 344.078 msl

DRILLING & SAMPLING INFORMATION

Total Drilled Depth	Static Water Level	Drilling Start Date	Drilling Completion Date	Drilling Method
4.0'	N/A	4-23-96	4-23-96	Hand Auger (3")

Sample Type	Sampling Interval	Sample Type	Sampling Interval
Hand Auger (3")	0.0'-4.0'		

Drilling & Sampling Comments (include drilling muds used, source of water, lost circulation zones, etc.):

Dry surface samples.
Sampled 0.0'-1.0'
1.0'-4.0'

Drilling Company	Driller (last name, first initial)	Oversight Company	Oversight (last name, first initial)
N/A	N/A	RUST E and I	Joyce, W.

Disposition of Samples: Shipped to lab - onsite satellite storage area.

ABANDONMENT

Method of Abandonment	Materials Used in Abandonment
Grout to surface	Grout / concrete and potable water

APPROVALS

Abandonment Verified By	Date	Boring Installation Report Prepared By	Date
Lillian Joyce (William Joyce)	4-23-96	Lillian Joyce	4-25-96

SOIL BORING INSTALLATION REPORT

SRS — Savannah River Site

Boring Number (AAA,###,AA): AOB | SB | 6

GENERAL INFORMATION

Project Name: 716-A Motor Shops Seepage Basin		Project Manager: Jan Folk	Department: Environmental Restoration
Boring Purpose: Discrete Soil Sampling	County: Aiken	Location Description: West Side of Seepage Basin	

SRS North Grid Coordinate	SRS East Grid Coordinate	Latitude (decimal degrees)	Longitude (decimal degrees)	Ground Elevation
102024.0570	50585.2434	N/A	N/A	343.104 msl

DRILLING & SAMPLING INFORMATION

Total Drilled Depth	Static Water Level	Drilling Start Date	Drilling Completion Date	Drilling Method
4.0'	N/A	4-23-96	4-23-96	Hand Auger (3")

Sample Type	Sampling Interval	Sample Type	Sampling Interval
Hand Auger (3")	0.0'-4.0'		

Drilling & Sampling Comments (Include drilling muds used, source of water, lost circulation zones, etc.):

Dry surface samples.

Sampled 0.0' - 1.0'
1.0' - 4.0'

Drilling Company	Driller (last name, first initial)	Oversight Company	Oversight (last name, first initial)
N/A	N/A	RUST E and I	Joyce, W.

Disposition of Samples: Shipped to lab - onsite satellite storage area.

ABANDONMENT

Method of Abandonment	Materials Used in Abandonment
Grout to surface	Neat cement and potable water

APPROVALS

Abandonment Verified By	Date	Boring Installation Report Prepared By	Date
William Joyce (William Joyce)	4-23-96	William Joyce (William Joyce)	4-25-96

APPENDIX C.1

COMPILATION OF SUMMARY STATISTICS FOR 716-A MOTOR SHOPS SEEPAGE BASIN

The following procedure was used to compile the summary statistics for the 716-A Motor Shops Seepage Basin site:

1. Soil data received:

Station	Depth (ft)	Description
ABKSB0101	0-1	Background
ABKSB0102	1-4	
ABKSB0201	0-1	
ABKSB0202	1-4	
ABKSB0301	0-1	
ABKSB0302	1-4	
ABKSB0401	0-1	
ABKSB0402	1-4	
ABKSB0501	0-1	
ABKSB0502	1-4	
ABKSB0601	0-1	
ABKSB0602	1-4	
AOBSB0101	0-1	On-site
AOBSB0102	1-4	
AOBSB0201	0-1	
AOBSB0202	1-4	
AOBSB0301	0-1	
AOBSB0302	1-4	
AOBSB0401	0-1	
AOBSB0402	1-4	
AOBSB0501	0-1	
AOBSB0502	1-4	
AOBSB0601	0-1	
AOBSB0602	1-4	

* No Quality Assurance/Quality Control samples were received.

2. The original analytical data received (file 716mastr.xls) used the estimated quantitation limit (EQL) value as the surrogate value for non-detects. Per WSRC's (Greg Rucker) instructions, the EQL value was to be replaced with the method detection limit (MDL) value from Table 4.1 from the Quality Control Summary Report (QCSR) (for non-detects only). As Table 4.1 had data from both Roy F. Weston, Inc. (WA), and General Engineering Laboratories (GEL), WSRC confirmed that the MDL data from Weston should be used and not the MDL data from General Engineering. The MDL from Weston was chosen because Weston was the primary laboratory used to analyze the samples and GEL served as the secondary laboratory. This procedure is standard protocol for the SRS Quality Control program.

a. Table 4.1 was copied directly from an electronic copy of the QCSR into an Excel® spreadsheet. The GEL data were then removed, leaving only the WA MDL values to be used for updating the analytical data.

b. The resulting MDL file was matched to the analytical data file, using analyte name as the matching key, and the result for non-detects was replaced with the corresponding MDL value.

3. Summary statistics were then compiled for detected chemicals grouped as follows:

- On-site, 0-1 ft
- On-site, 0-4 ft
- Background, 0-1 ft
- Background, 0-4 ft

a. For both on-site and background data, one-half the MDL value was used for calculation purposes for non-detects.

b. Resulting summary statistics are in file MSSB_SUM.XLS.

c. The statistics were derived as follows:

The distribution of sampling data for the soil was analyzed to determine whether the data were normally or lognormally distributed. If the data distributions indicated both normal and lognormal distributions, 95 percent upper confidence

limits (UCLs) of the mean were calculated for both untransformed (normal) and transformed (lognormal) data. To calculate the 95 percent UCL of the arithmetic mean for lognormally distributed data, the data were first transformed using the natural logarithm function (ln(x)). The arithmetic mean and standard deviation of the transformed data were calculated and the H-statistic was determined or interpolated (Gilbert 1987). When calculating the 95 percent UCL and mean, non-detected values were considered as one-half the MDL. The 95 percent UCL was calculated as follows for transformed data:

$$95\%\ UCL = e^{(\bar{x}+0.5s^2+sH/(n-1)^{0.5})}$$

where:

95% UCL = 95 percent upper confidence limit of mean

e = constant (base of the natural log, equal to 2.718)

$\bar{x}$ = arithmetic mean of the transformed data

s = standard deviation of the transformed data

H = H-statistic (from Table X in Gilbert 1987, or interpolated)

n = number of samples

To calculate the 95 percent UCL for normally distributed data, the arithmetic mean and standard deviation of the untransformed data were calculated, and the one-tailed student-t statistics were determined from Gilbert (1987). Nondetected values were considered as one-half the MDL for the 95 percent UCL calculations. The 95 percent UCL was then calculated for each chemical as follows for untransformed data:

$$95\%\ UCL = \bar{x}+t(s/(n^{0.5}))$$

where:

95% UCL = 95 percent upper confidence limit of the mean

$\bar{x}$ = arithmetic mean of the untransformed data

s = standard deviation of the untransformed data

t = one-tailed student-t statistic (from Gilbert 1987)

n = number of samples

To assure use of a conservative (i.e., health-protective) exposure-point concentration in risk assessment calculations, a tiered approach was adopted for determining that value. Key elements remained consistent throughout the approach. First, given that lognormality of data can be assumed for environmental media (USEPA, 1992- Calculating the Concentration Term), chemicals detected in over 50 percent of samples were log-transformed. Second, for chemicals detected in 25 percent up to 50 percent of samples, where the distribution of the data is not clear given the large number of non-detects, a comparison was made between untransformed and transformed data, with the more conservative value used. Finally, for chemicals with less than 25 percent detections (or with less than 5 samples), a distribution cannot be determined given the large number of non-detects and log-transformation was inappropriate, therefore, the maximum detected concentration was used as the exposure-point concentration. The following rationale was used in the derivation of media-specific exposure-point concentrations.

Reasonable Maximum Exposure (RME) Exposure-Point Concentration

1. For chemicals detected in 50 percent or more of the samples, the 95 percent UCL of the log-transformed data was compared to the maximum detected concentration, and the lesser value was used as the exposure-point concentration.

2. For chemicals detected in 25 percent or more, but less than 50 percent, of the samples, the 95 percent UCL from the untransformed data was compared to the 95 percent UCL from the transformed data. The greater of these two values was then compared to the maximum detected concentration, and the lesser value of this second comparison was used as the exposure-point concentration.

3. For chemicals detected in fewer than 25 percent of the samples or with less than five total samples, the maximum detected concentration was used as the exposure-point concentration.

Appendix D

Field Geologic Logs

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OSR 30-3

FIELD GEOLOGIC LOG

PROJECT: 716-A Motor Shops Seepage Basin		DATE: 4/23/96	SHEET: 1 of 1
	REFERENCE DATUM:	DRILLING CONTRACTOR: N/A	
WELL NO.: ABK-SB.1	SRP COORDINATES:	DRILLER: N/A	
LOGGED BY: Bill Joyce	COMPANY: RUST E and I	DRILLING METHOD: Hand Auger (3")	

RUN NUMBER	DEPTH, FEET	LITHOLOGY	PERCENT RECOVERY	SAMPLE DESCRIPTION	DRILLING COMMENTS
	0			SAND (silt 5%-10%) med-crse gra with some granules med yellowish brown (10 YR 5/4)-light brown (5 YR 5/6), sbang-sbrnd, med sorted, dry	HNu: 0.0 ppm
	1				
	2			SAND (silt 10%-15%) med-crse gra, med yellowish brown (10YR 5/4)-light brown (5 YR 5/6), sbang-sbrnd, well sorted, slightly moist, trace of manq. oxide	
	3				HNu: 0.0 ppm
	4			SAND (silt 20%) med-fine gra, light brown (5 YR 5/6), sbang-sbrnd, well sorted, moist	
				Total depth of soil boring 4.0'	

OSR 30-3

FIELD GEOLOGIC LOG

PROJECT: 716-A Motor Shops Seepage Basin		DATE: 4/19/96	SHEET: 1 of 1
	REFERENCE DATUM	DRILLING CONTRACTOR: N/A	
WELL NO.: ABK-SB2	SRP COORDINATES	DRILLER: N/A	
LOGGED BY: Bill Joyce	COMPANY: RUST E and I	DRILLING METHOD: Hand Auger (3")	

RUN NUMBER	DEPTH, FEET	LITHOLOGY	PERCENT RECOVERY	SAMPLE DESCRIPTION	DRILLING COMMENTS
	0			0.0'-0.3' Crush and run rock	
				0.3'-0.5' Light brown Top soil	HNU: 0.0 ppm
	1			SAND (backfill material) (Silt 30%) fine-med grn, med reddish brown (10R4/6), sbang-sbrnd, well sorted, dry, includes kaolin stringers	
	2			SAND (Silt 25%-30%) med-fine grn, mod brown (5YR4/4)-med reddish brown (10R4/6) sbang-sbrnd, med sorted, moist	HNU: 0.0 ppm
	3			SAND As Above.	
	4			Total depth of soil boring 4.0'	

OSR 20-6

FIELD GEOLOGIC LOG

PROJECT: 716-A Motor Shops Seepage Basin		DATE: 4/22/96	SHEET: 1 of 1
	REFERENCE DATUM	DRILLING CONTRACTOR: N/A	
WELL NO.: ABK-SB3	GRP COORDINATES	DRILLER: N/A	
LOGGED BY: Bill Joyce	COMPANY: RUST E and I	DRILLING METHOD: Hand Auger (3")	

RUN NUMBER	DEPTH, FEET	LITHOLOGY	PERCENT RECOVERY	SAMPLE DESCRIPTION	DRILLING COMMENTS
	0			SAND (silt trace - 5%) med - crse gra, pale yellowish brown (10 YR 6/2) & dark yellowish brown (10 YR 4/2), sbang - sbrnd, mod sorted, dry	HNu : 0.0 ppm
	1				
	2			SAND (silt trace - 5%) med - crse gra, mod yellowish brown (10 YR 5/4) with trace of light brown (5 YR 5/6), sbang - sbrnd, mod sorted, mod moist, trace organics	HNu : 0.2 ppm
	3				
	4			SAND As Above	
				Total depth of soil boring 4.0'	

OSR 30-3

FIELD GEOLOGIC LOG

PROJECT: 716-A Motor Shops Seepage Basin	REFERENCE DATUM:	DATE: 4/22/96	SHEET: 1 of 1
WELL NO.: ABK-SB4	GRID COORDINATES:	DRILLING CONTRACTOR: N/A	
LOGGED BY: Bill Joyce	COMPANY: RUST E and I	DRILLER: N/A	
		DRILLING METHOD: Hand Auger (3")	

RUN NUMBER	DEPTH, FEET	LITHOLOGY	PERCENT RECOVERY	SAMPLE DESCRIPTION	DRILLING COMMENTS
	0			SAND (silt trace - 5%) med - crse gra pale yellowish brown (10 YR 6/2) sbang - sbrnd, med sorted, dry, trace of organics	HNu : 10-20 ppm Vegetation indicates pesticides/herbicides had been sprayed in the area.
	1				
	2			SAND (silt 20% - 30%) med - fine gra, light brown (5 YR 5/6) - med reddish brown (10 R 4/6), sbang - sbrnd, mod - well sorted, med moist	HNu : 5-10 ppm
	3				
	4			Total depth of soil boring 4.0'	

OSR 30-3

FIELD GEOLOGIC LOG

PROJECT: 716-A Motor Shops Seepage Basin		DATE: 4/22/96	SHEET: 1 of 1
	REFERENCE DATUM:	DRILLING CONTRACTOR: N/A	
WELL NO.: ABK-SB5	GRP COORDINATES:	DRILLER: N/A	
LOGGED BY: Bill Joyce	COMPANY: RUST E and I	DRILLING METHOD: Hand Auger (3")	

RUN NUMBER	DEPTH, FEET	LITHOLOGY	PERCENT RECOVERY	SAMPLE DESCRIPTION	DRILLING COMMENTS
	0			SAND (silt trace-5%) med-crse grn, pale yellowish brown (10YR 6/2) - dark yellowish brown (10YR 4/2), sbang-sbrnd, mod sorted, dry	HNu: 0.0 ppm
	1				
	2			SAND (silt trace-5%) med-crse grn, mod yellowish brown (10YR 5/4) with a trace of light brown (5YR 5/6), sbang-sbrnd, mod sorted, slightly moist, trace of organics	HNu: 0.0 ppm
	3				
	4			Total depth of soil boring 4.0'	

OSR 30-3

FIELD GEOLOGIC LOG

PROJECT: 716-A Motor Shops Seepage Basin		DATE: 4/22/96	SHEET: 1 of 1
WELL NO.: ABK-SB6	REFERENCE DATUM:	DRILLING CONTRACTOR: N/A	
LOGGED BY: Bill Joyce	SRP COORDINATES:	DRILLER: N/A	
	COMPANY: RUST E and I	DRILLING METHOD: Hand Auger (3")	

RUN NUMBER	DEPTH, FEET	LITHOLOGY	PERCENT RECOVERY	SAMPLE DESCRIPTION	DRILLING COMMENTS
	0			SAND (Si H 5% grading to 20%-25%) med-crse gra, dark yellowish brown (10 YR 4/2) & pale yellowish brown (10 YR 6/2) with sections of med reddish brown (10 R 4/6) sbang-sbrad mod-well sorted, dry-slightly moist	HNu: 0.0 ppm
	1				
	2				
	3			SAND (Si H 30%-35%) med-fine gra, med reddish brown (10 R 4/6) sbang-sbrad, well sorted, slightly moist, could be fill material	HNu: 0.0 ppm
	4			Total depth of soil boring 4.0'	

GER 30-3

FIELD GEOLOGIC LOG

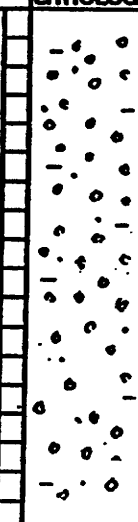
PROJECT: 716-A Motor Shops Seepage Basin		DATE: 4-23-96	SHEET: 1 of 1
	REFERENCE DATUM	DRILLING CONTRACTOR: N/A	
WELL NO.: AOB-SB1	GRID COORDINATES	DRILLER: N/A	
LOGGED BY: Bill Joyce	COMPANY: RUST E and I	DRILLING METHOD: Hand Auger (3")	

RUN NUMBER	DEPTH, FEET	LITHOLOGY	PERCENT RECOVERY	SAMPLE DESCRIPTION	DRILLING COMMENTS
	0			SAND (SiH - trace) crse - med gra, mod yellowish brown (10YR 5/4) - pale yellowish brown (10YR 6/2), sbang - sbrnd, mod sorted, dry	HNu: 0.0 ppm
	1				
	2			SAND (SiH - trace) crse - med gra, greyish orange (10YR 7/4) - light brown (5YR 5/6), sbang - sbrnd, mod - well sorted, slightly moist	HNu: 0.0 ppm
	3				
	4			Total depth of soil boring 4.0'	

GSR.30-0

FIELD GEOLOGIC LOG

PROJECT: 716-A Motor Slops Seepage Basin		DATE: 4-23-96	SHEET: 1 of 1
	REFERENCE DATUM:	DRILLING CONTRACTOR: N/A	
WELL NO.: AOB-SB2	GRP COORDINATES:	DRILLER: N/A	
LOGGED BY: Bill Joyce	COMPANY: RUST E and I	DRILLING METHOD: Hand Auger (3")	

RUN NUMBER	DEPTH, FEET	LITHOLOGY	PERCENT RECOVERY	SAMPLE DESCRIPTION	DRILLING COMMENTS
	0			SAND (Silt trace-5%) crse-med grn mod yellowish brown (10 YR 5/4)-pale yellowish brown (10 YR 6/2) sbang-sbrnd, mod sorted, dry. trace of kaolin, some crush and rvs rock in sample.	HNu: 0.0 ppm
	1				
	2			SAND (silt-trace) crse-med grn, light brown (5 YR 5/6)-mod yellowish brown (10 YR 5/4) sbang-sbrnd, mod sorted, slightly moist	HNu: 0.0 ppm
	3				
	4			Total depth of soil boring 4.0'	

OSR 20-3

FIELD GEOLOGIC LOG

PROJECT: 716-A Motor Shops Seepage Basin	REFERENCE DATUM:	DATE: 4-23-96	SHEET: 1 OF 1
WELL NO.: AOB-SB.3	GRID COORDINATES:	DRILLING CONTRACTOR: N/A	
LOGGED BY: Bill Joyce	COMPANY: RUST E and I	DRILLER: N/A	
		DRILLING METHOD: Hand Auger (3")	

RUN NUMBER	DEPTH, FEET	LITHOLOGY	PERCENT RECOVERY	SAMPLE DESCRIPTION	DRILLING COMMENTS
	0			SAND (silt trace - 5%) crse-med grn, mod yellowish brown (10 YR 5/4) - pale yellowish brown (10 YR 6/2), sbang-sbrnd, mod sorted, dry, some grvsh and cvn rock in sample	HNu: 0.2 ppm
	1				
	2				
	3			SAND (silt-trace) crse-med grn, mod yellowish brown (10 YR 5/4) - grayish orange (10 YR 7/4) sbang-sbrnd, mod sorted, slightly moist, slight trace of lignite or charcoal burnt material.	HNu: 0.3 ppm
	4			Total depth of soil boring 4.0'	

OER 30-6

FIELD GEOLOGIC LOG

PROJECT: 716-A Motor Shops Seepage Basin	REFERENCE DATUM:	DATE: 4-23-96	SHEET: 1 OF 1
WELL NO.: AOB-SB4	SRP COORDINATES:	DRILLING CONTRACTOR: N/A	
LOGGED BY: Bill Joyce	COMPANY: RUST E and I	DRILLER: N/A	
		DRILLING METHOD: Hand Auger (3")	

RUN NUMBER	DEPTH, FEET	LITHOLOGY	PERCENT RECOVERY	SAMPLE DESCRIPTION	DRILLING COMMENTS
	0			SAND (silt trace - 5%) crse - med grn, dark yellowish brown (10 YR 4/2) & pale yellowish brown (10 YR 6/2), subang - subrnd, med - well sorted, dry	HNu: 0.0 ppm
	1				
	2				
	3			SAND (silt - trace) crse - med grn, med yellowish brown (10 YR 5/4) & light brown (5 YR 5/6) subang - subrnd med sorted, slightly moist	HNu: 0.0 ppm
	4			Total depth of soil boring 4.0'	

OSR 30-5

FIELD GEOLOGIC LOG

PROJECT: 716-A Motor Shops Seepage Basin	REFERENCE DATUM:	DATE: 4/23/96	SHEET: 1 of 1
WELL NO.: AOB-SB5	SRP COORDINATES:	DRILLING CONTRACTOR: N/A	
LOGGED BY: Bill Joyce	COMPANY: RUST E and I	DRILLER: N/A	
		DRILLING METHOD: Hand Auger (3")	

RUN NUMBER	DEPTH, FEET	LITHOLOGY	PERCENT RECOVERY	SAMPLE DESCRIPTION	DRILLING COMMENTS
	0			SAND (silt trace - 5%) crse - med grn, mod yellowish brown (10 YR 5/4) - pale yellowish brown (10 YR 6/2), sbang - sbrnd, mod - well sorted, dry	HNu: 0.2 ppm
	1				
	2				
	3			SAND (silt - trace) crse - med grn, mod yellowish brown (10 YR 5/4) - light brown (5 YR 5/6) - grayish orange (10 YR 7/4), sbang - sbrnd, mod - well sorted, slightly moist	HNu: 0.1 ppm
	4			Total depth of soil boring 4.0'	

OSR 30-8

FIELD GEOLOGIC LOG

PROJECT: 716-A Motor Shops Seepage Basin	REFERENCE DATUM:	DATE: 4/23/96	SHEET: 1 of 1
WELL NO.: AOB-SB6	GRID COORDINATES:	DRILLING CONTRACTOR: N/A	
LOGGED BY: Bill Joyce	COMPANY: RUST E and I	DRILLER: N/A	
		DRILLING METHOD: Hand Auger (3")	

RUN NUMBER	DEPTH, FEET	LITHOLOGY	PERCENT RECOVERY	SAMPLE DESCRIPTION	DRILLING COMMENTS
	0			SAND (silt trace-5%) crse-med gra, pale yellowish brown (10YR6/2)- med yellowish brown (10YR 5/4), sbang-sbrnd, med sorted, dry	HNu: 0.0 ppm
	1				
	2				
	3			SAND (silt trace-5%) crse-med gra med yellowish brown (10YR 5/4)- light brown (5YR 5/6), sbang-sbrnd, med sorted, slightly moist	HNu: 0.0 ppm
	4			SAND (silt 25-30%) med-fine gra, med reddish brown (10R 4/6), sbang-sbrnd, well sorted, moist	
				Total depth of soil boring 4.0'	
				"	

Appendix E

Site Health and Safety Briefing Signature Page

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ATTACHMENT 3

PRE-JOB BRIEFING/SAFETY MEETING
Documentation

PROJECT: 716-A MSSB DATE/TIME: 4-19-96 / 08:30

CONDUCTED BY: William O. Joyce William O Joyce
(Printed Name) (Signature)

NOTE: Each person signing below is acknowledging:

- A general knowledge of the content of this document,
- An understanding of this document, and
- Agrees to comply with the requirements of this document.

	Name (Printed)	Signature	Organization
1.	William O. Joyce	William O Joyce	RUST E and I
2.	Janelle Janssen	Janelle Janssen	EMS
3.	JAN E. Folk	Jan E. Folk	ERD
4.			
5.			
6.			
7.			
8.			
9.			
10.			
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12.			
13.			
14.			
15.			
16.			

William O Joyce 4-19-96

ATTACHMENT 3

PRE-JOB BRIEFING/SAFETY MEETING
Documentation

PROJECT: 716-A MSSB DATE/TIME: 4-22-96 / 08:20

CONDUCTED BY: William O. Joyce William O Joyce
(Printed Name) (Signature)

NOTE: Each person signing below is acknowledging:

- A general knowledge of the content of this document,
- An understanding of this document, and
- Agrees to comply with the requirements of this document.

	Name (Printed)	Signature	Organization
1.	GARY W HARRIS	Gary W. Harris	WSRC/EPD
2.	MARGIE G. BATTEN	MG Batten	WSRC/EPD
3.	JB MORRIS	JB Morris	WSRC/EPD
4.			
5.			
6.			
7.			
8.			
9.			
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16.			

William O Joyce 4-22-96

APPENDIX B

ANALYTICAL RESULTS

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APPENDIX B.1
PHASE I ANALYTICAL RESULTS
FOR THE
716-A MOTOR SHOPS SEEPAGE BASIN

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Appendix B
Phase I Soil Analytical Results for the 716-A Motor Shops Seepage Basin

Sample ID	Sample Name	Sample Depth	Sample Date	Analyte	Analyte Class	Units	MDL	EQL	Result	Result Qualifier
102692	ABKSB0101	0-1	042396	1,1,1-Trichloroethane	Volatiles	mg/kg	9.71E-04	5.50E-03	1.84E-03	J
102692	ABKSB0101	0-1	042396	1,1,2,2-Tetrachloroethane	Volatiles	mg/kg	3.47E-03	5.50E-03	3.47E-03	U
102692	ABKSB0101	0-1	042396	1,1,2-Trichloroethane	Volatiles	mg/kg	2.40E-03	5.50E-03	2.40E-03	U
102692	ABKSB0101	0-1	042396	1,1-Dichloroethane	Volatiles	mg/kg	1.05E-03	5.50E-03	1.05E-03	U
102692	ABKSB0101	0-1	042396	1,1-Dichloroethene	Volatiles	mg/kg	1.42E-03	5.50E-03	1.42E-03	U
102692	ABKSB0101	0-1	042396	1,2-Dichloroethane	Volatiles	mg/kg	1.34E-03	5.50E-03	1.34E-03	U
102692	ABKSB0101	0-1	042396	1,2-Dichloroethene (total)	Volatiles	mg/kg	8.54E-04	5.50E-03	8.54E-04	U
102692	ABKSB0101	0-1	042396	1,2-Dichloropropane	Volatiles	mg/kg	1.67E-03	5.50E-03	1.67E-03	U
102692	ABKSB0101	0-1	042396	2-Butanone (MEK)	Volatiles	mg/kg	2.81E-03	1.10E-02	2.81E-03	U
102692	ABKSB0101	0-1	042396	2-Hexanone	Volatiles	mg/kg	3.77E-03	1.10E-02	3.77E-03	U
102692	ABKSB0101	0-1	042396	4-Methyl-2-pentanone	Volatiles	mg/kg	3.29E-03	1.10E-02	3.29E-03	U
102692	ABKSB0101	0-1	042396	Acetone	Volatiles	mg/kg	4.04E-03	1.10E-02	4.04E-03	U
102692	ABKSB0101	0-1	042396	Benzene	Volatiles	mg/kg	7.52E-04	5.50E-03	7.52E-04	U
102692	ABKSB0101	0-1	042396	Bromodichloromethane	Volatiles	mg/kg	1.74E-03	5.50E-03	1.74E-03	U
102692	ABKSB0101	0-1	042396	Bromoform	Volatiles	mg/kg	2.93E-03	5.50E-03	2.93E-03	U
102692	ABKSB0101	0-1	042396	Bromomethane (Methyl bromide)	Volatiles	mg/kg	2.01E-03	1.10E-02	2.01E-03	U
102692	ABKSB0101	0-1	042396	Carbon disulfide	Volatiles	mg/kg	1.71E-03	5.50E-03	1.71E-03	U
102692	ABKSB0101	0-1	042396	Carbon tetrachloride	Volatiles	mg/kg	9.71E-04	5.50E-03	9.71E-04	U
102692	ABKSB0101	0-1	042396	Chlorobenzene	Volatiles	mg/kg	1.74E-03	5.50E-03	1.74E-03	U
102692	ABKSB0101	0-1	042396	Chlorodibromomethane	Volatiles	mg/kg	2.53E-03	5.50E-03	2.53E-03	U
102692	ABKSB0101	0-1	042396	Chloroethane	Volatiles	mg/kg	2.06E-03	1.10E-02	2.06E-03	U
102692	ABKSB0101	0-1	042396	Chloroform	Volatiles	mg/kg	1.11E-03	5.50E-03	1.11E-03	U
102692	ABKSB0101	0-1	042396	Chloromethane (methyl chloride)	Volatiles	mg/kg	3.20E-03	1.10E-02	3.20E-03	U
102692	ABKSB0101	0-1	042396	cis-1,3-Dichloropropene	Volatiles	mg/kg	1.79E-03	5.50E-03	1.79E-03	U
102692	ABKSB0101	0-1	042396	Dichloromethane (methylene chlo	Volatiles	mg/kg	1.83E-03	5.50E-03	1.83E-03	U
102692	ABKSB0101	0-1	042396	Ethylbenzene	Volatiles	mg/kg	1.47E-03	5.50E-03	1.47E-03	U
102692	ABKSB0101	0-1	042396	Styrene	Volatiles	mg/kg	1.98E-03	5.50E-03	1.98E-03	U
102692	ABKSB0101	0-1	042396	Tetrachloroethene	Volatiles	mg/kg	1.17E-03	5.50E-03	7.71E-03	
102692	ABKSB0101	0-1	042396	Toluene	Volatiles	mg/kg	1.45E-03	5.50E-03	1.45E-03	U
102692	ABKSB0101	0-1	042396	trans-1,3-Dichloropropene	Volatiles	mg/kg	2.08E-03	5.50E-03	2.08E-03	U

Appendix B
Phase I Soil Analytical Results for the 716-A Motor Shops Seepage Basin

Sample ID	Sample Name	Sample Depth	Sample Date	Analyte	Analyte Class	Units	MDL	EQL	Result	Result Qualifier
102692	ABKSB0101	0-1	042396	Trichloroethene (TCE)	Volatiles	mg/kg	2.09E-03	5.50E-03	2.09E-03	U
102692	ABKSB0101	0-1	042396	Vinyl acetate	Volatiles	mg/kg	5.48E-03	1.10E-02	5.48E-03	U
102692	ABKSB0101	0-1	042396	Vinyl chloride	Volatiles	mg/kg	2.47E-03	1.10E-02	2.47E-03	U
102692	ABKSB0101	0-1	042396	Xylenes (total)	Volatiles	mg/kg	1.53E-03	5.50E-03	1.53E-03	U
102692	ABKSB0101	0-1	042396	1,2,4-Trichlorobenzene	Semivolatiles	mg/kg	1.80E-02	3.51E-01	1.80E-02	U
102692	ABKSB0101	0-1	042396	1,2-Dichlorobenzene	Semivolatiles	mg/kg	1.70E-02	3.51E-01	1.70E-02	U
102692	ABKSB0101	0-1	042396	1,3-Dichlorobenzene	Semivolatiles	mg/kg	1.80E-02	3.51E-01	1.80E-02	U
102692	ABKSB0101	0-1	042396	1,4-Dichlorobenzene	Semivolatiles	mg/kg	1.80E-02	3.51E-01	1.80E-02	U
102692	ABKSB0101	0-1	042396	2,4,5-Trichlorophenol	Semivolatiles	mg/kg	1.40E-02	1.76E+00	1.40E-02	U
102692	ABKSB0101	0-1	042396	2,4,6-Trichlorophenol	Semivolatiles	mg/kg	1.10E-02	3.51E-01	1.10E-02	U
102692	ABKSB0101	0-1	042396	2,4-Dichlorophenol	Semivolatiles	mg/kg	1.30E-02	3.51E-01	1.30E-02	U
102692	ABKSB0101	0-1	042396	2,4-Dimethyl phenol	Semivolatiles	mg/kg	2.60E-02	3.51E-01	2.60E-02	U
102692	ABKSB0101	0-1	042396	2,4-Dinitrophenol	Semivolatiles	mg/kg	4.40E-02	1.76E+00	4.40E-02	U
102692	ABKSB0101	0-1	042396	2,4-Dinitrotoluene	Semivolatiles	mg/kg	1.90E-02	3.51E-01	1.90E-02	U
102692	ABKSB0101	0-1	042396	2,6-Dinitrotoluene	Semivolatiles	mg/kg	1.60E-02	3.51E-01	1.60E-02	U
102692	ABKSB0101	0-1	042396	2-Chloronaphthalene	Semivolatiles	mg/kg	1.60E-02	3.51E-01	1.60E-02	U
102692	ABKSB0101	0-1	042396	2-Chlorophenol	Semivolatiles	mg/kg	1.70E-02	3.51E-01	1.70E-02	U
102692	ABKSB0101	0-1	042396	2-Methyl-4,6-dinitrophenol	Semivolatiles	mg/kg	1.10E-02	1.76E+00	1.10E-02	U
102692	ABKSB0101	0-1	042396	2-Methylnaphthalene	Semivolatiles	mg/kg	1.70E-02	3.51E-01	1.70E-02	U
102692	ABKSB0101	0-1	042396	2-Nitroaniline	Semivolatiles	mg/kg	1.90E-02	1.76E+00	1.90E-02	U
102692	ABKSB0101	0-1	042396	2-Nitrophenol	Semivolatiles	mg/kg	1.70E-02	3.51E-01	1.70E-02	U
102692	ABKSB0101	0-1	042396	3,3'-Dichlorobenzidine	Semivolatiles	mg/kg	7.30E-02	7.02E-01	7.30E-02	U
102692	ABKSB0101	0-1	042396	3-Nitroaniline	Semivolatiles	mg/kg	4.20E-02	1.76E+00	4.20E-02	U
102692	ABKSB0101	0-1	042396	4-Bromophenyl phenyl ether	Semivolatiles	mg/kg	1.00E-02	3.51E-01	1.00E-02	U
102692	ABKSB0101	0-1	042396	4-Chloro-3-methylphenol (p-chlo	Semivolatiles	mg/kg	1.80E-02	3.51E-01	1.80E-02	U
102692	ABKSB0101	0-1	042396	4-Chloroaniline	Semivolatiles	mg/kg	6.00E-03	3.51E-01	6.00E-03	U
102692	ABKSB0101	0-1	042396	4-Chlorophenyl phenyl ether	Semivolatiles	mg/kg	1.30E-02	3.51E-01	1.30E-02	U
102692	ABKSB0101	0-1	042396	4-Nitroaniline	Semivolatiles	mg/kg	2.00E-02	1.76E+00	2.00E-02	U
102692	ABKSB0101	0-1	042396	4-Nitrophenol	Semivolatiles	mg/kg	4.90E-02	1.76E+00	4.90E-02	U
102692	ABKSB0101	0-1	042396	Acenapthene	Semivolatiles	mg/kg	1.50E-02	3.51E-01	1.50E-02	U

Appendix B
Phase I Soil Analytical Results for the 716-A Motor Shops Seepage Basin

Sample ID	Sample Name	Sample Depth	Sample Date	Analyte	Analyte Class	Units	MDL	EQL	Result	Result Qualifier
102692	ABKSB0101	0-1	042396	Acenapthylene	Semivolatiles	mg/kg	1.60E-02	3.51E-01	1.60E-02	U
102692	ABKSB0101	0-1	042396	Anthracene	Semivolatiles	mg/kg	1.60E-02	3.51E-01	1.60E-02	U
102692	ABKSB0101	0-1	042396	Benzo(a)anthracene	Semivolatiles	mg/kg	2.00E-02	3.51E-01	2.00E-02	U
102692	ABKSB0101	0-1	042396	Benzo(a)pyrene	Semivolatiles	mg/kg	2.40E-02	3.51E-01	2.40E-02	U
102692	ABKSB0101	0-1	042396	Benzo(b)fluoranthene	Semivolatiles	mg/kg	2.30E-02	3.51E-01	2.30E-02	U
102692	ABKSB0101	0-1	042396	Benzo(g,h,i)perylene	Semivolatiles	mg/kg	1.60E-02	3.51E-01	1.60E-02	U
102692	ABKSB0101	0-1	042396	Benzo(k)fluoranthene	Semivolatiles	mg/kg	2.20E-02	3.51E-01	2.20E-02	U
102692	ABKSB0101	0-1	042396	Benzoic acid	Semivolatiles	mg/kg	3.40E-02	1.76E+00	3.40E-02	U
102692	ABKSB0101	0-1	042396	Benzyl alcohol	Semivolatiles	mg/kg	1.90E-02	3.51E-01	1.90E-02	U
102692	ABKSB0101	0-1	042396	Bis(2-chloroethoxy) methane	Semivolatiles	mg/kg	1.60E-02	3.51E-01	1.60E-02	U
102692	ABKSB0101	0-1	042396	Bis(2-chloroethyl) ether	Semivolatiles	mg/kg	2.20E-02	3.51E-01	2.20E-02	U
102692	ABKSB0101	0-1	042396	Bis(2-chloroisopropyl) ether	Semivolatiles	mg/kg	1.80E-02	3.51E-01	1.80E-02	U
102692	ABKSB0101	0-1	042396	Bis(2-ethylhexyl) phthalate	Semivolatiles	mg/kg	2.20E-02	3.51E-01	2.20E-02	U
102692	ABKSB0101	0-1	042396	Butyl benzyl phthalate	Semivolatiles	mg/kg	2.10E-02	3.51E-01	2.10E-02	U
102692	ABKSB0101	0-1	042396	Chrysene	Semivolatiles	mg/kg	1.90E-02	3.51E-01	1.90E-02	U
102692	ABKSB0101	0-1	042396	Di-n-butyl phthalate	Semivolatiles	mg/kg	1.90E-02	3.51E-01	1.90E-02	U
102692	ABKSB0101	0-1	042396	Di-n-octyl phthalate	Semivolatiles	mg/kg	2.60E-02	3.51E-01	2.60E-02	U
102692	ABKSB0101	0-1	042396	Dibenzo(a,h)anthracene	Semivolatiles	mg/kg	1.70E-02	3.51E-01	1.70E-02	U
102692	ABKSB0101	0-1	042396	Dibenzofuran	Semivolatiles	mg/kg	1.60E-02	3.51E-01	1.60E-02	U
102692	ABKSB0101	0-1	042396	Diethyl phthalate	Semivolatiles	mg/kg	1.60E-02	3.51E-01	1.60E-02	U
102692	ABKSB0101	0-1	042396	Dimethyl phthalate	Semivolatiles	mg/kg	1.50E-02	3.51E-01	1.50E-02	U
102692	ABKSB0101	0-1	042396	Fluoranthene	Semivolatiles	mg/kg	1.90E-02	3.51E-01	1.90E-02	U
102692	ABKSB0101	0-1	042396	Fluorene	Semivolatiles	mg/kg	1.60E-02	3.51E-01	1.60E-02	U
102692	ABKSB0101	0-1	042396	Hexachlorobenzene	Semivolatiles	mg/kg	1.00E-02	3.51E-01	1.00E-02	U
102692	ABKSB0101	0-1	042396	Hexachlorobutadiene	Semivolatiles	mg/kg	1.50E-02	3.51E-01	1.50E-02	U
102692	ABKSB0101	0-1	042396	Hexachlorocyclopentadiene	Semivolatiles	mg/kg	2.60E-02	3.51E-01	2.60E-02	U
102692	ABKSB0101	0-1	042396	Hexachloroethane	Semivolatiles	mg/kg	1.60E-02	3.51E-01	1.60E-02	U
102692	ABKSB0101	0-1	042396	Indeno(1,2,3-c,d)pyrene	Semivolatiles	mg/kg	1.80E-02	3.51E-01	1.80E-02	U
102692	ABKSB0101	0-1	042396	Isophorone	Semivolatiles	mg/kg	1.70E-02	3.51E-01	1.70E-02	U
102692	ABKSB0101	0-1	042396	N-Nitrosodi-n-propylamine	Semivolatiles	mg/kg	2.00E-02	3.51E-01	2.00E-02	U

Appendix B
Phase I Soil Analytical Results for the 716-A Motor Shops Seepage Basin

Sample ID	Sample Name	Sample Depth	Sample Date	Analyte	Analyte Class	Units	MDL	EQL	Result	Result Qualifier
102692	ABKSB0101	0-1	042396	N-Nitrosodiphenylamine	Semivolatiles	mg/kg	1.40E-02	3.51E-01	1.40E-02	U
102692	ABKSB0101	0-1	042396	Naphthalene	Semivolatiles	mg/kg	1.90E-02	3.51E-01	1.90E-02	U
102692	ABKSB0101	0-1	042396	Nitrobenzene	Semivolatiles	mg/kg	1.90E-02	3.51E-01	1.90E-02	U
102692	ABKSB0101	0-1	042396	o-cresol (2-methylphenol)	Semivolatiles	mg/kg	1.60E-02	3.51E-01	1.60E-02	U
102692	ABKSB0101	0-1	042396	p-cresol (4-methylphenol)	Semivolatiles	mg/kg	1.70E-02	3.51E-01	1.70E-02	U
102692	ABKSB0101	0-1	042396	Pentachlorophenol	Semivolatiles	mg/kg	3.90E-02	1.76E+00	3.90E-02	U
102692	ABKSB0101	0-1	042396	Phenanthrene	Semivolatiles	mg/kg	1.50E-02	3.51E-01	1.50E-02	U
102692	ABKSB0101	0-1	042396	Phenol	Semivolatiles	mg/kg	1.90E-02	3.51E-01	1.90E-02	U
102692	ABKSB0101	0-1	042396	Pyrene	Semivolatiles	mg/kg	2.10E-02	3.51E-01	2.10E-02	U
102692	ABKSB0101	0-1	042396	Unknown	SVOA TICs	mg/kg	0.00E+00	0.00E+00	2.00E-01	J
102692	ABKSB0101	0-1	042396	Aldrin	Pesticides/PCBs	mg/kg	5.70E-04	1.75E-03	5.70E-04	U
102692	ABKSB0101	0-1	042396	alpha-Benzene hexachloride	Pesticides/PCBs	mg/kg	5.70E-04	1.75E-03	5.70E-04	U
102692	ABKSB0101	0-1	042396	alpha-Chlordane	Pesticides/PCBs	mg/kg	5.70E-04	1.75E-03	5.70E-04	U
102692	ABKSB0101	0-1	042396	Aroclor 1016	Pesticides/PCBs	mg/kg	1.10E-02	3.51E-02	1.10E-02	U
102692	ABKSB0101	0-1	042396	Aroclor 1221	Pesticides/PCBs	mg/kg	2.20E-02	7.02E-02	2.20E-02	U
102692	ABKSB0101	0-1	042396	Aroclor 1232	Pesticides/PCBs	mg/kg	1.10E-02	3.51E-02	1.10E-02	U
102692	ABKSB0101	0-1	042396	Aroclor 1242	Pesticides/PCBs	mg/kg	1.10E-02	3.51E-02	1.10E-02	U
102692	ABKSB0101	0-1	042396	Aroclor 1248	Pesticides/PCBs	mg/kg	1.10E-02	3.51E-02	1.10E-02	U
102692	ABKSB0101	0-1	042396	Aroclor 1254	Pesticides/PCBs	mg/kg	1.10E-02	3.51E-02	1.10E-02	U
102692	ABKSB0101	0-1	042396	Aroclor 1260	Pesticides/PCBs	mg/kg	1.10E-02	3.51E-02	1.10E-02	U
102692	ABKSB0101	0-1	042396	beta-Benzene hexachloride	Pesticides/PCBs	mg/kg	5.70E-04	1.75E-03	5.70E-04	U
102692	ABKSB0101	0-1	042396	delta-Benzene hexachloride	Pesticides/PCBs	mg/kg	5.70E-04	1.75E-03	5.70E-04	U
102692	ABKSB0101	0-1	042396	Dieldrin	Pesticides/PCBs	mg/kg	6.33E-04	3.51E-03	6.33E-04	U
102692	ABKSB0101	0-1	042396	Endosulfan I	Pesticides/PCBs	mg/kg	5.70E-04	1.75E-03	5.70E-04	U
102692	ABKSB0101	0-1	042396	Endosulfan II	Pesticides/PCBs	mg/kg	9.00E-04	3.51E-03	9.00E-04	U
102692	ABKSB0101	0-1	042396	Endosulfan sulfate	Pesticides/PCBs	mg/kg	1.10E-03	3.51E-03	1.10E-03	U
102692	ABKSB0101	0-1	042396	Endrin	Pesticides/PCBs	mg/kg	1.10E-03	3.51E-03	1.10E-03	U
102692	ABKSB0101	0-1	042396	Endrin ketone	Pesticides/PCBs	mg/kg	1.10E-03	3.51E-03	1.10E-03	U
102692	ABKSB0101	0-1	042396	gamma-Benzene hexachloride (Lin	Pesticides/PCBs	mg/kg	5.70E-04	1.75E-03	5.70E-04	U
102692	ABKSB0101	0-1	042396	gamma-Chlordane	Pesticides/PCBs	mg/kg	5.70E-04	1.75E-03	5.70E-04	U

Appendix B
Phase I Soil Analytical Results for the 716-A Motor Shops Seepage Basin

Sample ID	Sample Name	Sample Depth	Sample Date	Analyte	Analyte Class	Units	MDL	EQL	Result	Result Qualifier
102692	ABKSB0101	0-1	042396	Heptachlor	Pesticides/PCBs	mg/kg	5.70E-04	1.75E-03	5.70E-04	U
102692	ABKSB0101	0-1	042396	Heptachlor epoxide	Pesticides/PCBs	mg/kg	5.70E-04	1.75E-03	5.70E-04	U
102692	ABKSB0101	0-1	042396	Methoxychlor (Mariate)	Pesticides/PCBs	mg/kg	5.70E-03	1.75E-02	5.70E-03	U
102692	ABKSB0101	0-1	042396	p,p'-DDD	Pesticides/PCBs	mg/kg	1.10E-03	3.51E-03	1.10E-03	U
102692	ABKSB0101	0-1	042396	p,p'-DDE	Pesticides/PCBs	mg/kg	9.00E-04	3.51E-03	9.00E-04	U
102692	ABKSB0101	0-1	042396	p,p'-DDT	Pesticides/PCBs	mg/kg	1.10E-03	3.51E-03	1.10E-03	U
102692	ABKSB0101	0-1	042396	Toxaphene	Pesticides/PCBs	mg/kg	5.30E-02	1.75E-01	5.30E-02	U
102692	ABKSB0101	0-1	042396	Aluminum	TAL Inorganics	mg/kg	1.90E+00	1.87E+01	5.89E+03	
102692	ABKSB0101	0-1	042396	Antimony	TAL Inorganics	mg/kg	3.50E-01	3.51E+00	3.50E-01	U
102692	ABKSB0101	0-1	042396	Arsenic	TAL Inorganics	mg/kg	1.11E+00	1.11E+01	2.00E+00	J
102692	ABKSB0101	0-1	042396	Barium	TAL Inorganics	mg/kg	1.10E-01	1.10E+00	2.11E+01	
102692	ABKSB0101	0-1	042396	Beryllium	TAL Inorganics	mg/kg	3.00E-02	2.51E-01	2.02E-01	
102692	ABKSB0101	0-1	042396	Cadmium	TAL Inorganics	mg/kg	4.00E-02	4.01E-01	1.91E-01	J
102692	ABKSB0101	0-1	042396	Calcium	TAL Inorganics	mg/kg	1.68E+00	1.69E+01	1.86E+02	
102692	ABKSB0101	0-1	042396	Chromium	TAL Inorganics	mg/kg	9.00E-02	9.03E-01	7.70E+00	
102692	ABKSB0101	0-1	042396	Cobalt	TAL Inorganics	mg/kg	8.00E-02	8.02E-01	1.10E+00	
102692	ABKSB0101	0-1	042396	Copper	TAL Inorganics	mg/kg	1.00E-01	1.00E+00	2.00E+00	
102692	ABKSB0101	0-1	042396	Cyanide	TAL Inorganics	mg/kg	8.00E-02	8.00E-01	8.00E-02	U
102692	ABKSB0101	0-1	042396	Iron	TAL Inorganics	mg/kg	2.19E+00	2.20E+01	6.23E+03	
102692	ABKSB0101	0-1	042396	Lead	TAL Inorganics	mg/kg	5.90E-01	5.92E+00	6.60E+00	
102692	ABKSB0101	0-1	042396	Magnesium	TAL Inorganics	mg/kg	8.70E-01	8.73E+00	1.13E+02	
102692	ABKSB0101	0-1	042396	Manganese	TAL Inorganics	mg/kg	2.00E-02	2.01E-01	7.55E+01	
102692	ABKSB0101	0-1	042396	Mercury	TAL Inorganics	mg/kg	1.30E-02	1.40E-01	3.90E-02	J
102692	ABKSB0101	0-1	042396	Nickel	TAL Inorganics	mg/kg	1.70E-01	1.71E+00	1.80E+00	
102692	ABKSB0101	0-1	042396	Potassium	TAL Inorganics	mg/kg	6.70E+00	6.72E+01	7.35E+01	
102692	ABKSB0101	0-1	042396	Selenium	TAL Inorganics	mg/kg	1.04E+00	1.04E+01	1.04E+00	U
102692	ABKSB0101	0-1	042396	Silver	TAL Inorganics	mg/kg	9.00E-02	9.03E-01	9.00E-02	U
102692	ABKSB0101	0-1	042396	Sodium	TAL Inorganics	mg/kg	1.29E+01	1.29E+02	3.95E+01	J
102692	ABKSB0101	0-1	042396	Thallium	TAL Inorganics	mg/kg	8.50E-01	8.53E+00	8.50E-01	U
102692	ABKSB0101	0-1	042396	Vanadium	TAL Inorganics	mg/kg	7.00E-02	7.02E-01	1.60E+01	

Appendix B
Phase I Soil Analytical Results for the 716-A Motor Shops Seepage Basin

Sample ID	Sample Name	Sample Depth	Sample Date	Analyte	Analyte Class	Units	MDL	EQL	Result	Result Qualifier
102692	ABKSB0101	0-1	042396	Zinc	TAL Inorganics	mg/kg	1.61E+00	1.61E+01	3.09E+01	
102692	ABKSB0101	0-1	042396	Gross Alpha	Radiologicals	pCi/g	4.00E+00	2.92E+00	1.43E+01	
102692	ABKSB0101	0-1	042396	Non-volatile Beta	Radiologicals	pCi/g	1.00E+01	1.79E+00	1.00E+01	UI
102692	ABKSB0101	0-1	042396	Cation exchange capacity	Miscellaneous	Meq/	6.00E+00	6.31E+02	6.00E+00	U
102692	ABKSB0101	0-1	042396	Total Organic Carbon	Miscellaneous	mg/kg	8.40E+00	6.00E+01	1.58E+03	
102692	ABKSB0101	0-1	042396	Total petroleum hydrocarbons	Miscellaneous	mg/kg	3.30E+00	1.12E+01	1.18E+01	
102694	ABKSB0102	1-4	042396	1,1,1-Trichloroethane	Volatiles	mg/kg	9.71E-04	5.50E-03	9.71E-04	U
102694	ABKSB0102	1-4	042396	1,1,2,2-Tetrachloroethane	Volatiles	mg/kg	3.47E-03	5.50E-03	3.47E-03	U
102694	ABKSB0102	1-4	042396	1,1,2-Trichloroethane	Volatiles	mg/kg	2.40E-03	5.50E-03	2.40E-03	U
102694	ABKSB0102	1-4	042396	1,1-Dichloroethane	Volatiles	mg/kg	1.05E-03	5.50E-03	1.05E-03	U
102694	ABKSB0102	1-4	042396	1,1-Dichloroethene	Volatiles	mg/kg	1.42E-03	5.50E-03	1.42E-03	U
102694	ABKSB0102	1-4	042396	1,2-Dichloroethane	Volatiles	mg/kg	1.34E-03	5.50E-03	1.34E-03	U
102694	ABKSB0102	1-4	042396	1,2-Dichloroethene (total)	Volatiles	mg/kg	8.54E-04	5.50E-03	8.54E-04	U
102694	ABKSB0102	1-4	042396	1,2-Dichloropropane	Volatiles	mg/kg	1.67E-03	5.50E-03	1.67E-03	U
102694	ABKSB0102	1-4	042396	2-Butanone (MEK)	Volatiles	mg/kg	2.81E-03	1.10E-02	2.81E-03	U
102694	ABKSB0102	1-4	042396	2-Hexanone	Volatiles	mg/kg	3.77E-03	1.10E-02	3.77E-03	U
102694	ABKSB0102	1-4	042396	4-Methyl-2-pentanone	Volatiles	mg/kg	3.29E-03	1.10E-02	3.29E-03	U
102694	ABKSB0102	1-4	042396	Acetone	Volatiles	mg/kg	4.04E-03	1.10E-02	4.04E-03	U
102694	ABKSB0102	1-4	042396	Benzene	Volatiles	mg/kg	7.52E-04	5.50E-03	7.52E-04	U
102694	ABKSB0102	1-4	042396	Bromodichloromethane	Volatiles	mg/kg	1.74E-03	5.50E-03	1.74E-03	U
102694	ABKSB0102	1-4	042396	Bromoform	Volatiles	mg/kg	2.93E-03	5.50E-03	2.93E-03	U
102694	ABKSB0102	1-4	042396	Bromomethane (Methyl bromide)	Volatiles	mg/kg	2.01E-03	1.10E-02	2.01E-03	U
102694	ABKSB0102	1-4	042396	Carbon disulfide	Volatiles	mg/kg	1.71E-03	5.50E-03	1.71E-03	U
102694	ABKSB0102	1-4	042396	Carbon tetrachloride	Volatiles	mg/kg	9.71E-04	5.50E-03	9.71E-04	U
102694	ABKSB0102	1-4	042396	Chlorobenzene	Volatiles	mg/kg	1.74E-03	5.50E-03	1.74E-03	U
102694	ABKSB0102	1-4	042396	Chlorodibromomethane	Volatiles	mg/kg	2.53E-03	5.50E-03	2.53E-03	U
102694	ABKSB0102	1-4	042396	Chloroethane	Volatiles	mg/kg	2.06E-03	1.10E-02	2.06E-03	U
102694	ABKSB0102	1-4	042396	Chloroform	Volatiles	mg/kg	1.11E-03	5.50E-03	1.11E-03	U
102694	ABKSB0102	1-4	042396	Chloromethane (methyl chloride)	Volatiles	mg/kg	3.20E-03	1.10E-02	3.20E-03	U
102694	ABKSB0102	1-4	042396	cis-1,3-Dichloropropene	Volatiles	mg/kg	1.79E-03	5.50E-03	1.79E-03	U

Appendix B
Phase I Soil Analytical Results for the 716-A Motor Shops Seepage Basin

Sample ID	Sample Name	Sample Depth	Sample Date	Analyte	Analyte Class	Units	MDL	EQL	Result	Result Qualifier
102694	ABKSB0102	1-4	042396	Dichloromethane (methylene chlo	Volatiles	mg/kg	1.83E-03	5.50E-03	1.83E-03	U
102694	ABKSB0102	1-4	042396	Ethylbenzene	Volatiles	mg/kg	1.47E-03	5.50E-03	1.47E-03	U
102694	ABKSB0102	1-4	042396	Styrene	Volatiles	mg/kg	1.98E-03	5.50E-03	1.98E-03	U
102694	ABKSB0102	1-4	042396	Tetrachloroethene	Volatiles	mg/kg	1.17E-03	5.50E-03	3.68E-03	J
102694	ABKSB0102	1-4	042396	Toluene	Volatiles	mg/kg	1.45E-03	5.50E-03	1.45E-03	U
102694	ABKSB0102	1-4	042396	trans-1,3-Dichloropropene	Volatiles	mg/kg	2.08E-03	5.50E-03	2.08E-03	U
102694	ABKSB0102	1-4	042396	Trichloroethene (TCE)	Volatiles	mg/kg	2.09E-03	5.50E-03	2.09E-03	U
102694	ABKSB0102	1-4	042396	Vinyl acetate	Volatiles	mg/kg	5.48E-03	1.10E-02	5.48E-03	U
102694	ABKSB0102	1-4	042396	Vinyl chloride	Volatiles	mg/kg	2.47E-03	1.10E-02	2.47E-03	U
102694	ABKSB0102	1-4	042396	Xylenes (total)	Volatiles	mg/kg	1.53E-03	5.50E-03	1.53E-03	U
102694	ABKSB0102	1-4	042396	1,2,4-Trichlorobenzene	Semivolatiles	mg/kg	1.80E-02	3.72E-01	1.80E-02	U
102694	ABKSB0102	1-4	042396	1,2-Dichlorobenzene	Semivolatiles	mg/kg	1.70E-02	3.72E-01	1.70E-02	U
102694	ABKSB0102	1-4	042396	1,3-Dichlorobenzene	Semivolatiles	mg/kg	1.80E-02	3.72E-01	1.80E-02	U
102694	ABKSB0102	1-4	042396	1,4-Dichlorobenzene	Semivolatiles	mg/kg	1.80E-02	3.72E-01	1.80E-02	U
102694	ABKSB0102	1-4	042396	2,4,5-Trichlorophenol	Semivolatiles	mg/kg	1.40E-02	1.86E+00	1.40E-02	U
102694	ABKSB0102	1-4	042396	2,4,6-Trichlorophenol	Semivolatiles	mg/kg	1.10E-02	3.72E-01	1.10E-02	U
102694	ABKSB0102	1-4	042396	2,4-Dichlorophenol	Semivolatiles	mg/kg	1.30E-02	3.72E-01	1.30E-02	U
102694	ABKSB0102	1-4	042396	2,4-Dimethyl phenol	Semivolatiles	mg/kg	2.60E-02	3.72E-01	2.60E-02	U
102694	ABKSB0102	1-4	042396	2,4-Dinitrophenol	Semivolatiles	mg/kg	4.40E-02	1.86E+00	4.40E-02	U
102694	ABKSB0102	1-4	042396	2,4-Dinitrotoluene	Semivolatiles	mg/kg	1.90E-02	3.72E-01	1.90E-02	U
102694	ABKSB0102	1-4	042396	2,6-Dinitrotoluene	Semivolatiles	mg/kg	1.60E-02	3.72E-01	1.60E-02	U
102694	ABKSB0102	1-4	042396	2-Chloronaphthalene	Semivolatiles	mg/kg	1.60E-02	3.72E-01	1.60E-02	U
102694	ABKSB0102	1-4	042396	2-Chlorophenol	Semivolatiles	mg/kg	1.70E-02	3.72E-01	1.70E-02	U
102694	ABKSB0102	1-4	042396	2-Methyl-4,6-dinitrophenol	Semivolatiles	mg/kg	1.10E-02	1.86E+00	1.10E-02	U
102694	ABKSB0102	1-4	042396	2-Methylnaphthalene	Semivolatiles	mg/kg	1.70E-02	3.72E-01	1.70E-02	U
102694	ABKSB0102	1-4	042396	2-Nitroaniline	Semivolatiles	mg/kg	1.90E-02	1.86E+00	1.90E-02	U
102694	ABKSB0102	1-4	042396	2-Nitrophenol	Semivolatiles	mg/kg	1.70E-02	3.72E-01	1.70E-02	U
102694	ABKSB0102	1-4	042396	3,3'-Dichlorobenzidine	Semivolatiles	mg/kg	7.30E-02	7.44E-01	7.30E-02	U
102694	ABKSB0102	1-4	042396	3-Nitroaniline	Semivolatiles	mg/kg	4.20E-02	1.86E+00	4.20E-02	U
102694	ABKSB0102	1-4	042396	4-Bromophenyl phenyl ether	Semivolatiles	mg/kg	1.00E-02	3.72E-01	1.00E-02	U

Appendix B
Phase I Soil Analytical Results for the 716-A Motor Shops Seepage Basin

Sample ID	Sample Name	Sample Depth	Sample Date	Analyte	Analyte Class	Units	MDL	EQL	Result	Result Qualifier
102694	ABKSB0102	1-4	042396	4-Chloro-3-methylphenol (p-chlo	Semivolatiles	mg/kg	1.80E-02	3.72E-01	1.80E-02	U
102694	ABKSB0102	1-4	042396	4-Chloroaniline	Semivolatiles	mg/kg	6.00E-03	3.72E-01	6.00E-03	U
102694	ABKSB0102	1-4	042396	4-Chlorophenyl phenyl ether	Semivolatiles	mg/kg	1.30E-02	3.72E-01	1.30E-02	U
102694	ABKSB0102	1-4	042396	4-Nitroaniline	Semivolatiles	mg/kg	2.00E-02	1.86E+00	2.00E-02	U
102694	ABKSB0102	1-4	042396	4-Nitrophenol	Semivolatiles	mg/kg	4.90E-02	1.86E+00	4.90E-02	U
102694	ABKSB0102	1-4	042396	Acenapthene	Semivolatiles	mg/kg	1.50E-02	3.72E-01	1.50E-02	U
102694	ABKSB0102	1-4	042396	Acenapthylene	Semivolatiles	mg/kg	1.60E-02	3.72E-01	1.60E-02	U
102694	ABKSB0102	1-4	042396	Anthracene	Semivolatiles	mg/kg	1.60E-02	3.72E-01	1.60E-02	U
102694	ABKSB0102	1-4	042396	Benzo(a)anthracene	Semivolatiles	mg/kg	2.00E-02	3.72E-01	2.00E-02	U
102694	ABKSB0102	1-4	042396	Benzo(a)pyrene	Semivolatiles	mg/kg	2.40E-02	3.72E-01	2.40E-02	U
102694	ABKSB0102	1-4	042396	Benzo(b)fluoranthene	Semivolatiles	mg/kg	2.30E-02	3.72E-01	2.30E-02	U
102694	ABKSB0102	1-4	042396	Benzo(g,h,i)perylene	Semivolatiles	mg/kg	1.60E-02	3.72E-01	1.60E-02	U
102694	ABKSB0102	1-4	042396	Benzo(k)fluoranthene	Semivolatiles	mg/kg	2.20E-02	3.72E-01	2.20E-02	U
102694	ABKSB0102	1-4	042396	Benzoic acid	Semivolatiles	mg/kg	3.40E-02	1.86E+00	3.40E-02	U
102694	ABKSB0102	1-4	042396	Benzyl alcohol	Semivolatiles	mg/kg	1.90E-02	3.72E-01	1.90E-02	U
102694	ABKSB0102	1-4	042396	Bis(2-chloroethoxy) methane	Semivolatiles	mg/kg	1.60E-02	3.72E-01	1.60E-02	U
102694	ABKSB0102	1-4	042396	Bis(2-chloroethyl) ether	Semivolatiles	mg/kg	2.20E-02	3.72E-01	2.20E-02	U
102694	ABKSB0102	1-4	042396	Bis(2-chloroisopropyl) ether	Semivolatiles	mg/kg	1.80E-02	3.72E-01	1.80E-02	U
102694	ABKSB0102	1-4	042396	Bis(2-ethylhexyl) phthalate	Semivolatiles	mg/kg	2.20E-02	3.72E-01	2.20E-02	U
102694	ABKSB0102	1-4	042396	Butyl benzyl phthalate	Semivolatiles	mg/kg	2.10E-02	3.72E-01	2.10E-02	U
102694	ABKSB0102	1-4	042396	Chrysene	Semivolatiles	mg/kg	1.90E-02	3.72E-01	1.90E-02	U
102694	ABKSB0102	1-4	042396	Di-n-butyl phthalate	Semivolatiles	mg/kg	1.90E-02	3.72E-01	1.90E-02	U
102694	ABKSB0102	1-4	042396	Di-n-octyl phthalate	Semivolatiles	mg/kg	2.60E-02	3.72E-01	2.60E-02	U
102694	ABKSB0102	1-4	042396	Dibenzo(a,h)anthracene	Semivolatiles	mg/kg	1.70E-02	3.72E-01	1.70E-02	U
102694	ABKSB0102	1-4	042396	Dibenzofuran	Semivolatiles	mg/kg	1.60E-02	3.72E-01	1.60E-02	U
102694	ABKSB0102	1-4	042396	Diethyl phthalate	Semivolatiles	mg/kg	1.60E-02	3.72E-01	1.60E-02	U
102694	ABKSB0102	1-4	042396	Dimethyl phthalate	Semivolatiles	mg/kg	1.50E-02	3.72E-01	1.50E-02	U
102694	ABKSB0102	1-4	042396	Fluoranthene	Semivolatiles	mg/kg	1.90E-02	3.72E-01	1.90E-02	U
102694	ABKSB0102	1-4	042396	Fluorene	Semivolatiles	mg/kg	1.60E-02	3.72E-01	1.60E-02	U
102694	ABKSB0102	1-4	042396	Hexachlorobenzene	Semivolatiles	mg/kg	1.00E-02	3.72E-01	1.00E-02	U

Appendix B
Phase I Soil Analytical Results for the 716-A Motor Shops Seepage Basin

Sample ID	Sample Name	Sample Depth	Sample Date	Analyte	Analyte Class	Units	MDL	EQL	Result	Result Qualifier
102694	ABKSB0102	1-4	042396	Hexachlorobutadiene	Semivolatiles	mg/kg	1.50E-02	3.72E-01	1.50E-02	U
102694	ABKSB0102	1-4	042396	Hexachlorocyclopentadiene	Semivolatiles	mg/kg	2.60E-02	3.72E-01	2.60E-02	U
102694	ABKSB0102	1-4	042396	Hexachloroethane	Semivolatiles	mg/kg	1.60E-02	3.72E-01	1.60E-02	U
102694	ABKSB0102	1-4	042396	Indeno(1,2,3-c,d)pyrene	Semivolatiles	mg/kg	1.80E-02	3.72E-01	1.80E-02	U
102694	ABKSB0102	1-4	042396	Isophorone	Semivolatiles	mg/kg	1.70E-02	3.72E-01	1.70E-02	U
102694	ABKSB0102	1-4	042396	N-Nitrosodi-n-propylamine	Semivolatiles	mg/kg	2.00E-02	3.72E-01	2.00E-02	U
102694	ABKSB0102	1-4	042396	N-Nitrosodiphenylamine	Semivolatiles	mg/kg	1.40E-02	3.72E-01	1.40E-02	U
102694	ABKSB0102	1-4	042396	Naphthalene	Semivolatiles	mg/kg	1.90E-02	3.72E-01	1.90E-02	U
102694	ABKSB0102	1-4	042396	Nitrobenzene	Semivolatiles	mg/kg	1.90E-02	3.72E-01	1.90E-02	U
102694	ABKSB0102	1-4	042396	o-cresol (2-methylphenol)	Semivolatiles	mg/kg	1.60E-02	3.72E-01	1.60E-02	U
102694	ABKSB0102	1-4	042396	p-cresol (4-methylphenol)	Semivolatiles	mg/kg	1.70E-02	3.72E-01	1.70E-02	U
102694	ABKSB0102	1-4	042396	Pentachlorophenol	Semivolatiles	mg/kg	3.90E-02	1.86E+00	3.90E-02	U
102694	ABKSB0102	1-4	042396	Phenanthrene	Semivolatiles	mg/kg	1.50E-02	3.72E-01	1.50E-02	U
102694	ABKSB0102	1-4	042396	Phenol	Semivolatiles	mg/kg	1.90E-02	3.72E-01	1.90E-02	U
102694	ABKSB0102	1-4	042396	Pyrene	Semivolatiles	mg/kg	2.10E-02	3.72E-01	2.10E-02	U
102694	ABKSB0102	1-4	042396	Aldol condensate	SVOA TICs	mg/kg	0.00E+00	0.00E+00	5.00E-01	J
102694	ABKSB0102	1-4	042396	Aldrin	Pesticides/PCBs	mg/kg	5.70E-04	1.86E-03	5.70E-04	U
102694	ABKSB0102	1-4	042396	alpha-Benzene hexachloride	Pesticides/PCBs	mg/kg	5.70E-04	1.86E-03	5.70E-04	U
102694	ABKSB0102	1-4	042396	alpha-Chlordane	Pesticides/PCBs	mg/kg	5.70E-04	1.86E-03	5.70E-04	U
102694	ABKSB0102	1-4	042396	Aroclor 1016	Pesticides/PCBs	mg/kg	1.10E-02	3.72E-02	1.10E-02	U
102694	ABKSB0102	1-4	042396	Aroclor 1221	Pesticides/PCBs	mg/kg	2.20E-02	7.44E-02	2.20E-02	U
102694	ABKSB0102	1-4	042396	Aroclor 1232	Pesticides/PCBs	mg/kg	1.10E-02	3.72E-02	1.10E-02	U
102694	ABKSB0102	1-4	042396	Aroclor 1242	Pesticides/PCBs	mg/kg	1.10E-02	3.72E-02	1.10E-02	U
102694	ABKSB0102	1-4	042396	Aroclor 1248	Pesticides/PCBs	mg/kg	1.10E-02	3.72E-02	1.10E-02	U
102694	ABKSB0102	1-4	042396	Aroclor 1254	Pesticides/PCBs	mg/kg	1.10E-02	3.72E-02	1.10E-02	U
102694	ABKSB0102	1-4	042396	Aroclor 1260	Pesticides/PCBs	mg/kg	1.10E-02	3.72E-02	1.10E-02	U
102694	ABKSB0102	1-4	042396	beta-Benzene hexachloride	Pesticides/PCBs	mg/kg	5.70E-04	1.86E-03	5.70E-04	U
102694	ABKSB0102	1-4	042396	delta-Benzene hexachloride	Pesticides/PCBs	mg/kg	5.70E-04	1.86E-03	5.70E-04	U
102694	ABKSB0102	1-4	042396	Dieldrin	Pesticides/PCBs	mg/kg	6.33E-04	3.72E-03	6.33E-04	U
102694	ABKSB0102	1-4	042396	Endosulfan I	Pesticides/PCBs	mg/kg	5.70E-04	1.86E-03	5.70E-04	U

Appendix B
Phase I Soil Analytical Results for the 716-A Motor Shops Seepage Basin

Sample ID	Sample Name	Sample Depth	Sample Date	Analyte	Analyte Class	Units	MDL	EQL	Result	Result Qualifier
102694	ABKSB0102	1-4	042396	Endosulfan II	Pesticides/PCBs	mg/kg	9.00E-04	3.72E-03	9.00E-04	U
102694	ABKSB0102	1-4	042396	Endosulfan sulfate	Pesticides/PCBs	mg/kg	1.10E-03	3.72E-03	1.10E-03	U
102694	ABKSB0102	1-4	042396	Endrin	Pesticides/PCBs	mg/kg	1.10E-03	3.72E-03	1.10E-03	U
102694	ABKSB0102	1-4	042396	Endrin ketone	Pesticides/PCBs	mg/kg	1.10E-03	3.72E-03	1.10E-03	U
102694	ABKSB0102	1-4	042396	gamma-Benzene hexachloride (Lin	Pesticides/PCBs	mg/kg	5.70E-04	1.86E-03	5.70E-04	U
102694	ABKSB0102	1-4	042396	gamma-Chlordane	Pesticides/PCBs	mg/kg	5.70E-04	1.86E-03	5.70E-04	U
102694	ABKSB0102	1-4	042396	Heptachlor	Pesticides/PCBs	mg/kg	5.70E-04	1.86E-03	5.70E-04	U
102694	ABKSB0102	1-4	042396	Heptachlor epoxide	Pesticides/PCBs	mg/kg	5.70E-04	1.86E-03	5.70E-04	U
102694	ABKSB0102	1-4	042396	Methoxychlor (Mariate)	Pesticides/PCBs	mg/kg	5.70E-03	1.86E-02	5.70E-03	U
102694	ABKSB0102	1-4	042396	p,p'-DDD	Pesticides/PCBs	mg/kg	1.10E-03	3.72E-03	1.10E-03	U
102694	ABKSB0102	1-4	042396	p,p'-DDE	Pesticides/PCBs	mg/kg	9.00E-04	3.72E-03	9.00E-04	U
102694	ABKSB0102	1-4	042396	p,p'-DDT	Pesticides/PCBs	mg/kg	1.10E-03	3.72E-03	1.10E-03	U
102694	ABKSB0102	1-4	042396	Toxaphene	Pesticides/PCBs	mg/kg	5.30E-02	1.86E-01	5.30E-02	U
102694	ABKSB0102	1-4	042396	Aluminum	TAL Inorganics	mg/kg	1.90E+00	2.06E+01	1.62E+04	
102694	ABKSB0102	1-4	042396	Antimony	TAL Inorganics	mg/kg	3.50E-01	3.87E+00	4.45E-01	J
102694	ABKSB0102	1-4	042396	Arsenic	TAL Inorganics	mg/kg	1.11E+00	1.23E+01	3.00E+00	J
102694	ABKSB0102	1-4	042396	Barium	TAL Inorganics	mg/kg	1.10E-01	1.22E+00	4.39E+01	
102694	ABKSB0102	1-4	042396	Beryllium	TAL Inorganics	mg/kg	3.00E-02	2.76E-01	4.07E-01	
102694	ABKSB0102	1-4	042396	Cadmium	TAL Inorganics	mg/kg	4.00E-02	4.42E-01	2.36E-01	J
102694	ABKSB0102	1-4	042396	Calcium	TAL Inorganics	mg/kg	1.68E+00	1.86E+01	3.29E+02	
102694	ABKSB0102	1-4	042396	Chromium	TAL Inorganics	mg/kg	9.00E-02	9.94E-01	1.34E+01	
102694	ABKSB0102	1-4	042396	Cobalt	TAL Inorganics	mg/kg	8.00E-02	8.84E-01	1.80E+00	
102694	ABKSB0102	1-4	042396	Copper	TAL Inorganics	mg/kg	1.00E-01	1.10E+00	3.50E+00	
102694	ABKSB0102	1-4	042396	Cyanide	TAL Inorganics	mg/kg	8.00E-02	8.50E-01	8.00E-02	U
102694	ABKSB0102	1-4	042396	Iron	TAL Inorganics	mg/kg	2.19E+00	2.42E+01	9.87E+03	
102694	ABKSB0102	1-4	042396	Lead	TAL Inorganics	mg/kg	5.90E-01	6.52E+00	8.60E+00	
102694	ABKSB0102	1-4	042396	Magnesium	TAL Inorganics	mg/kg	8.70E-01	9.61E+00	2.22E+02	
102694	ABKSB0102	1-4	042396	Manganese	TAL Inorganics	mg/kg	2.00E-02	2.21E-01	4.66E+01	
102694	ABKSB0102	1-4	042396	Mercury	TAL Inorganics	mg/kg	1.30E-02	1.49E-01	8.20E-02	J
102694	ABKSB0102	1-4	042396	Nickel	TAL Inorganics	mg/kg	1.70E-01	1.88E+00	4.00E+00	

Appendix B
Phase I Soil Analytical Results for the 716-A Motor Shops Seepage Basin

Sample ID	Sample Name	Sample Depth	Sample Date	Analyte	Analyte Class	Units	MDL	EQL	Result	Result Qualifier
102694	ABKSB0102	1-4	042396	Potassium	TAL Inorganics	mg/kg	6.70E+00	7.40E+01	1.65E+02	
102694	ABKSB0102	1-4	042396	Selenium	TAL Inorganics	mg/kg	1.04E+00	1.15E+01	1.04E+00	U
102694	ABKSB0102	1-4	042396	Silver	TAL Inorganics	mg/kg	9.00E-02	9.94E-01	9.00E-02	U
102694	ABKSB0102	1-4	042396	Sodium	TAL Inorganics	mg/kg	1.29E+01	1.43E+02	2.11E+01	J
102694	ABKSB0102	1-4	042396	Thallium	TAL Inorganics	mg/kg	8.50E-01	9.39E+00	8.50E-01	U
102694	ABKSB0102	1-4	042396	Vanadium	TAL Inorganics	mg/kg	7.00E-02	7.74E-01	2.41E+01	
102694	ABKSB0102	1-4	042396	Zinc	TAL Inorganics	mg/kg	1.61E+00	1.78E+01	7.70E+00	J
102694	ABKSB0102	1-4	042396	Gross Alpha	Radiologicals	pCi/g	4.00E+00	2.89E+00	5.10E+00	
102694	ABKSB0102	1-4	042396	Non-volatile Beta	Radiologicals	pCi/g	1.00E+01	1.73E+00	6.88E+00	
102694	ABKSB0102	1-4	042396	Cation exchange capacity	Miscellaneous	Meq/	6.00E+00	6.70E+02	6.00E+00	U
102694	ABKSB0102	1-4	042396	Total Organic Carbon	Miscellaneous	mg/kg	8.40E+00	6.00E+01	8.49E+02	
102694	ABKSB0102	1-4	042396	Total petroleum hydrocarbons	Miscellaneous	mg/kg	3.30E+00	1.19E+01	1.26E+01	
102663	ABKSB0201	0-1	041996	1,1,1-Trichloroethane	Volatiles	mg/kg	9.71E-04	5.50E-03	1.13E-02	
102663	ABKSB0201	0-1	041996	1,1,2,2-Tetrachloroethane	Volatiles	mg/kg	3.47E-03	5.50E-03	3.47E-03	U
102663	ABKSB0201	0-1	041996	1,1,2-Trichloroethane	Volatiles	mg/kg	2.40E-03	5.50E-03	2.40E-03	U
102663	ABKSB0201	0-1	041996	1,1-Dichloroethane	Volatiles	mg/kg	1.05E-03	5.50E-03	1.05E-03	U
102663	ABKSB0201	0-1	041996	1,1-Dichloroethene	Volatiles	mg/kg	1.42E-03	5.50E-03	1.42E-03	U
102663	ABKSB0201	0-1	041996	1,2-Dichloroethane	Volatiles	mg/kg	1.34E-03	5.50E-03	1.34E-03	U
102663	ABKSB0201	0-1	041996	1,2-Dichloroethene (total)	Volatiles	mg/kg	8.54E-04	5.50E-03	8.54E-04	U
102663	ABKSB0201	0-1	041996	1,2-Dichloropropane	Volatiles	mg/kg	1.67E-03	5.50E-03	1.67E-03	U
102663	ABKSB0201	0-1	041996	2-Butanone (MEK)	Volatiles	mg/kg	2.81E-03	1.10E-02	2.81E-03	U
102663	ABKSB0201	0-1	041996	2-Hexanone	Volatiles	mg/kg	3.77E-03	1.10E-02	3.77E-03	U
102663	ABKSB0201	0-1	041996	4-Methyl-2-pentanone	Volatiles	mg/kg	3.29E-03	1.10E-02	3.29E-03	U
102663	ABKSB0201	0-1	041996	Acetone	Volatiles	mg/kg	4.04E-03	1.10E-02	4.04E-03	U
102663	ABKSB0201	0-1	041996	Benzene	Volatiles	mg/kg	7.52E-04	5.50E-03	7.52E-04	U
102663	ABKSB0201	0-1	041996	Bromodichloromethane	Volatiles	mg/kg	1.74E-03	5.50E-03	1.74E-03	U
102663	ABKSB0201	0-1	041996	Bromoform	Volatiles	mg/kg	2.93E-03	5.50E-03	2.93E-03	U
102663	ABKSB0201	0-1	041996	Bromomethane (Methyl bromide)	Volatiles	mg/kg	2.01E-03	1.10E-02	2.01E-03	U
102663	ABKSB0201	0-1	041996	Carbon disulfide	Volatiles	mg/kg	1.71E-03	5.50E-03	1.71E-03	U
102663	ABKSB0201	0-1	041996	Carbon tetrachloride	Volatiles	mg/kg	9.71E-04	5.50E-03	9.71E-04	U

Appendix B
Phase I Soil Analytical Results for the 716-A Motor Shops Seepage Basin

Sample ID	Sample Name	Sample Depth	Sample Date	Analyte	Analyte Class	Units	MDL	EQL	Result	Result Qualifier
102663	ABKSB0201	0-1	041996	Chlorobenzene	Volatiles	mg/kg	1.74E-03	5.50E-03	1.74E-03	U
102663	ABKSB0201	0-1	041996	Chlorodibromomethane	Volatiles	mg/kg	2.53E-03	5.50E-03	2.53E-03	U
102663	ABKSB0201	0-1	041996	Chloroethane	Volatiles	mg/kg	2.06E-03	1.10E-02	2.06E-03	U
102663	ABKSB0201	0-1	041996	Chloroform	Volatiles	mg/kg	1.11E-03	5.50E-03	1.11E-03	U
102663	ABKSB0201	0-1	041996	Chloromethane (methyl chloride)	Volatiles	mg/kg	3.20E-03	1.10E-02	3.20E-03	U
102663	ABKSB0201	0-1	041996	cis-1,3-Dichloropropene	Volatiles	mg/kg	1.79E-03	5.50E-03	1.79E-03	U
102663	ABKSB0201	0-1	041996	Dichloromethane (methylene chlo	Volatiles	mg/kg	1.83E-03	5.50E-03	1.83E-03	U
102663	ABKSB0201	0-1	041996	Ethylbenzene	Volatiles	mg/kg	1.47E-03	5.50E-03	1.47E-03	U
102663	ABKSB0201	0-1	041996	Styrene	Volatiles	mg/kg	1.98E-03	5.50E-03	1.98E-03	U
102663	ABKSB0201	0-1	041996	Tetrachloroethene	Volatiles	mg/kg	1.17E-03	5.50E-03	1.03E-02	
102663	ABKSB0201	0-1	041996	Toluene	Volatiles	mg/kg	1.45E-03	5.50E-03	1.45E-03	U
102663	ABKSB0201	0-1	041996	trans-1,3-Dichloropropene	Volatiles	mg/kg	2.08E-03	5.50E-03	2.08E-03	U
102663	ABKSB0201	0-1	041996	Trichloroethene (TCE)	Volatiles	mg/kg	2.09E-03	5.50E-03	2.09E-03	U
102663	ABKSB0201	0-1	041996	Vinyl acetate	Volatiles	mg/kg	5.48E-03	1.10E-02	5.48E-03	U
102663	ABKSB0201	0-1	041996	Vinyl chloride	Volatiles	mg/kg	2.47E-03	1.10E-02	2.47E-03	U
102663	ABKSB0201	0-1	041996	Xylenes (total)	Volatiles	mg/kg	1.53E-03	5.50E-03	1.53E-03	U
102663	ABKSB0201	0-1	041996	1,2,4-Trichlorobenzene	Semivolatiles	mg/kg	1.80E-02	3.65E-01	1.80E-02	U
102663	ABKSB0201	0-1	041996	1,2-Dichlorobenzene	Semivolatiles	mg/kg	1.70E-02	3.65E-01	1.70E-02	U
102663	ABKSB0201	0-1	041996	1,3-Dichlorobenzene	Semivolatiles	mg/kg	1.80E-02	3.65E-01	1.80E-02	U
102663	ABKSB0201	0-1	041996	1,4-Dichlorobenzene	Semivolatiles	mg/kg	1.80E-02	3.65E-01	1.80E-02	U
102663	ABKSB0201	0-1	041996	2,4,5-Trichlorophenol	Semivolatiles	mg/kg	1.40E-02	1.82E+00	1.40E-02	U
102663	ABKSB0201	0-1	041996	2,4,6-Trichlorophenol	Semivolatiles	mg/kg	1.10E-02	3.65E-01	1.10E-02	U
102663	ABKSB0201	0-1	041996	2,4-Dichlorophenol	Semivolatiles	mg/kg	1.30E-02	3.65E-01	1.30E-02	U
102663	ABKSB0201	0-1	041996	2,4-Dimethyl phenol	Semivolatiles	mg/kg	2.60E-02	3.65E-01	2.60E-02	U
102663	ABKSB0201	0-1	041996	2,4-Dinitrophenol	Semivolatiles	mg/kg	4.40E-02	1.82E+00	4.40E-02	U
102663	ABKSB0201	0-1	041996	2,4-Dinitrotoluene	Semivolatiles	mg/kg	1.90E-02	3.65E-01	1.90E-02	U
102663	ABKSB0201	0-1	041996	2,6-Dinitrotoluene	Semivolatiles	mg/kg	1.60E-02	3.65E-01	1.60E-02	U
102663	ABKSB0201	0-1	041996	2-Chloronaphthalene	Semivolatiles	mg/kg	1.60E-02	3.65E-01	1.60E-02	U
102663	ABKSB0201	0-1	041996	2-Chlorophenol	Semivolatiles	mg/kg	1.70E-02	3.65E-01	1.70E-02	U
102663	ABKSB0201	0-1	041996	2-Methyl-4,6-dinitrophenol	Semivolatiles	mg/kg	1.10E-02	1.82E+00	1.10E-02	U

Appendix B
Phase I Soil Analytical Results for the 716-A Motor Shops Seepage Basin

Sample ID	Sample Name	Sample Depth	Sample Date	Analyte	Analyte Class	Units	MDL	EQL	Result	Result Qualifier
102663	ABKSB0201	0-1	041996	2-Methylnaphthalene	Semivolatiles	mg/kg	1.70E-02	3.65E-01	1.70E-02	U
102663	ABKSB0201	0-1	041996	2-Nitroaniline	Semivolatiles	mg/kg	1.90E-02	1.82E+00	1.90E-02	U
102663	ABKSB0201	0-1	041996	2-Nitrophenol	Semivolatiles	mg/kg	1.70E-02	3.65E-01	1.70E-02	U
102663	ABKSB0201	0-1	041996	3,3'-Dichlorobenzidine	Semivolatiles	mg/kg	7.30E-02	7.30E-01	7.30E-02	U
102663	ABKSB0201	0-1	041996	3-Nitroaniline	Semivolatiles	mg/kg	4.20E-02	1.82E+00	4.20E-02	U
102663	ABKSB0201	0-1	041996	4-Bromophenyl phenyl ether	Semivolatiles	mg/kg	1.00E-02	3.65E-01	1.00E-02	U
102663	ABKSB0201	0-1	041996	4-Chloro-3-methylphenol (p-chlo	Semivolatiles	mg/kg	1.80E-02	3.65E-01	1.80E-02	U
102663	ABKSB0201	0-1	041996	4-Chloroaniline	Semivolatiles	mg/kg	6.00E-03	3.65E-01	6.00E-03	U
102663	ABKSB0201	0-1	041996	4-Chlorophenyl phenyl ether	Semivolatiles	mg/kg	1.30E-02	3.65E-01	1.30E-02	U
102663	ABKSB0201	0-1	041996	4-Nitroaniline	Semivolatiles	mg/kg	2.00E-02	1.82E+00	2.00E-02	U
102663	ABKSB0201	0-1	041996	4-Nitrophenol	Semivolatiles	mg/kg	4.90E-02	1.82E+00	4.90E-02	U
102663	ABKSB0201	0-1	041996	Acenapthene	Semivolatiles	mg/kg	1.50E-02	3.65E-01	1.50E-02	U
102663	ABKSB0201	0-1	041996	Acenapthylene	Semivolatiles	mg/kg	1.60E-02	3.65E-01	1.60E-02	U
102663	ABKSB0201	0-1	041996	Anthracene	Semivolatiles	mg/kg	1.60E-02	3.65E-01	3.68E-02	J
102663	ABKSB0201	0-1	041996	Benzo(a)anthracene	Semivolatiles	mg/kg	2.00E-02	3.65E-01	1.17E-01	J
102663	ABKSB0201	0-1	041996	Benzo(a)pyrene	Semivolatiles	mg/kg	2.40E-02	3.65E-01	1.13E-01	J
102663	ABKSB0201	0-1	041996	Benzo(b)fluoranthene	Semivolatiles	mg/kg	2.30E-02	3.65E-01	1.04E-01	J
102663	ABKSB0201	0-1	041996	Benzo(g,h,i)perylene	Semivolatiles	mg/kg	1.60E-02	3.65E-01	6.98E-02	J
102663	ABKSB0201	0-1	041996	Benzo(k)fluoranthene	Semivolatiles	mg/kg	2.20E-02	3.65E-01	1.08E-01	J
102663	ABKSB0201	0-1	041996	Benzoic acid	Semivolatiles	mg/kg	3.40E-02	1.82E+00	3.40E-02	U
102663	ABKSB0201	0-1	041996	Benzyl alcohol	Semivolatiles	mg/kg	1.90E-02	3.65E-01	1.90E-02	U
102663	ABKSB0201	0-1	041996	Bis(2-chloroethoxy) methane	Semivolatiles	mg/kg	1.60E-02	3.65E-01	1.60E-02	U
102663	ABKSB0201	0-1	041996	Bis(2-chloroethyl) ether	Semivolatiles	mg/kg	2.20E-02	3.65E-01	2.20E-02	U
102663	ABKSB0201	0-1	041996	Bis(2-chloroisopropyl) ether	Semivolatiles	mg/kg	1.80E-02	3.65E-01	1.80E-02	U
102663	ABKSB0201	0-1	041996	Bis(2-ethylhexyl) phthalate	Semivolatiles	mg/kg	2.20E-02	3.65E-01	2.20E-02	U
102663	ABKSB0201	0-1	041996	Butyl benzyl phthalate	Semivolatiles	mg/kg	2.10E-02	3.65E-01	2.10E-02	U
102663	ABKSB0201	0-1	041996	Chrysene	Semivolatiles	mg/kg	1.90E-02	3.65E-01	1.58E-01	J
102663	ABKSB0201	0-1	041996	Di-n-butyl phthalate	Semivolatiles	mg/kg	1.90E-02	3.65E-01	1.90E-02	U
102663	ABKSB0201	0-1	041996	Di-n-octyl phthalate	Semivolatiles	mg/kg	2.60E-02	3.65E-01	2.60E-02	U
102663	ABKSB0201	0-1	041996	Dibenzo(a,h)anthracene	Semivolatiles	mg/kg	1.70E-02	3.65E-01	1.70E-02	U

Appendix B
Phase I Soil Analytical Results for the 716-A Motor Shops Seepage Basin

Sample ID	Sample Name	Sample Depth	Sample Date	Analyte	Analyte Class	Units	MDL	EQL	Result	Result Qualifier
102663	ABKSB0201	0-1	041996	Dibenzofuran	Semivolatiles	mg/kg	1.60E-02	3.65E-01	1.60E-02	U
102663	ABKSB0201	0-1	041996	Diethyl phthalate	Semivolatiles	mg/kg	1.60E-02	3.65E-01	1.60E-02	U
102663	ABKSB0201	0-1	041996	Dimethyl phthalate	Semivolatiles	mg/kg	1.50E-02	3.65E-01	1.50E-02	U
102663	ABKSB0201	0-1	041996	Fluoranthene	Semivolatiles	mg/kg	1.90E-02	3.65E-01	2.49E-01	J
102663	ABKSB0201	0-1	041996	Fluorene	Semivolatiles	mg/kg	1.60E-02	3.65E-01	1.60E-02	U
102663	ABKSB0201	0-1	041996	Hexachlorobenzene	Semivolatiles	mg/kg	1.00E-02	3.65E-01	1.00E-02	U
102663	ABKSB0201	0-1	041996	Hexachlorobutadiene	Semivolatiles	mg/kg	1.50E-02	3.65E-01	1.50E-02	U
102663	ABKSB0201	0-1	041996	Hexachlorocyclopentadiene	Semivolatiles	mg/kg	2.60E-02	3.65E-01	2.60E-02	U
102663	ABKSB0201	0-1	041996	Hexachloroethane	Semivolatiles	mg/kg	1.60E-02	3.65E-01	1.60E-02	U
102663	ABKSB0201	0-1	041996	Indeno(1,2,3-c,d)pyrene	Semivolatiles	mg/kg	1.80E-02	3.65E-01	6.61E-02	J
102663	ABKSB0201	0-1	041996	Isophorone	Semivolatiles	mg/kg	1.70E-02	3.65E-01	1.70E-02	U
102663	ABKSB0201	0-1	041996	N-Nitrosodi-n-propylamine	Semivolatiles	mg/kg	2.00E-02	3.65E-01	2.00E-02	U
102663	ABKSB0201	0-1	041996	N-Nitrosodiphenylamine	Semivolatiles	mg/kg	1.40E-02	3.65E-01	1.40E-02	U
102663	ABKSB0201	0-1	041996	Naphthalene	Semivolatiles	mg/kg	1.90E-02	3.65E-01	1.90E-02	U
102663	ABKSB0201	0-1	041996	Nitrobenzene	Semivolatiles	mg/kg	1.90E-02	3.65E-01	1.90E-02	U
102663	ABKSB0201	0-1	041996	o-cresol (2-methylphenol)	Semivolatiles	mg/kg	1.60E-02	3.65E-01	1.60E-02	U
102663	ABKSB0201	0-1	041996	p-cresol (4-methylphenol)	Semivolatiles	mg/kg	1.70E-02	3.65E-01	1.70E-02	U
102663	ABKSB0201	0-1	041996	Pentachlorophenol	Semivolatiles	mg/kg	3.90E-02	1.82E+00	3.90E-02	U
102663	ABKSB0201	0-1	041996	Phenanthrene	Semivolatiles	mg/kg	1.50E-02	3.65E-01	1.72E-01	J
102663	ABKSB0201	0-1	041996	Phenol	Semivolatiles	mg/kg	1.90E-02	3.65E-01	1.90E-02	U
102663	ABKSB0201	0-1	041996	Pyrene	Semivolatiles	mg/kg	2.10E-02	3.65E-01	2.04E-01	J
102663	ABKSB0201	0-1	041996	Aldol condensate	SVOA TICs	mg/kg	0.00E+00	0.00E+00	3.00E-01	J
102663	ABKSB0201	0-1	041996	Unknown	SVOA TICs	mg/kg	0.00E+00	0.00E+00	2.00E-01	J
102663	ABKSB0201	0-1	041996	Unknown	SVOA TICs	mg/kg	0.00E+00	0.00E+00	4.00E-01	J
102663	ABKSB0201	0-1	041996	Unknown	SVOA TICs	mg/kg	0.00E+00	0.00E+00	3.00E-01	J
102663	ABKSB0201	0-1	041996	Aldrin	Pesticides/PCBs	mg/kg	5.70E-04	1.83E-03	5.70E-04	U
102663	ABKSB0201	0-1	041996	alpha-Benzene hexachloride	Pesticides/PCBs	mg/kg	5.70E-04	1.83E-03	5.70E-04	U
102663	ABKSB0201	0-1	041996	alpha-Chlordane	Pesticides/PCBs	mg/kg	5.70E-04	1.83E-03	5.70E-04	U
102663	ABKSB0201	0-1	041996	Aroclor 1016	Pesticides/PCBs	mg/kg	1.10E-02	3.65E-02	1.10E-02	U
102663	ABKSB0201	0-1	041996	Aroclor 1221	Pesticides/PCBs	mg/kg	2.20E-02	7.30E-02	2.20E-02	U

Appendix B
Phase I Soil Analytical Results for the 716-A Motor Shops Seepage Basin

Sample ID	Sample Name	Sample Depth	Sample Date	Analyte	Analyte Class	Units	MDL	EQL	Result	Result Qualifier
102663	ABKSB0201	0-1	041996	Aroclor 1232	Pesticides/PCBs	mg/kg	1.10E-02	3.65E-02	1.10E-02	U
102663	ABKSB0201	0-1	041996	Aroclor 1242	Pesticides/PCBs	mg/kg	1.10E-02	3.65E-02	1.10E-02	U
102663	ABKSB0201	0-1	041996	Aroclor 1248	Pesticides/PCBs	mg/kg	1.10E-02	3.65E-02	1.10E-02	U
102663	ABKSB0201	0-1	041996	Aroclor 1254	Pesticides/PCBs	mg/kg	1.10E-02	3.65E-02	1.10E-02	U
102663	ABKSB0201	0-1	041996	Aroclor 1260	Pesticides/PCBs	mg/kg	1.10E-02	3.65E-02	1.10E-02	U
102663	ABKSB0201	0-1	041996	beta-Benzene hexachloride	Pesticides/PCBs	mg/kg	5.70E-04	1.83E-03	5.70E-04	U
102663	ABKSB0201	0-1	041996	delta-Benzene hexachloride	Pesticides/PCBs	mg/kg	5.70E-04	1.83E-03	5.70E-04	U
102663	ABKSB0201	0-1	041996	Dieldrin	Pesticides/PCBs	mg/kg	6.33E-04	3.65E-03	6.33E-04	U
102663	ABKSB0201	0-1	041996	Endosulfan I	Pesticides/PCBs	mg/kg	5.70E-04	1.83E-03	5.70E-04	U
102663	ABKSB0201	0-1	041996	Endosulfan II	Pesticides/PCBs	mg/kg	9.00E-04	3.65E-03	9.00E-04	U
102663	ABKSB0201	0-1	041996	Endosulfan sulfate	Pesticides/PCBs	mg/kg	1.10E-03	3.65E-03	1.10E-03	U
102663	ABKSB0201	0-1	041996	Endrin	Pesticides/PCBs	mg/kg	1.10E-03	3.65E-03	1.10E-03	U
102663	ABKSB0201	0-1	041996	Endrin ketone	Pesticides/PCBs	mg/kg	1.10E-03	3.65E-03	1.10E-03	U
102663	ABKSB0201	0-1	041996	gamma-Benzene hexachloride (Lin	Pesticides/PCBs	mg/kg	5.70E-04	1.83E-03	5.70E-04	U
102663	ABKSB0201	0-1	041996	gamma-Chlordane	Pesticides/PCBs	mg/kg	5.70E-04	1.83E-03	5.70E-04	U
102663	ABKSB0201	0-1	041996	Heptachlor	Pesticides/PCBs	mg/kg	5.70E-04	1.83E-03	5.70E-04	U
102663	ABKSB0201	0-1	041996	Heptachlor epoxide	Pesticides/PCBs	mg/kg	5.70E-04	1.83E-03	5.70E-04	U
102663	ABKSB0201	0-1	041996	Methoxychlor (Mariate)	Pesticides/PCBs	mg/kg	5.70E-03	1.83E-02	5.70E-03	U
102663	ABKSB0201	0-1	041996	p,p'-DDD	Pesticides/PCBs	mg/kg	1.10E-03	3.65E-03	1.10E-03	U
102663	ABKSB0201	0-1	041996	p,p'-DDE	Pesticides/PCBs	mg/kg	9.00E-04	3.65E-03	9.00E-04	U
102663	ABKSB0201	0-1	041996	p,p'-DDT	Pesticides/PCBs	mg/kg	1.10E-03	3.65E-03	1.10E-03	U
102663	ABKSB0201	0-1	041996	Toxaphene	Pesticides/PCBs	mg/kg	5.30E-02	1.83E-01	5.30E-02	U
102663	ABKSB0201	0-1	041996	Aluminum	TAL Inorganics	mg/kg	1.90E+00	2.04E+01	9.99E+03	J
102663	ABKSB0201	0-1	041996	Antimony	TAL Inorganics	mg/kg	3.50E-01	3.83E+00	6.59E-01	J
102663	ABKSB0201	0-1	041996	Arsenic	TAL Inorganics	mg/kg	1.11E+00	1.22E+01	5.00E+00	J
102663	ABKSB0201	0-1	041996	Barium	TAL Inorganics	mg/kg	1.10E-01	1.20E+00	1.51E+01	J
102663	ABKSB0201	0-1	041996	Beryllium	TAL Inorganics	mg/kg	3.00E-02	2.74E-01	2.74E-01	
102663	ABKSB0201	0-1	041996	Cadmium	TAL Inorganics	mg/kg	4.00E-02	4.38E-01	9.72E-01	
102663	ABKSB0201	0-1	041996	Calcium	TAL Inorganics	mg/kg	1.68E+00	1.84E+01	2.81E+03	J
102663	ABKSB0201	0-1	041996	Chromium	TAL Inorganics	mg/kg	9.00E-02	9.86E-01	2.55E+01	

Appendix B
Phase I Soil Analytical Results for the 716-A Motor Shops Seepage Basin

Sample ID	Sample Name	Sample Depth	Sample Date	Analyte	Analyte Class	Units	MDL	EQL	Result	Result Qualifier
102663	ABKSB0201	0-1	041996	Cobalt	TAL Inorganics	mg/kg	8.00E-02	8.76E-01	1.30E+00	
102663	ABKSB0201	0-1	041996	Copper	TAL Inorganics	mg/kg	1.00E-01	1.10E+00	4.00E+00	
102663	ABKSB0201	0-1	041996	Cyanide	TAL Inorganics	mg/kg	8.00E-02	8.30E-01	8.00E-02	U
102663	ABKSB0201	0-1	041996	Iron	TAL Inorganics	mg/kg	2.19E+00	2.40E+01	2.07E+04	J
102663	ABKSB0201	0-1	041996	Lead	TAL Inorganics	mg/kg	5.90E-01	6.46E+00	8.70E+00	
102663	ABKSB0201	0-1	041996	Magnesium	TAL Inorganics	mg/kg	8.70E-01	9.53E+00	4.67E+02	J
102663	ABKSB0201	0-1	041996	Manganese	TAL Inorganics	mg/kg	2.00E-02	2.19E-01	2.39E+02	J
102663	ABKSB0201	0-1	041996	Mercury	TAL Inorganics	mg/kg	1.30E-02	1.42E-01	1.30E-02	U
102663	ABKSB0201	0-1	041996	Nickel	TAL Inorganics	mg/kg	1.70E-01	1.86E+00	2.10E+00	J
102663	ABKSB0201	0-1	041996	Potassium	TAL Inorganics	mg/kg	6.70E+00	7.34E+01	1.91E+02	J
102663	ABKSB0201	0-1	041996	Selenium	TAL Inorganics	mg/kg	1.04E+00	1.14E+01	1.04E+00	U
102663	ABKSB0201	0-1	041996	Silver	TAL Inorganics	mg/kg	9.00E-02	9.86E-01	9.00E-02	U
102663	ABKSB0201	0-1	041996	Sodium	TAL Inorganics	mg/kg	1.29E+01	1.41E+02	2.09E+01	J
102663	ABKSB0201	0-1	041996	Thallium	TAL Inorganics	mg/kg	8.50E-01	9.31E+00	8.50E-01	U
102663	ABKSB0201	0-1	041996	Vanadium	TAL Inorganics	mg/kg	7.00E-02	7.66E-01	5.01E+01	J
102663	ABKSB0201	0-1	041996	Zinc	TAL Inorganics	mg/kg	1.61E+00	1.76E+01	2.31E+01	
102663	ABKSB0201	0-1	041996	Gross Alpha	Radiologicals	pCi/g	4.00E+00	3.13E+00	1.17E+01	
102663	ABKSB0201	0-1	041996	Non-volatile Beta	Radiologicals	pCi/g	1.00E+01	1.71E+00	1.25E+01	
102663	ABKSB0201	0-1	041996	Cation exchange capacity	Miscellaneous	Meq/	6.00E+00	1.31E+03	6.00E+00	U
102663	ABKSB0201	0-1	041996	Total Organic Carbon	Miscellaneous	mg/kg	8.40E+00	6.00E+01	3.39E+03	
102663	ABKSB0201	0-1	041996	Total petroleum hydrocarbons	Miscellaneous	mg/kg	3.30E+00	3.65E+01	7.56E+01	
102664	ABKSB0202	1-4	041996	1,1,1-Trichloroethane	Volatiles	mg/kg	9.71E-04	5.50E-03	4.09E-03	J
102664	ABKSB0202	1-4	041996	1,1,2,2-Tetrachloroethane	Volatiles	mg/kg	3.47E-03	5.50E-03	3.47E-03	U
102664	ABKSB0202	1-4	041996	1,1,2-Trichloroethane	Volatiles	mg/kg	2.40E-03	5.50E-03	2.40E-03	U
102664	ABKSB0202	1-4	041996	1,1-Dichloroethane	Volatiles	mg/kg	1.05E-03	5.50E-03	1.05E-03	U
102664	ABKSB0202	1-4	041996	1,1-Dichloroethene	Volatiles	mg/kg	1.42E-03	5.50E-03	1.42E-03	U
102664	ABKSB0202	1-4	041996	1,2-Dichloroethane	Volatiles	mg/kg	1.34E-03	5.50E-03	1.34E-03	U
102664	ABKSB0202	1-4	041996	1,2-Dichloroethene (total)	Volatiles	mg/kg	8.54E-04	5.50E-03	8.54E-04	U
102664	ABKSB0202	1-4	041996	1,2-Dichloropropane	Volatiles	mg/kg	1.67E-03	5.50E-03	1.67E-03	U
102664	ABKSB0202	1-4	041996	2-Butanone (MEK)	Volatiles	mg/kg	2.81E-03	1.10E-02	2.81E-03	U

Appendix B
Phase I Soil Analytical Results for the 716-A Motor Shops Seepage Basin

Sample ID	Sample Name	Sample Depth	Sample Date	Analyte	Analyte Class	Units	MDL	EQL	Result	Result Qualifier
102664	ABKSB0202	1-4	041996	2-Hexanone	Volatiles	mg/kg	3.77E-03	1.10E-02	3.77E-03	U
102664	ABKSB0202	1-4	041996	4-Methyl-2-pentanone	Volatiles	mg/kg	3.29E-03	1.10E-02	3.29E-03	U
102664	ABKSB0202	1-4	041996	Acetone	Volatiles	mg/kg	4.04E-03	1.10E-02	4.04E-03	U
102664	ABKSB0202	1-4	041996	Benzene	Volatiles	mg/kg	7.52E-04	5.50E-03	7.52E-04	U
102664	ABKSB0202	1-4	041996	Bromodichloromethane	Volatiles	mg/kg	1.74E-03	5.50E-03	1.74E-03	U
102664	ABKSB0202	1-4	041996	Bromoform	Volatiles	mg/kg	2.93E-03	5.50E-03	2.93E-03	U
102664	ABKSB0202	1-4	041996	Bromomethane (Methyl bromide)	Volatiles	mg/kg	2.01E-03	1.10E-02	2.01E-03	U
102664	ABKSB0202	1-4	041996	Carbon disulfide	Volatiles	mg/kg	1.71E-03	5.50E-03	1.71E-03	U
102664	ABKSB0202	1-4	041996	Carbon tetrachloride	Volatiles	mg/kg	9.71E-04	5.50E-03	9.71E-04	U
102664	ABKSB0202	1-4	041996	Chlorobenzene	Volatiles	mg/kg	1.74E-03	5.50E-03	1.74E-03	U
102664	ABKSB0202	1-4	041996	Chlorodibromomethane	Volatiles	mg/kg	2.53E-03	5.50E-03	2.53E-03	U
102664	ABKSB0202	1-4	041996	Chloroethane	Volatiles	mg/kg	2.06E-03	1.10E-02	2.06E-03	U
102664	ABKSB0202	1-4	041996	Chloroform	Volatiles	mg/kg	1.11E-03	5.50E-03	1.11E-03	U
102664	ABKSB0202	1-4	041996	Chloromethane (methyl chloride)	Volatiles	mg/kg	3.20E-03	1.10E-02	3.20E-03	U
102664	ABKSB0202	1-4	041996	cis-1,3-Dichloropropene	Volatiles	mg/kg	1.79E-03	5.50E-03	1.79E-03	U
102664	ABKSB0202	1-4	041996	Dichloromethane (methylene chlo	Volatiles	mg/kg	1.83E-03	5.50E-03	1.83E-03	U
102664	ABKSB0202	1-4	041996	Ethylbenzene	Volatiles	mg/kg	1.47E-03	5.50E-03	1.47E-03	U
102664	ABKSB0202	1-4	041996	Styrene	Volatiles	mg/kg	1.98E-03	5.50E-03	1.98E-03	U
102664	ABKSB0202	1-4	041996	Tetrachloroethene	Volatiles	mg/kg	1.17E-03	5.50E-03	5.73E-03	
102664	ABKSB0202	1-4	041996	Toluene	Volatiles	mg/kg	1.45E-03	5.50E-03	1.45E-03	U
102664	ABKSB0202	1-4	041996	trans-1,3-Dichloropropene	Volatiles	mg/kg	2.08E-03	5.50E-03	2.08E-03	U
102664	ABKSB0202	1-4	041996	Trichloroethene (TCE)	Volatiles	mg/kg	2.09E-03	5.50E-03	2.09E-03	U
102664	ABKSB0202	1-4	041996	Vinyl acetate	Volatiles	mg/kg	5.48E-03	1.10E-02	5.48E-03	U
102664	ABKSB0202	1-4	041996	Vinyl chloride	Volatiles	mg/kg	2.47E-03	1.10E-02	2.47E-03	U
102664	ABKSB0202	1-4	041996	Xylenes (total)	Volatiles	mg/kg	1.53E-03	5.50E-03	1.53E-03	U
102664	ABKSB0202	1-4	041996	1,2,4-Trichlorobenzene	Semivolatiles	mg/kg	1.80E-02	3.64E-01	1.80E-02	U
102664	ABKSB0202	1-4	041996	1,2-Dichlorobenzene	Semivolatiles	mg/kg	1.70E-02	3.64E-01	1.70E-02	U
102664	ABKSB0202	1-4	041996	1,3-Dichlorobenzene	Semivolatiles	mg/kg	1.80E-02	3.64E-01	1.80E-02	U
102664	ABKSB0202	1-4	041996	1,4-Dichlorobenzene	Semivolatiles	mg/kg	1.80E-02	3.64E-01	1.80E-02	U
102664	ABKSB0202	1-4	041996	2,4,5-Trichlorophenol	Semivolatiles	mg/kg	1.40E-02	1.82E+00	1.40E-02	U

Appendix B
Phase I Soil Analytical Results for the 716-A Motor Shops Seepage Basin

Sample ID	Sample Name	Sample Depth	Sample Date	Analyte	Analyte Class	Units	MDL	EQL	Result	Result Qualifier
102664	ABKSB0202	1-4	041996	2,4,6-Trichlorophenol	Semivolatiles	mg/kg	1.10E-02	3.64E-01	1.10E-02	U
102664	ABKSB0202	1-4	041996	2,4-Dichlorophenol	Semivolatiles	mg/kg	1.30E-02	3.64E-01	1.30E-02	U
102664	ABKSB0202	1-4	041996	2,4-Dimethyl phenol	Semivolatiles	mg/kg	2.60E-02	3.64E-01	2.60E-02	U
102664	ABKSB0202	1-4	041996	2,4-Dinitrophenol	Semivolatiles	mg/kg	4.40E-02	1.82E+00	4.40E-02	U
102664	ABKSB0202	1-4	041996	2,4-Dinitrotoluene	Semivolatiles	mg/kg	1.90E-02	3.64E-01	1.90E-02	U
102664	ABKSB0202	1-4	041996	2,6-Dinitrotoluene	Semivolatiles	mg/kg	1.60E-02	3.64E-01	1.60E-02	U
102664	ABKSB0202	1-4	041996	2-Chloronaphthalene	Semivolatiles	mg/kg	1.60E-02	3.64E-01	1.60E-02	U
102664	ABKSB0202	1-4	041996	2-Chlorophenol	Semivolatiles	mg/kg	1.70E-02	3.64E-01	1.70E-02	U
102664	ABKSB0202	1-4	041996	2-Methyl-4,6-dinitrophenol	Semivolatiles	mg/kg	1.10E-02	1.82E+00	1.10E-02	U
102664	ABKSB0202	1-4	041996	2-Methylnaphthalene	Semivolatiles	mg/kg	1.70E-02	3.64E-01	1.70E-02	U
102664	ABKSB0202	1-4	041996	2-Nitroaniline	Semivolatiles	mg/kg	1.90E-02	1.82E+00	1.90E-02	U
102664	ABKSB0202	1-4	041996	2-Nitrophenol	Semivolatiles	mg/kg	1.70E-02	3.64E-01	1.70E-02	U
102664	ABKSB0202	1-4	041996	3,3'-Dichlorobenzidine	Semivolatiles	mg/kg	7.30E-02	7.28E-01	7.30E-02	U
102664	ABKSB0202	1-4	041996	3-Nitroaniline	Semivolatiles	mg/kg	4.20E-02	1.82E+00	4.20E-02	U
102664	ABKSB0202	1-4	041996	4-Bromophenyl phenyl ether	Semivolatiles	mg/kg	1.00E-02	3.64E-01	1.00E-02	U
102664	ABKSB0202	1-4	041996	4-Chloro-3-methylphenol (p-chlo	Semivolatiles	mg/kg	1.80E-02	3.64E-01	1.80E-02	U
102664	ABKSB0202	1-4	041996	4-Chloroaniline	Semivolatiles	mg/kg	6.00E-03	3.64E-01	6.00E-03	U
102664	ABKSB0202	1-4	041996	4-Chlorophenyl phenyl ether	Semivolatiles	mg/kg	1.30E-02	3.64E-01	1.30E-02	U
102664	ABKSB0202	1-4	041996	4-Nitroaniline	Semivolatiles	mg/kg	2.00E-02	1.82E+00	2.00E-02	U
102664	ABKSB0202	1-4	041996	4-Nitrophenol	Semivolatiles	mg/kg	4.90E-02	1.82E+00	4.90E-02	U
102664	ABKSB0202	1-4	041996	Acenapthene	Semivolatiles	mg/kg	1.50E-02	3.64E-01	1.50E-02	U
102664	ABKSB0202	1-4	041996	Acenapthylene	Semivolatiles	mg/kg	1.60E-02	3.64E-01	1.60E-02	U
102664	ABKSB0202	1-4	041996	Anthracene	Semivolatiles	mg/kg	1.60E-02	3.64E-01	1.60E-02	U
102664	ABKSB0202	1-4	041996	Benzo(a)anthracene	Semivolatiles	mg/kg	2.00E-02	3.64E-01	2.00E-02	U
102664	ABKSB0202	1-4	041996	Benzo(a)pyrene	Semivolatiles	mg/kg	2.40E-02	3.64E-01	2.40E-02	U
102664	ABKSB0202	1-4	041996	Benzo(b)fluoranthene	Semivolatiles	mg/kg	2.30E-02	3.64E-01	2.30E-02	U
102664	ABKSB0202	1-4	041996	Benzo(g,h,i)perylene	Semivolatiles	mg/kg	1.60E-02	3.64E-01	1.60E-02	U
102664	ABKSB0202	1-4	041996	Benzo(k)fluoranthene	Semivolatiles	mg/kg	2.20E-02	3.64E-01	2.20E-02	U
102664	ABKSB0202	1-4	041996	Benzoic acid	Semivolatiles	mg/kg	3.40E-02	1.82E+00	3.40E-02	U
102664	ABKSB0202	1-4	041996	Benzyl alcohol	Semivolatiles	mg/kg	1.90E-02	3.64E-01	1.90E-02	U

Appendix B
Phase I Soil Analytical Results for the 716-A Motor Shops Seepage Basin

Sample ID	Sample Name	Sample Depth	Sample Date	Analyte	Analyte Class	Units	MDL	EQL	Result	Result Qualifier
102664	ABKSB0202	1-4	041996	Bis(2-chloroethoxy) methane	Semivolatiles	mg/kg	1.60E-02	3.64E-01	1.60E-02	U
102664	ABKSB0202	1-4	041996	Bis(2-chloroethyl) ether	Semivolatiles	mg/kg	2.20E-02	3.64E-01	2.20E-02	U
102664	ABKSB0202	1-4	041996	Bis(2-chloroisopropyl) ether	Semivolatiles	mg/kg	1.80E-02	3.64E-01	1.80E-02	U
102664	ABKSB0202	1-4	041996	Bis(2-ethylhexyl) phthalate	Semivolatiles	mg/kg	2.20E-02	3.64E-01	2.20E-02	U
102664	ABKSB0202	1-4	041996	Butyl benzyl phthalate	Semivolatiles	mg/kg	2.10E-02	3.64E-01	2.10E-02	U
102664	ABKSB0202	1-4	041996	Chrysene	Semivolatiles	mg/kg	1.90E-02	3.64E-01	1.90E-02	U
102664	ABKSB0202	1-4	041996	Di-n-butyl phthalate	Semivolatiles	mg/kg	1.90E-02	3.64E-01	1.90E-02	U
102664	ABKSB0202	1-4	041996	Di-n-octyl phthalate	Semivolatiles	mg/kg	2.60E-02	3.64E-01	2.60E-02	U
102664	ABKSB0202	1-4	041996	Dibenzo(a,h)anthracene	Semivolatiles	mg/kg	1.70E-02	3.64E-01	1.70E-02	U
102664	ABKSB0202	1-4	041996	Dibenzofuran	Semivolatiles	mg/kg	1.60E-02	3.64E-01	1.60E-02	U
102664	ABKSB0202	1-4	041996	Diethyl phthalate	Semivolatiles	mg/kg	1.60E-02	3.64E-01	1.60E-02	U
102664	ABKSB0202	1-4	041996	Dimethyl phthalate	Semivolatiles	mg/kg	1.50E-02	3.64E-01	1.50E-02	U
102664	ABKSB0202	1-4	041996	Fluoranthene	Semivolatiles	mg/kg	1.90E-02	3.64E-01	1.90E-02	U
102664	ABKSB0202	1-4	041996	Fluorene	Semivolatiles	mg/kg	1.60E-02	3.64E-01	1.60E-02	U
102664	ABKSB0202	1-4	041996	Hexachlorobenzene	Semivolatiles	mg/kg	1.00E-02	3.64E-01	1.00E-02	U
102664	ABKSB0202	1-4	041996	Hexachlorobutadiene	Semivolatiles	mg/kg	1.50E-02	3.64E-01	1.50E-02	U
102664	ABKSB0202	1-4	041996	Hexachlorocyclopentadiene	Semivolatiles	mg/kg	2.60E-02	3.64E-01	2.60E-02	U
102664	ABKSB0202	1-4	041996	Hexachloroethane	Semivolatiles	mg/kg	1.60E-02	3.64E-01	1.60E-02	U
102664	ABKSB0202	1-4	041996	Indeno(1,2,3-c,d)pyrene	Semivolatiles	mg/kg	1.80E-02	3.64E-01	1.80E-02	U
102664	ABKSB0202	1-4	041996	Isophorone	Semivolatiles	mg/kg	1.70E-02	3.64E-01	1.70E-02	U
102664	ABKSB0202	1-4	041996	N-Nitrosodi-n-propylamine	Semivolatiles	mg/kg	2.00E-02	3.64E-01	2.00E-02	U
102664	ABKSB0202	1-4	041996	N-Nitrosodiphenylamine	Semivolatiles	mg/kg	1.40E-02	3.64E-01	1.40E-02	U
102664	ABKSB0202	1-4	041996	Naphthalene	Semivolatiles	mg/kg	1.90E-02	3.64E-01	1.90E-02	U
102664	ABKSB0202	1-4	041996	Nitrobenzene	Semivolatiles	mg/kg	1.90E-02	3.64E-01	1.90E-02	U
102664	ABKSB0202	1-4	041996	o-cresol (2-methylphenol)	Semivolatiles	mg/kg	1.60E-02	3.64E-01	1.60E-02	U
102664	ABKSB0202	1-4	041996	p-cresol (4-methylphenol)	Semivolatiles	mg/kg	1.70E-02	3.64E-01	1.70E-02	U
102664	ABKSB0202	1-4	041996	Pentachlorophenol	Semivolatiles	mg/kg	3.90E-02	1.82E+00	3.90E-02	U
102664	ABKSB0202	1-4	041996	Phenanthrene	Semivolatiles	mg/kg	1.50E-02	3.64E-01	1.50E-02	U
102664	ABKSB0202	1-4	041996	Phenol	Semivolatiles	mg/kg	1.90E-02	3.64E-01	1.90E-02	U
102664	ABKSB0202	1-4	041996	Pyrene	Semivolatiles	mg/kg	2.10E-02	3.64E-01	2.10E-02	U

Appendix B
Phase I Soil Analytical Results for the 716-A Motor Shops Seepage Basin

Sample ID	Sample Name	Sample Depth	Sample Date	Analyte	Analyte Class	Units	MDL	EQL	Result	Result Qualifier
102664	ABKSB0202	1-4	041996	Aldol condensate	SVOA TICs	mg/kg	0.00E+00	0.00E+00	8.00E-01	J
102664	ABKSB0202	1-4	041996	Unknown	SVOA TICs	mg/kg	0.00E+00	0.00E+00	2.00E-01	J
102664	ABKSB0202	1-4	041996	Unknown	SVOA TICs	mg/kg	0.00E+00	0.00E+00	2.00E-01	J
102664	ABKSB0202	1-4	041996	Aldrin	Pesticides/PCBs	mg/kg	5.70E-04	1.82E-03	5.70E-04	UJ
102664	ABKSB0202	1-4	041996	alpha-Benzene hexachloride	Pesticides/PCBs	mg/kg	5.70E-04	1.82E-03	5.70E-04	UJ
102664	ABKSB0202	1-4	041996	alpha-Chlordane	Pesticides/PCBs	mg/kg	5.70E-04	1.82E-03	5.70E-04	UJ
102664	ABKSB0202	1-4	041996	Aroclor 1016	Pesticides/PCBs	mg/kg	1.10E-02	3.64E-02	1.10E-02	UJ
102664	ABKSB0202	1-4	041996	Aroclor 1221	Pesticides/PCBs	mg/kg	2.20E-02	7.29E-02	2.20E-02	UJ
102664	ABKSB0202	1-4	041996	Aroclor 1232	Pesticides/PCBs	mg/kg	1.10E-02	3.64E-02	1.10E-02	UJ
102664	ABKSB0202	1-4	041996	Aroclor 1242	Pesticides/PCBs	mg/kg	1.10E-02	3.64E-02	1.10E-02	UJ
102664	ABKSB0202	1-4	041996	Aroclor 1248	Pesticides/PCBs	mg/kg	1.10E-02	3.64E-02	1.10E-02	UJ
102664	ABKSB0202	1-4	041996	Aroclor 1254	Pesticides/PCBs	mg/kg	1.10E-02	3.64E-02	1.10E-02	UJ
102664	ABKSB0202	1-4	041996	Aroclor 1260	Pesticides/PCBs	mg/kg	1.10E-02	3.64E-02	1.10E-02	UJ
102664	ABKSB0202	1-4	041996	beta-Benzene hexachloride	Pesticides/PCBs	mg/kg	5.70E-04	1.82E-03	5.70E-04	UJ
102664	ABKSB0202	1-4	041996	delta-Benzene hexachloride	Pesticides/PCBs	mg/kg	5.70E-04	1.82E-03	5.70E-04	UJ
102664	ABKSB0202	1-4	041996	Dieldrin	Pesticides/PCBs	mg/kg	6.33E-04	3.64E-03	6.33E-04	UJ
102664	ABKSB0202	1-4	041996	Endosulfan I	Pesticides/PCBs	mg/kg	5.70E-04	1.82E-03	5.70E-04	UJ
102664	ABKSB0202	1-4	041996	Endosulfan II	Pesticides/PCBs	mg/kg	9.00E-04	3.64E-03	9.00E-04	UJ
102664	ABKSB0202	1-4	041996	Endosulfan sulfate	Pesticides/PCBs	mg/kg	1.10E-03	3.64E-03	1.10E-03	UJ
102664	ABKSB0202	1-4	041996	Endrin	Pesticides/PCBs	mg/kg	1.10E-03	3.64E-03	1.10E-03	UJ
102664	ABKSB0202	1-4	041996	Endrin ketone	Pesticides/PCBs	mg/kg	1.10E-03	3.64E-03	1.10E-03	UJ
102664	ABKSB0202	1-4	041996	gamma-Benzene hexachloride (Lin	Pesticides/PCBs	mg/kg	5.70E-04	1.82E-03	5.70E-04	UJ
102664	ABKSB0202	1-4	041996	gamma-Chlordane	Pesticides/PCBs	mg/kg	5.70E-04	1.82E-03	5.70E-04	UJ
102664	ABKSB0202	1-4	041996	Heptachlor	Pesticides/PCBs	mg/kg	5.70E-04	1.82E-03	5.70E-04	UJ
102664	ABKSB0202	1-4	041996	Heptachlor epoxide	Pesticides/PCBs	mg/kg	5.70E-04	1.82E-03	5.70E-04	UJ
102664	ABKSB0202	1-4	041996	Methoxychlor (Mariate)	Pesticides/PCBs	mg/kg	5.70E-03	1.82E-02	5.70E-03	UJ
102664	ABKSB0202	1-4	041996	p,p'-DDD	Pesticides/PCBs	mg/kg	1.10E-03	3.64E-03	1.10E-03	UJ
102664	ABKSB0202	1-4	041996	p,p'-DDE	Pesticides/PCBs	mg/kg	9.00E-04	3.64E-03	9.00E-04	UJ
102664	ABKSB0202	1-4	041996	p,p'-DDT	Pesticides/PCBs	mg/kg	1.10E-03	3.64E-03	1.10E-03	UJ
102664	ABKSB0202	1-4	041996	Toxaphene	Pesticides/PCBs	mg/kg	5.30E-02	1.82E-01	5.30E-02	UJ

Appendix B
Phase I Soil Analytical Results for the 716-A Motor Shops Seepage Basin

Sample ID	Sample Name	Sample Depth	Sample Date	Analyte	Analyte Class	Units	MDL	EQL	Result	Result Qualifier
102664	ABKSB0202	1-4	041996	Aluminum	TAL Inorganics	mg/kg	1.90E+00	1.92E+01	6.61E+03	
102664	ABKSB0202	1-4	041996	Antimony	TAL Inorganics	mg/kg	3.50E-01	3.61E+00	3.50E-01	U
102664	ABKSB0202	1-4	041996	Arsenic	TAL Inorganics	mg/kg	1.11E+00	1.15E+01	2.70E+00	J
102664	ABKSB0202	1-4	041996	Barium	TAL Inorganics	mg/kg	1.10E-01	1.14E+00	1.19E+01	
102664	ABKSB0202	1-4	041996	Beryllium	TAL Inorganics	mg/kg	3.00E-02	2.58E-01	1.34E-01	J
102664	ABKSB0202	1-4	041996	Cadmium	TAL Inorganics	mg/kg	4.00E-02	4.13E-01	4.36E-01	
102664	ABKSB0202	1-4	041996	Calcium	TAL Inorganics	mg/kg	1.68E+00	1.73E+01	3.24E+02	
102664	ABKSB0202	1-4	041996	Chromium	TAL Inorganics	mg/kg	9.00E-02	9.29E-01	1.19E+01	
102664	ABKSB0202	1-4	041996	Cobalt	TAL Inorganics	mg/kg	8.00E-02	8.26E-01	7.51E-01	J
102664	ABKSB0202	1-4	041996	Copper	TAL Inorganics	mg/kg	1.00E-01	1.03E+00	2.60E+00	
102664	ABKSB0202	1-4	041996	Cyanide	TAL Inorganics	mg/kg	8.00E-02	8.30E-01	8.00E-02	UJ
102664	ABKSB0202	1-4	041996	Iron	TAL Inorganics	mg/kg	2.19E+00	2.26E+01	1.07E+04	
102664	ABKSB0202	1-4	041996	Lead	TAL Inorganics	mg/kg	5.90E-01	6.09E+00	6.10E+00	
102664	ABKSB0202	1-4	041996	Magnesium	TAL Inorganics	mg/kg	8.70E-01	8.98E+00	8.43E+01	
102664	ABKSB0202	1-4	041996	Manganese	TAL Inorganics	mg/kg	2.00E-02	2.06E-01	3.74E+01	
102664	ABKSB0202	1-4	041996	Mercury	TAL Inorganics	mg/kg	1.30E-02	1.42E-01	1.30E-02	U
102664	ABKSB0202	1-4	041996	Nickel	TAL Inorganics	mg/kg	1.70E-01	1.75E+00	9.48E-01	J
102664	ABKSB0202	1-4	041996	Potassium	TAL Inorganics	mg/kg	6.70E+00	6.91E+01	7.14E+01	
102664	ABKSB0202	1-4	041996	Selenium	TAL Inorganics	mg/kg	1.04E+00	1.07E+01	1.04E+00	U
102664	ABKSB0202	1-4	041996	Silver	TAL Inorganics	mg/kg	9.00E-02	9.29E-01	9.00E-02	U
102664	ABKSB0202	1-4	041996	Sodium	TAL Inorganics	mg/kg	1.29E+01	1.33E+02	1.85E+01	J
102664	ABKSB0202	1-4	041996	Thallium	TAL Inorganics	mg/kg	8.50E-01	8.77E+00	8.50E-01	U
102664	ABKSB0202	1-4	041996	Vanadium	TAL Inorganics	mg/kg	7.00E-02	7.22E-01	2.52E+01	
102664	ABKSB0202	1-4	041996	Zinc	TAL Inorganics	mg/kg	1.61E+00	1.66E+01	5.00E+00	J
102664	ABKSB0202	1-4	041996	Gross Alpha	Radiologicals	pCi/g	4.00E+00	3.06E+00	2.04E+01	
102664	ABKSB0202	1-4	041996	Non-volatile Beta	Radiologicals	pCi/g	1.00E+01	1.59E+00	1.04E+01	
102664	ABKSB0202	1-4	041996	Cation exchange capacity	Miscellaneous	Meq/	6.00E+00	1.31E+03	6.00E+00	U
102664	ABKSB0202	1-4	041996	Total Organic Carbon	Miscellaneous	mg/kg	8.40E+00	6.00E+01	8.39E+02	
102664	ABKSB0202	1-4	041996	Total petroleum hydrocarbons	Miscellaneous	mg/kg	3.30E+00	3.64E+01	3.81E+01	
102666	ABKSB0301	0-1	042296	1,1,1-Trichloroethane	Volatiles	mg/kg	9.71E-04	5.50E-03	8.18E-03	

Appendix B
Phase I Soil Analytical Results for the 716-A Motor Shops Seepage Basin

Sample ID	Sample Name	Sample Depth	Sample Date	Analyte	Analyte Class	Units	MDL	EQL	Result	Result Qualifier
102666	ABKSB0301	0-1	042296	1,1,2,2-Tetrachloroethane	Volatiles	mg/kg	3.47E-03	5.50E-03	3.47E-03	U
102666	ABKSB0301	0-1	042296	1,1,2-Trichloroethane	Volatiles	mg/kg	2.40E-03	5.50E-03	2.40E-03	U
102666	ABKSB0301	0-1	042296	1,1-Dichloroethane	Volatiles	mg/kg	1.05E-03	5.50E-03	1.05E-03	U
102666	ABKSB0301	0-1	042296	1,1-Dichloroethene	Volatiles	mg/kg	1.42E-03	5.50E-03	1.42E-03	U
102666	ABKSB0301	0-1	042296	1,2-Dichloroethane	Volatiles	mg/kg	1.34E-03	5.50E-03	1.34E-03	U
102666	ABKSB0301	0-1	042296	1,2-Dichloroethene (total)	Volatiles	mg/kg	8.54E-04	5.50E-03	8.54E-04	U
102666	ABKSB0301	0-1	042296	1,2-Dichloropropane	Volatiles	mg/kg	1.67E-03	5.50E-03	1.67E-03	U
102666	ABKSB0301	0-1	042296	2-Butanone (MEK)	Volatiles	mg/kg	2.81E-03	1.10E-02	2.81E-03	U
102666	ABKSB0301	0-1	042296	2-Hexanone	Volatiles	mg/kg	3.77E-03	1.10E-02	3.77E-03	U
102666	ABKSB0301	0-1	042296	4-Methyl-2-pentanone	Volatiles	mg/kg	3.29E-03	1.10E-02	3.29E-03	U
102666	ABKSB0301	0-1	042296	Acetone	Volatiles	mg/kg	4.04E-03	1.10E-02	4.04E-03	U
102666	ABKSB0301	0-1	042296	Benzene	Volatiles	mg/kg	7.52E-04	5.50E-03	7.52E-04	U
102666	ABKSB0301	0-1	042296	Bromodichloromethane	Volatiles	mg/kg	1.74E-03	5.50E-03	1.74E-03	U
102666	ABKSB0301	0-1	042296	Bromoform	Volatiles	mg/kg	2.93E-03	5.50E-03	2.93E-03	U
102666	ABKSB0301	0-1	042296	Bromomethane (Methyl bromide)	Volatiles	mg/kg	2.01E-03	1.10E-02	2.01E-03	U
102666	ABKSB0301	0-1	042296	Carbon disulfide	Volatiles	mg/kg	1.71E-03	5.50E-03	1.71E-03	U
102666	ABKSB0301	0-1	042296	Carbon tetrachloride	Volatiles	mg/kg	9.71E-04	5.50E-03	9.71E-04	U
102666	ABKSB0301	0-1	042296	Chlorobenzene	Volatiles	mg/kg	1.74E-03	5.50E-03	1.74E-03	U
102666	ABKSB0301	0-1	042296	Chlorodibromomethane	Volatiles	mg/kg	2.53E-03	5.50E-03	2.53E-03	U
102666	ABKSB0301	0-1	042296	Chloroethane	Volatiles	mg/kg	2.06E-03	1.10E-02	2.06E-03	U
102666	ABKSB0301	0-1	042296	Chloroform	Volatiles	mg/kg	1.11E-03	5.50E-03	1.11E-03	U
102666	ABKSB0301	0-1	042296	Chloromethane (methyl chloride)	Volatiles	mg/kg	3.20E-03	1.10E-02	3.20E-03	U
102666	ABKSB0301	0-1	042296	cis-1,3-Dichloropropene	Volatiles	mg/kg	1.79E-03	5.50E-03	1.79E-03	U
102666	ABKSB0301	0-1	042296	Dichloromethane (methylene chlo	Volatiles	mg/kg	1.83E-03	5.50E-03	1.83E-03	U
102666	ABKSB0301	0-1	042296	Ethylbenzene	Volatiles	mg/kg	1.47E-03	5.50E-03	1.47E-03	U
102666	ABKSB0301	0-1	042296	Styrene	Volatiles	mg/kg	1.98E-03	5.50E-03	1.98E-03	U
102666	ABKSB0301	0-1	042296	Tetrachloroethene	Volatiles	mg/kg	1.17E-03	5.50E-03	1.10E-02	
102666	ABKSB0301	0-1	042296	Toluene	Volatiles	mg/kg	1.45E-03	5.50E-03	2.23E-03	J
102666	ABKSB0301	0-1	042296	trans-1,3-Dichloropropene	Volatiles	mg/kg	2.08E-03	5.50E-03	2.08E-03	U
102666	ABKSB0301	0-1	042296	Trichloroethene (TCE)	Volatiles	mg/kg	2.09E-03	5.50E-03	2.09E-03	U

Appendix B
Phase I Soil Analytical Results for the 716-A Motor Shops Seepage Basin

Sample ID	Sample Name	Sample Depth	Sample Date	Analyte	Analyte Class	Units	MDL	EQL	Result	Result Qualifier
102666	ABKSB0301	0-1	042296	Vinyl acetate	Volatiles	mg/kg	5.48E-03	1.10E-02	5.48E-03	U
102666	ABKSB0301	0-1	042296	Vinyl chloride	Volatiles	mg/kg	2.47E-03	1.10E-02	2.47E-03	U
102666	ABKSB0301	0-1	042296	Xylenes (total)	Volatiles	mg/kg	1.53E-03	5.50E-03	3.50E-03	J
102666	ABKSB0301	0-1	042296	1,2,4-Trichlorobenzene	Semivolatiles	mg/kg	1.80E-02	3.48E-01	1.80E-02	U
102666	ABKSB0301	0-1	042296	1,2-Dichlorobenzene	Semivolatiles	mg/kg	1.70E-02	3.48E-01	1.70E-02	U
102666	ABKSB0301	0-1	042296	1,3-Dichlorobenzene	Semivolatiles	mg/kg	1.80E-02	3.48E-01	1.80E-02	U
102666	ABKSB0301	0-1	042296	1,4-Dichlorobenzene	Semivolatiles	mg/kg	1.80E-02	3.48E-01	1.80E-02	U
102666	ABKSB0301	0-1	042296	2,4,5-Trichlorophenol	Semivolatiles	mg/kg	1.40E-02	1.74E+00	1.40E-02	U
102666	ABKSB0301	0-1	042296	2,4,6-Trichlorophenol	Semivolatiles	mg/kg	1.10E-02	3.48E-01	1.10E-02	U
102666	ABKSB0301	0-1	042296	2,4-Dichlorophenol	Semivolatiles	mg/kg	1.30E-02	3.48E-01	1.30E-02	U
102666	ABKSB0301	0-1	042296	2,4-Dimethyl phenol	Semivolatiles	mg/kg	2.60E-02	3.48E-01	2.60E-02	U
102666	ABKSB0301	0-1	042296	2,4-Dinitrophenol	Semivolatiles	mg/kg	4.40E-02	1.74E+00	4.40E-02	U
102666	ABKSB0301	0-1	042296	2,4-Dinitrotoluene	Semivolatiles	mg/kg	1.90E-02	3.48E-01	1.90E-02	U
102666	ABKSB0301	0-1	042296	2,6-Dinitrotoluene	Semivolatiles	mg/kg	1.60E-02	3.48E-01	1.60E-02	U
102666	ABKSB0301	0-1	042296	2-Chloronaphthalene	Semivolatiles	mg/kg	1.60E-02	3.48E-01	1.60E-02	U
102666	ABKSB0301	0-1	042296	2-Chlorophenol	Semivolatiles	mg/kg	1.70E-02	3.48E-01	1.70E-02	U
102666	ABKSB0301	0-1	042296	2-Methyl-4,6-dinitrophenol	Semivolatiles	mg/kg	1.10E-02	1.74E+00	1.10E-02	U
102666	ABKSB0301	0-1	042296	2-Methylnaphthalene	Semivolatiles	mg/kg	1.70E-02	3.48E-01	1.70E-02	U
102666	ABKSB0301	0-1	042296	2-Nitroaniline	Semivolatiles	mg/kg	1.90E-02	1.74E+00	1.90E-02	U
102666	ABKSB0301	0-1	042296	2-Nitrophenol	Semivolatiles	mg/kg	1.70E-02	3.48E-01	1.70E-02	U
102666	ABKSB0301	0-1	042296	3,3'-Dichlorobenzidine	Semivolatiles	mg/kg	7.30E-02	6.96E-01	7.30E-02	U
102666	ABKSB0301	0-1	042296	3-Nitroaniline	Semivolatiles	mg/kg	4.20E-02	1.74E+00	4.20E-02	U
102666	ABKSB0301	0-1	042296	4-Bromophenyl phenyl ether	Semivolatiles	mg/kg	1.00E-02	3.48E-01	1.00E-02	U
102666	ABKSB0301	0-1	042296	4-Chloro-3-methylphenol (p-chlo	Semivolatiles	mg/kg	1.80E-02	3.48E-01	1.80E-02	U
102666	ABKSB0301	0-1	042296	4-Chloroaniline	Semivolatiles	mg/kg	6.00E-03	3.48E-01	6.00E-03	U
102666	ABKSB0301	0-1	042296	4-Chlorophenyl phenyl ether	Semivolatiles	mg/kg	1.30E-02	3.48E-01	1.30E-02	U
102666	ABKSB0301	0-1	042296	4-Nitroaniline	Semivolatiles	mg/kg	2.00E-02	1.74E+00	2.00E-02	U
102666	ABKSB0301	0-1	042296	4-Nitrophenol	Semivolatiles	mg/kg	4.90E-02	1.74E+00	4.90E-02	U
102666	ABKSB0301	0-1	042296	Acenapthene	Semivolatiles	mg/kg	1.50E-02	3.48E-01	1.50E-02	U
102666	ABKSB0301	0-1	042296	Acenapthylene	Semivolatiles	mg/kg	1.60E-02	3.48E-01	1.60E-02	U

Appendix B
Phase I Soil Analytical Results for the 716-A Motor Shops Seepage Basin

Sample ID	Sample Name	Sample Depth	Sample Date	Analyte	Analyte Class	Units	MDL	EQL	Result	Result Qualifier
102666	ABKSB0301	0-1	042296	Anthracene	Semivolatiles	mg/kg	1.60E-02	3.48E-01	1.60E-02	U
102666	ABKSB0301	0-1	042296	Benzo(a)anthracene	Semivolatiles	mg/kg	2.00E-02	3.48E-01	2.00E-02	U
102666	ABKSB0301	0-1	042296	Benzo(a)pyrene	Semivolatiles	mg/kg	2.40E-02	3.48E-01	2.40E-02	U
102666	ABKSB0301	0-1	042296	Benzo(b)fluoranthene	Semivolatiles	mg/kg	2.30E-02	3.48E-01	2.30E-02	U
102666	ABKSB0301	0-1	042296	Benzo(g,h,i)perylene	Semivolatiles	mg/kg	1.60E-02	3.48E-01	1.60E-02	U
102666	ABKSB0301	0-1	042296	Benzo(k)fluoranthene	Semivolatiles	mg/kg	2.20E-02	3.48E-01	2.20E-02	U
102666	ABKSB0301	0-1	042296	Benzoic acid	Semivolatiles	mg/kg	3.40E-02	1.74E+00	3.40E-02	U
102666	ABKSB0301	0-1	042296	Benzyl alcohol	Semivolatiles	mg/kg	1.90E-02	3.48E-01	1.90E-02	U
102666	ABKSB0301	0-1	042296	Bis(2-chloroethoxy) methane	Semivolatiles	mg/kg	1.60E-02	3.48E-01	1.60E-02	U
102666	ABKSB0301	0-1	042296	Bis(2-chloroethyl) ether	Semivolatiles	mg/kg	2.20E-02	3.48E-01	2.20E-02	U
102666	ABKSB0301	0-1	042296	Bis(2-chloroisopropyl) ether	Semivolatiles	mg/kg	1.80E-02	3.48E-01	1.80E-02	U
102666	ABKSB0301	0-1	042296	Bis(2-ethylhexyl) phthalate	Semivolatiles	mg/kg	2.20E-02	3.48E-01	2.20E-02	U
102666	ABKSB0301	0-1	042296	Butyl benzyl phthalate	Semivolatiles	mg/kg	2.10E-02	3.48E-01	2.10E-02	U
102666	ABKSB0301	0-1	042296	Chrysene	Semivolatiles	mg/kg	1.90E-02	3.48E-01	1.90E-02	U
102666	ABKSB0301	0-1	042296	Di-n-butyl phthalate	Semivolatiles	mg/kg	1.90E-02	3.48E-01	1.90E-02	U
102666	ABKSB0301	0-1	042296	Di-n-octyl phthalate	Semivolatiles	mg/kg	2.60E-02	3.48E-01	2.60E-02	U
102666	ABKSB0301	0-1	042296	Dibenzo(a,h)anthracene	Semivolatiles	mg/kg	1.70E-02	3.48E-01	1.70E-02	U
102666	ABKSB0301	0-1	042296	Dibenzofuran	Semivolatiles	mg/kg	1.60E-02	3.48E-01	1.60E-02	U
102666	ABKSB0301	0-1	042296	Diethyl phthalate	Semivolatiles	mg/kg	1.60E-02	3.48E-01	1.60E-02	U
102666	ABKSB0301	0-1	042296	Dimethyl phthalate	Semivolatiles	mg/kg	1.50E-02	3.48E-01	1.50E-02	U
102666	ABKSB0301	0-1	042296	Fluoranthene	Semivolatiles	mg/kg	1.90E-02	3.48E-01	1.90E-02	U
102666	ABKSB0301	0-1	042296	Fluorene	Semivolatiles	mg/kg	1.60E-02	3.48E-01	1.60E-02	U
102666	ABKSB0301	0-1	042296	Hexachlorobenzene	Semivolatiles	mg/kg	1.00E-02	3.48E-01	1.00E-02	U
102666	ABKSB0301	0-1	042296	Hexachlorobutadiene	Semivolatiles	mg/kg	1.50E-02	3.48E-01	1.50E-02	U
102666	ABKSB0301	0-1	042296	Hexachlorocyclopentadiene	Semivolatiles	mg/kg	2.60E-02	3.48E-01	2.60E-02	U
102666	ABKSB0301	0-1	042296	Hexachloroethane	Semivolatiles	mg/kg	1.60E-02	3.48E-01	1.60E-02	U
102666	ABKSB0301	0-1	042296	Indeno(1,2,3-c,d)pyrene	Semivolatiles	mg/kg	1.80E-02	3.48E-01	1.80E-02	U
102666	ABKSB0301	0-1	042296	Isophorone	Semivolatiles	mg/kg	1.70E-02	3.48E-01	1.70E-02	U
102666	ABKSB0301	0-1	042296	N-Nitrosodi-n-propylamine	Semivolatiles	mg/kg	2.00E-02	3.48E-01	2.00E-02	U
102666	ABKSB0301	0-1	042296	N-Nitrosodiphenylamine	Semivolatiles	mg/kg	1.40E-02	3.48E-01	1.40E-02	U

Appendix B
Phase I Soil Analytical Results for the 716-A Motor Shops Seepage Basin

Sample ID	Sample Name	Sample Depth	Sample Date	Analyte	Analyte Class	Units	MDL	EQL	Result	Result Qualifier
102666	ABKSB0301	0-1	042296	Naphthalene	Semivolatiles	mg/kg	1.90E-02	3.48E-01	1.90E-02	U
102666	ABKSB0301	0-1	042296	Nitrobenzene	Semivolatiles	mg/kg	1.90E-02	3.48E-01	1.90E-02	U
102666	ABKSB0301	0-1	042296	o-cresol (2-methylphenol)	Semivolatiles	mg/kg	1.60E-02	3.48E-01	1.60E-02	U
102666	ABKSB0301	0-1	042296	p-cresol (4-methylphenol)	Semivolatiles	mg/kg	1.70E-02	3.48E-01	1.70E-02	U
102666	ABKSB0301	0-1	042296	Pentachlorophenol	Semivolatiles	mg/kg	3.90E-02	1.74E+00	3.90E-02	U
102666	ABKSB0301	0-1	042296	Phenanthrene	Semivolatiles	mg/kg	1.50E-02	3.48E-01	1.50E-02	U
102666	ABKSB0301	0-1	042296	Phenol	Semivolatiles	mg/kg	1.90E-02	3.48E-01	1.90E-02	U
102666	ABKSB0301	0-1	042296	Pyrene	Semivolatiles	mg/kg	2.10E-02	3.48E-01	2.10E-02	U
102666	ABKSB0301	0-1	042296	Aldol condensate	SVOA TICs	mg/kg	0.00E+00	0.00E+00	7.00E-01	J
102666	ABKSB0301	0-1	042296	Aldrin	Pesticides/PCBs	mg/kg	5.70E-04	1.74E-03	5.70E-04	UJ
102666	ABKSB0301	0-1	042296	alpha-Benzene hexachloride	Pesticides/PCBs	mg/kg	5.70E-04	1.74E-03	5.70E-04	UJ
102666	ABKSB0301	0-1	042296	alpha-Chlordane	Pesticides/PCBs	mg/kg	5.70E-04	1.74E-03	5.70E-04	UJ
102666	ABKSB0301	0-1	042296	Aroclor 1016	Pesticides/PCBs	mg/kg	1.10E-02	3.48E-02	1.10E-02	UJ
102666	ABKSB0301	0-1	042296	Aroclor 1221	Pesticides/PCBs	mg/kg	2.20E-02	6.95E-02	2.20E-02	UJ
102666	ABKSB0301	0-1	042296	Aroclor 1232	Pesticides/PCBs	mg/kg	1.10E-02	3.48E-02	1.10E-02	UJ
102666	ABKSB0301	0-1	042296	Aroclor 1242	Pesticides/PCBs	mg/kg	1.10E-02	3.48E-02	1.10E-02	UJ
102666	ABKSB0301	0-1	042296	Aroclor 1248	Pesticides/PCBs	mg/kg	1.10E-02	3.48E-02	1.10E-02	UJ
102666	ABKSB0301	0-1	042296	Aroclor 1254	Pesticides/PCBs	mg/kg	1.10E-02	3.48E-02	1.10E-02	UJ
102666	ABKSB0301	0-1	042296	Aroclor 1260	Pesticides/PCBs	mg/kg	1.10E-02	3.48E-02	1.10E-02	UJ
102666	ABKSB0301	0-1	042296	beta-Benzene hexachloride	Pesticides/PCBs	mg/kg	5.70E-04	1.74E-03	5.70E-04	UJ
102666	ABKSB0301	0-1	042296	delta-Benzene hexachloride	Pesticides/PCBs	mg/kg	5.70E-04	1.74E-03	5.70E-04	UJ
102666	ABKSB0301	0-1	042296	Dieldrin	Pesticides/PCBs	mg/kg	6.33E-04	3.48E-03	6.33E-04	UJ
102666	ABKSB0301	0-1	042296	Endosulfan I	Pesticides/PCBs	mg/kg	5.70E-04	1.74E-03	5.70E-04	UJ
102666	ABKSB0301	0-1	042296	Endosulfan II	Pesticides/PCBs	mg/kg	9.00E-04	3.48E-03	9.00E-04	UJ
102666	ABKSB0301	0-1	042296	Endosulfan sulfate	Pesticides/PCBs	mg/kg	1.10E-03	3.48E-03	1.10E-03	UJ
102666	ABKSB0301	0-1	042296	Endrin	Pesticides/PCBs	mg/kg	1.10E-03	3.48E-03	1.10E-03	UJ
102666	ABKSB0301	0-1	042296	Endrin ketone	Pesticides/PCBs	mg/kg	1.10E-03	3.48E-03	1.10E-03	UJ
102666	ABKSB0301	0-1	042296	gamma-Benzene hexachloride (Lin	Pesticides/PCBs	mg/kg	5.70E-04	1.74E-03	5.70E-04	UJ
102666	ABKSB0301	0-1	042296	gamma-Chlordane	Pesticides/PCBs	mg/kg	5.70E-04	1.74E-03	5.70E-04	UJ
102666	ABKSB0301	0-1	042296	Heptachlor	Pesticides/PCBs	mg/kg	5.70E-04	1.74E-03	5.70E-04	UJ

Appendix B
Phase I Soil Analytical Results for the 716-A Motor Shops Seepage Basin

Sample ID	Sample Name	Sample Depth	Sample Date	Analyte	Analyte Class	Units	MDL	EQL	Result	Result Qualifier
102666	ABKSB0301	0-1	042296	Heptachlor epoxide	Pesticides/PCBs	mg/kg	5.70E-04	1.74E-03	5.70E-04	UJ
102666	ABKSB0301	0-1	042296	Methoxychlor (Mariate)	Pesticides/PCBs	mg/kg	5.70E-03	1.74E-02	5.70E-03	UJ
102666	ABKSB0301	0-1	042296	p,p'-DDD	Pesticides/PCBs	mg/kg	1.10E-03	3.48E-03	1.10E-03	UJ
102666	ABKSB0301	0-1	042296	p,p'-DDE	Pesticides/PCBs	mg/kg	9.00E-04	3.48E-03	9.00E-04	UJ
102666	ABKSB0301	0-1	042296	p,p'-DDT	Pesticides/PCBs	mg/kg	1.10E-03	3.48E-03	1.10E-03	UJ
102666	ABKSB0301	0-1	042296	Toxaphene	Pesticides/PCBs	mg/kg	5.30E-02	1.74E-01	5.30E-02	UJ
102666	ABKSB0301	0-1	042296	Aluminum	TAL Inorganics	mg/kg	1.90E+00	1.85E+01	2.82E+03	
102666	ABKSB0301	0-1	042296	Antimony	TAL Inorganics	mg/kg	3.50E-01	3.48E+00	3.50E-01	U
102666	ABKSB0301	0-1	042296	Arsenic	TAL Inorganics	mg/kg	1.11E+00	1.10E+01	1.11E+00	U
102666	ABKSB0301	0-1	042296	Barium	TAL Inorganics	mg/kg	1.10E-01	1.09E+00	1.17E+01	
102666	ABKSB0301	0-1	042296	Beryllium	TAL Inorganics	mg/kg	3.00E-02	2.48E-01	8.04E-02	J
102666	ABKSB0301	0-1	042296	Cadmium	TAL Inorganics	mg/kg	4.00E-02	3.97E-01	1.20E-01	J
102666	ABKSB0301	0-1	042296	Calcium	TAL Inorganics	mg/kg	1.68E+00	1.67E+01	5.79E+01	
102666	ABKSB0301	0-1	042296	Chromium	TAL Inorganics	mg/kg	9.00E-02	8.94E-01	3.20E+00	
102666	ABKSB0301	0-1	042296	Cobalt	TAL Inorganics	mg/kg	8.00E-02	7.94E-01	6.71E-01	J
102666	ABKSB0301	0-1	042296	Copper	TAL Inorganics	mg/kg	1.00E-01	9.93E-01	1.60E+00	
102666	ABKSB0301	0-1	042296	Cyanide	TAL Inorganics	mg/kg	8.00E-02	7.90E-01	8.00E-02	U
102666	ABKSB0301	0-1	042296	Iron	TAL Inorganics	mg/kg	2.19E+00	2.17E+01	1.51E+03	
102666	ABKSB0301	0-1	042296	Lead	TAL Inorganics	mg/kg	5.90E-01	5.86E+00	3.60E+00	J
102666	ABKSB0301	0-1	042296	Magnesium	TAL Inorganics	mg/kg	8.70E-01	8.64E+00	5.69E+01	
102666	ABKSB0301	0-1	042296	Manganese	TAL Inorganics	mg/kg	2.00E-02	1.99E-01	7.97E+01	
102666	ABKSB0301	0-1	042296	Mercury	TAL Inorganics	mg/kg	1.30E-02	1.39E-01	2.00E-02	J
102666	ABKSB0301	0-1	042296	Nickel	TAL Inorganics	mg/kg	1.70E-01	1.69E+00	1.60E+00	J
102666	ABKSB0301	0-1	042296	Potassium	TAL Inorganics	mg/kg	6.70E+00	6.65E+01	4.64E+01	J
102666	ABKSB0301	0-1	042296	Selenium	TAL Inorganics	mg/kg	1.04E+00	1.03E+01	1.04E+00	U
102666	ABKSB0301	0-1	042296	Silver	TAL Inorganics	mg/kg	9.00E-02	8.94E-01	9.00E-02	U
102666	ABKSB0301	0-1	042296	Sodium	TAL Inorganics	mg/kg	1.29E+01	1.28E+02	1.29E+01	U
102666	ABKSB0301	0-1	042296	Thallium	TAL Inorganics	mg/kg	8.50E-01	8.44E+00	8.50E-01	U
102666	ABKSB0301	0-1	042296	Vanadium	TAL Inorganics	mg/kg	7.00E-02	6.95E-01	3.60E+00	
102666	ABKSB0301	0-1	042296	Zinc	TAL Inorganics	mg/kg	1.61E+00	1.60E+01	3.10E+00	J

Appendix B
Phase I Soil Analytical Results for the 716-A Motor Shops Seepage Basin

Sample ID	Sample Name	Sample Depth	Sample Date	Analyte	Analyte Class	Units	MDL	EQL	Result	Result Qualifier
102666	ABKSB0301	0-1	042296	Gross Alpha	Radiologicals	pCi/g	4.00E+00	3.28E+00	4.00E+00	UI
102666	ABKSB0301	0-1	042296	Non-volatile Beta	Radiologicals	pCi/g	1.00E+01	1.59E+00	1.42E+01	
102666	ABKSB0301	0-1	042296	Cation exchange capacity	Miscellaneous	Meq/	6.00E+00	6.26E+02	6.00E+00	U
102666	ABKSB0301	0-1	042296	Total Organic Carbon	Miscellaneous	mg/kg	8.40E+00	6.00E+01	6.86E+03	
102666	ABKSB0301	0-1	042296	Total petroleum hydrocarbons	Miscellaneous	mg/kg	3.30E+00	1.11E+01	3.30E+00	UJ
102668	ABKSB0302	1-4	042296	1,1,1-Trichloroethane	Volatiles	mg/kg	9.71E-04	5.00E-03	1.21E-03	J
102668	ABKSB0302	1-4	042296	1,1,2,2-Tetrachloroethane	Volatiles	mg/kg	3.47E-03	5.00E-03	3.47E-03	U
102668	ABKSB0302	1-4	042296	1,1,2-Trichloroethane	Volatiles	mg/kg	2.40E-03	5.00E-03	2.40E-03	U
102668	ABKSB0302	1-4	042296	1,1-Dichloroethane	Volatiles	mg/kg	1.05E-03	5.00E-03	1.05E-03	U
102668	ABKSB0302	1-4	042296	1,1-Dichloroethene	Volatiles	mg/kg	1.42E-03	5.00E-03	1.42E-03	U
102668	ABKSB0302	1-4	042296	1,2-Dichloroethane	Volatiles	mg/kg	1.34E-03	5.00E-03	1.34E-03	U
102668	ABKSB0302	1-4	042296	1,2-Dichloroethene (total)	Volatiles	mg/kg	8.54E-04	5.00E-03	8.54E-04	U
102668	ABKSB0302	1-4	042296	1,2-Dichloropropane	Volatiles	mg/kg	1.67E-03	5.00E-03	1.67E-03	U
102668	ABKSB0302	1-4	042296	2-Butanone (MEK)	Volatiles	mg/kg	2.81E-03	1.00E-02	2.81E-03	U
102668	ABKSB0302	1-4	042296	2-Hexanone	Volatiles	mg/kg	3.77E-03	1.00E-02	3.77E-03	U
102668	ABKSB0302	1-4	042296	4-Methyl-2-pentanone	Volatiles	mg/kg	3.29E-03	1.00E-02	3.29E-03	U
102668	ABKSB0302	1-4	042296	Acetone	Volatiles	mg/kg	4.04E-03	1.00E-02	4.04E-03	U
102668	ABKSB0302	1-4	042296	Benzene	Volatiles	mg/kg	7.52E-04	5.00E-03	7.52E-04	U
102668	ABKSB0302	1-4	042296	Bromodichloromethane	Volatiles	mg/kg	1.74E-03	5.00E-03	1.74E-03	U
102668	ABKSB0302	1-4	042296	Bromoform	Volatiles	mg/kg	2.93E-03	5.00E-03	2.93E-03	U
102668	ABKSB0302	1-4	042296	Bromomethane (Methyl bromide)	Volatiles	mg/kg	2.01E-03	1.00E-02	2.01E-03	U
102668	ABKSB0302	1-4	042296	Carbon disulfide	Volatiles	mg/kg	1.71E-03	5.00E-03	1.71E-03	U
102668	ABKSB0302	1-4	042296	Carbon tetrachloride	Volatiles	mg/kg	9.71E-04	5.00E-03	9.71E-04	U
102668	ABKSB0302	1-4	042296	Chlorobenzene	Volatiles	mg/kg	1.74E-03	5.00E-03	1.74E-03	U
102668	ABKSB0302	1-4	042296	Chlorodibromomethane	Volatiles	mg/kg	2.53E-03	5.00E-03	2.53E-03	U
102668	ABKSB0302	1-4	042296	Chloroethane	Volatiles	mg/kg	2.06E-03	1.00E-02	2.06E-03	U
102668	ABKSB0302	1-4	042296	Chloroform	Volatiles	mg/kg	1.11E-03	5.00E-03	1.11E-03	U
102668	ABKSB0302	1-4	042296	Chloromethane (methyl chloride)	Volatiles	mg/kg	3.20E-03	1.00E-02	3.20E-03	U
102668	ABKSB0302	1-4	042296	cis-1,3-Dichloropropene	Volatiles	mg/kg	1.79E-03	5.00E-03	1.79E-03	U
102668	ABKSB0302	1-4	042296	Dichloromethane (methylene chlo	Volatiles	mg/kg	1.83E-03	5.00E-03	1.83E-03	U

Appendix B
Phase I Soil Analytical Results for the 716-A Motor Shops Seepage Basin

Sample ID	Sample Name	Sample Depth	Sample Date	Analyte	Analyte Class	Units	MDL	EQL	Result	Result Qualifier
102668	ABKSB0302	1-4	042296	Ethylbenzene	Volatiles	mg/kg	1.47E-03	5.00E-03	1.47E-03	U
102668	ABKSB0302	1-4	042296	Styrene	Volatiles	mg/kg	1.98E-03	5.00E-03	1.98E-03	U
102668	ABKSB0302	1-4	042296	Tetrachloroethene	Volatiles	mg/kg	1.17E-03	5.00E-03	2.56E-03	J
102668	ABKSB0302	1-4	042296	Toluene	Volatiles	mg/kg	1.45E-03	5.00E-03	1.45E-03	U
102668	ABKSB0302	1-4	042296	trans-1,3-Dichloropropene	Volatiles	mg/kg	2.08E-03	5.00E-03	2.08E-03	U
102668	ABKSB0302	1-4	042296	Trichloroethene (TCE)	Volatiles	mg/kg	2.09E-03	5.00E-03	2.09E-03	U
102668	ABKSB0302	1-4	042296	Vinyl acetate	Volatiles	mg/kg	5.48E-03	1.00E-02	5.48E-03	U
102668	ABKSB0302	1-4	042296	Vinyl chloride	Volatiles	mg/kg	2.47E-03	1.00E-02	2.47E-03	U
102668	ABKSB0302	1-4	042296	Xylenes (total)	Volatiles	mg/kg	1.53E-03	5.00E-03	1.53E-03	U
102668	ABKSB0302	1-4	042296	1,2,4-Trichlorobenzene	Semivolatiles	mg/kg	1.80E-02	3.53E-01	1.80E-02	U
102668	ABKSB0302	1-4	042296	1,2-Dichlorobenzene	Semivolatiles	mg/kg	1.70E-02	3.53E-01	1.70E-02	U
102668	ABKSB0302	1-4	042296	1,3-Dichlorobenzene	Semivolatiles	mg/kg	1.80E-02	3.53E-01	1.80E-02	U
102668	ABKSB0302	1-4	042296	1,4-Dichlorobenzene	Semivolatiles	mg/kg	1.80E-02	3.53E-01	1.80E-02	U
102668	ABKSB0302	1-4	042296	2,4,5-Trichlorophenol	Semivolatiles	mg/kg	1.40E-02	1.76E+00	1.40E-02	U
102668	ABKSB0302	1-4	042296	2,4,6-Trichlorophenol	Semivolatiles	mg/kg	1.10E-02	3.53E-01	1.10E-02	U
102668	ABKSB0302	1-4	042296	2,4-Dichlorophenol	Semivolatiles	mg/kg	1.30E-02	3.53E-01	1.30E-02	U
102668	ABKSB0302	1-4	042296	2,4-Dimethyl phenol	Semivolatiles	mg/kg	2.60E-02	3.53E-01	2.60E-02	U
102668	ABKSB0302	1-4	042296	2,4-Dinitrophenol	Semivolatiles	mg/kg	4.40E-02	1.76E+00	4.40E-02	U
102668	ABKSB0302	1-4	042296	2,4-Dinitrotoluene	Semivolatiles	mg/kg	1.90E-02	3.53E-01	1.90E-02	U
102668	ABKSB0302	1-4	042296	2,6-Dinitrotoluene	Semivolatiles	mg/kg	1.60E-02	3.53E-01	1.60E-02	U
102668	ABKSB0302	1-4	042296	2-Chloronaphthalene	Semivolatiles	mg/kg	1.60E-02	3.53E-01	1.60E-02	U
102668	ABKSB0302	1-4	042296	2-Chlorophenol	Semivolatiles	mg/kg	1.70E-02	3.53E-01	1.70E-02	U
102668	ABKSB0302	1-4	042296	2-Methyl-4,6-dinitrophenol	Semivolatiles	mg/kg	1.10E-02	1.76E+00	1.10E-02	U
102668	ABKSB0302	1-4	042296	2-Methylnaphthalene	Semivolatiles	mg/kg	1.70E-02	3.53E-01	1.70E-02	U
102668	ABKSB0302	1-4	042296	2-Nitroaniline	Semivolatiles	mg/kg	1.90E-02	1.76E+00	1.90E-02	U
102668	ABKSB0302	1-4	042296	2-Nitrophenol	Semivolatiles	mg/kg	1.70E-02	3.53E-01	1.70E-02	U
102668	ABKSB0302	1-4	042296	3,3'-Dichlorobenzidine	Semivolatiles	mg/kg	7.30E-02	7.06E-01	7.30E-02	U
102668	ABKSB0302	1-4	042296	3-Nitroaniline	Semivolatiles	mg/kg	4.20E-02	1.76E+00	4.20E-02	U
102668	ABKSB0302	1-4	042296	4-Bromophenyl phenyl ether	Semivolatiles	mg/kg	1.00E-02	3.53E-01	1.00E-02	U
102668	ABKSB0302	1-4	042296	4-Chloro-3-methylphenol (p-chlo	Semivolatiles	mg/kg	1.80E-02	3.53E-01	1.80E-02	U

Appendix B
Phase I Soil Analytical Results for the 716-A Motor Shops Seepage Basin

Sample ID	Sample Name	Sample Depth	Sample Date	Analyte	Analyte Class	Units	MDL	EQL	Result	Result Qualifier
102668	ABKSB0302	1-4	042296	4-Chloroaniline	Semivolatiles	mg/kg	6.00E-03	3.53E-01	6.00E-03	U
102668	ABKSB0302	1-4	042296	4-Chlorophenyl phenyl ether	Semivolatiles	mg/kg	1.30E-02	3.53E-01	1.30E-02	U
102668	ABKSB0302	1-4	042296	4-Nitroaniline	Semivolatiles	mg/kg	2.00E-02	1.76E+00	2.00E-02	U
102668	ABKSB0302	1-4	042296	4-Nitrophenol	Semivolatiles	mg/kg	4.90E-02	1.76E+00	4.90E-02	U
102668	ABKSB0302	1-4	042296	Acenapthene	Semivolatiles	mg/kg	1.50E-02	3.53E-01	1.50E-02	U
102668	ABKSB0302	1-4	042296	Acenapthylene	Semivolatiles	mg/kg	1.60E-02	3.53E-01	1.60E-02	U
102668	ABKSB0302	1-4	042296	Anthracene	Semivolatiles	mg/kg	1.60E-02	3.53E-01	1.60E-02	U
102668	ABKSB0302	1-4	042296	Benzo(a)anthracene	Semivolatiles	mg/kg	2.00E-02	3.53E-01	2.00E-02	U
102668	ABKSB0302	1-4	042296	Benzo(a)pyrene	Semivolatiles	mg/kg	2.40E-02	3.53E-01	2.40E-02	U
102668	ABKSB0302	1-4	042296	Benzo(b)fluoranthene	Semivolatiles	mg/kg	2.30E-02	3.53E-01	2.30E-02	U
102668	ABKSB0302	1-4	042296	Benzo(g,h,i)perylene	Semivolatiles	mg/kg	1.60E-02	3.53E-01	1.60E-02	U
102668	ABKSB0302	1-4	042296	Benzo(k)fluoranthene	Semivolatiles	mg/kg	2.20E-02	3.53E-01	2.20E-02	U
102668	ABKSB0302	1-4	042296	Benzoic acid	Semivolatiles	mg/kg	3.40E-02	1.76E+00	3.40E-02	U
102668	ABKSB0302	1-4	042296	Benzyl alcohol	Semivolatiles	mg/kg	1.90E-02	3.53E-01	1.90E-02	U
102668	ABKSB0302	1-4	042296	Bis(2-chloroethoxy) methane	Semivolatiles	mg/kg	1.60E-02	3.53E-01	1.60E-02	U
102668	ABKSB0302	1-4	042296	Bis(2-chloroethyl) ether	Semivolatiles	mg/kg	2.20E-02	3.53E-01	2.20E-02	U
102668	ABKSB0302	1-4	042296	Bis(2-chloroisopropyl) ether	Semivolatiles	mg/kg	1.80E-02	3.53E-01	1.80E-02	U
102668	ABKSB0302	1-4	042296	Bis(2-ethylhexyl) phthalate	Semivolatiles	mg/kg	2.20E-02	3.53E-01	2.20E-02	U
102668	ABKSB0302	1-4	042296	Butyl benzyl phthalate	Semivolatiles	mg/kg	2.10E-02	3.53E-01	2.10E-02	U
102668	ABKSB0302	1-4	042296	Chrysene	Semivolatiles	mg/kg	1.90E-02	3.53E-01	1.90E-02	U
102668	ABKSB0302	1-4	042296	Di-n-butyl phthalate	Semivolatiles	mg/kg	1.90E-02	3.53E-01	1.90E-02	U
102668	ABKSB0302	1-4	042296	Di-n-octyl phthalate	Semivolatiles	mg/kg	2.60E-02	3.53E-01	2.60E-02	U
102668	ABKSB0302	1-4	042296	Dibenzo(a,h)anthracene	Semivolatiles	mg/kg	1.70E-02	3.53E-01	1.70E-02	U
102668	ABKSB0302	1-4	042296	Dibenzofuran	Semivolatiles	mg/kg	1.60E-02	3.53E-01	1.60E-02	U
102668	ABKSB0302	1-4	042296	Diethyl phthalate	Semivolatiles	mg/kg	1.60E-02	3.53E-01	1.60E-02	U
102668	ABKSB0302	1-4	042296	Dimethyl phthalate	Semivolatiles	mg/kg	1.50E-02	3.53E-01	1.50E-02	U
102668	ABKSB0302	1-4	042296	Fluoranthene	Semivolatiles	mg/kg	1.90E-02	3.53E-01	1.90E-02	U
102668	ABKSB0302	1-4	042296	Fluorene	Semivolatiles	mg/kg	1.60E-02	3.53E-01	1.60E-02	U
102668	ABKSB0302	1-4	042296	Hexachlorobenzene	Semivolatiles	mg/kg	1.00E-02	3.53E-01	1.00E-02	U
102668	ABKSB0302	1-4	042296	Hexachlorobutadiene	Semivolatiles	mg/kg	1.50E-02	3.53E-01	1.50E-02	U

Appendix B
Phase I Soil Analytical Results for the 716-A Motor Shops Seepage Basin

Sample ID	Sample Name	Sample Depth	Sample Date	Analyte	Analyte Class	Units	MDL	EQL	Result	Result Qualifier
102668	ABKSB0302	1-4	042296	Hexachlorocyclopentadiene	Semivolatiles	mg/kg	2.60E-02	3.53E-01	2.60E-02	U
102668	ABKSB0302	1-4	042296	Hexachloroethane	Semivolatiles	mg/kg	1.60E-02	3.53E-01	1.60E-02	U
102668	ABKSB0302	1-4	042296	Indeno(1,2,3-c,d)pyrene	Semivolatiles	mg/kg	1.80E-02	3.53E-01	1.80E-02	U
102668	ABKSB0302	1-4	042296	Isophorone	Semivolatiles	mg/kg	1.70E-02	3.53E-01	1.70E-02	U
102668	ABKSB0302	1-4	042296	N-Nitrosodi-n-propylamine	Semivolatiles	mg/kg	2.00E-02	3.53E-01	2.00E-02	U
102668	ABKSB0302	1-4	042296	N-Nitrosodiphenylamine	Semivolatiles	mg/kg	1.40E-02	3.53E-01	1.40E-02	U
102668	ABKSB0302	1-4	042296	Naphthalene	Semivolatiles	mg/kg	1.90E-02	3.53E-01	1.90E-02	U
102668	ABKSB0302	1-4	042296	Nitrobenzene	Semivolatiles	mg/kg	1.90E-02	3.53E-01	1.90E-02	U
102668	ABKSB0302	1-4	042296	o-cresol (2-methylphenol)	Semivolatiles	mg/kg	1.60E-02	3.53E-01	1.60E-02	U
102668	ABKSB0302	1-4	042296	p-cresol (4-methylphenol)	Semivolatiles	mg/kg	1.70E-02	3.53E-01	1.70E-02	U
102668	ABKSB0302	1-4	042296	Pentachlorophenol	Semivolatiles	mg/kg	3.90E-02	1.76E+00	3.90E-02	U
102668	ABKSB0302	1-4	042296	Phenanthrene	Semivolatiles	mg/kg	1.50E-02	3.53E-01	1.50E-02	U
102668	ABKSB0302	1-4	042296	Phenol	Semivolatiles	mg/kg	1.90E-02	3.53E-01	1.90E-02	U
102668	ABKSB0302	1-4	042296	Pyrene	Semivolatiles	mg/kg	2.10E-02	3.53E-01	2.10E-02	U
102668	ABKSB0302	1-4	042296	Terpene	SVOA TICs	mg/kg	0.00E+00	0.00E+00	2.00E+00	J
102668	ABKSB0302	1-4	042296	Unknown	SVOA TICs	mg/kg	0.00E+00	0.00E+00	2.00E-01	J
102668	ABKSB0302	1-4	042296	Unknown	SVOA TICs	mg/kg	0.00E+00	0.00E+00	2.00E-01	J
102668	ABKSB0302	1-4	042296	Unknown	SVOA TICs	mg/kg	0.00E+00	0.00E+00	2.00E-01	J
102668	ABKSB0302	1-4	042296	Aldrin	Pesticides/PCBs	mg/kg	5.70E-04	1.77E-03	5.70E-04	U
102668	ABKSB0302	1-4	042296	alpha-Benzene hexachloride	Pesticides/PCBs	mg/kg	5.70E-04	1.77E-03	5.70E-04	U
102668	ABKSB0302	1-4	042296	alpha-Chlordane	Pesticides/PCBs	mg/kg	5.70E-04	1.77E-03	5.70E-04	U
102668	ABKSB0302	1-4	042296	Aroclor 1016	Pesticides/PCBs	mg/kg	1.10E-02	3.53E-02	1.10E-02	U
102668	ABKSB0302	1-4	042296	Aroclor 1221	Pesticides/PCBs	mg/kg	2.20E-02	7.06E-02	2.20E-02	U
102668	ABKSB0302	1-4	042296	Aroclor 1232	Pesticides/PCBs	mg/kg	1.10E-02	3.53E-02	1.10E-02	U
102668	ABKSB0302	1-4	042296	Aroclor 1242	Pesticides/PCBs	mg/kg	1.10E-02	3.53E-02	1.10E-02	U
102668	ABKSB0302	1-4	042296	Aroclor 1248	Pesticides/PCBs	mg/kg	1.10E-02	3.53E-02	1.10E-02	U
102668	ABKSB0302	1-4	042296	Aroclor 1254	Pesticides/PCBs	mg/kg	1.10E-02	3.53E-02	1.10E-02	U
102668	ABKSB0302	1-4	042296	Aroclor 1260	Pesticides/PCBs	mg/kg	1.10E-02	3.53E-02	1.10E-02	U
102668	ABKSB0302	1-4	042296	beta-Benzene hexachloride	Pesticides/PCBs	mg/kg	5.70E-04	1.77E-03	5.70E-04	U
102668	ABKSB0302	1-4	042296	delta-Benzene hexachloride	Pesticides/PCBs	mg/kg	5.70E-04	1.77E-03	5.70E-04	U

Appendix B
Phase I Soil Analytical Results for the 716-A Motor Shops Seepage Basin

Sample ID	Sample Name	Sample Depth	Sample Date	Analyte	Analyte Class	Units	MDL	EQL	Result	Result Qualifier
102668	ABKSB0302	1-4	042296	Dieldrin	Pesticides/PCBs	mg/kg	6.33E-04	3.53E-03	6.33E-04	U
102668	ABKSB0302	1-4	042296	Endosulfan I	Pesticides/PCBs	mg/kg	5.70E-04	1.77E-03	5.70E-04	U
102668	ABKSB0302	1-4	042296	Endosulfan II	Pesticides/PCBs	mg/kg	9.00E-04	3.53E-03	9.00E-04	U
102668	ABKSB0302	1-4	042296	Endosulfan sulfate	Pesticides/PCBs	mg/kg	1.10E-03	3.53E-03	1.10E-03	U
102668	ABKSB0302	1-4	042296	Endrin	Pesticides/PCBs	mg/kg	1.10E-03	3.53E-03	1.10E-03	UJ
102668	ABKSB0302	1-4	042296	Endrin ketone	Pesticides/PCBs	mg/kg	1.10E-03	3.53E-03	1.10E-03	UJ
102668	ABKSB0302	1-4	042296	gamma-Benzene hexachloride (Lin	Pesticides/PCBs	mg/kg	5.70E-04	1.77E-03	5.70E-04	U
102668	ABKSB0302	1-4	042296	gamma-Chlordane	Pesticides/PCBs	mg/kg	5.70E-04	1.77E-03	5.70E-04	U
102668	ABKSB0302	1-4	042296	Heptachlor	Pesticides/PCBs	mg/kg	5.70E-04	1.77E-03	5.70E-04	U
102668	ABKSB0302	1-4	042296	Heptachlor epoxide	Pesticides/PCBs	mg/kg	5.70E-04	1.77E-03	5.70E-04	U
102668	ABKSB0302	1-4	042296	Methoxychlor (Mariate)	Pesticides/PCBs	mg/kg	5.70E-03	1.77E-02	5.70E-03	U
102668	ABKSB0302	1-4	042296	p,p'-DDD	Pesticides/PCBs	mg/kg	1.10E-03	3.53E-03	1.10E-03	UJ
102668	ABKSB0302	1-4	042296	p,p'-DDE	Pesticides/PCBs	mg/kg	9.00E-04	3.53E-03	9.00E-04	UJ
102668	ABKSB0302	1-4	042296	p,p'-DDT	Pesticides/PCBs	mg/kg	1.10E-03	3.53E-03	1.10E-03	UJ
102668	ABKSB0302	1-4	042296	Toxaphene	Pesticides/PCBs	mg/kg	5.30E-02	1.77E-01	5.30E-02	U
102668	ABKSB0302	1-4	042296	Aluminum	TAL Inorganics	mg/kg	1.90E+00	1.95E+01	5.64E+03	
102668	ABKSB0302	1-4	042296	Antimony	TAL Inorganics	mg/kg	3.50E-01	3.67E+00	3.50E-01	U
102668	ABKSB0302	1-4	042296	Arsenic	TAL Inorganics	mg/kg	1.11E+00	1.16E+01	1.11E+00	U
102668	ABKSB0302	1-4	042296	Barium	TAL Inorganics	mg/kg	1.10E-01	1.15E+00	2.36E+01	
102668	ABKSB0302	1-4	042296	Beryllium	TAL Inorganics	mg/kg	3.00E-02	2.62E-01	2.27E-01	
102668	ABKSB0302	1-4	042296	Cadmium	TAL Inorganics	mg/kg	4.00E-02	4.20E-01	7.13E-02	J
102668	ABKSB0302	1-4	042296	Calcium	TAL Inorganics	mg/kg	1.68E+00	1.76E+01	9.06E+01	
102668	ABKSB0302	1-4	042296	Chromium	TAL Inorganics	mg/kg	9.00E-02	9.44E-01	4.70E+00	
102668	ABKSB0302	1-4	042296	Cobalt	TAL Inorganics	mg/kg	8.00E-02	8.39E-01	1.20E+00	
102668	ABKSB0302	1-4	042296	Copper	TAL Inorganics	mg/kg	1.00E-01	1.05E+00	1.60E+00	
102668	ABKSB0302	1-4	042296	Cyanide	TAL Inorganics	mg/kg	8.00E-02	8.10E-01	8.00E-02	U
102668	ABKSB0302	1-4	042296	Iron	TAL Inorganics	mg/kg	2.19E+00	2.30E+01	3.10E+03	
102668	ABKSB0302	1-4	042296	Lead	TAL Inorganics	mg/kg	5.90E-01	6.19E+00	3.90E+00	J
102668	ABKSB0302	1-4	042296	Magnesium	TAL Inorganics	mg/kg	8.70E-01	9.13E+00	1.13E+02	
102668	ABKSB0302	1-4	042296	Manganese	TAL Inorganics	mg/kg	2.00E-02	2.10E-01	3.80E+01	

Appendix B
Phase I Soil Analytical Results for the 716-A Motor Shops Seepage Basin

Sample ID	Sample Name	Sample Depth	Sample Date	Analyte	Analyte Class	Units	MDL	EQL	Result	Result Qualifier
102668	ABKSB0302	1-4	042296	Mercury	TAL Inorganics	mg/kg	1.30E-02	1.41E-01	3.00E-02	J
102668	ABKSB0302	1-4	042296	Nickel	TAL Inorganics	mg/kg	1.70E-01	1.78E+00	2.10E+00	
102668	ABKSB0302	1-4	042296	Potassium	TAL Inorganics	mg/kg	6.70E+00	7.03E+01	8.48E+01	
102668	ABKSB0302	1-4	042296	Selenium	TAL Inorganics	mg/kg	1.04E+00	1.09E+01	1.04E+00	U
102668	ABKSB0302	1-4	042296	Silver	TAL Inorganics	mg/kg	9.00E-02	9.44E-01	9.00E-02	U
102668	ABKSB0302	1-4	042296	Sodium	TAL Inorganics	mg/kg	1.29E+01	1.35E+02	1.77E+01	J
102668	ABKSB0302	1-4	042296	Thallium	TAL Inorganics	mg/kg	8.50E-01	8.92E+00	8.50E-01	U
102668	ABKSB0302	1-4	042296	Vanadium	TAL Inorganics	mg/kg	7.00E-02	7.34E-01	7.10E+00	
102668	ABKSB0302	1-4	042296	Zinc	TAL Inorganics	mg/kg	1.61E+00	1.69E+01	4.50E+00	J
102668	ABKSB0302	1-4	042296	Gross Alpha	Radiologicals	pCi/g	4.00E+00	2.93E+00	4.00E+00	UI
102668	ABKSB0302	1-4	042296	Non-volatile Beta	Radiologicals	pCi/g	1.00E+01	1.81E+00	1.00E+01	UI
102668	ABKSB0302	1-4	042296	Cation exchange capacity	Miscellaneous	Meq/	6.00E+00	6.36E+02	6.00E+00	U
102668	ABKSB0302	1-4	042296	Total Organic Carbon	Miscellaneous	mg/kg	8.40E+00	6.00E+01	7.83E+02	
102668	ABKSB0302	1-4	042296	Total petroleum hydrocarbons	Miscellaneous	mg/kg	3.30E+00	1.13E+01	3.30E+00	UJ
102673	ABKSB0401	0-1	042296	1,1,1-Trichloroethane	Volatiles	mg/kg	9.71E-04	5.00E-03	4.61E-03	J
102673	ABKSB0401	0-1	042296	1,1,2,2-Tetrachloroethane	Volatiles	mg/kg	3.47E-03	5.00E-03	3.47E-03	U
102673	ABKSB0401	0-1	042296	1,1,2-Trichloroethane	Volatiles	mg/kg	2.40E-03	5.00E-03	2.40E-03	U
102673	ABKSB0401	0-1	042296	1,1-Dichloroethane	Volatiles	mg/kg	1.05E-03	5.00E-03	1.05E-03	U
102673	ABKSB0401	0-1	042296	1,1-Dichloroethene	Volatiles	mg/kg	1.42E-03	5.00E-03	1.42E-03	U
102673	ABKSB0401	0-1	042296	1,2-Dichloroethane	Volatiles	mg/kg	1.34E-03	5.00E-03	1.34E-03	U
102673	ABKSB0401	0-1	042296	1,2-Dichloroethene (total)	Volatiles	mg/kg	8.54E-04	5.00E-03	8.54E-04	U
102673	ABKSB0401	0-1	042296	1,2-Dichloropropane	Volatiles	mg/kg	1.67E-03	5.00E-03	1.67E-03	U
102673	ABKSB0401	0-1	042296	2-Butanone (MEK)	Volatiles	mg/kg	2.81E-03	1.00E-02	2.81E-03	U
102673	ABKSB0401	0-1	042296	2-Hexanone	Volatiles	mg/kg	3.77E-03	1.00E-02	3.77E-03	U
102673	ABKSB0401	0-1	042296	4-Methyl-2-pentanone	Volatiles	mg/kg	3.29E-03	1.00E-02	3.29E-03	U
102673	ABKSB0401	0-1	042296	Acetone	Volatiles	mg/kg	4.04E-03	1.00E-02	4.04E-03	U
102673	ABKSB0401	0-1	042296	Benzene	Volatiles	mg/kg	7.52E-04	5.00E-03	7.52E-04	U
102673	ABKSB0401	0-1	042296	Bromodichloromethane	Volatiles	mg/kg	1.74E-03	5.00E-03	1.74E-03	U
102673	ABKSB0401	0-1	042296	Bromoform	Volatiles	mg/kg	2.93E-03	5.00E-03	2.93E-03	U
102673	ABKSB0401	0-1	042296	Bromomethane (Methyl bromide)	Volatiles	mg/kg	2.01E-03	1.00E-02	2.01E-03	U

Appendix B
Phase I Soil Analytical Results for the 716-A Motor Shops Seepage Basin

Sample ID	Sample Name	Sample Depth	Sample Date	Analyte	Analyte Class	Units	MDL	EQL	Result	Result Qualifier
102673	ABKSB0401	0-1	042296	Carbon disulfide	Volatiles	mg/kg	1.71E-03	5.00E-03	1.71E-03	U
102673	ABKSB0401	0-1	042296	Carbon tetrachloride	Volatiles	mg/kg	9.71E-04	5.00E-03	9.71E-04	U
102673	ABKSB0401	0-1	042296	Chlorobenzene	Volatiles	mg/kg	1.74E-03	5.00E-03	1.74E-03	U
102673	ABKSB0401	0-1	042296	Chlorodibromomethane	Volatiles	mg/kg	2.53E-03	5.00E-03	2.53E-03	U
102673	ABKSB0401	0-1	042296	Chloroethane	Volatiles	mg/kg	2.06E-03	1.00E-02	2.06E-03	U
102673	ABKSB0401	0-1	042296	Chloroform	Volatiles	mg/kg	1.11E-03	5.00E-03	1.11E-03	U
102673	ABKSB0401	0-1	042296	Chloromethane (methyl chloride)	Volatiles	mg/kg	3.20E-03	1.00E-02	3.20E-03	U
102673	ABKSB0401	0-1	042296	cis-1,3-Dichloropropene	Volatiles	mg/kg	1.79E-03	5.00E-03	1.79E-03	U
102673	ABKSB0401	0-1	042296	Dichloromethane (methylene chlo	Volatiles	mg/kg	1.83E-03	5.00E-03	1.83E-03	U
102673	ABKSB0401	0-1	042296	Ethylbenzene	Volatiles	mg/kg	1.47E-03	5.00E-03	1.47E-03	U
102673	ABKSB0401	0-1	042296	Styrene	Volatiles	mg/kg	1.98E-03	5.00E-03	1.98E-03	U
102673	ABKSB0401	0-1	042296	Tetrachloroethene	Volatiles	mg/kg	1.17E-03	5.00E-03	1.30E-02	
102673	ABKSB0401	0-1	042296	Toluene	Volatiles	mg/kg	1.45E-03	5.00E-03	1.45E-03	U
102673	ABKSB0401	0-1	042296	trans-1,3-Dichloropropene	Volatiles	mg/kg	2.08E-03	5.00E-03	2.08E-03	U
102673	ABKSB0401	0-1	042296	Trichloroethene (TCE)	Volatiles	mg/kg	2.09E-03	5.00E-03	2.09E-03	U
102673	ABKSB0401	0-1	042296	Vinyl acetate	Volatiles	mg/kg	5.48E-03	1.00E-02	5.48E-03	U
102673	ABKSB0401	0-1	042296	Vinyl chloride	Volatiles	mg/kg	2.47E-03	1.00E-02	2.47E-03	U
102673	ABKSB0401	0-1	042296	Xylenes (total)	Volatiles	mg/kg	1.53E-03	5.00E-03	1.53E-03	U
102673	ABKSB0401	0-1	042296	Unknown	VOA TICs	mg/kg	0.00E+00	0.00E+00	2.00E-02	J
102673	ABKSB0401	0-1	042296	1,2,4-Trichlorobenzene	Semivolatiles	mg/kg	1.80E-02	3.55E-01	1.80E-02	U
102673	ABKSB0401	0-1	042296	1,2-Dichlorobenzene	Semivolatiles	mg/kg	1.70E-02	3.55E-01	1.70E-02	U
102673	ABKSB0401	0-1	042296	1,3-Dichlorobenzene	Semivolatiles	mg/kg	1.80E-02	3.55E-01	1.80E-02	U
102673	ABKSB0401	0-1	042296	1,4-Dichlorobenzene	Semivolatiles	mg/kg	1.80E-02	3.55E-01	1.80E-02	U
102673	ABKSB0401	0-1	042296	2,4,5-Trichlorophenol	Semivolatiles	mg/kg	1.40E-02	1.78E+00	1.40E-02	U
102673	ABKSB0401	0-1	042296	2,4,6-Trichlorophenol	Semivolatiles	mg/kg	1.10E-02	3.55E-01	1.10E-02	U
102673	ABKSB0401	0-1	042296	2,4-Dichlorophenol	Semivolatiles	mg/kg	1.30E-02	3.55E-01	1.30E-02	U
102673	ABKSB0401	0-1	042296	2,4-Dimethyl phenol	Semivolatiles	mg/kg	2.60E-02	3.55E-01	2.60E-02	U
102673	ABKSB0401	0-1	042296	2,4-Dinitrophenol	Semivolatiles	mg/kg	4.40E-02	1.78E+00	4.40E-02	U
102673	ABKSB0401	0-1	042296	2,4-Dinitrotoluene	Semivolatiles	mg/kg	1.90E-02	3.55E-01	1.90E-02	U
102673	ABKSB0401	0-1	042296	2,6-Dinitrotoluene	Semivolatiles	mg/kg	1.60E-02	3.55E-01	1.60E-02	U

Appendix B
Phase I Soil Analytical Results for the 716-A Motor Shops Seepage Basin

Sample ID	Sample Name	Sample Depth	Sample Date	Analyte	Analyte Class	Units	MDL	EQL	Result	Result Qualifier
102673	ABKSB0401	0-1	042296	2-Chloronaphthalene	Semivolatiles	mg/kg	1.60E-02	3.55E-01	1.60E-02	U
102673	ABKSB0401	0-1	042296	2-Chlorophenol	Semivolatiles	mg/kg	1.70E-02	3.55E-01	1.70E-02	U
102673	ABKSB0401	0-1	042296	2-Methyl-4,6-dinitrophenol	Semivolatiles	mg/kg	1.10E-02	1.78E+00	1.10E-02	U
102673	ABKSB0401	0-1	042296	2-Methylnaphthalene	Semivolatiles	mg/kg	1.70E-02	3.55E-01	1.70E-02	U
102673	ABKSB0401	0-1	042296	2-Nitroaniline	Semivolatiles	mg/kg	1.90E-02	1.78E+00	1.90E-02	U
102673	ABKSB0401	0-1	042296	2-Nitrophenol	Semivolatiles	mg/kg	1.70E-02	3.55E-01	1.70E-02	U
102673	ABKSB0401	0-1	042296	3,3'-Dichlorobenzidine	Semivolatiles	mg/kg	7.30E-02	7.10E-01	7.30E-02	U
102673	ABKSB0401	0-1	042296	3-Nitroaniline	Semivolatiles	mg/kg	4.20E-02	1.78E+00	4.20E-02	U
102673	ABKSB0401	0-1	042296	4-Bromophenyl phenyl ether	Semivolatiles	mg/kg	1.00E-02	3.55E-01	1.00E-02	U
102673	ABKSB0401	0-1	042296	4-Chloro-3-methylphenol (p-chlo	Semivolatiles	mg/kg	1.80E-02	3.55E-01	1.80E-02	U
102673	ABKSB0401	0-1	042296	4-Chloroaniline	Semivolatiles	mg/kg	6.00E-03	3.55E-01	6.00E-03	U
102673	ABKSB0401	0-1	042296	4-Chlorophenyl phenyl ether	Semivolatiles	mg/kg	1.30E-02	3.55E-01	1.30E-02	U
102673	ABKSB0401	0-1	042296	4-Nitroaniline	Semivolatiles	mg/kg	2.00E-02	1.78E+00	2.00E-02	U
102673	ABKSB0401	0-1	042296	4-Nitrophenol	Semivolatiles	mg/kg	4.90E-02	1.78E+00	4.90E-02	U
102673	ABKSB0401	0-1	042296	Acenapthene	Semivolatiles	mg/kg	1.50E-02	3.55E-01	1.50E-02	U
102673	ABKSB0401	0-1	042296	Acenapthylene	Semivolatiles	mg/kg	1.60E-02	3.55E-01	1.60E-02	U
102673	ABKSB0401	0-1	042296	Anthracene	Semivolatiles	mg/kg	1.60E-02	3.55E-01	1.60E-02	U
102673	ABKSB0401	0-1	042296	Benzo(a)anthracene	Semivolatiles	mg/kg	2.00E-02	3.55E-01	2.00E-02	U
102673	ABKSB0401	0-1	042296	Benzo(a)pyrene	Semivolatiles	mg/kg	2.40E-02	3.55E-01	2.40E-02	U
102673	ABKSB0401	0-1	042296	Benzo(b)fluoranthene	Semivolatiles	mg/kg	2.30E-02	3.55E-01	2.30E-02	U
102673	ABKSB0401	0-1	042296	Benzo(g,h,i)perylene	Semivolatiles	mg/kg	1.60E-02	3.55E-01	1.60E-02	U
102673	ABKSB0401	0-1	042296	Benzo(k)fluoranthene	Semivolatiles	mg/kg	2.20E-02	3.55E-01	2.20E-02	U
102673	ABKSB0401	0-1	042296	Benzoic acid	Semivolatiles	mg/kg	3.40E-02	1.78E+00	3.40E-02	U
102673	ABKSB0401	0-1	042296	Benzyl alcohol	Semivolatiles	mg/kg	1.90E-02	3.55E-01	1.90E-02	U
102673	ABKSB0401	0-1	042296	Bis(2-chloroethoxy) methane	Semivolatiles	mg/kg	1.60E-02	3.55E-01	1.60E-02	U
102673	ABKSB0401	0-1	042296	Bis(2-chloroethyl) ether	Semivolatiles	mg/kg	2.20E-02	3.55E-01	2.20E-02	U
102673	ABKSB0401	0-1	042296	Bis(2-chloroisopropyl) ether	Semivolatiles	mg/kg	1.80E-02	3.55E-01	1.80E-02	U
102673	ABKSB0401	0-1	042296	Bis(2-ethylhexyl) phthalate	Semivolatiles	mg/kg	2.20E-02	3.55E-01	2.20E-02	U
102673	ABKSB0401	0-1	042296	Butyl benzyl phthalate	Semivolatiles	mg/kg	2.10E-02	3.55E-01	2.10E-02	U
102673	ABKSB0401	0-1	042296	Chrysene	Semivolatiles	mg/kg	1.90E-02	3.55E-01	1.90E-02	U

Appendix B
Phase I Soil Analytical Results for the 716-A Motor Shops Seepage Basin

Sample ID	Sample Name	Sample Depth	Sample Date	Analyte	Analyte Class	Units	MDL	EQL	Result	Result Qualifier
102673	ABKSB0401	0-1	042296	Di-n-butyl phthalate	Semivolatiles	mg/kg	1.90E-02	3.55E-01	1.90E-02	U
102673	ABKSB0401	0-1	042296	Di-n-octyl phthalate	Semivolatiles	mg/kg	2.60E-02	3.55E-01	2.60E-02	U
102673	ABKSB0401	0-1	042296	Dibenzo(a,h)anthracene	Semivolatiles	mg/kg	1.70E-02	3.55E-01	1.70E-02	U
102673	ABKSB0401	0-1	042296	Dibenzofuran	Semivolatiles	mg/kg	1.60E-02	3.55E-01	1.60E-02	U
102673	ABKSB0401	0-1	042296	Diethyl phthalate	Semivolatiles	mg/kg	1.60E-02	3.55E-01	1.60E-02	U
102673	ABKSB0401	0-1	042296	Dimethyl phthalate	Semivolatiles	mg/kg	1.50E-02	3.55E-01	1.50E-02	U
102673	ABKSB0401	0-1	042296	Fluoranthene	Semivolatiles	mg/kg	1.90E-02	3.55E-01	1.90E-02	U
102673	ABKSB0401	0-1	042296	Fluorene	Semivolatiles	mg/kg	1.60E-02	3.55E-01	1.60E-02	U
102673	ABKSB0401	0-1	042296	Hexachlorobenzene	Semivolatiles	mg/kg	1.00E-02	3.55E-01	1.00E-02	U
102673	ABKSB0401	0-1	042296	Hexachlorobutadiene	Semivolatiles	mg/kg	1.50E-02	3.55E-01	1.50E-02	U
102673	ABKSB0401	0-1	042296	Hexachlorocyclopentadiene	Semivolatiles	mg/kg	2.60E-02	3.55E-01	2.60E-02	U
102673	ABKSB0401	0-1	042296	Hexachloroethane	Semivolatiles	mg/kg	1.60E-02	3.55E-01	1.60E-02	U
102673	ABKSB0401	0-1	042296	Indeno(1,2,3-c,d)pyrene	Semivolatiles	mg/kg	1.80E-02	3.55E-01	1.80E-02	U
102673	ABKSB0401	0-1	042296	Isophorone	Semivolatiles	mg/kg	1.70E-02	3.55E-01	1.70E-02	U
102673	ABKSB0401	0-1	042296	N-Nitrosodi-n-propylamine	Semivolatiles	mg/kg	2.00E-02	3.55E-01	2.00E-02	U
102673	ABKSB0401	0-1	042296	N-Nitrosodiphenylamine	Semivolatiles	mg/kg	1.40E-02	3.55E-01	1.40E-02	U
102673	ABKSB0401	0-1	042296	Naphthalene	Semivolatiles	mg/kg	1.90E-02	3.55E-01	1.90E-02	U
102673	ABKSB0401	0-1	042296	Nitrobenzene	Semivolatiles	mg/kg	1.90E-02	3.55E-01	1.90E-02	U
102673	ABKSB0401	0-1	042296	o-cresol (2-methylphenol)	Semivolatiles	mg/kg	1.60E-02	3.55E-01	1.60E-02	U
102673	ABKSB0401	0-1	042296	p-cresol (4-methylphenol)	Semivolatiles	mg/kg	1.70E-02	3.55E-01	1.70E-02	U
102673	ABKSB0401	0-1	042296	Pentachlorophenol	Semivolatiles	mg/kg	3.90E-02	1.78E+00	3.90E-02	U
102673	ABKSB0401	0-1	042296	Phenanthrene	Semivolatiles	mg/kg	1.50E-02	3.55E-01	1.50E-02	U
102673	ABKSB0401	0-1	042296	Phenol	Semivolatiles	mg/kg	1.90E-02	3.55E-01	1.90E-02	U
102673	ABKSB0401	0-1	042296	Pyrene	Semivolatiles	mg/kg	2.10E-02	3.55E-01	2.10E-02	U
102673	ABKSB0401	0-1	042296	Terpene	SVOA TICs	mg/kg	0.00E+00	0.00E+00	1.00E+00	J
102673	ABKSB0401	0-1	042296	Terpene	SVOA TICs	mg/kg	0.00E+00	0.00E+00	2.00E-01	J
102673	ABKSB0401	0-1	042296	Unknown	SVOA TICs	mg/kg	0.00E+00	0.00E+00	2.00E-01	J
102673	ABKSB0401	0-1	042296	Unknown	SVOA TICs	mg/kg	0.00E+00	0.00E+00	3.00E-01	J
102673	ABKSB0401	0-1	042296	Aldrin	Pesticides/PCBs	mg/kg	5.70E-04	1.77E-03	5.70E-04	U
102673	ABKSB0401	0-1	042296	alpha-Benzene hexachloride	Pesticides/PCBs	mg/kg	5.70E-04	1.77E-03	5.70E-04	U

Appendix B
Phase I Soil Analytical Results for the 716-A Motor Shops Seepage Basin

Sample ID	Sample Name	Sample Depth	Sample Date	Analyte	Analyte Class	Units	MDL	EQL	Result	Result Qualifier
102673	ABKSB0401	0-1	042296	alpha-Chlordane	Pesticides/PCBs	mg/kg	5.70E-04	1.77E-03	5.70E-04	U
102673	ABKSB0401	0-1	042296	Aroclor 1016	Pesticides/PCBs	mg/kg	1.10E-02	3.55E-02	1.10E-02	U
102673	ABKSB0401	0-1	042296	Aroclor 1221	Pesticides/PCBs	mg/kg	2.20E-02	7.10E-02	2.20E-02	U
102673	ABKSB0401	0-1	042296	Aroclor 1232	Pesticides/PCBs	mg/kg	1.10E-02	3.55E-02	1.10E-02	U
102673	ABKSB0401	0-1	042296	Aroclor 1242	Pesticides/PCBs	mg/kg	1.10E-02	3.55E-02	1.10E-02	U
102673	ABKSB0401	0-1	042296	Aroclor 1248	Pesticides/PCBs	mg/kg	1.10E-02	3.55E-02	1.10E-02	U
102673	ABKSB0401	0-1	042296	Aroclor 1254	Pesticides/PCBs	mg/kg	1.10E-02	3.55E-02	1.10E-02	U
102673	ABKSB0401	0-1	042296	Aroclor 1260	Pesticides/PCBs	mg/kg	1.10E-02	3.55E-02	1.10E-02	U
102673	ABKSB0401	0-1	042296	beta-Benzene hexachloride	Pesticides/PCBs	mg/kg	5.70E-04	1.77E-03	5.70E-04	U
102673	ABKSB0401	0-1	042296	delta-Benzene hexachloride	Pesticides/PCBs	mg/kg	5.70E-04	1.77E-03	5.70E-04	U
102673	ABKSB0401	0-1	042296	Dieldrin	Pesticides/PCBs	mg/kg	6.33E-04	3.55E-03	6.33E-04	U
102673	ABKSB0401	0-1	042296	Endosulfan I	Pesticides/PCBs	mg/kg	5.70E-04	1.77E-03	5.70E-04	U
102673	ABKSB0401	0-1	042296	Endosulfan II	Pesticides/PCBs	mg/kg	9.00E-04	3.55E-03	9.00E-04	U
102673	ABKSB0401	0-1	042296	Endosulfan sulfate	Pesticides/PCBs	mg/kg	1.10E-03	3.55E-03	1.10E-03	U
102673	ABKSB0401	0-1	042296	Endrin	Pesticides/PCBs	mg/kg	1.10E-03	3.55E-03	1.10E-03	UJ
102673	ABKSB0401	0-1	042296	Endrin ketone	Pesticides/PCBs	mg/kg	1.10E-03	3.55E-03	1.10E-03	UJ
102673	ABKSB0401	0-1	042296	gamma-Benzene hexachloride (Lin	Pesticides/PCBs	mg/kg	5.70E-04	1.77E-03	5.70E-04	U
102673	ABKSB0401	0-1	042296	gamma-Chlordane	Pesticides/PCBs	mg/kg	5.70E-04	1.77E-03	5.70E-04	U
102673	ABKSB0401	0-1	042296	Heptachlor	Pesticides/PCBs	mg/kg	5.70E-04	1.77E-03	5.70E-04	U
102673	ABKSB0401	0-1	042296	Heptachlor epoxide	Pesticides/PCBs	mg/kg	5.70E-04	1.77E-03	5.70E-04	U
102673	ABKSB0401	0-1	042296	Methoxychlor (Mariate)	Pesticides/PCBs	mg/kg	5.70E-03	1.77E-02	5.70E-03	U
102673	ABKSB0401	0-1	042296	p,p'-DDD	Pesticides/PCBs	mg/kg	1.10E-03	3.55E-03	1.10E-03	UJ
102673	ABKSB0401	0-1	042296	p,p'-DDE	Pesticides/PCBs	mg/kg	9.00E-04	3.55E-03	9.00E-04	UJ
102673	ABKSB0401	0-1	042296	p,p'-DDT	Pesticides/PCBs	mg/kg	1.10E-03	3.55E-03	1.10E-03	UJ
102673	ABKSB0401	0-1	042296	Toxaphene	Pesticides/PCBs	mg/kg	5.30E-02	1.77E-01	5.30E-02	U
102673	ABKSB0401	0-1	042296	Aluminum	TAL Inorganics	mg/kg	1.90E+00	1.94E+01	4.00E+03	
102673	ABKSB0401	0-1	042296	Antimony	TAL Inorganics	mg/kg	3.50E-01	3.65E+00	3.50E-01	U
102673	ABKSB0401	0-1	042296	Arsenic	TAL Inorganics	mg/kg	1.11E+00	1.16E+01	1.50E+00	J
102673	ABKSB0401	0-1	042296	Barium	TAL Inorganics	mg/kg	1.10E-01	1.15E+00	2.47E+01	
102673	ABKSB0401	0-1	042296	Beryllium	TAL Inorganics	mg/kg	3.00E-02	2.61E-01	2.23E-01	

Appendix B
Phase I Soil Analytical Results for the 716-A Motor Shops Seepage Basin

Sample ID	Sample Name	Sample Depth	Sample Date	Analyte	Analyte Class	Units	MDL	EQL	Result	Result Qualifier
102673	ABKSB0401	0-1	042296	Cadmium	TAL Inorganics	mg/kg	4.00E-02	4.17E-01	8.76E-02	J
102673	ABKSB0401	0-1	042296	Calcium	TAL Inorganics	mg/kg	1.68E+00	1.75E+01	6.60E+01	
102673	ABKSB0401	0-1	042296	Chromium	TAL Inorganics	mg/kg	9.00E-02	9.39E-01	4.00E+00	
102673	ABKSB0401	0-1	042296	Cobalt	TAL Inorganics	mg/kg	8.00E-02	8.34E-01	1.10E+00	
102673	ABKSB0401	0-1	042296	Copper	TAL Inorganics	mg/kg	1.00E-01	1.04E+00	1.60E+00	
102673	ABKSB0401	0-1	042296	Cyanide	TAL Inorganics	mg/kg	8.00E-02	7.80E-01	8.00E-02	U
102673	ABKSB0401	0-1	042296	Iron	TAL Inorganics	mg/kg	2.19E+00	2.28E+01	2.53E+03	
102673	ABKSB0401	0-1	042296	Lead	TAL Inorganics	mg/kg	5.90E-01	6.15E+00	5.00E+00	J
102673	ABKSB0401	0-1	042296	Magnesium	TAL Inorganics	mg/kg	8.70E-01	9.07E+00	7.96E+01	
102673	ABKSB0401	0-1	042296	Manganese	TAL Inorganics	mg/kg	2.00E-02	2.09E-01	1.47E+02	
102673	ABKSB0401	0-1	042296	Mercury	TAL Inorganics	mg/kg	1.30E-02	1.42E-01	2.00E-02	J
102673	ABKSB0401	0-1	042296	Nickel	TAL Inorganics	mg/kg	1.70E-01	1.77E+00	1.40E+00	J
102673	ABKSB0401	0-1	042296	Potassium	TAL Inorganics	mg/kg	6.70E+00	6.99E+01	6.44E+01	J
102673	ABKSB0401	0-1	042296	Selenium	TAL Inorganics	mg/kg	1.04E+00	1.08E+01	1.04E+00	U
102673	ABKSB0401	0-1	042296	Silver	TAL Inorganics	mg/kg	9.00E-02	9.39E-01	9.00E-02	U
102673	ABKSB0401	0-1	042296	Sodium	TAL Inorganics	mg/kg	1.29E+01	1.35E+02	1.97E+01	J
102673	ABKSB0401	0-1	042296	Thallium	TAL Inorganics	mg/kg	8.50E-01	8.87E+00	8.50E-01	U
102673	ABKSB0401	0-1	042296	Vanadium	TAL Inorganics	mg/kg	7.00E-02	7.30E-01	6.40E+00	
102673	ABKSB0401	0-1	042296	Zinc	TAL Inorganics	mg/kg	1.61E+00	1.68E+01	3.30E+00	J
102673	ABKSB0401	0-1	042296	Gross Alpha	Radiologicals	pCi/g	4.00E+00	2.87E+00	9.95E+00	
102673	ABKSB0401	0-1	042296	Non-volatile Beta	Radiologicals	pCi/g	1.00E+01	1.69E+00	1.00E+01	UI
102673	ABKSB0401	0-1	042296	Cation exchange capacity	Miscellaneous	Meq/	6.00E+00	6.39E+02	6.00E+00	U
102673	ABKSB0401	0-1	042296	Total Organic Carbon	Miscellaneous	mg/kg	8.40E+00	6.00E+01	4.76E+03	
102673	ABKSB0401	0-1	042296	Total petroleum hydrocarbons	Miscellaneous	mg/kg	3.30E+00	1.14E+01	1.51E+01	
102674	ABKSB0402	1-4	042296	1,1,1-Trichloroethane	Volatiles	mg/kg	9.71E-04	6.00E-03	9.71E-04	U
102674	ABKSB0402	1-4	042296	1,1,2,2-Tetrachloroethane	Volatiles	mg/kg	3.47E-03	6.00E-03	3.47E-03	U
102674	ABKSB0402	1-4	042296	1,1,2-Trichloroethane	Volatiles	mg/kg	2.40E-03	6.00E-03	2.40E-03	U
102674	ABKSB0402	1-4	042296	1,1-Dichloroethane	Volatiles	mg/kg	1.05E-03	6.00E-03	1.05E-03	U
102674	ABKSB0402	1-4	042296	1,1-Dichloroethene	Volatiles	mg/kg	1.42E-03	6.00E-03	1.42E-03	U
102674	ABKSB0402	1-4	042296	1,2-Dichloroethane	Volatiles	mg/kg	1.34E-03	6.00E-03	1.34E-03	U

Appendix B
Phase I Soil Analytical Results for the 716-A Motor Shops Seepage Basin

Sample ID	Sample Name	Sample Depth	Sample Date	Analyte	Analyte Class	Units	MDL	EQL	Result	Result Qualifier
102674	ABKSB0402	1-4	042296	1,2-Dichloroethene (total)	Volatiles	mg/kg	8.54E-04	6.00E-03	8.54E-04	U
102674	ABKSB0402	1-4	042296	1,2-Dichloropropane	Volatiles	mg/kg	1.67E-03	6.00E-03	1.67E-03	U
102674	ABKSB0402	1-4	042296	2-Butanone (MEK)	Volatiles	mg/kg	2.81E-03	1.20E-02	2.81E-03	U
102674	ABKSB0402	1-4	042296	2-Hexanone	Volatiles	mg/kg	3.77E-03	1.20E-02	3.77E-03	U
102674	ABKSB0402	1-4	042296	4-Methyl-2-pentanone	Volatiles	mg/kg	3.29E-03	1.20E-02	3.29E-03	U
102674	ABKSB0402	1-4	042296	Acetone	Volatiles	mg/kg	4.04E-03	1.20E-02	4.04E-03	U
102674	ABKSB0402	1-4	042296	Benzene	Volatiles	mg/kg	7.52E-04	6.00E-03	7.52E-04	U
102674	ABKSB0402	1-4	042296	Bromodichloromethane	Volatiles	mg/kg	1.74E-03	6.00E-03	1.74E-03	U
102674	ABKSB0402	1-4	042296	Bromoform	Volatiles	mg/kg	2.93E-03	6.00E-03	2.93E-03	U
102674	ABKSB0402	1-4	042296	Bromomethane (Methyl bromide)	Volatiles	mg/kg	2.01E-03	1.20E-02	2.01E-03	U
102674	ABKSB0402	1-4	042296	Carbon disulfide	Volatiles	mg/kg	1.71E-03	6.00E-03	1.71E-03	U
102674	ABKSB0402	1-4	042296	Carbon tetrachloride	Volatiles	mg/kg	9.71E-04	6.00E-03	9.71E-04	U
102674	ABKSB0402	1-4	042296	Chlorobenzene	Volatiles	mg/kg	1.74E-03	6.00E-03	1.74E-03	U
102674	ABKSB0402	1-4	042296	Chlorodibromomethane	Volatiles	mg/kg	2.53E-03	6.00E-03	2.53E-03	U
102674	ABKSB0402	1-4	042296	Chloroethane	Volatiles	mg/kg	2.06E-03	1.20E-02	2.06E-03	U
102674	ABKSB0402	1-4	042296	Chloroform	Volatiles	mg/kg	1.11E-03	6.00E-03	1.11E-03	U
102674	ABKSB0402	1-4	042296	Chloromethane (methyl chloride)	Volatiles	mg/kg	3.20E-03	1.20E-02	3.20E-03	U
102674	ABKSB0402	1-4	042296	cis-1,3-Dichloropropene	Volatiles	mg/kg	1.79E-03	6.00E-03	1.79E-03	U
102674	ABKSB0402	1-4	042296	Dichloromethane (methylene chlo	Volatiles	mg/kg	1.83E-03	6.00E-03	1.83E-03	U
102674	ABKSB0402	1-4	042296	Ethylbenzene	Volatiles	mg/kg	1.47E-03	6.00E-03	1.47E-03	U
102674	ABKSB0402	1-4	042296	Styrene	Volatiles	mg/kg	1.98E-03	6.00E-03	1.98E-03	U
102674	ABKSB0402	1-4	042296	Tetrachloroethene	Volatiles	mg/kg	1.17E-03	6.00E-03	3.26E-03	J
102674	ABKSB0402	1-4	042296	Toluene	Volatiles	mg/kg	1.45E-03	6.00E-03	1.45E-03	U
102674	ABKSB0402	1-4	042296	trans-1,3-Dichloropropene	Volatiles	mg/kg	2.08E-03	6.00E-03	2.08E-03	U
102674	ABKSB0402	1-4	042296	Trichloroethene (TCE)	Volatiles	mg/kg	2.09E-03	6.00E-03	2.09E-03	U
102674	ABKSB0402	1-4	042296	Vinyl acetate	Volatiles	mg/kg	5.48E-03	1.20E-02	5.48E-03	U
102674	ABKSB0402	1-4	042296	Vinyl chloride	Volatiles	mg/kg	2.47E-03	1.20E-02	2.47E-03	U
102674	ABKSB0402	1-4	042296	Xylenes (total)	Volatiles	mg/kg	1.53E-03	6.00E-03	1.53E-03	U
102674	ABKSB0402	1-4	042296	Unknown	VOA TICs	mg/kg	0.00E+00	0.00E+00	1.00E-01	J
102674	ABKSB0402	1-4	042296	Unknown	VOA TICs	mg/kg	0.00E+00	0.00E+00	1.00E-02	J

Appendix B
Phase I Soil Analytical Results for the 716-A Motor Shops Seepage Basin

Sample ID	Sample Name	Sample Depth	Sample Date	Analyte	Analyte Class	Units	MDL	EQL	Result	Result Qualifier
102674	ABKSB0402	1-4	042296	1,2,4-Trichlorobenzene	Semivolatiles	mg/kg	1.80E-02	3.74E-01	1.80E-02	U
102674	ABKSB0402	1-4	042296	1,2-Dichlorobenzene	Semivolatiles	mg/kg	1.70E-02	3.74E-01	1.70E-02	U
102674	ABKSB0402	1-4	042296	1,3-Dichlorobenzene	Semivolatiles	mg/kg	1.80E-02	3.74E-01	1.80E-02	U
102674	ABKSB0402	1-4	042296	1,4-Dichlorobenzene	Semivolatiles	mg/kg	1.80E-02	3.74E-01	1.80E-02	U
102674	ABKSB0402	1-4	042296	2,4,5-Trichlorophenol	Semivolatiles	mg/kg	1.40E-02	1.87E+00	1.40E-02	U
102674	ABKSB0402	1-4	042296	2,4,6-Trichlorophenol	Semivolatiles	mg/kg	1.10E-02	3.74E-01	1.10E-02	U
102674	ABKSB0402	1-4	042296	2,4-Dichlorophenol	Semivolatiles	mg/kg	1.30E-02	3.74E-01	1.30E-02	U
102674	ABKSB0402	1-4	042296	2,4-Dimethyl phenol	Semivolatiles	mg/kg	2.60E-02	3.74E-01	2.60E-02	U
102674	ABKSB0402	1-4	042296	2,4-Dinitrophenol	Semivolatiles	mg/kg	4.40E-02	1.87E+00	4.40E-02	U
102674	ABKSB0402	1-4	042296	2,4-Dinitrotoluene	Semivolatiles	mg/kg	1.90E-02	3.74E-01	1.90E-02	U
102674	ABKSB0402	1-4	042296	2,6-Dinitrotoluene	Semivolatiles	mg/kg	1.60E-02	3.74E-01	1.60E-02	U
102674	ABKSB0402	1-4	042296	2-Chloronaphthalene	Semivolatiles	mg/kg	1.60E-02	3.74E-01	1.60E-02	U
102674	ABKSB0402	1-4	042296	2-Chlorophenol	Semivolatiles	mg/kg	1.70E-02	3.74E-01	1.70E-02	U
102674	ABKSB0402	1-4	042296	2-Methyl-4,6-dinitrophenol	Semivolatiles	mg/kg	1.10E-02	1.87E+00	1.10E-02	U
102674	ABKSB0402	1-4	042296	2-Methylnaphthalene	Semivolatiles	mg/kg	1.70E-02	3.74E-01	1.70E-02	U
102674	ABKSB0402	1-4	042296	2-Nitroaniline	Semivolatiles	mg/kg	1.90E-02	1.87E+00	1.90E-02	U
102674	ABKSB0402	1-4	042296	2-Nitrophenol	Semivolatiles	mg/kg	1.70E-02	3.74E-01	1.70E-02	U
102674	ABKSB0402	1-4	042296	3,3'-Dichlorobenzidine	Semivolatiles	mg/kg	7.30E-02	7.48E-01	7.30E-02	U
102674	ABKSB0402	1-4	042296	3-Nitroaniline	Semivolatiles	mg/kg	4.20E-02	1.87E+00	4.20E-02	U
102674	ABKSB0402	1-4	042296	4-Bromophenyl phenyl ether	Semivolatiles	mg/kg	1.00E-02	3.74E-01	1.00E-02	U
102674	ABKSB0402	1-4	042296	4-Chloro-3-methylphenol (p-chlo	Semivolatiles	mg/kg	1.80E-02	3.74E-01	1.80E-02	U
102674	ABKSB0402	1-4	042296	4-Chloroaniline	Semivolatiles	mg/kg	6.00E-03	3.74E-01	6.00E-03	U
102674	ABKSB0402	1-4	042296	4-Chlorophenyl phenyl ether	Semivolatiles	mg/kg	1.30E-02	3.74E-01	1.30E-02	U
102674	ABKSB0402	1-4	042296	4-Nitroaniline	Semivolatiles	mg/kg	2.00E-02	1.87E+00	2.00E-02	U
102674	ABKSB0402	1-4	042296	4-Nitrophenol	Semivolatiles	mg/kg	4.90E-02	1.87E+00	4.90E-02	U
102674	ABKSB0402	1-4	042296	Acenapthene	Semivolatiles	mg/kg	1.50E-02	3.74E-01	1.50E-02	U
102674	ABKSB0402	1-4	042296	Acenapthylene	Semivolatiles	mg/kg	1.60E-02	3.74E-01	1.60E-02	U
102674	ABKSB0402	1-4	042296	Anthracene	Semivolatiles	mg/kg	1.60E-02	3.74E-01	1.60E-02	U
102674	ABKSB0402	1-4	042296	Benzo(a)anthracene	Semivolatiles	mg/kg	2.00E-02	3.74E-01	2.00E-02	U
102674	ABKSB0402	1-4	042296	Benzo(a)pyrene	Semivolatiles	mg/kg	2.40E-02	3.74E-01	2.40E-02	U

Appendix B
Phase I Soil Analytical Results for the 716-A Motor Shops Seepage Basin

Sample ID	Sample Name	Sample Depth	Sample Date	Analyte	Analyte Class	Units	MDL	EQL	Result	Result Qualifier
102674	ABKSB0402	1-4	042296	Benzo(b)fluoranthene	Semivolatiles	mg/kg	2.30E-02	3.74E-01	2.30E-02	U
102674	ABKSB0402	1-4	042296	Benzo(g,h,i)perylene	Semivolatiles	mg/kg	1.60E-02	3.74E-01	1.60E-02	U
102674	ABKSB0402	1-4	042296	Benzo(k)fluoranthene	Semivolatiles	mg/kg	2.20E-02	3.74E-01	2.20E-02	U
102674	ABKSB0402	1-4	042296	Benzoic acid	Semivolatiles	mg/kg	3.40E-02	1.87E+00	3.40E-02	U
102674	ABKSB0402	1-4	042296	Benzyl alcohol	Semivolatiles	mg/kg	1.90E-02	3.74E-01	1.90E-02	U
102674	ABKSB0402	1-4	042296	Bis(2-chloroethoxy) methane	Semivolatiles	mg/kg	1.60E-02	3.74E-01	1.60E-02	U
102674	ABKSB0402	1-4	042296	Bis(2-chloroethyl) ether	Semivolatiles	mg/kg	2.20E-02	3.74E-01	2.20E-02	U
102674	ABKSB0402	1-4	042296	Bis(2-chloroisopropyl) ether	Semivolatiles	mg/kg	1.80E-02	3.74E-01	1.80E-02	U
102674	ABKSB0402	1-4	042296	Bis(2-ethylhexyl) phthalate	Semivolatiles	mg/kg	2.20E-02	3.74E-01	2.20E-02	U
102674	ABKSB0402	1-4	042296	Butyl benzyl phthalate	Semivolatiles	mg/kg	2.10E-02	3.74E-01	2.10E-02	U
102674	ABKSB0402	1-4	042296	Chrysene	Semivolatiles	mg/kg	1.90E-02	3.74E-01	1.90E-02	U
102674	ABKSB0402	1-4	042296	Di-n-butyl phthalate	Semivolatiles	mg/kg	1.90E-02	3.74E-01	1.90E-02	U
102674	ABKSB0402	1-4	042296	Di-n-octyl phthalate	Semivolatiles	mg/kg	2.60E-02	3.74E-01	2.60E-02	U
102674	ABKSB0402	1-4	042296	Dibenzo(a,h)anthracene	Semivolatiles	mg/kg	1.70E-02	3.74E-01	1.70E-02	U
102674	ABKSB0402	1-4	042296	Dibenzofuran	Semivolatiles	mg/kg	1.60E-02	3.74E-01	1.60E-02	U
102674	ABKSB0402	1-4	042296	Diethyl phthalate	Semivolatiles	mg/kg	1.60E-02	3.74E-01	1.60E-02	U
102674	ABKSB0402	1-4	042296	Dimethyl phthalate	Semivolatiles	mg/kg	1.50E-02	3.74E-01	1.50E-02	U
102674	ABKSB0402	1-4	042296	Fluoranthene	Semivolatiles	mg/kg	1.90E-02	3.74E-01	1.90E-02	U
102674	ABKSB0402	1-4	042296	Fluorene	Semivolatiles	mg/kg	1.60E-02	3.74E-01	1.60E-02	U
102674	ABKSB0402	1-4	042296	Hexachlorobenzene	Semivolatiles	mg/kg	1.00E-02	3.74E-01	1.00E-02	U
102674	ABKSB0402	1-4	042296	Hexachlorobutadiene	Semivolatiles	mg/kg	1.50E-02	3.74E-01	1.50E-02	U
102674	ABKSB0402	1-4	042296	Hexachlorocyclopentadiene	Semivolatiles	mg/kg	2.60E-02	3.74E-01	2.60E-02	U
102674	ABKSB0402	1-4	042296	Hexachloroethane	Semivolatiles	mg/kg	1.60E-02	3.74E-01	1.60E-02	U
102674	ABKSB0402	1-4	042296	Indeno(1,2,3-c,d)pyrene	Semivolatiles	mg/kg	1.80E-02	3.74E-01	1.80E-02	U
102674	ABKSB0402	1-4	042296	Isophorone	Semivolatiles	mg/kg	1.70E-02	3.74E-01	1.70E-02	U
102674	ABKSB0402	1-4	042296	N-Nitrosodi-n-propylamine	Semivolatiles	mg/kg	2.00E-02	3.74E-01	2.00E-02	U
102674	ABKSB0402	1-4	042296	N-Nitrosodiphenylamine	Semivolatiles	mg/kg	1.40E-02	3.74E-01	1.40E-02	U
102674	ABKSB0402	1-4	042296	Naphthalene	Semivolatiles	mg/kg	1.90E-02	3.74E-01	1.90E-02	U
102674	ABKSB0402	1-4	042296	Nitrobenzene	Semivolatiles	mg/kg	1.90E-02	3.74E-01	1.90E-02	U
102674	ABKSB0402	1-4	042296	o-cresol (2-methylphenol)	Semivolatiles	mg/kg	1.60E-02	3.74E-01	1.60E-02	U

Appendix B
Phase I Soil Analytical Results for the 716-A Motor Shops Seepage Basin

Sample ID	Sample Name	Sample Depth	Sample Date	Analyte	Analyte Class	Units	MDL	EQL	Result	Result Qualifier
102674	ABKSB0402	1-4	042296	p-cresol (4-methylphenol)	Semivolatiles	mg/kg	1.70E-02	3.74E-01	1.70E-02	U
102674	ABKSB0402	1-4	042296	Pentachlorophenol	Semivolatiles	mg/kg	3.90E-02	1.87E+00	3.90E-02	U
102674	ABKSB0402	1-4	042296	Phenanthrene	Semivolatiles	mg/kg	1.50E-02	3.74E-01	1.50E-02	U
102674	ABKSB0402	1-4	042296	Phenol	Semivolatiles	mg/kg	1.90E-02	3.74E-01	1.90E-02	U
102674	ABKSB0402	1-4	042296	Pyrene	Semivolatiles	mg/kg	2.10E-02	3.74E-01	2.10E-02	U
102674	ABKSB0402	1-4	042296	Unknown	SVOA TICs	mg/kg	0.00E+00	0.00E+00	3.00E-01	J
102674	ABKSB0402	1-4	042296	Unknown	SVOA TICs	mg/kg	0.00E+00	0.00E+00	5.00E-01	J
102674	ABKSB0402	1-4	042296	Aldrin	Pesticides/PCBs	mg/kg	5.70E-04	1.87E-03	5.70E-04	U
102674	ABKSB0402	1-4	042296	alpha-Benzene hexachloride	Pesticides/PCBs	mg/kg	5.70E-04	1.87E-03	5.70E-04	U
102674	ABKSB0402	1-4	042296	alpha-Chlordane	Pesticides/PCBs	mg/kg	5.70E-04	1.87E-03	5.70E-04	U
102674	ABKSB0402	1-4	042296	Aroclor 1016	Pesticides/PCBs	mg/kg	1.10E-02	3.74E-02	1.10E-02	U
102674	ABKSB0402	1-4	042296	Aroclor 1221	Pesticides/PCBs	mg/kg	2.20E-02	7.48E-02	2.20E-02	U
102674	ABKSB0402	1-4	042296	Aroclor 1232	Pesticides/PCBs	mg/kg	1.10E-02	3.74E-02	1.10E-02	U
102674	ABKSB0402	1-4	042296	Aroclor 1242	Pesticides/PCBs	mg/kg	1.10E-02	3.74E-02	1.10E-02	U
102674	ABKSB0402	1-4	042296	Aroclor 1248	Pesticides/PCBs	mg/kg	1.10E-02	3.74E-02	1.10E-02	U
102674	ABKSB0402	1-4	042296	Aroclor 1254	Pesticides/PCBs	mg/kg	1.10E-02	3.74E-02	1.10E-02	U
102674	ABKSB0402	1-4	042296	Aroclor 1260	Pesticides/PCBs	mg/kg	1.10E-02	3.74E-02	1.10E-02	U
102674	ABKSB0402	1-4	042296	beta-Benzene hexachloride	Pesticides/PCBs	mg/kg	5.70E-04	1.87E-03	5.70E-04	U
102674	ABKSB0402	1-4	042296	delta-Benzene hexachloride	Pesticides/PCBs	mg/kg	5.70E-04	1.87E-03	5.70E-04	U
102674	ABKSB0402	1-4	042296	Dieldrin	Pesticides/PCBs	mg/kg	6.33E-04	3.74E-03	6.33E-04	U
102674	ABKSB0402	1-4	042296	Endosulfan I	Pesticides/PCBs	mg/kg	5.70E-04	1.87E-03	5.70E-04	U
102674	ABKSB0402	1-4	042296	Endosulfan II	Pesticides/PCBs	mg/kg	9.00E-04	3.74E-03	9.00E-04	U
102674	ABKSB0402	1-4	042296	Endosulfan sulfate	Pesticides/PCBs	mg/kg	1.10E-03	3.74E-03	1.10E-03	U
102674	ABKSB0402	1-4	042296	Endrin	Pesticides/PCBs	mg/kg	1.10E-03	3.74E-03	1.10E-03	UJ
102674	ABKSB0402	1-4	042296	Endrin ketone	Pesticides/PCBs	mg/kg	1.10E-03	3.74E-03	1.10E-03	UJ
102674	ABKSB0402	1-4	042296	gamma-Benzene hexachloride (Lin	Pesticides/PCBs	mg/kg	5.70E-04	1.87E-03	5.70E-04	U
102674	ABKSB0402	1-4	042296	gamma-Chlordane	Pesticides/PCBs	mg/kg	5.70E-04	1.87E-03	5.70E-04	U
102674	ABKSB0402	1-4	042296	Heptachlor	Pesticides/PCBs	mg/kg	5.70E-04	1.87E-03	5.70E-04	U
102674	ABKSB0402	1-4	042296	Heptachlor epoxide	Pesticides/PCBs	mg/kg	5.70E-04	1.87E-03	5.70E-04	U
102674	ABKSB0402	1-4	042296	Methoxychlor (Mariate)	Pesticides/PCBs	mg/kg	5.70E-03	1.87E-02	5.70E-03	U

Appendix B
Phase I Soil Analytical Results for the 716-A Motor Shops Seepage Basin

Sample ID	Sample Name	Sample Depth	Sample Date	Analyte	Analyte Class	Units	MDL	EQL	Result	Result Qualifier
102674	ABKSB0402	1-4	042296	p,p'-DDD	Pesticides/PCBs	mg/kg	1.10E-03	3.74E-03	1.10E-03	UJ
102674	ABKSB0402	1-4	042296	p,p'-DDE	Pesticides/PCBs	mg/kg	9.00E-04	3.74E-03	9.00E-04	UJ
102674	ABKSB0402	1-4	042296	p,p'-DDT	Pesticides/PCBs	mg/kg	1.10E-03	3.74E-03	1.10E-03	UJ
102674	ABKSB0402	1-4	042296	Toxaphene	Pesticides/PCBs	mg/kg	5.30E-02	1.87E-01	5.30E-02	U
102674	ABKSB0402	1-4	042296	Aluminum	TAL Inorganics	mg/kg	1.90E+00	2.05E+01	1.56E+04	
102674	ABKSB0402	1-4	042296	Antimony	TAL Inorganics	mg/kg	3.50E-01	3.85E+00	4.84E-01	J
102674	ABKSB0402	1-4	042296	Arsenic	TAL Inorganics	mg/kg	1.11E+00	1.22E+01	3.60E+00	J
102674	ABKSB0402	1-4	042296	Barium	TAL Inorganics	mg/kg	1.10E-01	1.21E+00	4.27E+01	
102674	ABKSB0402	1-4	042296	Beryllium	TAL Inorganics	mg/kg	3.00E-02	2.75E-01	3.87E-01	
102674	ABKSB0402	1-4	042296	Cadmium	TAL Inorganics	mg/kg	4.00E-02	4.40E-01	4.11E-01	J
102674	ABKSB0402	1-4	042296	Calcium	TAL Inorganics	mg/kg	1.68E+00	1.85E+01	2.73E+02	
102674	ABKSB0402	1-4	042296	Chromium	TAL Inorganics	mg/kg	9.00E-02	9.90E-01	1.59E+01	
102674	ABKSB0402	1-4	042296	Cobalt	TAL Inorganics	mg/kg	8.00E-02	8.80E-01	2.00E+00	
102674	ABKSB0402	1-4	042296	Copper	TAL Inorganics	mg/kg	1.00E-01	1.10E+00	3.50E+00	
102674	ABKSB0402	1-4	042296	Cyanide	TAL Inorganics	mg/kg	8.00E-02	8.50E-01	8.00E-02	U
102674	ABKSB0402	1-4	042296	Iron	TAL Inorganics	mg/kg	2.19E+00	2.41E+01	1.32E+04	
102674	ABKSB0402	1-4	042296	Lead	TAL Inorganics	mg/kg	5.90E-01	6.49E+00	7.80E+00	
102674	ABKSB0402	1-4	042296	Magnesium	TAL Inorganics	mg/kg	8.70E-01	9.57E+00	1.71E+02	
102674	ABKSB0402	1-4	042296	Manganese	TAL Inorganics	mg/kg	2.00E-02	2.20E-01	5.91E+01	
102674	ABKSB0402	1-4	042296	Mercury	TAL Inorganics	mg/kg	1.30E-02	1.50E-01	8.30E-02	J
102674	ABKSB0402	1-4	042296	Nickel	TAL Inorganics	mg/kg	1.70E-01	1.87E+00	3.80E+00	
102674	ABKSB0402	1-4	042296	Potassium	TAL Inorganics	mg/kg	6.70E+00	7.37E+01	1.39E+02	
102674	ABKSB0402	1-4	042296	Selenium	TAL Inorganics	mg/kg	1.04E+00	1.14E+01	1.04E+00	U
102674	ABKSB0402	1-4	042296	Silver	TAL Inorganics	mg/kg	9.00E-02	9.90E-01	9.00E-02	U
102674	ABKSB0402	1-4	042296	Sodium	TAL Inorganics	mg/kg	1.29E+01	1.42E+02	7.16E+01	J
102674	ABKSB0402	1-4	042296	Thallium	TAL Inorganics	mg/kg	8.50E-01	9.35E+00	8.50E-01	U
102674	ABKSB0402	1-4	042296	Vanadium	TAL Inorganics	mg/kg	7.00E-02	7.70E-01	3.16E+01	
102674	ABKSB0402	1-4	042296	Zinc	TAL Inorganics	mg/kg	1.61E+00	1.77E+01	6.70E+00	J
102674	ABKSB0402	1-4	042296	Gross Alpha	Radiologicals	pCi/g	4.00E+00	2.92E+00	2.59E+01	
102674	ABKSB0402	1-4	042296	Non-volatile Beta	Radiologicals	pCi/g	1.00E+01	1.79E+00	1.06E+01	

Appendix B
Phase I Soil Analytical Results for the 716-A Motor Shops Seepage Basin

Sample ID	Sample Name	Sample Depth	Sample Date	Analyte	Analyte Class	Units	MDL	EQL	Result	Result Qualifier
102674	ABKSB0402	1-4	042296	Cation exchange capacity	Miscellaneous	Meq/	6.00E+00	6.73E+02	6.00E+00	U
102674	ABKSB0402	1-4	042296	Total Organic Carbon	Miscellaneous	mg/kg	8.40E+00	6.00E+01	9.59E+02	
102674	ABKSB0402	1-4	042296	Total petroleum hydrocarbons	Miscellaneous	mg/kg	3.30E+00	1.20E+01	3.30E+00	UJ
102669	ABKSB0501	0-1	042296	1,1,1-Trichloroethane	Volatiles	mg/kg	9.71E-04	5.50E-03	7.16E-03	J
102669	ABKSB0501	0-1	042296	1,1,2,2-Tetrachloroethane	Volatiles	mg/kg	3.47E-03	5.50E-03	3.47E-03	UJ
102669	ABKSB0501	0-1	042296	1,1,2-Trichloroethane	Volatiles	mg/kg	2.40E-03	5.50E-03	2.40E-03	UJ
102669	ABKSB0501	0-1	042296	1,1-Dichloroethane	Volatiles	mg/kg	1.05E-03	5.50E-03	1.05E-03	UJ
102669	ABKSB0501	0-1	042296	1,1-Dichloroethene	Volatiles	mg/kg	1.42E-03	5.50E-03	1.42E-03	UJ
102669	ABKSB0501	0-1	042296	1,2-Dichloroethane	Volatiles	mg/kg	1.34E-03	5.50E-03	1.34E-03	UJ
102669	ABKSB0501	0-1	042296	1,2-Dichloroethene (total)	Volatiles	mg/kg	8.54E-04	5.50E-03	8.54E-04	UJ
102669	ABKSB0501	0-1	042296	1,2-Dichloropropane	Volatiles	mg/kg	1.67E-03	5.50E-03	1.67E-03	UJ
102669	ABKSB0501	0-1	042296	2-Butanone (MEK)	Volatiles	mg/kg	2.81E-03	1.10E-02	2.81E-03	UJ
102669	ABKSB0501	0-1	042296	2-Hexanone	Volatiles	mg/kg	3.77E-03	1.10E-02	3.77E-03	UJ
102669	ABKSB0501	0-1	042296	4-Methyl-2-pentanone	Volatiles	mg/kg	3.29E-03	1.10E-02	3.29E-03	UJ
102669	ABKSB0501	0-1	042296	Acetone	Volatiles	mg/kg	4.04E-03	1.10E-02	4.04E-03	UJ
102669	ABKSB0501	0-1	042296	Benzene	Volatiles	mg/kg	7.52E-04	5.50E-03	7.52E-04	UJ
102669	ABKSB0501	0-1	042296	Bromodichloromethane	Volatiles	mg/kg	1.74E-03	5.50E-03	1.74E-03	UJ
102669	ABKSB0501	0-1	042296	Bromoform	Volatiles	mg/kg	2.93E-03	5.50E-03	2.93E-03	UJ
102669	ABKSB0501	0-1	042296	Bromomethane (Methyl bromide)	Volatiles	mg/kg	2.01E-03	1.10E-02	2.01E-03	UJ
102669	ABKSB0501	0-1	042296	Carbon disulfide	Volatiles	mg/kg	1.71E-03	5.50E-03	1.71E-03	UJ
102669	ABKSB0501	0-1	042296	Carbon tetrachloride	Volatiles	mg/kg	9.71E-04	5.50E-03	9.71E-04	UJ
102669	ABKSB0501	0-1	042296	Chlorobenzene	Volatiles	mg/kg	1.74E-03	5.50E-03	1.74E-03	UJ
102669	ABKSB0501	0-1	042296	Chlorodibromomethane	Volatiles	mg/kg	2.53E-03	5.50E-03	2.53E-03	UJ
102669	ABKSB0501	0-1	042296	Chloroethane	Volatiles	mg/kg	2.06E-03	1.10E-02	2.06E-03	UJ
102669	ABKSB0501	0-1	042296	Chloroform	Volatiles	mg/kg	1.11E-03	5.50E-03	1.11E-03	UJ
102669	ABKSB0501	0-1	042296	Chloromethane (methyl chloride)	Volatiles	mg/kg	3.20E-03	1.10E-02	3.20E-03	UJ
102669	ABKSB0501	0-1	042296	cis-1,3-Dichloropropene	Volatiles	mg/kg	1.79E-03	5.50E-03	1.79E-03	UJ
102669	ABKSB0501	0-1	042296	Dichloromethane (methylene chlo	Volatiles	mg/kg	1.83E-03	5.50E-03	1.83E-03	UJ
102669	ABKSB0501	0-1	042296	Ethylbenzene	Volatiles	mg/kg	1.47E-03	5.50E-03	1.47E-03	UJ
102669	ABKSB0501	0-1	042296	Styrene	Volatiles	mg/kg	1.98E-03	5.50E-03	1.98E-03	UJ

Appendix B
Phase I Soil Analytical Results for the 716-A Motor Shops Seepage Basin

Sample ID	Sample Name	Sample Depth	Sample Date	Analyte	Analyte Class	Units	MDL	EQL	Result	Result Qualifier
102669	ABKSB0501	0-1	042296	Tetrachloroethene	Volatiles	mg/kg	1.17E-03	5.50E-03	9.79E-03	J
102669	ABKSB0501	0-1	042296	Toluene	Volatiles	mg/kg	1.45E-03	5.50E-03	1.45E-03	UJ
102669	ABKSB0501	0-1	042296	trans-1,3-Dichloropropene	Volatiles	mg/kg	2.08E-03	5.50E-03	2.08E-03	UJ
102669	ABKSB0501	0-1	042296	Trichloroethene (TCE)	Volatiles	mg/kg	2.09E-03	5.50E-03	2.09E-03	UJ
102669	ABKSB0501	0-1	042296	Vinyl acetate	Volatiles	mg/kg	5.48E-03	1.10E-02	5.48E-03	UJ
102669	ABKSB0501	0-1	042296	Vinyl chloride	Volatiles	mg/kg	2.47E-03	1.10E-02	2.47E-03	UJ
102669	ABKSB0501	0-1	042296	Xylenes (total)	Volatiles	mg/kg	1.53E-03	5.50E-03	1.22E-03	J
102669	ABKSB0501	0-1	042296	1,2,4-Trichlorobenzene	Semivolatiles	mg/kg	1.80E-02	3.53E-01	1.80E-02	U
102669	ABKSB0501	0-1	042296	1,2-Dichlorobenzene	Semivolatiles	mg/kg	1.70E-02	3.53E-01	1.70E-02	U
102669	ABKSB0501	0-1	042296	1,3-Dichlorobenzene	Semivolatiles	mg/kg	1.80E-02	3.53E-01	1.80E-02	U
102669	ABKSB0501	0-1	042296	1,4-Dichlorobenzene	Semivolatiles	mg/kg	1.80E-02	3.53E-01	1.80E-02	U
102669	ABKSB0501	0-1	042296	2,4,5-Trichlorophenol	Semivolatiles	mg/kg	1.40E-02	1.76E+00	1.40E-02	U
102669	ABKSB0501	0-1	042296	2,4,6-Trichlorophenol	Semivolatiles	mg/kg	1.10E-02	3.53E-01	1.10E-02	U
102669	ABKSB0501	0-1	042296	2,4-Dichlorophenol	Semivolatiles	mg/kg	1.30E-02	3.53E-01	1.30E-02	U
102669	ABKSB0501	0-1	042296	2,4-Dimethyl phenol	Semivolatiles	mg/kg	2.60E-02	3.53E-01	2.60E-02	U
102669	ABKSB0501	0-1	042296	2,4-Dinitrophenol	Semivolatiles	mg/kg	4.40E-02	1.76E+00	4.40E-02	U
102669	ABKSB0501	0-1	042296	2,4-Dinitrotoluene	Semivolatiles	mg/kg	1.90E-02	3.53E-01	1.90E-02	U
102669	ABKSB0501	0-1	042296	2,6-Dinitrotoluene	Semivolatiles	mg/kg	1.60E-02	3.53E-01	1.60E-02	U
102669	ABKSB0501	0-1	042296	2-Chloronaphthalene	Semivolatiles	mg/kg	1.60E-02	3.53E-01	1.60E-02	U
102669	ABKSB0501	0-1	042296	2-Chlorophenol	Semivolatiles	mg/kg	1.70E-02	3.53E-01	1.70E-02	U
102669	ABKSB0501	0-1	042296	2-Methyl-4,6-dinitrophenol	Semivolatiles	mg/kg	1.10E-02	1.76E+00	1.10E-02	U
102669	ABKSB0501	0-1	042296	2-Methylnaphthalene	Semivolatiles	mg/kg	1.70E-02	3.53E-01	1.70E-02	U
102669	ABKSB0501	0-1	042296	2-Nitroaniline	Semivolatiles	mg/kg	1.90E-02	1.76E+00	1.90E-02	U
102669	ABKSB0501	0-1	042296	2-Nitrophenol	Semivolatiles	mg/kg	1.70E-02	3.53E-01	1.70E-02	U
102669	ABKSB0501	0-1	042296	3,3'-Dichlorobenzidine	Semivolatiles	mg/kg	7.30E-02	7.06E-01	7.30E-02	U
102669	ABKSB0501	0-1	042296	3-Nitroaniline	Semivolatiles	mg/kg	4.20E-02	1.76E+00	4.20E-02	U
102669	ABKSB0501	0-1	042296	4-Bromophenyl phenyl ether	Semivolatiles	mg/kg	1.00E-02	3.53E-01	1.00E-02	U
102669	ABKSB0501	0-1	042296	4-Chloro-3-methylphenol (p-chlo	Semivolatiles	mg/kg	1.80E-02	3.53E-01	1.80E-02	U
102669	ABKSB0501	0-1	042296	4-Chloroaniline	Semivolatiles	mg/kg	6.00E-03	3.53E-01	6.00E-03	U
102669	ABKSB0501	0-1	042296	4-Chlorophenyl phenyl ether	Semivolatiles	mg/kg	1.30E-02	3.53E-01	1.30E-02	U

Appendix B
Phase I Soil Analytical Results for the 716-A Motor Shops Seepage Basin

Sample ID	Sample Name	Sample Depth	Sample Date	Analyte	Analyte Class	Units	MDL	EQL	Result	Result Qualifier
102669	ABKSB0501	0-1	042296	4-Nitroaniline	Semivolatiles	mg/kg	2.00E-02	1.76E+00	2.00E-02	U
102669	ABKSB0501	0-1	042296	4-Nitrophenol	Semivolatiles	mg/kg	4.90E-02	1.76E+00	4.90E-02	U
102669	ABKSB0501	0-1	042296	Acenapthene	Semivolatiles	mg/kg	1.50E-02	3.53E-01	1.50E-02	U
102669	ABKSB0501	0-1	042296	Acenapthylene	Semivolatiles	mg/kg	1.60E-02	3.53E-01	1.60E-02	U
102669	ABKSB0501	0-1	042296	Anthracene	Semivolatiles	mg/kg	1.60E-02	3.53E-01	1.60E-02	U
102669	ABKSB0501	0-1	042296	Benzo(a)anthracene	Semivolatiles	mg/kg	2.00E-02	3.53E-01	2.00E-02	U
102669	ABKSB0501	0-1	042296	Benzo(a)pyrene	Semivolatiles	mg/kg	2.40E-02	3.53E-01	2.40E-02	U
102669	ABKSB0501	0-1	042296	Benzo(b)fluoranthene	Semivolatiles	mg/kg	2.30E-02	3.53E-01	2.30E-02	U
102669	ABKSB0501	0-1	042296	Benzo(g,h,i)perylene	Semivolatiles	mg/kg	1.60E-02	3.53E-01	1.60E-02	U
102669	ABKSB0501	0-1	042296	Benzo(k)fluoranthene	Semivolatiles	mg/kg	2.20E-02	3.53E-01	2.20E-02	U
102669	ABKSB0501	0-1	042296	Benzoic acid	Semivolatiles	mg/kg	3.40E-02	1.76E+00	3.40E-02	U
102669	ABKSB0501	0-1	042296	Benzyl alcohol	Semivolatiles	mg/kg	1.90E-02	3.53E-01	1.90E-02	U
102669	ABKSB0501	0-1	042296	Bis(2-chloroethoxy) methane	Semivolatiles	mg/kg	1.60E-02	3.53E-01	1.60E-02	U
102669	ABKSB0501	0-1	042296	Bis(2-chloroethyl) ether	Semivolatiles	mg/kg	2.20E-02	3.53E-01	2.20E-02	U
102669	ABKSB0501	0-1	042296	Bis(2-chloroisopropyl) ether	Semivolatiles	mg/kg	1.80E-02	3.53E-01	1.80E-02	U
102669	ABKSB0501	0-1	042296	Bis(2-ethylhexyl) phthalate	Semivolatiles	mg/kg	2.20E-02	3.53E-01	2.20E-02	U
102669	ABKSB0501	0-1	042296	Butyl benzyl phthalate	Semivolatiles	mg/kg	2.10E-02	3.53E-01	2.10E-02	U
102669	ABKSB0501	0-1	042296	Chrysene	Semivolatiles	mg/kg	1.90E-02	3.53E-01	1.90E-02	U
102669	ABKSB0501	0-1	042296	Di-n-butyl phthalate	Semivolatiles	mg/kg	1.90E-02	3.53E-01	1.90E-02	U
102669	ABKSB0501	0-1	042296	Di-n-octyl phthalate	Semivolatiles	mg/kg	2.60E-02	3.53E-01	2.60E-02	U
102669	ABKSB0501	0-1	042296	Dibenzo(a,h)anthracene	Semivolatiles	mg/kg	1.70E-02	3.53E-01	1.70E-02	U
102669	ABKSB0501	0-1	042296	Dibenzofuran	Semivolatiles	mg/kg	1.60E-02	3.53E-01	1.60E-02	U
102669	ABKSB0501	0-1	042296	Diethyl phthalate	Semivolatiles	mg/kg	1.60E-02	3.53E-01	1.60E-02	U
102669	ABKSB0501	0-1	042296	Dimethyl phthalate	Semivolatiles	mg/kg	1.50E-02	3.53E-01	1.50E-02	U
102669	ABKSB0501	0-1	042296	Fluoranthene	Semivolatiles	mg/kg	1.90E-02	3.53E-01	1.90E-02	U
102669	ABKSB0501	0-1	042296	Fluorene	Semivolatiles	mg/kg	1.60E-02	3.53E-01	1.60E-02	U
102669	ABKSB0501	0-1	042296	Hexachlorobenzene	Semivolatiles	mg/kg	1.00E-02	3.53E-01	1.00E-02	U
102669	ABKSB0501	0-1	042296	Hexachlorobutadiene	Semivolatiles	mg/kg	1.50E-02	3.53E-01	1.50E-02	U
102669	ABKSB0501	0-1	042296	Hexachlorocyclopentadiene	Semivolatiles	mg/kg	2.60E-02	3.53E-01	2.60E-02	U
102669	ABKSB0501	0-1	042296	Hexachloroethane	Semivolatiles	mg/kg	1.60E-02	3.53E-01	1.60E-02	U

Appendix B
Phase I Soil Analytical Results for the 716-A Motor Shops Seepage Basin

Sample ID	Sample Name	Sample Depth	Sample Date	Analyte	Analyte Class	Units	MDL	EQL	Result	Result Qualifier
102669	ABKSB0501	0-1	042296	Indeno(1,2,3-c,d)pyrene	Semivolatiles	mg/kg	1.80E-02	3.53E-01	1.80E-02	U
102669	ABKSB0501	0-1	042296	Isophorone	Semivolatiles	mg/kg	1.70E-02	3.53E-01	1.70E-02	U
102669	ABKSB0501	0-1	042296	N-Nitrosodi-n-propylamine	Semivolatiles	mg/kg	2.00E-02	3.53E-01	2.00E-02	U
102669	ABKSB0501	0-1	042296	N-Nitrosodiphenylamine	Semivolatiles	mg/kg	1.40E-02	3.53E-01	1.40E-02	U
102669	ABKSB0501	0-1	042296	Naphthalene	Semivolatiles	mg/kg	1.90E-02	3.53E-01	1.90E-02	U
102669	ABKSB0501	0-1	042296	Nitrobenzene	Semivolatiles	mg/kg	1.90E-02	3.53E-01	1.90E-02	U
102669	ABKSB0501	0-1	042296	o-cresol (2-methylphenol)	Semivolatiles	mg/kg	1.60E-02	3.53E-01	1.60E-02	U
102669	ABKSB0501	0-1	042296	p-cresol (4-methylphenol)	Semivolatiles	mg/kg	1.70E-02	3.53E-01	1.70E-02	U
102669	ABKSB0501	0-1	042296	Pentachlorophenol	Semivolatiles	mg/kg	3.90E-02	1.76E+00	3.90E-02	U
102669	ABKSB0501	0-1	042296	Phenanthrene	Semivolatiles	mg/kg	1.50E-02	3.53E-01	1.50E-02	U
102669	ABKSB0501	0-1	042296	Phenol	Semivolatiles	mg/kg	1.90E-02	3.53E-01	1.90E-02	U
102669	ABKSB0501	0-1	042296	Pyrene	Semivolatiles	mg/kg	2.10E-02	3.53E-01	2.10E-02	U
102669	ABKSB0501	0-1	042296	Unknown	SVOA TICs	mg/kg	0.00E+00	0.00E+00	2.00E-01	J
102669	ABKSB0501	0-1	042296	Aldrin	Pesticides/PCBs	mg/kg	5.70E-04	1.77E-03	5.70E-04	U
102669	ABKSB0501	0-1	042296	alpha-Benzene hexachloride	Pesticides/PCBs	mg/kg	5.70E-04	1.77E-03	5.70E-04	U
102669	ABKSB0501	0-1	042296	alpha-Chlordane	Pesticides/PCBs	mg/kg	5.70E-04	1.77E-03	5.70E-04	U
102669	ABKSB0501	0-1	042296	Aroclor 1016	Pesticides/PCBs	mg/kg	1.10E-02	3.53E-02	1.10E-02	U
102669	ABKSB0501	0-1	042296	Aroclor 1221	Pesticides/PCBs	mg/kg	2.20E-02	7.06E-02	2.20E-02	U
102669	ABKSB0501	0-1	042296	Aroclor 1232	Pesticides/PCBs	mg/kg	1.10E-02	3.53E-02	1.10E-02	U
102669	ABKSB0501	0-1	042296	Aroclor 1242	Pesticides/PCBs	mg/kg	1.10E-02	3.53E-02	1.10E-02	U
102669	ABKSB0501	0-1	042296	Aroclor 1248	Pesticides/PCBs	mg/kg	1.10E-02	3.53E-02	1.10E-02	U
102669	ABKSB0501	0-1	042296	Aroclor 1254	Pesticides/PCBs	mg/kg	1.10E-02	3.53E-02	1.10E-02	U
102669	ABKSB0501	0-1	042296	Aroclor 1260	Pesticides/PCBs	mg/kg	1.10E-02	3.53E-02	1.10E-02	U
102669	ABKSB0501	0-1	042296	beta-Benzene hexachloride	Pesticides/PCBs	mg/kg	5.70E-04	1.77E-03	5.70E-04	U
102669	ABKSB0501	0-1	042296	delta-Benzene hexachloride	Pesticides/PCBs	mg/kg	5.70E-04	1.77E-03	5.70E-04	U
102669	ABKSB0501	0-1	042296	Dieldrin	Pesticides/PCBs	mg/kg	6.33E-04	3.53E-03	6.33E-04	U
102669	ABKSB0501	0-1	042296	Endosulfan I	Pesticides/PCBs	mg/kg	5.70E-04	1.77E-03	5.70E-04	U
102669	ABKSB0501	0-1	042296	Endosulfan II	Pesticides/PCBs	mg/kg	9.00E-04	3.53E-03	9.00E-04	U
102669	ABKSB0501	0-1	042296	Endosulfan sulfate	Pesticides/PCBs	mg/kg	1.10E-03	3.53E-03	1.10E-03	U
102669	ABKSB0501	0-1	042296	Endrin	Pesticides/PCBs	mg/kg	1.10E-03	3.53E-03	1.10E-03	UJ

Appendix B
Phase I Soil Analytical Results for the 716-A Motor Shops Seepage Basin

Sample ID	Sample Name	Sample Depth	Sample Date	Analyte	Analyte Class	Units	MDL	EQL	Result	Result Qualifier
102669	ABKSB0501	0-1	042296	Endrin ketone	Pesticides/PCBs	mg/kg	1.10E-03	3.53E-03	1.10E-03	UJ
102669	ABKSB0501	0-1	042296	gamma-Benzene hexachloride (Lin	Pesticides/PCBs	mg/kg	5.70E-04	1.77E-03	5.70E-04	U
102669	ABKSB0501	0-1	042296	gamma-Chlordane	Pesticides/PCBs	mg/kg	5.70E-04	1.77E-03	5.70E-04	U
102669	ABKSB0501	0-1	042296	Heptachlor	Pesticides/PCBs	mg/kg	5.70E-04	1.77E-03	5.70E-04	U
102669	ABKSB0501	0-1	042296	Heptachlor epoxide	Pesticides/PCBs	mg/kg	5.70E-04	1.77E-03	5.70E-04	U
102669	ABKSB0501	0-1	042296	Methoxychlor (Mariate)	Pesticides/PCBs	mg/kg	5.70E-03	1.77E-02	5.70E-03	U
102669	ABKSB0501	0-1	042296	p,p'-DDD	Pesticides/PCBs	mg/kg	1.10E-03	3.53E-03	1.10E-03	UJ
102669	ABKSB0501	0-1	042296	p,p'-DDE	Pesticides/PCBs	mg/kg	9.00E-04	3.53E-03	9.00E-04	UJ
102669	ABKSB0501	0-1	042296	p,p'-DDT	Pesticides/PCBs	mg/kg	1.10E-03	3.53E-03	1.10E-03	UJ
102669	ABKSB0501	0-1	042296	Toxaphene	Pesticides/PCBs	mg/kg	5.30E-02	1.77E-01	5.30E-02	U
102669	ABKSB0501	0-1	042296	Aluminum	TAL Inorganics	mg/kg	1.90E+00	1.93E+01	3.68E+03	
102669	ABKSB0501	0-1	042296	Antimony	TAL Inorganics	mg/kg	3.50E-01	3.64E+00	3.50E-01	U
102669	ABKSB0501	0-1	042296	Arsenic	TAL Inorganics	mg/kg	1.11E+00	1.15E+01	1.11E+00	U
102669	ABKSB0501	0-1	042296	Barium	TAL Inorganics	mg/kg	1.10E-01	1.14E+00	1.82E+01	
102669	ABKSB0501	0-1	042296	Beryllium	TAL Inorganics	mg/kg	3.00E-02	2.60E-01	1.85E-01	
102669	ABKSB0501	0-1	042296	Cadmium	TAL Inorganics	mg/kg	4.00E-02	4.16E-01	7.90E-02	J
102669	ABKSB0501	0-1	042296	Calcium	TAL Inorganics	mg/kg	1.68E+00	1.75E+01	2.28E+02	
102669	ABKSB0501	0-1	042296	Chromium	TAL Inorganics	mg/kg	9.00E-02	9.35E-01	3.90E+00	
102669	ABKSB0501	0-1	042296	Cobalt	TAL Inorganics	mg/kg	8.00E-02	8.31E-01	8.45E-01	
102669	ABKSB0501	0-1	042296	Copper	TAL Inorganics	mg/kg	1.00E-01	1.04E+00	1.60E+00	
102669	ABKSB0501	0-1	042296	Cyanide	TAL Inorganics	mg/kg	8.00E-02	8.00E-01	8.00E-02	U
102669	ABKSB0501	0-1	042296	Iron	TAL Inorganics	mg/kg	2.19E+00	2.28E+01	2.35E+03	
102669	ABKSB0501	0-1	042296	Lead	TAL Inorganics	mg/kg	5.90E-01	6.13E+00	3.40E+00	J
102669	ABKSB0501	0-1	042296	Magnesium	TAL Inorganics	mg/kg	8.70E-01	9.04E+00	6.87E+01	
102669	ABKSB0501	0-1	042296	Manganese	TAL Inorganics	mg/kg	2.00E-02	2.08E-01	8.43E+01	
102669	ABKSB0501	0-1	042296	Mercury	TAL Inorganics	mg/kg	1.30E-02	1.41E-01	1.00E-02	J
102669	ABKSB0501	0-1	042296	Nickel	TAL Inorganics	mg/kg	1.70E-01	1.77E+00	1.50E+00	J
102669	ABKSB0501	0-1	042296	Potassium	TAL Inorganics	mg/kg	6.70E+00	6.96E+01	6.80E+01	J
102669	ABKSB0501	0-1	042296	Selenium	TAL Inorganics	mg/kg	1.04E+00	1.08E+01	1.04E+00	U
102669	ABKSB0501	0-1	042296	Silver	TAL Inorganics	mg/kg	9.00E-02	9.35E-01	9.00E-02	U

Appendix B
Phase I Soil Analytical Results for the 716-A Motor Shops Seepage Basin

Sample ID	Sample Name	Sample Depth	Sample Date	Analyte	Analyte Class	Units	MDL	EQL	Result	Result Qualifier
102669	ABKSB0501	0-1	042296	Sodium	TAL Inorganics	mg/kg	1.29E+01	1.34E+02	1.71E+01	J
102669	ABKSB0501	0-1	042296	Thallium	TAL Inorganics	mg/kg	8.50E-01	8.83E+00	8.50E-01	U
102669	ABKSB0501	0-1	042296	Vanadium	TAL Inorganics	mg/kg	7.00E-02	7.27E-01	5.10E+00	
102669	ABKSB0501	0-1	042296	Zinc	TAL Inorganics	mg/kg	1.61E+00	1.67E+01	3.20E+00	J
102669	ABKSB0501	0-1	042296	Gross Alpha	Radiologicals	pCi/g	4.00E+00	2.92E+00	1.10E+01	
102669	ABKSB0501	0-1	042296	Non-volatile Beta	Radiologicals	pCi/g	1.00E+01	1.79E+00	1.00E+01	UI
102669	ABKSB0501	0-1	042296	Cation exchange capacity	Miscellaneous	Meq/	6.00E+00	6.36E+02	6.00E+00	U
102669	ABKSB0501	0-1	042296	Total Organic Carbon	Miscellaneous	mg/kg	8.40E+00	6.00E+01	3.71E+03	
102669	ABKSB0501	0-1	042296	Total petroleum hydrocarbons	Miscellaneous	mg/kg	3.30E+00	1.13E+01	3.30E+00	UJ
102670	ABKSB0502	1-4	042296	1,1,1-Trichloroethane	Volatiles	mg/kg	9.71E-04	5.50E-03	9.71E-04	U
102670	ABKSB0502	1-4	042296	1,1,2,2-Tetrachloroethane	Volatiles	mg/kg	3.47E-03	5.50E-03	3.47E-03	U
102670	ABKSB0502	1-4	042296	1,1,2-Trichloroethane	Volatiles	mg/kg	2.40E-03	5.50E-03	2.40E-03	U
102670	ABKSB0502	1-4	042296	1,1-Dichloroethane	Volatiles	mg/kg	1.05E-03	5.50E-03	1.05E-03	U
102670	ABKSB0502	1-4	042296	1,1-Dichloroethene	Volatiles	mg/kg	1.42E-03	5.50E-03	1.42E-03	U
102670	ABKSB0502	1-4	042296	1,2-Dichloroethane	Volatiles	mg/kg	1.34E-03	5.50E-03	1.34E-03	U
102670	ABKSB0502	1-4	042296	1,2-Dichloroethene (total)	Volatiles	mg/kg	8.54E-04	5.50E-03	8.54E-04	U
102670	ABKSB0502	1-4	042296	1,2-Dichloropropane	Volatiles	mg/kg	1.67E-03	5.50E-03	1.67E-03	U
102670	ABKSB0502	1-4	042296	2-Butanone (MEK)	Volatiles	mg/kg	2.81E-03	1.10E-02	2.81E-03	U
102670	ABKSB0502	1-4	042296	2-Hexanone	Volatiles	mg/kg	3.77E-03	1.10E-02	3.77E-03	U
102670	ABKSB0502	1-4	042296	4-Methyl-2-pentanone	Volatiles	mg/kg	3.29E-03	1.10E-02	3.29E-03	U
102670	ABKSB0502	1-4	042296	Acetone	Volatiles	mg/kg	4.04E-03	1.10E-02	4.04E-03	U
102670	ABKSB0502	1-4	042296	Benzene	Volatiles	mg/kg	7.52E-04	5.50E-03	7.52E-04	U
102670	ABKSB0502	1-4	042296	Bromodichloromethane	Volatiles	mg/kg	1.74E-03	5.50E-03	1.74E-03	U
102670	ABKSB0502	1-4	042296	Bromoform	Volatiles	mg/kg	2.93E-03	5.50E-03	2.93E-03	U
102670	ABKSB0502	1-4	042296	Bromomethane (Methyl bromide)	Volatiles	mg/kg	2.01E-03	1.10E-02	2.01E-03	U
102670	ABKSB0502	1-4	042296	Carbon disulfide	Volatiles	mg/kg	1.71E-03	5.50E-03	1.71E-03	U
102670	ABKSB0502	1-4	042296	Carbon tetrachloride	Volatiles	mg/kg	9.71E-04	5.50E-03	9.71E-04	U
102670	ABKSB0502	1-4	042296	Chlorobenzene	Volatiles	mg/kg	1.74E-03	5.50E-03	1.74E-03	U
102670	ABKSB0502	1-4	042296	Chlorodibromomethane	Volatiles	mg/kg	2.53E-03	5.50E-03	2.53E-03	U
102670	ABKSB0502	1-4	042296	Chloroethane	Volatiles	mg/kg	2.06E-03	1.10E-02	2.06E-03	U

Appendix B
Phase I Soil Analytical Results for the 716-A Motor Shops Seepage Basin

Sample ID	Sample Name	Sample Depth	Sample Date	Analyte	Analyte Class	Units	MDL	EQL	Result	Result Qualifier
102670	ABKSB0502	1-4	042296	Chloroform	Volatiles	mg/kg	1.11E-03	5.50E-03	1.11E-03	U
102670	ABKSB0502	1-4	042296	Chloromethane (methyl chloride)	Volatiles	mg/kg	3.20E-03	1.10E-02	3.20E-03	U
102670	ABKSB0502	1-4	042296	cis-1,3-Dichloropropene	Volatiles	mg/kg	1.79E-03	5.50E-03	1.79E-03	U
102670	ABKSB0502	1-4	042296	Dichloromethane (methylene chlo	Volatiles	mg/kg	1.83E-03	5.50E-03	1.83E-03	U
102670	ABKSB0502	1-4	042296	Ethylbenzene	Volatiles	mg/kg	1.47E-03	5.50E-03	1.47E-03	U
102670	ABKSB0502	1-4	042296	Styrene	Volatiles	mg/kg	1.98E-03	5.50E-03	1.98E-03	U
102670	ABKSB0502	1-4	042296	Tetrachloroethene	Volatiles	mg/kg	1.17E-03	5.50E-03	1.44E-03	J
102670	ABKSB0502	1-4	042296	Toluene	Volatiles	mg/kg	1.45E-03	5.50E-03	1.45E-03	U
102670	ABKSB0502	1-4	042296	trans-1,3-Dichloropropene	Volatiles	mg/kg	2.08E-03	5.50E-03	2.08E-03	U
102670	ABKSB0502	1-4	042296	Trichloroethene (TCE)	Volatiles	mg/kg	2.09E-03	5.50E-03	2.09E-03	U
102670	ABKSB0502	1-4	042296	Vinyl acetate	Volatiles	mg/kg	5.48E-03	1.10E-02	5.48E-03	U
102670	ABKSB0502	1-4	042296	Vinyl chloride	Volatiles	mg/kg	2.47E-03	1.10E-02	2.47E-03	U
102670	ABKSB0502	1-4	042296	Xylenes (total)	Volatiles	mg/kg	1.53E-03	5.50E-03	1.53E-03	U
102670	ABKSB0502	1-4	042296	1,2,4-Trichlorobenzene	Semivolatiles	mg/kg	1.80E-02	3.57E-01	1.80E-02	U
102670	ABKSB0502	1-4	042296	1,2-Dichlorobenzene	Semivolatiles	mg/kg	1.70E-02	3.57E-01	1.70E-02	U
102670	ABKSB0502	1-4	042296	1,3-Dichlorobenzene	Semivolatiles	mg/kg	1.80E-02	3.57E-01	1.80E-02	U
102670	ABKSB0502	1-4	042296	1,4-Dichlorobenzene	Semivolatiles	mg/kg	1.80E-02	3.57E-01	1.80E-02	U
102670	ABKSB0502	1-4	042296	2,4,5-Trichlorophenol	Semivolatiles	mg/kg	1.40E-02	1.78E+00	1.40E-02	U
102670	ABKSB0502	1-4	042296	2,4,6-Trichlorophenol	Semivolatiles	mg/kg	1.10E-02	3.57E-01	1.10E-02	U
102670	ABKSB0502	1-4	042296	2,4-Dichlorophenol	Semivolatiles	mg/kg	1.30E-02	3.57E-01	1.30E-02	U
102670	ABKSB0502	1-4	042296	2,4-Dimethyl phenol	Semivolatiles	mg/kg	2.60E-02	3.57E-01	2.60E-02	U
102670	ABKSB0502	1-4	042296	2,4-Dinitrophenol	Semivolatiles	mg/kg	4.40E-02	1.78E+00	4.40E-02	U
102670	ABKSB0502	1-4	042296	2,4-Dinitrotoluene	Semivolatiles	mg/kg	1.90E-02	3.57E-01	1.90E-02	U
102670	ABKSB0502	1-4	042296	2,6-Dinitrotoluene	Semivolatiles	mg/kg	1.60E-02	3.57E-01	1.60E-02	U
102670	ABKSB0502	1-4	042296	2-Chloronaphthalene	Semivolatiles	mg/kg	1.60E-02	3.57E-01	1.60E-02	U
102670	ABKSB0502	1-4	042296	2-Chlorophenol	Semivolatiles	mg/kg	1.70E-02	3.57E-01	1.70E-02	U
102670	ABKSB0502	1-4	042296	2-Methyl-4,6-dinitrophenol	Semivolatiles	mg/kg	1.10E-02	1.78E+00	1.10E-02	U
102670	ABKSB0502	1-4	042296	2-Methylnaphthalene	Semivolatiles	mg/kg	1.70E-02	3.57E-01	1.70E-02	U
102670	ABKSB0502	1-4	042296	2-Nitroaniline	Semivolatiles	mg/kg	1.90E-02	1.78E+00	1.90E-02	U
102670	ABKSB0502	1-4	042296	2-Nitrophenol	Semivolatiles	mg/kg	1.70E-02	3.57E-01	1.70E-02	U

Appendix B
Phase I Soil Analytical Results for the 716-A Motor Shops Seepage Basin

Sample ID	Sample Name	Sample Depth	Sample Date	Analyte	Analyte Class	Units	MDL	EQL	Result	Result Qualifier
102670	ABKSB0502	1-4	042296	3,3'-Dichlorobenzidine	Semivolatiles	mg/kg	7.30E-02	7.14E-01	7.30E-02	U
102670	ABKSB0502	1-4	042296	3-Nitroaniline	Semivolatiles	mg/kg	4.20E-02	1.78E+00	4.20E-02	U
102670	ABKSB0502	1-4	042296	4-Bromophenyl phenyl ether	Semivolatiles	mg/kg	1.00E-02	3.57E-01	1.00E-02	U
102670	ABKSB0502	1-4	042296	4-Chloro-3-methylphenol (p-chlo	Semivolatiles	mg/kg	1.80E-02	3.57E-01	1.80E-02	U
102670	ABKSB0502	1-4	042296	4-Chloroaniline	Semivolatiles	mg/kg	6.00E-03	3.57E-01	6.00E-03	U
102670	ABKSB0502	1-4	042296	4-Chlorophenyl phenyl ether	Semivolatiles	mg/kg	1.30E-02	3.57E-01	1.30E-02	U
102670	ABKSB0502	1-4	042296	4-Nitroaniline	Semivolatiles	mg/kg	2.00E-02	1.78E+00	2.00E-02	U
102670	ABKSB0502	1-4	042296	4-Nitrophenol	Semivolatiles	mg/kg	4.90E-02	1.78E+00	4.90E-02	U
102670	ABKSB0502	1-4	042296	Acenapthene	Semivolatiles	mg/kg	1.50E-02	3.57E-01	1.50E-02	U
102670	ABKSB0502	1-4	042296	Acenapthylene	Semivolatiles	mg/kg	1.60E-02	3.57E-01	1.60E-02	U
102670	ABKSB0502	1-4	042296	Anthracene	Semivolatiles	mg/kg	1.60E-02	3.57E-01	1.60E-02	U
102670	ABKSB0502	1-4	042296	Benzo(a)anthracene	Semivolatiles	mg/kg	2.00E-02	3.57E-01	2.00E-02	U
102670	ABKSB0502	1-4	042296	Benzo(a)pyrene	Semivolatiles	mg/kg	2.40E-02	3.57E-01	2.40E-02	U
102670	ABKSB0502	1-4	042296	Benzo(b)fluoranthene	Semivolatiles	mg/kg	2.30E-02	3.57E-01	2.30E-02	U
102670	ABKSB0502	1-4	042296	Benzo(g,h,i)perylene	Semivolatiles	mg/kg	1.60E-02	3.57E-01	1.60E-02	U
102670	ABKSB0502	1-4	042296	Benzo(k)fluoranthene	Semivolatiles	mg/kg	2.20E-02	3.57E-01	2.20E-02	U
102670	ABKSB0502	1-4	042296	Benzoic acid	Semivolatiles	mg/kg	3.40E-02	1.78E+00	3.40E-02	U
102670	ABKSB0502	1-4	042296	Benzyl alcohol	Semivolatiles	mg/kg	1.90E-02	3.57E-01	1.90E-02	U
102670	ABKSB0502	1-4	042296	Bis(2-chloroethoxy) methane	Semivolatiles	mg/kg	1.60E-02	3.57E-01	1.60E-02	U
102670	ABKSB0502	1-4	042296	Bis(2-chloroethyl) ether	Semivolatiles	mg/kg	2.20E-02	3.57E-01	2.20E-02	U
102670	ABKSB0502	1-4	042296	Bis(2-chloroisopropyl) ether	Semivolatiles	mg/kg	1.80E-02	3.57E-01	1.80E-02	U
102670	ABKSB0502	1-4	042296	Bis(2-ethylhexyl) phthalate	Semivolatiles	mg/kg	2.20E-02	3.57E-01	2.20E-02	U
102670	ABKSB0502	1-4	042296	Butyl benzyl phthalate	Semivolatiles	mg/kg	2.10E-02	3.57E-01	2.10E-02	U
102670	ABKSB0502	1-4	042296	Chrysene	Semivolatiles	mg/kg	1.90E-02	3.57E-01	1.90E-02	U
102670	ABKSB0502	1-4	042296	Di-n-butyl phthalate	Semivolatiles	mg/kg	1.90E-02	3.57E-01	1.90E-02	U
102670	ABKSB0502	1-4	042296	Di-n-octyl phthalate	Semivolatiles	mg/kg	2.60E-02	3.57E-01	2.60E-02	U
102670	ABKSB0502	1-4	042296	Dibenzo(a,h)anthracene	Semivolatiles	mg/kg	1.70E-02	3.57E-01	1.70E-02	U
102670	ABKSB0502	1-4	042296	Dibenzofuran	Semivolatiles	mg/kg	1.60E-02	3.57E-01	1.60E-02	U
102670	ABKSB0502	1-4	042296	Diethyl phthalate	Semivolatiles	mg/kg	1.60E-02	3.57E-01	1.60E-02	U
102670	ABKSB0502	1-4	042296	Dimethyl phthalate	Semivolatiles	mg/kg	1.50E-02	3.57E-01	1.50E-02	U

Appendix B
Phase I Soil Analytical Results for the 716-A Motor Shops Seepage Basin

Sample ID	Sample Name	Sample Depth	Sample Date	Analyte	Analyte Class	Units	MDL	EQL	Result	Result Qualifier
102670	ABKSB0502	1-4	042296	Fluoranthene	Semivolatiles	mg/kg	1.90E-02	3.57E-01	1.90E-02	U
102670	ABKSB0502	1-4	042296	Fluorene	Semivolatiles	mg/kg	1.60E-02	3.57E-01	1.60E-02	U
102670	ABKSB0502	1-4	042296	Hexachlorobenzene	Semivolatiles	mg/kg	1.00E-02	3.57E-01	1.00E-02	U
102670	ABKSB0502	1-4	042296	Hexachlorobutadiene	Semivolatiles	mg/kg	1.50E-02	3.57E-01	1.50E-02	U
102670	ABKSB0502	1-4	042296	Hexachlorocyclopentadiene	Semivolatiles	mg/kg	2.60E-02	3.57E-01	2.60E-02	U
102670	ABKSB0502	1-4	042296	Hexachloroethane	Semivolatiles	mg/kg	1.60E-02	3.57E-01	1.60E-02	U
102670	ABKSB0502	1-4	042296	Indeno(1,2,3-c,d)pyrene	Semivolatiles	mg/kg	1.80E-02	3.57E-01	1.80E-02	U
102670	ABKSB0502	1-4	042296	Isophorone	Semivolatiles	mg/kg	1.70E-02	3.57E-01	1.70E-02	U
102670	ABKSB0502	1-4	042296	N-Nitrosodi-n-propylamine	Semivolatiles	mg/kg	2.00E-02	3.57E-01	2.00E-02	U
102670	ABKSB0502	1-4	042296	N-Nitrosodiphenylamine	Semivolatiles	mg/kg	1.40E-02	3.57E-01	1.40E-02	U
102670	ABKSB0502	1-4	042296	Naphthalene	Semivolatiles	mg/kg	1.90E-02	3.57E-01	1.90E-02	U
102670	ABKSB0502	1-4	042296	Nitrobenzene	Semivolatiles	mg/kg	1.90E-02	3.57E-01	1.90E-02	U
102670	ABKSB0502	1-4	042296	o-cresol (2-methylphenol)	Semivolatiles	mg/kg	1.60E-02	3.57E-01	1.60E-02	U
102670	ABKSB0502	1-4	042296	p-cresol (4-methylphenol)	Semivolatiles	mg/kg	1.70E-02	3.57E-01	1.70E-02	U
102670	ABKSB0502	1-4	042296	Pentachlorophenol	Semivolatiles	mg/kg	3.90E-02	1.78E+00	3.90E-02	U
102670	ABKSB0502	1-4	042296	Phenanthrene	Semivolatiles	mg/kg	1.50E-02	3.57E-01	1.50E-02	U
102670	ABKSB0502	1-4	042296	Phenol	Semivolatiles	mg/kg	1.90E-02	3.57E-01	1.90E-02	U
102670	ABKSB0502	1-4	042296	Pyrene	Semivolatiles	mg/kg	2.10E-02	3.57E-01	2.10E-02	U
102670	ABKSB0502	1-4	042296	Aldol condensate	SVOA TICs	mg/kg	0.00E+00	0.00E+00	5.00E-01	J
102670	ABKSB0502	1-4	042296	Unknown	SVOA TICs	mg/kg	0.00E+00	0.00E+00	2.00E-01	J
102670	ABKSB0502	1-4	042296	Unknown	SVOA TICs	mg/kg	0.00E+00	0.00E+00	3.00E-01	J
102670	ABKSB0502	1-4	042296	Unknown	SVOA TICs	mg/kg	0.00E+00	0.00E+00	4.00E-01	J
102670	ABKSB0502	1-4	042296	Aldrin	Pesticides/PCBs	mg/kg	5.70E-04	1.78E-03	5.70E-04	UJ
102670	ABKSB0502	1-4	042296	alpha-Benzene hexachloride	Pesticides/PCBs	mg/kg	5.70E-04	1.78E-03	5.70E-04	UJ
102670	ABKSB0502	1-4	042296	alpha-Chlordane	Pesticides/PCBs	mg/kg	5.70E-04	1.78E-03	5.70E-04	UJ
102670	ABKSB0502	1-4	042296	Aroclor 1016	Pesticides/PCBs	mg/kg	1.10E-02	3.57E-02	1.10E-02	UJ
102670	ABKSB0502	1-4	042296	Aroclor 1221	Pesticides/PCBs	mg/kg	2.20E-02	7.14E-02	2.20E-02	UJ
102670	ABKSB0502	1-4	042296	Aroclor 1232	Pesticides/PCBs	mg/kg	1.10E-02	3.57E-02	1.10E-02	UJ
102670	ABKSB0502	1-4	042296	Aroclor 1242	Pesticides/PCBs	mg/kg	1.10E-02	3.57E-02	1.10E-02	UJ
102670	ABKSB0502	1-4	042296	Aroclor 1248	Pesticides/PCBs	mg/kg	1.10E-02	3.57E-02	1.10E-02	UJ

Appendix B
Phase I Soil Analytical Results for the 716-A Motor Shops Seepage Basin

Sample ID	Sample Name	Sample Depth	Sample Date	Analyte	Analyte Class	Units	MDL	EQL	Result	Result Qualifier
102670	ABKSB0502	1-4	042296	Aroclor 1254	Pesticides/PCBs	mg/kg	1.10E-02	3.57E-02	1.10E-02	UJ
102670	ABKSB0502	1-4	042296	Aroclor 1260	Pesticides/PCBs	mg/kg	1.10E-02	3.57E-02	1.10E-02	UJ
102670	ABKSB0502	1-4	042296	beta-Benzene hexachloride	Pesticides/PCBs	mg/kg	5.70E-04	1.78E-03	5.70E-04	UJ
102670	ABKSB0502	1-4	042296	delta-Benzene hexachloride	Pesticides/PCBs	mg/kg	5.70E-04	1.78E-03	5.70E-04	UJ
102670	ABKSB0502	1-4	042296	Dieldrin	Pesticides/PCBs	mg/kg	6.33E-04	3.57E-03	6.33E-04	UJ
102670	ABKSB0502	1-4	042296	Endosulfan I	Pesticides/PCBs	mg/kg	5.70E-04	1.78E-03	5.70E-04	UJ
102670	ABKSB0502	1-4	042296	Endosulfan II	Pesticides/PCBs	mg/kg	9.00E-04	3.57E-03	9.00E-04	UJ
102670	ABKSB0502	1-4	042296	Endosulfan sulfate	Pesticides/PCBs	mg/kg	1.10E-03	3.57E-03	1.10E-03	UJ
102670	ABKSB0502	1-4	042296	Endrin	Pesticides/PCBs	mg/kg	1.10E-03	3.57E-03	1.10E-03	UJ
102670	ABKSB0502	1-4	042296	Endrin ketone	Pesticides/PCBs	mg/kg	1.10E-03	3.57E-03	1.10E-03	UJ
102670	ABKSB0502	1-4	042296	gamma-Benzene hexachloride (Lin	Pesticides/PCBs	mg/kg	5.70E-04	1.78E-03	5.70E-04	UJ
102670	ABKSB0502	1-4	042296	gamma-Chlordane	Pesticides/PCBs	mg/kg	5.70E-04	1.78E-03	5.70E-04	UJ
102670	ABKSB0502	1-4	042296	Heptachlor	Pesticides/PCBs	mg/kg	5.70E-04	1.78E-03	5.70E-04	UJ
102670	ABKSB0502	1-4	042296	Heptachlor epoxide	Pesticides/PCBs	mg/kg	5.70E-04	1.78E-03	5.70E-04	UJ
102670	ABKSB0502	1-4	042296	Methoxychlor (Mariate)	Pesticides/PCBs	mg/kg	5.70E-03	1.78E-02	5.70E-03	UJ
102670	ABKSB0502	1-4	042296	p,p'-DDD	Pesticides/PCBs	mg/kg	1.10E-03	3.57E-03	1.10E-03	UJ
102670	ABKSB0502	1-4	042296	p,p'-DDE	Pesticides/PCBs	mg/kg	9.00E-04	3.57E-03	9.00E-04	UJ
102670	ABKSB0502	1-4	042296	p,p'-DDT	Pesticides/PCBs	mg/kg	1.10E-03	3.57E-03	1.10E-03	UJ
102670	ABKSB0502	1-4	042296	Toxaphene	Pesticides/PCBs	mg/kg	5.30E-02	1.78E-01	5.30E-02	UJ
102670	ABKSB0502	1-4	042296	Aluminum	TAL Inorganics	mg/kg	1.90E+00	1.99E+01	5.58E+03	
102670	ABKSB0502	1-4	042296	Antimony	TAL Inorganics	mg/kg	3.50E-01	3.75E+00	3.50E-01	U
102670	ABKSB0502	1-4	042296	Arsenic	TAL Inorganics	mg/kg	1.11E+00	1.19E+01	1.50E+00	J
102670	ABKSB0502	1-4	042296	Barium	TAL Inorganics	mg/kg	1.10E-01	1.18E+00	2.37E+01	
102670	ABKSB0502	1-4	042296	Beryllium	TAL Inorganics	mg/kg	3.00E-02	2.68E-01	2.25E-01	J
102670	ABKSB0502	1-4	042296	Cadmium	TAL Inorganics	mg/kg	4.00E-02	4.28E-01	4.00E-02	U
102670	ABKSB0502	1-4	042296	Calcium	TAL Inorganics	mg/kg	1.68E+00	1.80E+01	1.31E+02	
102670	ABKSB0502	1-4	042296	Chromium	TAL Inorganics	mg/kg	9.00E-02	9.64E-01	5.60E+00	
102670	ABKSB0502	1-4	042296	Cobalt	TAL Inorganics	mg/kg	8.00E-02	8.57E-01	1.30E+00	
102670	ABKSB0502	1-4	042296	Copper	TAL Inorganics	mg/kg	1.00E-01	1.07E+00	2.10E+00	
102670	ABKSB0502	1-4	042296	Cyanide	TAL Inorganics	mg/kg	8.00E-02	8.10E-01	8.00E-02	U

Appendix B
Phase I Soil Analytical Results for the 716-A Motor Shops Seepage Basin

Sample ID	Sample Name	Sample Depth	Sample Date	Analyte	Analyte Class	Units	MDL	EQL	Result	Result Qualifier
102670	ABKSB0502	1-4	042296	Iron	TAL Inorganics	mg/kg	2.19E+00	2.35E+01	3.81E+03	
102670	ABKSB0502	1-4	042296	Lead	TAL Inorganics	mg/kg	5.90E-01	6.32E+00	3.70E+00	J
102670	ABKSB0502	1-4	042296	Magnesium	TAL Inorganics	mg/kg	8.70E-01	9.32E+00	9.46E+01	
102670	ABKSB0502	1-4	042296	Manganese	TAL Inorganics	mg/kg	2.00E-02	2.14E-01	6.98E+01	
102670	ABKSB0502	1-4	042296	Mercury	TAL Inorganics	mg/kg	1.30E-02	1.43E-01	4.70E-02	J
102670	ABKSB0502	1-4	042296	Nickel	TAL Inorganics	mg/kg	1.70E-01	1.82E+00	2.10E+00	
102670	ABKSB0502	1-4	042296	Potassium	TAL Inorganics	mg/kg	6.70E+00	7.18E+01	7.09E+01	J
102670	ABKSB0502	1-4	042296	Selenium	TAL Inorganics	mg/kg	1.04E+00	1.11E+01	1.04E+00	U
102670	ABKSB0502	1-4	042296	Silver	TAL Inorganics	mg/kg	9.00E-02	9.64E-01	9.00E-02	U
102670	ABKSB0502	1-4	042296	Sodium	TAL Inorganics	mg/kg	1.29E+01	1.38E+02	2.16E+01	J
102670	ABKSB0502	1-4	042296	Thallium	TAL Inorganics	mg/kg	8.50E-01	9.10E+00	8.50E-01	U
102670	ABKSB0502	1-4	042296	Vanadium	TAL Inorganics	mg/kg	7.00E-02	7.50E-01	7.80E+00	
102670	ABKSB0502	1-4	042296	Zinc	TAL Inorganics	mg/kg	1.61E+00	1.72E+01	3.00E+00	J
102670	ABKSB0502	1-4	042296	Gross Alpha	Radiologicals	pCi/g	4.00E+00	3.30E+00	4.00E+00	UI
102670	ABKSB0502	1-4	042296	Non-volatile Beta	Radiologicals	pCi/g	1.00E+01	1.62E+00	1.43E+01	
102670	ABKSB0502	1-4	042296	Cation exchange capacity	Miscellaneous	Meq/	6.00E+00	6.42E+02	6.00E+00	U
102670	ABKSB0502	1-4	042296	Total Organic Carbon	Miscellaneous	mg/kg	8.40E+00	6.00E+01	5.26E+03	
102670	ABKSB0502	1-4	042296	Total petroleum hydrocarbons	Miscellaneous	mg/kg	3.30E+00	1.14E+01	3.30E+00	UJ
102671	ABKSB0601	0-1	042296	1,2,4-Trichlorobenzene	Semivolatiles	mg/kg	1.80E-02	3.67E-01	1.80E-02	U
102671	ABKSB0601	0-1	042296	1,2-Dichlorobenzene	Semivolatiles	mg/kg	1.70E-02	3.67E-01	1.70E-02	U
102671	ABKSB0601	0-1	042296	1,3-Dichlorobenzene	Semivolatiles	mg/kg	1.80E-02	3.67E-01	1.80E-02	U
102671	ABKSB0601	0-1	042296	1,4-Dichlorobenzene	Semivolatiles	mg/kg	1.80E-02	3.67E-01	1.80E-02	U
102671	ABKSB0601	0-1	042296	2,4,5-Trichlorophenol	Semivolatiles	mg/kg	1.40E-02	1.84E+00	1.40E-02	U
102671	ABKSB0601	0-1	042296	2,4,6-Trichlorophenol	Semivolatiles	mg/kg	1.10E-02	3.67E-01	1.10E-02	U
102671	ABKSB0601	0-1	042296	2,4-Dichlorophenol	Semivolatiles	mg/kg	1.30E-02	3.67E-01	1.30E-02	U
102671	ABKSB0601	0-1	042296	2,4-Dimethyl phenol	Semivolatiles	mg/kg	2.60E-02	3.67E-01	2.60E-02	U
102671	ABKSB0601	0-1	042296	2,4-Dinitrophenol	Semivolatiles	mg/kg	4.40E-02	1.84E+00	4.40E-02	U
102671	ABKSB0601	0-1	042296	2,4-Dinitrotoluene	Semivolatiles	mg/kg	1.90E-02	3.67E-01	1.90E-02	U
102671	ABKSB0601	0-1	042296	2,6-Dinitrotoluene	Semivolatiles	mg/kg	1.60E-02	3.67E-01	1.60E-02	U
102671	ABKSB0601	0-1	042296	2-Chloronaphthalene	Semivolatiles	mg/kg	1.60E-02	3.67E-01	1.60E-02	U

Appendix B
Phase I Soil Analytical Results for the 716-A Motor Shops Seepage Basin

Sample ID	Sample Name	Sample Depth	Sample Date	Analyte	Analyte Class	Units	MDL	EQL	Result	Result Qualifier
102671	ABKSB0601	0-1	042296	2-Chlorophenol	Semivolatiles	mg/kg	1.70E-02	3.67E-01	1.70E-02	U
102671	ABKSB0601	0-1	042296	2-Methyl-4,6-dinitrophenol	Semivolatiles	mg/kg	1.10E-02	1.84E+00	1.10E-02	U
102671	ABKSB0601	0-1	042296	2-Methylnaphthalene	Semivolatiles	mg/kg	1.70E-02	3.67E-01	1.70E-02	U
102671	ABKSB0601	0-1	042296	2-Nitroaniline	Semivolatiles	mg/kg	1.90E-02	1.84E+00	1.90E-02	U
102671	ABKSB0601	0-1	042296	2-Nitrophenol	Semivolatiles	mg/kg	1.70E-02	3.67E-01	1.70E-02	U
102671	ABKSB0601	0-1	042296	3,3'-Dichlorobenzidine	Semivolatiles	mg/kg	7.30E-02	7.34E-01	7.30E-02	U
102671	ABKSB0601	0-1	042296	3-Nitroaniline	Semivolatiles	mg/kg	4.20E-02	1.84E+00	4.20E-02	U
102671	ABKSB0601	0-1	042296	4-Bromophenyl phenyl ether	Semivolatiles	mg/kg	1.00E-02	3.67E-01	1.00E-02	U
102671	ABKSB0601	0-1	042296	4-Chloro-3-methylphenol (p-chlo	Semivolatiles	mg/kg	1.80E-02	3.67E-01	1.80E-02	U
102671	ABKSB0601	0-1	042296	4-Chloroaniline	Semivolatiles	mg/kg	6.00E-03	3.67E-01	6.00E-03	U
102671	ABKSB0601	0-1	042296	4-Chlorophenyl phenyl ether	Semivolatiles	mg/kg	1.30E-02	3.67E-01	1.30E-02	U
102671	ABKSB0601	0-1	042296	4-Nitroaniline	Semivolatiles	mg/kg	2.00E-02	1.84E+00	2.00E-02	U
102671	ABKSB0601	0-1	042296	4-Nitrophenol	Semivolatiles	mg/kg	4.90E-02	1.84E+00	4.90E-02	U
102671	ABKSB0601	0-1	042296	Acenapthene	Semivolatiles	mg/kg	1.50E-02	3.67E-01	1.50E-02	U
102671	ABKSB0601	0-1	042296	Acenapthylene	Semivolatiles	mg/kg	1.60E-02	3.67E-01	1.60E-02	U
102671	ABKSB0601	0-1	042296	Anthracene	Semivolatiles	mg/kg	1.60E-02	3.67E-01	1.60E-02	U
102671	ABKSB0601	0-1	042296	Benzo(a)anthracene	Semivolatiles	mg/kg	2.00E-02	3.67E-01	5.02E-02	J
102671	ABKSB0601	0-1	042296	Benzo(a)pyrene	Semivolatiles	mg/kg	2.40E-02	3.67E-01	5.23E-02	J
102671	ABKSB0601	0-1	042296	Benzo(b)fluoranthene	Semivolatiles	mg/kg	2.30E-02	3.67E-01	5.74E-02	J
102671	ABKSB0601	0-1	042296	Benzo(g,h,i)perylene	Semivolatiles	mg/kg	1.60E-02	3.67E-01	1.60E-02	U
102671	ABKSB0601	0-1	042296	Benzo(k)fluoranthene	Semivolatiles	mg/kg	2.20E-02	3.67E-01	7.23E-02	J
102671	ABKSB0601	0-1	042296	Benzoic acid	Semivolatiles	mg/kg	3.40E-02	1.84E+00	3.40E-02	U
102671	ABKSB0601	0-1	042296	Benzyl alcohol	Semivolatiles	mg/kg	1.90E-02	3.67E-01	1.90E-02	U
102671	ABKSB0601	0-1	042296	Bis(2-chloroethoxy) methane	Semivolatiles	mg/kg	1.60E-02	3.67E-01	1.60E-02	U
102671	ABKSB0601	0-1	042296	Bis(2-chloroethyl) ether	Semivolatiles	mg/kg	2.20E-02	3.67E-01	2.20E-02	U
102671	ABKSB0601	0-1	042296	Bis(2-chloroisopropyl) ether	Semivolatiles	mg/kg	1.80E-02	3.67E-01	1.80E-02	U
102671	ABKSB0601	0-1	042296	Bis(2-ethylhexyl) phthalate	Semivolatiles	mg/kg	2.20E-02	3.67E-01	2.20E-02	U
102671	ABKSB0601	0-1	042296	Butyl benzyl phthalate	Semivolatiles	mg/kg	2.10E-02	3.67E-01	2.10E-02	U
102671	ABKSB0601	0-1	042296	Chrysene	Semivolatiles	mg/kg	1.90E-02	3.67E-01	8.21E-02	J
102671	ABKSB0601	0-1	042296	Di-n-butyl phthalate	Semivolatiles	mg/kg	1.90E-02	3.67E-01	1.90E-02	U

Appendix B
Phase I Soil Analytical Results for the 716-A Motor Shops Seepage Basin

Sample ID	Sample Name	Sample Depth	Sample Date	Analyte	Analyte Class	Units	MDL	EQL	Result	Result Qualifier
102671	ABKSB0601	0-1	042296	Di-n-octyl phthalate	Semivolatiles	mg/kg	2.60E-02	3.67E-01	2.60E-02	U
102671	ABKSB0601	0-1	042296	Dibenzo(a,h)anthracene	Semivolatiles	mg/kg	1.70E-02	3.67E-01	1.70E-02	U
102671	ABKSB0601	0-1	042296	Dibenzofuran	Semivolatiles	mg/kg	1.60E-02	3.67E-01	1.60E-02	U
102671	ABKSB0601	0-1	042296	Diethyl phthalate	Semivolatiles	mg/kg	1.60E-02	3.67E-01	1.60E-02	U
102671	ABKSB0601	0-1	042296	Dimethyl phthalate	Semivolatiles	mg/kg	1.50E-02	3.67E-01	1.50E-02	U
102671	ABKSB0601	0-1	042296	Fluoranthene	Semivolatiles	mg/kg	1.90E-02	3.67E-01	1.15E-01	J
102671	ABKSB0601	0-1	042296	Fluorene	Semivolatiles	mg/kg	1.60E-02	3.67E-01	1.60E-02	U
102671	ABKSB0601	0-1	042296	Hexachlorobenzene	Semivolatiles	mg/kg	1.00E-02	3.67E-01	1.00E-02	U
102671	ABKSB0601	0-1	042296	Hexachlorobutadiene	Semivolatiles	mg/kg	1.50E-02	3.67E-01	1.50E-02	U
102671	ABKSB0601	0-1	042296	Hexachlorocyclopentadiene	Semivolatiles	mg/kg	2.60E-02	3.67E-01	2.60E-02	U
102671	ABKSB0601	0-1	042296	Hexachloroethane	Semivolatiles	mg/kg	1.60E-02	3.67E-01	1.60E-02	U
102671	ABKSB0601	0-1	042296	Indeno(1,2,3-c,d)pyrene	Semivolatiles	mg/kg	1.80E-02	3.67E-01	1.80E-02	U
102671	ABKSB0601	0-1	042296	Isophorone	Semivolatiles	mg/kg	1.70E-02	3.67E-01	1.70E-02	U
102671	ABKSB0601	0-1	042296	N-Nitrosodi-n-propylamine	Semivolatiles	mg/kg	2.00E-02	3.67E-01	2.00E-02	U
102671	ABKSB0601	0-1	042296	N-Nitrosodiphenylamine	Semivolatiles	mg/kg	1.40E-02	3.67E-01	1.40E-02	U
102671	ABKSB0601	0-1	042296	Naphthalene	Semivolatiles	mg/kg	1.90E-02	3.67E-01	1.90E-02	U
102671	ABKSB0601	0-1	042296	Nitrobenzene	Semivolatiles	mg/kg	1.90E-02	3.67E-01	1.90E-02	U
102671	ABKSB0601	0-1	042296	o-cresol (2-methylphenol)	Semivolatiles	mg/kg	1.60E-02	3.67E-01	1.60E-02	U
102671	ABKSB0601	0-1	042296	p-cresol (4-methylphenol)	Semivolatiles	mg/kg	1.70E-02	3.67E-01	1.70E-02	U
102671	ABKSB0601	0-1	042296	Pentachlorophenol	Semivolatiles	mg/kg	3.90E-02	1.84E+00	3.90E-02	U
102671	ABKSB0601	0-1	042296	Phenanthrene	Semivolatiles	mg/kg	1.50E-02	3.67E-01	1.50E-02	U
102671	ABKSB0601	0-1	042296	Phenol	Semivolatiles	mg/kg	1.90E-02	3.67E-01	1.90E-02	U
102671	ABKSB0601	0-1	042296	Pyrene	Semivolatiles	mg/kg	2.10E-02	3.67E-01	1.05E-01	J
102671	ABKSB0601	0-1	042296	Unknown	SVOA TICs	mg/kg	0.00E+00	0.00E+00	2.00E-01	J
102671	ABKSB0601	0-1	042296	Unknown	SVOA TICs	mg/kg	0.00E+00	0.00E+00	2.00E-01	J
102671	ABKSB0601	0-1	042296	Aldrin	Pesticides/PCBs	mg/kg	5.70E-04	1.84E-03	5.70E-04	U
102671	ABKSB0601	0-1	042296	alpha-Benzene hexachloride	Pesticides/PCBs	mg/kg	5.70E-04	1.84E-03	5.70E-04	U
102671	ABKSB0601	0-1	042296	alpha-Chlordane	Pesticides/PCBs	mg/kg	5.70E-04	1.84E-03	5.70E-04	U
102671	ABKSB0601	0-1	042296	Aroclor 1016	Pesticides/PCBs	mg/kg	1.10E-02	3.67E-02	1.10E-02	U
102671	ABKSB0601	0-1	042296	Aroclor 1221	Pesticides/PCBs	mg/kg	2.20E-02	7.35E-02	2.20E-02	U

Appendix B
Phase I Soil Analytical Results for the 716-A Motor Shops Seepage Basin

Sample ID	Sample Name	Sample Depth	Sample Date	Analyte	Analyte Class	Units	MDL	EQL	Result	Result Qualifier
102671	ABKSB0601	0-1	042296	Aroclor 1232	Pesticides/PCBs	mg/kg	1.10E-02	3.67E-02	1.10E-02	U
102671	ABKSB0601	0-1	042296	Aroclor 1242	Pesticides/PCBs	mg/kg	1.10E-02	3.67E-02	1.10E-02	U
102671	ABKSB0601	0-1	042296	Aroclor 1248	Pesticides/PCBs	mg/kg	1.10E-02	3.67E-02	1.10E-02	U
102671	ABKSB0601	0-1	042296	Aroclor 1254	Pesticides/PCBs	mg/kg	1.10E-02	3.67E-02	1.10E-02	U
102671	ABKSB0601	0-1	042296	Aroclor 1260	Pesticides/PCBs	mg/kg	1.10E-02	3.67E-02	1.10E-02	U
102671	ABKSB0601	0-1	042296	beta-Benzene hexachloride	Pesticides/PCBs	mg/kg	5.70E-04	1.84E-03	5.70E-04	U
102671	ABKSB0601	0-1	042296	delta-Benzene hexachloride	Pesticides/PCBs	mg/kg	5.70E-04	1.84E-03	5.70E-04	U
102671	ABKSB0601	0-1	042296	Dieldrin	Pesticides/PCBs	mg/kg	6.33E-04	3.67E-03	6.33E-04	U
102671	ABKSB0601	0-1	042296	Endosulfan I	Pesticides/PCBs	mg/kg	5.70E-04	1.84E-03	5.70E-04	U
102671	ABKSB0601	0-1	042296	Endosulfan II	Pesticides/PCBs	mg/kg	9.00E-04	3.67E-03	9.00E-04	U
102671	ABKSB0601	0-1	042296	Endosulfan sulfate	Pesticides/PCBs	mg/kg	1.10E-03	3.67E-03	1.10E-03	U
102671	ABKSB0601	0-1	042296	Endrin	Pesticides/PCBs	mg/kg	1.10E-03	3.67E-03	1.10E-03	UJ
102671	ABKSB0601	0-1	042296	Endrin ketone	Pesticides/PCBs	mg/kg	1.10E-03	3.67E-03	1.10E-03	UJ
102671	ABKSB0601	0-1	042296	gamma-Benzene hexachloride (Lin	Pesticides/PCBs	mg/kg	5.70E-04	1.84E-03	5.70E-04	U
102671	ABKSB0601	0-1	042296	gamma-Chlordane	Pesticides/PCBs	mg/kg	5.70E-04	1.84E-03	5.70E-04	U
102671	ABKSB0601	0-1	042296	Heptachlor	Pesticides/PCBs	mg/kg	5.70E-04	1.84E-03	5.70E-04	U
102671	ABKSB0601	0-1	042296	Heptachlor epoxide	Pesticides/PCBs	mg/kg	5.70E-04	1.84E-03	5.70E-04	U
102671	ABKSB0601	0-1	042296	Methoxychlor (Mariate)	Pesticides/PCBs	mg/kg	5.70E-03	1.84E-02	5.70E-03	U
102671	ABKSB0601	0-1	042296	p,p'-DDD	Pesticides/PCBs	mg/kg	1.10E-03	3.67E-03	1.10E-03	UJ
102671	ABKSB0601	0-1	042296	p,p'-DDE	Pesticides/PCBs	mg/kg	9.00E-04	3.67E-03	5.88E-03	J
102671	ABKSB0601	0-1	042296	p,p'-DDT	Pesticides/PCBs	mg/kg	1.10E-03	3.67E-03	4.78E-03	J
102671	ABKSB0601	0-1	042296	Toxaphene	Pesticides/PCBs	mg/kg	5.30E-02	1.84E-01	5.30E-02	U
102671	ABKSB0601	0-1	042296	Aluminum	TAL Inorganics	mg/kg	1.90E+00	1.97E+01	8.27E+03	
102671	ABKSB0601	0-1	042296	Antimony	TAL Inorganics	mg/kg	3.50E-01	3.71E+00	7.24E-01	J
102671	ABKSB0601	0-1	042296	Arsenic	TAL Inorganics	mg/kg	1.11E+00	1.18E+01	3.90E+00	J
102671	ABKSB0601	0-1	042296	Barium	TAL Inorganics	mg/kg	1.10E-01	1.16E+00	1.49E+01	
102671	ABKSB0601	0-1	042296	Beryllium	TAL Inorganics	mg/kg	3.00E-02	2.65E-01	3.00E-02	U
102671	ABKSB0601	0-1	042296	Cadmium	TAL Inorganics	mg/kg	4.00E-02	4.24E-01	5.15E-01	
102671	ABKSB0601	0-1	042296	Calcium	TAL Inorganics	mg/kg	1.68E+00	1.78E+01	4.77E+02	
102671	ABKSB0601	0-1	042296	Chromium	TAL Inorganics	mg/kg	9.00E-02	9.53E-01	1.83E+01	

Appendix B
Phase I Soil Analytical Results for the 716-A Motor Shops Seepage Basin

Sample ID	Sample Name	Sample Depth	Sample Date	Analyte	Analyte Class	Units	MDL	EQL	Result	Result Qualifier
102671	ABKSB0601	0-1	042296	Cobalt	TAL Inorganics	mg/kg	8.00E-02	8.47E-01	8.00E-01	J
102671	ABKSB0601	0-1	042296	Copper	TAL Inorganics	mg/kg	1.00E-01	1.06E+00	3.70E+00	
102671	ABKSB0601	0-1	042296	Cyanide	TAL Inorganics	mg/kg	8.00E-02	8.40E-01	8.00E-02	U
102671	ABKSB0601	0-1	042296	Iron	TAL Inorganics	mg/kg	2.19E+00	2.32E+01	1.39E+04	
102671	ABKSB0601	0-1	042296	Lead	TAL Inorganics	mg/kg	5.90E-01	6.25E+00	1.30E+01	
102671	ABKSB0601	0-1	042296	Magnesium	TAL Inorganics	mg/kg	8.70E-01	9.21E+00	1.43E+02	
102671	ABKSB0601	0-1	042296	Manganese	TAL Inorganics	mg/kg	2.00E-02	2.12E-01	8.31E+01	
102671	ABKSB0601	0-1	042296	Mercury	TAL Inorganics	mg/kg	1.30E-02	1.47E-01	3.00E-02	J
102671	ABKSB0601	0-1	042296	Nickel	TAL Inorganics	mg/kg	1.70E-01	1.80E+00	2.30E+00	
102671	ABKSB0601	0-1	042296	Potassium	TAL Inorganics	mg/kg	6.70E+00	7.10E+01	8.73E+01	
102671	ABKSB0601	0-1	042296	Selenium	TAL Inorganics	mg/kg	1.04E+00	1.10E+01	1.04E+00	U
102671	ABKSB0601	0-1	042296	Silver	TAL Inorganics	mg/kg	9.00E-02	9.53E-01	9.00E-02	U
102671	ABKSB0601	0-1	042296	Sodium	TAL Inorganics	mg/kg	1.29E+01	1.37E+02	1.69E+01	J
102671	ABKSB0601	0-1	042296	Thallium	TAL Inorganics	mg/kg	8.50E-01	9.00E+00	8.50E-01	U
102671	ABKSB0601	0-1	042296	Vanadium	TAL Inorganics	mg/kg	7.00E-02	7.41E-01	3.82E+01	
102671	ABKSB0601	0-1	042296	Zinc	TAL Inorganics	mg/kg	1.61E+00	1.70E+01	9.60E+00	J
102671	ABKSB0601	0-1	042296	Gross Alpha	Radiologicals	pCi/g	4.00E+00	2.89E+00	2.72E+01	
102671	ABKSB0601	0-1	042296	Non-volatile Beta	Radiologicals	pCi/g	1.00E+01	1.72E+00	1.85E+01	
102671	ABKSB0601	0-1	042296	Cation exchange capacity	Miscellaneous	Meq/	6.00E+00	6.61E+02	6.00E+00	U
102671	ABKSB0601	0-1	042296	Total Organic Carbon	Miscellaneous	mg/kg	8.40E+00	6.00E+01	3.41E+03	
102671	ABKSB0601	0-1	042296	Total petroleum hydrocarbons	Miscellaneous	mg/kg	3.30E+00	1.18E+01	3.48E+01	
102672	ABKSB0602	1-4	042296	1,1,1-Trichloroethane	Volatiles	mg/kg	9.71E-04	5.50E-03	4.49E-03	J
102672	ABKSB0602	1-4	042296	1,1,2,2-Tetrachloroethane	Volatiles	mg/kg	3.47E-03	5.50E-03	3.47E-03	U
102672	ABKSB0602	1-4	042296	1,1,2-Trichloroethane	Volatiles	mg/kg	2.40E-03	5.50E-03	2.40E-03	U
102672	ABKSB0602	1-4	042296	1,1-Dichloroethane	Volatiles	mg/kg	1.05E-03	5.50E-03	1.05E-03	U
102672	ABKSB0602	1-4	042296	1,1-Dichloroethene	Volatiles	mg/kg	1.42E-03	5.50E-03	1.42E-03	U
102672	ABKSB0602	1-4	042296	1,2-Dichloroethane	Volatiles	mg/kg	1.34E-03	5.50E-03	1.34E-03	U
102672	ABKSB0602	1-4	042296	1,2-Dichloroethene (total)	Volatiles	mg/kg	8.54E-04	5.50E-03	8.54E-04	U
102672	ABKSB0602	1-4	042296	1,2-Dichloropropane	Volatiles	mg/kg	1.67E-03	5.50E-03	1.67E-03	U
102672	ABKSB0602	1-4	042296	2-Butanone (MEK)	Volatiles	mg/kg	2.81E-03	1.10E-02	2.81E-03	U

Appendix B
Phase I Soil Analytical Results for the 716-A Motor Shops Seepage Basin

Sample ID	Sample Name	Sample Depth	Sample Date	Analyte	Analyte Class	Units	MDL	EQL	Result	Result Qualifier
102672	ABKSB0602	1-4	042296	2-Hexanone	Volatiles	mg/kg	3.77E-03	1.10E-02	3.77E-03	U
102672	ABKSB0602	1-4	042296	4-Methyl-2-pentanone	Volatiles	mg/kg	3.29E-03	1.10E-02	3.29E-03	U
102672	ABKSB0602	1-4	042296	Acetone	Volatiles	mg/kg	4.04E-03	1.10E-02	4.04E-03	U
102672	ABKSB0602	1-4	042296	Benzene	Volatiles	mg/kg	7.52E-04	5.50E-03	7.52E-04	U
102672	ABKSB0602	1-4	042296	Bromodichloromethane	Volatiles	mg/kg	1.74E-03	5.50E-03	1.74E-03	U
102672	ABKSB0602	1-4	042296	Bromoform	Volatiles	mg/kg	2.93E-03	5.50E-03	2.93E-03	U
102672	ABKSB0602	1-4	042296	Bromomethane (Methyl bromide)	Volatiles	mg/kg	2.01E-03	1.10E-02	2.01E-03	U
102672	ABKSB0602	1-4	042296	Carbon disulfide	Volatiles	mg/kg	1.71E-03	5.50E-03	1.71E-03	U
102672	ABKSB0602	1-4	042296	Carbon tetrachloride	Volatiles	mg/kg	9.71E-04	5.50E-03	9.71E-04	U
102672	ABKSB0602	1-4	042296	Chlorobenzene	Volatiles	mg/kg	1.74E-03	5.50E-03	1.74E-03	U
102672	ABKSB0602	1-4	042296	Chlorodibromomethane	Volatiles	mg/kg	2.53E-03	5.50E-03	2.53E-03	U
102672	ABKSB0602	1-4	042296	Chloroethane	Volatiles	mg/kg	2.06E-03	1.10E-02	2.06E-03	U
102672	ABKSB0602	1-4	042296	Chloroform	Volatiles	mg/kg	1.11E-03	5.50E-03	1.11E-03	U
102672	ABKSB0602	1-4	042296	Chloromethane (methyl chloride)	Volatiles	mg/kg	3.20E-03	1.10E-02	3.20E-03	U
102672	ABKSB0602	1-4	042296	cis-1,3-Dichloropropene	Volatiles	mg/kg	1.79E-03	5.50E-03	1.79E-03	U
102672	ABKSB0602	1-4	042296	Dichloromethane (methylene chlo	Volatiles	mg/kg	1.83E-03	5.50E-03	1.83E-03	U
102672	ABKSB0602	1-4	042296	Ethylbenzene	Volatiles	mg/kg	1.47E-03	5.50E-03	1.47E-03	U
102672	ABKSB0602	1-4	042296	Styrene	Volatiles	mg/kg	1.98E-03	5.50E-03	1.98E-03	U
102672	ABKSB0602	1-4	042296	Tetrachloroethene	Volatiles	mg/kg	1.17E-03	5.50E-03	9.67E-03	
102672	ABKSB0602	1-4	042296	Toluene	Volatiles	mg/kg	1.45E-03	5.50E-03	1.78E-03	J
102672	ABKSB0602	1-4	042296	trans-1,3-Dichloropropene	Volatiles	mg/kg	2.08E-03	5.50E-03	2.08E-03	U
102672	ABKSB0602	1-4	042296	Trichloroethene (TCE)	Volatiles	mg/kg	2.09E-03	5.50E-03	2.09E-03	U
102672	ABKSB0602	1-4	042296	Vinyl acetate	Volatiles	mg/kg	5.48E-03	1.10E-02	5.48E-03	U
102672	ABKSB0602	1-4	042296	Vinyl chloride	Volatiles	mg/kg	2.47E-03	1.10E-02	2.47E-03	U
102672	ABKSB0602	1-4	042296	Xylenes (total)	Volatiles	mg/kg	1.53E-03	5.50E-03	2.86E-03	J
102672	ABKSB0602	1-4	042296	1,2,4-Trichlorobenzene	Semivolatiles	mg/kg	1.80E-02	3.84E-01	1.80E-02	U
102672	ABKSB0602	1-4	042296	1,2-Dichlorobenzene	Semivolatiles	mg/kg	1.70E-02	3.84E-01	1.70E-02	U
102672	ABKSB0602	1-4	042296	1,3-Dichlorobenzene	Semivolatiles	mg/kg	1.80E-02	3.84E-01	1.80E-02	U
102672	ABKSB0602	1-4	042296	1,4-Dichlorobenzene	Semivolatiles	mg/kg	1.80E-02	3.84E-01	1.80E-02	U
102672	ABKSB0602	1-4	042296	2,4,5-Trichlorophenol	Semivolatiles	mg/kg	1.40E-02	1.92E+00	1.40E-02	U

Appendix B
Phase I Soil Analytical Results for the 716-A Motor Shops Seepage Basin

Sample ID	Sample Name	Sample Depth	Sample Date	Analyte	Analyte Class	Units	MDL	EQL	Result	Result Qualifier
102672	ABKSB0602	1-4	042296	2,4,6-Trichlorophenol	Semivolatiles	mg/kg	1.10E-02	3.84E-01	1.10E-02	U
102672	ABKSB0602	1-4	042296	2,4-Dichlorophenol	Semivolatiles	mg/kg	1.30E-02	3.84E-01	1.30E-02	U
102672	ABKSB0602	1-4	042296	2,4-Dimethyl phenol	Semivolatiles	mg/kg	2.60E-02	3.84E-01	2.60E-02	U
102672	ABKSB0602	1-4	042296	2,4-Dinitrophenol	Semivolatiles	mg/kg	4.40E-02	1.92E+00	4.40E-02	U
102672	ABKSB0602	1-4	042296	2,4-Dinitrotoluene	Semivolatiles	mg/kg	1.90E-02	3.84E-01	1.90E-02	U
102672	ABKSB0602	1-4	042296	2,6-Dinitrotoluene	Semivolatiles	mg/kg	1.60E-02	3.84E-01	1.60E-02	U
102672	ABKSB0602	1-4	042296	2-Chloronaphthalene	Semivolatiles	mg/kg	1.60E-02	3.84E-01	1.60E-02	U
102672	ABKSB0602	1-4	042296	2-Chlorophenol	Semivolatiles	mg/kg	1.70E-02	3.84E-01	1.70E-02	U
102672	ABKSB0602	1-4	042296	2-Methyl-4,6-dinitrophenol	Semivolatiles	mg/kg	1.10E-02	1.92E+00	1.10E-02	U
102672	ABKSB0602	1-4	042296	2-Methylnaphthalene	Semivolatiles	mg/kg	1.70E-02	3.84E-01	1.70E-02	U
102672	ABKSB0602	1-4	042296	2-Nitroaniline	Semivolatiles	mg/kg	1.90E-02	1.92E+00	1.90E-02	U
102672	ABKSB0602	1-4	042296	2-Nitrophenol	Semivolatiles	mg/kg	1.70E-02	3.84E-01	1.70E-02	U
102672	ABKSB0602	1-4	042296	3,3'-Dichlorobenzidine	Semivolatiles	mg/kg	7.30E-02	7.68E-01	7.30E-02	U
102672	ABKSB0602	1-4	042296	3-Nitroaniline	Semivolatiles	mg/kg	4.20E-02	1.92E+00	4.20E-02	U
102672	ABKSB0602	1-4	042296	4-Bromophenyl phenyl ether	Semivolatiles	mg/kg	1.00E-02	3.84E-01	1.00E-02	U
102672	ABKSB0602	1-4	042296	4-Chloro-3-methylphenol (p-chlo	Semivolatiles	mg/kg	1.80E-02	3.84E-01	1.80E-02	U
102672	ABKSB0602	1-4	042296	4-Chloroaniline	Semivolatiles	mg/kg	6.00E-03	3.84E-01	6.00E-03	U
102672	ABKSB0602	1-4	042296	4-Chlorophenyl phenyl ether	Semivolatiles	mg/kg	1.30E-02	3.84E-01	1.30E-02	U
102672	ABKSB0602	1-4	042296	4-Nitroaniline	Semivolatiles	mg/kg	2.00E-02	1.92E+00	2.00E-02	U
102672	ABKSB0602	1-4	042296	4-Nitrophenol	Semivolatiles	mg/kg	4.90E-02	1.92E+00	4.90E-02	U
102672	ABKSB0602	1-4	042296	Acenapthene	Semivolatiles	mg/kg	1.50E-02	3.84E-01	1.50E-02	U
102672	ABKSB0602	1-4	042296	Acenapthylene	Semivolatiles	mg/kg	1.60E-02	3.84E-01	1.60E-02	U
102672	ABKSB0602	1-4	042296	Anthracene	Semivolatiles	mg/kg	1.60E-02	3.84E-01	1.60E-02	U
102672	ABKSB0602	1-4	042296	Benzo(a)anthracene	Semivolatiles	mg/kg	2.00E-02	3.84E-01	2.00E-02	U
102672	ABKSB0602	1-4	042296	Benzo(a)pyrene	Semivolatiles	mg/kg	2.40E-02	3.84E-01	2.40E-02	U
102672	ABKSB0602	1-4	042296	Benzo(b)fluoranthene	Semivolatiles	mg/kg	2.30E-02	3.84E-01	2.30E-02	U
102672	ABKSB0602	1-4	042296	Benzo(g,h,i)perylene	Semivolatiles	mg/kg	1.60E-02	3.84E-01	1.60E-02	U
102672	ABKSB0602	1-4	042296	Benzo(k)fluoranthene	Semivolatiles	mg/kg	2.20E-02	3.84E-01	2.20E-02	U
102672	ABKSB0602	1-4	042296	Benzoic acid	Semivolatiles	mg/kg	3.40E-02	1.92E+00	3.40E-02	U
102672	ABKSB0602	1-4	042296	Benzyl alcohol	Semivolatiles	mg/kg	1.90E-02	3.84E-01	1.90E-02	U

Appendix B
Phase I Soil Analytical Results for the 716-A Motor Shops Seepage Basin

Sample ID	Sample Name	Sample Depth	Sample Date	Analyte	Analyte Class	Units	MDL	EQL	Result	Result Qualifier
102672	ABKSB0602	1-4	042296	Bis(2-chloroethoxy) methane	Semivolatiles	mg/kg	1.60E-02	3.84E-01	1.60E-02	U
102672	ABKSB0602	1-4	042296	Bis(2-chloroethyl) ether	Semivolatiles	mg/kg	2.20E-02	3.84E-01	2.20E-02	U
102672	ABKSB0602	1-4	042296	Bis(2-chloroisopropyl) ether	Semivolatiles	mg/kg	1.80E-02	3.84E-01	1.80E-02	U
102672	ABKSB0602	1-4	042296	Bis(2-ethylhexyl) phthalate	Semivolatiles	mg/kg	2.20E-02	3.84E-01	2.20E-02	U
102672	ABKSB0602	1-4	042296	Butyl benzyl phthalate	Semivolatiles	mg/kg	2.10E-02	3.84E-01	2.10E-02	U
102672	ABKSB0602	1-4	042296	Chrysene	Semivolatiles	mg/kg	1.90E-02	3.84E-01	1.90E-02	U
102672	ABKSB0602	1-4	042296	Di-n-butyl phthalate	Semivolatiles	mg/kg	1.90E-02	3.84E-01	1.90E-02	U
102672	ABKSB0602	1-4	042296	Di-n-octyl phthalate	Semivolatiles	mg/kg	2.60E-02	3.84E-01	2.60E-02	U
102672	ABKSB0602	1-4	042296	Dibenzo(a,h)anthracene	Semivolatiles	mg/kg	1.70E-02	3.84E-01	1.70E-02	U
102672	ABKSB0602	1-4	042296	Dibenzofuran	Semivolatiles	mg/kg	1.60E-02	3.84E-01	1.60E-02	U
102672	ABKSB0602	1-4	042296	Diethyl phthalate	Semivolatiles	mg/kg	1.60E-02	3.84E-01	1.60E-02	U
102672	ABKSB0602	1-4	042296	Dimethyl phthalate	Semivolatiles	mg/kg	1.50E-02	3.84E-01	1.50E-02	U
102672	ABKSB0602	1-4	042296	Fluoranthene	Semivolatiles	mg/kg	1.90E-02	3.84E-01	1.90E-02	U
102672	ABKSB0602	1-4	042296	Fluorene	Semivolatiles	mg/kg	1.60E-02	3.84E-01	1.60E-02	U
102672	ABKSB0602	1-4	042296	Hexachlorobenzene	Semivolatiles	mg/kg	1.00E-02	3.84E-01	1.00E-02	U
102672	ABKSB0602	1-4	042296	Hexachlorobutadiene	Semivolatiles	mg/kg	1.50E-02	3.84E-01	1.50E-02	U
102672	ABKSB0602	1-4	042296	Hexachlorocyclopentadiene	Semivolatiles	mg/kg	2.60E-02	3.84E-01	2.60E-02	U
102672	ABKSB0602	1-4	042296	Hexachloroethane	Semivolatiles	mg/kg	1.60E-02	3.84E-01	1.60E-02	U
102672	ABKSB0602	1-4	042296	Indeno(1,2,3-c,d)pyrene	Semivolatiles	mg/kg	1.80E-02	3.84E-01	1.80E-02	U
102672	ABKSB0602	1-4	042296	Isophorone	Semivolatiles	mg/kg	1.70E-02	3.84E-01	1.70E-02	U
102672	ABKSB0602	1-4	042296	N-Nitrosodi-n-propylamine	Semivolatiles	mg/kg	2.00E-02	3.84E-01	2.00E-02	U
102672	ABKSB0602	1-4	042296	N-Nitrosodiphenylamine	Semivolatiles	mg/kg	1.40E-02	3.84E-01	1.40E-02	U
102672	ABKSB0602	1-4	042296	Naphthalene	Semivolatiles	mg/kg	1.90E-02	3.84E-01	1.90E-02	U
102672	ABKSB0602	1-4	042296	Nitrobenzene	Semivolatiles	mg/kg	1.90E-02	3.84E-01	1.90E-02	U
102672	ABKSB0602	1-4	042296	o-cresol (2-methylphenol)	Semivolatiles	mg/kg	1.60E-02	3.84E-01	1.60E-02	U
102672	ABKSB0602	1-4	042296	p-cresol (4-methylphenol)	Semivolatiles	mg/kg	1.70E-02	3.84E-01	1.70E-02	U
102672	ABKSB0602	1-4	042296	Pentachlorophenol	Semivolatiles	mg/kg	3.90E-02	1.92E+00	3.90E-02	U
102672	ABKSB0602	1-4	042296	Phenanthrene	Semivolatiles	mg/kg	1.50E-02	3.84E-01	1.50E-02	U
102672	ABKSB0602	1-4	042296	Phenol	Semivolatiles	mg/kg	1.90E-02	3.84E-01	1.90E-02	U
102672	ABKSB0602	1-4	042296	Pyrene	Semivolatiles	mg/kg	2.10E-02	3.84E-01	2.10E-02	U

Appendix B
Phase I Soil Analytical Results for the 716-A Motor Shops Seepage Basin

Sample ID	Sample Name	Sample Depth	Sample Date	Analyte	Analyte Class	Units	MDL	EQL	Result	Result Qualifier
102672	ABKSB0602	1-4	042296	Aldol condensate	SVOA TICs	mg/kg	0.00E+00	0.00E+00	6.00E-01	J
102672	ABKSB0602	1-4	042296	Aldrin	Pesticides/PCBs	mg/kg	5.70E-04	1.92E-03	5.70E-04	U
102672	ABKSB0602	1-4	042296	alpha-Benzene hexachloride	Pesticides/PCBs	mg/kg	5.70E-04	1.92E-03	5.70E-04	U
102672	ABKSB0602	1-4	042296	alpha-Chlordane	Pesticides/PCBs	mg/kg	5.70E-04	1.92E-03	5.70E-04	U
102672	ABKSB0602	1-4	042296	Aroclor 1016	Pesticides/PCBs	mg/kg	1.10E-02	3.84E-02	1.10E-02	U
102672	ABKSB0602	1-4	042296	Aroclor 1221	Pesticides/PCBs	mg/kg	2.20E-02	7.69E-02	2.20E-02	U
102672	ABKSB0602	1-4	042296	Aroclor 1232	Pesticides/PCBs	mg/kg	1.10E-02	3.84E-02	1.10E-02	U
102672	ABKSB0602	1-4	042296	Aroclor 1242	Pesticides/PCBs	mg/kg	1.10E-02	3.84E-02	1.10E-02	U
102672	ABKSB0602	1-4	042296	Aroclor 1248	Pesticides/PCBs	mg/kg	1.10E-02	3.84E-02	1.10E-02	U
102672	ABKSB0602	1-4	042296	Aroclor 1254	Pesticides/PCBs	mg/kg	1.10E-02	3.84E-02	1.10E-02	U
102672	ABKSB0602	1-4	042296	Aroclor 1260	Pesticides/PCBs	mg/kg	1.10E-02	3.84E-02	1.10E-02	U
102672	ABKSB0602	1-4	042296	beta-Benzene hexachloride	Pesticides/PCBs	mg/kg	5.70E-04	1.92E-03	5.70E-04	U
102672	ABKSB0602	1-4	042296	delta-Benzene hexachloride	Pesticides/PCBs	mg/kg	5.70E-04	1.92E-03	5.70E-04	U
102672	ABKSB0602	1-4	042296	Dieldrin	Pesticides/PCBs	mg/kg	6.33E-04	3.84E-03	6.33E-04	U
102672	ABKSB0602	1-4	042296	Endosulfan I	Pesticides/PCBs	mg/kg	5.70E-04	1.92E-03	5.70E-04	U
102672	ABKSB0602	1-4	042296	Endosulfan II	Pesticides/PCBs	mg/kg	9.00E-04	3.84E-03	9.00E-04	U
102672	ABKSB0602	1-4	042296	Endosulfan sulfate	Pesticides/PCBs	mg/kg	1.10E-03	3.84E-03	1.10E-03	U
102672	ABKSB0602	1-4	042296	Endrin	Pesticides/PCBs	mg/kg	1.10E-03	3.84E-03	1.10E-03	UJ
102672	ABKSB0602	1-4	042296	Endrin ketone	Pesticides/PCBs	mg/kg	1.10E-03	3.84E-03	1.10E-03	UJ
102672	ABKSB0602	1-4	042296	gamma-Benzene hexachloride (Lin	Pesticides/PCBs	mg/kg	5.70E-04	1.92E-03	5.70E-04	U
102672	ABKSB0602	1-4	042296	gamma-Chlordane	Pesticides/PCBs	mg/kg	5.70E-04	1.92E-03	5.70E-04	U
102672	ABKSB0602	1-4	042296	Heptachlor	Pesticides/PCBs	mg/kg	5.70E-04	1.92E-03	5.70E-04	U
102672	ABKSB0602	1-4	042296	Heptachlor epoxide	Pesticides/PCBs	mg/kg	5.70E-04	1.92E-03	5.70E-04	U
102672	ABKSB0602	1-4	042296	Methoxychlor (Mariate)	Pesticides/PCBs	mg/kg	5.70E-03	1.92E-02	5.70E-03	U
102672	ABKSB0602	1-4	042296	p,p'-DDD	Pesticides/PCBs	mg/kg	1.10E-03	3.84E-03	1.10E-03	UJ
102672	ABKSB0602	1-4	042296	p,p'-DDE	Pesticides/PCBs	mg/kg	9.00E-04	3.84E-03	9.00E-04	UJ
102672	ABKSB0602	1-4	042296	p,p'-DDT	Pesticides/PCBs	mg/kg	1.10E-03	3.84E-03	1.10E-03	UJ
102672	ABKSB0602	1-4	042296	Toxaphene	Pesticides/PCBs	mg/kg	5.30E-02	1.92E-01	5.30E-02	U
102672	ABKSB0602	1-4	042296	Aluminum	TAL Inorganics	mg/kg	1.90E+00	2.14E+01	1.02E+04	
102672	ABKSB0602	1-4	042296	Antimony	TAL Inorganics	mg/kg	3.50E-01	4.04E+00	9.49E-01	J

Appendix B
Phase I Soil Analytical Results for the 716-A Motor Shops Seepage Basin

Sample ID	Sample Name	Sample Depth	Sample Date	Analyte	Analyte Class	Units	MDL	EQL	Result	Result Qualifier
102672	ABKSB0602	1-4	042296	Arsenic	TAL Inorganics	mg/kg	1.11E+00	1.28E+01	5.90E+00	J
102672	ABKSB0602	1-4	042296	Barium	TAL Inorganics	mg/kg	1.10E-01	1.27E+00	9.20E+00	
102672	ABKSB0602	1-4	042296	Beryllium	TAL Inorganics	mg/kg	3.00E-02	2.88E-01	1.64E-01	
102672	ABKSB0602	1-4	042296	Cadmium	TAL Inorganics	mg/kg	4.00E-02	4.61E-01	7.85E-01	
102672	ABKSB0602	1-4	042296	Calcium	TAL Inorganics	mg/kg	1.68E+00	1.94E+01	3.79E+02	
102672	ABKSB0602	1-4	042296	Chromium	TAL Inorganics	mg/kg	9.00E-02	1.04E+00	2.74E+01	
102672	ABKSB0602	1-4	042296	Cobalt	TAL Inorganics	mg/kg	8.00E-02	9.22E-01	9.11E-01	J
102672	ABKSB0602	1-4	042296	Copper	TAL Inorganics	mg/kg	1.00E-01	1.15E+00	3.60E+00	
102672	ABKSB0602	1-4	042296	Cyanide	TAL Inorganics	mg/kg	8.00E-02	8.80E-01	8.00E-02	U
102672	ABKSB0602	1-4	042296	Iron	TAL Inorganics	mg/kg	2.19E+00	2.53E+01	2.38E+04	J
102672	ABKSB0602	1-4	042296	Lead	TAL Inorganics	mg/kg	5.90E-01	6.80E+00	8.80E+00	
102672	ABKSB0602	1-4	042296	Magnesium	TAL Inorganics	mg/kg	8.70E-01	1.00E+01	1.54E+02	
102672	ABKSB0602	1-4	042296	Manganese	TAL Inorganics	mg/kg	2.00E-02	2.31E-01	3.36E+01	
102672	ABKSB0602	1-4	042296	Mercury	TAL Inorganics	mg/kg	1.30E-02	1.54E-01	3.00E-02	J
102672	ABKSB0602	1-4	042296	Nickel	TAL Inorganics	mg/kg	1.70E-01	1.96E+00	2.50E+00	
102672	ABKSB0602	1-4	042296	Potassium	TAL Inorganics	mg/kg	6.70E+00	7.73E+01	7.00E+01	J
102672	ABKSB0602	1-4	042296	Selenium	TAL Inorganics	mg/kg	1.04E+00	1.20E+01	1.04E+00	U
102672	ABKSB0602	1-4	042296	Silver	TAL Inorganics	mg/kg	9.00E-02	1.04E+00	9.00E-02	U
102672	ABKSB0602	1-4	042296	Sodium	TAL Inorganics	mg/kg	1.29E+01	1.49E+02	2.02E+01	J
102672	ABKSB0602	1-4	042296	Thallium	TAL Inorganics	mg/kg	8.50E-01	9.80E+00	8.50E-01	U
102672	ABKSB0602	1-4	042296	Vanadium	TAL Inorganics	mg/kg	7.00E-02	8.07E-01	5.98E+01	
102672	ABKSB0602	1-4	042296	Zinc	TAL Inorganics	mg/kg	1.61E+00	1.86E+01	4.20E+00	J
102672	ABKSB0602	1-4	042296	Gross Alpha	Radiologicals	pCi/g	4.00E+00	2.81E+00	1.77E+01	
102672	ABKSB0602	1-4	042296	Non-volatile Beta	Radiologicals	pCi/g	1.00E+01	1.57E+00	1.13E+01	
102672	ABKSB0602	1-4	042296	Cation exchange capacity	Miscellaneous	Meq/	6.00E+00	1.38E+03	6.00E+00	U
102672	ABKSB0602	1-4	042296	Total Organic Carbon	Miscellaneous	mg/kg	8.40E+00	6.00E+01	2.38E+03	
102672	ABKSB0602	1-4	042296	Total petroleum hydrocarbons	Miscellaneous	mg/kg	3.30E+00	1.23E+01	3.30E+00	UJ
102680	AOBSB0101	0-1	042396	1,1,1-Trichloroethane	Volatiles	mg/kg	9.71E-04	5.00E-03	9.71E-04	U
102680	AOBSB0101	0-1	042396	1,1,2,2-Tetrachloroethane	Volatiles	mg/kg	3.47E-03	5.00E-03	3.47E-03	U
102680	AOBSB0101	0-1	042396	1,1,2-Trichloroethane	Volatiles	mg/kg	2.40E-03	5.00E-03	2.40E-03	U

Appendix B
Phase I Soil Analytical Results for the 716-A Motor Shops Seepage Basin

Sample ID	Sample Name	Sample Depth	Sample Date	Analyte	Analyte Class	Units	MDL	EQL	Result	Result Qualifier
102680	AOBSB0101	0-1	042396	1,1-Dichloroethane	Volatiles	mg/kg	1.05E-03	5.00E-03	1.05E-03	U
102680	AOBSB0101	0-1	042396	1,1-Dichloroethene	Volatiles	mg/kg	1.42E-03	5.00E-03	1.42E-03	U
102680	AOBSB0101	0-1	042396	1,2-Dichloroethane	Volatiles	mg/kg	1.34E-03	5.00E-03	1.34E-03	U
102680	AOBSB0101	0-1	042396	1,2-Dichloroethene (total)	Volatiles	mg/kg	8.54E-04	5.00E-03	8.54E-04	U
102680	AOBSB0101	0-1	042396	1,2-Dichloropropane	Volatiles	mg/kg	1.67E-03	5.00E-03	1.67E-03	U
102680	AOBSB0101	0-1	042396	2-Butanone (MEK)	Volatiles	mg/kg	2.81E-03	1.00E-02	2.81E-03	U
102680	AOBSB0101	0-1	042396	2-Hexanone	Volatiles	mg/kg	3.77E-03	1.00E-02	3.77E-03	U
102680	AOBSB0101	0-1	042396	4-Methyl-2-pentanone	Volatiles	mg/kg	3.29E-03	1.00E-02	3.29E-03	U
102680	AOBSB0101	0-1	042396	Acetone	Volatiles	mg/kg	4.04E-03	1.00E-02	4.04E-03	U
102680	AOBSB0101	0-1	042396	Benzene	Volatiles	mg/kg	7.52E-04	5.00E-03	7.52E-04	U
102680	AOBSB0101	0-1	042396	Bromodichloromethane	Volatiles	mg/kg	1.74E-03	5.00E-03	1.74E-03	U
102680	AOBSB0101	0-1	042396	Bromoform	Volatiles	mg/kg	2.93E-03	5.00E-03	2.93E-03	U
102680	AOBSB0101	0-1	042396	Bromomethane (Methyl bromide)	Volatiles	mg/kg	2.01E-03	1.00E-02	2.01E-03	U
102680	AOBSB0101	0-1	042396	Carbon disulfide	Volatiles	mg/kg	1.71E-03	5.00E-03	1.71E-03	U
102680	AOBSB0101	0-1	042396	Carbon tetrachloride	Volatiles	mg/kg	9.71E-04	5.00E-03	9.71E-04	U
102680	AOBSB0101	0-1	042396	Chlorobenzene	Volatiles	mg/kg	1.74E-03	5.00E-03	1.74E-03	U
102680	AOBSB0101	0-1	042396	Chlorodibromomethane	Volatiles	mg/kg	2.53E-03	5.00E-03	2.53E-03	U
102680	AOBSB0101	0-1	042396	Chloroethane	Volatiles	mg/kg	2.06E-03	1.00E-02	2.06E-03	U
102680	AOBSB0101	0-1	042396	Chloroform	Volatiles	mg/kg	1.11E-03	5.00E-03	1.11E-03	U
102680	AOBSB0101	0-1	042396	Chloromethane (methyl chloride)	Volatiles	mg/kg	3.20E-03	1.00E-02	3.20E-03	U
102680	AOBSB0101	0-1	042396	cis-1,3-Dichloropropene	Volatiles	mg/kg	1.79E-03	5.00E-03	1.79E-03	U
102680	AOBSB0101	0-1	042396	Dichloromethane (methylene chlo	Volatiles	mg/kg	1.83E-03	5.00E-03	1.83E-03	U
102680	AOBSB0101	0-1	042396	Ethylbenzene	Volatiles	mg/kg	1.47E-03	5.00E-03	1.47E-03	U
102680	AOBSB0101	0-1	042396	Styrene	Volatiles	mg/kg	1.98E-03	5.00E-03	1.98E-03	U
102680	AOBSB0101	0-1	042396	Tetrachloroethene	Volatiles	mg/kg	1.17E-03	5.00E-03	1.92E-03	J
102680	AOBSB0101	0-1	042396	Toluene	Volatiles	mg/kg	1.45E-03	5.00E-03	1.45E-03	U
102680	AOBSB0101	0-1	042396	trans-1,3-Dichloropropene	Volatiles	mg/kg	2.08E-03	5.00E-03	2.08E-03	U
102680	AOBSB0101	0-1	042396	Trichloroethene (TCE)	Volatiles	mg/kg	2.09E-03	5.00E-03	2.09E-03	U
102680	AOBSB0101	0-1	042396	Vinyl acetate	Volatiles	mg/kg	5.48E-03	1.00E-02	5.48E-03	U
102680	AOBSB0101	0-1	042396	Vinyl chloride	Volatiles	mg/kg	2.47E-03	1.00E-02	2.47E-03	U

Appendix B
Phase I Soil Analytical Results for the 716-A Motor Shops Seepage Basin

Sample ID	Sample Name	Sample Depth	Sample Date	Analyte	Analyte Class	Units	MDL	EQL	Result	Result Qualifier
102680	AOBSB0101	0-1	042396	Xylenes (total)	Volatiles	mg/kg	1.53E-03	5.00E-03	1.53E-03	U
102680	AOBSB0101	0-1	042396	1,2,4-Trichlorobenzene	Semivolatiles	mg/kg	1.80E-02	3.51E-01	1.80E-02	U
102680	AOBSB0101	0-1	042396	1,2-Dichlorobenzene	Semivolatiles	mg/kg	1.70E-02	3.51E-01	1.70E-02	U
102680	AOBSB0101	0-1	042396	1,3-Dichlorobenzene	Semivolatiles	mg/kg	1.80E-02	3.51E-01	1.80E-02	U
102680	AOBSB0101	0-1	042396	1,4-Dichlorobenzene	Semivolatiles	mg/kg	1.80E-02	3.51E-01	1.80E-02	U
102680	AOBSB0101	0-1	042396	2,4,5-Trichlorophenol	Semivolatiles	mg/kg	1.40E-02	1.76E+00	1.40E-02	U
102680	AOBSB0101	0-1	042396	2,4,6-Trichlorophenol	Semivolatiles	mg/kg	1.10E-02	3.51E-01	1.10E-02	U
102680	AOBSB0101	0-1	042396	2,4-Dichlorophenol	Semivolatiles	mg/kg	1.30E-02	3.51E-01	1.30E-02	U
102680	AOBSB0101	0-1	042396	2,4-Dimethyl phenol	Semivolatiles	mg/kg	2.60E-02	3.51E-01	2.60E-02	U
102680	AOBSB0101	0-1	042396	2,4-Dinitrophenol	Semivolatiles	mg/kg	4.40E-02	1.76E+00	4.40E-02	U
102680	AOBSB0101	0-1	042396	2,4-Dinitrotoluene	Semivolatiles	mg/kg	1.90E-02	3.51E-01	1.90E-02	U
102680	AOBSB0101	0-1	042396	2,6-Dinitrotoluene	Semivolatiles	mg/kg	1.60E-02	3.51E-01	1.60E-02	U
102680	AOBSB0101	0-1	042396	2-Chloronaphthalene	Semivolatiles	mg/kg	1.60E-02	3.51E-01	1.60E-02	U
102680	AOBSB0101	0-1	042396	2-Chlorophenol	Semivolatiles	mg/kg	1.70E-02	3.51E-01	1.70E-02	U
102680	AOBSB0101	0-1	042396	2-Methyl-4,6-dinitrophenol	Semivolatiles	mg/kg	1.10E-02	1.76E+00	1.10E-02	U
102680	AOBSB0101	0-1	042396	2-Methylnaphthalene	Semivolatiles	mg/kg	1.70E-02	3.51E-01	1.70E-02	U
102680	AOBSB0101	0-1	042396	2-Nitroaniline	Semivolatiles	mg/kg	1.90E-02	1.76E+00	1.90E-02	U
102680	AOBSB0101	0-1	042396	2-Nitrophenol	Semivolatiles	mg/kg	1.70E-02	3.51E-01	1.70E-02	U
102680	AOBSB0101	0-1	042396	3,3'-Dichlorobenzidine	Semivolatiles	mg/kg	7.30E-02	7.02E-01	7.30E-02	U
102680	AOBSB0101	0-1	042396	3-Nitroaniline	Semivolatiles	mg/kg	4.20E-02	1.76E+00	4.20E-02	U
102680	AOBSB0101	0-1	042396	4-Bromophenyl phenyl ether	Semivolatiles	mg/kg	1.00E-02	3.51E-01	1.00E-02	U
102680	AOBSB0101	0-1	042396	4-Chloro-3-methylphenol (p-chlo	Semivolatiles	mg/kg	1.80E-02	3.51E-01	1.80E-02	U
102680	AOBSB0101	0-1	042396	4-Chloroaniline	Semivolatiles	mg/kg	6.00E-03	3.51E-01	6.00E-03	U
102680	AOBSB0101	0-1	042396	4-Chlorophenyl phenyl ether	Semivolatiles	mg/kg	1.30E-02	3.51E-01	1.30E-02	U
102680	AOBSB0101	0-1	042396	4-Nitroaniline	Semivolatiles	mg/kg	2.00E-02	1.76E+00	2.00E-02	U
102680	AOBSB0101	0-1	042396	4-Nitrophenol	Semivolatiles	mg/kg	4.90E-02	1.76E+00	4.90E-02	U
102680	AOBSB0101	0-1	042396	Acenapthene	Semivolatiles	mg/kg	1.50E-02	3.51E-01	1.50E-02	U
102680	AOBSB0101	0-1	042396	Acenapthylene	Semivolatiles	mg/kg	1.60E-02	3.51E-01	1.60E-02	U
102680	AOBSB0101	0-1	042396	Anthracene	Semivolatiles	mg/kg	1.60E-02	3.51E-01	1.60E-02	U
102680	AOBSB0101	0-1	042396	Benzo(a)anthracene	Semivolatiles	mg/kg	2.00E-02	3.51E-01	2.00E-02	U

Appendix B
Phase I Soil Analytical Results for the 716-A Motor Shops Seepage Basin

Sample ID	Sample Name	Sample Depth	Sample Date	Analyte	Analyte Class	Units	MDL	EQL	Result	Result Qualifier
102680	AOBSB0101	0-1	042396	Benzo(a)pyrene	Semivolatiles	mg/kg	2.40E-02	3.51E-01	2.40E-02	U
102680	AOBSB0101	0-1	042396	Benzo(b)fluoranthene	Semivolatiles	mg/kg	2.30E-02	3.51E-01	2.30E-02	U
102680	AOBSB0101	0-1	042396	Benzo(g,h,i)perylene	Semivolatiles	mg/kg	1.60E-02	3.51E-01	1.60E-02	U
102680	AOBSB0101	0-1	042396	Benzo(k)fluoranthene	Semivolatiles	mg/kg	2.20E-02	3.51E-01	2.20E-02	U
102680	AOBSB0101	0-1	042396	Benzoic acid	Semivolatiles	mg/kg	3.40E-02	1.76E+00	3.40E-02	U
102680	AOBSB0101	0-1	042396	Benzyl alcohol	Semivolatiles	mg/kg	1.90E-02	3.51E-01	1.90E-02	U
102680	AOBSB0101	0-1	042396	Bis(2-chloroethoxy) methane	Semivolatiles	mg/kg	1.60E-02	3.51E-01	1.60E-02	U
102680	AOBSB0101	0-1	042396	Bis(2-chloroethyl) ether	Semivolatiles	mg/kg	2.20E-02	3.51E-01	2.20E-02	U
102680	AOBSB0101	0-1	042396	Bis(2-chloroisopropyl) ether	Semivolatiles	mg/kg	1.80E-02	3.51E-01	1.80E-02	U
102680	AOBSB0101	0-1	042396	Bis(2-ethylhexyl) phthalate	Semivolatiles	mg/kg	2.20E-02	3.51E-01	2.20E-02	U
102680	AOBSB0101	0-1	042396	Butyl benzyl phthalate	Semivolatiles	mg/kg	2.10E-02	3.51E-01	2.10E-02	U
102680	AOBSB0101	0-1	042396	Chrysene	Semivolatiles	mg/kg	1.90E-02	3.51E-01	1.90E-02	U
102680	AOBSB0101	0-1	042396	Di-n-butyl phthalate	Semivolatiles	mg/kg	1.90E-02	3.51E-01	1.90E-02	U
102680	AOBSB0101	0-1	042396	Di-n-octyl phthalate	Semivolatiles	mg/kg	2.60E-02	3.51E-01	2.60E-02	U
102680	AOBSB0101	0-1	042396	Dibenzo(a,h)anthracene	Semivolatiles	mg/kg	1.70E-02	3.51E-01	1.70E-02	U
102680	AOBSB0101	0-1	042396	Dibenzofuran	Semivolatiles	mg/kg	1.60E-02	3.51E-01	1.60E-02	U
102680	AOBSB0101	0-1	042396	Diethyl phthalate	Semivolatiles	mg/kg	1.60E-02	3.51E-01	1.60E-02	U
102680	AOBSB0101	0-1	042396	Dimethyl phthalate	Semivolatiles	mg/kg	1.50E-02	3.51E-01	1.50E-02	U
102680	AOBSB0101	0-1	042396	Fluoranthene	Semivolatiles	mg/kg	1.90E-02	3.51E-01	1.90E-02	U
102680	AOBSB0101	0-1	042396	Fluorene	Semivolatiles	mg/kg	1.60E-02	3.51E-01	1.60E-02	U
102680	AOBSB0101	0-1	042396	Hexachlorobenzene	Semivolatiles	mg/kg	1.00E-02	3.51E-01	1.00E-02	U
102680	AOBSB0101	0-1	042396	Hexachlorobutadiene	Semivolatiles	mg/kg	1.50E-02	3.51E-01	1.50E-02	U
102680	AOBSB0101	0-1	042396	Hexachlorocyclopentadiene	Semivolatiles	mg/kg	2.60E-02	3.51E-01	2.60E-02	U
102680	AOBSB0101	0-1	042396	Hexachloroethane	Semivolatiles	mg/kg	1.60E-02	3.51E-01	1.60E-02	U
102680	AOBSB0101	0-1	042396	Indeno(1,2,3-c,d)pyrene	Semivolatiles	mg/kg	1.80E-02	3.51E-01	1.80E-02	U
102680	AOBSB0101	0-1	042396	Isophorone	Semivolatiles	mg/kg	1.70E-02	3.51E-01	1.70E-02	U
102680	AOBSB0101	0-1	042396	N-Nitrosodi-n-propylamine	Semivolatiles	mg/kg	2.00E-02	3.51E-01	2.00E-02	U
102680	AOBSB0101	0-1	042396	N-Nitrosodiphenylamine	Semivolatiles	mg/kg	1.40E-02	3.51E-01	1.40E-02	U
102680	AOBSB0101	0-1	042396	Naphthalene	Semivolatiles	mg/kg	1.90E-02	3.51E-01	1.90E-02	U
102680	AOBSB0101	0-1	042396	Nitrobenzene	Semivolatiles	mg/kg	1.90E-02	3.51E-01	1.90E-02	U

Appendix B
Phase I Soil Analytical Results for the 716-A Motor Shops Seepage Basin

Sample ID	Sample Name	Sample Depth	Sample Date	Analyte	Analyte Class	Units	MDL	EQL	Result	Result Qualifier
102680	AOBSB0101	0-1	042396	o-cresol (2-methylphenol)	Semivolatiles	mg/kg	1.60E-02	3.51E-01	1.60E-02	U
102680	AOBSB0101	0-1	042396	p-cresol (4-methylphenol)	Semivolatiles	mg/kg	1.70E-02	3.51E-01	1.70E-02	U
102680	AOBSB0101	0-1	042396	Pentachlorophenol	Semivolatiles	mg/kg	3.90E-02	1.76E+00	3.90E-02	U
102680	AOBSB0101	0-1	042396	Phenanthrene	Semivolatiles	mg/kg	1.50E-02	3.51E-01	1.50E-02	U
102680	AOBSB0101	0-1	042396	Phenol	Semivolatiles	mg/kg	1.90E-02	3.51E-01	1.90E-02	U
102680	AOBSB0101	0-1	042396	Pyrene	Semivolatiles	mg/kg	2.10E-02	3.51E-01	2.10E-02	U
102680	AOBSB0101	0-1	042396	Aldol condensate	SVOA TICs	mg/kg	0.00E+00	0.00E+00	3.00E-01	J
102680	AOBSB0101	0-1	042396	Unknown	SVOA TICs	mg/kg	0.00E+00	0.00E+00	5.00E-01	J
102680	AOBSB0101	0-1	042396	Unknown	SVOA TICs	mg/kg	0.00E+00	0.00E+00	4.00E-01	J
102680	AOBSB0101	0-1	042396	Aldrin	Pesticides/PCBs	mg/kg	5.70E-04	1.76E-03	5.70E-04	U
102680	AOBSB0101	0-1	042396	alpha-Benzene hexachloride	Pesticides/PCBs	mg/kg	5.70E-04	1.76E-03	5.70E-04	U
102680	AOBSB0101	0-1	042396	alpha-Chlordane	Pesticides/PCBs	mg/kg	5.70E-04	1.76E-03	5.70E-04	U
102680	AOBSB0101	0-1	042396	Aroclor 1016	Pesticides/PCBs	mg/kg	1.10E-02	3.51E-02	1.10E-02	U
102680	AOBSB0101	0-1	042396	Aroclor 1221	Pesticides/PCBs	mg/kg	2.20E-02	7.02E-02	2.20E-02	U
102680	AOBSB0101	0-1	042396	Aroclor 1232	Pesticides/PCBs	mg/kg	1.10E-02	3.51E-02	1.10E-02	U
102680	AOBSB0101	0-1	042396	Aroclor 1242	Pesticides/PCBs	mg/kg	1.10E-02	3.51E-02	1.10E-02	U
102680	AOBSB0101	0-1	042396	Aroclor 1248	Pesticides/PCBs	mg/kg	1.10E-02	3.51E-02	1.10E-02	U
102680	AOBSB0101	0-1	042396	Aroclor 1254	Pesticides/PCBs	mg/kg	1.10E-02	3.51E-02	1.10E-02	U
102680	AOBSB0101	0-1	042396	Aroclor 1260	Pesticides/PCBs	mg/kg	1.10E-02	3.51E-02	1.10E-02	U
102680	AOBSB0101	0-1	042396	beta-Benzene hexachloride	Pesticides/PCBs	mg/kg	5.70E-04	1.76E-03	5.70E-04	U
102680	AOBSB0101	0-1	042396	delta-Benzene hexachloride	Pesticides/PCBs	mg/kg	5.70E-04	1.76E-03	5.70E-04	U
102680	AOBSB0101	0-1	042396	Dieldrin	Pesticides/PCBs	mg/kg	6.33E-04	3.51E-03	6.33E-04	U
102680	AOBSB0101	0-1	042396	Endosulfan I	Pesticides/PCBs	mg/kg	5.70E-04	1.76E-03	5.70E-04	U
102680	AOBSB0101	0-1	042396	Endosulfan II	Pesticides/PCBs	mg/kg	9.00E-04	3.51E-03	9.00E-04	U
102680	AOBSB0101	0-1	042396	Endosulfan sulfate	Pesticides/PCBs	mg/kg	1.10E-03	3.51E-03	1.10E-03	U
102680	AOBSB0101	0-1	042396	Endrin	Pesticides/PCBs	mg/kg	1.10E-03	3.51E-03	1.10E-03	UJ
102680	AOBSB0101	0-1	042396	Endrin ketone	Pesticides/PCBs	mg/kg	1.10E-03	3.51E-03	1.10E-03	UJ
102680	AOBSB0101	0-1	042396	gamma-Benzene hexachloride (Lin	Pesticides/PCBs	mg/kg	5.70E-04	1.76E-03	5.70E-04	U
102680	AOBSB0101	0-1	042396	gamma-Chlordane	Pesticides/PCBs	mg/kg	5.70E-04	1.76E-03	5.70E-04	U
102680	AOBSB0101	0-1	042396	Heptachlor	Pesticides/PCBs	mg/kg	5.70E-04	1.76E-03	5.70E-04	U

Appendix B
Phase I Soil Analytical Results for the 716-A Motor Shops Seepage Basin

Sample ID	Sample Name	Sample Depth	Sample Date	Analyte	Analyte Class	Units	MDL	EQL	Result	Result Qualifier
102680	AOBSB0101	0-1	042396	Heptachlor epoxide	Pesticides/PCBs	mg/kg	5.70E-04	1.76E-03	5.70E-04	U
102680	AOBSB0101	0-1	042396	Methoxychlor (Mariate)	Pesticides/PCBs	mg/kg	5.70E-03	1.76E-02	5.70E-03	U
102680	AOBSB0101	0-1	042396	p,p'-DDD	Pesticides/PCBs	mg/kg	1.10E-03	3.51E-03	1.10E-03	UJ
102680	AOBSB0101	0-1	042396	p,p'-DDE	Pesticides/PCBs	mg/kg	9.00E-04	3.51E-03	9.00E-04	UJ
102680	AOBSB0101	0-1	042396	p,p'-DDT	Pesticides/PCBs	mg/kg	1.10E-03	3.51E-03	1.10E-03	UJ
102680	AOBSB0101	0-1	042396	Toxaphene	Pesticides/PCBs	mg/kg	5.30E-02	1.76E-01	5.30E-02	U
102680	AOBSB0101	0-1	042396	Aluminum	TAL Inorganics	mg/kg	1.90E+00	1.94E+01	3.27E+03	
102680	AOBSB0101	0-1	042396	Antimony	TAL Inorganics	mg/kg	3.50E-01	3.65E+00	3.50E-01	U
102680	AOBSB0101	0-1	042396	Arsenic	TAL Inorganics	mg/kg	1.11E+00	1.16E+01	1.11E+00	U
102680	AOBSB0101	0-1	042396	Barium	TAL Inorganics	mg/kg	1.10E-01	1.15E+00	1.46E+01	
102680	AOBSB0101	0-1	042396	Beryllium	TAL Inorganics	mg/kg	3.00E-02	2.61E-01	8.55E-02	J
102680	AOBSB0101	0-1	042396	Cadmium	TAL Inorganics	mg/kg	4.00E-02	4.17E-01	4.38E-02	J
102680	AOBSB0101	0-1	042396	Calcium	TAL Inorganics	mg/kg	1.68E+00	1.75E+01	7.96E+01	
102680	AOBSB0101	0-1	042396	Chromium	TAL Inorganics	mg/kg	9.00E-02	9.39E-01	2.90E+00	
102680	AOBSB0101	0-1	042396	Cobalt	TAL Inorganics	mg/kg	8.00E-02	8.34E-01	7.42E-01	J
102680	AOBSB0101	0-1	042396	Copper	TAL Inorganics	mg/kg	1.00E-01	1.04E+00	1.60E+00	
102680	AOBSB0101	0-1	042396	Cyanide	TAL Inorganics	mg/kg	8.00E-02	8.00E-01	8.00E-02	U
102680	AOBSB0101	0-1	042396	Iron	TAL Inorganics	mg/kg	2.19E+00	2.28E+01	1.96E+03	
102680	AOBSB0101	0-1	042396	Lead	TAL Inorganics	mg/kg	5.90E-01	6.15E+00	2.60E+00	J
102680	AOBSB0101	0-1	042396	Magnesium	TAL Inorganics	mg/kg	8.70E-01	9.07E+00	6.45E+01	
102680	AOBSB0101	0-1	042396	Manganese	TAL Inorganics	mg/kg	2.00E-02	2.09E-01	6.99E+01	
102680	AOBSB0101	0-1	042396	Mercury	TAL Inorganics	mg/kg	1.30E-02	1.40E-01	2.00E-02	J
102680	AOBSB0101	0-1	042396	Nickel	TAL Inorganics	mg/kg	1.70E-01	1.77E+00	1.40E+00	J
102680	AOBSB0101	0-1	042396	Potassium	TAL Inorganics	mg/kg	6.70E+00	6.99E+01	4.93E+01	J
102680	AOBSB0101	0-1	042396	Selenium	TAL Inorganics	mg/kg	1.04E+00	1.08E+01	1.04E+00	U
102680	AOBSB0101	0-1	042396	Silver	TAL Inorganics	mg/kg	9.00E-02	9.39E-01	9.00E-02	U
102680	AOBSB0101	0-1	042396	Sodium	TAL Inorganics	mg/kg	1.29E+01	1.35E+02	1.29E+01	U
102680	AOBSB0101	0-1	042396	Thallium	TAL Inorganics	mg/kg	8.50E-01	8.87E+00	8.50E-01	U
102680	AOBSB0101	0-1	042396	Vanadium	TAL Inorganics	mg/kg	7.00E-02	7.30E-01	4.50E+00	
102680	AOBSB0101	0-1	042396	Zinc	TAL Inorganics	mg/kg	1.61E+00	1.68E+01	2.90E+00	J

Appendix B
Phase I Soil Analytical Results for the 716-A Motor Shops Seepage Basin

Sample ID	Sample Name	Sample Depth	Sample Date	Analyte	Analyte Class	Units	MDL	EQL	Result	Result Qualifier
102680	AOBSB0101	0-1	042396	Gross Alpha	Radiologicals	pCi/g	4.00E+00	3.33E+00	4.00E+00	UI
102680	AOBSB0101	0-1	042396	Non-volatile Beta	Radiologicals	pCi/g	1.00E+01	1.67E+00	1.00E+01	UI
102680	AOBSB0101	0-1	042396	Cation exchange capacity	Miscellaneous	Meq/	6.00E+00	3.16E+02	6.00E+00	U
102680	AOBSB0101	0-1	042396	Total Organic Carbon	Miscellaneous	mg/kg	8.40E+00	6.00E+01	2.60E+03	
102680	AOBSB0101	0-1	042396	Total petroleum hydrocarbons	Miscellaneous	mg/kg	3.30E+00	1.12E+01	3.30E+00	UJ
102681	AOBSB0102	1-4	042396	1,1,1-Trichloroethane	Volatiles	mg/kg	9.71E-04	5.50E-03	1.14E-03	J
102681	AOBSB0102	1-4	042396	1,1,2,2-Tetrachloroethane	Volatiles	mg/kg	3.47E-03	5.50E-03	3.47E-03	U
102681	AOBSB0102	1-4	042396	1,1,2-Trichloroethane	Volatiles	mg/kg	2.40E-03	5.50E-03	2.40E-03	U
102681	AOBSB0102	1-4	042396	1,1-Dichloroethane	Volatiles	mg/kg	1.05E-03	5.50E-03	1.05E-03	U
102681	AOBSB0102	1-4	042396	1,1-Dichloroethene	Volatiles	mg/kg	1.42E-03	5.50E-03	1.42E-03	U
102681	AOBSB0102	1-4	042396	1,2-Dichloroethane	Volatiles	mg/kg	1.34E-03	5.50E-03	1.34E-03	U
102681	AOBSB0102	1-4	042396	1,2-Dichloroethene (total)	Volatiles	mg/kg	8.54E-04	5.50E-03	8.54E-04	U
102681	AOBSB0102	1-4	042396	1,2-Dichloropropane	Volatiles	mg/kg	1.67E-03	5.50E-03	1.67E-03	U
102681	AOBSB0102	1-4	042396	2-Butanone (MEK)	Volatiles	mg/kg	2.81E-03	1.10E-02	2.81E-03	U
102681	AOBSB0102	1-4	042396	2-Hexanone	Volatiles	mg/kg	3.77E-03	1.10E-02	3.77E-03	U
102681	AOBSB0102	1-4	042396	4-Methyl-2-pentanone	Volatiles	mg/kg	3.29E-03	1.10E-02	3.29E-03	U
102681	AOBSB0102	1-4	042396	Acetone	Volatiles	mg/kg	4.04E-03	1.10E-02	4.04E-03	U
102681	AOBSB0102	1-4	042396	Benzene	Volatiles	mg/kg	7.52E-04	5.50E-03	7.52E-04	U
102681	AOBSB0102	1-4	042396	Bromodichloromethane	Volatiles	mg/kg	1.74E-03	5.50E-03	1.74E-03	U
102681	AOBSB0102	1-4	042396	Bromoform	Volatiles	mg/kg	2.93E-03	5.50E-03	2.93E-03	U
102681	AOBSB0102	1-4	042396	Bromomethane (Methyl bromide)	Volatiles	mg/kg	2.01E-03	1.10E-02	2.01E-03	U
102681	AOBSB0102	1-4	042396	Carbon disulfide	Volatiles	mg/kg	1.71E-03	5.50E-03	1.71E-03	U
102681	AOBSB0102	1-4	042396	Carbon tetrachloride	Volatiles	mg/kg	9.71E-04	5.50E-03	9.71E-04	U
102681	AOBSB0102	1-4	042396	Chlorobenzene	Volatiles	mg/kg	1.74E-03	5.50E-03	1.74E-03	U
102681	AOBSB0102	1-4	042396	Chlorodibromomethane	Volatiles	mg/kg	2.53E-03	5.50E-03	2.53E-03	U
102681	AOBSB0102	1-4	042396	Chloroethane	Volatiles	mg/kg	2.06E-03	1.10E-02	2.06E-03	U
102681	AOBSB0102	1-4	042396	Chloroform	Volatiles	mg/kg	1.11E-03	5.50E-03	1.11E-03	U
102681	AOBSB0102	1-4	042396	Chloromethane (methyl chloride)	Volatiles	mg/kg	3.20E-03	1.10E-02	3.20E-03	U
102681	AOBSB0102	1-4	042396	cis-1,3-Dichloropropene	Volatiles	mg/kg	1.79E-03	5.50E-03	1.79E-03	U
102681	AOBSB0102	1-4	042396	Dichloromethane (methylene chlo	Volatiles	mg/kg	1.83E-03	5.50E-03	1.83E-03	U

Appendix B
Phase I Soil Analytical Results for the 716-A Motor Shops Seepage Basin

Sample ID	Sample Name	Sample Depth	Sample Date	Analyte	Analyte Class	Units	MDL	EQL	Result	Result Qualifier
102681	AOBSB0102	1-4	042396	Ethylbenzene	Volatiles	mg/kg	1.47E-03	5.50E-03	1.47E-03	U
102681	AOBSB0102	1-4	042396	Styrene	Volatiles	mg/kg	1.98E-03	5.50E-03	1.98E-03	U
102681	AOBSB0102	1-4	042396	Tetrachloroethene	Volatiles	mg/kg	1.17E-03	5.50E-03	2.97E-03	J
102681	AOBSB0102	1-4	042396	Toluene	Volatiles	mg/kg	1.45E-03	5.50E-03	1.45E-03	U
102681	AOBSB0102	1-4	042396	trans-1,3-Dichloropropene	Volatiles	mg/kg	2.08E-03	5.50E-03	2.08E-03	U
102681	AOBSB0102	1-4	042396	Trichloroethene (TCE)	Volatiles	mg/kg	2.09E-03	5.50E-03	2.09E-03	U
102681	AOBSB0102	1-4	042396	Vinyl acetate	Volatiles	mg/kg	5.48E-03	1.10E-02	5.48E-03	U
102681	AOBSB0102	1-4	042396	Vinyl chloride	Volatiles	mg/kg	2.47E-03	1.10E-02	2.47E-03	U
102681	AOBSB0102	1-4	042396	Xylenes (total)	Volatiles	mg/kg	1.53E-03	5.50E-03	1.53E-03	U
102681	AOBSB0102	1-4	042396	1,2,4-Trichlorobenzene	Semivolatiles	mg/kg	1.80E-02	3.48E-01	1.80E-02	U
102681	AOBSB0102	1-4	042396	1,2-Dichlorobenzene	Semivolatiles	mg/kg	1.70E-02	3.48E-01	1.70E-02	U
102681	AOBSB0102	1-4	042396	1,3-Dichlorobenzene	Semivolatiles	mg/kg	1.80E-02	3.48E-01	1.80E-02	U
102681	AOBSB0102	1-4	042396	1,4-Dichlorobenzene	Semivolatiles	mg/kg	1.80E-02	3.48E-01	1.80E-02	U
102681	AOBSB0102	1-4	042396	2,4,5-Trichlorophenol	Semivolatiles	mg/kg	1.40E-02	1.74E+00	1.40E-02	U
102681	AOBSB0102	1-4	042396	2,4,6-Trichlorophenol	Semivolatiles	mg/kg	1.10E-02	3.48E-01	1.10E-02	U
102681	AOBSB0102	1-4	042396	2,4-Dichlorophenol	Semivolatiles	mg/kg	1.30E-02	3.48E-01	1.30E-02	U
102681	AOBSB0102	1-4	042396	2,4-Dimethyl phenol	Semivolatiles	mg/kg	2.60E-02	3.48E-01	2.60E-02	U
102681	AOBSB0102	1-4	042396	2,4-Dinitrophenol	Semivolatiles	mg/kg	4.40E-02	1.74E+00	4.40E-02	U
102681	AOBSB0102	1-4	042396	2,4-Dinitrotoluene	Semivolatiles	mg/kg	1.90E-02	3.48E-01	1.90E-02	U
102681	AOBSB0102	1-4	042396	2,6-Dinitrotoluene	Semivolatiles	mg/kg	1.60E-02	3.48E-01	1.60E-02	U
102681	AOBSB0102	1-4	042396	2-Chloronaphthalene	Semivolatiles	mg/kg	1.60E-02	3.48E-01	1.60E-02	U
102681	AOBSB0102	1-4	042396	2-Chlorophenol	Semivolatiles	mg/kg	1.70E-02	3.48E-01	1.70E-02	U
102681	AOBSB0102	1-4	042396	2-Methyl-4,6-dinitrophenol	Semivolatiles	mg/kg	1.10E-02	1.74E+00	1.10E-02	U
102681	AOBSB0102	1-4	042396	2-Methylnaphthalene	Semivolatiles	mg/kg	1.70E-02	3.48E-01	1.70E-02	U
102681	AOBSB0102	1-4	042396	2-Nitroaniline	Semivolatiles	mg/kg	1.90E-02	1.74E+00	1.90E-02	U
102681	AOBSB0102	1-4	042396	2-Nitrophenol	Semivolatiles	mg/kg	1.70E-02	3.48E-01	1.70E-02	U
102681	AOBSB0102	1-4	042396	3,3'-Dichlorobenzidine	Semivolatiles	mg/kg	7.30E-02	6.96E-01	7.30E-02	U
102681	AOBSB0102	1-4	042396	3-Nitroaniline	Semivolatiles	mg/kg	4.20E-02	1.74E+00	4.20E-02	U
102681	AOBSB0102	1-4	042396	4-Bromophenyl phenyl ether	Semivolatiles	mg/kg	1.00E-02	3.48E-01	1.00E-02	U
102681	AOBSB0102	1-4	042396	4-Chloro-3-methylphenol (p-chlo	Semivolatiles	mg/kg	1.80E-02	3.48E-01	1.80E-02	U

Appendix B
Phase I Soil Analytical Results for the 716-A Motor Shops Seepage Basin

Sample ID	Sample Name	Sample Depth	Sample Date	Analyte	Analyte Class	Units	MDL	EQL	Result	Result Qualifier
102681	AOBSB0102	1-4	042396	4-Chloroaniline	Semivolatiles	mg/kg	6.00E-03	3.48E-01	6.00E-03	U
102681	AOBSB0102	1-4	042396	4-Chlorophenyl phenyl ether	Semivolatiles	mg/kg	1.30E-02	3.48E-01	1.30E-02	U
102681	AOBSB0102	1-4	042396	4-Nitroaniline	Semivolatiles	mg/kg	2.00E-02	1.74E+00	2.00E-02	U
102681	AOBSB0102	1-4	042396	4-Nitrophenol	Semivolatiles	mg/kg	4.90E-02	1.74E+00	4.90E-02	U
102681	AOBSB0102	1-4	042396	Acenapthene	Semivolatiles	mg/kg	1.50E-02	3.48E-01	1.50E-02	U
102681	AOBSB0102	1-4	042396	Acenapthylene	Semivolatiles	mg/kg	1.60E-02	3.48E-01	1.60E-02	U
102681	AOBSB0102	1-4	042396	Anthracene	Semivolatiles	mg/kg	1.60E-02	3.48E-01	1.60E-02	U
102681	AOBSB0102	1-4	042396	Benzo(a)anthracene	Semivolatiles	mg/kg	2.00E-02	3.48E-01	2.00E-02	U
102681	AOBSB0102	1-4	042396	Benzo(a)pyrene	Semivolatiles	mg/kg	2.40E-02	3.48E-01	2.40E-02	U
102681	AOBSB0102	1-4	042396	Benzo(b)fluoranthene	Semivolatiles	mg/kg	2.30E-02	3.48E-01	2.30E-02	U
102681	AOBSB0102	1-4	042396	Benzo(g,h,i)perylene	Semivolatiles	mg/kg	1.60E-02	3.48E-01	1.60E-02	U
102681	AOBSB0102	1-4	042396	Benzo(k)fluoranthene	Semivolatiles	mg/kg	2.20E-02	3.48E-01	2.20E-02	U
102681	AOBSB0102	1-4	042396	Benzoic acid	Semivolatiles	mg/kg	3.40E-02	1.74E+00	3.40E-02	U
102681	AOBSB0102	1-4	042396	Benzyl alcohol	Semivolatiles	mg/kg	1.90E-02	3.48E-01	1.90E-02	U
102681	AOBSB0102	1-4	042396	Bis(2-chloroethoxy) methane	Semivolatiles	mg/kg	1.60E-02	3.48E-01	1.60E-02	U
102681	AOBSB0102	1-4	042396	Bis(2-chloroethyl) ether	Semivolatiles	mg/kg	2.20E-02	3.48E-01	2.20E-02	U
102681	AOBSB0102	1-4	042396	Bis(2-chloroisopropyl) ether	Semivolatiles	mg/kg	1.80E-02	3.48E-01	1.80E-02	U
102681	AOBSB0102	1-4	042396	Bis(2-ethylhexyl) phthalate	Semivolatiles	mg/kg	2.20E-02	3.48E-01	2.20E-02	U
102681	AOBSB0102	1-4	042396	Butyl benzyl phthalate	Semivolatiles	mg/kg	2.10E-02	3.48E-01	2.10E-02	U
102681	AOBSB0102	1-4	042396	Chrysene	Semivolatiles	mg/kg	1.90E-02	3.48E-01	1.90E-02	U
102681	AOBSB0102	1-4	042396	Di-n-butyl phthalate	Semivolatiles	mg/kg	1.90E-02	3.48E-01	1.90E-02	U
102681	AOBSB0102	1-4	042396	Di-n-octyl phthalate	Semivolatiles	mg/kg	2.60E-02	3.48E-01	2.60E-02	U
102681	AOBSB0102	1-4	042396	Dibenzo(a,h)anthracene	Semivolatiles	mg/kg	1.70E-02	3.48E-01	1.70E-02	U
102681	AOBSB0102	1-4	042396	Dibenzofuran	Semivolatiles	mg/kg	1.60E-02	3.48E-01	1.60E-02	U
102681	AOBSB0102	1-4	042396	Diethyl phthalate	Semivolatiles	mg/kg	1.60E-02	3.48E-01	1.60E-02	U
102681	AOBSB0102	1-4	042396	Dimethyl phthalate	Semivolatiles	mg/kg	1.50E-02	3.48E-01	1.50E-02	U
102681	AOBSB0102	1-4	042396	Fluoranthene	Semivolatiles	mg/kg	1.90E-02	3.48E-01	1.90E-02	U
102681	AOBSB0102	1-4	042396	Fluorene	Semivolatiles	mg/kg	1.60E-02	3.48E-01	1.60E-02	U
102681	AOBSB0102	1-4	042396	Hexachlorobenzene	Semivolatiles	mg/kg	1.00E-02	3.48E-01	1.00E-02	U
102681	AOBSB0102	1-4	042396	Hexachlorobutadiene	Semivolatiles	mg/kg	1.50E-02	3.48E-01	1.50E-02	U

Appendix B
Phase I Soil Analytical Results for the 716-A Motor Shops Seepage Basin

Sample ID	Sample Name	Sample Depth	Sample Date	Analyte	Analyte Class	Units	MDL	EQL	Result	Result Qualifier
102681	AOBSB0102	1-4	042396	Hexachlorocyclopentadiene	Semivolatiles	mg/kg	2.60E-02	3.48E-01	2.60E-02	U
102681	AOBSB0102	1-4	042396	Hexachloroethane	Semivolatiles	mg/kg	1.60E-02	3.48E-01	1.60E-02	U
102681	AOBSB0102	1-4	042396	Indeno(1,2,3-c,d)pyrene	Semivolatiles	mg/kg	1.80E-02	3.48E-01	1.80E-02	U
102681	AOBSB0102	1-4	042396	Isophorone	Semivolatiles	mg/kg	1.70E-02	3.48E-01	1.70E-02	U
102681	AOBSB0102	1-4	042396	N-Nitrosodi-n-propylamine	Semivolatiles	mg/kg	2.00E-02	3.48E-01	2.00E-02	U
102681	AOBSB0102	1-4	042396	N-Nitrosodiphenylamine	Semivolatiles	mg/kg	1.40E-02	3.48E-01	1.40E-02	U
102681	AOBSB0102	1-4	042396	Naphthalene	Semivolatiles	mg/kg	1.90E-02	3.48E-01	1.90E-02	U
102681	AOBSB0102	1-4	042396	Nitrobenzene	Semivolatiles	mg/kg	1.90E-02	3.48E-01	1.90E-02	U
102681	AOBSB0102	1-4	042396	o-cresol (2-methylphenol)	Semivolatiles	mg/kg	1.60E-02	3.48E-01	1.60E-02	U
102681	AOBSB0102	1-4	042396	p-cresol (4-methylphenol)	Semivolatiles	mg/kg	1.70E-02	3.48E-01	1.70E-02	U
102681	AOBSB0102	1-4	042396	Pentachlorophenol	Semivolatiles	mg/kg	3.90E-02	1.74E+00	3.90E-02	U
102681	AOBSB0102	1-4	042396	Phenanthrene	Semivolatiles	mg/kg	1.50E-02	3.48E-01	1.50E-02	U
102681	AOBSB0102	1-4	042396	Phenol	Semivolatiles	mg/kg	1.90E-02	3.48E-01	1.90E-02	U
102681	AOBSB0102	1-4	042396	Pyrene	Semivolatiles	mg/kg	2.10E-02	3.48E-01	2.10E-02	U
102681	AOBSB0102	1-4	042396	Aldol condensate	SVOA TICs	mg/kg	0.00E+00	0.00E+00	3.00E-01	J
102681	AOBSB0102	1-4	042396	Unknown	SVOA TICs	mg/kg	0.00E+00	0.00E+00	2.00E-01	J
102681	AOBSB0102	1-4	042396	Aldrin	Pesticides/PCBs	mg/kg	5.70E-04	1.74E-03	5.70E-04	U
102681	AOBSB0102	1-4	042396	alpha-Benzene hexachloride	Pesticides/PCBs	mg/kg	5.70E-04	1.74E-03	5.70E-04	U
102681	AOBSB0102	1-4	042396	alpha-Chlordane	Pesticides/PCBs	mg/kg	5.70E-04	1.74E-03	5.70E-04	U
102681	AOBSB0102	1-4	042396	Aroclor 1016	Pesticides/PCBs	mg/kg	1.10E-02	3.48E-02	1.10E-02	U
102681	AOBSB0102	1-4	042396	Aroclor 1221	Pesticides/PCBs	mg/kg	2.20E-02	6.97E-02	2.20E-02	U
102681	AOBSB0102	1-4	042396	Aroclor 1232	Pesticides/PCBs	mg/kg	1.10E-02	3.48E-02	1.10E-02	U
102681	AOBSB0102	1-4	042396	Aroclor 1242	Pesticides/PCBs	mg/kg	1.10E-02	3.48E-02	1.10E-02	U
102681	AOBSB0102	1-4	042396	Aroclor 1248	Pesticides/PCBs	mg/kg	1.10E-02	3.48E-02	1.10E-02	U
102681	AOBSB0102	1-4	042396	Aroclor 1254	Pesticides/PCBs	mg/kg	1.10E-02	3.48E-02	1.10E-02	U
102681	AOBSB0102	1-4	042396	Aroclor 1260	Pesticides/PCBs	mg/kg	1.10E-02	3.48E-02	1.10E-02	U
102681	AOBSB0102	1-4	042396	beta-Benzene hexachloride	Pesticides/PCBs	mg/kg	5.70E-04	1.74E-03	5.70E-04	U
102681	AOBSB0102	1-4	042396	delta-Benzene hexachloride	Pesticides/PCBs	mg/kg	5.70E-04	1.74E-03	5.70E-04	U
102681	AOBSB0102	1-4	042396	Dieldrin	Pesticides/PCBs	mg/kg	6.33E-04	3.48E-03	6.33E-04	U
102681	AOBSB0102	1-4	042396	Endosulfan I	Pesticides/PCBs	mg/kg	5.70E-04	1.74E-03	5.70E-04	U

Appendix B
Phase I Soil Analytical Results for the 716-A Motor Shops Seepage Basin

Sample ID	Sample Name	Sample Depth	Sample Date	Analyte	Analyte Class	Units	MDL	EQL	Result	Result Qualifier
102681	AOBSB0102	1-4	042396	Endosulfan II	Pesticides/PCBs	mg/kg	9.00E-04	3.48E-03	9.00E-04	U
102681	AOBSB0102	1-4	042396	Endosulfan sulfate	Pesticides/PCBs	mg/kg	1.10E-03	3.48E-03	1.10E-03	U
102681	AOBSB0102	1-4	042396	Endrin	Pesticides/PCBs	mg/kg	1.10E-03	3.48E-03	1.10E-03	UJ
102681	AOBSB0102	1-4	042396	Endrin ketone	Pesticides/PCBs	mg/kg	1.10E-03	3.48E-03	1.10E-03	UJ
102681	AOBSB0102	1-4	042396	gamma-Benzene hexachloride (Lin	Pesticides/PCBs	mg/kg	5.70E-04	1.74E-03	5.70E-04	U
102681	AOBSB0102	1-4	042396	gamma-Chlordane	Pesticides/PCBs	mg/kg	5.70E-04	1.74E-03	5.70E-04	U
102681	AOBSB0102	1-4	042396	Heptachlor	Pesticides/PCBs	mg/kg	5.70E-04	1.74E-03	5.70E-04	U
102681	AOBSB0102	1-4	042396	Heptachlor epoxide	Pesticides/PCBs	mg/kg	5.70E-04	1.74E-03	5.70E-04	U
102681	AOBSB0102	1-4	042396	Methoxychlor (Mariate)	Pesticides/PCBs	mg/kg	5.70E-03	1.74E-02	5.70E-03	U
102681	AOBSB0102	1-4	042396	p,p'-DDD	Pesticides/PCBs	mg/kg	1.10E-03	3.48E-03	1.10E-03	UJ
102681	AOBSB0102	1-4	042396	p,p'-DDE	Pesticides/PCBs	mg/kg	9.00E-04	3.48E-03	9.00E-04	UJ
102681	AOBSB0102	1-4	042396	p,p'-DDT	Pesticides/PCBs	mg/kg	1.10E-03	3.48E-03	1.10E-03	UJ
102681	AOBSB0102	1-4	042396	Toxaphene	Pesticides/PCBs	mg/kg	5.30E-02	1.74E-01	5.30E-02	U
102681	AOBSB0102	1-4	042396	Aluminum	TAL Inorganics	mg/kg	1.90E+00	1.89E+01	1.97E+03	
102681	AOBSB0102	1-4	042396	Antimony	TAL Inorganics	mg/kg	3.50E-01	3.55E+00	2.00E+00	J
102681	AOBSB0102	1-4	042396	Arsenic	TAL Inorganics	mg/kg	1.11E+00	1.13E+01	1.11E+00	U
102681	AOBSB0102	1-4	042396	Barium	TAL Inorganics	mg/kg	1.10E-01	1.12E+00	9.10E+00	
102681	AOBSB0102	1-4	042396	Beryllium	TAL Inorganics	mg/kg	3.00E-02	2.54E-01	5.78E-02	J
102681	AOBSB0102	1-4	042396	Cadmium	TAL Inorganics	mg/kg	4.00E-02	4.06E-01	4.00E-02	U
102681	AOBSB0102	1-4	042396	Calcium	TAL Inorganics	mg/kg	1.68E+00	1.70E+01	5.32E+01	
102681	AOBSB0102	1-4	042396	Chromium	TAL Inorganics	mg/kg	9.00E-02	9.13E-01	2.40E+00	
102681	AOBSB0102	1-4	042396	Cobalt	TAL Inorganics	mg/kg	8.00E-02	8.11E-01	6.80E-01	J
102681	AOBSB0102	1-4	042396	Copper	TAL Inorganics	mg/kg	1.00E-01	1.01E+00	1.00E+00	J
102681	AOBSB0102	1-4	042396	Cyanide	TAL Inorganics	mg/kg	8.00E-02	7.90E-01	8.00E-02	U
102681	AOBSB0102	1-4	042396	Iron	TAL Inorganics	mg/kg	2.19E+00	2.22E+01	1.30E+03	
102681	AOBSB0102	1-4	042396	Lead	TAL Inorganics	mg/kg	5.90E-01	5.98E+00	2.50E+00	J
102681	AOBSB0102	1-4	042396	Magnesium	TAL Inorganics	mg/kg	8.70E-01	8.82E+00	4.69E+01	
102681	AOBSB0102	1-4	042396	Manganese	TAL Inorganics	mg/kg	2.00E-02	2.03E-01	2.79E+01	
102681	AOBSB0102	1-4	042396	Mercury	TAL Inorganics	mg/kg	1.30E-02	1.39E-01	2.00E-02	J
102681	AOBSB0102	1-4	042396	Nickel	TAL Inorganics	mg/kg	1.70E-01	1.72E+00	1.10E+00	J

Appendix B
Phase I Soil Analytical Results for the 716-A Motor Shops Seepage Basin

Sample ID	Sample Name	Sample Depth	Sample Date	Analyte	Analyte Class	Units	MDL	EQL	Result	Result Qualifier
102681	AOBSB0102	1-4	042396	Potassium	TAL Inorganics	mg/kg	6.70E+00	6.79E+01	3.61E+01	J
102681	AOBSB0102	1-4	042396	Selenium	TAL Inorganics	mg/kg	1.04E+00	1.05E+01	1.04E+00	U
102681	AOBSB0102	1-4	042396	Silver	TAL Inorganics	mg/kg	9.00E-02	9.13E-01	9.00E-02	U
102681	AOBSB0102	1-4	042396	Sodium	TAL Inorganics	mg/kg	1.29E+01	1.31E+02	1.29E+01	U
102681	AOBSB0102	1-4	042396	Thallium	TAL Inorganics	mg/kg	8.50E-01	8.62E+00	8.50E-01	U
102681	AOBSB0102	1-4	042396	Vanadium	TAL Inorganics	mg/kg	7.00E-02	7.10E-01	2.80E+00	
102681	AOBSB0102	1-4	042396	Zinc	TAL Inorganics	mg/kg	1.61E+00	1.63E+01	1.80E+00	J
102681	AOBSB0102	1-4	042396	Gross Alpha	Radiologicals	pCi/g	4.00E+00	3.31E+00	4.00E+00	UI
102681	AOBSB0102	1-4	042396	Non-volatile Beta	Radiologicals	pCi/g	1.00E+01	1.63E+00	1.46E+01	
102681	AOBSB0102	1-4	042396	Cation exchange capacity	Miscellaneous	Meq/	6.00E+00	3.14E+02	6.00E+00	U
102681	AOBSB0102	1-4	042396	Total Organic Carbon	Miscellaneous	mg/kg	8.40E+00	6.00E+01	3.02E+02	
102681	AOBSB0102	1-4	042396	Total petroleum hydrocarbons	Miscellaneous	mg/kg	3.30E+00	1.11E+01	3.30E+00	UJ
102676	AOBSB0201	0-1	042396	1,1,1-Trichloroethane	Volatiles	mg/kg	9.71E-04	5.50E-03	1.03E-02	J
102676	AOBSB0201	0-1	042396	1,1,2,2-Tetrachloroethane	Volatiles	mg/kg	3.47E-03	5.50E-03	3.47E-03	UJ
102676	AOBSB0201	0-1	042396	1,1,2-Trichloroethane	Volatiles	mg/kg	2.40E-03	5.50E-03	2.40E-03	UJ
102676	AOBSB0201	0-1	042396	1,1-Dichloroethane	Volatiles	mg/kg	1.05E-03	5.50E-03	1.05E-03	UJ
102676	AOBSB0201	0-1	042396	1,1-Dichloroethene	Volatiles	mg/kg	1.42E-03	5.50E-03	1.42E-03	UJ
102676	AOBSB0201	0-1	042396	1,2-Dichloroethane	Volatiles	mg/kg	1.34E-03	5.50E-03	1.34E-03	UJ
102676	AOBSB0201	0-1	042396	1,2-Dichloroethene (total)	Volatiles	mg/kg	8.54E-04	5.50E-03	8.54E-04	UJ
102676	AOBSB0201	0-1	042396	1,2-Dichloropropane	Volatiles	mg/kg	1.67E-03	5.50E-03	1.67E-03	UJ
102676	AOBSB0201	0-1	042396	2-Butanone (MEK)	Volatiles	mg/kg	2.81E-03	1.10E-02	2.81E-03	UJ
102676	AOBSB0201	0-1	042396	2-Hexanone	Volatiles	mg/kg	3.77E-03	1.10E-02	3.77E-03	UJ
102676	AOBSB0201	0-1	042396	4-Methyl-2-pentanone	Volatiles	mg/kg	3.29E-03	1.10E-02	3.29E-03	UJ
102676	AOBSB0201	0-1	042396	Acetone	Volatiles	mg/kg	4.04E-03	1.10E-02	4.04E-03	UJ
102676	AOBSB0201	0-1	042396	Benzene	Volatiles	mg/kg	7.52E-04	5.50E-03	7.52E-04	UJ
102676	AOBSB0201	0-1	042396	Bromodichloromethane	Volatiles	mg/kg	1.74E-03	5.50E-03	1.74E-03	UJ
102676	AOBSB0201	0-1	042396	Bromoform	Volatiles	mg/kg	2.93E-03	5.50E-03	2.93E-03	UJ
102676	AOBSB0201	0-1	042396	Bromomethane (Methyl bromide)	Volatiles	mg/kg	2.01E-03	1.10E-02	2.01E-03	UJ
102676	AOBSB0201	0-1	042396	Carbon disulfide	Volatiles	mg/kg	1.71E-03	5.50E-03	1.71E-03	UJ
102676	AOBSB0201	0-1	042396	Carbon tetrachloride	Volatiles	mg/kg	9.71E-04	5.50E-03	9.71E-04	UJ

Appendix B
Phase I Soil Analytical Results for the 716-A Motor Shops Seepage Basin

Sample ID	Sample Name	Sample Depth	Sample Date	Analyte	Analyte Class	Units	MDL	EQL	Result	Result Qualifier
102676	AOBSB0201	0-1	042396	Chlorobenzene	Volatiles	mg/kg	1.74E-03	5.50E-03	1.74E-03	UJ
102676	AOBSB0201	0-1	042396	Chlorodibromomethane	Volatiles	mg/kg	2.53E-03	5.50E-03	2.53E-03	UJ
102676	AOBSB0201	0-1	042396	Chloroethane	Volatiles	mg/kg	2.06E-03	1.10E-02	2.06E-03	UJ
102676	AOBSB0201	0-1	042396	Chloroform	Volatiles	mg/kg	1.11E-03	5.50E-03	1.11E-03	UJ
102676	AOBSB0201	0-1	042396	Chloromethane (methyl chloride)	Volatiles	mg/kg	3.20E-03	1.10E-02	3.20E-03	UJ
102676	AOBSB0201	0-1	042396	cis-1,3-Dichloropropene	Volatiles	mg/kg	1.79E-03	5.50E-03	1.79E-03	UJ
102676	AOBSB0201	0-1	042396	Dichloromethane (methylene chlo	Volatiles	mg/kg	1.83E-03	5.50E-03	1.83E-03	UJ
102676	AOBSB0201	0-1	042396	Ethylbenzene	Volatiles	mg/kg	1.47E-03	5.50E-03	1.47E-03	UJ
102676	AOBSB0201	0-1	042396	Styrene	Volatiles	mg/kg	1.98E-03	5.50E-03	1.98E-03	UJ
102676	AOBSB0201	0-1	042396	Tetrachloroethene	Volatiles	mg/kg	1.17E-03	5.50E-03	6.32E-03	J
102676	AOBSB0201	0-1	042396	Toluene	Volatiles	mg/kg	1.45E-03	5.50E-03	1.45E-03	UJ
102676	AOBSB0201	0-1	042396	trans-1,3-Dichloropropene	Volatiles	mg/kg	2.08E-03	5.50E-03	2.08E-03	UJ
102676	AOBSB0201	0-1	042396	Trichloroethene (TCE)	Volatiles	mg/kg	2.09E-03	5.50E-03	2.09E-03	UJ
102676	AOBSB0201	0-1	042396	Vinyl acetate	Volatiles	mg/kg	5.48E-03	1.10E-02	5.48E-03	UJ
102676	AOBSB0201	0-1	042396	Vinyl chloride	Volatiles	mg/kg	2.47E-03	1.10E-02	2.47E-03	UJ
102676	AOBSB0201	0-1	042396	Xylenes (total)	Volatiles	mg/kg	1.53E-03	5.50E-03	1.53E-03	UJ
102676	AOBSB0201	0-1	042396	1,2,4-Trichlorobenzene	Semivolatiles	mg/kg	1.80E-02	3.52E-01	1.80E-02	U
102676	AOBSB0201	0-1	042396	1,2-Dichlorobenzene	Semivolatiles	mg/kg	1.70E-02	3.52E-01	1.70E-02	U
102676	AOBSB0201	0-1	042396	1,3-Dichlorobenzene	Semivolatiles	mg/kg	1.80E-02	3.52E-01	1.80E-02	U
102676	AOBSB0201	0-1	042396	1,4-Dichlorobenzene	Semivolatiles	mg/kg	1.80E-02	3.52E-01	1.80E-02	U
102676	AOBSB0201	0-1	042396	2,4,5-Trichlorophenol	Semivolatiles	mg/kg	1.40E-02	1.76E+00	1.40E-02	U
102676	AOBSB0201	0-1	042396	2,4,6-Trichlorophenol	Semivolatiles	mg/kg	1.10E-02	3.52E-01	1.10E-02	U
102676	AOBSB0201	0-1	042396	2,4-Dichlorophenol	Semivolatiles	mg/kg	1.30E-02	3.52E-01	1.30E-02	U
102676	AOBSB0201	0-1	042396	2,4-Dimethyl phenol	Semivolatiles	mg/kg	2.60E-02	3.52E-01	2.60E-02	U
102676	AOBSB0201	0-1	042396	2,4-Dinitrophenol	Semivolatiles	mg/kg	4.40E-02	1.76E+00	4.40E-02	U
102676	AOBSB0201	0-1	042396	2,4-Dinitrotoluene	Semivolatiles	mg/kg	1.90E-02	3.52E-01	1.90E-02	U
102676	AOBSB0201	0-1	042396	2,6-Dinitrotoluene	Semivolatiles	mg/kg	1.60E-02	3.52E-01	1.60E-02	U
102676	AOBSB0201	0-1	042396	2-Chloronaphthalene	Semivolatiles	mg/kg	1.60E-02	3.52E-01	1.60E-02	U
102676	AOBSB0201	0-1	042396	2-Chlorophenol	Semivolatiles	mg/kg	1.70E-02	3.52E-01	1.70E-02	U
102676	AOBSB0201	0-1	042396	2-Methyl-4,6-dinitrophenol	Semivolatiles	mg/kg	1.10E-02	1.76E+00	1.10E-02	U

Appendix B
Phase I Soil Analytical Results for the 716-A Motor Shops Seepage Basin

Sample ID	Sample Name	Sample Depth	Sample Date	Analyte	Analyte Class	Units	MDL	EQL	Result	Result Qualifier
102676	AOBSB0201	0-1	042396	2-Methylnaphthalene	Semivolatiles	mg/kg	1.70E-02	3.52E-01	1.70E-02	U
102676	AOBSB0201	0-1	042396	2-Nitroaniline	Semivolatiles	mg/kg	1.90E-02	1.76E+00	1.90E-02	U
102676	AOBSB0201	0-1	042396	2-Nitrophenol	Semivolatiles	mg/kg	1.70E-02	3.52E-01	1.70E-02	U
102676	AOBSB0201	0-1	042396	3,3'-Dichlorobenzidine	Semivolatiles	mg/kg	7.30E-02	7.04E-01	7.30E-02	U
102676	AOBSB0201	0-1	042396	3-Nitroaniline	Semivolatiles	mg/kg	4.20E-02	1.76E+00	4.20E-02	U
102676	AOBSB0201	0-1	042396	4-Bromophenyl phenyl ether	Semivolatiles	mg/kg	1.00E-02	3.52E-01	1.00E-02	U
102676	AOBSB0201	0-1	042396	4-Chloro-3-methylphenol (p-chlo	Semivolatiles	mg/kg	1.80E-02	3.52E-01	1.80E-02	U
102676	AOBSB0201	0-1	042396	4-Chloroaniline	Semivolatiles	mg/kg	6.00E-03	3.52E-01	6.00E-03	U
102676	AOBSB0201	0-1	042396	4-Chlorophenyl phenyl ether	Semivolatiles	mg/kg	1.30E-02	3.52E-01	1.30E-02	U
102676	AOBSB0201	0-1	042396	4-Nitroaniline	Semivolatiles	mg/kg	2.00E-02	1.76E+00	2.00E-02	U
102676	AOBSB0201	0-1	042396	4-Nitrophenol	Semivolatiles	mg/kg	4.90E-02	1.76E+00	4.90E-02	U
102676	AOBSB0201	0-1	042396	Acenapthene	Semivolatiles	mg/kg	1.50E-02	3.52E-01	1.00E-01	J
102676	AOBSB0201	0-1	042396	Acenapthylene	Semivolatiles	mg/kg	1.60E-02	3.52E-01	1.60E-02	U
102676	AOBSB0201	0-1	042396	Anthracene	Semivolatiles	mg/kg	1.60E-02	3.52E-01	2.30E-01	J
102676	AOBSB0201	0-1	042396	Benzo(a)anthracene	Semivolatiles	mg/kg	2.00E-02	3.52E-01	5.03E-01	
102676	AOBSB0201	0-1	042396	Benzo(a)pyrene	Semivolatiles	mg/kg	2.40E-02	3.52E-01	4.10E-01	
102676	AOBSB0201	0-1	042396	Benzo(b)fluoranthene	Semivolatiles	mg/kg	2.30E-02	3.52E-01	4.10E-01	
102676	AOBSB0201	0-1	042396	Benzo(g,h,i)perylene	Semivolatiles	mg/kg	1.60E-02	3.52E-01	2.67E-01	J
102676	AOBSB0201	0-1	042396	Benzo(k)fluoranthene	Semivolatiles	mg/kg	2.20E-02	3.52E-01	3.66E-01	
102676	AOBSB0201	0-1	042396	Benzoic acid	Semivolatiles	mg/kg	3.40E-02	1.76E+00	3.40E-02	U
102676	AOBSB0201	0-1	042396	Benzyl alcohol	Semivolatiles	mg/kg	1.90E-02	3.52E-01	1.90E-02	U
102676	AOBSB0201	0-1	042396	Bis(2-chloroethoxy) methane	Semivolatiles	mg/kg	1.60E-02	3.52E-01	1.60E-02	U
102676	AOBSB0201	0-1	042396	Bis(2-chloroethyl) ether	Semivolatiles	mg/kg	2.20E-02	3.52E-01	2.20E-02	U
102676	AOBSB0201	0-1	042396	Bis(2-chloroisopropyl) ether	Semivolatiles	mg/kg	1.80E-02	3.52E-01	1.80E-02	U
102676	AOBSB0201	0-1	042396	Bis(2-ethylhexyl) phthalate	Semivolatiles	mg/kg	2.20E-02	3.52E-01	2.20E-02	U
102676	AOBSB0201	0-1	042396	Butyl benzyl phthalate	Semivolatiles	mg/kg	2.10E-02	3.52E-01	2.10E-02	U
102676	AOBSB0201	0-1	042396	Chrysene	Semivolatiles	mg/kg	1.90E-02	3.52E-01	5.34E-01	
102676	AOBSB0201	0-1	042396	Di-n-butyl phthalate	Semivolatiles	mg/kg	1.90E-02	3.52E-01	1.90E-02	U
102676	AOBSB0201	0-1	042396	Di-n-octyl phthalate	Semivolatiles	mg/kg	2.60E-02	3.52E-01	2.60E-02	U
102676	AOBSB0201	0-1	042396	Dibenzo(a,h)anthracene	Semivolatiles	mg/kg	1.70E-02	3.52E-01	1.70E-02	U

Appendix B
Phase I Soil Analytical Results for the 716-A Motor Shops Seepage Basin

Sample ID	Sample Name	Sample Depth	Sample Date	Analyte	Analyte Class	Units	MDL	EQL	Result	Result Qualifier
102676	AOBSB0201	0-1	042396	Dibenzofuran	Semivolatiles	mg/kg	1.60E-02	3.52E-01	5.98E-02	J
102676	AOBSB0201	0-1	042396	Diethyl phthalate	Semivolatiles	mg/kg	1.60E-02	3.52E-01	1.60E-02	U
102676	AOBSB0201	0-1	042396	Dimethyl phthalate	Semivolatiles	mg/kg	1.50E-02	3.52E-01	1.50E-02	U
102676	AOBSB0201	0-1	042396	Fluoranthene	Semivolatiles	mg/kg	1.90E-02	3.52E-01	1.10E+00	
102676	AOBSB0201	0-1	042396	Fluorene	Semivolatiles	mg/kg	1.60E-02	3.52E-01	1.02E-01	J
102676	AOBSB0201	0-1	042396	Hexachlorobenzene	Semivolatiles	mg/kg	1.00E-02	3.52E-01	1.00E-02	U
102676	AOBSB0201	0-1	042396	Hexachlorobutadiene	Semivolatiles	mg/kg	1.50E-02	3.52E-01	1.50E-02	U
102676	AOBSB0201	0-1	042396	Hexachlorocyclopentadiene	Semivolatiles	mg/kg	2.60E-02	3.52E-01	2.60E-02	U
102676	AOBSB0201	0-1	042396	Hexachloroethane	Semivolatiles	mg/kg	1.60E-02	3.52E-01	1.60E-02	U
102676	AOBSB0201	0-1	042396	Indeno(1,2,3-c,d)pyrene	Semivolatiles	mg/kg	1.80E-02	3.52E-01	2.22E-01	J
102676	AOBSB0201	0-1	042396	Isophorone	Semivolatiles	mg/kg	1.70E-02	3.52E-01	1.70E-02	U
102676	AOBSB0201	0-1	042396	N-Nitrosodi-n-propylamine	Semivolatiles	mg/kg	2.00E-02	3.52E-01	2.00E-02	U
102676	AOBSB0201	0-1	042396	N-Nitrosodiphenylamine	Semivolatiles	mg/kg	1.40E-02	3.52E-01	1.40E-02	U
102676	AOBSB0201	0-1	042396	Naphthalene	Semivolatiles	mg/kg	1.90E-02	3.52E-01	1.90E-02	U
102676	AOBSB0201	0-1	042396	Nitrobenzene	Semivolatiles	mg/kg	1.90E-02	3.52E-01	1.90E-02	U
102676	AOBSB0201	0-1	042396	o-cresol (2-methylphenol)	Semivolatiles	mg/kg	1.60E-02	3.52E-01	1.60E-02	U
102676	AOBSB0201	0-1	042396	p-cresol (4-methylphenol)	Semivolatiles	mg/kg	1.70E-02	3.52E-01	1.70E-02	U
102676	AOBSB0201	0-1	042396	Pentachlorophenol	Semivolatiles	mg/kg	3.90E-02	1.76E+00	3.90E-02	U
102676	AOBSB0201	0-1	042396	Phenanthrene	Semivolatiles	mg/kg	1.50E-02	3.52E-01	9.48E-01	
102676	AOBSB0201	0-1	042396	Phenol	Semivolatiles	mg/kg	1.90E-02	3.52E-01	1.90E-02	U
102676	AOBSB0201	0-1	042396	Pyrene	Semivolatiles	mg/kg	2.10E-02	3.52E-01	8.95E-01	
102676	AOBSB0201	0-1	042396	Aldol condensate	SVOA TICs	mg/kg	0.00E+00	0.00E+00	6.00E-01	J
102676	AOBSB0201	0-1	042396	Aromatic	SVOA TICs	mg/kg	0.00E+00	0.00E+00	2.00E-01	J
102676	AOBSB0201	0-1	042396	Unknown	SVOA TICs	mg/kg	0.00E+00	0.00E+00	4.00E-01	J
102676	AOBSB0201	0-1	042396	Unknown	SVOA TICs	mg/kg	0.00E+00	0.00E+00	5.00E-01	J
102676	AOBSB0201	0-1	042396	Unknown	SVOA TICs	mg/kg	0.00E+00	0.00E+00	7.00E-01	J
102676	AOBSB0201	0-1	042396	Aldrin	Pesticides/PCBs	mg/kg	5.70E-04	1.76E-03	5.70E-04	UJ
102676	AOBSB0201	0-1	042396	alpha-Benzene hexachloride	Pesticides/PCBs	mg/kg	5.70E-04	1.76E-03	5.70E-04	UJ
102676	AOBSB0201	0-1	042396	alpha-Chlordane	Pesticides/PCBs	mg/kg	5.70E-04	1.76E-03	5.70E-04	UJ
102676	AOBSB0201	0-1	042396	Aroclor 1016	Pesticides/PCBs	mg/kg	1.10E-02	3.52E-02	1.10E-02	UJ

Appendix B
Phase I Soil Analytical Results for the 716-A Motor Shops Seepage Basin

Sample ID	Sample Name	Sample Depth	Sample Date	Analyte	Analyte Class	Units	MDL	EQL	Result	Result Qualifier
102676	AOBSB0201	0-1	042396	Aroclor 1221	Pesticides/PCBs	mg/kg	2.20E-02	7.04E-02	2.20E-02	UJ
102676	AOBSB0201	0-1	042396	Aroclor 1232	Pesticides/PCBs	mg/kg	1.10E-02	3.52E-02	1.10E-02	UJ
102676	AOBSB0201	0-1	042396	Aroclor 1242	Pesticides/PCBs	mg/kg	1.10E-02	3.52E-02	1.10E-02	UJ
102676	AOBSB0201	0-1	042396	Aroclor 1248	Pesticides/PCBs	mg/kg	1.10E-02	3.52E-02	1.10E-02	UJ
102676	AOBSB0201	0-1	042396	Aroclor 1254	Pesticides/PCBs	mg/kg	1.10E-02	3.52E-02	1.10E-02	UJ
102676	AOBSB0201	0-1	042396	Aroclor 1260	Pesticides/PCBs	mg/kg	1.10E-02	3.52E-02	6.76E-02	J
102676	AOBSB0201	0-1	042396	beta-Benzene hexachloride	Pesticides/PCBs	mg/kg	5.70E-04	1.76E-03	5.70E-04	UJ
102676	AOBSB0201	0-1	042396	delta-Benzene hexachloride	Pesticides/PCBs	mg/kg	5.70E-04	1.76E-03	5.70E-04	UJ
102676	AOBSB0201	0-1	042396	Dieldrin	Pesticides/PCBs	mg/kg	6.33E-04	3.52E-03	6.33E-04	UJ
102676	AOBSB0201	0-1	042396	Endosulfan I	Pesticides/PCBs	mg/kg	5.70E-04	1.76E-03	5.70E-04	UJ
102676	AOBSB0201	0-1	042396	Endosulfan II	Pesticides/PCBs	mg/kg	9.00E-04	3.52E-03	9.00E-04	UJ
102676	AOBSB0201	0-1	042396	Endosulfan sulfate	Pesticides/PCBs	mg/kg	1.10E-03	3.52E-03	1.10E-03	UJ
102676	AOBSB0201	0-1	042396	Endrin	Pesticides/PCBs	mg/kg	1.10E-03	3.52E-03	1.10E-03	UJ
102676	AOBSB0201	0-1	042396	Endrin ketone	Pesticides/PCBs	mg/kg	1.10E-03	3.52E-03	1.10E-03	UJ
102676	AOBSB0201	0-1	042396	gamma-Benzene hexachloride (Lin	Pesticides/PCBs	mg/kg	5.70E-04	1.76E-03	5.70E-04	UJ
102676	AOBSB0201	0-1	042396	gamma-Chlordane	Pesticides/PCBs	mg/kg	5.70E-04	1.76E-03	5.70E-04	UJ
102676	AOBSB0201	0-1	042396	Heptachlor	Pesticides/PCBs	mg/kg	5.70E-04	1.76E-03	5.70E-04	UJ
102676	AOBSB0201	0-1	042396	Heptachlor epoxide	Pesticides/PCBs	mg/kg	5.70E-04	1.76E-03	5.70E-04	UJ
102676	AOBSB0201	0-1	042396	Methoxychlor (Mariate)	Pesticides/PCBs	mg/kg	5.70E-03	1.76E-02	5.70E-03	UJ
102676	AOBSB0201	0-1	042396	p,p'-DDD	Pesticides/PCBs	mg/kg	1.10E-03	3.52E-03	1.10E-03	UJ
102676	AOBSB0201	0-1	042396	p,p'-DDE	Pesticides/PCBs	mg/kg	9.00E-04	3.52E-03	9.00E-04	UJ
102676	AOBSB0201	0-1	042396	p,p'-DDT	Pesticides/PCBs	mg/kg	1.10E-03	3.52E-03	1.10E-03	UJ
102676	AOBSB0201	0-1	042396	Toxaphene	Pesticides/PCBs	mg/kg	5.30E-02	1.76E-01	5.30E-02	UJ
102676	AOBSB0201	0-1	042396	Aluminum	TAL Inorganics	mg/kg	1.90E+00	1.95E+01	3.70E+03	
102676	AOBSB0201	0-1	042396	Antimony	TAL Inorganics	mg/kg	3.50E-01	3.66E+00	3.50E-01	U
102676	AOBSB0201	0-1	042396	Arsenic	TAL Inorganics	mg/kg	1.11E+00	1.16E+01	1.70E+00	J
102676	AOBSB0201	0-1	042396	Barium	TAL Inorganics	mg/kg	1.10E-01	1.15E+00	1.63E+01	
102676	AOBSB0201	0-1	042396	Beryllium	TAL Inorganics	mg/kg	3.00E-02	2.62E-01	9.73E-02	J
102676	AOBSB0201	0-1	042396	Cadmium	TAL Inorganics	mg/kg	4.00E-02	4.18E-01	1.50E+00	
102676	AOBSB0201	0-1	042396	Calcium	TAL Inorganics	mg/kg	1.68E+00	1.76E+01	2.71E+02	

Appendix B
Phase I Soil Analytical Results for the 716-A Motor Shops Seepage Basin

Sample ID	Sample Name	Sample Depth	Sample Date	Analyte	Analyte Class	Units	MDL	EQL	Result	Result Qualifier
102676	AOBSB0201	0-1	042396	Chromium	TAL Inorganics	mg/kg	9.00E-02	9.41E-01	6.10E+00	
102676	AOBSB0201	0-1	042396	Cobalt	TAL Inorganics	mg/kg	8.00E-02	8.37E-01	7.74E-01	J
102676	AOBSB0201	0-1	042396	Copper	TAL Inorganics	mg/kg	1.00E-01	1.05E+00	1.21E+01	
102676	AOBSB0201	0-1	042396	Cyanide	TAL Inorganics	mg/kg	8.00E-02	8.00E-01	8.00E-02	U
102676	AOBSB0201	0-1	042396	Iron	TAL Inorganics	mg/kg	2.19E+00	2.29E+01	3.50E+03	
102676	AOBSB0201	0-1	042396	Lead	TAL Inorganics	mg/kg	5.90E-01	6.17E+00	1.30E+01	
102676	AOBSB0201	0-1	042396	Magnesium	TAL Inorganics	mg/kg	8.70E-01	9.10E+00	1.15E+02	
102676	AOBSB0201	0-1	042396	Manganese	TAL Inorganics	mg/kg	2.00E-02	2.09E-01	3.06E+01	
102676	AOBSB0201	0-1	042396	Mercury	TAL Inorganics	mg/kg	1.30E-02	1.41E-01	5.60E-02	J
102676	AOBSB0201	0-1	042396	Nickel	TAL Inorganics	mg/kg	1.70E-01	1.78E+00	2.40E+00	
102676	AOBSB0201	0-1	042396	Potassium	TAL Inorganics	mg/kg	6.70E+00	7.01E+01	1.41E+02	
102676	AOBSB0201	0-1	042396	Selenium	TAL Inorganics	mg/kg	1.04E+00	1.09E+01	1.04E+00	U
102676	AOBSB0201	0-1	042396	Silver	TAL Inorganics	mg/kg	9.00E-02	9.41E-01	9.00E-02	U
102676	AOBSB0201	0-1	042396	Sodium	TAL Inorganics	mg/kg	1.29E+01	1.35E+02	1.42E+01	J
102676	AOBSB0201	0-1	042396	Thallium	TAL Inorganics	mg/kg	8.50E-01	8.89E+00	8.50E-01	U
102676	AOBSB0201	0-1	042396	Vanadium	TAL Inorganics	mg/kg	7.00E-02	7.32E-01	8.10E+00	
102676	AOBSB0201	0-1	042396	Zinc	TAL Inorganics	mg/kg	1.61E+00	1.68E+01	6.46E+01	
102676	AOBSB0201	0-1	042396	Gross Alpha	Radiologicals	pCi/g	4.00E+00	3.34E+00	1.46E+01	
102676	AOBSB0201	0-1	042396	Non-volatile Beta	Radiologicals	pCi/g	1.00E+01	1.68E+00	1.59E+01	
102676	AOBSB0201	0-1	042396	Cation exchange capacity	Miscellaneous	Meq/	6.00E+00	6.34E+02	6.00E+00	U
102676	AOBSB0201	0-1	042396	Total Organic Carbon	Miscellaneous	mg/kg	8.40E+00	6.00E+01	2.74E+03	
102676	AOBSB0201	0-1	042396	Total petroleum hydrocarbons	Miscellaneous	mg/kg	3.30E+00	2.25E+01	4.23E+02	
102677	AOBSB0202	1-4	042396	1,1,1-Trichloroethane	Volatiles	mg/kg	9.71E-04	5.50E-03	1.17E-03	J
102677	AOBSB0202	1-4	042396	1,1,2,2-Tetrachloroethane	Volatiles	mg/kg	3.47E-03	5.50E-03	3.47E-03	U
102677	AOBSB0202	1-4	042396	1,1,2-Trichloroethane	Volatiles	mg/kg	2.40E-03	5.50E-03	2.40E-03	U
102677	AOBSB0202	1-4	042396	1,1-Dichloroethane	Volatiles	mg/kg	1.05E-03	5.50E-03	1.05E-03	U
102677	AOBSB0202	1-4	042396	1,1-Dichloroethene	Volatiles	mg/kg	1.42E-03	5.50E-03	1.42E-03	U
102677	AOBSB0202	1-4	042396	1,2-Dichloroethane	Volatiles	mg/kg	1.34E-03	5.50E-03	1.34E-03	U
102677	AOBSB0202	1-4	042396	1,2-Dichloroethene (total)	Volatiles	mg/kg	8.54E-04	5.50E-03	8.54E-04	U
102677	AOBSB0202	1-4	042396	1,2-Dichloropropane	Volatiles	mg/kg	1.67E-03	5.50E-03	1.67E-03	U

Appendix B
Phase I Soil Analytical Results for the 716-A Motor Shops Seepage Basin

Sample ID	Sample Name	Sample Depth	Sample Date	Analyte	Analyte Class	Units	MDL	EQL	Result	Result Qualifier
102677	AOBSB0202	1-4	042396	2-Butanone (MEK)	Volatiles	mg/kg	2.81E-03	1.10E-02	2.81E-03	U
102677	AOBSB0202	1-4	042396	2-Hexanone	Volatiles	mg/kg	3.77E-03	1.10E-02	3.77E-03	U
102677	AOBSB0202	1-4	042396	4-Methyl-2-pentanone	Volatiles	mg/kg	3.29E-03	1.10E-02	3.29E-03	U
102677	AOBSB0202	1-4	042396	Acetone	Volatiles	mg/kg	4.04E-03	1.10E-02	4.04E-03	U
102677	AOBSB0202	1-4	042396	Benzene	Volatiles	mg/kg	7.52E-04	5.50E-03	7.52E-04	U
102677	AOBSB0202	1-4	042396	Bromodichloromethane	Volatiles	mg/kg	1.74E-03	5.50E-03	1.74E-03	U
102677	AOBSB0202	1-4	042396	Bromoform	Volatiles	mg/kg	2.93E-03	5.50E-03	2.93E-03	U
102677	AOBSB0202	1-4	042396	Bromomethane (Methyl bromide)	Volatiles	mg/kg	2.01E-03	1.10E-02	2.01E-03	U
102677	AOBSB0202	1-4	042396	Carbon disulfide	Volatiles	mg/kg	1.71E-03	5.50E-03	1.71E-03	U
102677	AOBSB0202	1-4	042396	Carbon tetrachloride	Volatiles	mg/kg	9.71E-04	5.50E-03	9.71E-04	U
102677	AOBSB0202	1-4	042396	Chlorobenzene	Volatiles	mg/kg	1.74E-03	5.50E-03	1.74E-03	U
102677	AOBSB0202	1-4	042396	Chlorodibromomethane	Volatiles	mg/kg	2.53E-03	5.50E-03	2.53E-03	U
102677	AOBSB0202	1-4	042396	Chloroethane	Volatiles	mg/kg	2.06E-03	1.10E-02	2.06E-03	U
102677	AOBSB0202	1-4	042396	Chloroform	Volatiles	mg/kg	1.11E-03	5.50E-03	1.11E-03	U
102677	AOBSB0202	1-4	042396	Chloromethane (methyl chloride)	Volatiles	mg/kg	3.20E-03	1.10E-02	3.20E-03	U
102677	AOBSB0202	1-4	042396	cis-1,3-Dichloropropene	Volatiles	mg/kg	1.79E-03	5.50E-03	1.79E-03	U
102677	AOBSB0202	1-4	042396	Dichloromethane (methylene chlo	Volatiles	mg/kg	1.83E-03	5.50E-03	1.83E-03	U
102677	AOBSB0202	1-4	042396	Ethylbenzene	Volatiles	mg/kg	1.47E-03	5.50E-03	1.47E-03	U
102677	AOBSB0202	1-4	042396	Styrene	Volatiles	mg/kg	1.98E-03	5.50E-03	1.98E-03	U
102677	AOBSB0202	1-4	042396	Tetrachloroethene	Volatiles	mg/kg	1.17E-03	5.50E-03	4.32E-03	J
102677	AOBSB0202	1-4	042396	Toluene	Volatiles	mg/kg	1.45E-03	5.50E-03	1.45E-03	U
102677	AOBSB0202	1-4	042396	trans-1,3-Dichloropropene	Volatiles	mg/kg	2.08E-03	5.50E-03	2.08E-03	U
102677	AOBSB0202	1-4	042396	Trichloroethene (TCE)	Volatiles	mg/kg	2.09E-03	5.50E-03	2.09E-03	U
102677	AOBSB0202	1-4	042396	Vinyl acetate	Volatiles	mg/kg	5.48E-03	1.10E-02	5.48E-03	U
102677	AOBSB0202	1-4	042396	Vinyl chloride	Volatiles	mg/kg	2.47E-03	1.10E-02	2.47E-03	U
102677	AOBSB0202	1-4	042396	Xylenes (total)	Volatiles	mg/kg	1.53E-03	5.50E-03	1.53E-03	U
102677	AOBSB0202	1-4	042396	1,2,4-Trichlorobenzene	Semivolatiles	mg/kg	1.80E-02	3.54E-01	1.80E-02	U
102677	AOBSB0202	1-4	042396	1,2-Dichlorobenzene	Semivolatiles	mg/kg	1.70E-02	3.54E-01	1.70E-02	U
102677	AOBSB0202	1-4	042396	1,3-Dichlorobenzene	Semivolatiles	mg/kg	1.80E-02	3.54E-01	1.80E-02	U
102677	AOBSB0202	1-4	042396	1,4-Dichlorobenzene	Semivolatiles	mg/kg	1.80E-02	3.54E-01	1.80E-02	U

Appendix B
Phase I Soil Analytical Results for the 716-A Motor Shops Seepage Basin

Sample ID	Sample Name	Sample Depth	Sample Date	Analyte	Analyte Class	Units	MDL	EQL	Result	Result Qualifier
102677	AOBSB0202	1-4	042396	2,4,5-Trichlorophenol	Semivolatiles	mg/kg	1.40E-02	1.77E+00	1.40E-02	U
102677	AOBSB0202	1-4	042396	2,4,6-Trichlorophenol	Semivolatiles	mg/kg	1.10E-02	3.54E-01	1.10E-02	U
102677	AOBSB0202	1-4	042396	2,4-Dichlorophenol	Semivolatiles	mg/kg	1.30E-02	3.54E-01	1.30E-02	U
102677	AOBSB0202	1-4	042396	2,4-Dimethyl phenol	Semivolatiles	mg/kg	2.60E-02	3.54E-01	2.60E-02	U
102677	AOBSB0202	1-4	042396	2,4-Dinitrophenol	Semivolatiles	mg/kg	4.40E-02	1.77E+00	4.40E-02	U
102677	AOBSB0202	1-4	042396	2,4-Dinitrotoluene	Semivolatiles	mg/kg	1.90E-02	3.54E-01	1.90E-02	U
102677	AOBSB0202	1-4	042396	2,6-Dinitrotoluene	Semivolatiles	mg/kg	1.60E-02	3.54E-01	1.60E-02	U
102677	AOBSB0202	1-4	042396	2-Chloronaphthalene	Semivolatiles	mg/kg	1.60E-02	3.54E-01	1.60E-02	U
102677	AOBSB0202	1-4	042396	2-Chlorophenol	Semivolatiles	mg/kg	1.70E-02	3.54E-01	1.70E-02	U
102677	AOBSB0202	1-4	042396	2-Methyl-4,6-dinitrophenol	Semivolatiles	mg/kg	1.10E-02	1.77E+00	1.10E-02	U
102677	AOBSB0202	1-4	042396	2-Methylnaphthalene	Semivolatiles	mg/kg	1.70E-02	3.54E-01	1.70E-02	U
102677	AOBSB0202	1-4	042396	2-Nitroaniline	Semivolatiles	mg/kg	1.90E-02	1.77E+00	1.90E-02	U
102677	AOBSB0202	1-4	042396	2-Nitrophenol	Semivolatiles	mg/kg	1.70E-02	3.54E-01	1.70E-02	U
102677	AOBSB0202	1-4	042396	3,3'-Dichlorobenzidine	Semivolatiles	mg/kg	7.30E-02	7.08E-01	7.30E-02	U
102677	AOBSB0202	1-4	042396	3-Nitroaniline	Semivolatiles	mg/kg	4.20E-02	1.77E+00	4.20E-02	U
102677	AOBSB0202	1-4	042396	4-Bromophenyl phenyl ether	Semivolatiles	mg/kg	1.00E-02	3.54E-01	1.00E-02	U
102677	AOBSB0202	1-4	042396	4-Chloro-3-methylphenol (p-chlo	Semivolatiles	mg/kg	1.80E-02	3.54E-01	1.80E-02	U
102677	AOBSB0202	1-4	042396	4-Chloroaniline	Semivolatiles	mg/kg	6.00E-03	3.54E-01	6.00E-03	U
102677	AOBSB0202	1-4	042396	4-Chlorophenyl phenyl ether	Semivolatiles	mg/kg	1.30E-02	3.54E-01	1.30E-02	U
102677	AOBSB0202	1-4	042396	4-Nitroaniline	Semivolatiles	mg/kg	2.00E-02	1.77E+00	2.00E-02	U
102677	AOBSB0202	1-4	042396	4-Nitrophenol	Semivolatiles	mg/kg	4.90E-02	1.77E+00	4.90E-02	U
102677	AOBSB0202	1-4	042396	Acenapthene	Semivolatiles	mg/kg	1.50E-02	3.54E-01	1.50E-02	U
102677	AOBSB0202	1-4	042396	Acenapthylene	Semivolatiles	mg/kg	1.60E-02	3.54E-01	1.60E-02	U
102677	AOBSB0202	1-4	042396	Anthracene	Semivolatiles	mg/kg	1.60E-02	3.54E-01	1.60E-02	U
102677	AOBSB0202	1-4	042396	Benzo(a)anthracene	Semivolatiles	mg/kg	2.00E-02	3.54E-01	2.00E-02	U
102677	AOBSB0202	1-4	042396	Benzo(a)pyrene	Semivolatiles	mg/kg	2.40E-02	3.54E-01	2.40E-02	U
102677	AOBSB0202	1-4	042396	Benzo(b)fluoranthene	Semivolatiles	mg/kg	2.30E-02	3.54E-01	2.30E-02	U
102677	AOBSB0202	1-4	042396	Benzo(g,h,i)perylene	Semivolatiles	mg/kg	1.60E-02	3.54E-01	1.60E-02	U
102677	AOBSB0202	1-4	042396	Benzo(k)fluoranthene	Semivolatiles	mg/kg	2.20E-02	3.54E-01	2.20E-02	U
102677	AOBSB0202	1-4	042396	Benzoic acid	Semivolatiles	mg/kg	3.40E-02	1.77E+00	3.40E-02	U

Appendix B
Phase I Soil Analytical Results for the 716-A Motor Shops Seepage Basin

Sample ID	Sample Name	Sample Depth	Sample Date	Analyte	Analyte Class	Units	MDL	EQL	Result	Result Qualifier
102677	AOBSB0202	1-4	042396	Benzyl alcohol	Semivolatiles	mg/kg	1.90E-02	3.54E-01	1.90E-02	U
102677	AOBSB0202	1-4	042396	Bis(2-chloroethoxy) methane	Semivolatiles	mg/kg	1.60E-02	3.54E-01	1.60E-02	U
102677	AOBSB0202	1-4	042396	Bis(2-chloroethyl) ether	Semivolatiles	mg/kg	2.20E-02	3.54E-01	2.20E-02	U
102677	AOBSB0202	1-4	042396	Bis(2-chloroisopropyl) ether	Semivolatiles	mg/kg	1.80E-02	3.54E-01	1.80E-02	U
102677	AOBSB0202	1-4	042396	Bis(2-ethylhexyl) phthalate	Semivolatiles	mg/kg	2.20E-02	3.54E-01	2.20E-02	U
102677	AOBSB0202	1-4	042396	Butyl benzyl phthalate	Semivolatiles	mg/kg	2.10E-02	3.54E-01	2.10E-02	U
102677	AOBSB0202	1-4	042396	Chrysene	Semivolatiles	mg/kg	1.90E-02	3.54E-01	1.90E-02	U
102677	AOBSB0202	1-4	042396	Di-n-butyl phthalate	Semivolatiles	mg/kg	1.90E-02	3.54E-01	1.90E-02	U
102677	AOBSB0202	1-4	042396	Di-n-octyl phthalate	Semivolatiles	mg/kg	2.60E-02	3.54E-01	2.60E-02	U
102677	AOBSB0202	1-4	042396	Dibenzo(a,h)anthracene	Semivolatiles	mg/kg	1.70E-02	3.54E-01	1.70E-02	U
102677	AOBSB0202	1-4	042396	Dibenzofuran	Semivolatiles	mg/kg	1.60E-02	3.54E-01	1.60E-02	U
102677	AOBSB0202	1-4	042396	Diethyl phthalate	Semivolatiles	mg/kg	1.60E-02	3.54E-01	1.60E-02	U
102677	AOBSB0202	1-4	042396	Dimethyl phthalate	Semivolatiles	mg/kg	1.50E-02	3.54E-01	1.50E-02	U
102677	AOBSB0202	1-4	042396	Fluoranthene	Semivolatiles	mg/kg	1.90E-02	3.54E-01	1.90E-02	U
102677	AOBSB0202	1-4	042396	Fluorene	Semivolatiles	mg/kg	1.60E-02	3.54E-01	1.60E-02	U
102677	AOBSB0202	1-4	042396	Hexachlorobenzene	Semivolatiles	mg/kg	1.00E-02	3.54E-01	1.00E-02	U
102677	AOBSB0202	1-4	042396	Hexachlorobutadiene	Semivolatiles	mg/kg	1.50E-02	3.54E-01	1.50E-02	U
102677	AOBSB0202	1-4	042396	Hexachlorocyclopentadiene	Semivolatiles	mg/kg	2.60E-02	3.54E-01	2.60E-02	U
102677	AOBSB0202	1-4	042396	Hexachloroethane	Semivolatiles	mg/kg	1.60E-02	3.54E-01	1.60E-02	U
102677	AOBSB0202	1-4	042396	Indeno(1,2,3-c,d)pyrene	Semivolatiles	mg/kg	1.80E-02	3.54E-01	1.80E-02	U
102677	AOBSB0202	1-4	042396	Isophorone	Semivolatiles	mg/kg	1.70E-02	3.54E-01	1.70E-02	U
102677	AOBSB0202	1-4	042396	N-Nitrosodi-n-propylamine	Semivolatiles	mg/kg	2.00E-02	3.54E-01	2.00E-02	U
102677	AOBSB0202	1-4	042396	N-Nitrosodiphenylamine	Semivolatiles	mg/kg	1.40E-02	3.54E-01	1.40E-02	U
102677	AOBSB0202	1-4	042396	Naphthalene	Semivolatiles	mg/kg	1.90E-02	3.54E-01	1.90E-02	U
102677	AOBSB0202	1-4	042396	Nitrobenzene	Semivolatiles	mg/kg	1.90E-02	3.54E-01	1.90E-02	U
102677	AOBSB0202	1-4	042396	o-cresol (2-methylphenol)	Semivolatiles	mg/kg	1.60E-02	3.54E-01	1.60E-02	U
102677	AOBSB0202	1-4	042396	p-cresol (4-methylphenol)	Semivolatiles	mg/kg	1.70E-02	3.54E-01	1.70E-02	U
102677	AOBSB0202	1-4	042396	Pentachlorophenol	Semivolatiles	mg/kg	3.90E-02	1.77E+00	3.90E-02	U
102677	AOBSB0202	1-4	042396	Phenanthrene	Semivolatiles	mg/kg	1.50E-02	3.54E-01	1.50E-02	U
102677	AOBSB0202	1-4	042396	Phenol	Semivolatiles	mg/kg	1.90E-02	3.54E-01	1.90E-02	U

Appendix B
Phase I Soil Analytical Results for the 716-A Motor Shops Seepage Basin

Sample ID	Sample Name	Sample Depth	Sample Date	Analyte	Analyte Class	Units	MDL	EQL	Result	Result Qualifier
102677	AOBSB0202	1-4	042396	Pyrene	Semivolatiles	mg/kg	2.10E-02	3.54E-01	2.10E-02	U
102677	AOBSB0202	1-4	042396	Unknown	SVOA TICs	mg/kg	0.00E+00	0.00E+00	3.00E-01	J
102677	AOBSB0202	1-4	042396	Aldrin	Pesticides/PCBs	mg/kg	5.70E-04	1.77E-03	5.70E-04	U
102677	AOBSB0202	1-4	042396	alpha-Benzene hexachloride	Pesticides/PCBs	mg/kg	5.70E-04	1.77E-03	5.70E-04	U
102677	AOBSB0202	1-4	042396	alpha-Chlordane	Pesticides/PCBs	mg/kg	5.70E-04	1.77E-03	5.70E-04	U
102677	AOBSB0202	1-4	042396	Aroclor 1016	Pesticides/PCBs	mg/kg	1.10E-02	3.54E-02	1.10E-02	U
102677	AOBSB0202	1-4	042396	Aroclor 1221	Pesticides/PCBs	mg/kg	2.20E-02	7.07E-02	2.20E-02	U
102677	AOBSB0202	1-4	042396	Aroclor 1232	Pesticides/PCBs	mg/kg	1.10E-02	3.54E-02	1.10E-02	U
102677	AOBSB0202	1-4	042396	Aroclor 1242	Pesticides/PCBs	mg/kg	1.10E-02	3.54E-02	1.10E-02	U
102677	AOBSB0202	1-4	042396	Aroclor 1248	Pesticides/PCBs	mg/kg	1.10E-02	3.54E-02	1.10E-02	U
102677	AOBSB0202	1-4	042396	Aroclor 1254	Pesticides/PCBs	mg/kg	1.10E-02	3.54E-02	1.10E-02	U
102677	AOBSB0202	1-4	042396	Aroclor 1260	Pesticides/PCBs	mg/kg	1.10E-02	3.54E-02	1.10E-02	U
102677	AOBSB0202	1-4	042396	beta-Benzene hexachloride	Pesticides/PCBs	mg/kg	5.70E-04	1.77E-03	5.70E-04	U
102677	AOBSB0202	1-4	042396	delta-Benzene hexachloride	Pesticides/PCBs	mg/kg	5.70E-04	1.77E-03	5.70E-04	U
102677	AOBSB0202	1-4	042396	Dieldrin	Pesticides/PCBs	mg/kg	6.33E-04	3.54E-03	6.33E-04	U
102677	AOBSB0202	1-4	042396	Endosulfan I	Pesticides/PCBs	mg/kg	5.70E-04	1.77E-03	5.70E-04	U
102677	AOBSB0202	1-4	042396	Endosulfan II	Pesticides/PCBs	mg/kg	9.00E-04	3.54E-03	9.00E-04	U
102677	AOBSB0202	1-4	042396	Endosulfan sulfate	Pesticides/PCBs	mg/kg	1.10E-03	3.54E-03	1.10E-03	U
102677	AOBSB0202	1-4	042396	Endrin	Pesticides/PCBs	mg/kg	1.10E-03	3.54E-03	1.10E-03	UJ
102677	AOBSB0202	1-4	042396	Endrin ketone	Pesticides/PCBs	mg/kg	1.10E-03	3.54E-03	1.10E-03	UJ
102677	AOBSB0202	1-4	042396	gamma-Benzene hexachloride (Lin	Pesticides/PCBs	mg/kg	5.70E-04	1.77E-03	5.70E-04	U
102677	AOBSB0202	1-4	042396	gamma-Chlordane	Pesticides/PCBs	mg/kg	5.70E-04	1.77E-03	5.70E-04	U
102677	AOBSB0202	1-4	042396	Heptachlor	Pesticides/PCBs	mg/kg	5.70E-04	1.77E-03	5.70E-04	U
102677	AOBSB0202	1-4	042396	Heptachlor epoxide	Pesticides/PCBs	mg/kg	5.70E-04	1.77E-03	5.70E-04	U
102677	AOBSB0202	1-4	042396	Methoxychlor (Mariate)	Pesticides/PCBs	mg/kg	5.70E-03	1.77E-02	5.70E-03	U
102677	AOBSB0202	1-4	042396	p,p'-DDD	Pesticides/PCBs	mg/kg	1.10E-03	3.54E-03	1.10E-03	UJ
102677	AOBSB0202	1-4	042396	p,p'-DDE	Pesticides/PCBs	mg/kg	9.00E-04	3.54E-03	9.00E-04	UJ
102677	AOBSB0202	1-4	042396	p,p'-DDT	Pesticides/PCBs	mg/kg	1.10E-03	3.54E-03	1.10E-03	UJ
102677	AOBSB0202	1-4	042396	Toxaphene	Pesticides/PCBs	mg/kg	5.30E-02	1.77E-01	5.30E-02	U
102677	AOBSB0202	1-4	042396	Aluminum	TAL Inorganics	mg/kg	1.90E+00	1.90E+01	4.37E+03	

Appendix B
Phase I Soil Analytical Results for the 716-A Motor Shops Seepage Basin

Sample ID	Sample Name	Sample Depth	Sample Date	Analyte	Analyte Class	Units	MDL	EQL	Result	Result Qualifier
102677	AOBSB0202	1-4	042396	Antimony	TAL Inorganics	mg/kg	3.50E-01	3.57E+00	3.50E-01	U
102677	AOBSB0202	1-4	042396	Arsenic	TAL Inorganics	mg/kg	1.11E+00	1.13E+01	1.11E+00	U
102677	AOBSB0202	1-4	042396	Barium	TAL Inorganics	mg/kg	1.10E-01	1.12E+00	1.97E+01	
102677	AOBSB0202	1-4	042396	Beryllium	TAL Inorganics	mg/kg	3.00E-02	2.55E-01	2.12E-01	
102677	AOBSB0202	1-4	042396	Cadmium	TAL Inorganics	mg/kg	4.00E-02	4.08E-01	1.28E-01	J
102677	AOBSB0202	1-4	042396	Calcium	TAL Inorganics	mg/kg	1.68E+00	1.72E+01	1.49E+02	
102677	AOBSB0202	1-4	042396	Chromium	TAL Inorganics	mg/kg	9.00E-02	9.19E-01	4.40E+00	
102677	AOBSB0202	1-4	042396	Cobalt	TAL Inorganics	mg/kg	8.00E-02	8.17E-01	1.00E+00	
102677	AOBSB0202	1-4	042396	Copper	TAL Inorganics	mg/kg	1.00E-01	1.02E+00	2.10E+00	
102677	AOBSB0202	1-4	042396	Cyanide	TAL Inorganics	mg/kg	8.00E-02	8.50E-01	1.10E-01	J
102677	AOBSB0202	1-4	042396	Iron	TAL Inorganics	mg/kg	2.19E+00	2.24E+01	2.79E+03	
102677	AOBSB0202	1-4	042396	Magnesium	TAL Inorganics	mg/kg	8.70E-01	8.88E+00	8.96E+01	
102677	AOBSB0202	1-4	042396	Manganese	TAL Inorganics	mg/kg	2.00E-02	2.04E-01	5.03E+01	
102677	AOBSB0202	1-4	042396	Mercury	TAL Inorganics	mg/kg	1.30E-02	1.42E-01	3.00E-02	J
102677	AOBSB0202	1-4	042396	Nickel	TAL Inorganics	mg/kg	1.70E-01	1.74E+00	1.80E+00	
102677	AOBSB0202	1-4	042396	Potassium	TAL Inorganics	mg/kg	6.70E+00	6.84E+01	8.62E+01	
102677	AOBSB0202	1-4	042396	Selenium	TAL Inorganics	mg/kg	1.04E+00	1.06E+01	1.04E+00	U
102677	AOBSB0202	1-4	042396	Silver	TAL Inorganics	mg/kg	9.00E-02	9.19E-01	9.00E-02	U
102677	AOBSB0202	1-4	042396	Sodium	TAL Inorganics	mg/kg	1.29E+01	1.32E+02	1.93E+01	J
102677	AOBSB0202	1-4	042396	Thallium	TAL Inorganics	mg/kg	8.50E-01	8.68E+00	8.50E-01	U
102677	AOBSB0202	1-4	042396	Vanadium	TAL Inorganics	mg/kg	7.00E-02	7.15E-01	6.20E+00	
102677	AOBSB0202	1-4	042396	Zinc	TAL Inorganics	mg/kg	1.61E+00	1.64E+01	6.90E+00	J
102677	AOBSB0202	1-4	042396	Gross Alpha	Radiologicals	pCi/g	4.00E+00	2.90E+00	8.40E+00	
102677	AOBSB0202	1-4	042396	Non-volatile Beta	Radiologicals	pCi/g	1.00E+01	1.74E+00	1.00E+01	UI
102677	AOBSB0202	1-4	042396	Cation exchange capacity	Miscellaneous	Meq/	6.00E+00	6.37E+02	6.00E+00	U
102677	AOBSB0202	1-4	042396	Total Organic Carbon	Miscellaneous	mg/kg	8.40E+00	6.00E+01	4.82E+02	
102677	AOBSB0202	1-4	042396	Total petroleum hydrocarbons	Miscellaneous	mg/kg	3.30E+00	1.13E+01	2.04E+01	
102683	AOBSB0301	0-1	042396	1,1,1-Trichloroethane	Volatiles	mg/kg	9.71E-04	5.00E-03	3.46E-03	J
102683	AOBSB0301	0-1	042396	1,1,2,2-Tetrachloroethane	Volatiles	mg/kg	3.47E-03	5.00E-03	3.47E-03	U
102683	AOBSB0301	0-1	042396	1,1,2-Trichloroethane	Volatiles	mg/kg	2.40E-03	5.00E-03	2.40E-03	U

Appendix B
Phase I Soil Analytical Results for the 716-A Motor Shops Seepage Basin

Sample ID	Sample Name	Sample Depth	Sample Date	Analyte	Analyte Class	Units	MDL	EQL	Result	Result Qualifier
102683	AOBSB0301	0-1	042396	1,1-Dichloroethane	Volatiles	mg/kg	1.05E-03	5.00E-03	1.05E-03	U
102683	AOBSB0301	0-1	042396	1,1-Dichloroethene	Volatiles	mg/kg	1.42E-03	5.00E-03	1.42E-03	U
102683	AOBSB0301	0-1	042396	1,2-Dichloroethane	Volatiles	mg/kg	1.34E-03	5.00E-03	1.34E-03	U
102683	AOBSB0301	0-1	042396	1,2-Dichloroethene (total)	Volatiles	mg/kg	8.54E-04	5.00E-03	8.54E-04	U
102683	AOBSB0301	0-1	042396	1,2-Dichloropropane	Volatiles	mg/kg	1.67E-03	5.00E-03	1.67E-03	U
102683	AOBSB0301	0-1	042396	2-Butanone (MEK)	Volatiles	mg/kg	2.81E-03	1.00E-02	2.81E-03	U
102683	AOBSB0301	0-1	042396	2-Hexanone	Volatiles	mg/kg	3.77E-03	1.00E-02	3.77E-03	U
102683	AOBSB0301	0-1	042396	4-Methyl-2-pentanone	Volatiles	mg/kg	3.29E-03	1.00E-02	3.29E-03	U
102683	AOBSB0301	0-1	042396	Acetone	Volatiles	mg/kg	4.04E-03	1.00E-02	4.04E-03	U
102683	AOBSB0301	0-1	042396	Benzene	Volatiles	mg/kg	7.52E-04	5.00E-03	7.52E-04	U
102683	AOBSB0301	0-1	042396	Bromodichloromethane	Volatiles	mg/kg	1.74E-03	5.00E-03	1.74E-03	U
102683	AOBSB0301	0-1	042396	Bromoform	Volatiles	mg/kg	2.93E-03	5.00E-03	2.93E-03	U
102683	AOBSB0301	0-1	042396	Bromomethane (Methyl bromide)	Volatiles	mg/kg	2.01E-03	1.00E-02	2.01E-03	U
102683	AOBSB0301	0-1	042396	Carbon disulfide	Volatiles	mg/kg	1.71E-03	5.00E-03	1.71E-03	U
102683	AOBSB0301	0-1	042396	Carbon tetrachloride	Volatiles	mg/kg	9.71E-04	5.00E-03	9.71E-04	U
102683	AOBSB0301	0-1	042396	Chlorobenzene	Volatiles	mg/kg	1.74E-03	5.00E-03	1.74E-03	U
102683	AOBSB0301	0-1	042396	Chlorodibromomethane	Volatiles	mg/kg	2.53E-03	5.00E-03	2.53E-03	U
102683	AOBSB0301	0-1	042396	Chloroethane	Volatiles	mg/kg	2.06E-03	1.00E-02	2.06E-03	U
102683	AOBSB0301	0-1	042396	Chloroform	Volatiles	mg/kg	1.11E-03	5.00E-03	1.11E-03	U
102683	AOBSB0301	0-1	042396	Chloromethane (methyl chloride)	Volatiles	mg/kg	3.20E-03	1.00E-02	3.20E-03	U
102683	AOBSB0301	0-1	042396	cis-1,3-Dichloropropene	Volatiles	mg/kg	1.79E-03	5.00E-03	1.79E-03	U
102683	AOBSB0301	0-1	042396	Dichloromethane (methylene chlo	Volatiles	mg/kg	1.83E-03	5.00E-03	1.83E-03	U
102683	AOBSB0301	0-1	042396	Ethylbenzene	Volatiles	mg/kg	1.47E-03	5.00E-03	1.47E-03	U
102683	AOBSB0301	0-1	042396	Styrene	Volatiles	mg/kg	1.98E-03	5.00E-03	1.98E-03	U
102683	AOBSB0301	0-1	042396	Tetrachloroethene	Volatiles	mg/kg	1.17E-03	5.00E-03	3.87E-03	J
102683	AOBSB0301	0-1	042396	Toluene	Volatiles	mg/kg	1.45E-03	5.00E-03	1.45E-03	U
102683	AOBSB0301	0-1	042396	trans-1,3-Dichloropropene	Volatiles	mg/kg	2.08E-03	5.00E-03	2.08E-03	U
102683	AOBSB0301	0-1	042396	Trichloroethene (TCE)	Volatiles	mg/kg	2.09E-03	5.00E-03	2.09E-03	U
102683	AOBSB0301	0-1	042396	Vinyl acetate	Volatiles	mg/kg	5.48E-03	1.00E-02	5.48E-03	U
102683	AOBSB0301	0-1	042396	Vinyl chloride	Volatiles	mg/kg	2.47E-03	1.00E-02	2.47E-03	U

Appendix B
Phase I Soil Analytical Results for the 716-A Motor Shops Seepage Basin

Sample ID	Sample Name	Sample Depth	Sample Date	Analyte	Analyte Class	Units	MDL	EQL	Result	Result Qualifier
102683	AOBSB0301	0-1	042396	Xylenes (total)	Volatiles	mg/kg	1.53E-03	5.00E-03	1.53E-03	U
102683	AOBSB0301	0-1	042396	Unknown	VOA TICs	mg/kg	0.00E+00	0.00E+00	1.00E-01	J
102683	AOBSB0301	0-1	042396	1,2,4-Trichlorobenzene	Semivolatiles	mg/kg	1.80E-02	3.46E-01	1.80E-02	U
102683	AOBSB0301	0-1	042396	1,2-Dichlorobenzene	Semivolatiles	mg/kg	1.70E-02	3.46E-01	1.70E-02	U
102683	AOBSB0301	0-1	042396	1,3-Dichlorobenzene	Semivolatiles	mg/kg	1.80E-02	3.46E-01	1.80E-02	U
102683	AOBSB0301	0-1	042396	1,4-Dichlorobenzene	Semivolatiles	mg/kg	1.80E-02	3.46E-01	1.80E-02	U
102683	AOBSB0301	0-1	042396	2,4,5-Trichlorophenol	Semivolatiles	mg/kg	1.40E-02	1.73E+00	1.40E-02	U
102683	AOBSB0301	0-1	042396	2,4,6-Trichlorophenol	Semivolatiles	mg/kg	1.10E-02	3.46E-01	1.10E-02	U
102683	AOBSB0301	0-1	042396	2,4-Dichlorophenol	Semivolatiles	mg/kg	1.30E-02	3.46E-01	1.30E-02	U
102683	AOBSB0301	0-1	042396	2,4-Dimethyl phenol	Semivolatiles	mg/kg	2.60E-02	3.46E-01	2.60E-02	U
102683	AOBSB0301	0-1	042396	2,4-Dinitrophenol	Semivolatiles	mg/kg	4.40E-02	1.73E+00	4.40E-02	U
102683	AOBSB0301	0-1	042396	2,4-Dinitrotoluene	Semivolatiles	mg/kg	1.90E-02	3.46E-01	1.90E-02	U
102683	AOBSB0301	0-1	042396	2,6-Dinitrotoluene	Semivolatiles	mg/kg	1.60E-02	3.46E-01	1.60E-02	U
102683	AOBSB0301	0-1	042396	2-Chloronaphthalene	Semivolatiles	mg/kg	1.60E-02	3.46E-01	1.60E-02	U
102683	AOBSB0301	0-1	042396	2-Chlorophenol	Semivolatiles	mg/kg	1.70E-02	3.46E-01	1.70E-02	U
102683	AOBSB0301	0-1	042396	2-Methyl-4,6-dinitrophenol	Semivolatiles	mg/kg	1.10E-02	1.73E+00	1.10E-02	U
102683	AOBSB0301	0-1	042396	2-Methylnaphthalene	Semivolatiles	mg/kg	1.70E-02	3.46E-01	1.70E-02	U
102683	AOBSB0301	0-1	042396	2-Nitroaniline	Semivolatiles	mg/kg	1.90E-02	1.73E+00	1.90E-02	U
102683	AOBSB0301	0-1	042396	2-Nitrophenol	Semivolatiles	mg/kg	1.70E-02	3.46E-01	1.70E-02	U
102683	AOBSB0301	0-1	042396	3,3'-Dichlorobenzidine	Semivolatiles	mg/kg	7.30E-02	6.92E-01	7.30E-02	U
102683	AOBSB0301	0-1	042396	3-Nitroaniline	Semivolatiles	mg/kg	4.20E-02	1.73E+00	4.20E-02	U
102683	AOBSB0301	0-1	042396	4-Bromophenyl phenyl ether	Semivolatiles	mg/kg	1.00E-02	3.46E-01	1.00E-02	U
102683	AOBSB0301	0-1	042396	4-Chloro-3-methylphenol (p-chlo	Semivolatiles	mg/kg	1.80E-02	3.46E-01	1.80E-02	U
102683	AOBSB0301	0-1	042396	4-Chloroaniline	Semivolatiles	mg/kg	6.00E-03	3.46E-01	6.00E-03	U
102683	AOBSB0301	0-1	042396	4-Chlorophenyl phenyl ether	Semivolatiles	mg/kg	1.30E-02	3.46E-01	1.30E-02	U
102683	AOBSB0301	0-1	042396	4-Nitroaniline	Semivolatiles	mg/kg	2.00E-02	1.73E+00	2.00E-02	U
102683	AOBSB0301	0-1	042396	4-Nitrophenol	Semivolatiles	mg/kg	4.90E-02	1.73E+00	4.90E-02	U
102683	AOBSB0301	0-1	042396	Acenapthene	Semivolatiles	mg/kg	1.50E-02	3.46E-01	1.50E-02	U
102683	AOBSB0301	0-1	042396	Acenapthylene	Semivolatiles	mg/kg	1.60E-02	3.46E-01	1.60E-02	U
102683	AOBSB0301	0-1	042396	Anthracene	Semivolatiles	mg/kg	1.60E-02	3.46E-01	1.60E-02	U

Appendix B
Phase I Soil Analytical Results for the 716-A Motor Shops Seepage Basin

Sample ID	Sample Name	Sample Depth	Sample Date	Analyte	Analyte Class	Units	MDL	EQL	Result	Result Qualifier
102683	AOBSB0301	0-1	042396	Benzo(a)anthracene	Semivolatiles	mg/kg	2.00E-02	3.46E-01	2.00E-02	U
102683	AOBSB0301	0-1	042396	Benzo(a)pyrene	Semivolatiles	mg/kg	2.40E-02	3.46E-01	2.40E-02	U
102683	AOBSB0301	0-1	042396	Benzo(b)fluoranthene	Semivolatiles	mg/kg	2.30E-02	3.46E-01	6.61E-02	J
102683	AOBSB0301	0-1	042396	Benzo(g,h,i)perylene	Semivolatiles	mg/kg	1.60E-02	3.46E-01	1.60E-02	U
102683	AOBSB0301	0-1	042396	Benzo(k)fluoranthene	Semivolatiles	mg/kg	2.20E-02	3.46E-01	4.42E-02	J
102683	AOBSB0301	0-1	042396	Benzoic acid	Semivolatiles	mg/kg	3.40E-02	1.73E+00	3.40E-02	U
102683	AOBSB0301	0-1	042396	Benzyl alcohol	Semivolatiles	mg/kg	1.90E-02	3.46E-01	1.90E-02	U
102683	AOBSB0301	0-1	042396	Bis(2-chloroethoxy) methane	Semivolatiles	mg/kg	1.60E-02	3.46E-01	1.60E-02	U
102683	AOBSB0301	0-1	042396	Bis(2-chloroethyl) ether	Semivolatiles	mg/kg	2.20E-02	3.46E-01	2.20E-02	U
102683	AOBSB0301	0-1	042396	Bis(2-chloroisopropyl) ether	Semivolatiles	mg/kg	1.80E-02	3.46E-01	1.80E-02	U
102683	AOBSB0301	0-1	042396	Bis(2-ethylhexyl) phthalate	Semivolatiles	mg/kg	2.20E-02	3.46E-01	2.20E-02	U
102683	AOBSB0301	0-1	042396	Butyl benzyl phthalate	Semivolatiles	mg/kg	2.10E-02	3.46E-01	2.10E-02	U
102683	AOBSB0301	0-1	042396	Chrysene	Semivolatiles	mg/kg	1.90E-02	3.46E-01	5.87E-02	J
102683	AOBSB0301	0-1	042396	Di-n-butyl phthalate	Semivolatiles	mg/kg	1.90E-02	3.46E-01	1.90E-02	U
102683	AOBSB0301	0-1	042396	Di-n-octyl phthalate	Semivolatiles	mg/kg	2.60E-02	3.46E-01	2.60E-02	U
102683	AOBSB0301	0-1	042396	Dibenzo(a,h)anthracene	Semivolatiles	mg/kg	1.70E-02	3.46E-01	1.70E-02	U
102683	AOBSB0301	0-1	042396	Dibenzofuran	Semivolatiles	mg/kg	1.60E-02	3.46E-01	1.60E-02	U
102683	AOBSB0301	0-1	042396	Diethyl phthalate	Semivolatiles	mg/kg	1.60E-02	3.46E-01	1.60E-02	U
102683	AOBSB0301	0-1	042396	Dimethyl phthalate	Semivolatiles	mg/kg	1.50E-02	3.46E-01	1.50E-02	U
102683	AOBSB0301	0-1	042396	Fluoranthene	Semivolatiles	mg/kg	1.90E-02	3.46E-01	4.78E-02	J
102683	AOBSB0301	0-1	042396	Fluorene	Semivolatiles	mg/kg	1.60E-02	3.46E-01	1.60E-02	U
102683	AOBSB0301	0-1	042396	Hexachlorobenzene	Semivolatiles	mg/kg	1.00E-02	3.46E-01	1.00E-02	U
102683	AOBSB0301	0-1	042396	Hexachlorobutadiene	Semivolatiles	mg/kg	1.50E-02	3.46E-01	1.50E-02	U
102683	AOBSB0301	0-1	042396	Hexachlorocyclopentadiene	Semivolatiles	mg/kg	2.60E-02	3.46E-01	2.60E-02	U
102683	AOBSB0301	0-1	042396	Hexachloroethane	Semivolatiles	mg/kg	1.60E-02	3.46E-01	1.60E-02	U
102683	AOBSB0301	0-1	042396	Indeno(1,2,3-c,d)pyrene	Semivolatiles	mg/kg	1.80E-02	3.46E-01	1.80E-02	U
102683	AOBSB0301	0-1	042396	Isophorone	Semivolatiles	mg/kg	1.70E-02	3.46E-01	1.70E-02	U
102683	AOBSB0301	0-1	042396	N-Nitrosodi-n-propylamine	Semivolatiles	mg/kg	2.00E-02	3.46E-01	2.00E-02	U
102683	AOBSB0301	0-1	042396	N-Nitrosodiphenylamine	Semivolatiles	mg/kg	1.40E-02	3.46E-01	1.40E-02	U
102683	AOBSB0301	0-1	042396	Naphthalene	Semivolatiles	mg/kg	1.90E-02	3.46E-01	1.90E-02	U

Appendix B
Phase I Soil Analytical Results for the 716-A Motor Shops Seepage Basin

Sample ID	Sample Name	Sample Depth	Sample Date	Analyte	Analyte Class	Units	MDL	EQL	Result	Result Qualifier
102683	AOBSB0301	0-1	042396	Nitrobenzene	Semivolatiles	mg/kg	1.90E-02	3.46E-01	1.90E-02	U
102683	AOBSB0301	0-1	042396	o-cresol (2-methylphenol)	Semivolatiles	mg/kg	1.60E-02	3.46E-01	1.60E-02	U
102683	AOBSB0301	0-1	042396	p-cresol (4-methylphenol)	Semivolatiles	mg/kg	1.70E-02	3.46E-01	1.70E-02	U
102683	AOBSB0301	0-1	042396	Pentachlorophenol	Semivolatiles	mg/kg	3.90E-02	1.73E+00	3.90E-02	U
102683	AOBSB0301	0-1	042396	Phenanthrene	Semivolatiles	mg/kg	1.50E-02	3.46E-01	1.50E-02	U
102683	AOBSB0301	0-1	042396	Phenol	Semivolatiles	mg/kg	1.90E-02	3.46E-01	1.90E-02	U
102683	AOBSB0301	0-1	042396	Pyrene	Semivolatiles	mg/kg	2.10E-02	3.46E-01	4.01E-02	J
102683	AOBSB0301	0-1	042396	Aldol condensate	SVOA TICs	mg/kg	0.00E+00	0.00E+00	7.00E-01	J
102683	AOBSB0301	0-1	042396	Unknown	SVOA TICs	mg/kg	0.00E+00	0.00E+00	3.00E-01	J
102683	AOBSB0301	0-1	042396	Unknown	SVOA TICs	mg/kg	0.00E+00	0.00E+00	8.00E-01	J
102683	AOBSB0301	0-1	042396	Unknown	SVOA TICs	mg/kg	0.00E+00	0.00E+00	4.00E-01	J
102683	AOBSB0301	0-1	042396	Aldrin	Pesticides/PCBs	mg/kg	5.70E-04	1.73E-03	5.70E-04	U
102683	AOBSB0301	0-1	042396	alpha-Benzene hexachloride	Pesticides/PCBs	mg/kg	5.70E-04	1.73E-03	5.70E-04	U
102683	AOBSB0301	0-1	042396	alpha-Chlordane	Pesticides/PCBs	mg/kg	5.70E-04	1.73E-03	5.70E-04	U
102683	AOBSB0301	0-1	042396	Aroclor 1016	Pesticides/PCBs	mg/kg	1.10E-02	3.46E-02	1.10E-02	U
102683	AOBSB0301	0-1	042396	Aroclor 1221	Pesticides/PCBs	mg/kg	2.20E-02	6.92E-02	2.20E-02	U
102683	AOBSB0301	0-1	042396	Aroclor 1232	Pesticides/PCBs	mg/kg	1.10E-02	3.46E-02	1.10E-02	U
102683	AOBSB0301	0-1	042396	Aroclor 1242	Pesticides/PCBs	mg/kg	1.10E-02	3.46E-02	1.10E-02	U
102683	AOBSB0301	0-1	042396	Aroclor 1248	Pesticides/PCBs	mg/kg	1.10E-02	3.46E-02	1.10E-02	U
102683	AOBSB0301	0-1	042396	Aroclor 1254	Pesticides/PCBs	mg/kg	1.10E-02	3.46E-02	1.10E-02	U
102683	AOBSB0301	0-1	042396	Aroclor 1260	Pesticides/PCBs	mg/kg	1.10E-02	3.46E-02	1.10E-02	U
102683	AOBSB0301	0-1	042396	beta-Benzene hexachloride	Pesticides/PCBs	mg/kg	5.70E-04	1.73E-03	5.70E-04	U
102683	AOBSB0301	0-1	042396	delta-Benzene hexachloride	Pesticides/PCBs	mg/kg	5.70E-04	1.73E-03	5.70E-04	U
102683	AOBSB0301	0-1	042396	Dieldrin	Pesticides/PCBs	mg/kg	6.33E-04	3.46E-03	6.33E-04	U
102683	AOBSB0301	0-1	042396	Endosulfan I	Pesticides/PCBs	mg/kg	5.70E-04	1.73E-03	5.70E-04	U
102683	AOBSB0301	0-1	042396	Endosulfan II	Pesticides/PCBs	mg/kg	9.00E-04	3.46E-03	9.00E-04	U
102683	AOBSB0301	0-1	042396	Endosulfan sulfate	Pesticides/PCBs	mg/kg	1.10E-03	3.46E-03	1.10E-03	U
102683	AOBSB0301	0-1	042396	Endrin	Pesticides/PCBs	mg/kg	1.10E-03	3.46E-03	1.10E-03	UJ
102683	AOBSB0301	0-1	042396	Endrin ketone	Pesticides/PCBs	mg/kg	1.10E-03	3.46E-03	1.10E-03	UJ
102683	AOBSB0301	0-1	042396	gamma-Benzene hexachloride (Lin	Pesticides/PCBs	mg/kg	5.70E-04	1.73E-03	5.70E-04	U

Appendix B
Phase I Soil Analytical Results for the 716-A Motor Shops Seepage Basin

Sample ID	Sample Name	Sample Depth	Sample Date	Analyte	Analyte Class	Units	MDL	EQL	Result	Result Qualifier
102683	AOBSB0301	0-1	042396	gamma-Chlordane	Pesticides/PCBs	mg/kg	5.70E-04	1.73E-03	5.70E-04	U
102683	AOBSB0301	0-1	042396	Heptachlor	Pesticides/PCBs	mg/kg	5.70E-04	1.73E-03	5.70E-04	U
102683	AOBSB0301	0-1	042396	Heptachlor epoxide	Pesticides/PCBs	mg/kg	5.70E-04	1.73E-03	5.70E-04	U
102683	AOBSB0301	0-1	042396	Methoxychlor (Mariate)	Pesticides/PCBs	mg/kg	5.70E-03	1.73E-02	5.70E-03	U
102683	AOBSB0301	0-1	042396	p,p'-DDD	Pesticides/PCBs	mg/kg	1.10E-03	3.46E-03	1.10E-03	UJ
102683	AOBSB0301	0-1	042396	p,p'-DDE	Pesticides/PCBs	mg/kg	9.00E-04	3.46E-03	9.00E-04	UJ
102683	AOBSB0301	0-1	042396	p,p'-DDT	Pesticides/PCBs	mg/kg	1.10E-03	3.46E-03	1.10E-03	UJ
102683	AOBSB0301	0-1	042396	Toxaphene	Pesticides/PCBs	mg/kg	5.30E-02	1.73E-01	5.30E-02	U
102683	AOBSB0301	0-1	042396	Aluminum	TAL Inorganics	mg/kg	1.90E+00	1.87E+01	3.62E+03	
102683	AOBSB0301	0-1	042396	Antimony	TAL Inorganics	mg/kg	3.50E-01	3.53E+00	3.50E-01	U
102683	AOBSB0301	0-1	042396	Arsenic	TAL Inorganics	mg/kg	1.11E+00	1.12E+01	1.11E+00	U
102683	AOBSB0301	0-1	042396	Barium	TAL Inorganics	mg/kg	1.10E-01	1.11E+00	1.15E+01	
102683	AOBSB0301	0-1	042396	Beryllium	TAL Inorganics	mg/kg	3.00E-02	2.52E-01	1.14E-01	J
102683	AOBSB0301	0-1	042396	Cadmium	TAL Inorganics	mg/kg	4.00E-02	4.03E-01	1.36E-01	J
102683	AOBSB0301	0-1	042396	Calcium	TAL Inorganics	mg/kg	1.68E+00	1.69E+01	7.79E+01	
102683	AOBSB0301	0-1	042396	Chromium	TAL Inorganics	mg/kg	9.00E-02	9.07E-01	3.80E+00	
102683	AOBSB0301	0-1	042396	Cobalt	TAL Inorganics	mg/kg	8.00E-02	8.06E-01	4.29E-01	J
102683	AOBSB0301	0-1	042396	Copper	TAL Inorganics	mg/kg	1.00E-01	1.01E+00	2.70E+00	
102683	AOBSB0301	0-1	042396	Cyanide	TAL Inorganics	mg/kg	8.00E-02	7.90E-01	8.00E-02	U
102683	AOBSB0301	0-1	042396	Iron	TAL Inorganics	mg/kg	2.19E+00	2.21E+01	1.82E+03	
102683	AOBSB0301	0-1	042396	Lead	TAL Inorganics	mg/kg	5.90E-01	5.95E+00	4.90E+00	J
102683	AOBSB0301	0-1	042396	Magnesium	TAL Inorganics	mg/kg	8.70E-01	8.77E+00	5.48E+01	
102683	AOBSB0301	0-1	042396	Manganese	TAL Inorganics	mg/kg	2.00E-02	2.02E-01	1.12E+01	
102683	AOBSB0301	0-1	042396	Mercury	TAL Inorganics	mg/kg	1.30E-02	1.38E-01	2.00E-02	J
102683	AOBSB0301	0-1	042396	Nickel	TAL Inorganics	mg/kg	1.70E-01	1.71E+00	1.30E+00	J
102683	AOBSB0301	0-1	042396	Potassium	TAL Inorganics	mg/kg	6.70E+00	6.75E+01	6.09E+01	J
102683	AOBSB0301	0-1	042396	Selenium	TAL Inorganics	mg/kg	1.04E+00	1.05E+01	1.04E+00	U
102683	AOBSB0301	0-1	042396	Silver	TAL Inorganics	mg/kg	9.00E-02	9.07E-01	9.00E-02	U
102683	AOBSB0301	0-1	042396	Sodium	TAL Inorganics	mg/kg	1.29E+01	1.30E+02	1.29E+01	U
102683	AOBSB0301	0-1	042396	Thallium	TAL Inorganics	mg/kg	8.50E-01	8.57E+00	8.50E-01	U

Appendix B
Phase I Soil Analytical Results for the 716-A Motor Shops Seepage Basin

Sample ID	Sample Name	Sample Depth	Sample Date	Analyte	Analyte Class	Units	MDL	EQL	Result	Result Qualifier
102683	AOBSB0301	0-1	042396	Vanadium	TAL Inorganics	mg/kg	7.00E-02	7.06E-01	6.20E+00	
102683	AOBSB0301	0-1	042396	Zinc	TAL Inorganics	mg/kg	1.61E+00	1.62E+01	1.10E+01	J
102683	AOBSB0301	0-1	042396	Gross Alpha	Radiologicals	pCi/g	4.00E+00	3.28E+00	4.00E+00	UI
102683	AOBSB0301	0-1	042396	Non-volatile Beta	Radiologicals	pCi/g	1.00E+01	1.58E+00	1.56E+01	
102683	AOBSB0301	0-1	042396	Cation exchange capacity	Miscellaneous	Meq/	6.00E+00	6.23E+02	6.00E+00	U
102683	AOBSB0301	0-1	042396	Total Organic Carbon	Miscellaneous	mg/kg	8.40E+00	6.00E+01	2.92E+03	
102683	AOBSB0301	0-1	042396	Total petroleum hydrocarbons	Miscellaneous	mg/kg	3.30E+00	1.11E+01	2.41E+01	
102684	AOBSB0302	1-4	042396	1,1,1-Trichloroethane	Volatiles	mg/kg	9.71E-04	5.00E-03	6.15E-03	
102684	AOBSB0302	1-4	042396	1,1,2,2-Tetrachloroethane	Volatiles	mg/kg	3.47E-03	5.00E-03	3.47E-03	U
102684	AOBSB0302	1-4	042396	1,1,2-Trichloroethane	Volatiles	mg/kg	2.40E-03	5.00E-03	2.40E-03	U
102684	AOBSB0302	1-4	042396	1,1-Dichloroethane	Volatiles	mg/kg	1.05E-03	5.00E-03	1.05E-03	U
102684	AOBSB0302	1-4	042396	1,1-Dichloroethene	Volatiles	mg/kg	1.42E-03	5.00E-03	1.42E-03	U
102684	AOBSB0302	1-4	042396	1,2-Dichloroethane	Volatiles	mg/kg	1.34E-03	5.00E-03	1.34E-03	U
102684	AOBSB0302	1-4	042396	1,2-Dichloroethene (total)	Volatiles	mg/kg	8.54E-04	5.00E-03	8.54E-04	U
102684	AOBSB0302	1-4	042396	1,2-Dichloropropane	Volatiles	mg/kg	1.67E-03	5.00E-03	1.67E-03	U
102684	AOBSB0302	1-4	042396	2-Butanone (MEK)	Volatiles	mg/kg	2.81E-03	1.00E-02	2.81E-03	U
102684	AOBSB0302	1-4	042396	2-Hexanone	Volatiles	mg/kg	3.77E-03	1.00E-02	3.77E-03	U
102684	AOBSB0302	1-4	042396	4-Methyl-2-pentanone	Volatiles	mg/kg	3.29E-03	1.00E-02	3.29E-03	U
102684	AOBSB0302	1-4	042396	Acetone	Volatiles	mg/kg	4.04E-03	1.00E-02	4.04E-03	U
102684	AOBSB0302	1-4	042396	Benzene	Volatiles	mg/kg	7.52E-04	5.00E-03	7.52E-04	U
102684	AOBSB0302	1-4	042396	Bromodichloromethane	Volatiles	mg/kg	1.74E-03	5.00E-03	1.74E-03	U
102684	AOBSB0302	1-4	042396	Bromoform	Volatiles	mg/kg	2.93E-03	5.00E-03	2.93E-03	U
102684	AOBSB0302	1-4	042396	Bromomethane (Methyl bromide)	Volatiles	mg/kg	2.01E-03	1.00E-02	2.01E-03	U
102684	AOBSB0302	1-4	042396	Carbon disulfide	Volatiles	mg/kg	1.71E-03	5.00E-03	1.71E-03	U
102684	AOBSB0302	1-4	042396	Carbon tetrachloride	Volatiles	mg/kg	9.71E-04	5.00E-03	9.71E-04	U
102684	AOBSB0302	1-4	042396	Chlorobenzene	Volatiles	mg/kg	1.74E-03	5.00E-03	1.74E-03	U
102684	AOBSB0302	1-4	042396	Chlorodibromomethane	Volatiles	mg/kg	2.53E-03	5.00E-03	2.53E-03	U
102684	AOBSB0302	1-4	042396	Chloroethane	Volatiles	mg/kg	2.06E-03	1.00E-02	2.06E-03	U
102684	AOBSB0302	1-4	042396	Chloroform	Volatiles	mg/kg	1.11E-03	5.00E-03	1.11E-03	U
102684	AOBSB0302	1-4	042396	Chloromethane (methyl chloride)	Volatiles	mg/kg	3.20E-03	1.00E-02	3.20E-03	U

Appendix B
Phase I Soil Analytical Results for the 716-A Motor Shops Seepage Basin

Sample ID	Sample Name	Sample Depth	Sample Date	Analyte	Analyte Class	Units	MDL	EQL	Result	Result Qualifier
102684	AOBSB0302	1-4	042396	cis-1,3-Dichloropropene	Volatiles	mg/kg	1.79E-03	5.00E-03	1.79E-03	U
102684	AOBSB0302	1-4	042396	Dichloromethane (methylene chlo	Volatiles	mg/kg	1.83E-03	5.00E-03	1.83E-03	U
102684	AOBSB0302	1-4	042396	Ethylbenzene	Volatiles	mg/kg	1.47E-03	5.00E-03	1.47E-03	U
102684	AOBSB0302	1-4	042396	Styrene	Volatiles	mg/kg	1.98E-03	5.00E-03	1.98E-03	U
102684	AOBSB0302	1-4	042396	Tetrachloroethene	Volatiles	mg/kg	1.17E-03	5.00E-03	6.04E-03	
102684	AOBSB0302	1-4	042396	Toluene	Volatiles	mg/kg	1.45E-03	5.00E-03	1.45E-03	U
102684	AOBSB0302	1-4	042396	trans-1,3-Dichloropropene	Volatiles	mg/kg	2.08E-03	5.00E-03	2.08E-03	U
102684	AOBSB0302	1-4	042396	Trichloroethene (TCE)	Volatiles	mg/kg	2.09E-03	5.00E-03	2.09E-03	U
102684	AOBSB0302	1-4	042396	Vinyl acetate	Volatiles	mg/kg	5.48E-03	1.00E-02	5.48E-03	U
102684	AOBSB0302	1-4	042396	Vinyl chloride	Volatiles	mg/kg	2.47E-03	1.00E-02	2.47E-03	U
102684	AOBSB0302	1-4	042396	Xylenes (total)	Volatiles	mg/kg	1.53E-03	5.00E-03	1.53E-03	U
102684	AOBSB0302	1-4	042396	1,2,4-Trichlorobenzene	Semivolatiles	mg/kg	1.80E-02	3.55E-01	1.80E-02	U
102684	AOBSB0302	1-4	042396	1,2-Dichlorobenzene	Semivolatiles	mg/kg	1.70E-02	3.55E-01	1.70E-02	U
102684	AOBSB0302	1-4	042396	1,3-Dichlorobenzene	Semivolatiles	mg/kg	1.80E-02	3.55E-01	1.80E-02	U
102684	AOBSB0302	1-4	042396	1,4-Dichlorobenzene	Semivolatiles	mg/kg	1.80E-02	3.55E-01	1.80E-02	U
102684	AOBSB0302	1-4	042396	2,4,5-Trichlorophenol	Semivolatiles	mg/kg	1.40E-02	1.78E+00	1.40E-02	U
102684	AOBSB0302	1-4	042396	2,4,6-Trichlorophenol	Semivolatiles	mg/kg	1.10E-02	3.55E-01	1.10E-02	U
102684	AOBSB0302	1-4	042396	2,4-Dichlorophenol	Semivolatiles	mg/kg	1.30E-02	3.55E-01	1.30E-02	U
102684	AOBSB0302	1-4	042396	2,4-Dimethyl phenol	Semivolatiles	mg/kg	2.60E-02	3.55E-01	2.60E-02	U
102684	AOBSB0302	1-4	042396	2,4-Dinitrophenol	Semivolatiles	mg/kg	4.40E-02	1.78E+00	4.40E-02	U
102684	AOBSB0302	1-4	042396	2,4-Dinitrotoluene	Semivolatiles	mg/kg	1.90E-02	3.55E-01	1.90E-02	U
102684	AOBSB0302	1-4	042396	2,6-Dinitrotoluene	Semivolatiles	mg/kg	1.60E-02	3.55E-01	1.60E-02	U
102684	AOBSB0302	1-4	042396	2-Chloronaphthalene	Semivolatiles	mg/kg	1.60E-02	3.55E-01	1.60E-02	U
102684	AOBSB0302	1-4	042396	2-Chlorophenol	Semivolatiles	mg/kg	1.70E-02	3.55E-01	1.70E-02	U
102684	AOBSB0302	1-4	042396	2-Methyl-4,6-dinitrophenol	Semivolatiles	mg/kg	1.10E-02	1.78E+00	1.10E-02	U
102684	AOBSB0302	1-4	042396	2-Methylnaphthalene	Semivolatiles	mg/kg	1.70E-02	3.55E-01	1.70E-02	U
102684	AOBSB0302	1-4	042396	2-Nitroaniline	Semivolatiles	mg/kg	1.90E-02	1.78E+00	1.90E-02	U
102684	AOBSB0302	1-4	042396	2-Nitrophenol	Semivolatiles	mg/kg	1.70E-02	3.55E-01	1.70E-02	U
102684	AOBSB0302	1-4	042396	3,3'-Dichlorobenzidine	Semivolatiles	mg/kg	7.30E-02	7.10E-01	7.30E-02	U
102684	AOBSB0302	1-4	042396	3-Nitroaniline	Semivolatiles	mg/kg	4.20E-02	1.78E+00	4.20E-02	U

Appendix B
Phase I Soil Analytical Results for the 716-A Motor Shops Seepage Basin

Sample ID	Sample Name	Sample Depth	Sample Date	Analyte	Analyte Class	Units	MDL	EQL	Result	Result Qualifier
102684	AOBSB0302	1-4	042396	4-Bromophenyl phenyl ether	Semivolatiles	mg/kg	1.00E-02	3.55E-01	1.00E-02	U
102684	AOBSB0302	1-4	042396	4-Chloro-3-methylphenol (p-chlo	Semivolatiles	mg/kg	1.80E-02	3.55E-01	1.80E-02	U
102684	AOBSB0302	1-4	042396	4-Chloroaniline	Semivolatiles	mg/kg	6.00E-03	3.55E-01	6.00E-03	U
102684	AOBSB0302	1-4	042396	4-Chlorophenyl phenyl ether	Semivolatiles	mg/kg	1.30E-02	3.55E-01	1.30E-02	U
102684	AOBSB0302	1-4	042396	4-Nitroaniline	Semivolatiles	mg/kg	2.00E-02	1.78E+00	2.00E-02	U
102684	AOBSB0302	1-4	042396	4-Nitrophenol	Semivolatiles	mg/kg	4.90E-02	1.78E+00	4.90E-02	U
102684	AOBSB0302	1-4	042396	Acenapthene	Semivolatiles	mg/kg	1.50E-02	3.55E-01	1.50E-02	U
102684	AOBSB0302	1-4	042396	Acenapthylene	Semivolatiles	mg/kg	1.60E-02	3.55E-01	1.60E-02	U
102684	AOBSB0302	1-4	042396	Anthracene	Semivolatiles	mg/kg	1.60E-02	3.55E-01	1.60E-02	U
102684	AOBSB0302	1-4	042396	Benzo(a)anthracene	Semivolatiles	mg/kg	2.00E-02	3.55E-01	2.00E-02	U
102684	AOBSB0302	1-4	042396	Benzo(a)pyrene	Semivolatiles	mg/kg	2.40E-02	3.55E-01	2.40E-02	U
102684	AOBSB0302	1-4	042396	Benzo(b)fluoranthene	Semivolatiles	mg/kg	2.30E-02	3.55E-01	2.30E-02	U
102684	AOBSB0302	1-4	042396	Benzo(g,h,i)perylene	Semivolatiles	mg/kg	1.60E-02	3.55E-01	1.60E-02	U
102684	AOBSB0302	1-4	042396	Benzo(k)fluoranthene	Semivolatiles	mg/kg	2.20E-02	3.55E-01	2.20E-02	U
102684	AOBSB0302	1-4	042396	Benzoic acid	Semivolatiles	mg/kg	3.40E-02	1.78E+00	3.40E-02	U
102684	AOBSB0302	1-4	042396	Benzyl alcohol	Semivolatiles	mg/kg	1.90E-02	3.55E-01	1.90E-02	U
102684	AOBSB0302	1-4	042396	Bis(2-chloroethoxy) methane	Semivolatiles	mg/kg	1.60E-02	3.55E-01	1.60E-02	U
102684	AOBSB0302	1-4	042396	Bis(2-chloroethyl) ether	Semivolatiles	mg/kg	2.20E-02	3.55E-01	2.20E-02	U
102684	AOBSB0302	1-4	042396	Bis(2-chloroisopropyl) ether	Semivolatiles	mg/kg	1.80E-02	3.55E-01	1.80E-02	U
102684	AOBSB0302	1-4	042396	Bis(2-ethylhexyl) phthalate	Semivolatiles	mg/kg	2.20E-02	3.55E-01	2.20E-02	U
102684	AOBSB0302	1-4	042396	Butyl benzyl phthalate	Semivolatiles	mg/kg	2.10E-02	3.55E-01	2.10E-02	U
102684	AOBSB0302	1-4	042396	Chrysene	Semivolatiles	mg/kg	1.90E-02	3.55E-01	1.90E-02	U
102684	AOBSB0302	1-4	042396	Di-n-butyl phthalate	Semivolatiles	mg/kg	1.90E-02	3.55E-01	1.90E-02	U
102684	AOBSB0302	1-4	042396	Di-n-octyl phthalate	Semivolatiles	mg/kg	2.60E-02	3.55E-01	2.60E-02	U
102684	AOBSB0302	1-4	042396	Dibenzo(a,h)anthracene	Semivolatiles	mg/kg	1.70E-02	3.55E-01	1.70E-02	U
102684	AOBSB0302	1-4	042396	Dibenzofuran	Semivolatiles	mg/kg	1.60E-02	3.55E-01	1.60E-02	U
102684	AOBSB0302	1-4	042396	Diethyl phthalate	Semivolatiles	mg/kg	1.60E-02	3.55E-01	1.60E-02	U
102684	AOBSB0302	1-4	042396	Dimethyl phthalate	Semivolatiles	mg/kg	1.50E-02	3.55E-01	1.50E-02	U
102684	AOBSB0302	1-4	042396	Fluoranthene	Semivolatiles	mg/kg	1.90E-02	3.55E-01	1.90E-02	U
102684	AOBSB0302	1-4	042396	Fluorene	Semivolatiles	mg/kg	1.60E-02	3.55E-01	1.60E-02	U

Appendix B
Phase I Soil Analytical Results for the 716-A Motor Shops Seepage Basin

Sample ID	Sample Name	Sample Depth	Sample Date	Analyte	Analyte Class	Units	MDL	EQL	Result	Result Qualifier
102684	AOBSB0302	1-4	042396	Hexachlorobenzene	Semivolatiles	mg/kg	1.00E-02	3.55E-01	1.00E-02	U
102684	AOBSB0302	1-4	042396	Hexachlorobutadiene	Semivolatiles	mg/kg	1.50E-02	3.55E-01	1.50E-02	U
102684	AOBSB0302	1-4	042396	Hexachlorocyclopentadiene	Semivolatiles	mg/kg	2.60E-02	3.55E-01	2.60E-02	U
102684	AOBSB0302	1-4	042396	Hexachloroethane	Semivolatiles	mg/kg	1.60E-02	3.55E-01	1.60E-02	U
102684	AOBSB0302	1-4	042396	Indeno(1,2,3-c,d)pyrene	Semivolatiles	mg/kg	1.80E-02	3.55E-01	1.80E-02	U
102684	AOBSB0302	1-4	042396	Isophorone	Semivolatiles	mg/kg	1.70E-02	3.55E-01	1.70E-02	U
102684	AOBSB0302	1-4	042396	N-Nitrosodi-n-propylamine	Semivolatiles	mg/kg	2.00E-02	3.55E-01	2.00E-02	U
102684	AOBSB0302	1-4	042396	N-Nitrosodiphenylamine	Semivolatiles	mg/kg	1.40E-02	3.55E-01	1.40E-02	U
102684	AOBSB0302	1-4	042396	Naphthalene	Semivolatiles	mg/kg	1.90E-02	3.55E-01	1.90E-02	U
102684	AOBSB0302	1-4	042396	Nitrobenzene	Semivolatiles	mg/kg	1.90E-02	3.55E-01	1.90E-02	U
102684	AOBSB0302	1-4	042396	o-cresol (2-methylphenol)	Semivolatiles	mg/kg	1.60E-02	3.55E-01	1.60E-02	U
102684	AOBSB0302	1-4	042396	p-cresol (4-methylphenol)	Semivolatiles	mg/kg	1.70E-02	3.55E-01	1.70E-02	U
102684	AOBSB0302	1-4	042396	Pentachlorophenol	Semivolatiles	mg/kg	3.90E-02	1.78E+00	3.90E-02	U
102684	AOBSB0302	1-4	042396	Phenanthrene	Semivolatiles	mg/kg	1.50E-02	3.55E-01	1.50E-02	U
102684	AOBSB0302	1-4	042396	Phenol	Semivolatiles	mg/kg	1.90E-02	3.55E-01	1.90E-02	U
102684	AOBSB0302	1-4	042396	Pyrene	Semivolatiles	mg/kg	2.10E-02	3.55E-01	2.10E-02	U
102684	AOBSB0302	1-4	042396	Unknown	SVOA TICs	mg/kg	0.00E+00	0.00E+00	2.00E-01	J
102684	AOBSB0302	1-4	042396	Aldrin	Pesticides/PCBs	mg/kg	5.70E-04	1.77E-03	5.70E-04	U
102684	AOBSB0302	1-4	042396	alpha-Benzene hexachloride	Pesticides/PCBs	mg/kg	5.70E-04	1.77E-03	5.70E-04	U
102684	AOBSB0302	1-4	042396	alpha-Chlordane	Pesticides/PCBs	mg/kg	5.70E-04	1.77E-03	5.70E-04	U
102684	AOBSB0302	1-4	042396	Aroclor 1016	Pesticides/PCBs	mg/kg	1.10E-02	3.55E-02	1.10E-02	U
102684	AOBSB0302	1-4	042396	Aroclor 1221	Pesticides/PCBs	mg/kg	2.20E-02	7.09E-02	2.20E-02	U
102684	AOBSB0302	1-4	042396	Aroclor 1232	Pesticides/PCBs	mg/kg	1.10E-02	3.55E-02	1.10E-02	U
102684	AOBSB0302	1-4	042396	Aroclor 1242	Pesticides/PCBs	mg/kg	1.10E-02	3.55E-02	1.10E-02	U
102684	AOBSB0302	1-4	042396	Aroclor 1248	Pesticides/PCBs	mg/kg	1.10E-02	3.55E-02	1.10E-02	U
102684	AOBSB0302	1-4	042396	Aroclor 1254	Pesticides/PCBs	mg/kg	1.10E-02	3.55E-02	1.10E-02	U
102684	AOBSB0302	1-4	042396	Aroclor 1260	Pesticides/PCBs	mg/kg	1.10E-02	3.55E-02	1.10E-02	U
102684	AOBSB0302	1-4	042396	beta-Benzene hexachloride	Pesticides/PCBs	mg/kg	5.70E-04	1.77E-03	5.70E-04	U
102684	AOBSB0302	1-4	042396	delta-Benzene hexachloride	Pesticides/PCBs	mg/kg	5.70E-04	1.77E-03	5.70E-04	U
102684	AOBSB0302	1-4	042396	Dieldrin	Pesticides/PCBs	mg/kg	6.33E-04	3.55E-03	6.33E-04	U

Appendix B
Phase I Soil Analytical Results for the 716-A Motor Shops Seepage Basin

Sample ID	Sample Name	Sample Depth	Sample Date	Analyte	Analyte Class	Units	MDL	EQL	Result	Result Qualifier
102684	AOBSB0302	1-4	042396	Endosulfan I	Pesticides/PCBs	mg/kg	5.70E-04	1.77E-03	5.70E-04	U
102684	AOBSB0302	1-4	042396	Endosulfan II	Pesticides/PCBs	mg/kg	9.00E-04	3.55E-03	9.00E-04	U
102684	AOBSB0302	1-4	042396	Endosulfan sulfate	Pesticides/PCBs	mg/kg	1.10E-03	3.55E-03	1.10E-03	U
102684	AOBSB0302	1-4	042396	Endrin	Pesticides/PCBs	mg/kg	1.10E-03	3.55E-03	1.10E-03	UJ
102684	AOBSB0302	1-4	042396	Endrin ketone	Pesticides/PCBs	mg/kg	1.10E-03	3.55E-03	1.10E-03	UJ
102684	AOBSB0302	1-4	042396	gamma-Benzene hexachloride (Lin	Pesticides/PCBs	mg/kg	5.70E-04	1.77E-03	5.70E-04	U
102684	AOBSB0302	1-4	042396	gamma-Chlordane	Pesticides/PCBs	mg/kg	5.70E-04	1.77E-03	5.70E-04	U
102684	AOBSB0302	1-4	042396	Heptachlor	Pesticides/PCBs	mg/kg	5.70E-04	1.77E-03	5.70E-04	U
102684	AOBSB0302	1-4	042396	Heptachlor epoxide	Pesticides/PCBs	mg/kg	5.70E-04	1.77E-03	5.70E-04	U
102684	AOBSB0302	1-4	042396	Methoxychlor (Mariate)	Pesticides/PCBs	mg/kg	5.70E-03	1.77E-02	5.70E-03	U
102684	AOBSB0302	1-4	042396	p,p'-DDD	Pesticides/PCBs	mg/kg	1.10E-03	3.55E-03	1.10E-03	UJ
102684	AOBSB0302	1-4	042396	p,p'-DDE	Pesticides/PCBs	mg/kg	9.00E-04	3.55E-03	9.00E-04	UJ
102684	AOBSB0302	1-4	042396	p,p'-DDT	Pesticides/PCBs	mg/kg	1.10E-03	3.55E-03	1.10E-03	UJ
102684	AOBSB0302	1-4	042396	Toxaphene	Pesticides/PCBs	mg/kg	5.30E-02	1.77E-01	5.30E-02	U
102684	AOBSB0302	1-4	042396	Aluminum	TAL Inorganics	mg/kg	1.90E+00	1.92E+01	5.23E+03	
102684	AOBSB0302	1-4	042396	Antimony	TAL Inorganics	mg/kg	3.50E-01	3.62E+00	3.50E-01	U
102684	AOBSB0302	1-4	042396	Arsenic	TAL Inorganics	mg/kg	1.11E+00	1.15E+01	1.30E+00	J
102684	AOBSB0302	1-4	042396	Barium	TAL Inorganics	mg/kg	1.10E-01	1.14E+00	2.14E+01	
102684	AOBSB0302	1-4	042396	Beryllium	TAL Inorganics	mg/kg	3.00E-02	2.58E-01	3.00E-02	U
102684	AOBSB0302	1-4	042396	Cadmium	TAL Inorganics	mg/kg	4.00E-02	4.13E-01	1.14E-01	J
102684	AOBSB0302	1-4	042396	Calcium	TAL Inorganics	mg/kg	1.68E+00	1.74E+01	9.24E+01	
102684	AOBSB0302	1-4	042396	Chromium	TAL Inorganics	mg/kg	9.00E-02	9.30E-01	4.40E+00	
102684	AOBSB0302	1-4	042396	Cobalt	TAL Inorganics	mg/kg	8.00E-02	8.26E-01	6.84E-01	J
102684	AOBSB0302	1-4	042396	Copper	TAL Inorganics	mg/kg	1.00E-01	1.03E+00	2.30E+00	
102684	AOBSB0302	1-4	042396	Cyanide	TAL Inorganics	mg/kg	8.00E-02	8.10E-01	8.00E-02	U
102684	AOBSB0302	1-4	042396	Iron	TAL Inorganics	mg/kg	2.19E+00	2.26E+01	2.48E+03	
102684	AOBSB0302	1-4	042396	Lead	TAL Inorganics	mg/kg	5.90E-01	6.09E+00	4.50E+00	J
102684	AOBSB0302	1-4	042396	Magnesium	TAL Inorganics	mg/kg	8.70E-01	8.99E+00	6.97E+01	
102684	AOBSB0302	1-4	042396	Manganese	TAL Inorganics	mg/kg	2.00E-02	2.07E-01	1.41E+01	
102684	AOBSB0302	1-4	042396	Mercury	TAL Inorganics	mg/kg	1.30E-02	1.42E-01	3.00E-02	J

Appendix B
Phase I Soil Analytical Results for the 716-A Motor Shops Seepage Basin

Sample ID	Sample Name	Sample Depth	Sample Date	Analyte	Analyte Class	Units	MDL	EQL	Result	Result Qualifier
102684	AOBSB0302	1-4	042396	Nickel	TAL Inorganics	mg/kg	1.70E-01	1.76E+00	1.80E+00	
102684	AOBSB0302	1-4	042396	Potassium	TAL Inorganics	mg/kg	6.70E+00	6.92E+01	9.40E+01	
102684	AOBSB0302	1-4	042396	Selenium	TAL Inorganics	mg/kg	1.04E+00	1.07E+01	1.04E+00	U
102684	AOBSB0302	1-4	042396	Silver	TAL Inorganics	mg/kg	9.00E-02	9.30E-01	9.00E-02	U
102684	AOBSB0302	1-4	042396	Sodium	TAL Inorganics	mg/kg	1.29E+01	1.33E+02	1.65E+01	J
102684	AOBSB0302	1-4	042396	Thallium	TAL Inorganics	mg/kg	8.50E-01	8.78E+00	8.50E-01	U
102684	AOBSB0302	1-4	042396	Vanadium	TAL Inorganics	mg/kg	7.00E-02	7.23E-01	7.10E+00	
102684	AOBSB0302	1-4	042396	Zinc	TAL Inorganics	mg/kg	1.61E+00	1.66E+01	7.80E+00	J
102684	AOBSB0302	1-4	042396	Gross Alpha	Radiologicals	pCi/g	4.00E+00	2.89E+00	7.55E+00	
102684	AOBSB0302	1-4	042396	Non-volatile Beta	Radiologicals	pCi/g	1.00E+01	1.72E+00	1.00E+01	UI
102684	AOBSB0302	1-4	042396	Cation exchange capacity	Miscellaneous	Meq/	6.00E+00	6.38E+02	6.00E+00	U
102684	AOBSB0302	1-4	042396	Total Organic Carbon	Miscellaneous	mg/kg	8.40E+00	6.00E+01	1.30E+03	
102684	AOBSB0302	1-4	042396	Total petroleum hydrocarbons	Miscellaneous	mg/kg	3.30E+00	1.14E+01	3.30E+00	UJ
102685	AOBSB0401	0-1	042396	1,2,4-Trichlorobenzene	Semivolatiles	mg/kg	1.80E-02	3.52E-01	1.80E-02	U
102685	AOBSB0401	0-1	042396	1,2-Dichlorobenzene	Semivolatiles	mg/kg	1.70E-02	3.52E-01	1.70E-02	U
102685	AOBSB0401	0-1	042396	1,3-Dichlorobenzene	Semivolatiles	mg/kg	1.80E-02	3.52E-01	1.80E-02	U
102685	AOBSB0401	0-1	042396	1,4-Dichlorobenzene	Semivolatiles	mg/kg	1.80E-02	3.52E-01	1.80E-02	U
102685	AOBSB0401	0-1	042396	2,4,5-Trichlorophenol	Semivolatiles	mg/kg	1.40E-02	1.76E+00	1.40E-02	U
102685	AOBSB0401	0-1	042396	2,4,6-Trichlorophenol	Semivolatiles	mg/kg	1.10E-02	3.52E-01	1.10E-02	U
102685	AOBSB0401	0-1	042396	2,4-Dichlorophenol	Semivolatiles	mg/kg	1.30E-02	3.52E-01	1.30E-02	U
102685	AOBSB0401	0-1	042396	2,4-Dimethyl phenol	Semivolatiles	mg/kg	2.60E-02	3.52E-01	2.60E-02	U
102685	AOBSB0401	0-1	042396	2,4-Dinitrophenol	Semivolatiles	mg/kg	4.40E-02	1.76E+00	4.40E-02	U
102685	AOBSB0401	0-1	042396	2,4-Dinitrotoluene	Semivolatiles	mg/kg	1.90E-02	3.52E-01	1.90E-02	U
102685	AOBSB0401	0-1	042396	2,6-Dinitrotoluene	Semivolatiles	mg/kg	1.60E-02	3.52E-01	1.60E-02	U
102685	AOBSB0401	0-1	042396	2-Chloronaphthalene	Semivolatiles	mg/kg	1.60E-02	3.52E-01	1.60E-02	U
102685	AOBSB0401	0-1	042396	2-Chlorophenol	Semivolatiles	mg/kg	1.70E-02	3.52E-01	1.70E-02	U
102685	AOBSB0401	0-1	042396	2-Methyl-4,6-dinitrophenol	Semivolatiles	mg/kg	1.10E-02	1.76E+00	1.10E-02	U
102685	AOBSB0401	0-1	042396	2-Methylnaphthalene	Semivolatiles	mg/kg	1.70E-02	3.52E-01	1.70E-02	U
102685	AOBSB0401	0-1	042396	2-Nitroaniline	Semivolatiles	mg/kg	1.90E-02	1.76E+00	1.90E-02	U
102685	AOBSB0401	0-1	042396	2-Nitrophenol	Semivolatiles	mg/kg	1.70E-02	3.52E-01	1.70E-02	U

Appendix B
Phase I Soil Analytical Results for the 716-A Motor Shops Seepage Basin

Sample ID	Sample Name	Sample Depth	Sample Date	Analyte	Analyte Class	Units	MDL	EQL	Result	Result Qualifier
102685	AOBSB0401	0-1	042396	3,3'-Dichlorobenzidine	Semivolatiles	mg/kg	7.30E-02	7.04E-01	7.30E-02	U
102685	AOBSB0401	0-1	042396	3-Nitroaniline	Semivolatiles	mg/kg	4.20E-02	1.76E+00	4.20E-02	U
102685	AOBSB0401	0-1	042396	4-Bromophenyl phenyl ether	Semivolatiles	mg/kg	1.00E-02	3.52E-01	1.00E-02	U
102685	AOBSB0401	0-1	042396	4-Chloro-3-methylphenol (p-chlo	Semivolatiles	mg/kg	1.80E-02	3.52E-01	1.80E-02	U
102685	AOBSB0401	0-1	042396	4-Chloroaniline	Semivolatiles	mg/kg	6.00E-03	3.52E-01	6.00E-03	U
102685	AOBSB0401	0-1	042396	4-Chlorophenyl phenyl ether	Semivolatiles	mg/kg	1.30E-02	3.52E-01	1.30E-02	U
102685	AOBSB0401	0-1	042396	4-Nitroaniline	Semivolatiles	mg/kg	2.00E-02	1.76E+00	2.00E-02	U
102685	AOBSB0401	0-1	042396	4-Nitrophenol	Semivolatiles	mg/kg	4.90E-02	1.76E+00	4.90E-02	U
102685	AOBSB0401	0-1	042396	Acenapthene	Semivolatiles	mg/kg	1.50E-02	3.52E-01	1.50E-02	U
102685	AOBSB0401	0-1	042396	Acenapthylene	Semivolatiles	mg/kg	1.60E-02	3.52E-01	1.60E-02	U
102685	AOBSB0401	0-1	042396	Anthracene	Semivolatiles	mg/kg	1.60E-02	3.52E-01	1.60E-02	U
102685	AOBSB0401	0-1	042396	Benzo(a)anthracene	Semivolatiles	mg/kg	2.00E-02	3.52E-01	2.00E-02	U
102685	AOBSB0401	0-1	042396	Benzo(a)pyrene	Semivolatiles	mg/kg	2.40E-02	3.52E-01	2.40E-02	U
102685	AOBSB0401	0-1	042396	Benzo(b)fluoranthene	Semivolatiles	mg/kg	2.30E-02	3.52E-01	2.30E-02	U
102685	AOBSB0401	0-1	042396	Benzo(g,h,i)perylene	Semivolatiles	mg/kg	1.60E-02	3.52E-01	1.60E-02	U
102685	AOBSB0401	0-1	042396	Benzo(k)fluoranthene	Semivolatiles	mg/kg	2.20E-02	3.52E-01	2.20E-02	U
102685	AOBSB0401	0-1	042396	Benzoic acid	Semivolatiles	mg/kg	3.40E-02	1.76E+00	3.40E-02	U
102685	AOBSB0401	0-1	042396	Benzyl alcohol	Semivolatiles	mg/kg	1.90E-02	3.52E-01	1.90E-02	U
102685	AOBSB0401	0-1	042396	Bis(2-chloroethoxy) methane	Semivolatiles	mg/kg	1.60E-02	3.52E-01	1.60E-02	U
102685	AOBSB0401	0-1	042396	Bis(2-chloroethyl) ether	Semivolatiles	mg/kg	2.20E-02	3.52E-01	2.20E-02	U
102685	AOBSB0401	0-1	042396	Bis(2-chloroisopropyl) ether	Semivolatiles	mg/kg	1.80E-02	3.52E-01	1.80E-02	U
102685	AOBSB0401	0-1	042396	Bis(2-ethylhexyl) phthalate	Semivolatiles	mg/kg	2.20E-02	3.52E-01	2.20E-02	U
102685	AOBSB0401	0-1	042396	Butyl benzyl phthalate	Semivolatiles	mg/kg	2.10E-02	3.52E-01	2.10E-02	U
102685	AOBSB0401	0-1	042396	Chrysene	Semivolatiles	mg/kg	1.90E-02	3.52E-01	1.90E-02	U
102685	AOBSB0401	0-1	042396	Di-n-butyl phthalate	Semivolatiles	mg/kg	1.90E-02	3.52E-01	1.90E-02	U
102685	AOBSB0401	0-1	042396	Di-n-octyl phthalate	Semivolatiles	mg/kg	2.60E-02	3.52E-01	2.60E-02	U
102685	AOBSB0401	0-1	042396	Dibenzo(a,h)anthracene	Semivolatiles	mg/kg	1.70E-02	3.52E-01	1.70E-02	U
102685	AOBSB0401	0-1	042396	Dibenzofuran	Semivolatiles	mg/kg	1.60E-02	3.52E-01	1.60E-02	U
102685	AOBSB0401	0-1	042396	Diethyl phthalate	Semivolatiles	mg/kg	1.60E-02	3.52E-01	1.60E-02	U
102685	AOBSB0401	0-1	042396	Dimethyl phthalate	Semivolatiles	mg/kg	1.50E-02	3.52E-01	1.50E-02	U

Appendix B
Phase I Soil Analytical Results for the 716-A Motor Shops Seepage Basin

Sample ID	Sample Name	Sample Depth	Sample Date	Analyte	Analyte Class	Units	MDL	EQL	Result	Result Qualifier
102685	AOBSB0401	0-1	042396	Fluoranthene	Semivolatiles	mg/kg	1.90E-02	3.52E-01	1.90E-02	U
102685	AOBSB0401	0-1	042396	Fluorene	Semivolatiles	mg/kg	1.60E-02	3.52E-01	1.60E-02	U
102685	AOBSB0401	0-1	042396	Hexachlorobenzene	Semivolatiles	mg/kg	1.00E-02	3.52E-01	1.00E-02	U
102685	AOBSB0401	0-1	042396	Hexachlorobutadiene	Semivolatiles	mg/kg	1.50E-02	3.52E-01	1.50E-02	U
102685	AOBSB0401	0-1	042396	Hexachlorocyclopentadiene	Semivolatiles	mg/kg	2.60E-02	3.52E-01	2.60E-02	U
102685	AOBSB0401	0-1	042396	Hexachloroethane	Semivolatiles	mg/kg	1.60E-02	3.52E-01	1.60E-02	U
102685	AOBSB0401	0-1	042396	Indeno(1,2,3-c,d)pyrene	Semivolatiles	mg/kg	1.80E-02	3.52E-01	1.80E-02	U
102685	AOBSB0401	0-1	042396	Isophorone	Semivolatiles	mg/kg	1.70E-02	3.52E-01	1.70E-02	U
102685	AOBSB0401	0-1	042396	N-Nitrosodi-n-propylamine	Semivolatiles	mg/kg	2.00E-02	3.52E-01	2.00E-02	U
102685	AOBSB0401	0-1	042396	N-Nitrosodiphenylamine	Semivolatiles	mg/kg	1.40E-02	3.52E-01	1.40E-02	U
102685	AOBSB0401	0-1	042396	Naphthalene	Semivolatiles	mg/kg	1.90E-02	3.52E-01	1.90E-02	U
102685	AOBSB0401	0-1	042396	Nitrobenzene	Semivolatiles	mg/kg	1.90E-02	3.52E-01	1.90E-02	U
102685	AOBSB0401	0-1	042396	o-cresol (2-methylphenol)	Semivolatiles	mg/kg	1.60E-02	3.52E-01	1.60E-02	U
102685	AOBSB0401	0-1	042396	p-cresol (4-methylphenol)	Semivolatiles	mg/kg	1.70E-02	3.52E-01	1.70E-02	U
102685	AOBSB0401	0-1	042396	Pentachlorophenol	Semivolatiles	mg/kg	3.90E-02	1.76E+00	3.90E-02	U
102685	AOBSB0401	0-1	042396	Phenanthrene	Semivolatiles	mg/kg	1.50E-02	3.52E-01	1.50E-02	U
102685	AOBSB0401	0-1	042396	Phenol	Semivolatiles	mg/kg	1.90E-02	3.52E-01	1.90E-02	U
102685	AOBSB0401	0-1	042396	Pyrene	Semivolatiles	mg/kg	2.10E-02	3.52E-01	2.10E-02	U
102685	AOBSB0401	0-1	042396	Aldol condensate	SVOA TICs	mg/kg	0.00E+00	0.00E+00	5.00E-01	J
102685	AOBSB0401	0-1	042396	Unknown	SVOA TICs	mg/kg	0.00E+00	0.00E+00	5.00E-01	J
102685	AOBSB0401	0-1	042396	Unknown	SVOA TICs	mg/kg	0.00E+00	0.00E+00	1.00E-01	J
102685	AOBSB0401	0-1	042396	Unknown	SVOA TICs	mg/kg	0.00E+00	0.00E+00	2.00E-01	J
102685	AOBSB0401	0-1	042396	Unknown	SVOA TICs	mg/kg	0.00E+00	0.00E+00	1.00E-01	J
102685	AOBSB0401	0-1	042396	Unknown	SVOA TICs	mg/kg	0.00E+00	0.00E+00	1.00E+00	J
102685	AOBSB0401	0-1	042396	Aldrin	Pesticides/PCBs	mg/kg	5.70E-04	1.76E-03	5.70E-04	U
102685	AOBSB0401	0-1	042396	alpha-Benzene hexachloride	Pesticides/PCBs	mg/kg	5.70E-04	1.76E-03	5.70E-04	U
102685	AOBSB0401	0-1	042396	alpha-Chlordane	Pesticides/PCBs	mg/kg	5.70E-04	1.76E-03	5.70E-04	U
102685	AOBSB0401	0-1	042396	Aroclor 1016	Pesticides/PCBs	mg/kg	1.10E-02	3.52E-02	1.10E-02	U
102685	AOBSB0401	0-1	042396	Aroclor 1221	Pesticides/PCBs	mg/kg	2.20E-02	7.04E-02	2.20E-02	U
102685	AOBSB0401	0-1	042396	Aroclor 1232	Pesticides/PCBs	mg/kg	1.10E-02	3.52E-02	1.10E-02	U

Appendix B
Phase I Soil Analytical Results for the 716-A Motor Shops Seepage Basin

Sample ID	Sample Name	Sample Depth	Sample Date	Analyte	Analyte Class	Units	MDL	EQL	Result	Result Qualifier
102685	AOBSB0401	0-1	042396	Aroclor 1242	Pesticides/PCBs	mg/kg	1.10E-02	3.52E-02	1.10E-02	U
102685	AOBSB0401	0-1	042396	Aroclor 1248	Pesticides/PCBs	mg/kg	1.10E-02	3.52E-02	1.10E-02	U
102685	AOBSB0401	0-1	042396	Aroclor 1254	Pesticides/PCBs	mg/kg	1.10E-02	3.52E-02	1.10E-02	U
102685	AOBSB0401	0-1	042396	Aroclor 1260	Pesticides/PCBs	mg/kg	1.10E-02	3.52E-02	5.39E-02	
102685	AOBSB0401	0-1	042396	beta-Benzene hexachloride	Pesticides/PCBs	mg/kg	5.70E-04	1.76E-03	5.70E-04	U
102685	AOBSB0401	0-1	042396	delta-Benzene hexachloride	Pesticides/PCBs	mg/kg	5.70E-04	1.76E-03	5.70E-04	U
102685	AOBSB0401	0-1	042396	Dieldrin	Pesticides/PCBs	mg/kg	6.33E-04	3.52E-03	6.33E-04	U
102685	AOBSB0401	0-1	042396	Endosulfan I	Pesticides/PCBs	mg/kg	5.70E-04	1.76E-03	5.70E-04	U
102685	AOBSB0401	0-1	042396	Endosulfan II	Pesticides/PCBs	mg/kg	9.00E-04	3.52E-03	9.00E-04	U
102685	AOBSB0401	0-1	042396	Endosulfan sulfate	Pesticides/PCBs	mg/kg	1.10E-03	3.52E-03	1.10E-03	U
102685	AOBSB0401	0-1	042396	Endrin	Pesticides/PCBs	mg/kg	1.10E-03	3.52E-03	1.10E-03	UJ
102685	AOBSB0401	0-1	042396	Endrin ketone	Pesticides/PCBs	mg/kg	1.10E-03	3.52E-03	1.10E-03	UJ
102685	AOBSB0401	0-1	042396	gamma-Benzene hexachloride (Lin	Pesticides/PCBs	mg/kg	5.70E-04	1.76E-03	5.70E-04	U
102685	AOBSB0401	0-1	042396	gamma-Chlordane	Pesticides/PCBs	mg/kg	5.70E-04	1.76E-03	5.70E-04	U
102685	AOBSB0401	0-1	042396	Heptachlor	Pesticides/PCBs	mg/kg	5.70E-04	1.76E-03	5.70E-04	U
102685	AOBSB0401	0-1	042396	Heptachlor epoxide	Pesticides/PCBs	mg/kg	5.70E-04	1.76E-03	5.70E-04	U
102685	AOBSB0401	0-1	042396	Methoxychlor (Mariate)	Pesticides/PCBs	mg/kg	5.70E-03	1.76E-02	5.70E-03	U
102685	AOBSB0401	0-1	042396	p,p'-DDD	Pesticides/PCBs	mg/kg	1.10E-03	3.52E-03	1.10E-03	UJ
102685	AOBSB0401	0-1	042396	p,p'-DDE	Pesticides/PCBs	mg/kg	9.00E-04	3.52E-03	9.00E-04	UJ
102685	AOBSB0401	0-1	042396	p,p'-DDT	Pesticides/PCBs	mg/kg	1.10E-03	3.52E-03	1.10E-03	UJ
102685	AOBSB0401	0-1	042396	Toxaphene	Pesticides/PCBs	mg/kg	5.30E-02	1.76E-01	5.30E-02	U
102685	AOBSB0401	0-1	042396	Aluminum	TAL Inorganics	mg/kg	1.90E+00	1.95E+01	2.98E+03	
102685	AOBSB0401	0-1	042396	Antimony	TAL Inorganics	mg/kg	3.50E-01	3.66E+00	3.50E-01	U
102685	AOBSB0401	0-1	042396	Arsenic	TAL Inorganics	mg/kg	1.11E+00	1.16E+01	1.11E+00	U
102685	AOBSB0401	0-1	042396	Barium	TAL Inorganics	mg/kg	1.10E-01	1.15E+00	1.32E+01	
102685	AOBSB0401	0-1	042396	Beryllium	TAL Inorganics	mg/kg	3.00E-02	2.62E-01	3.00E-02	U
102685	AOBSB0401	0-1	042396	Cadmium	TAL Inorganics	mg/kg	4.00E-02	4.18E-01	2.84E-01	J
102685	AOBSB0401	0-1	042396	Calcium	TAL Inorganics	mg/kg	1.68E+00	1.76E+01	3.88E+01	
102685	AOBSB0401	0-1	042396	Chromium	TAL Inorganics	mg/kg	9.00E-02	9.41E-01	7.20E+00	
102685	AOBSB0401	0-1	042396	Cobalt	TAL Inorganics	mg/kg	8.00E-02	8.37E-01	3.74E-01	J

Appendix B
Phase I Soil Analytical Results for the 716-A Motor Shops Seepage Basin

Sample ID	Sample Name	Sample Depth	Sample Date	Analyte	Analyte Class	Units	MDL	EQL	Result	Result Qualifier
102685	AOBSB0401	0-1	042396	Copper	TAL Inorganics	mg/kg	1.00E-01	1.05E+00	6.20E+00	
102685	AOBSB0401	0-1	042396	Cyanide	TAL Inorganics	mg/kg	8.00E-02	8.40E-01	2.70E-01	J
102685	AOBSB0401	0-1	042396	Iron	TAL Inorganics	mg/kg	2.19E+00	2.29E+01	1.47E+03	
102685	AOBSB0401	0-1	042396	Lead	TAL Inorganics	mg/kg	5.90E-01	6.17E+00	9.90E+00	
102685	AOBSB0401	0-1	042396	Magnesium	TAL Inorganics	mg/kg	8.70E-01	9.10E+00	5.65E+01	
102685	AOBSB0401	0-1	042396	Manganese	TAL Inorganics	mg/kg	2.00E-02	2.09E-01	1.03E+01	
102685	AOBSB0401	0-1	042396	Mercury	TAL Inorganics	mg/kg	1.30E-02	1.41E-01	2.00E-02	J
102685	AOBSB0401	0-1	042396	Nickel	TAL Inorganics	mg/kg	1.70E-01	1.78E+00	1.20E+00	J
102685	AOBSB0401	0-1	042396	Potassium	TAL Inorganics	mg/kg	6.70E+00	7.01E+01	5.04E+01	J
102685	AOBSB0401	0-1	042396	Selenium	TAL Inorganics	mg/kg	1.04E+00	1.09E+01	1.04E+00	U
102685	AOBSB0401	0-1	042396	Silver	TAL Inorganics	mg/kg	9.00E-02	9.41E-01	9.00E-02	U
102685	AOBSB0401	0-1	042396	Sodium	TAL Inorganics	mg/kg	1.29E+01	1.35E+02	2.43E+01	J
102685	AOBSB0401	0-1	042396	Thallium	TAL Inorganics	mg/kg	8.50E-01	8.89E+00	8.50E-01	U
102685	AOBSB0401	0-1	042396	Vanadium	TAL Inorganics	mg/kg	7.00E-02	7.32E-01	4.70E+00	
102685	AOBSB0401	0-1	042396	Zinc	TAL Inorganics	mg/kg	1.61E+00	1.68E+01	8.10E+00	J
102685	AOBSB0401	0-1	042396	Gross Alpha	Radiologicals	pCi/g	4.00E+00	2.88E+00	1.41E+01	
102685	AOBSB0401	0-1	042396	Non-volatile Beta	Radiologicals	pCi/g	1.00E+01	1.70E+00	6.35E+00	
102685	AOBSB0401	0-1	042396	Cation exchange capacity	Miscellaneous	Meq/	6.00E+00	6.34E+02	6.00E+00	U
102685	AOBSB0401	0-1	042396	Total Organic Carbon	Miscellaneous	mg/kg	8.40E+00	6.00E+01	6.70E+03	
102685	AOBSB0401	0-1	042396	Total petroleum hydrocarbons	Miscellaneous	mg/kg	3.30E+00	2.25E+01	5.30E+02	
102686	AOBSB0402	1-4	042396	1,1,1-Trichloroethane	Volatiles	mg/kg	9.71E-04	5.50E-03	4.13E-03	J
102686	AOBSB0402	1-4	042396	1,1,2,2-Tetrachloroethane	Volatiles	mg/kg	3.47E-03	5.50E-03	3.47E-03	U
102686	AOBSB0402	1-4	042396	1,1,2-Trichloroethane	Volatiles	mg/kg	2.40E-03	5.50E-03	2.40E-03	U
102686	AOBSB0402	1-4	042396	1,1-Dichloroethane	Volatiles	mg/kg	1.05E-03	5.50E-03	1.05E-03	U
102686	AOBSB0402	1-4	042396	1,1-Dichloroethene	Volatiles	mg/kg	1.42E-03	5.50E-03	1.42E-03	U
102686	AOBSB0402	1-4	042396	1,2-Dichloroethane	Volatiles	mg/kg	1.34E-03	5.50E-03	1.34E-03	U
102686	AOBSB0402	1-4	042396	1,2-Dichloroethene (total)	Volatiles	mg/kg	8.54E-04	5.50E-03	8.54E-04	U
102686	AOBSB0402	1-4	042396	1,2-Dichloropropane	Volatiles	mg/kg	1.67E-03	5.50E-03	1.67E-03	U
102686	AOBSB0402	1-4	042396	2-Butanone (MEK)	Volatiles	mg/kg	2.81E-03	1.10E-02	2.81E-03	U
102686	AOBSB0402	1-4	042396	2-Hexanone	Volatiles	mg/kg	3.77E-03	1.10E-02	3.77E-03	U

Appendix B
Phase I Soil Analytical Results for the 716-A Motor Shops Seepage Basin

Sample ID	Sample Name	Sample Depth	Sample Date	Analyte	Analyte Class	Units	MDL	EQL	Result	Result Qualifier
102686	AOBSB0402	1-4	042396	4-Methyl-2-pentanone	Volatiles	mg/kg	3.29E-03	1.10E-02	3.29E-03	U
102686	AOBSB0402	1-4	042396	Acetone	Volatiles	mg/kg	4.04E-03	1.10E-02	4.04E-03	U
102686	AOBSB0402	1-4	042396	Benzene	Volatiles	mg/kg	7.52E-04	5.50E-03	7.52E-04	U
102686	AOBSB0402	1-4	042396	Bromodichloromethane	Volatiles	mg/kg	1.74E-03	5.50E-03	1.74E-03	U
102686	AOBSB0402	1-4	042396	Bromoform	Volatiles	mg/kg	2.93E-03	5.50E-03	2.93E-03	U
102686	AOBSB0402	1-4	042396	Bromomethane (Methyl bromide)	Volatiles	mg/kg	2.01E-03	1.10E-02	2.01E-03	U
102686	AOBSB0402	1-4	042396	Carbon disulfide	Volatiles	mg/kg	1.71E-03	5.50E-03	1.71E-03	U
102686	AOBSB0402	1-4	042396	Carbon tetrachloride	Volatiles	mg/kg	9.71E-04	5.50E-03	9.71E-04	U
102686	AOBSB0402	1-4	042396	Chlorobenzene	Volatiles	mg/kg	1.74E-03	5.50E-03	1.74E-03	U
102686	AOBSB0402	1-4	042396	Chlorodibromomethane	Volatiles	mg/kg	2.53E-03	5.50E-03	2.53E-03	U
102686	AOBSB0402	1-4	042396	Chloroethane	Volatiles	mg/kg	2.06E-03	1.10E-02	2.06E-03	U
102686	AOBSB0402	1-4	042396	Chloroform	Volatiles	mg/kg	1.11E-03	5.50E-03	1.11E-03	U
102686	AOBSB0402	1-4	042396	Chloromethane (methyl chloride)	Volatiles	mg/kg	3.20E-03	1.10E-02	3.20E-03	U
102686	AOBSB0402	1-4	042396	cis-1,3-Dichloropropene	Volatiles	mg/kg	1.79E-03	5.50E-03	1.79E-03	U
102686	AOBSB0402	1-4	042396	Dichloromethane (methylene chlo	Volatiles	mg/kg	1.83E-03	5.50E-03	1.83E-03	U
102686	AOBSB0402	1-4	042396	Ethylbenzene	Volatiles	mg/kg	1.47E-03	5.50E-03	1.47E-03	U
102686	AOBSB0402	1-4	042396	Styrene	Volatiles	mg/kg	1.98E-03	5.50E-03	1.98E-03	U
102686	AOBSB0402	1-4	042396	Tetrachloroethene	Volatiles	mg/kg	1.17E-03	5.50E-03	1.04E-02	
102686	AOBSB0402	1-4	042396	Toluene	Volatiles	mg/kg	1.45E-03	5.50E-03	1.45E-03	U
102686	AOBSB0402	1-4	042396	trans-1,3-Dichloropropene	Volatiles	mg/kg	2.08E-03	5.50E-03	2.08E-03	U
102686	AOBSB0402	1-4	042396	Trichloroethene (TCE)	Volatiles	mg/kg	2.09E-03	5.50E-03	2.09E-03	U
102686	AOBSB0402	1-4	042396	Vinyl acetate	Volatiles	mg/kg	5.48E-03	1.10E-02	5.48E-03	U
102686	AOBSB0402	1-4	042396	Vinyl chloride	Volatiles	mg/kg	2.47E-03	1.10E-02	2.47E-03	U
102686	AOBSB0402	1-4	042396	Xylenes (total)	Volatiles	mg/kg	1.53E-03	5.50E-03	1.53E-03	U
102686	AOBSB0402	1-4	042396	1,2,4-Trichlorobenzene	Semivolatiles	mg/kg	1.80E-02	3.56E-01	1.80E-02	U
102686	AOBSB0402	1-4	042396	1,2-Dichlorobenzene	Semivolatiles	mg/kg	1.70E-02	3.56E-01	1.70E-02	U
102686	AOBSB0402	1-4	042396	1,3-Dichlorobenzene	Semivolatiles	mg/kg	1.80E-02	3.56E-01	1.80E-02	U
102686	AOBSB0402	1-4	042396	1,4-Dichlorobenzene	Semivolatiles	mg/kg	1.80E-02	3.56E-01	1.80E-02	U
102686	AOBSB0402	1-4	042396	2,4,5-Trichlorophenol	Semivolatiles	mg/kg	1.40E-02	1.78E+00	1.40E-02	U
102686	AOBSB0402	1-4	042396	2,4,6-Trichlorophenol	Semivolatiles	mg/kg	1.10E-02	3.56E-01	1.10E-02	U

Appendix B
Phase I Soil Analytical Results for the 716-A Motor Shops Seepage Basin

Sample ID	Sample Name	Sample Depth	Sample Date	Analyte	Analyte Class	Units	MDL	EQL	Result	Result Qualifier
102686	AOBSB0402	1-4	042396	2,4-Dichlorophenol	Semivolatiles	mg/kg	1.30E-02	3.56E-01	1.30E-02	U
102686	AOBSB0402	1-4	042396	2,4-Dimethyl phenol	Semivolatiles	mg/kg	2.60E-02	3.56E-01	2.60E-02	U
102686	AOBSB0402	1-4	042396	2,4-Dinitrophenol	Semivolatiles	mg/kg	4.40E-02	1.78E+00	4.40E-02	U
102686	AOBSB0402	1-4	042396	2,4-Dinitrotoluene	Semivolatiles	mg/kg	1.90E-02	3.56E-01	1.90E-02	U
102686	AOBSB0402	1-4	042396	2,6-Dinitrotoluene	Semivolatiles	mg/kg	1.60E-02	3.56E-01	1.60E-02	U
102686	AOBSB0402	1-4	042396	2-Chloronaphthalene	Semivolatiles	mg/kg	1.60E-02	3.56E-01	1.60E-02	U
102686	AOBSB0402	1-4	042396	2-Chlorophenol	Semivolatiles	mg/kg	1.70E-02	3.56E-01	1.70E-02	U
102686	AOBSB0402	1-4	042396	2-Methyl-4,6-dinitrophenol	Semivolatiles	mg/kg	1.10E-02	1.78E+00	1.10E-02	U
102686	AOBSB0402	1-4	042396	2-Methylnaphthalene	Semivolatiles	mg/kg	1.70E-02	3.56E-01	1.70E-02	U
102686	AOBSB0402	1-4	042396	2-Nitroaniline	Semivolatiles	mg/kg	1.90E-02	1.78E+00	1.90E-02	U
102686	AOBSB0402	1-4	042396	2-Nitrophenol	Semivolatiles	mg/kg	1.70E-02	3.56E-01	1.70E-02	U
102686	AOBSB0402	1-4	042396	3,3'-Dichlorobenzidine	Semivolatiles	mg/kg	7.30E-02	7.12E-01	7.30E-02	U
102686	AOBSB0402	1-4	042396	3-Nitroaniline	Semivolatiles	mg/kg	4.20E-02	1.78E+00	4.20E-02	U
102686	AOBSB0402	1-4	042396	4-Bromophenyl phenyl ether	Semivolatiles	mg/kg	1.00E-02	3.56E-01	1.00E-02	U
102686	AOBSB0402	1-4	042396	4-Chloro-3-methylphenol (p-chlo	Semivolatiles	mg/kg	1.80E-02	3.56E-01	1.80E-02	U
102686	AOBSB0402	1-4	042396	4-Chloroaniline	Semivolatiles	mg/kg	6.00E-03	3.56E-01	6.00E-03	U
102686	AOBSB0402	1-4	042396	4-Chlorophenyl phenyl ether	Semivolatiles	mg/kg	1.30E-02	3.56E-01	1.30E-02	U
102686	AOBSB0402	1-4	042396	4-Nitroaniline	Semivolatiles	mg/kg	2.00E-02	1.78E+00	2.00E-02	U
102686	AOBSB0402	1-4	042396	4-Nitrophenol	Semivolatiles	mg/kg	4.90E-02	1.78E+00	4.90E-02	U
102686	AOBSB0402	1-4	042396	Acenapthene	Semivolatiles	mg/kg	1.50E-02	3.56E-01	1.50E-02	U
102686	AOBSB0402	1-4	042396	Acenapthylene	Semivolatiles	mg/kg	1.60E-02	3.56E-01	1.60E-02	U
102686	AOBSB0402	1-4	042396	Anthracene	Semivolatiles	mg/kg	1.60E-02	3.56E-01	1.60E-02	U
102686	AOBSB0402	1-4	042396	Benzo(a)anthracene	Semivolatiles	mg/kg	2.00E-02	3.56E-01	2.00E-02	U
102686	AOBSB0402	1-4	042396	Benzo(a)pyrene	Semivolatiles	mg/kg	2.40E-02	3.56E-01	2.40E-02	U
102686	AOBSB0402	1-4	042396	Benzo(b)fluoranthene	Semivolatiles	mg/kg	2.30E-02	3.56E-01	2.30E-02	U
102686	AOBSB0402	1-4	042396	Benzo(g,h,i)perylene	Semivolatiles	mg/kg	1.60E-02	3.56E-01	1.60E-02	U
102686	AOBSB0402	1-4	042396	Benzo(k)fluoranthene	Semivolatiles	mg/kg	2.20E-02	3.56E-01	2.20E-02	U
102686	AOBSB0402	1-4	042396	Benzoic acid	Semivolatiles	mg/kg	3.40E-02	1.78E+00	3.40E-02	U
102686	AOBSB0402	1-4	042396	Benzyl alcohol	Semivolatiles	mg/kg	1.90E-02	3.56E-01	1.90E-02	U
102686	AOBSB0402	1-4	042396	Bis(2-chloroethoxy) methane	Semivolatiles	mg/kg	1.60E-02	3.56E-01	1.60E-02	U

Appendix B
Phase I Soil Analytical Results for the 716-A Motor Shops Seepage Basin

Sample ID	Sample Name	Sample Depth	Sample Date	Analyte	Analyte Class	Units	MDL	EQL	Result	Result Qualifier
102686	AOBSB0402	1-4	042396	Bis(2-chloroethyl) ether	Semivolatiles	mg/kg	2.20E-02	3.56E-01	2.20E-02	U
102686	AOBSB0402	1-4	042396	Bis(2-chloroisopropyl) ether	Semivolatiles	mg/kg	1.80E-02	3.56E-01	1.80E-02	U
102686	AOBSB0402	1-4	042396	Bis(2-ethylhexyl) phthalate	Semivolatiles	mg/kg	2.20E-02	3.56E-01	2.20E-02	U
102686	AOBSB0402	1-4	042396	Butyl benzyl phthalate	Semivolatiles	mg/kg	2.10E-02	3.56E-01	2.10E-02	U
102686	AOBSB0402	1-4	042396	Chrysene	Semivolatiles	mg/kg	1.90E-02	3.56E-01	1.90E-02	U
102686	AOBSB0402	1-4	042396	Di-n-butyl phthalate	Semivolatiles	mg/kg	1.90E-02	3.56E-01	1.90E-02	U
102686	AOBSB0402	1-4	042396	Di-n-octyl phthalate	Semivolatiles	mg/kg	2.60E-02	3.56E-01	2.60E-02	U
102686	AOBSB0402	1-4	042396	Dibenzo(a,h)anthracene	Semivolatiles	mg/kg	1.70E-02	3.56E-01	1.70E-02	U
102686	AOBSB0402	1-4	042396	Dibenzofuran	Semivolatiles	mg/kg	1.60E-02	3.56E-01	1.60E-02	U
102686	AOBSB0402	1-4	042396	Diethyl phthalate	Semivolatiles	mg/kg	1.60E-02	3.56E-01	1.60E-02	U
102686	AOBSB0402	1-4	042396	Dimethyl phthalate	Semivolatiles	mg/kg	1.50E-02	3.56E-01	1.50E-02	U
102686	AOBSB0402	1-4	042396	Fluoranthene	Semivolatiles	mg/kg	1.90E-02	3.56E-01	1.90E-02	U
102686	AOBSB0402	1-4	042396	Fluorene	Semivolatiles	mg/kg	1.60E-02	3.56E-01	1.60E-02	U
102686	AOBSB0402	1-4	042396	Hexachlorobenzene	Semivolatiles	mg/kg	1.00E-02	3.56E-01	1.00E-02	U
102686	AOBSB0402	1-4	042396	Hexachlorobutadiene	Semivolatiles	mg/kg	1.50E-02	3.56E-01	1.50E-02	U
102686	AOBSB0402	1-4	042396	Hexachlorocyclopentadiene	Semivolatiles	mg/kg	2.60E-02	3.56E-01	2.60E-02	U
102686	AOBSB0402	1-4	042396	Hexachloroethane	Semivolatiles	mg/kg	1.60E-02	3.56E-01	1.60E-02	U
102686	AOBSB0402	1-4	042396	Indeno(1,2,3-c,d)pyrene	Semivolatiles	mg/kg	1.80E-02	3.56E-01	1.80E-02	U
102686	AOBSB0402	1-4	042396	Isophorone	Semivolatiles	mg/kg	1.70E-02	3.56E-01	1.70E-02	U
102686	AOBSB0402	1-4	042396	N-Nitrosodi-n-propylamine	Semivolatiles	mg/kg	2.00E-02	3.56E-01	2.00E-02	U
102686	AOBSB0402	1-4	042396	N-Nitrosodiphenylamine	Semivolatiles	mg/kg	1.40E-02	3.56E-01	1.40E-02	U
102686	AOBSB0402	1-4	042396	Naphthalene	Semivolatiles	mg/kg	1.90E-02	3.56E-01	1.90E-02	U
102686	AOBSB0402	1-4	042396	Nitrobenzene	Semivolatiles	mg/kg	1.90E-02	3.56E-01	1.90E-02	U
102686	AOBSB0402	1-4	042396	o-cresol (2-methylphenol)	Semivolatiles	mg/kg	1.60E-02	3.56E-01	1.60E-02	U
102686	AOBSB0402	1-4	042396	p-cresol (4-methylphenol)	Semivolatiles	mg/kg	1.70E-02	3.56E-01	1.70E-02	U
102686	AOBSB0402	1-4	042396	Pentachlorophenol	Semivolatiles	mg/kg	3.90E-02	1.78E+00	3.90E-02	U
102686	AOBSB0402	1-4	042396	Phenanthrene	Semivolatiles	mg/kg	1.50E-02	3.56E-01	1.50E-02	U
102686	AOBSB0402	1-4	042396	Phenol	Semivolatiles	mg/kg	1.90E-02	3.56E-01	1.90E-02	U
102686	AOBSB0402	1-4	042396	Pyrene	Semivolatiles	mg/kg	2.10E-02	3.56E-01	2.10E-02	U
102686	AOBSB0402	1-4	042396	Unknown	SVOA TICs	mg/kg	0.00E+00	0.00E+00	3.00E-01	J

Appendix B
Phase I Soil Analytical Results for the 716-A Motor Shops Seepage Basin

Sample ID	Sample Name	Sample Depth	Sample Date	Analyte	Analyte Class	Units	MDL	EQL	Result	Result Qualifier
102686	AOBSB0402	1-4	042396	Unknown	SVOA TICs	mg/kg	0.00E+00	0.00E+00	1.00E-01	J
102686	AOBSB0402	1-4	042396	Unknown	SVOA TICs	mg/kg	0.00E+00	0.00E+00	2.00E-01	J
102686	AOBSB0402	1-4	042396	Aldrin	Pesticides/PCBs	mg/kg	5.70E-04	1.78E-03	5.70E-04	U
102686	AOBSB0402	1-4	042396	alpha-Benzene hexachloride	Pesticides/PCBs	mg/kg	5.70E-04	1.78E-03	5.70E-04	U
102686	AOBSB0402	1-4	042396	alpha-Chlordane	Pesticides/PCBs	mg/kg	5.70E-04	1.78E-03	5.70E-04	U
102686	AOBSB0402	1-4	042396	Aroclor 1016	Pesticides/PCBs	mg/kg	1.10E-02	3.56E-02	1.10E-02	U
102686	AOBSB0402	1-4	042396	Aroclor 1221	Pesticides/PCBs	mg/kg	2.20E-02	7.11E-02	2.20E-02	U
102686	AOBSB0402	1-4	042396	Aroclor 1232	Pesticides/PCBs	mg/kg	1.10E-02	3.56E-02	1.10E-02	U
102686	AOBSB0402	1-4	042396	Aroclor 1242	Pesticides/PCBs	mg/kg	1.10E-02	3.56E-02	1.10E-02	U
102686	AOBSB0402	1-4	042396	Aroclor 1248	Pesticides/PCBs	mg/kg	1.10E-02	3.56E-02	1.10E-02	U
102686	AOBSB0402	1-4	042396	Aroclor 1254	Pesticides/PCBs	mg/kg	1.10E-02	3.56E-02	1.10E-02	U
102686	AOBSB0402	1-4	042396	Aroclor 1260	Pesticides/PCBs	mg/kg	1.10E-02	3.56E-02	1.10E-02	U
102686	AOBSB0402	1-4	042396	beta-Benzene hexachloride	Pesticides/PCBs	mg/kg	5.70E-04	1.78E-03	5.70E-04	U
102686	AOBSB0402	1-4	042396	delta-Benzene hexachloride	Pesticides/PCBs	mg/kg	5.70E-04	1.78E-03	5.70E-04	U
102686	AOBSB0402	1-4	042396	Dieldrin	Pesticides/PCBs	mg/kg	6.33E-04	3.56E-03	6.33E-04	U
102686	AOBSB0402	1-4	042396	Endosulfan I	Pesticides/PCBs	mg/kg	5.70E-04	1.78E-03	5.70E-04	U
102686	AOBSB0402	1-4	042396	Endosulfan II	Pesticides/PCBs	mg/kg	9.00E-04	3.56E-03	9.00E-04	U
102686	AOBSB0402	1-4	042396	Endosulfan sulfate	Pesticides/PCBs	mg/kg	1.10E-03	3.56E-03	1.10E-03	U
102686	AOBSB0402	1-4	042396	Endrin	Pesticides/PCBs	mg/kg	1.10E-03	3.56E-03	1.10E-03	UJ
102686	AOBSB0402	1-4	042396	Endrin ketone	Pesticides/PCBs	mg/kg	1.10E-03	3.56E-03	1.10E-03	UJ
102686	AOBSB0402	1-4	042396	gamma-Benzene hexachloride (Lin	Pesticides/PCBs	mg/kg	5.70E-04	1.78E-03	5.70E-04	U
102686	AOBSB0402	1-4	042396	gamma-Chlordane	Pesticides/PCBs	mg/kg	5.70E-04	1.78E-03	5.70E-04	U
102686	AOBSB0402	1-4	042396	Heptachlor	Pesticides/PCBs	mg/kg	5.70E-04	1.78E-03	5.70E-04	U
102686	AOBSB0402	1-4	042396	Heptachlor epoxide	Pesticides/PCBs	mg/kg	5.70E-04	1.78E-03	5.70E-04	U
102686	AOBSB0402	1-4	042396	Methoxychlor (Mariate)	Pesticides/PCBs	mg/kg	5.70E-03	1.78E-02	5.70E-03	U
102686	AOBSB0402	1-4	042396	p,p'-DDD	Pesticides/PCBs	mg/kg	1.10E-03	3.56E-03	1.10E-03	UJ
102686	AOBSB0402	1-4	042396	p,p'-DDE	Pesticides/PCBs	mg/kg	9.00E-04	3.56E-03	9.00E-04	UJ
102686	AOBSB0402	1-4	042396	p,p'-DDT	Pesticides/PCBs	mg/kg	1.10E-03	3.56E-03	1.10E-03	UJ
102686	AOBSB0402	1-4	042396	Toxaphene	Pesticides/PCBs	mg/kg	5.30E-02	1.78E-01	5.30E-02	U
102686	AOBSB0402	1-4	042396	Aluminum	TAL Inorganics	mg/kg	1.90E+00	1.98E+01	6.38E+03	

Appendix B
Phase I Soil Analytical Results for the 716-A Motor Shops Seepage Basin

Sample ID	Sample Name	Sample Depth	Sample Date	Analyte	Analyte Class	Units	MDL	EQL	Result	Result Qualifier
102686	AOBSB0402	1-4	042396	Antimony	TAL Inorganics	mg/kg	3.50E-01	3.73E+00	3.50E-01	U
102686	AOBSB0402	1-4	042396	Arsenic	TAL Inorganics	mg/kg	1.11E+00	1.18E+01	1.40E+00	J
102686	AOBSB0402	1-4	042396	Barium	TAL Inorganics	mg/kg	1.10E-01	1.17E+00	2.18E+01	
102686	AOBSB0402	1-4	042396	Beryllium	TAL Inorganics	mg/kg	3.00E-02	2.67E-01	2.64E-01	
102686	AOBSB0402	1-4	042396	Cadmium	TAL Inorganics	mg/kg	4.00E-02	4.27E-01	5.35E-01	
102686	AOBSB0402	1-4	042396	Calcium	TAL Inorganics	mg/kg	1.68E+00	1.79E+01	6.84E+01	
102686	AOBSB0402	1-4	042396	Chromium	TAL Inorganics	mg/kg	9.00E-02	9.60E-01	5.90E+00	
102686	AOBSB0402	1-4	042396	Cobalt	TAL Inorganics	mg/kg	8.00E-02	8.54E-01	9.48E-01	
102686	AOBSB0402	1-4	042396	Copper	TAL Inorganics	mg/kg	1.00E-01	1.07E+00	2.90E+00	
102686	AOBSB0402	1-4	042396	Cyanide	TAL Inorganics	mg/kg	8.00E-02	8.10E-01	8.00E-02	U
102686	AOBSB0402	1-4	042396	Iron	TAL Inorganics	mg/kg	2.19E+00	2.34E+01	3.26E+03	
102686	AOBSB0402	1-4	042396	Lead	TAL Inorganics	mg/kg	5.90E-01	6.30E+00	5.50E+00	J
102686	AOBSB0402	1-4	042396	Magnesium	TAL Inorganics	mg/kg	8.70E-01	9.28E+00	1.02E+02	
102686	AOBSB0402	1-4	042396	Manganese	TAL Inorganics	mg/kg	2.00E-02	2.13E-01	1.60E+01	
102686	AOBSB0402	1-4	042396	Mercury	TAL Inorganics	mg/kg	1.30E-02	1.42E-01	2.00E-02	J
102686	AOBSB0402	1-4	042396	Nickel	TAL Inorganics	mg/kg	1.70E-01	1.81E+00	2.40E+00	
102686	AOBSB0402	1-4	042396	Potassium	TAL Inorganics	mg/kg	6.70E+00	7.15E+01	9.82E+01	
102686	AOBSB0402	1-4	042396	Selenium	TAL Inorganics	mg/kg	1.04E+00	1.11E+01	1.04E+00	U
102686	AOBSB0402	1-4	042396	Silver	TAL Inorganics	mg/kg	9.00E-02	9.60E-01	9.00E-02	U
102686	AOBSB0402	1-4	042396	Sodium	TAL Inorganics	mg/kg	1.29E+01	1.38E+02	2.04E+01	J
102686	AOBSB0402	1-4	042396	Thallium	TAL Inorganics	mg/kg	8.50E-01	9.07E+00	8.50E-01	U
102686	AOBSB0402	1-4	042396	Vanadium	TAL Inorganics	mg/kg	7.00E-02	7.47E-01	9.00E+00	
102686	AOBSB0402	1-4	042396	Zinc	TAL Inorganics	mg/kg	1.61E+00	1.72E+01	2.45E+01	
102686	AOBSB0402	1-4	042396	Gross Alpha	Radiologicals	pCi/g	4.00E+00	2.91E+00	1.26E+01	
102686	AOBSB0402	1-4	042396	Non-volatile Beta	Radiologicals	pCi/g	1.00E+01	1.77E+00	7.25E+00	
102686	AOBSB0402	1-4	042396	Cation exchange capacity	Miscellaneous	Meq/	6.00E+00	6.40E+02	6.00E+00	U
102686	AOBSB0402	1-4	042396	Total Organic Carbon	Miscellaneous	mg/kg	8.40E+00	6.00E+01	6.58E+02	
102686	AOBSB0402	1-4	042396	Total petroleum hydrocarbons	Miscellaneous	mg/kg	3.30E+00	1.14E+01	9.76E+01	
102687	AOBSB0501	0-1	042396	1,1,1-Trichloroethane	Volatiles	mg/kg	9.71E-04	5.00E-03	3.74E-03	J
102687	AOBSB0501	0-1	042396	1,1,2,2-Tetrachloroethane	Volatiles	mg/kg	3.47E-03	5.00E-03	3.47E-03	U

Appendix B
Phase I Soil Analytical Results for the 716-A Motor Shops Seepage Basin

Sample ID	Sample Name	Sample Depth	Sample Date	Analyte	Analyte Class	Units	MDL	EQL	Result	Result Qualifier
102687	AOBSB0501	0-1	042396	1,1,2-Trichloroethane	Volatiles	mg/kg	2.40E-03	5.00E-03	2.40E-03	U
102687	AOBSB0501	0-1	042396	1,1-Dichloroethane	Volatiles	mg/kg	1.05E-03	5.00E-03	1.05E-03	U
102687	AOBSB0501	0-1	042396	1,1-Dichloroethene	Volatiles	mg/kg	1.42E-03	5.00E-03	1.42E-03	U
102687	AOBSB0501	0-1	042396	1,2-Dichloroethane	Volatiles	mg/kg	1.34E-03	5.00E-03	1.34E-03	U
102687	AOBSB0501	0-1	042396	1,2-Dichloroethene (total)	Volatiles	mg/kg	8.54E-04	5.00E-03	8.54E-04	U
102687	AOBSB0501	0-1	042396	1,2-Dichloropropane	Volatiles	mg/kg	1.67E-03	5.00E-03	1.67E-03	U
102687	AOBSB0501	0-1	042396	2-Butanone (MEK)	Volatiles	mg/kg	2.81E-03	1.00E-02	2.81E-03	U
102687	AOBSB0501	0-1	042396	2-Hexanone	Volatiles	mg/kg	3.77E-03	1.00E-02	3.77E-03	U
102687	AOBSB0501	0-1	042396	4-Methyl-2-pentanone	Volatiles	mg/kg	3.29E-03	1.00E-02	3.29E-03	U
102687	AOBSB0501	0-1	042396	Acetone	Volatiles	mg/kg	4.04E-03	1.00E-02	4.04E-03	U
102687	AOBSB0501	0-1	042396	Benzene	Volatiles	mg/kg	7.52E-04	5.00E-03	7.52E-04	U
102687	AOBSB0501	0-1	042396	Bromodichloromethane	Volatiles	mg/kg	1.74E-03	5.00E-03	1.74E-03	U
102687	AOBSB0501	0-1	042396	Bromoform	Volatiles	mg/kg	2.93E-03	5.00E-03	2.93E-03	U
102687	AOBSB0501	0-1	042396	Bromomethane (Methyl bromide)	Volatiles	mg/kg	2.01E-03	1.00E-02	2.01E-03	U
102687	AOBSB0501	0-1	042396	Carbon disulfide	Volatiles	mg/kg	1.71E-03	5.00E-03	1.71E-03	U
102687	AOBSB0501	0-1	042396	Carbon tetrachloride	Volatiles	mg/kg	9.71E-04	5.00E-03	9.71E-04	U
102687	AOBSB0501	0-1	042396	Chlorobenzene	Volatiles	mg/kg	1.74E-03	5.00E-03	1.74E-03	U
102687	AOBSB0501	0-1	042396	Chlorodibromomethane	Volatiles	mg/kg	2.53E-03	5.00E-03	2.53E-03	U
102687	AOBSB0501	0-1	042396	Chloroethane	Volatiles	mg/kg	2.06E-03	1.00E-02	2.06E-03	U
102687	AOBSB0501	0-1	042396	Chloroform	Volatiles	mg/kg	1.11E-03	5.00E-03	1.11E-03	U
102687	AOBSB0501	0-1	042396	Chloromethane (methyl chloride)	Volatiles	mg/kg	3.20E-03	1.00E-02	3.20E-03	U
102687	AOBSB0501	0-1	042396	cis-1,3-Dichloropropene	Volatiles	mg/kg	1.79E-03	5.00E-03	1.79E-03	U
102687	AOBSB0501	0-1	042396	Dichloromethane (methylene chlo	Volatiles	mg/kg	1.83E-03	5.00E-03	1.83E-03	U
102687	AOBSB0501	0-1	042396	Ethylbenzene	Volatiles	mg/kg	1.47E-03	5.00E-03	1.47E-03	U
102687	AOBSB0501	0-1	042396	Styrene	Volatiles	mg/kg	1.98E-03	5.00E-03	1.98E-03	U
102687	AOBSB0501	0-1	042396	Tetrachloroethene	Volatiles	mg/kg	1.17E-03	5.00E-03	1.31E-02	
102687	AOBSB0501	0-1	042396	Toluene	Volatiles	mg/kg	1.45E-03	5.00E-03	1.45E-03	U
102687	AOBSB0501	0-1	042396	trans-1,3-Dichloropropene	Volatiles	mg/kg	2.08E-03	5.00E-03	2.08E-03	U
102687	AOBSB0501	0-1	042396	Trichloroethene (TCE)	Volatiles	mg/kg	2.09E-03	5.00E-03	2.09E-03	U
102687	AOBSB0501	0-1	042396	Vinyl acetate	Volatiles	mg/kg	5.48E-03	1.00E-02	5.48E-03	U

Appendix B
Phase I Soil Analytical Results for the 716-A Motor Shops Seepage Basin

Sample ID	Sample Name	Sample Depth	Sample Date	Analyte	Analyte Class	Units	MDL	EQL	Result	Result Qualifier
102687	AOBSB0501	0-1	042396	Vinyl chloride	Volatiles	mg/kg	2.47E-03	1.00E-02	2.47E-03	U
102687	AOBSB0501	0-1	042396	Xylenes (total)	Volatiles	mg/kg	1.53E-03	5.00E-03	1.53E-03	U
102687	AOBSB0501	0-1	042396	1,2,4-Trichlorobenzene	Semivolatiles	mg/kg	1.80E-02	3.51E-01	1.80E-02	U
102687	AOBSB0501	0-1	042396	1,2-Dichlorobenzene	Semivolatiles	mg/kg	1.70E-02	3.51E-01	1.70E-02	U
102687	AOBSB0501	0-1	042396	1,3-Dichlorobenzene	Semivolatiles	mg/kg	1.80E-02	3.51E-01	1.80E-02	U
102687	AOBSB0501	0-1	042396	1,4-Dichlorobenzene	Semivolatiles	mg/kg	1.80E-02	3.51E-01	1.80E-02	U
102687	AOBSB0501	0-1	042396	2,4,5-Trichlorophenol	Semivolatiles	mg/kg	1.40E-02	1.76E+00	1.40E-02	U
102687	AOBSB0501	0-1	042396	2,4,6-Trichlorophenol	Semivolatiles	mg/kg	1.10E-02	3.51E-01	1.10E-02	U
102687	AOBSB0501	0-1	042396	2,4-Dichlorophenol	Semivolatiles	mg/kg	1.30E-02	3.51E-01	1.30E-02	U
102687	AOBSB0501	0-1	042396	2,4-Dimethyl phenol	Semivolatiles	mg/kg	2.60E-02	3.51E-01	2.60E-02	U
102687	AOBSB0501	0-1	042396	2,4-Dinitrophenol	Semivolatiles	mg/kg	4.40E-02	1.76E+00	4.40E-02	U
102687	AOBSB0501	0-1	042396	2,4-Dinitrotoluene	Semivolatiles	mg/kg	1.90E-02	3.51E-01	1.90E-02	U
102687	AOBSB0501	0-1	042396	2,6-Dinitrotoluene	Semivolatiles	mg/kg	1.60E-02	3.51E-01	1.60E-02	U
102687	AOBSB0501	0-1	042396	2-Chloronaphthalene	Semivolatiles	mg/kg	1.60E-02	3.51E-01	1.60E-02	U
102687	AOBSB0501	0-1	042396	2-Chlorophenol	Semivolatiles	mg/kg	1.70E-02	3.51E-01	1.70E-02	U
102687	AOBSB0501	0-1	042396	2-Methyl-4,6-dinitrophenol	Semivolatiles	mg/kg	1.10E-02	1.76E+00	1.10E-02	U
102687	AOBSB0501	0-1	042396	2-Methylnaphthalene	Semivolatiles	mg/kg	1.70E-02	3.51E-01	1.70E-02	U
102687	AOBSB0501	0-1	042396	2-Nitroaniline	Semivolatiles	mg/kg	1.90E-02	1.76E+00	1.90E-02	U
102687	AOBSB0501	0-1	042396	2-Nitrophenol	Semivolatiles	mg/kg	1.70E-02	3.51E-01	1.70E-02	U
102687	AOBSB0501	0-1	042396	3,3'-Dichlorobenzidine	Semivolatiles	mg/kg	7.30E-02	7.02E-01	7.30E-02	U
102687	AOBSB0501	0-1	042396	3-Nitroaniline	Semivolatiles	mg/kg	4.20E-02	1.76E+00	4.20E-02	U
102687	AOBSB0501	0-1	042396	4-Bromophenyl phenyl ether	Semivolatiles	mg/kg	1.00E-02	3.51E-01	1.00E-02	U
102687	AOBSB0501	0-1	042396	4-Chloro-3-methylphenol (p-chlo	Semivolatiles	mg/kg	1.80E-02	3.51E-01	1.80E-02	U
102687	AOBSB0501	0-1	042396	4-Chloroaniline	Semivolatiles	mg/kg	6.00E-03	3.51E-01	6.00E-03	U
102687	AOBSB0501	0-1	042396	4-Chlorophenyl phenyl ether	Semivolatiles	mg/kg	1.30E-02	3.51E-01	1.30E-02	U
102687	AOBSB0501	0-1	042396	4-Nitroaniline	Semivolatiles	mg/kg	2.00E-02	1.76E+00	2.00E-02	U
102687	AOBSB0501	0-1	042396	4-Nitrophenol	Semivolatiles	mg/kg	4.90E-02	1.76E+00	4.90E-02	U
102687	AOBSB0501	0-1	042396	Acenapthene	Semivolatiles	mg/kg	1.50E-02	3.51E-01	1.50E-02	U
102687	AOBSB0501	0-1	042396	Acenapthylene	Semivolatiles	mg/kg	1.60E-02	3.51E-01	1.60E-02	U
102687	AOBSB0501	0-1	042396	Anthracene	Semivolatiles	mg/kg	1.60E-02	3.51E-01	1.60E-02	U

Appendix B
Phase I Soil Analytical Results for the 716-A Motor Shops Seepage Basin

Sample ID	Sample Name	Sample Depth	Sample Date	Analyte	Analyte Class	Units	MDL	EQL	Result	Result Qualifier
102687	AOBSB0501	0-1	042396	Benzo(a)anthracene	Semivolatiles	mg/kg	2.00E-02	3.51E-01	2.00E-02	U
102687	AOBSB0501	0-1	042396	Benzo(a)pyrene	Semivolatiles	mg/kg	2.40E-02	3.51E-01	2.40E-02	U
102687	AOBSB0501	0-1	042396	Benzo(b)fluoranthene	Semivolatiles	mg/kg	2.30E-02	3.51E-01	2.30E-02	U
102687	AOBSB0501	0-1	042396	Benzo(g,h,i)perylene	Semivolatiles	mg/kg	1.60E-02	3.51E-01	1.60E-02	U
102687	AOBSB0501	0-1	042396	Benzo(k)fluoranthene	Semivolatiles	mg/kg	2.20E-02	3.51E-01	2.20E-02	U
102687	AOBSB0501	0-1	042396	Benzoic acid	Semivolatiles	mg/kg	3.40E-02	1.76E+00	3.40E-02	U
102687	AOBSB0501	0-1	042396	Benzyl alcohol	Semivolatiles	mg/kg	1.90E-02	3.51E-01	1.90E-02	U
102687	AOBSB0501	0-1	042396	Bis(2-chloroethoxy) methane	Semivolatiles	mg/kg	1.60E-02	3.51E-01	1.60E-02	U
102687	AOBSB0501	0-1	042396	Bis(2-chloroethyl) ether	Semivolatiles	mg/kg	2.20E-02	3.51E-01	2.20E-02	U
102687	AOBSB0501	0-1	042396	Bis(2-chloroisopropyl) ether	Semivolatiles	mg/kg	1.80E-02	3.51E-01	1.80E-02	U
102687	AOBSB0501	0-1	042396	Bis(2-ethylhexyl) phthalate	Semivolatiles	mg/kg	2.20E-02	3.51E-01	2.20E-02	U
102687	AOBSB0501	0-1	042396	Butyl benzyl phthalate	Semivolatiles	mg/kg	2.10E-02	3.51E-01	2.10E-02	U
102687	AOBSB0501	0-1	042396	Chrysene	Semivolatiles	mg/kg	1.90E-02	3.51E-01	1.90E-02	U
102687	AOBSB0501	0-1	042396	Di-n-butyl phthalate	Semivolatiles	mg/kg	1.90E-02	3.51E-01	1.90E-02	U
102687	AOBSB0501	0-1	042396	Di-n-octyl phthalate	Semivolatiles	mg/kg	2.60E-02	3.51E-01	2.60E-02	U
102687	AOBSB0501	0-1	042396	Dibenzo(a,h)anthracene	Semivolatiles	mg/kg	1.70E-02	3.51E-01	1.70E-02	U
102687	AOBSB0501	0-1	042396	Dibenzofuran	Semivolatiles	mg/kg	1.60E-02	3.51E-01	1.60E-02	U
102687	AOBSB0501	0-1	042396	Diethyl phthalate	Semivolatiles	mg/kg	1.60E-02	3.51E-01	1.60E-02	U
102687	AOBSB0501	0-1	042396	Dimethyl phthalate	Semivolatiles	mg/kg	1.50E-02	3.51E-01	1.50E-02	U
102687	AOBSB0501	0-1	042396	Fluoranthene	Semivolatiles	mg/kg	1.90E-02	3.51E-01	1.90E-02	U
102687	AOBSB0501	0-1	042396	Fluorene	Semivolatiles	mg/kg	1.60E-02	3.51E-01	1.60E-02	U
102687	AOBSB0501	0-1	042396	Hexachlorobenzene	Semivolatiles	mg/kg	1.00E-02	3.51E-01	1.00E-02	U
102687	AOBSB0501	0-1	042396	Hexachlorobutadiene	Semivolatiles	mg/kg	1.50E-02	3.51E-01	1.50E-02	U
102687	AOBSB0501	0-1	042396	Hexachlorocyclopentadiene	Semivolatiles	mg/kg	2.60E-02	3.51E-01	2.60E-02	U
102687	AOBSB0501	0-1	042396	Hexachloroethane	Semivolatiles	mg/kg	1.60E-02	3.51E-01	1.60E-02	U
102687	AOBSB0501	0-1	042396	Indeno(1,2,3-c,d)pyrene	Semivolatiles	mg/kg	1.80E-02	3.51E-01	1.80E-02	U
102687	AOBSB0501	0-1	042396	Isophorone	Semivolatiles	mg/kg	1.70E-02	3.51E-01	1.70E-02	U
102687	AOBSB0501	0-1	042396	N-Nitrosodi-n-propylamine	Semivolatiles	mg/kg	2.00E-02	3.51E-01	2.00E-02	U
102687	AOBSB0501	0-1	042396	N-Nitrosodiphenylamine	Semivolatiles	mg/kg	1.40E-02	3.51E-01	1.40E-02	U
102687	AOBSB0501	0-1	042396	Naphthalene	Semivolatiles	mg/kg	1.90E-02	3.51E-01	1.90E-02	U

Appendix B
Phase I Soil Analytical Results for the 716-A Motor Shops Seepage Basin

Sample ID	Sample Name	Sample Depth	Sample Date	Analyte	Analyte Class	Units	MDL	EQL	Result	Result Qualifier
102687	AOBSB0501	0-1	042396	Nitrobenzene	Semivolatiles	mg/kg	1.90E-02	3.51E-01	1.90E-02	U
102687	AOBSB0501	0-1	042396	o-cresol (2-methylphenol)	Semivolatiles	mg/kg	1.60E-02	3.51E-01	1.60E-02	U
102687	AOBSB0501	0-1	042396	p-cresol (4-methylphenol)	Semivolatiles	mg/kg	1.70E-02	3.51E-01	1.70E-02	U
102687	AOBSB0501	0-1	042396	Pentachlorophenol	Semivolatiles	mg/kg	3.90E-02	1.76E+00	3.90E-02	U
102687	AOBSB0501	0-1	042396	Phenanthrene	Semivolatiles	mg/kg	1.50E-02	3.51E-01	1.50E-02	U
102687	AOBSB0501	0-1	042396	Phenol	Semivolatiles	mg/kg	1.90E-02	3.51E-01	1.90E-02	U
102687	AOBSB0501	0-1	042396	Pyrene	Semivolatiles	mg/kg	2.10E-02	3.51E-01	2.10E-02	U
102687	AOBSB0501	0-1	042396	Unknown	SVOA TICs	mg/kg	0.00E+00	0.00E+00	2.00E-01	J
102687	AOBSB0501	0-1	042396	Unknown	SVOA TICs	mg/kg	0.00E+00	0.00E+00	4.00E-01	J
102687	AOBSB0501	0-1	042396	Unknown	SVOA TICs	mg/kg	0.00E+00	0.00E+00	9.00E-01	J
102687	AOBSB0501	0-1	042396	Aldrin	Pesticides/PCBs	mg/kg	5.70E-04	1.76E-03	5.70E-04	U
102687	AOBSB0501	0-1	042396	alpha-Benzene hexachloride	Pesticides/PCBs	mg/kg	5.70E-04	1.76E-03	5.70E-04	U
102687	AOBSB0501	0-1	042396	alpha-Chlordane	Pesticides/PCBs	mg/kg	5.70E-04	1.76E-03	5.70E-04	U
102687	AOBSB0501	0-1	042396	Aroclor 1016	Pesticides/PCBs	mg/kg	1.10E-02	3.51E-02	1.10E-02	U
102687	AOBSB0501	0-1	042396	Aroclor 1221	Pesticides/PCBs	mg/kg	2.20E-02	7.02E-02	2.20E-02	U
102687	AOBSB0501	0-1	042396	Aroclor 1232	Pesticides/PCBs	mg/kg	1.10E-02	3.51E-02	1.10E-02	U
102687	AOBSB0501	0-1	042396	Aroclor 1242	Pesticides/PCBs	mg/kg	1.10E-02	3.51E-02	1.10E-02	U
102687	AOBSB0501	0-1	042396	Aroclor 1248	Pesticides/PCBs	mg/kg	1.10E-02	3.51E-02	1.10E-02	U
102687	AOBSB0501	0-1	042396	Aroclor 1254	Pesticides/PCBs	mg/kg	1.10E-02	3.51E-02	1.10E-02	U
102687	AOBSB0501	0-1	042396	Aroclor 1260	Pesticides/PCBs	mg/kg	1.10E-02	3.51E-02	1.10E-02	U
102687	AOBSB0501	0-1	042396	beta-Benzene hexachloride	Pesticides/PCBs	mg/kg	5.70E-04	1.76E-03	5.70E-04	U
102687	AOBSB0501	0-1	042396	delta-Benzene hexachloride	Pesticides/PCBs	mg/kg	5.70E-04	1.76E-03	5.70E-04	U
102687	AOBSB0501	0-1	042396	Dieldrin	Pesticides/PCBs	mg/kg	6.33E-04	3.51E-03	6.33E-04	U
102687	AOBSB0501	0-1	042396	Endosulfan I	Pesticides/PCBs	mg/kg	5.70E-04	1.76E-03	5.70E-04	U
102687	AOBSB0501	0-1	042396	Endosulfan II	Pesticides/PCBs	mg/kg	9.00E-04	3.51E-03	9.00E-04	U
102687	AOBSB0501	0-1	042396	Endosulfan sulfate	Pesticides/PCBs	mg/kg	1.10E-03	3.51E-03	1.10E-03	U
102687	AOBSB0501	0-1	042396	Endrin	Pesticides/PCBs	mg/kg	1.10E-03	3.51E-03	1.10E-03	UJ
102687	AOBSB0501	0-1	042396	Endrin ketone	Pesticides/PCBs	mg/kg	1.10E-03	3.51E-03	1.10E-03	UJ
102687	AOBSB0501	0-1	042396	gamma-Benzene hexachloride (Lin	Pesticides/PCBs	mg/kg	5.70E-04	1.76E-03	5.70E-04	U
102687	AOBSB0501	0-1	042396	gamma-Chlordane	Pesticides/PCBs	mg/kg	5.70E-04	1.76E-03	5.70E-04	U

Appendix B
Phase I Soil Analytical Results for the 716-A Motor Shops Seepage Basin

Sample ID	Sample Name	Sample Depth	Sample Date	Analyte	Analyte Class	Units	MDL	EQL	Result	Result Qualifier
102687	AOBSB0501	0-1	042396	Heptachlor	Pesticides/PCBs	mg/kg	5.70E-04	1.76E-03	5.70E-04	U
102687	AOBSB0501	0-1	042396	Heptachlor epoxide	Pesticides/PCBs	mg/kg	5.70E-04	1.76E-03	5.70E-04	U
102687	AOBSB0501	0-1	042396	Methoxychlor (Mariate)	Pesticides/PCBs	mg/kg	5.70E-03	1.76E-02	5.70E-03	U
102687	AOBSB0501	0-1	042396	p,p'-DDD	Pesticides/PCBs	mg/kg	1.10E-03	3.51E-03	1.10E-03	UJ
102687	AOBSB0501	0-1	042396	p,p'-DDE	Pesticides/PCBs	mg/kg	9.00E-04	3.51E-03	9.00E-04	UJ
102687	AOBSB0501	0-1	042396	p,p'-DDT	Pesticides/PCBs	mg/kg	1.10E-03	3.51E-03	1.10E-03	UJ
102687	AOBSB0501	0-1	042396	Toxaphene	Pesticides/PCBs	mg/kg	5.30E-02	1.76E-01	5.30E-02	U
102687	AOBSB0501	0-1	042396	Aluminum	TAL Inorganics	mg/kg	1.90E+00	1.94E+01	4.01E+03	
102687	AOBSB0501	0-1	042396	Antimony	TAL Inorganics	mg/kg	3.50E-01	3.65E+00	3.50E-01	U
102687	AOBSB0501	0-1	042396	Arsenic	TAL Inorganics	mg/kg	1.11E+00	1.16E+01	1.11E+00	U
102687	AOBSB0501	0-1	042396	Barium	TAL Inorganics	mg/kg	1.10E-01	1.15E+00	3.49E+01	
102687	AOBSB0501	0-1	042396	Beryllium	TAL Inorganics	mg/kg	3.00E-02	2.61E-01	3.00E-02	U
102687	AOBSB0501	0-1	042396	Cadmium	TAL Inorganics	mg/kg	4.00E-02	4.17E-01	5.22E-01	
102687	AOBSB0501	0-1	042396	Calcium	TAL Inorganics	mg/kg	1.68E+00	1.75E+01	9.69E+01	
102687	AOBSB0501	0-1	042396	Chromium	TAL Inorganics	mg/kg	9.00E-02	9.39E-01	4.90E+00	
102687	AOBSB0501	0-1	042396	Cobalt	TAL Inorganics	mg/kg	8.00E-02	8.34E-01	6.15E-01	J
102687	AOBSB0501	0-1	042396	Copper	TAL Inorganics	mg/kg	1.00E-01	1.04E+00	3.50E+00	
102687	AOBSB0501	0-1	042396	Cyanide	TAL Inorganics	mg/kg	8.00E-02	8.40E-01	8.00E-02	UJ
102687	AOBSB0501	0-1	042396	Iron	TAL Inorganics	mg/kg	2.19E+00	2.28E+01	2.01E+03	
102687	AOBSB0501	0-1	042396	Lead	TAL Inorganics	mg/kg	5.90E-01	6.15E+00	8.20E+00	
102687	AOBSB0501	0-1	042396	Magnesium	TAL Inorganics	mg/kg	8.70E-01	9.07E+00	7.27E+01	
102687	AOBSB0501	0-1	042396	Manganese	TAL Inorganics	mg/kg	2.00E-02	2.09E-01	1.44E+01	
102687	AOBSB0501	0-1	042396	Mercury	TAL Inorganics	mg/kg	1.30E-02	1.40E-01	2.00E-02	J
102687	AOBSB0501	0-1	042396	Nickel	TAL Inorganics	mg/kg	1.70E-01	1.77E+00	1.80E+00	
102687	AOBSB0501	0-1	042396	Potassium	TAL Inorganics	mg/kg	6.70E+00	6.99E+01	7.60E+01	
102687	AOBSB0501	0-1	042396	Selenium	TAL Inorganics	mg/kg	1.04E+00	1.08E+01	1.04E+00	U
102687	AOBSB0501	0-1	042396	Silver	TAL Inorganics	mg/kg	9.00E-02	9.39E-01	9.00E-02	U
102687	AOBSB0501	0-1	042396	Sodium	TAL Inorganics	mg/kg	1.29E+01	1.35E+02	2.05E+01	J
102687	AOBSB0501	0-1	042396	Thallium	TAL Inorganics	mg/kg	8.50E-01	8.87E+00	8.50E-01	U
102687	AOBSB0501	0-1	042396	Vanadium	TAL Inorganics	mg/kg	7.00E-02	7.30E-01	5.60E+00	

Appendix B
Phase I Soil Analytical Results for the 716-A Motor Shops Seepage Basin

Sample ID	Sample Name	Sample Depth	Sample Date	Analyte	Analyte Class	Units	MDL	EQL	Result	Result Qualifier
102687	AOBSB0501	0-1	042396	Zinc	TAL Inorganics	mg/kg	1.61E+00	1.68E+01	1.50E+01	J
102687	AOBSB0501	0-1	042396	Gross Alpha	Radiologicals	pCi/g	4.00E+00	2.84E+00	5.81E+00	
102687	AOBSB0501	0-1	042396	Non-volatile Beta	Radiologicals	pCi/g	1.00E+01	1.62E+00	1.00E+01	UI
102687	AOBSB0501	0-1	042396	Cation exchange capacity	Miscellaneous	Meq/	6.00E+00	6.32E+02	6.00E+00	U
102687	AOBSB0501	0-1	042396	Total Organic Carbon	Miscellaneous	mg/kg	8.40E+00	6.00E+01	3.99E+03	
102687	AOBSB0501	0-1	042396	Total petroleum hydrocarbons	Miscellaneous	mg/kg	3.30E+00	1.12E+01	2.52E+01	
102688	AOBSB0502	1-4	042396	1,1,1-Trichloroethane	Volatiles	mg/kg	9.71E-04	5.00E-03	9.71E-04	U
102688	AOBSB0502	1-4	042396	1,1,2,2-Tetrachloroethane	Volatiles	mg/kg	3.47E-03	5.00E-03	3.47E-03	U
102688	AOBSB0502	1-4	042396	1,1,2-Trichloroethane	Volatiles	mg/kg	2.40E-03	5.00E-03	2.40E-03	U
102688	AOBSB0502	1-4	042396	1,1-Dichloroethane	Volatiles	mg/kg	1.05E-03	5.00E-03	1.05E-03	U
102688	AOBSB0502	1-4	042396	1,1-Dichloroethene	Volatiles	mg/kg	1.42E-03	5.00E-03	1.42E-03	U
102688	AOBSB0502	1-4	042396	1,2-Dichloroethane	Volatiles	mg/kg	1.34E-03	5.00E-03	1.34E-03	U
102688	AOBSB0502	1-4	042396	1,2-Dichloroethene (total)	Volatiles	mg/kg	8.54E-04	5.00E-03	8.54E-04	U
102688	AOBSB0502	1-4	042396	1,2-Dichloropropane	Volatiles	mg/kg	1.67E-03	5.00E-03	1.67E-03	U
102688	AOBSB0502	1-4	042396	2-Butanone (MEK)	Volatiles	mg/kg	2.81E-03	1.00E-02	2.81E-03	U
102688	AOBSB0502	1-4	042396	2-Hexanone	Volatiles	mg/kg	3.77E-03	1.00E-02	3.77E-03	U
102688	AOBSB0502	1-4	042396	4-Methyl-2-pentanone	Volatiles	mg/kg	3.29E-03	1.00E-02	3.29E-03	U
102688	AOBSB0502	1-4	042396	Acetone	Volatiles	mg/kg	4.04E-03	1.00E-02	4.04E-03	U
102688	AOBSB0502	1-4	042396	Benzene	Volatiles	mg/kg	7.52E-04	5.00E-03	7.52E-04	U
102688	AOBSB0502	1-4	042396	Bromodichloromethane	Volatiles	mg/kg	1.74E-03	5.00E-03	1.74E-03	U
102688	AOBSB0502	1-4	042396	Bromoform	Volatiles	mg/kg	2.93E-03	5.00E-03	2.93E-03	U
102688	AOBSB0502	1-4	042396	Bromomethane (Methyl bromide)	Volatiles	mg/kg	2.01E-03	1.00E-02	2.01E-03	U
102688	AOBSB0502	1-4	042396	Carbon disulfide	Volatiles	mg/kg	1.71E-03	5.00E-03	1.71E-03	U
102688	AOBSB0502	1-4	042396	Carbon tetrachloride	Volatiles	mg/kg	9.71E-04	5.00E-03	9.71E-04	U
102688	AOBSB0502	1-4	042396	Chlorobenzene	Volatiles	mg/kg	1.74E-03	5.00E-03	1.74E-03	U
102688	AOBSB0502	1-4	042396	Chlorodibromomethane	Volatiles	mg/kg	2.53E-03	5.00E-03	2.53E-03	U
102688	AOBSB0502	1-4	042396	Chloroethane	Volatiles	mg/kg	2.06E-03	1.00E-02	2.06E-03	U
102688	AOBSB0502	1-4	042396	Chloroform	Volatiles	mg/kg	1.11E-03	5.00E-03	1.11E-03	U
102688	AOBSB0502	1-4	042396	Chloromethane (methyl chloride)	Volatiles	mg/kg	3.20E-03	1.00E-02	3.20E-03	U
102688	AOBSB0502	1-4	042396	cis-1,3-Dichloropropene	Volatiles	mg/kg	1.79E-03	5.00E-03	1.79E-03	U

Appendix B
Phase I Soil Analytical Results for the 716-A Motor Shops Seepage Basin

Sample ID	Sample Name	Sample Depth	Sample Date	Analyte	Analyte Class	Units	MDL	EQL	Result	Result Qualifier
102688	AOBSB0502	1-4	042396	Dichloromethane (methylene chlo	Volatiles	mg/kg	1.83E-03	5.00E-03	1.83E-03	U
102688	AOBSB0502	1-4	042396	Ethylbenzene	Volatiles	mg/kg	1.47E-03	5.00E-03	1.47E-03	U
102688	AOBSB0502	1-4	042396	Styrene	Volatiles	mg/kg	1.98E-03	5.00E-03	1.98E-03	U
102688	AOBSB0502	1-4	042396	Tetrachloroethene	Volatiles	mg/kg	1.17E-03	5.00E-03	2.08E-03	J
102688	AOBSB0502	1-4	042396	Toluene	Volatiles	mg/kg	1.45E-03	5.00E-03	1.45E-03	U
102688	AOBSB0502	1-4	042396	trans-1,3-Dichloropropene	Volatiles	mg/kg	2.08E-03	5.00E-03	2.08E-03	U
102688	AOBSB0502	1-4	042396	Trichloroethene (TCE)	Volatiles	mg/kg	2.09E-03	5.00E-03	2.09E-03	U
102688	AOBSB0502	1-4	042396	Vinyl acetate	Volatiles	mg/kg	5.48E-03	1.00E-02	5.48E-03	U
102688	AOBSB0502	1-4	042396	Vinyl chloride	Volatiles	mg/kg	2.47E-03	1.00E-02	2.47E-03	U
102688	AOBSB0502	1-4	042396	Xylenes (total)	Volatiles	mg/kg	1.53E-03	5.00E-03	1.53E-03	U
102688	AOBSB0502	1-4	042396	1,2,4-Trichlorobenzene	Semivolatiles	mg/kg	1.80E-02	3.58E-01	1.80E-02	U
102688	AOBSB0502	1-4	042396	1,2-Dichlorobenzene	Semivolatiles	mg/kg	1.70E-02	3.58E-01	1.70E-02	U
102688	AOBSB0502	1-4	042396	1,3-Dichlorobenzene	Semivolatiles	mg/kg	1.80E-02	3.58E-01	1.80E-02	U
102688	AOBSB0502	1-4	042396	1,4-Dichlorobenzene	Semivolatiles	mg/kg	1.80E-02	3.58E-01	1.80E-02	U
102688	AOBSB0502	1-4	042396	2,4,5-Trichlorophenol	Semivolatiles	mg/kg	1.40E-02	1.79E+00	1.40E-02	U
102688	AOBSB0502	1-4	042396	2,4,6-Trichlorophenol	Semivolatiles	mg/kg	1.10E-02	3.58E-01	1.10E-02	U
102688	AOBSB0502	1-4	042396	2,4-Dichlorophenol	Semivolatiles	mg/kg	1.30E-02	3.58E-01	1.30E-02	U
102688	AOBSB0502	1-4	042396	2,4-Dimethyl phenol	Semivolatiles	mg/kg	2.60E-02	3.58E-01	2.60E-02	U
102688	AOBSB0502	1-4	042396	2,4-Dinitrophenol	Semivolatiles	mg/kg	4.40E-02	1.79E+00	4.40E-02	U
102688	AOBSB0502	1-4	042396	2,4-Dinitrotoluene	Semivolatiles	mg/kg	1.90E-02	3.58E-01	1.90E-02	U
102688	AOBSB0502	1-4	042396	2,6-Dinitrotoluene	Semivolatiles	mg/kg	1.60E-02	3.58E-01	1.60E-02	U
102688	AOBSB0502	1-4	042396	2-Chloronaphthalene	Semivolatiles	mg/kg	1.60E-02	3.58E-01	1.60E-02	U
102688	AOBSB0502	1-4	042396	2-Chlorophenol	Semivolatiles	mg/kg	1.70E-02	3.58E-01	1.70E-02	U
102688	AOBSB0502	1-4	042396	2-Methyl-4,6-dinitrophenol	Semivolatiles	mg/kg	1.10E-02	1.79E+00	1.10E-02	U
102688	AOBSB0502	1-4	042396	2-Methylnaphthalene	Semivolatiles	mg/kg	1.70E-02	3.58E-01	1.70E-02	U
102688	AOBSB0502	1-4	042396	2-Nitroaniline	Semivolatiles	mg/kg	1.90E-02	1.79E+00	1.90E-02	U
102688	AOBSB0502	1-4	042396	2-Nitrophenol	Semivolatiles	mg/kg	1.70E-02	3.58E-01	1.70E-02	U
102688	AOBSB0502	1-4	042396	3,3'-Dichlorobenzidine	Semivolatiles	mg/kg	7.30E-02	7.16E-01	7.30E-02	U
102688	AOBSB0502	1-4	042396	3-Nitroaniline	Semivolatiles	mg/kg	4.20E-02	1.79E+00	4.20E-02	U
102688	AOBSB0502	1-4	042396	4-Bromophenyl phenyl ether	Semivolatiles	mg/kg	1.00E-02	3.58E-01	1.00E-02	U

Appendix B
Phase I Soil Analytical Results for the 716-A Motor Shops Seepage Basin

Sample ID	Sample Name	Sample Depth	Sample Date	Analyte	Analyte Class	Units	MDL	EQL	Result	Result Qualifier
102688	AOBSB0502	1-4	042396	4-Chloro-3-methylphenol (p-chlo	Semivolatiles	mg/kg	1.80E-02	3.58E-01	1.80E-02	U
102688	AOBSB0502	1-4	042396	4-Chloroaniline	Semivolatiles	mg/kg	6.00E-03	3.58E-01	6.00E-03	U
102688	AOBSB0502	1-4	042396	4-Chlorophenyl phenyl ether	Semivolatiles	mg/kg	1.30E-02	3.58E-01	1.30E-02	U
102688	AOBSB0502	1-4	042396	4-Nitroaniline	Semivolatiles	mg/kg	2.00E-02	1.79E+00	2.00E-02	U
102688	AOBSB0502	1-4	042396	4-Nitrophenol	Semivolatiles	mg/kg	4.90E-02	1.79E+00	4.90E-02	U
102688	AOBSB0502	1-4	042396	Acenapthene	Semivolatiles	mg/kg	1.50E-02	3.58E-01	1.50E-02	U
102688	AOBSB0502	1-4	042396	Acenapthylene	Semivolatiles	mg/kg	1.60E-02	3.58E-01	1.60E-02	U
102688	AOBSB0502	1-4	042396	Anthracene	Semivolatiles	mg/kg	1.60E-02	3.58E-01	1.60E-02	U
102688	AOBSB0502	1-4	042396	Benzo(a)anthracene	Semivolatiles	mg/kg	2.00E-02	3.58E-01	2.00E-02	U
102688	AOBSB0502	1-4	042396	Benzo(a)pyrene	Semivolatiles	mg/kg	2.40E-02	3.58E-01	2.40E-02	U
102688	AOBSB0502	1-4	042396	Benzo(b)fluoranthene	Semivolatiles	mg/kg	2.30E-02	3.58E-01	2.30E-02	U
102688	AOBSB0502	1-4	042396	Benzo(g,h,i)perylene	Semivolatiles	mg/kg	1.60E-02	3.58E-01	1.60E-02	U
102688	AOBSB0502	1-4	042396	Benzo(k)fluoranthene	Semivolatiles	mg/kg	2.20E-02	3.58E-01	2.20E-02	U
102688	AOBSB0502	1-4	042396	Benzoic acid	Semivolatiles	mg/kg	3.40E-02	1.79E+00	3.40E-02	U
102688	AOBSB0502	1-4	042396	Benzyl alcohol	Semivolatiles	mg/kg	1.90E-02	3.58E-01	1.90E-02	U
102688	AOBSB0502	1-4	042396	Bis(2-chloroethoxy) methane	Semivolatiles	mg/kg	1.60E-02	3.58E-01	1.60E-02	U
102688	AOBSB0502	1-4	042396	Bis(2-chloroethyl) ether	Semivolatiles	mg/kg	2.20E-02	3.58E-01	2.20E-02	U
102688	AOBSB0502	1-4	042396	Bis(2-chloroisopropyl) ether	Semivolatiles	mg/kg	1.80E-02	3.58E-01	1.80E-02	U
102688	AOBSB0502	1-4	042396	Bis(2-ethylhexyl) phthalate	Semivolatiles	mg/kg	2.20E-02	3.58E-01	2.20E-02	U
102688	AOBSB0502	1-4	042396	Butyl benzyl phthalate	Semivolatiles	mg/kg	2.10E-02	3.58E-01	2.10E-02	U
102688	AOBSB0502	1-4	042396	Chrysene	Semivolatiles	mg/kg	1.90E-02	3.58E-01	1.90E-02	U
102688	AOBSB0502	1-4	042396	Di-n-butyl phthalate	Semivolatiles	mg/kg	1.90E-02	3.58E-01	1.90E-02	U
102688	AOBSB0502	1-4	042396	Di-n-octyl phthalate	Semivolatiles	mg/kg	2.60E-02	3.58E-01	2.60E-02	U
102688	AOBSB0502	1-4	042396	Dibenzo(a,h)anthracene	Semivolatiles	mg/kg	1.70E-02	3.58E-01	1.70E-02	U
102688	AOBSB0502	1-4	042396	Dibenzofuran	Semivolatiles	mg/kg	1.60E-02	3.58E-01	1.60E-02	U
102688	AOBSB0502	1-4	042396	Diethyl phthalate	Semivolatiles	mg/kg	1.60E-02	3.58E-01	1.60E-02	U
102688	AOBSB0502	1-4	042396	Dimethyl phthalate	Semivolatiles	mg/kg	1.50E-02	3.58E-01	1.50E-02	U
102688	AOBSB0502	1-4	042396	Fluoranthene	Semivolatiles	mg/kg	1.90E-02	3.58E-01	1.90E-02	U
102688	AOBSB0502	1-4	042396	Fluorene	Semivolatiles	mg/kg	1.60E-02	3.58E-01	1.60E-02	U
102688	AOBSB0502	1-4	042396	Hexachlorobenzene	Semivolatiles	mg/kg	1.00E-02	3.58E-01	1.00E-02	U

Appendix B
Phase I Soil Analytical Results for the 716-A Motor Shops Seepage Basin

Sample ID	Sample Name	Sample Depth	Sample Date	Analyte	Analyte Class	Units	MDL	EQL	Result	Result Qualifier
102688	AOBSB0502	1-4	042396	Hexachlorobutadiene	Semivolatiles	mg/kg	1.50E-02	3.58E-01	1.50E-02	U
102688	AOBSB0502	1-4	042396	Hexachlorocyclopentadiene	Semivolatiles	mg/kg	2.60E-02	3.58E-01	2.60E-02	U
102688	AOBSB0502	1-4	042396	Hexachloroethane	Semivolatiles	mg/kg	1.60E-02	3.58E-01	1.60E-02	U
102688	AOBSB0502	1-4	042396	Indeno(1,2,3-c,d)pyrene	Semivolatiles	mg/kg	1.80E-02	3.58E-01	1.80E-02	U
102688	AOBSB0502	1-4	042396	Isophorone	Semivolatiles	mg/kg	1.70E-02	3.58E-01	1.70E-02	U
102688	AOBSB0502	1-4	042396	N-Nitrosodi-n-propylamine	Semivolatiles	mg/kg	2.00E-02	3.58E-01	2.00E-02	U
102688	AOBSB0502	1-4	042396	N-Nitrosodiphenylamine	Semivolatiles	mg/kg	1.40E-02	3.58E-01	1.40E-02	U
102688	AOBSB0502	1-4	042396	Naphthalene	Semivolatiles	mg/kg	1.90E-02	3.58E-01	1.90E-02	U
102688	AOBSB0502	1-4	042396	Nitrobenzene	Semivolatiles	mg/kg	1.90E-02	3.58E-01	1.90E-02	U
102688	AOBSB0502	1-4	042396	o-cresol (2-methylphenol)	Semivolatiles	mg/kg	1.60E-02	3.58E-01	1.60E-02	U
102688	AOBSB0502	1-4	042396	p-cresol (4-methylphenol)	Semivolatiles	mg/kg	1.70E-02	3.58E-01	1.70E-02	U
102688	AOBSB0502	1-4	042396	Pentachlorophenol	Semivolatiles	mg/kg	3.90E-02	1.79E+00	3.90E-02	U
102688	AOBSB0502	1-4	042396	Phenanthrene	Semivolatiles	mg/kg	1.50E-02	3.58E-01	1.50E-02	U
102688	AOBSB0502	1-4	042396	Phenol	Semivolatiles	mg/kg	1.90E-02	3.58E-01	1.90E-02	U
102688	AOBSB0502	1-4	042396	Pyrene	Semivolatiles	mg/kg	2.10E-02	3.58E-01	2.10E-02	U
102688	AOBSB0502	1-4	042396	Unknown	SVOA TICs	mg/kg	0.00E+00	0.00E+00	3.00E-01	J
102688	AOBSB0502	1-4	042396	Unknown	SVOA TICs	mg/kg	0.00E+00	0.00E+00	4.00E-01	J
102688	AOBSB0502	1-4	042396	Aldrin	Pesticides/PCBs	mg/kg	5.70E-04	1.79E-03	5.70E-04	U
102688	AOBSB0502	1-4	042396	alpha-Benzene hexachloride	Pesticides/PCBs	mg/kg	5.70E-04	1.79E-03	5.70E-04	U
102688	AOBSB0502	1-4	042396	alpha-Chlordane	Pesticides/PCBs	mg/kg	5.70E-04	1.79E-03	5.70E-04	U
102688	AOBSB0502	1-4	042396	Aroclor 1016	Pesticides/PCBs	mg/kg	1.10E-02	3.58E-02	1.10E-02	U
102688	AOBSB0502	1-4	042396	Aroclor 1221	Pesticides/PCBs	mg/kg	2.20E-02	7.15E-02	2.20E-02	U
102688	AOBSB0502	1-4	042396	Aroclor 1232	Pesticides/PCBs	mg/kg	1.10E-02	3.58E-02	1.10E-02	U
102688	AOBSB0502	1-4	042396	Aroclor 1242	Pesticides/PCBs	mg/kg	1.10E-02	3.58E-02	1.10E-02	U
102688	AOBSB0502	1-4	042396	Aroclor 1248	Pesticides/PCBs	mg/kg	1.10E-02	3.58E-02	1.10E-02	U
102688	AOBSB0502	1-4	042396	Aroclor 1254	Pesticides/PCBs	mg/kg	1.10E-02	3.58E-02	1.10E-02	U
102688	AOBSB0502	1-4	042396	Aroclor 1260	Pesticides/PCBs	mg/kg	1.10E-02	3.58E-02	1.10E-02	U
102688	AOBSB0502	1-4	042396	beta-Benzene hexachloride	Pesticides/PCBs	mg/kg	5.70E-04	1.79E-03	5.70E-04	U
102688	AOBSB0502	1-4	042396	delta-Benzene hexachloride	Pesticides/PCBs	mg/kg	5.70E-04	1.79E-03	5.70E-04	U
102688	AOBSB0502	1-4	042396	Dieldrin	Pesticides/PCBs	mg/kg	6.33E-04	3.58E-03	6.33E-04	U

Appendix B
Phase I Soil Analytical Results for the 716-A Motor Shops Seepage Basin

Sample ID	Sample Name	Sample Depth	Sample Date	Analyte	Analyte Class	Units	MDL	EQL	Result	Result Qualifier
102688	AOBSB0502	1-4	042396	Endosulfan I	Pesticides/PCBs	mg/kg	5.70E-04	1.79E-03	5.70E-04	U
102688	AOBSB0502	1-4	042396	Endosulfan II	Pesticides/PCBs	mg/kg	9.00E-04	3.58E-03	9.00E-04	U
102688	AOBSB0502	1-4	042396	Endosulfan sulfate	Pesticides/PCBs	mg/kg	1.10E-03	3.58E-03	1.10E-03	U
102688	AOBSB0502	1-4	042396	Endrin	Pesticides/PCBs	mg/kg	1.10E-03	3.58E-03	1.10E-03	U
102688	AOBSB0502	1-4	042396	Endrin ketone	Pesticides/PCBs	mg/kg	1.10E-03	3.58E-03	1.10E-03	U
102688	AOBSB0502	1-4	042396	gamma-Benzene hexachloride (Lin	Pesticides/PCBs	mg/kg	5.70E-04	1.79E-03	5.70E-04	U
102688	AOBSB0502	1-4	042396	gamma-Chlordane	Pesticides/PCBs	mg/kg	5.70E-04	1.79E-03	5.70E-04	U
102688	AOBSB0502	1-4	042396	Heptachlor	Pesticides/PCBs	mg/kg	5.70E-04	1.79E-03	5.70E-04	U
102688	AOBSB0502	1-4	042396	Heptachlor epoxide	Pesticides/PCBs	mg/kg	5.70E-04	1.79E-03	5.70E-04	U
102688	AOBSB0502	1-4	042396	Methoxychlor (Mariate)	Pesticides/PCBs	mg/kg	5.70E-03	1.79E-02	5.70E-03	U
102688	AOBSB0502	1-4	042396	p,p'-DDD	Pesticides/PCBs	mg/kg	1.10E-03	3.58E-03	1.10E-03	U
102688	AOBSB0502	1-4	042396	p,p'-DDE	Pesticides/PCBs	mg/kg	9.00E-04	3.58E-03	9.00E-04	U
102688	AOBSB0502	1-4	042396	p,p'-DDT	Pesticides/PCBs	mg/kg	1.10E-03	3.58E-03	1.10E-03	U
102688	AOBSB0502	1-4	042396	Toxaphene	Pesticides/PCBs	mg/kg	5.30E-02	1.79E-01	5.30E-02	U
102688	AOBSB0502	1-4	042396	Aluminum	TAL Inorganics	mg/kg	1.90E+00	1.88E+01	7.11E+03	
102688	AOBSB0502	1-4	042396	Antimony	TAL Inorganics	mg/kg	3.50E-01	3.54E+00	3.50E-01	U
102688	AOBSB0502	1-4	042396	Arsenic	TAL Inorganics	mg/kg	1.11E+00	1.12E+01	1.50E+00	J
102688	AOBSB0502	1-4	042396	Barium	TAL Inorganics	mg/kg	1.10E-01	1.11E+00	2.45E+01	
102688	AOBSB0502	1-4	042396	Beryllium	TAL Inorganics	mg/kg	3.00E-02	2.53E-01	3.32E-01	
102688	AOBSB0502	1-4	042396	Cadmium	TAL Inorganics	mg/kg	4.00E-02	4.05E-01	1.42E-01	J
102688	AOBSB0502	1-4	042396	Calcium	TAL Inorganics	mg/kg	1.68E+00	1.70E+01	8.01E+01	
102688	AOBSB0502	1-4	042396	Chromium	TAL Inorganics	mg/kg	9.00E-02	9.11E-01	6.50E+00	
102688	AOBSB0502	1-4	042396	Cobalt	TAL Inorganics	mg/kg	8.00E-02	8.10E-01	1.10E+00	
102688	AOBSB0502	1-4	042396	Copper	TAL Inorganics	mg/kg	1.00E-01	1.01E+00	2.60E+00	
102688	AOBSB0502	1-4	042396	Cyanide	TAL Inorganics	mg/kg	8.00E-02	8.60E-01	8.00E-02	UJ
102688	AOBSB0502	1-4	042396	Iron	TAL Inorganics	mg/kg	2.19E+00	2.22E+01	3.43E+03	
102688	AOBSB0502	1-4	042396	Lead	TAL Inorganics	mg/kg	5.90E-01	5.97E+00	5.30E+00	J
102688	AOBSB0502	1-4	042396	Magnesium	TAL Inorganics	mg/kg	8.70E-01	8.80E+00	9.66E+01	
102688	AOBSB0502	1-4	042396	Manganese	TAL Inorganics	mg/kg	2.00E-02	2.02E-01	1.82E+01	
102688	AOBSB0502	1-4	042396	Mercury	TAL Inorganics	mg/kg	1.30E-02	1.43E-01	4.00E-02	J

Appendix B
Phase I Soil Analytical Results for the 716-A Motor Shops Seepage Basin

Sample ID	Sample Name	Sample Depth	Sample Date	Analyte	Analyte Class	Units	MDL	EQL	Result	Result Qualifier
102688	AOBSB0502	1-4	042396	Nickel	TAL Inorganics	mg/kg	1.70E-01	1.72E+00	2.60E+00	
102688	AOBSB0502	1-4	042396	Potassium	TAL Inorganics	mg/kg	6.70E+00	6.78E+01	1.16E+02	
102688	AOBSB0502	1-4	042396	Selenium	TAL Inorganics	mg/kg	1.04E+00	1.05E+01	1.04E+00	U
102688	AOBSB0502	1-4	042396	Silver	TAL Inorganics	mg/kg	9.00E-02	9.11E-01	9.00E-02	U
102688	AOBSB0502	1-4	042396	Sodium	TAL Inorganics	mg/kg	1.29E+01	1.31E+02	1.75E+01	J
102688	AOBSB0502	1-4	042396	Thallium	TAL Inorganics	mg/kg	8.50E-01	8.60E+00	8.50E-01	U
102688	AOBSB0502	1-4	042396	Vanadium	TAL Inorganics	mg/kg	7.00E-02	7.08E-01	9.90E+00	
102688	AOBSB0502	1-4	042396	Zinc	TAL Inorganics	mg/kg	1.61E+00	1.63E+01	1.03E+01	J
102688	AOBSB0502	1-4	042396	Gross Alpha	Radiologicals	pCi/g	4.00E+00	2.91E+00	1.09E+01	
102688	AOBSB0502	1-4	042396	Non-volatile Beta	Radiologicals	pCi/g	1.00E+01	1.78E+00	1.00E+01	UI
102688	AOBSB0502	1-4	042396	Cation exchange capacity	Miscellaneous	Meq/	6.00E+00	6.44E+02	6.00E+00	U
102688	AOBSB0502	1-4	042396	Total Organic Carbon	Miscellaneous	mg/kg	8.40E+00	6.00E+01	6.64E+02	
102688	AOBSB0502	1-4	042396	Total petroleum hydrocarbons	Miscellaneous	mg/kg	3.30E+00	1.14E+01	1.09E+01	J
102689	AOBSB0601	0-1	042396	1,1,1-Trichloroethane	Volatiles	mg/kg	9.71E-04	5.00E-03	7.80E-03	J
102689	AOBSB0601	0-1	042396	1,1,2,2-Tetrachloroethane	Volatiles	mg/kg	3.47E-03	5.00E-03	3.47E-03	UJ
102689	AOBSB0601	0-1	042396	1,1,2-Trichloroethane	Volatiles	mg/kg	2.40E-03	5.00E-03	2.40E-03	UJ
102689	AOBSB0601	0-1	042396	1,1-Dichloroethane	Volatiles	mg/kg	1.05E-03	5.00E-03	1.05E-03	UJ
102689	AOBSB0601	0-1	042396	1,1-Dichloroethene	Volatiles	mg/kg	1.42E-03	5.00E-03	1.42E-03	UJ
102689	AOBSB0601	0-1	042396	1,2-Dichloroethane	Volatiles	mg/kg	1.34E-03	5.00E-03	1.34E-03	UJ
102689	AOBSB0601	0-1	042396	1,2-Dichloroethene (total)	Volatiles	mg/kg	8.54E-04	5.00E-03	8.54E-04	UJ
102689	AOBSB0601	0-1	042396	1,2-Dichloropropane	Volatiles	mg/kg	1.67E-03	5.00E-03	1.67E-03	UJ
102689	AOBSB0601	0-1	042396	2-Butanone (MEK)	Volatiles	mg/kg	2.81E-03	1.00E-02	2.81E-03	UJ
102689	AOBSB0601	0-1	042396	2-Hexanone	Volatiles	mg/kg	3.77E-03	1.00E-02	3.77E-03	UJ
102689	AOBSB0601	0-1	042396	4-Methyl-2-pentanone	Volatiles	mg/kg	3.29E-03	1.00E-02	3.29E-03	UJ
102689	AOBSB0601	0-1	042396	Acetone	Volatiles	mg/kg	4.04E-03	1.00E-02	4.04E-03	UJ
102689	AOBSB0601	0-1	042396	Benzene	Volatiles	mg/kg	7.52E-04	5.00E-03	7.52E-04	UJ
102689	AOBSB0601	0-1	042396	Bromodichloromethane	Volatiles	mg/kg	1.74E-03	5.00E-03	1.74E-03	UJ
102689	AOBSB0601	0-1	042396	Bromoform	Volatiles	mg/kg	2.93E-03	5.00E-03	2.93E-03	UJ
102689	AOBSB0601	0-1	042396	Bromomethane (Methyl bromide)	Volatiles	mg/kg	2.01E-03	1.00E-02	2.01E-03	UJ
102689	AOBSB0601	0-1	042396	Carbon disulfide	Volatiles	mg/kg	1.71E-03	5.00E-03	1.71E-03	UJ

Appendix B
Phase I Soil Analytical Results for the 716-A Motor Shops Seepage Basin

Sample ID	Sample Name	Sample Depth	Sample Date	Analyte	Analyte Class	Units	MDL	EQL	Result	Result Qualifier
102689	AOBSB0601	0-1	042396	Carbon tetrachloride	Volatiles	mg/kg	9.71E-04	5.00E-03	9.71E-04	UJ
102689	AOBSB0601	0-1	042396	Chlorobenzene	Volatiles	mg/kg	1.74E-03	5.00E-03	1.74E-03	UJ
102689	AOBSB0601	0-1	042396	Chlorodibromomethane	Volatiles	mg/kg	2.53E-03	5.00E-03	2.53E-03	UJ
102689	AOBSB0601	0-1	042396	Chloroethane	Volatiles	mg/kg	2.06E-03	1.00E-02	2.06E-03	UJ
102689	AOBSB0601	0-1	042396	Chloroform	Volatiles	mg/kg	1.11E-03	5.00E-03	1.11E-03	UJ
102689	AOBSB0601	0-1	042396	Chloromethane (methyl chloride)	Volatiles	mg/kg	3.20E-03	1.00E-02	3.20E-03	UJ
102689	AOBSB0601	0-1	042396	cis-1,3-Dichloropropene	Volatiles	mg/kg	1.79E-03	5.00E-03	1.79E-03	UJ
102689	AOBSB0601	0-1	042396	Dichloromethane (methylene chlo	Volatiles	mg/kg	1.83E-03	5.00E-03	1.83E-03	UJ
102689	AOBSB0601	0-1	042396	Ethylbenzene	Volatiles	mg/kg	1.47E-03	5.00E-03	1.47E-03	UJ
102689	AOBSB0601	0-1	042396	Styrene	Volatiles	mg/kg	1.98E-03	5.00E-03	1.98E-03	UJ
102689	AOBSB0601	0-1	042396	Tetrachloroethene	Volatiles	mg/kg	1.17E-03	5.00E-03	9.62E-03	J
102689	AOBSB0601	0-1	042396	Toluene	Volatiles	mg/kg	1.45E-03	5.00E-03	1.45E-03	UJ
102689	AOBSB0601	0-1	042396	trans-1,3-Dichloropropene	Volatiles	mg/kg	2.08E-03	5.00E-03	2.08E-03	UJ
102689	AOBSB0601	0-1	042396	Trichloroethene (TCE)	Volatiles	mg/kg	2.09E-03	5.00E-03	2.09E-03	UJ
102689	AOBSB0601	0-1	042396	Vinyl acetate	Volatiles	mg/kg	5.48E-03	1.00E-02	5.48E-03	UJ
102689	AOBSB0601	0-1	042396	Vinyl chloride	Volatiles	mg/kg	2.47E-03	1.00E-02	2.47E-03	UJ
102689	AOBSB0601	0-1	042396	Xylenes (total)	Volatiles	mg/kg	1.53E-03	5.00E-03	1.53E-03	UJ
102689	AOBSB0601	0-1	042396	1,2,4-Trichlorobenzene	Semivolatiles	mg/kg	1.80E-02	3.55E-01	1.80E-02	U
102689	AOBSB0601	0-1	042396	1,2-Dichlorobenzene	Semivolatiles	mg/kg	1.70E-02	3.55E-01	1.70E-02	U
102689	AOBSB0601	0-1	042396	1,3-Dichlorobenzene	Semivolatiles	mg/kg	1.80E-02	3.55E-01	1.80E-02	U
102689	AOBSB0601	0-1	042396	1,4-Dichlorobenzene	Semivolatiles	mg/kg	1.80E-02	3.55E-01	1.80E-02	U
102689	AOBSB0601	0-1	042396	2,4,5-Trichlorophenol	Semivolatiles	mg/kg	1.40E-02	1.78E+00	1.40E-02	U
102689	AOBSB0601	0-1	042396	2,4,6-Trichlorophenol	Semivolatiles	mg/kg	1.10E-02	3.55E-01	1.10E-02	U
102689	AOBSB0601	0-1	042396	2,4-Dichlorophenol	Semivolatiles	mg/kg	1.30E-02	3.55E-01	1.30E-02	U
102689	AOBSB0601	0-1	042396	2,4-Dimethyl phenol	Semivolatiles	mg/kg	2.60E-02	3.55E-01	2.60E-02	U
102689	AOBSB0601	0-1	042396	2,4-Dinitrophenol	Semivolatiles	mg/kg	4.40E-02	1.78E+00	4.40E-02	U
102689	AOBSB0601	0-1	042396	2,4-Dinitrotoluene	Semivolatiles	mg/kg	1.90E-02	3.55E-01	1.90E-02	U
102689	AOBSB0601	0-1	042396	2,6-Dinitrotoluene	Semivolatiles	mg/kg	1.60E-02	3.55E-01	1.60E-02	U
102689	AOBSB0601	0-1	042396	2-Chloronaphthalene	Semivolatiles	mg/kg	1.60E-02	3.55E-01	1.60E-02	U
102689	AOBSB0601	0-1	042396	2-Chlorophenol	Semivolatiles	mg/kg	1.70E-02	3.55E-01	1.70E-02	U

Appendix B
Phase I Soil Analytical Results for the 716-A Motor Shops Seepage Basin

Sample ID	Sample Name	Sample Depth	Sample Date	Analyte	Analyte Class	Units	MDL	EQL	Result	Result Qualifier
102689	AOBSB0601	0-1	042396	2-Methyl-4,6-dinitrophenol	Semivolatiles	mg/kg	1.10E-02	1.78E+00	1.10E-02	U
102689	AOBSB0601	0-1	042396	2-Methylnaphthalene	Semivolatiles	mg/kg	1.70E-02	3.55E-01	1.70E-02	U
102689	AOBSB0601	0-1	042396	2-Nitroaniline	Semivolatiles	mg/kg	1.90E-02	1.78E+00	1.90E-02	U
102689	AOBSB0601	0-1	042396	2-Nitrophenol	Semivolatiles	mg/kg	1.70E-02	3.55E-01	1.70E-02	U
102689	AOBSB0601	0-1	042396	3,3'-Dichlorobenzidine	Semivolatiles	mg/kg	7.30E-02	7.10E-01	7.30E-02	U
102689	AOBSB0601	0-1	042396	3-Nitroaniline	Semivolatiles	mg/kg	4.20E-02	1.78E+00	4.20E-02	U
102689	AOBSB0601	0-1	042396	4-Bromophenyl phenyl ether	Semivolatiles	mg/kg	1.00E-02	3.55E-01	1.00E-02	U
102689	AOBSB0601	0-1	042396	4-Chloro-3-methylphenol (p-chlo	Semivolatiles	mg/kg	1.80E-02	3.55E-01	1.80E-02	U
102689	AOBSB0601	0-1	042396	4-Chloroaniline	Semivolatiles	mg/kg	6.00E-03	3.55E-01	6.00E-03	U
102689	AOBSB0601	0-1	042396	4-Chlorophenyl phenyl ether	Semivolatiles	mg/kg	1.30E-02	3.55E-01	1.30E-02	U
102689	AOBSB0601	0-1	042396	4-Nitroaniline	Semivolatiles	mg/kg	2.00E-02	1.78E+00	2.00E-02	U
102689	AOBSB0601	0-1	042396	4-Nitrophenol	Semivolatiles	mg/kg	4.90E-02	1.78E+00	4.90E-02	U
102689	AOBSB0601	0-1	042396	Acenapthene	Semivolatiles	mg/kg	1.50E-02	3.55E-01	1.50E-02	U
102689	AOBSB0601	0-1	042396	Acenapthylene	Semivolatiles	mg/kg	1.60E-02	3.55E-01	1.60E-02	U
102689	AOBSB0601	0-1	042396	Anthracene	Semivolatiles	mg/kg	1.60E-02	3.55E-01	1.60E-02	U
102689	AOBSB0601	0-1	042396	Benzo(a)anthracene	Semivolatiles	mg/kg	2.00E-02	3.55E-01	2.00E-02	U
102689	AOBSB0601	0-1	042396	Benzo(a)pyrene	Semivolatiles	mg/kg	2.40E-02	3.55E-01	2.40E-02	U
102689	AOBSB0601	0-1	042396	Benzo(b)fluoranthene	Semivolatiles	mg/kg	2.30E-02	3.55E-01	2.30E-02	U
102689	AOBSB0601	0-1	042396	Benzo(g,h,i)perylene	Semivolatiles	mg/kg	1.60E-02	3.55E-01	1.60E-02	U
102689	AOBSB0601	0-1	042396	Benzo(k)fluoranthene	Semivolatiles	mg/kg	2.20E-02	3.55E-01	2.20E-02	U
102689	AOBSB0601	0-1	042396	Benzoic acid	Semivolatiles	mg/kg	3.40E-02	1.78E+00	3.40E-02	U
102689	AOBSB0601	0-1	042396	Benzyl alcohol	Semivolatiles	mg/kg	1.90E-02	3.55E-01	1.90E-02	U
102689	AOBSB0601	0-1	042396	Bis(2-chloroethoxy) methane	Semivolatiles	mg/kg	1.60E-02	3.55E-01	1.60E-02	U
102689	AOBSB0601	0-1	042396	Bis(2-chloroethyl) ether	Semivolatiles	mg/kg	2.20E-02	3.55E-01	2.20E-02	U
102689	AOBSB0601	0-1	042396	Bis(2-chloroisopropyl) ether	Semivolatiles	mg/kg	1.80E-02	3.55E-01	1.80E-02	U
102689	AOBSB0601	0-1	042396	Bis(2-ethylhexyl) phthalate	Semivolatiles	mg/kg	2.20E-02	3.55E-01	2.20E-02	U
102689	AOBSB0601	0-1	042396	Butyl benzyl phthalate	Semivolatiles	mg/kg	2.10E-02	3.55E-01	2.10E-02	U
102689	AOBSB0601	0-1	042396	Chrysene	Semivolatiles	mg/kg	1.90E-02	3.55E-01	1.90E-02	U
102689	AOBSB0601	0-1	042396	Di-n-butyl phthalate	Semivolatiles	mg/kg	1.90E-02	3.55E-01	1.90E-02	U
102689	AOBSB0601	0-1	042396	Di-n-octyl phthalate	Semivolatiles	mg/kg	2.60E-02	3.55E-01	2.60E-02	U

Appendix B
Phase I Soil Analytical Results for the 716-A Motor Shops Seepage Basin

Sample ID	Sample Name	Sample Depth	Sample Date	Analyte	Analyte Class	Units	MDL	EQL	Result	Result Qualifier
102689	AOBSB0601	0-1	042396	Dibenzo(a,h)anthracene	Semivolatiles	mg/kg	1.70E-02	3.55E-01	1.70E-02	U
102689	AOBSB0601	0-1	042396	Dibenzofuran	Semivolatiles	mg/kg	1.60E-02	3.55E-01	1.60E-02	U
102689	AOBSB0601	0-1	042396	Diethyl phthalate	Semivolatiles	mg/kg	1.60E-02	3.55E-01	1.60E-02	U
102689	AOBSB0601	0-1	042396	Dimethyl phthalate	Semivolatiles	mg/kg	1.50E-02	3.55E-01	1.50E-02	U
102689	AOBSB0601	0-1	042396	Fluoranthene	Semivolatiles	mg/kg	1.90E-02	3.55E-01	1.90E-02	U
102689	AOBSB0601	0-1	042396	Fluorene	Semivolatiles	mg/kg	1.60E-02	3.55E-01	1.60E-02	U
102689	AOBSB0601	0-1	042396	Hexachlorobenzene	Semivolatiles	mg/kg	1.00E-02	3.55E-01	1.00E-02	U
102689	AOBSB0601	0-1	042396	Hexachlorobutadiene	Semivolatiles	mg/kg	1.50E-02	3.55E-01	1.50E-02	U
102689	AOBSB0601	0-1	042396	Hexachlorocyclopentadiene	Semivolatiles	mg/kg	2.60E-02	3.55E-01	2.60E-02	U
102689	AOBSB0601	0-1	042396	Hexachloroethane	Semivolatiles	mg/kg	1.60E-02	3.55E-01	1.60E-02	U
102689	AOBSB0601	0-1	042396	Indeno(1,2,3-c,d)pyrene	Semivolatiles	mg/kg	1.80E-02	3.55E-01	1.80E-02	U
102689	AOBSB0601	0-1	042396	Isophorone	Semivolatiles	mg/kg	1.70E-02	3.55E-01	1.70E-02	U
102689	AOBSB0601	0-1	042396	N-Nitrosodi-n-propylamine	Semivolatiles	mg/kg	2.00E-02	3.55E-01	2.00E-02	U
102689	AOBSB0601	0-1	042396	N-Nitrosodiphenylamine	Semivolatiles	mg/kg	1.40E-02	3.55E-01	1.40E-02	U
102689	AOBSB0601	0-1	042396	Naphthalene	Semivolatiles	mg/kg	1.90E-02	3.55E-01	1.90E-02	U
102689	AOBSB0601	0-1	042396	Nitrobenzene	Semivolatiles	mg/kg	1.90E-02	3.55E-01	1.90E-02	U
102689	AOBSB0601	0-1	042396	o-cresol (2-methylphenol)	Semivolatiles	mg/kg	1.60E-02	3.55E-01	1.60E-02	U
102689	AOBSB0601	0-1	042396	p-cresol (4-methylphenol)	Semivolatiles	mg/kg	1.70E-02	3.55E-01	1.70E-02	U
102689	AOBSB0601	0-1	042396	Pentachlorophenol	Semivolatiles	mg/kg	3.90E-02	1.78E+00	3.90E-02	U
102689	AOBSB0601	0-1	042396	Phenanthrene	Semivolatiles	mg/kg	1.50E-02	3.55E-01	1.50E-02	U
102689	AOBSB0601	0-1	042396	Phenol	Semivolatiles	mg/kg	1.90E-02	3.55E-01	1.90E-02	U
102689	AOBSB0601	0-1	042396	Pyrene	Semivolatiles	mg/kg	2.10E-02	3.55E-01	2.10E-02	U
102689	AOBSB0601	0-1	042396	Unknown	SVOA TICs	mg/kg	0.00E+00	0.00E+00	2.00E-01	J
102689	AOBSB0601	0-1	042396	Unknown	SVOA TICs	mg/kg	0.00E+00	0.00E+00	2.00E-01	J
102689	AOBSB0601	0-1	042396	Unknown	SVOA TICs	mg/kg	0.00E+00	0.00E+00	1.00E+00	J
102689	AOBSB0601	0-1	042396	Aldrin	Pesticides/PCBs	mg/kg	5.70E-04	1.77E-03	5.70E-04	U
102689	AOBSB0601	0-1	042396	alpha-Benzene hexachloride	Pesticides/PCBs	mg/kg	5.70E-04	1.77E-03	5.70E-04	U
102689	AOBSB0601	0-1	042396	alpha-Chlordane	Pesticides/PCBs	mg/kg	5.70E-04	1.77E-03	5.70E-04	U
102689	AOBSB0601	0-1	042396	Aroclor 1016	Pesticides/PCBs	mg/kg	1.10E-02	3.54E-02	1.10E-02	U
102689	AOBSB0601	0-1	042396	Aroclor 1221	Pesticides/PCBs	mg/kg	2.20E-02	7.09E-02	2.20E-02	U

Appendix B
Phase I Soil Analytical Results for the 716-A Motor Shops Seepage Basin

Sample ID	Sample Name	Sample Depth	Sample Date	Analyte	Analyte Class	Units	MDL	EQL	Result	Result Qualifier
102689	AOBSB0601	0-1	042396	Aroclor 1232	Pesticides/PCBs	mg/kg	1.10E-02	3.54E-02	1.10E-02	U
102689	AOBSB0601	0-1	042396	Aroclor 1242	Pesticides/PCBs	mg/kg	1.10E-02	3.54E-02	1.10E-02	U
102689	AOBSB0601	0-1	042396	Aroclor 1248	Pesticides/PCBs	mg/kg	1.10E-02	3.54E-02	1.10E-02	U
102689	AOBSB0601	0-1	042396	Aroclor 1254	Pesticides/PCBs	mg/kg	1.10E-02	3.54E-02	1.10E-02	U
102689	AOBSB0601	0-1	042396	Aroclor 1260	Pesticides/PCBs	mg/kg	1.10E-02	3.54E-02	1.10E-02	U
102689	AOBSB0601	0-1	042396	beta-Benzene hexachloride	Pesticides/PCBs	mg/kg	5.70E-04	1.77E-03	5.70E-04	U
102689	AOBSB0601	0-1	042396	delta-Benzene hexachloride	Pesticides/PCBs	mg/kg	5.70E-04	1.77E-03	5.70E-04	U
102689	AOBSB0601	0-1	042396	Dieldrin	Pesticides/PCBs	mg/kg	6.33E-04	3.54E-03	6.33E-04	U
102689	AOBSB0601	0-1	042396	Endosulfan I	Pesticides/PCBs	mg/kg	5.70E-04	1.77E-03	5.70E-04	U
102689	AOBSB0601	0-1	042396	Endosulfan II	Pesticides/PCBs	mg/kg	9.00E-04	3.54E-03	9.00E-04	U
102689	AOBSB0601	0-1	042396	Endosulfan sulfate	Pesticides/PCBs	mg/kg	1.10E-03	3.54E-03	1.10E-03	U
102689	AOBSB0601	0-1	042396	Endrin	Pesticides/PCBs	mg/kg	1.10E-03	3.54E-03	1.10E-03	U
102689	AOBSB0601	0-1	042396	Endrin ketone	Pesticides/PCBs	mg/kg	1.10E-03	3.54E-03	1.10E-03	U
102689	AOBSB0601	0-1	042396	gamma-Benzene hexachloride (Lin	Pesticides/PCBs	mg/kg	5.70E-04	1.77E-03	5.70E-04	U
102689	AOBSB0601	0-1	042396	gamma-Chlordane	Pesticides/PCBs	mg/kg	5.70E-04	1.77E-03	5.70E-04	U
102689	AOBSB0601	0-1	042396	Heptachlor	Pesticides/PCBs	mg/kg	5.70E-04	1.77E-03	5.70E-04	U
102689	AOBSB0601	0-1	042396	Heptachlor epoxide	Pesticides/PCBs	mg/kg	5.70E-04	1.77E-03	5.70E-04	U
102689	AOBSB0601	0-1	042396	Methoxychlor (Mariate)	Pesticides/PCBs	mg/kg	5.70E-03	1.77E-02	5.70E-03	U
102689	AOBSB0601	0-1	042396	p,p'-DDD	Pesticides/PCBs	mg/kg	1.10E-03	3.54E-03	1.10E-03	U
102689	AOBSB0601	0-1	042396	p,p'-DDE	Pesticides/PCBs	mg/kg	9.00E-04	3.54E-03	9.00E-04	U
102689	AOBSB0601	0-1	042396	p,p'-DDT	Pesticides/PCBs	mg/kg	1.10E-03	3.54E-03	1.10E-03	U
102689	AOBSB0601	0-1	042396	Toxaphene	Pesticides/PCBs	mg/kg	5.30E-02	1.77E-01	5.30E-02	U
102689	AOBSB0601	0-1	042396	Aluminum	TAL Inorganics	mg/kg	1.90E+00	1.88E+01	4.27E+03	
102689	AOBSB0601	0-1	042396	Antimony	TAL Inorganics	mg/kg	3.50E-01	3.55E+00	3.50E-01	U
102689	AOBSB0601	0-1	042396	Arsenic	TAL Inorganics	mg/kg	1.11E+00	1.12E+01	1.40E+00	J
102689	AOBSB0601	0-1	042396	Barium	TAL Inorganics	mg/kg	1.10E-01	1.11E+00	1.96E+01	
102689	AOBSB0601	0-1	042396	Beryllium	TAL Inorganics	mg/kg	3.00E-02	2.53E-01	2.30E-01	
102689	AOBSB0601	0-1	042396	Cadmium	TAL Inorganics	mg/kg	4.00E-02	4.05E-01	3.26E-01	J
102689	AOBSB0601	0-1	042396	Calcium	TAL Inorganics	mg/kg	1.68E+00	1.70E+01	8.75E+01	
102689	AOBSB0601	0-1	042396	Chromium	TAL Inorganics	mg/kg	9.00E-02	9.12E-01	4.90E+00	

Appendix B
Phase I Soil Analytical Results for the 716-A Motor Shops Seepage Basin

Sample ID	Sample Name	Sample Depth	Sample Date	Analyte	Analyte Class	Units	MDL	EQL	Result	Result Qualifier
102689	AOBSB0601	0-1	042396	Cobalt	TAL Inorganics	mg/kg	8.00E-02	8.10E-01	7.13E-01	J
102689	AOBSB0601	0-1	042396	Copper	TAL Inorganics	mg/kg	1.00E-01	1.01E+00	4.40E+00	
102689	AOBSB0601	0-1	042396	Cyanide	TAL Inorganics	mg/kg	8.00E-02	8.50E-01	8.00E-02	UJ
102689	AOBSB0601	0-1	042396	Iron	TAL Inorganics	mg/kg	2.19E+00	2.22E+01	2.23E+03	
102689	AOBSB0601	0-1	042396	Lead	TAL Inorganics	mg/kg	5.90E-01	5.98E+00	8.20E+00	
102689	AOBSB0601	0-1	042396	Magnesium	TAL Inorganics	mg/kg	8.70E-01	8.81E+00	7.48E+01	
102689	AOBSB0601	0-1	042396	Manganese	TAL Inorganics	mg/kg	2.00E-02	2.03E-01	1.59E+01	
102689	AOBSB0601	0-1	042396	Mercury	TAL Inorganics	mg/kg	1.30E-02	1.42E-01	3.00E-02	J
102689	AOBSB0601	0-1	042396	Nickel	TAL Inorganics	mg/kg	1.70E-01	1.72E+00	1.80E+00	
102689	AOBSB0601	0-1	042396	Potassium	TAL Inorganics	mg/kg	6.70E+00	6.79E+01	7.13E+01	
102689	AOBSB0601	0-1	042396	Selenium	TAL Inorganics	mg/kg	1.04E+00	1.05E+01	1.04E+00	U
102689	AOBSB0601	0-1	042396	Silver	TAL Inorganics	mg/kg	9.00E-02	9.12E-01	9.00E-02	U
102689	AOBSB0601	0-1	042396	Sodium	TAL Inorganics	mg/kg	1.29E+01	1.31E+02	2.21E+01	J
102689	AOBSB0601	0-1	042396	Thallium	TAL Inorganics	mg/kg	8.50E-01	8.61E+00	8.50E-01	U
102689	AOBSB0601	0-1	042396	Vanadium	TAL Inorganics	mg/kg	7.00E-02	7.09E-01	6.80E+00	
102689	AOBSB0601	0-1	042396	Zinc	TAL Inorganics	mg/kg	1.61E+00	1.63E+01	1.45E+01	J
102689	AOBSB0601	0-1	042396	Gross Alpha	Radiologicals	pCi/g	4.00E+00	2.91E+00	4.00E+00	UI
102689	AOBSB0601	0-1	042396	Non-volatile Beta	Radiologicals	pCi/g	1.00E+01	1.77E+00	1.00E+01	UI
102689	AOBSB0601	0-1	042396	Cation exchange capacity	Miscellaneous	Meq/	6.00E+00	6.38E+02	6.00E+00	U
102689	AOBSB0601	0-1	042396	Total Organic Carbon	Miscellaneous	mg/kg	8.40E+00	6.00E+01	3.40E+03	
102689	AOBSB0601	0-1	042396	Total petroleum hydrocarbons	Miscellaneous	mg/kg	3.30E+00	1.13E+01	8.23E+01	
102690	AOBSB0602	1-4	042396	1,1,1-Trichloroethane	Volatiles	mg/kg	9.71E-04	5.50E-03	9.71E-04	U
102690	AOBSB0602	1-4	042396	1,1,2,2-Tetrachloroethane	Volatiles	mg/kg	3.47E-03	5.50E-03	3.47E-03	U
102690	AOBSB0602	1-4	042396	1,1,2-Trichloroethane	Volatiles	mg/kg	2.40E-03	5.50E-03	2.40E-03	U
102690	AOBSB0602	1-4	042396	1,1-Dichloroethane	Volatiles	mg/kg	1.05E-03	5.50E-03	1.05E-03	U
102690	AOBSB0602	1-4	042396	1,1-Dichloroethene	Volatiles	mg/kg	1.42E-03	5.50E-03	1.42E-03	U
102690	AOBSB0602	1-4	042396	1,2-Dichloroethane	Volatiles	mg/kg	1.34E-03	5.50E-03	1.34E-03	U
102690	AOBSB0602	1-4	042396	1,2-Dichloroethene (total)	Volatiles	mg/kg	8.54E-04	5.50E-03	8.54E-04	U
102690	AOBSB0602	1-4	042396	1,2-Dichloropropane	Volatiles	mg/kg	1.67E-03	5.50E-03	1.67E-03	U
102690	AOBSB0602	1-4	042396	2-Butanone (MEK)	Volatiles	mg/kg	2.81E-03	1.10E-02	2.81E-03	U

Appendix B
Phase I Soil Analytical Results for the 716-A Motor Shops Seepage Basin

Sample ID	Sample Name	Sample Depth	Sample Date	Analyte	Analyte Class	Units	MDL	EQL	Result	Result Qualifier
102690	AOBSB0602	1-4	042396	2-Hexanone	Volatiles	mg/kg	3.77E-03	1.10E-02	3.77E-03	U
102690	AOBSB0602	1-4	042396	4-Methyl-2-pentanone	Volatiles	mg/kg	3.29E-03	1.10E-02	3.29E-03	U
102690	AOBSB0602	1-4	042396	Acetone	Volatiles	mg/kg	4.04E-03	1.10E-02	4.04E-03	U
102690	AOBSB0602	1-4	042396	Benzene	Volatiles	mg/kg	7.52E-04	5.50E-03	7.52E-04	U
102690	AOBSB0602	1-4	042396	Bromodichloromethane	Volatiles	mg/kg	1.74E-03	5.50E-03	1.74E-03	U
102690	AOBSB0602	1-4	042396	Bromoform	Volatiles	mg/kg	2.93E-03	5.50E-03	2.93E-03	U
102690	AOBSB0602	1-4	042396	Bromomethane (Methyl bromide)	Volatiles	mg/kg	2.01E-03	1.10E-02	2.01E-03	U
102690	AOBSB0602	1-4	042396	Carbon disulfide	Volatiles	mg/kg	1.71E-03	5.50E-03	1.71E-03	U
102690	AOBSB0602	1-4	042396	Carbon tetrachloride	Volatiles	mg/kg	9.71E-04	5.50E-03	9.71E-04	U
102690	AOBSB0602	1-4	042396	Chlorobenzene	Volatiles	mg/kg	1.74E-03	5.50E-03	1.74E-03	U
102690	AOBSB0602	1-4	042396	Chlorodibromomethane	Volatiles	mg/kg	2.53E-03	5.50E-03	2.53E-03	U
102690	AOBSB0602	1-4	042396	Chloroethane	Volatiles	mg/kg	2.06E-03	1.10E-02	2.06E-03	U
102690	AOBSB0602	1-4	042396	Chloroform	Volatiles	mg/kg	1.11E-03	5.50E-03	1.11E-03	U
102690	AOBSB0602	1-4	042396	Chloromethane (methyl chloride)	Volatiles	mg/kg	3.20E-03	1.10E-02	3.20E-03	U
102690	AOBSB0602	1-4	042396	cis-1,3-Dichloropropene	Volatiles	mg/kg	1.79E-03	5.50E-03	1.79E-03	U
102690	AOBSB0602	1-4	042396	Dichloromethane (methylene chlo	Volatiles	mg/kg	1.83E-03	5.50E-03	1.83E-03	U
102690	AOBSB0602	1-4	042396	Ethylbenzene	Volatiles	mg/kg	1.47E-03	5.50E-03	1.47E-03	U
102690	AOBSB0602	1-4	042396	Styrene	Volatiles	mg/kg	1.98E-03	5.50E-03	1.98E-03	U
102690	AOBSB0602	1-4	042396	Tetrachloroethene	Volatiles	mg/kg	1.17E-03	5.50E-03	3.54E-03	J
102690	AOBSB0602	1-4	042396	Toluene	Volatiles	mg/kg	1.45E-03	5.50E-03	1.45E-03	U
102690	AOBSB0602	1-4	042396	trans-1,3-Dichloropropene	Volatiles	mg/kg	2.08E-03	5.50E-03	2.08E-03	U
102690	AOBSB0602	1-4	042396	Trichloroethene (TCE)	Volatiles	mg/kg	2.09E-03	5.50E-03	2.09E-03	U
102690	AOBSB0602	1-4	042396	Vinyl acetate	Volatiles	mg/kg	5.48E-03	1.10E-02	5.48E-03	U
102690	AOBSB0602	1-4	042396	Vinyl chloride	Volatiles	mg/kg	2.47E-03	1.10E-02	2.47E-03	U
102690	AOBSB0602	1-4	042396	Xylenes (total)	Volatiles	mg/kg	1.53E-03	5.50E-03	1.53E-03	U
102690	AOBSB0602	1-4	042396	1,2,4-Trichlorobenzene	Semivolatiles	mg/kg	1.80E-02	3.62E-01	1.80E-02	U
102690	AOBSB0602	1-4	042396	1,2-Dichlorobenzene	Semivolatiles	mg/kg	1.70E-02	3.62E-01	1.70E-02	U
102690	AOBSB0602	1-4	042396	1,3-Dichlorobenzene	Semivolatiles	mg/kg	1.80E-02	3.62E-01	1.80E-02	U
102690	AOBSB0602	1-4	042396	1,4-Dichlorobenzene	Semivolatiles	mg/kg	1.80E-02	3.62E-01	1.80E-02	U
102690	AOBSB0602	1-4	042396	2,4,5-Trichlorophenol	Semivolatiles	mg/kg	1.40E-02	1.81E+00	1.40E-02	U

Appendix B
Phase I Soil Analytical Results for the 716-A Motor Shops Seepage Basin

Sample ID	Sample Name	Sample Depth	Sample Date	Analyte	Analyte Class	Units	MDL	EQL	Result	Result Qualifier
102690	AOBSB0602	1-4	042396	2,4,6-Trichlorophenol	Semivolatiles	mg/kg	1.10E-02	3.62E-01	1.10E-02	U
102690	AOBSB0602	1-4	042396	2,4-Dichlorophenol	Semivolatiles	mg/kg	1.30E-02	3.62E-01	1.30E-02	U
102690	AOBSB0602	1-4	042396	2,4-Dimethyl phenol	Semivolatiles	mg/kg	2.60E-02	3.62E-01	2.60E-02	U
102690	AOBSB0602	1-4	042396	2,4-Dinitrophenol	Semivolatiles	mg/kg	4.40E-02	1.81E+00	4.40E-02	U
102690	AOBSB0602	1-4	042396	2,4-Dinitrotoluene	Semivolatiles	mg/kg	1.90E-02	3.62E-01	1.90E-02	U
102690	AOBSB0602	1-4	042396	2,6-Dinitrotoluene	Semivolatiles	mg/kg	1.60E-02	3.62E-01	1.60E-02	U
102690	AOBSB0602	1-4	042396	2-Chloronaphthalene	Semivolatiles	mg/kg	1.60E-02	3.62E-01	1.60E-02	U
102690	AOBSB0602	1-4	042396	2-Chlorophenol	Semivolatiles	mg/kg	1.70E-02	3.62E-01	1.70E-02	U
102690	AOBSB0602	1-4	042396	2-Methyl-4,6-dinitrophenol	Semivolatiles	mg/kg	1.10E-02	1.81E+00	1.10E-02	U
102690	AOBSB0602	1-4	042396	2-Methylnaphthalene	Semivolatiles	mg/kg	1.70E-02	3.62E-01	1.70E-02	U
102690	AOBSB0602	1-4	042396	2-Nitroaniline	Semivolatiles	mg/kg	1.90E-02	1.81E+00	1.90E-02	U
102690	AOBSB0602	1-4	042396	2-Nitrophenol	Semivolatiles	mg/kg	1.70E-02	3.62E-01	1.70E-02	U
102690	AOBSB0602	1-4	042396	3,3'-Dichlorobenzidine	Semivolatiles	mg/kg	7.30E-02	7.24E-01	7.30E-02	U
102690	AOBSB0602	1-4	042396	3-Nitroaniline	Semivolatiles	mg/kg	4.20E-02	1.81E+00	4.20E-02	U
102690	AOBSB0602	1-4	042396	4-Bromophenyl phenyl ether	Semivolatiles	mg/kg	1.00E-02	3.62E-01	1.00E-02	U
102690	AOBSB0602	1-4	042396	4-Chloro-3-methylphenol (p-chlo	Semivolatiles	mg/kg	1.80E-02	3.62E-01	1.80E-02	U
102690	AOBSB0602	1-4	042396	4-Chloroaniline	Semivolatiles	mg/kg	6.00E-03	3.62E-01	6.00E-03	U
102690	AOBSB0602	1-4	042396	4-Chlorophenyl phenyl ether	Semivolatiles	mg/kg	1.30E-02	3.62E-01	1.30E-02	U
102690	AOBSB0602	1-4	042396	4-Nitroaniline	Semivolatiles	mg/kg	2.00E-02	1.81E+00	2.00E-02	U
102690	AOBSB0602	1-4	042396	4-Nitrophenol	Semivolatiles	mg/kg	4.90E-02	1.81E+00	4.90E-02	U
102690	AOBSB0602	1-4	042396	Acenapthene	Semivolatiles	mg/kg	1.50E-02	3.62E-01	1.50E-02	U
102690	AOBSB0602	1-4	042396	Acenapthylene	Semivolatiles	mg/kg	1.60E-02	3.62E-01	1.60E-02	U
102690	AOBSB0602	1-4	042396	Anthracene	Semivolatiles	mg/kg	1.60E-02	3.62E-01	1.60E-02	U
102690	AOBSB0602	1-4	042396	Benzo(a)anthracene	Semivolatiles	mg/kg	2.00E-02	3.62E-01	2.00E-02	U
102690	AOBSB0602	1-4	042396	Benzo(a)pyrene	Semivolatiles	mg/kg	2.40E-02	3.62E-01	2.40E-02	U
102690	AOBSB0602	1-4	042396	Benzo(b)fluoranthene	Semivolatiles	mg/kg	2.30E-02	3.62E-01	2.30E-02	U
102690	AOBSB0602	1-4	042396	Benzo(g,h,i)perylene	Semivolatiles	mg/kg	1.60E-02	3.62E-01	1.60E-02	U
102690	AOBSB0602	1-4	042396	Benzo(k)fluoranthene	Semivolatiles	mg/kg	2.20E-02	3.62E-01	2.20E-02	U
102690	AOBSB0602	1-4	042396	Benzoic acid	Semivolatiles	mg/kg	3.40E-02	1.81E+00	3.40E-02	U
102690	AOBSB0602	1-4	042396	Benzyl alcohol	Semivolatiles	mg/kg	1.90E-02	3.62E-01	1.90E-02	U

Appendix B
Phase I Soil Analytical Results for the 716-A Motor Shops Seepage Basin

Sample ID	Sample Name	Sample Depth	Sample Date	Analyte	Analyte Class	Units	MDL	EQL	Result	Result Qualifier
102690	AOBSB0602	1-4	042396	Bis(2-chloroethoxy) methane	Semivolatiles	mg/kg	1.60E-02	3.62E-01	1.60E-02	U
102690	AOBSB0602	1-4	042396	Bis(2-chloroethyl) ether	Semivolatiles	mg/kg	2.20E-02	3.62E-01	2.20E-02	U
102690	AOBSB0602	1-4	042396	Bis(2-chloroisopropyl) ether	Semivolatiles	mg/kg	1.80E-02	3.62E-01	1.80E-02	U
102690	AOBSB0602	1-4	042396	Bis(2-ethylhexyl) phthalate	Semivolatiles	mg/kg	2.20E-02	3.62E-01	2.20E-02	U
102690	AOBSB0602	1-4	042396	Butyl benzyl phthalate	Semivolatiles	mg/kg	2.10E-02	3.62E-01	2.10E-02	U
102690	AOBSB0602	1-4	042396	Chrysene	Semivolatiles	mg/kg	1.90E-02	3.62E-01	1.90E-02	U
102690	AOBSB0602	1-4	042396	Di-n-butyl phthalate	Semivolatiles	mg/kg	1.90E-02	3.62E-01	1.90E-02	U
102690	AOBSB0602	1-4	042396	Di-n-octyl phthalate	Semivolatiles	mg/kg	2.60E-02	3.62E-01	2.60E-02	U
102690	AOBSB0602	1-4	042396	Dibenzo(a,h)anthracene	Semivolatiles	mg/kg	1.70E-02	3.62E-01	1.70E-02	U
102690	AOBSB0602	1-4	042396	Dibenzofuran	Semivolatiles	mg/kg	1.60E-02	3.62E-01	1.60E-02	U
102690	AOBSB0602	1-4	042396	Diethyl phthalate	Semivolatiles	mg/kg	1.60E-02	3.62E-01	1.60E-02	U
102690	AOBSB0602	1-4	042396	Dimethyl phthalate	Semivolatiles	mg/kg	1.50E-02	3.62E-01	1.50E-02	U
102690	AOBSB0602	1-4	042396	Fluoranthene	Semivolatiles	mg/kg	1.90E-02	3.62E-01	1.90E-02	U
102690	AOBSB0602	1-4	042396	Fluorene	Semivolatiles	mg/kg	1.60E-02	3.62E-01	1.60E-02	U
102690	AOBSB0602	1-4	042396	Hexachlorobenzene	Semivolatiles	mg/kg	1.00E-02	3.62E-01	1.00E-02	U
102690	AOBSB0602	1-4	042396	Hexachlorobutadiene	Semivolatiles	mg/kg	1.50E-02	3.62E-01	1.50E-02	U
102690	AOBSB0602	1-4	042396	Hexachlorocyclopentadiene	Semivolatiles	mg/kg	2.60E-02	3.62E-01	2.60E-02	U
102690	AOBSB0602	1-4	042396	Hexachloroethane	Semivolatiles	mg/kg	1.60E-02	3.62E-01	1.60E-02	U
102690	AOBSB0602	1-4	042396	Indeno(1,2,3-c,d)pyrene	Semivolatiles	mg/kg	1.80E-02	3.62E-01	1.80E-02	U
102690	AOBSB0602	1-4	042396	Isophorone	Semivolatiles	mg/kg	1.70E-02	3.62E-01	1.70E-02	U
102690	AOBSB0602	1-4	042396	N-Nitrosodi-n-propylamine	Semivolatiles	mg/kg	2.00E-02	3.62E-01	2.00E-02	U
102690	AOBSB0602	1-4	042396	N-Nitrosodiphenylamine	Semivolatiles	mg/kg	1.40E-02	3.62E-01	1.40E-02	U
102690	AOBSB0602	1-4	042396	Naphthalene	Semivolatiles	mg/kg	1.90E-02	3.62E-01	1.90E-02	U
102690	AOBSB0602	1-4	042396	Nitrobenzene	Semivolatiles	mg/kg	1.90E-02	3.62E-01	1.90E-02	U
102690	AOBSB0602	1-4	042396	o-cresol (2-methylphenol)	Semivolatiles	mg/kg	1.60E-02	3.62E-01	1.60E-02	U
102690	AOBSB0602	1-4	042396	p-cresol (4-methylphenol)	Semivolatiles	mg/kg	1.70E-02	3.62E-01	1.70E-02	U
102690	AOBSB0602	1-4	042396	Pentachlorophenol	Semivolatiles	mg/kg	3.90E-02	1.81E+00	3.90E-02	U
102690	AOBSB0602	1-4	042396	Phenanthrene	Semivolatiles	mg/kg	1.50E-02	3.62E-01	1.50E-02	U
102690	AOBSB0602	1-4	042396	Phenol	Semivolatiles	mg/kg	1.90E-02	3.62E-01	1.90E-02	U
102690	AOBSB0602	1-4	042396	Pyrene	Semivolatiles	mg/kg	2.10E-02	3.62E-01	2.10E-02	U

Appendix B
Phase I Soil Analytical Results for the 716-A Motor Shops Seepage Basin

Sample ID	Sample Name	Sample Depth	Sample Date	Analyte	Analyte Class	Units	MDL	EQL	Result	Result Qualifier
102690	AOBSB0602	1-4	042396	Aldol condensate	SVOA TICs	mg/kg	0.00E+00	0.00E+00	3.00E-01	J
102690	AOBSB0602	1-4	042396	Aldrin	Pesticides/PCBs	mg/kg	5.70E-04	1.81E-03	5.70E-04	UJ
102690	AOBSB0602	1-4	042396	alpha-Benzene hexachloride	Pesticides/PCBs	mg/kg	5.70E-04	1.81E-03	5.70E-04	UJ
102690	AOBSB0602	1-4	042396	alpha-Chlordane	Pesticides/PCBs	mg/kg	5.70E-04	1.81E-03	5.70E-04	UJ
102690	AOBSB0602	1-4	042396	Aroclor 1016	Pesticides/PCBs	mg/kg	1.10E-02	3.62E-02	1.10E-02	UJ
102690	AOBSB0602	1-4	042396	Aroclor 1221	Pesticides/PCBs	mg/kg	2.20E-02	7.24E-02	2.20E-02	UJ
102690	AOBSB0602	1-4	042396	Aroclor 1232	Pesticides/PCBs	mg/kg	1.10E-02	3.62E-02	1.10E-02	UJ
102690	AOBSB0602	1-4	042396	Aroclor 1242	Pesticides/PCBs	mg/kg	1.10E-02	3.62E-02	1.10E-02	UJ
102690	AOBSB0602	1-4	042396	Aroclor 1248	Pesticides/PCBs	mg/kg	1.10E-02	3.62E-02	1.10E-02	UJ
102690	AOBSB0602	1-4	042396	Aroclor 1254	Pesticides/PCBs	mg/kg	1.10E-02	3.62E-02	1.10E-02	UJ
102690	AOBSB0602	1-4	042396	Aroclor 1260	Pesticides/PCBs	mg/kg	1.10E-02	3.62E-02	1.10E-02	UJ
102690	AOBSB0602	1-4	042396	beta-Benzene hexachloride	Pesticides/PCBs	mg/kg	5.70E-04	1.81E-03	5.70E-04	UJ
102690	AOBSB0602	1-4	042396	delta-Benzene hexachloride	Pesticides/PCBs	mg/kg	5.70E-04	1.81E-03	5.70E-04	UJ
102690	AOBSB0602	1-4	042396	Dieldrin	Pesticides/PCBs	mg/kg	6.33E-04	3.62E-03	6.33E-04	UJ
102690	AOBSB0602	1-4	042396	Endosulfan I	Pesticides/PCBs	mg/kg	5.70E-04	1.81E-03	5.70E-04	UJ
102690	AOBSB0602	1-4	042396	Endosulfan II	Pesticides/PCBs	mg/kg	9.00E-04	3.62E-03	9.00E-04	UJ
102690	AOBSB0602	1-4	042396	Endosulfan sulfate	Pesticides/PCBs	mg/kg	1.10E-03	3.62E-03	1.10E-03	UJ
102690	AOBSB0602	1-4	042396	Endrin	Pesticides/PCBs	mg/kg	1.10E-03	3.62E-03	1.10E-03	UJ
102690	AOBSB0602	1-4	042396	Endrin ketone	Pesticides/PCBs	mg/kg	1.10E-03	3.62E-03	1.10E-03	UJ
102690	AOBSB0602	1-4	042396	gamma-Benzene hexachloride (Lin	Pesticides/PCBs	mg/kg	5.70E-04	1.81E-03	5.70E-04	UJ
102690	AOBSB0602	1-4	042396	gamma-Chlordane	Pesticides/PCBs	mg/kg	5.70E-04	1.81E-03	5.70E-04	UJ
102690	AOBSB0602	1-4	042396	Heptachlor	Pesticides/PCBs	mg/kg	5.70E-04	1.81E-03	5.70E-04	UJ
102690	AOBSB0602	1-4	042396	Heptachlor epoxide	Pesticides/PCBs	mg/kg	5.70E-04	1.81E-03	5.70E-04	UJ
102690	AOBSB0602	1-4	042396	Methoxychlor (Mariate)	Pesticides/PCBs	mg/kg	5.70E-03	1.81E-02	5.70E-03	UJ
102690	AOBSB0602	1-4	042396	p,p'-DDD	Pesticides/PCBs	mg/kg	1.10E-03	3.62E-03	1.10E-03	UJ
102690	AOBSB0602	1-4	042396	p,p'-DDE	Pesticides/PCBs	mg/kg	9.00E-04	3.62E-03	9.00E-04	UJ
102690	AOBSB0602	1-4	042396	p,p'-DDT	Pesticides/PCBs	mg/kg	1.10E-03	3.62E-03	1.10E-03	UJ
102690	AOBSB0602	1-4	042396	Toxaphene	Pesticides/PCBs	mg/kg	5.30E-02	1.81E-01	5.30E-02	UJ
102690	AOBSB0602	1-4	042396	Aluminum	TAL Inorganics	mg/kg	1.90E+00	1.92E+01	8.51E+03	
102690	AOBSB0602	1-4	042396	Antimony	TAL Inorganics	mg/kg	3.50E-01	3.62E+00	8.27E-01	J

Appendix B
Phase I Soil Analytical Results for the 716-A Motor Shops Seepage Basin

Sample ID	Sample Name	Sample Depth	Sample Date	Analyte	Analyte Class	Units	MDL	EQL	Result	Result Qualifier
102690	AOBSB0602	1-4	042396	Arsenic	TAL Inorganics	mg/kg	1.11E+00	1.15E+01	2.20E+00	J
102690	AOBSB0602	1-4	042396	Barium	TAL Inorganics	mg/kg	1.10E-01	1.14E+00	3.08E+01	
102690	AOBSB0602	1-4	042396	Beryllium	TAL Inorganics	mg/kg	3.00E-02	2.58E-01	3.52E-01	J
102690	AOBSB0602	1-4	042396	Cadmium	TAL Inorganics	mg/kg	4.00E-02	4.14E-01	1.20E-01	J
102690	AOBSB0602	1-4	042396	Calcium	TAL Inorganics	mg/kg	1.68E+00	1.74E+01	1.10E+02	
102690	AOBSB0602	1-4	042396	Chromium	TAL Inorganics	mg/kg	9.00E-02	9.31E-01	6.60E+00	
102690	AOBSB0602	1-4	042396	Cobalt	TAL Inorganics	mg/kg	8.00E-02	8.27E-01	1.50E+00	
102690	AOBSB0602	1-4	042396	Copper	TAL Inorganics	mg/kg	1.00E-01	1.03E+00	3.00E+00	
102690	AOBSB0602	1-4	042396	Cyanide	TAL Inorganics	mg/kg	8.00E-02	8.30E-01	8.00E-02	U
102690	AOBSB0602	1-4	042396	Iron	TAL Inorganics	mg/kg	2.19E+00	2.26E+01	4.80E+03	
102690	AOBSB0602	1-4	042396	Lead	TAL Inorganics	mg/kg	5.90E-01	6.10E+00	7.30E+00	
102690	AOBSB0602	1-4	042396	Magnesium	TAL Inorganics	mg/kg	8.70E-01	9.00E+00	1.03E+02	
102690	AOBSB0602	1-4	042396	Manganese	TAL Inorganics	mg/kg	2.00E-02	2.07E-01	2.39E+01	
102690	AOBSB0602	1-4	042396	Mercury	TAL Inorganics	mg/kg	1.30E-02	1.45E-01	5.30E-02	J
102690	AOBSB0602	1-4	042396	Nickel	TAL Inorganics	mg/kg	1.70E-01	1.76E+00	2.60E+00	
102690	AOBSB0602	1-4	042396	Potassium	TAL Inorganics	mg/kg	6.70E+00	6.93E+01	1.14E+02	
102690	AOBSB0602	1-4	042396	Selenium	TAL Inorganics	mg/kg	1.04E+00	1.08E+01	1.04E+00	U
102690	AOBSB0602	1-4	042396	Silver	TAL Inorganics	mg/kg	9.00E-02	9.31E-01	9.00E-02	U
102690	AOBSB0602	1-4	042396	Sodium	TAL Inorganics	mg/kg	1.29E+01	1.33E+02	2.70E+01	J
102690	AOBSB0602	1-4	042396	Thallium	TAL Inorganics	mg/kg	8.50E-01	8.79E+00	8.50E-01	U
102690	AOBSB0602	1-4	042396	Vanadium	TAL Inorganics	mg/kg	7.00E-02	7.24E-01	1.25E+01	
102690	AOBSB0602	1-4	042396	Zinc	TAL Inorganics	mg/kg	1.61E+00	1.66E+01	6.90E+00	J
102690	AOBSB0602	1-4	042396	Gross Alpha	Radiologicals	pCi/g	4.00E+00	3.31E+00	9.95E+00	
102690	AOBSB0602	1-4	042396	Non-volatile Beta	Radiologicals	pCi/g	1.00E+01	1.63E+00	1.11E+01	
102690	AOBSB0602	1-4	042396	Cation exchange capacity	Miscellaneous	Meq/	6.00E+00	6.52E+02	6.00E+00	U
102690	AOBSB0602	1-4	042396	Total Organic Carbon	Miscellaneous	mg/kg	8.40E+00	6.00E+01	8.69E+02	
102690	AOBSB0602	1-4	042396	Total petroleum hydrocarbons	Miscellaneous	mg/kg	3.30E+00	1.16E+01	1.89E+01	

APPENDIX B.2
QUALITY CONTROL SUMMARY REPORT FOR THE A-AREA MOTOR SHOPS SEEPAGE BASIN, PHASE I

THE ENVIRONMENTAL PROTECTION DEPARTMENT ESH-EMS-960374
ENVIRONMENTAL MONITORING SECTION

Quality Control Summary Report for the A-AREA MOTOR SHOPS SEEPAGE BASIN, PHASE I

June 1996

Prepared for the U.S. Department of Energy under Control Contract No. C001019P

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List of Acronyms

AMSSB1	A-Area Motor Shops Seepage Basin, Phase 1
AQ	analysis qualifier
BMP	best management practice
BQ	bias qualifier
CEC	cation exchange capacity
CFR	Code of Federal Regulations
CLP	Contract Laboratory Program
COC	chain-of-custody
CRQL	contract required quantitation limit
DQO	data quality objective
EDD	electronic data deliverable
EGG	Environmental Geochemistry Group
EMSL	Environmental Monitoring Support Laboratory
EPA	Environmental Protection Agency
EPD/EMS	Environmental Monitoring Section
EQL	estimated quantitation limit
ERA	Environmental Resource Associates
GC/MS	gas chromatograph/mass spectrometer
GEL	General Engineering Laboratories, Inc.
GPC	gel permeation chromatography
ICB/CCB	initial calibration blank/continuing calibration blank
ICP	inductively coupled plasma
ICV/CCV	initial calibration verification/continuing calibration verification
LCS	laboratory control sample
LDRR	laboratory data records review
LIMS	laboratory information management system
MDA	minimum detectable activity
MDL	method detection limit
MS	matrix spike
MSD	matrix spike duplicate
NCR	Nonconformance Report
PAL	performance acceptance limit
PCB	polychlorinated biphenyl
QA	quality assurance
QC	quality control
QAP	Quality Assurance Plan
QA/QC	quality assurance/quality control
RCRA	Resource Conservation and Recovery Act
RFI/RI	RCRA Facility Investigation/Remedial Investigation
RFW	Roy F. Weston, Inc.
RPD	relative percent difference
RQ	result qualifier
RRT	relative retention time

List of Acronyms, continued

SAIC	Science Applications International Corporation
SMC	sample/method combination
SOP	Standard Operating Procedures
SOW	statement of work
SQL	sample quantitation limit
SRS	Savannah River Site
ssEQL	sample-specific estimated quantitation limit
SVOA	semivolatile organic analyte
TAL	target analyte list
TCL	target compound list
TIC	tentatively identified compound
TOC	total organic carbon
TPH	total petroleum hydrocarbons
USC	unit-specific contaminant
VOA	volatile organic analytes
WSRC	Westinghouse Savannah River Company

A-AREA MOTOR SHOPS SEEPAGE BASIN, PHASE 1

Diskette Information

June 19, 1996

Validating Company: **Science Applications International Corporation**
360 Bay Street, Suite 200
Augusta, Georgia 30901

Primary Laboratory: **Roy F. Weston, Inc.**
208 Welsh Pool Road
Lionville, Pennsylvania 19341-1333

Secondary Laboratory: **General Engineering Laboratories, Inc.**
2040 Savage Road
Charleston, South Carolina 29414

Diskette Contents:

Data File Name	Data Description	Number of Bytes	Data Format	Date
*AN95.AMS	Analytical Data	2,015,912	AN95	06/18/96
SAM93A.AMS	Bottle Label Numbers	5,874	SAM93A	06/10/96
COC93.AMS	Chain-of-Custody Data	2,122	COC93	06/10/96
STA93.AMS	Station Data	550	STA93	06/19/96
SAM93.AMS	Sample List	3,924	SAM93	06/18/96

*This file appears on the diskette as AN95AMS.EXE with 101,662 bytes. This is a self-extracting file, which is compressed due to its size.

1.0 INTRODUCTION

1.1 OBJECTIVE

This Quality Control Summary Report describes activities performed under the direction of the Environmental Protection Department/Environmental Monitoring Section (EPD/EMS) at the Savannah River Site (SRS) in support of the first phase of sampling events at the 716-A Motor Shops Seepage Basin in the A-Area of SRS. This project is referred to as AMSSB1.

The 716-A Motor Shops Seepage Basin was an unlined earthen basin placed into service in 1977 to receive liquid waste from the 716-A Motor Shops oil/water separator. The basin is 207.0 feet long, 35.1 feet wide, and 6.6 feet deep, with a capacity of approximately 322,000 gallons. During operation of the basin, wastewater consisting of trace amounts of engine oil, grease, kerosenes, ethylene glycol, and soapy water flowed from the Motor Shops via an influent pipe that discharged on the northwest side of the basin. In 1983, discharges to the basin were discontinued and the influent pipe was capped. The basin currently collects water during periods of heavy precipitation, and it is covered with a growth of grass, weeds, and small trees.

A total of 24 environmental samples and 12 associated quality control (QC) samples (field blanks, trip blanks, rinsate blanks, splits, and duplicates) were collected for AMSSB1. Analytical data from these samples will be used to identify unit specific contaminants (USCs) and background contaminant levels. This information will be used in the Phase 2 sampling efforts to determine the extent of the identified USCs.

The samples for this project were analyzed for the following parameters in varying combinations:

- Target analyte list (TAL) inorganics,
- Target compound list (TCL) organics with Tentatively Identified Compounds (TICs),
- Gross alpha,
- Non-volatile beta,
- Pesticides/polychlorinated biphenyls (PCBs),
- Total petroleum hydrocarbons (TPH),
- Total organic carbon (TOC), and
- Cation exchange capacity (CEC).

The samples for the AMSSB1 project were collected by Westinghouse Savannah River Company (WSRC) personnel. Laboratory analyses were performed by Roy F. Weston, Inc. (RFW), of Lionville, Pennsylvania. The split samples and the associated trip blank were analyzed by General Engineering Laboratories, Inc. (GEL) of Charleston, South Carolina.

1.2 SAMPLING OBJECTIVE

The data obtained from the AMSSB1 project will be used to determine the contaminants present both at the basin and in background soils. This information will then be used to formulate a Phase 2 sampling regime for determining both the extent of contamination and the need for remedial action.

1.3 SAMPLE SETS AND ANALYSES

1.3.1 LIST OF ANALYTICAL SUITES

The 24 environmental samples, as well as the duplicate and split samples, were analyzed for the following constituents:

- TAL inorganics,
- TCL organics with TICs,
- Gross alpha,
- Non-volatile beta,
- Pesticides/PCBs,
- TPH,
- TOC, and
- CEC.

The rinsate blanks were analyzed for TAL inorganics, TCL organics, gross alpha, and non-volatile beta. The field blanks and trip blanks were analyzed for TCL volatile organic analytes (VOAs) only.

1.3.2 FIELD QUALITY CONTROL SAMPLING

The *RFI/RI Work Plan for the A-Area Motor Shops Seepage Basin* (WSRC-RP-96-00111, Rev. 0), specified 24 environmental samples, four field blanks, two duplicates, two rinsate blanks, and two splits. No trip blanks were specified. The Work Plan Assessment for AMSSB1 modified the QC sampling to include requests for six trip blanks and only two field blanks. See Section 3.2, "Discrepancies from the Work Plan," for a matrix and discussion of the samples requested in the Work Plan and Work Plan Assessment versus what was actually collected.

1.3.3 NUMBERS OF RECORDS

Included in the data for AMSSB1 are 37 sample logbook records and 36 chain-of-custody (COC) records. Table 1.1 summarizes the samples associated with this effort. One sample (EMS Sample ID 102675) for which a sample logbook record was created was placed in the wrong bottles and was not shipped to the laboratory; therefore, 36 samples were actually submitted for analysis. These samples comprise the field data for this project.

For AMSSB1, there are 8,542 analytical records. Of these, 8,444 are non-radionuclide records, of which 4,872 are sample results records. The remaining 3,572 non-radionuclide records are laboratory blanks, laboratory spikes, and laboratory-generated quality assurance/quality control (QA/QC) records.

There are 98 radionuclide records. Of these, 60 are analytical results and 38 are QA/QC records.

Table 1.1 Sample Numbers and Associated Work Plan Numbers

EMS Sample ID	Planned Station	Actual Station	Laboratory Sample ID	Cooler Number	Temperature at Lab (°C)
102663	ABKSB0201	ABKSB0201	96-04-172-04 S	1215	5.3
102663	ABKSB0201	ABKSB0201	9604L893-001 S	1215	5.3
102664	ABKSB0202	ABKSB0202	96-04-172-05 S	1215	5.3
102664	ABKSB0202	ABKSB0202	9604L893-002 S	1215	5.3
102665	ABKSBTB01B	ABKSBTB01B	9604L893-003 S	1215	5.3
102666	ABKSB0301	ABKSB0301	96-04-201-06 S	205	5.8
102666	ABKSB0301	ABKSB0301	9604L961-003 S	205	5.8
102667	ABKSB0301A	ABKSB0301A	96-04-182-04 S	1056	4.1
102667	ABKSB0301A	ABKSB0301A	9604L930-001 S	1056	4.1
102668	ABKSB0302	ABKSB0302	96-04-182-05 S	1056	4.1
102668	ABKSB0302	ABKSB0302	9604L930-002 S	1056	4.1
102669	ABKSB0501	ABKSB0501	96-04-182-06 S	1056	4.1
102669	ABKSB0501	ABKSB0501	9604L930-003 S	1056	4.1
102670	ABKSB0502	ABKSB0502	96-04-201-07 S	205	5.8
102670	ABKSB0502	ABKSB0502	9604L961-004 S	205	5.8
102671	ABKSB0601	ABKSB0601	96-04-182-07 S	1056	4.1
102671	ABKSB0601	ABKSB0601	9604L930-004 S	1056	4.1
102672	ABKSB0602	ABKSB0602	96-04-182-08 S	1056	4.1
102672	ABKSB0602	ABKSB0602	9604L930-005 S	1056	4.1
102673	ABKSB0401	ABKSB0401	96-04-182-09 S	1056	4.1
102673	ABKSB0401	ABKSB0401	9604L930-006 S	1056	4.1
102674	ABKSB0402	ABKSB0402	96-04-182-10 S	1056	4.1
102674	ABKSB0402	ABKSB0402	9604L930-007 S	1056	4.1
102676	AOBSB0201	AOBSB0201	96-04-201-08 S	205	5.8
102676	AOBSB0201	AOBSB0201	9604L961-005 S	205	5.8
102677	AOBSB0202	AOBSB0202	96-04-182-11 S	1056	4.1
102677	AOBSB0202	AOBSB0202	9604L930-008 S	1056	4.1
102678	AOBSBRB02E	AOBSBRB02E	96-04-200-04 S	205	5.8
102678	AOBSBRB02E	AOBSBRB02E	9604L961-006 S	205	5.8
102679	AOBSBFB02C	AOBSBFB02C	9604L961-007 S	205	5.8
102680	AOBSB0101	AOBSB0101	96-04-201-09 S	205	5.8
102680	AOBSB0101	AOBSB0101	9604L961-008 S	205	5.8
102681	AOBSB0102	AOBSB0102	96-04-201-10 S	205	5.8
102681	AOBSB0102	AOBSB0102	9604L961-009 S	205	5.8
102682	AOBSB0102A	AOBSB0102A	96-04-201-04 S	205	5.8
102682	AOBSB0102A	AOBSB0102A	9604L961-001 S	205	5.8
102683	AOBSB0301	AOBSB0301	96-04-201-05 S	205	5.8
102683	AOBSB0301	AOBSB0301	9604L961-002 S	205	5.8
102684	AOBSB0302	AOBSB0302	96-04-182-12 S	1056	4.1
102684	AOBSB0302	AOBSB0302	9604L930-009 S	1056	4.1
102685	AOBSB0401	AOBSB0401	96-04-182-13 S	1056	4.1

Table 1.1 Sample Numbers and Associated Work Plan Numbers, continued

EMS Sample ID	Planned Station	Actual Station	Laboratory Sample ID	Cooler Number	Temperature at Lab (°C)
102685	AOBSB0401	AOBSB0401	9604L930-010 S	1056	4.1
102686	AOBSB0402	AOBSB0402	96-04-182-14 S	1056	4.1
102686	AOBSB0402	AOBSB0402	9604L930-011 S	1056	4.1
102687	AOBSB0501	AOBSB0501	96-04-182-15 S	1056	4.1
102687	AOBSB0501	AOBSB0501	9604L930-012 S	1056	4.1
102688	AOBSB0502	AOBSB0502	96-04-182-16 S	1056	4.1
102688	AOBSB0502	AOBSB0502	9604L930-013 S	1056	4.1
102689	AOBSB0601	AOBSB0601	96-04-182-17 S	1056	4.1
102689	AOBSB0601	AOBSB0601	9604L930-014 S	1056	4.1
102690	AOBSB0602	AOBSB0602	96-04-201-11 S	205	5.8
102690	AOBSB0602	AOBSB0602	9604L961-010 S	205	5.8
102691	AOBSB0601D	AOBSB0601D	9604465-02	222	3.0
102692	ABKSB0101	ABKSB0101	96-04-182-18 S	1056	4.1
102692	ABKSB0101	ABKSB0101	9604L930-015 S	1056	4.1
102693	ABKSBFB01C	ABKSBFB01C	9604L930-016 S	1056	4.1
102694	ABKSB0102	ABKSB0102	96-04-182-19 S	1056	4.1
102694	ABKSB0102	ABKSB0102	9604L930-017 S	1056	4.1
102695	ABKSB0102D	ABKSB0102D	9604465-03	222	3.0
102696	ABKSBRB01E	ABKSBRB01E	96-04-183-04 S	1056	4.1
102696	ABKSBRB01E	ABKSBRB01E	9604L930-018 S	1056	4.1
102697	ABKSBTB02B	ABKSBTB02B	9604L930-019 S	1056	4.1
102698	ABKSBTB03B	ABKSBTB03B	9604465-01	222	3.0
102699	AOBSBTB01B	AOBSBTB01B	9604L961-011 S	205	5.8

1.3.4 REJECTED DATA

For AMSSB1, 105 analytical records were assigned the result qualifier *R*. Sixty-eight of the rejected records were environmental samples. The remaining 37 records were QA/QC analytical records. All the records were rejected by the laboratory due to matrix interference, problems with internal standards or spike recovery, serial dilution criteria not met, surrogate spike recoveries out of specification, or the analytical value was four times higher than the standard concentration, and percent recovery could not be determined. One thousand two hundred two analytical data records were qualified *J*, *UJ*, or *UIJ*. Of these, 447 were QA/QC analytical records.

1.4 VALIDATION STATUS OF THE DATA

1.4.1 SCOPE

Science Applications International Corporation (SAIC) of Augusta, Georgia validated and verified the information on sample collection, shipping, and laboratory analyses that was compiled for the AMSSB1 project. A list of the information compiled, reviewed, and maintained follows:

- sample documentation,
- COC maintenance,
- sample holding times and preservation,
- instrument initial and continuing calibration,
- analyte identification,
- analyte quantitation,
- analytical error,
- analysis of blanks,
- laboratory performance evaluations, and
- detection limits.

1.4.2 QUALITY LEVELS AND QUALITY ASSURANCE OBJECTIVES CHOSEN FOR THIS PROJECT

Technical criteria associated with definitive data as defined by the U.S. Environmental Protection Agency (EPA) in *Data Quality Objectives for Superfund* (EPA/540/G-93/071) were to be used to support the data quality objectives (DQOs) for this project.

EPA *Quality Assurance/Quality Control Guidance for Removal Activities* (EPA/540/G-90/004) was used as guidance for data validation activities. Quality Assurance 3 provides guidance for making confident decisions involving pollutant source identification, delineation of contaminants, site remediation and/or removal of pollutants, health risks, and environmental impact with regard to a group of critical samples.

1.4.3 PROCESS AND DOCUMENTATION

Sample documentation and COC maintenance were reviewed by examination of the field logs and COC forms. See Section 2.0, "Project Mobilization," and Section 3.0, "Sample Collection," for detailed discussions of these topics.

Sample holding times and preservation were evaluated by comparing the time between sample collection and sample extraction and/or analysis to method holding times and preservation requirements.

Analytical instrument calibration was reviewed as part of the Laboratory Data Records Review (LDRR). See Subsection 6.6, "Laboratory Data Records Review," in Section 6.0, "Validation and Verification," for a detailed discussion of this topic.

Analyte identification and analyte quantitation were verified as part of the computerized evaluation of the electronic data deliverables (EDDs), during review of the analytical narratives, and as part of the LDRR. Anomalies have been resolved with the laboratories wherever possible, and records not meeting specified criteria have been appropriately qualified. A more detailed discussion of this information may be found in the appropriate subsections of Section 6.0, "Validation and Verification."

Field-generated and laboratory-generated (method) blanks were examined. See Section 3.0, "Sample Collection," for an overview of the sampling plan with regard to field-generated blanks. Rinsate blanks, trip blanks, and field blanks were used on this project. Laboratory-generated blanks were performed in ratios of at least one for every 20 samples. See Section 6.0, "Validation and Verification," for additional information.

In evaluation of analytical error, percent recoveries and relative percent differences (RPDs) for QA/QC samples were reviewed and evaluated. The QA/QC samples and associated project sample data have been qualified when necessary according to the specifications outlined in Section 6.0, "Validation and Verification."

Laboratory performance evaluations are detailed in Section 4.0, "Sample Analysis," and in Appendix B.

The detection limits reported in the data tables are the sample-specific estimated quantitation limits (ssEQLs) for non-radiochemical analyses: 40 Code of Federal Regulations (CFR) Part 136, Appendix B. For radiochemical analyses, the detection limits reported in the data tables are the minimum detectable activities (MDAs). Dilution factor, aliquot size, and method detection limit (MDL) are used to calculate the estimated quantitation limits (EQLs). Because the sample aliquot size was not reported, it was not possible to reproduce the EQL calculation.

1.4.4 Summary of Data Quality

The COCs for the two field blanks, AOBSB-FB-01C and ABKSB-FB-02C, had originally requested TAL inorganics, TCL organics, gross alpha, non-volatile beta, TPH, and TOC. However, sampling personnel crossed through all but TCL VOAs for both of these samples. No explanation was provided in the EPD/EMS Sample Logbook.

The Work Plan requested a soil pH on all soil samples. The Work Plan Assessment specified this as a field measurement. No pH values were reported.

For AMSSB1, 105 analytical records were assigned the result qualifier ***R***. Sixty-eight of the rejected records were environmental samples. The remaining 37 records were QA/QC analytical records. All the records were rejected by the laboratory due to matrix interference, problems with internal standards or spike recovery, serial dilution criteria not met, surrogate spike recoveries out of specification, or the analytical value was four times higher than the standard concentration, and percent recovery could not be determined.

2.0 PROJECT MOBILIZATION

2.1 WORK PLAN ASSESSMENT

A Work Plan Assessment consistent with the WSRC *Environmental Geochemistry Group Operating Handbook*, Section 2.110, "Work Plan Assessment," was conducted for the AMSSB1 sampling activities. The assessment was conducted by Chet Nichols and Steve Conner and dated April 8, 1996.

2.2 CHANGES MADE TO SAMPLING INSTRUCTIONS

The changes made to the Work Plan that are discussed below were the result of the comments made in the Work Plan Assessment.

Six trip blanks were added because VOAs were one of the requested constituents. A trip blank was scheduled for each of the expected days of sampling and one each for the background sample split and the basin sample split.

The number of field blanks was reduced from four to two.

The request for tritium analyses was deleted. CEC analysis was added to the list of constituents for soil samples and m-cresol (3-methylphenol) was added to the TCL semivolatile organic analyte (SVOA) constituent list.

2.3 CONSTITUENT LISTS AND METHODS

See Appendix A for listings of the suites and constituents analyzed. See Section 4, "Sample Analysis," for a listing of analytical methods used.

2.4 PRODUCTION OF CHAIN-OF-CUSTODY FORMS

COC forms containing the list of requested analyses for each planned sample were printed on waterproof paper. A printed tear-off stub to the COC form stipulated the sample collection location. Information completed on the COC forms included the following: the EMS sample identification number from the logbook page for that sample; the laboratory sample identification number (completed by the analytical laboratory); the sample collection date; shipping information, including the signatures and dates of each person handling the sample; and the cooler number and temperature upon arrival at the analytical laboratory. Additionally, a peel-off section of each bottle label, printed with the bottle number, was affixed to the analysis request line on the COC form. Per the Work Plan Assessment, 38 COCs were generated for this project.

2.5 CHAIN-OF-CUSTODY CREATED IN THE FIELD

No COCs were created in the field for AMSSB1.

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3.0 SAMPLE COLLECTION

Sampling and packaging were conducted by WSRC personnel from April 19, 1996 through April 25, 1996.

3.1 DELAYS IN SAMPLING

No notations of delays in sampling were made in the EPD/EMS Sample Logbook.

3.2 DISCREPANCIES FROM THE WORK PLAN

The Work Plan called for 24 environmental samples, four field blanks, two duplicates, two rinsate blanks, two splits, and no trip blanks. The Work Plan Assessment modified the QC sampling to request two field blanks and six trip blanks. The remaining samples requested were unchanged.

The matrix below illustrates the differences between samples requested and what was actually submitted for analysis.

Sample Type	Requested in Work Plan	Requested in Assessment	Submitted for Analysis
Normal	24	24	24
Splits	2	2	2
Field Duplicates	2	2	2
Rinsate Blanks	2	2	2
Field Blanks	4	2	2
Trip Blanks	0	6	4

Several discrepancies between analysis methods requested and those received existed on the AMSSB1 project. These are discussed in greater detail in Section 4.5, "Analytical Methods and Detection Limits."

Split sample ABKSB-02-02D was not collected; however, split sample ABKSB-01-02D (EMS Sample ID 102695) was collected instead.

3.2.1 MISSING OR INCOMPLETE DATA

3.2.1.1 Samples Scheduled But Not Collected

Two trip blanks, AOBSB-TB-02B and AOBSB-TB-03B, were scheduled but not collected.

3.2.1.2 Samples Collected But Not Analyzed

The COCs for the two field blanks, AOBSB-FB-01C and ABKSB-FB-02C, had originally requested TAL inorganics, TCL organics, gross alpha, non-volatile beta, TPH, and TOC. However, sampling personnel crossed through all but TCL VOAs for both of these samples.

The Work Plan Assessment requested m-cresol (3-methylphenol), but no analyses were received. Typically, laboratories cannot differentiate between m-cresol and o-cresol, and the results are reported as a combination of the two compounds. Neither laboratory indicated whether or not this was the case for AMSSB1 data.

The Work Plan requested a soil pH on all soil samples. The Work Plan Assessment specified that this was to be a field measurement. No pH values were reported.

Sample AOBSB-02-02 (EMS Sample ID 102677) requested a total lead analysis that was not reported.

3.2.1.3 Missing or Incorrect Field Data

Numerous minor anomalies were found in the EPD/EMS Sample Logbook. All have been resolved; please refer to the EMS Environmental Geochemistry Group (EGG) project records for further information.

EMS sample number 102696 was a rinsate blank that was assigned the Work Plan ID ABKSB-01-02. In order to keep this separate from EMS sample number 102694, which also had this Work Plan ID, and to remain consistent with the conventional sample numbering system, EMS sample number 102696 was re-assigned the Work Plan ID ABKSB-RB-01E.

Environmental sample ABKSB-02-02 (EMS Sample ID 102664) was misidentified as ABKS-02-02 in the EPD/EMS Sample Logbook. The Work Plan ID was corrected by SAIC.

Environmental sample AOBSB-06-02 (EMS Sample ID 102690) was misidentified as AOSB-06-02 in the EPD/EMS Sample Logbook. The Work Plan ID was corrected by SAIC.

3.2.2 Extra Data

3.2.2.1 Samples Collected and/or Analyzed But Not Requested

No samples were collected that were not requested.

Decachlorobiphenyl results were received for all samples requesting pesticide/PCB analyses, although this compound was not requested in either the Work Plan or the Work Plan Assessment. Endrin aldehyde was also reported for two samples, however it was not requested.

3.3 FIELD QUALITY CONTROL SAMPLES

Table 3.1 lists rinsate blanks, field blanks, and trip blanks along with the analyses performed on each. Associated samples are listed for trip blanks. No qualification was done based on the rinsate blank or field blank results; therefore, the field samples that are associated to these are not included for those samples.

Table 3.1 Field-Generated Blanks

EPD/EMS Number	Associated Samples	Work Plan Sample Number	Analyses
102665	102663, 102664	ABKSB-TB-01B	TCL VOAs
102697	102667, 102668, 102669, 102671, 102672, 102673, 102674, 102677, 102684, 102685, 102686, 102687, 102688, 102689, 102692, 102694	ABKSB-TB-02B	TCL VOAs
102698	102691, 102695	ABKSB-TB-03B	TCL VOAs
102699	102666, 102670, 102676, 102678, 102679, 102680, 102681, 102682, 102683, 102690	AOBSB-TB-1B	TCL VOAs
102679		AOBSB-FB-02C	TCL VOAs
102693		ABKSB-FB-01C	TCL VOAs
102678		AOBSB-RB-02E	TAL inorganics, TCL organics, gross alpha, and non-volatile beta
102696		ABKSB-RB-01E	TAL inorganics, TCL organics, gross alpha, and non-volatile beta

3.4 FIELD OBSERVATIONS

Sampling personnel noted in the EPD/EMS Sample Logbook descriptions of some of the samples collected. Also noted were the origins of the water for rinsate blanks and field blanks and which laboratory provided the trip blanks. Please see the EPD/EMS Sample Logbooks for further information.

Following is a list of the SRS coordinates and elevations at which samples were collected:

Work Plan Location Description	Northing	Easting	Elevation
ABKSB01	103085.1858	50805.5177	370.022
ABKSB02	102610.6556	51088.5867	364.845
ABKSB03	102105.7719	51122.0048	348.616
ABKSB04	102247.6605	51666.2536	344.152
ABKSB05	102051.0021	50900.1169	346.759
ABKSB06	102187.9218	50771.7249	362.975
AOBSB01	102066.4036	50735.5085	346.969
AOBSB02	102062.9654	50695.9178	346.036
AOBSB03	102045.8522	50626.5856	344.649
AOBSB04	102042.8769	50666.4054	344.344
AOBSB05	102032.7514	50634.2496	344.078
AOBSB06	102024.0570	50585.2434	343.104

3.5 CHAIN-OF-CUSTODY REVIEW

Possible breaks in COC due to a missing time on the third "Relinquished by" occurred on the following samples:

EMS Sample No.	Work Plan ID	EMS Sample No.	Work Plan ID
102663	ABKSB-02-01	102680	AOBSB-01-01
102664	ABKSB-02-02	102681	AOBSB-01-02
102665	ABKSB-TB-01B	102682	AOBSB-01-02A
102666	ABKSB-03-01	102683	AOBSB-03-01
102668	ABKSB-03-02	102684	AOBSB-03-02
102669	ABKSB-05-01	102685	AOBSB-04-01
102670	ABKSB-05-02	102686	AOBSB-04-02
102671	ABKSB-06-01	102687	AOBSB-05-01
102672	ABKSB-06-02	102688	AOBSB-05-02
102673	ABKSB-04-01	102689	AOBSB-06-02
102676	ABKSB-02-01	102692	ABKSB-01-01
102677	ABKSB-02-02	102694	ABKSB-01-02
102678	AOBSB-RB-02E	102697	ABKSB-TB-02B
102679	AOBSB-FB-02C	102699	AOBSB-TB-01B

Sample 102696 (ABKSB-RB-01E) is missing both date and time on the third "Relinquished by" line, which is a possible break in COC.

The samples listed above were also missing "Received by" signature, date, and time on the third "Received by" line. SAIC assumed that this was a transfer to Federal Express due to the fact that the

fourth "Relinquished by" was Federal Express. In addition, the following samples were also missing the third signature, date, and time.

EMS Sample No.	Work Plan ID
102667	ABKSB-03-01A
102674	ABKSB-04-02
102690	AOBSB-06-02
102693	ABKSB-FB-01C

3.5.1 Temperatures Out of Range

There were no temperatures recorded by the laboratory upon receipt that were out of range.

3.5.2 Other Preservation

The pH of samples as received by the laboratory, any adjustment of pH performed by the laboratory, and any other preservatives added by the laboratory after sample receipt were not reported.

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4.0 SAMPLE ANALYSIS

4.1 THE LABORATORIES

The samples for AMSSB1 were analyzed by Roy F. Weston, Inc. of Lionville, Pennsylvania. The split samples and associated trip blank were analyzed by General Engineering Laboratories, Inc. of Charleston, South Carolina.

4.2 PERFORMANCE EVALUATIONS

4.2.1 ROY F. WESTON, INC. AND THERMO NUTECH EVALUATIONS

RFW participated in the U.S. EPA Water Supply Laboratory Performance Evaluation Study, WS035, for which results were reported in April 1996. Table B-1 in Appendix B contains RFW's results for WS035.

RFW also participated in the U.S. EPA Water Supply Laboratory Performance Evaluation Study, WS036, for which results were reported in June 1995. Table B-2 in Appendix B contains RFW's results for WS036. Results for inorganics for aluminum were slightly above the acceptable range. Results for vinyl chloride and carbon tetrachloride were slightly above and below the acceptable range, respectively. No explanation as to the root cause and proposed corrective action was provided by the laboratory. All other analytes requested in the AMSSB1 project were within the acceptable range.

Thermo NUtech, a subcontractor to RFW, participated in an EPA-EMSL Performance Evaluation for which results were reported in March 1996. Results of the study, which documented the laboratory's measurements of tritium in water, are shown in Appendix B, Table B-3. The laboratory's performance was acceptable.

4.2.2 GEL EVALUATIONS

GEL participated in the U.S. EPA Water Pollution Laboratory Performance Evaluation Study, WP033, for which results were reported in February 1995. EPA conducts the water pollution study biannually to certify laboratories for specific analyses. EPA's Environmental Monitoring Support Laboratory (EMSL) of Cincinnati, Ohio, prepares water samples spiked with known concentrations of constituents that are found in polluted waters and submits them to all laboratories seeking certification to analyze wastewater. EMSL evaluates the results, using limits statistically based on the performance of approximately 100 top-rated laboratories that analyze each constituent by the same procedure as that used by the laboratory being evaluated.

Table B-4 in Appendix B contains GEL's results from the February 1995 WP033 study. All TCL volatiles, pesticides/PCBs, and TAL metals, including mercury and cyanide results, were within acceptable ranges.

GEL participated in the U.S. EPA Water Pollution Performance Evaluation Study, WP034, for which results were reported in August 1995. Table B-5 in Appendix B contains GEL's results from the August 1995 WP034 study. All analytes requested in the AMSSB1 project relative to WP034 were

within acceptable ranges. Note that the result for one sample for toluene, though acceptable, was near the lower acceptance limit. GEL was instructed to check for error.

GEL participated in the U.S. EPA Water Supply Laboratory Performance Evaluation Study, WS036, for which results were reported in November 1995. Table B-6 in Appendix B contains GEL's results for WS036. Results for antimony, thallium, dichloromethane, and xylenes (total) were outside acceptable ranges. All other analytes requested in the AMSSB1 project relative to WS036 were within acceptable ranges.

4.3 QUALITY CONTROL STANDARDS

During the Second Quarter 1995, EPD/EMS conducted quality assessments of GEL. The laboratory received a set of certified environmental QC standards from Environmental Resource Associates (ERA) of Arvada, Colorado (lot numbers 426, 563, 3212, 3412, 8917, and 9964). The laboratory's results were compared with the ERA-certified values and performance acceptance limits (PALs). The PALs are listed as guidelines for acceptable analytical results given the limitations of the EPA methodologies used to determine these parameters. The PALs closely approximate the 95% confidence interval. GEL's results, certified values, and ranges for this assessment are contained in Table B-7 in Appendix B. Due to insufficient sample volume in the herbicides/pesticides vial, all requested compounds could not be analyzed; TCL SVOA analyses were performed instead.

Of 102 analyses reported, 87 (85%) were within the advisory ranges.

During the Third Quarter 1995, EPD/EMS conducted quality assessments of GEL. The laboratory received a set of certified environmental QC standards from ERA (lot numbers 427, 564, 567, 3213, 3413, 8918, and 9966). The laboratory's results were compared with the ERA-certified values and PALs. GEL's results, certified values, and ranges for this assessment are contained in Table B-8 in Appendix B. Note that GEL reported m,p-cresol instead of p-cresol due to the inability to separate these compounds completely. Also, alpha-chlordane was reported as total chlordane and p-xylene was reported as m,p-xylene. In addition, due to insufficient sample volume in the herbicides/pesticides vial, all of the compounds requested could not be determined. GEL instead performed the TCL pesticides/PCBs analysis, which included five of the requested compounds. GEL reported TPH by the gravimetric method.

Of 92 analyses reported, 90 (98%) were within the advisory ranges.

4.4 LABORATORY QUALITY ASSURANCE/QUALITY CONTROL

The laboratories follow their own Quality Assurance Plans (QAPs), which are designed to measure and document the accuracy and precision of the laboratory for the various analytical methods they perform. The laboratories also are guided by published method-specific QA/QC requirements, as well as other regulatory and contract-required QA procedures.

A laboratory's adherence to QA/QC practices is evaluated in a number of ways that are noted in this report. One general measure is examination of the laboratory's achievement in the analysis of performance evaluation samples and QC standards, as discussed above.

The performance reviews discussed later in this section are another QC check. The sections on validation and verification in this report provide information on the evaluation of the laboratories with respect to the specific analyses performed for this project.

4.5 ANALYTICAL METHODS AND DETECTION LIMITS

There were several discrepancies between the analytical methods requested in the Work Plan, the Work Plan Assessment, and what was actually reported. The matrix below summarizes these discrepancies:

Analysis	Work Plan	Work Plan Assessment	Methods Reported
Antimony	7041	7040/7041	6010
Arsenic	7060	7060	6010
VOAs from RFW	8260	8240	8240
VOAs from GEL	8260	8240	8260
Pesticides/PCBs	8080	8080	8081

Table 4.1 provides analytical methods and MDLs. The column headed *MDL* contains the detection limit the laboratories are expected to be able to achieve. The column headed *EQL* contains the detection limit at which the analyte can accurately be quantitated by the given method. The column headed *Reference* provides the source for the method reference, even if it does not include a detection limit for a particular analyte. See Section 8.0, " References" for additional information on the sources.

Contract-required detection limits were met throughout the project. The detection limits reported in the data tables are the sample EQLs. The EQL is the lowest concentration that can be reliably achieved within specified limits of precision and accuracy during routine laboratory operating conditions. The EQL is generally 5x to 10x the MDL. However, it may be nominally chosen within these guidelines to simplify data reporting. For many analytes, the EQL analyte concentration is selected as the lowest non-zero standard in the calibration curve. Sample EQLs are highly matrix-dependent. The EQLs in SW-846 are provided for guidance and may not always be achieved. Dilution factor, aliquot size, and method detection limit are determinants of the sample quantitation limits (SQLs). In addition, there are recommended dilutions in the method, such as those for medium level analyses, that are not reported as dilution factors in the EDD. Because the sample aliquot size was not reported, it was not possible to reproduce the calculation of the SQL; however, the SQLs were checked for reasonableness.

Table 4.1. Analytical Methods and Detection Limits

Analyte	Method	Units	MDL	EQL	Reference
Soil					
Cyanide	EPA335.3	ug/kg	4.4200	20.0000	GE
Total Organic Carbon	EPA415.1	mg/kg	18.5000	100.0000	GE
Total petroleum hydrocarbons	EPA418.1	mg/kg	.	10.0000	GE
Total petroleum hydrocarbons	EPA418.1	mg/kg	3.3000	33.0000	WA
Aluminum	EPA6010	mg/kg	1.9000	18.6000	WA
Antimony	EPA6010	mg/kg	0.3500	3.5000	WA
Arsenic	EPA6010	mg/kg	1.1100	11.1000	WA
Barium	EPA6010	mg/kg	0.1100	1.1000	WA
Beryllium	EPA6010	mg/kg	0.0300	0.3000	WA
Cadmium	EPA6010	mg/kg	0.0400	0.4000	WA
Calcium	EPA6010	mg/kg	1.6800	16.8000	WA
Chromium	EPA6010	mg/kg	0.0900	0.9000	WA
Cobalt	EPA6010	mg/kg	0.0800	0.8000	WA
Copper	EPA6010	mg/kg	0.1000	1.0000	WA
Iron	EPA6010	mg/kg	2.1900	21.9000	WA
Lead	EPA6010	mg/kg	0.5900	5.9000	WA
Magnesium	EPA6010	mg/kg	0.8700	8.7000	WA
Manganese	EPA6010	mg/kg	0.0200	0.2000	WA
Nickel	EPA6010	mg/kg	0.1700	1.7000	WA
Potassium	EPA6010	mg/kg	6.7000	67.0000	WA
Selenium	EPA6010	mg/kg	1.0400	10.4000	WA
Silver	EPA6010	mg/kg	0.0900	0.9000	WA
Sodium	EPA6010	mg/kg	12.9000	129.0000	WA
Thallium	EPA6010	mg/kg	0.8500	8.5000	WA
Vanadium	EPA6010	mg/kg	0.0700	0.7000	WA
Zinc	EPA6010	mg/kg	1.6100	16.1000	WA
Aluminum	EPA6010A	mg/kg	0.0172	0.2500	GE
Antimony	EPA6010A	mg/kg	0.0400	0.1000	GE
Arsenic	EPA6010A	mg/kg	0.0421	0.3000	GE
Barium	EPA6010A	mg/kg	0.0022	0.0250	GE
Beryllium	EPA6010A	mg/kg	0.0003	0.0100	GE
Cadmium	EPA6010A	mg/kg	0.0033	0.0050	GE
Calcium	EPA6010A	mg/kg	0.0070	0.2500	GE
Chromium	EPA6010A	mg/kg	0.0042	0.0250	GE
Cobalt	EPA6010A	mg/kg	0.0034	0.0100	GE
Copper	EPA6010A	mg/kg	0.0084	0.0250	GE
Iron	EPA6010A	mg/kg	0.0090	0.0100	GE
Lead	EPA6010A	mg/kg	0.0364	0.1000	GE
Magnesium	EPA6010A	mg/kg	0.0220	0.1000	GE
Manganese	EPA6010A	mg/kg	0.0025	0.0100	GE
Nickel	EPA6010A	mg/kg	0.0079	0.0250	GE
Potassium	EPA6010A	mg/kg	0.2724	2.0000	GE

Table 4.1. Analytical Methods and Detection Limits, continued

Analyte	Method	Units	MDL	EQL	Reference
Selenium	EPA6010A	mg/kg	0.0841	0.3000	GE
Silver	EPA6010A	mg/kg	0.0078	0.0250	GE
Sodium	EPA6010A	mg/kg	0.1519	1.0000	GE
Thallium	EPA6010A	mg/kg	0.0470	0.3000	GE
Vanadium	EPA6010A	mg/kg	0.0042	0.0100	GE
Zinc	EPA6010A	mg/kg	0.0021	0.0200	GE
Mercury	EPA7471	mg/kg	0.0000148	0.0002	GE
Mercury	EPA7471	mg/kg	0.0130	0.1300	WA
Aldrin	EPA8080	ug/kg	0.4200	0.8300	GE
Aroclor 1016	EPA8080	ug/kg	100.0000	4.1630	GE
Aroclor 1221	EPA8080	ug/kg	100.0000	4.1630	GE
Aroclor 1232	EPA8080	ug/kg	100.0000	4.1630	GE
Aroclor 1242	EPA8080	ug/kg	100.0000	4.1630	GE
Aroclor 1248	EPA8080	ug/kg	100.0000	4.1630	GE
Aroclor 1254	EPA8080	ug/kg	100.0000	4.1630	GE
Aroclor 1260	EPA8080	ug/kg	100.0000	4.1630	GE
Dieldrin	EPA8080	ug/kg	0.8300	1.6600	GE
Endosulfan I	EPA8080	ug/kg	0.8300	1.6600	GE
Endosulfan II	EPA8080	ug/kg	1.6700	3.3300	GE
Endosulfan sulfate	EPA8080	ug/kg	1.6700	3.3300	GE
Endrin	EPA8080	ug/kg	0.8300	1.6600	GE
Endrin ketone	EPA8080	ug/kg	1.6700	3.3000	GE
Heptachlor	EPA8080	ug/kg	0.8300	1.6600	GE
Heptachlor epoxide	EPA8080	ug/kg	0.8300	1.6600	GE
Methoxychlor (Mariate)	EPA8080	ug/kg	8.3300	16.6000	GE
Toxaphene	EPA8080	ug/kg	16.6700	33.0000	GE
alpha-Benzene hexachloride	EPA8080	ug/kg	0.4200	0.8300	GE
alpha-Chlordane	EPA8080	ug/kg	0.8300	1.5500	GE
beta-Benzene hexachloride	EPA8080	ug/kg	0.8300	1.6600	GE
delta-Benzene hexachloride	EPA8080	ug/kg	0.8300	1.6600	GE
gamma-Benzene hexachloride (Lindane)	EPA8080	ug/kg	0.4200	0.8300	GE
gamma-Chlordane	EPA8080	ug/kg	0.8300	1.6600	GE
p,p'-DDD	EPA8080	ug/kg	1.6700	3.3300	GE
p,p'-DDE	EPA8080	ug/kg	0.8300	1.6600	GE
p,p'-DDT	EPA8080	ug/kg	1.6700	3.3300	GE
Aldrin	EPA8081	ug/kg	0.5700	1.7000	WA
Aroclor 1016	EPA8081	ug/kg	11.0000	33.0000	WA
Aroclor 1221	EPA8081	ug/kg	22.0000	67.0000	WA
Aroclor 1232	EPA8081	ug/kg	11.0000	33.0000	WA
Aroclor 1242	EPA8081	ug/kg	11.0000	33.0000	WA
Aroclor 1248	EPA8081	ug/kg	11.0000	33.0000	WA
Aroclor 1254	EPA8081	ug/kg	11.0000	33.0000	WA
Aroclor 1260	EPA8081	ug/kg	11.0000	33.0000	WA

Table 4.1. Analytical Methods and Detection Limits, continued

Analyte	Method	Units	MDL	EQL	Reference
Dieldrin	EPA8081	ug/kg	0.6330	3.3300	WA
Endosulfan I	EPA8081	ug/kg	0.5700	1.7000	WA
Endosulfan II	EPA8081	ug/kg	0.9000	2.7000	WA
Endosulfan sulfate	EPA8081	ug/kg	1.1000	3.3000	WA
Endrin	EPA8081	ug/kg	1.1000	3.3000	WA
Endrin ketone	EPA8081	ug/kg	1.1000	3.3000	WA
Heptachlor	EPA8081	ug/kg	0.5700	1.7000	WA
Heptachlor epoxide	EPA8081	ug/kg	0.5700	1.7000	WA
Methoxychlor (mariate)	EPA8081	ug/kg	5.7000	17.0000	WA
Toxaphene	EPA8081	ug/kg	53.0000	160.0000	WA
alpha-Benzene hexachloride	EPA8081	ug/kg	0.5700	1.7000	WA
alpha-Chlordane	EPA8081	ug/kg	0.5700	1.7000	WA
beta-Benzene hexachloride	EPA8081	ug/kg	0.5700	1.7000	WA
delta-Benzene hexachloride	EPA8081	ug/kg	0.5700	1.7000	WA
gamma-Benzene hexachloride (Lindane)	EPA8081	ug/kg	0.5700	1.7000	WA
gamma-Chlordane	EPA8081	ug/kg	0.5700	1.7000	WA
p,p'-DDD	EPA8081	ug/kg	1.1000	3.3000	WA
p,p'-DDE	EPA8081	ug/kg	0.9000	2.7000	WA
p,p'-DDT	EPA8081	ug/kg	1.1000	3.3000	WA
1,1,1-Trichloroethane	EPA8240	ug/kg	0.9710	5.0000	WA
1,1,2,2-Tetrachloroethane	EPA8240	ug/kg	3.4700	5.0000	WA
1,1,2-Trichloroethane	EPA8240	ug/kg	2.4000	5.0000	WA
1,1-Dichloroethene	EPA8240	ug/kg	1.4200	5.0000	WA
1,2-Dichloroethane	EPA8240	ug/kg	1.3400	5.0000	WA
1,2-Dichloroethene (total)	EPA8240	ug/kg	0.8540	5.0000	WA
1,2-Dichloropropane	EPA8240	ug/kg	1.6700	5.0000	WA
1-1-Dichloroethane	EPA8240	ug/kg	1.0500	5.0000	WA
2-Butanone (MEK)	EPA8240	ug/kg	2.8100	10.0000	WA
2-Hexanone	EPA8240	ug/kg	3.7700	10.0000	WA
4-Methyl-2-pentanone	EPA8240	ug/kg	3.2900	10.0000	WA
Acetone	EPA8240	ug/kg	4.0400	10.0000	WA
Benzene	EPA8240	ug/kg	0.7520	5.0000	WA
Bromodichloromethane	EPA8240	ug/kg	1.7400	5.0000	WA
Bromoform	EPA8240	ug/kg	2.9300	5.0000	WA
Bromomethane (methyl bromide)	EPA8240	ug/kg	2.0100	10.0000	WA
Carbon disulfide	EPA8240	ug/kg	1.7100	5.0000	WA
Carbon tetrachloride	EPA8240	ug/kg	0.9710	5.0000	WA
Chlorobenzene	EPA8240	ug/kg	1.7400	5.0000	WA
Chlorodibromomethane	EPA8240	ug/kg	2.5300	5.0000	WA
Chloroethane	EPA8240	ug/kg	2.0600	10.0000	WA
Chloroform	EPA8240	ug/kg	1.1100	5.0000	WA
Chloromethane (methyl chloride)	EPA8240	ug/kg	3.2000	10.0000	WA
Dichloromethane (methylene chloride)	EPA8240	ug/kg	1.8300	5.0000	WA

Table 4.1. Analytical Methods and Detection Limits, continued

Analyte	Method	Units	MDL	EQL	Reference
Ethylbenzene	EPA8240	ug/kg	1.4700	5.0000	WA
Styrene	EPA8240	ug/kg	1.9800	5.0000	WA
Tetrachloroethene	EPA8240	ug/kg	1.1700	5.0000	WA
Toluene	EPA8240	ug/kg	1.4500	5.0000	WA
Trichloroethene (TCE)	EPA8240	ug/kg	2.0900	5.0000	WA
Vinyl acetate	EPA8240	ug/kg	5.4800	10.0000	WA
Vinyl chloride	EPA8240	ug/kg	2.4700	10.0000	WA
Xylenes (total)	EPA8240	ug/kg	1.5300	5.0000	WA
cis-1,3-Dichloropropene	EPA8240	ug/kg	1.7900	5.0000	WA
trans-1,3-Dichloropropene	EPA8240	ug/kg	2.0800	5.0000	WA
1,1,1-Trichloroethane	EPA8260	ug/kg	0.0220	0.0500	GE
1,1,2,2-Tetrachloroethane	EPA8260	ug/kg	0.0120	0.0500	GE
1,1,2-Trichloroethane	EPA8260	ug/kg	0.0170	0.0500	GE
1,1-Dichloroethene	EPA8260	ug/kg	0.0180	0.0500	GE
1,2-Dichloroethane	EPA8260	ug/kg	0.0150	0.0500	GE
1,2-Dichloroethene (total)	EPA8260	ug/kg	0.0300	0.1000	GE
1,2-Dichloropropane	EPA8260	ug/kg	0.0150	0.0500	GE
1-1-Dichloroethane	EPA8260	ug/kg	0.0170	0.0500	GE
2-Butanone (MEK)	EPA8260	ug/kg	0.1400	1.0000	GE
2-Hexanone	EPA8260	ug/kg	0.1940	1.0000	GE
4-Methyl-2-pentanone	EPA8260	ug/kg	0.2040	1.0000	GE
Acetone	EPA8260	ug/kg	3.1680	5.0000	GE
Benzene	EPA8260	ug/kg	0.0170	0.5000	GE
Bromodichloromethane	EPA8260	ug/kg	0.0120	0.0500	GE
Bromoform	EPA8260	ug/kg	0.0120	0.0500	GE
Bromomethane (methyl bromide)	EPA8260	ug/kg	0.0260	0.1000	GE
Carbon disulfide	EPA8260	ug/kg	0.1290	1.0000	GE
Carbon tetrachloride	EPA8260	ug/kg	0.0120	0.0500	GE
Chlorobenzene	EPA8260	ug/kg	0.0120	0.0500	GE
Chlorodibromomethane	EPA8260	ug/kg	0.0170	0.0500	GE
Chloroethane	EPA8260	ug/kg	0.0250	0.1000	GE
Chloroform	EPA8260	ug/kg	0.0170	0.0500	GE
Chloromethane (methyl chloride)	EPA8260	ug/kg	0.0240	0.1000	GE
Dichloromethane (methylene chloride)	EPA8260	ug/kg	0.2940	0.5000	GE
Ethylbenzene	EPA8260	ug/kg	0.0150	0.0500	GE
Styrene	EPA8260	ug/kg	0.0170	0.0500	GE
Tetrachloroethene	EPA8260	ug/kg	0.0260	0.0500	GE
Toluene	EPA8260	ug/kg	0.0440	0.5000	GE
Trichloroethene (TCE)	EPA8260	ug/kg	0.0170	0.0500	GE
Vinyl acetate	EPA8260	ug/kg	0.1420	1.0000	GE
Vinyl chloride	EPA8260	ug/kg	0.0150	0.1000	GE
Xylenes (total)	EPA8260	ug/kg	0.0600	0.1500	GE
cis-1,3-Dichloropropene	EPA8260	ug/kg	0.0120	0.0500	GE
trans-1,3-Dichloropropene	EPA8260	ug/kg	0.0150	0.0500	GE

Table 4.1. Analytical Methods and Detection Limits, continued

Analyte	Method	Units	MDL	EQL	Reference
1,2,4-Trichlorobenzene	EPA8270	ug/kg	1.4460	3.3300	GE
1,2,4-Trichlorobenzene	EPA8270	ug/kg	18.0000	33.0000	WA
1,2-Dichlorobenzene	EPA8270	ug/kg	0.8240	33.3300	GE
1,2-Dichlorobenzene	EPA8270	ug/kg	17.0000	33.0000	WA
1,3-Dichlorobenzene	EPA8270	ug/kg	0.9430	33.3300	GE
1,3-Dichlorobenzene	EPA8270	ug/kg	18.0000	33.0000	WA
1,4-Dichlorobenzene	EPA8270	ug/kg	5.1270	33.3300	GE
1,4-Dichlorobenzene	EPA8270	ug/kg	18.0000	33.0000	WA
2,4,5-Trichlorophenol	EPA8270	ug/kg	1.4090	33.3300	GE
2,4,5-Trichlorophenol	EPA8270	ug/kg	14.0000	165.0000	WA
2,4,6-Trichlorophenol	EPA8270	ug/kg	0.5000	1.0000	GE
2,4,6-Trichlorophenol	EPA8270	ug/kg	11.0000	33.0000	WA
2,4-Dichlorophenol	EPA8270	ug/kg	1.1880	33.3300	GE
2,4-Dichlorophenol	EPA8270	ug/kg	13.0000	33.0000	WA
2,4-Dimethyl phenol	EPA8270	ug/kg	1.2100	33.3300	GE
2,4-Dimethyl phenol	EPA8270	ug/kg	26.0000	33.0000	WA
2,4-Dinitrophenol	EPA8270	ug/kg	3.7150	333.0000	GE
2,4-Dinitrophenol	EPA8270	ug/kg	44.0000	165.0000	WA
2,4-Dinitrotoluene	EPA8270	ug/kg	0.5600	3.3300	GE
2,4-Dinitrotoluene	EPA8270	ug/kg	19.0000	33.0000	WA
2,6-Dinitrotoluene	EPA8270	ug/kg	0.5600	3.3300	GE
2,6-Dinitrotoluene	EPA8270	ug/kg	16.0000	33.0000	WA
2-Chloronaphthalene	EPA8270	ug/kg	1.0220	33.3300	GE
2-Chloronaphthalene	EPA8270	ug/kg	16.0000	33.0000	WA
2-Chlorophenol	EPA8270	ug/kg	2.4520	33.3300	GE
2-Chlorophenol	EPA8270	ug/kg	17.0000	33.0000	WA
2-Methyl-4,6-dinitrophenol	EPA8270	ug/kg	0.5000	10.0000	GE
2-Methyl-4,6-dinitrophenol	EPA8270	ug/kg	11.0000	165.0000	WA
2-Methylnaphthalene	EPA8270	ug/kg	1.4090	33.3300	GE
2-Methylnaphthalene	EPA8270	ug/kg	17.0000	33.0000	WA
2-Nitroaniline	EPA8270	ug/kg	2.8280	33.3300	GE
2-Nitroaniline	EPA8270	ug/kg	19.0000	165.0000	WA
2-Nitrophenol	EPA8270	ug/kg	0.8240	33.3300	GE
2-Nitrophenol	EPA8270	ug/kg	17.0000	33.0000	WA
3,3'-Dichlorobenzidine	EPA8270	ug/kg	73.0000	66.0000	WA
3,3'-Dichlorobenzidine	EPA8270	ug/kg	123.0000	33.3300	GE
3-Nitroaniline	EPA8270	ug/kg	0.8550	33.3300	GE
3-Nitroaniline	EPA8270	ug/kg	42.0000	165.0000	WA
4-Bromophenyl phenyl ether	EPA8270	ug/kg	0.8240	33.3300	GE
4-Bromophenyl phenyl ether	EPA8270	ug/kg	10.0000	33.0000	WA
4-Chloroaniline	EPA8270	ug/kg	4.5550	33.3300	GE
4-Chloroaniline	EPA8270	ug/kg	6.0000	33.0000	WA
4-Chlorophenyl phenyl ether	EPA8270	ug/kg	1.0480	33.3300	GE
4-Chlorophenyl phenyl ether	EPA8270	ug/kg	13.0000	33.0000	WA
4-Nitroaniline	EPA8270	ug/kg	3.2010	33.3300	GE

Table 4.1. Analytical Methods and Detection Limits, continued

Analyte	Method	Units	MDL	EQL	Reference
4-Nitroaniline	EPA8270	ug/kg	20.0000	165.0000	WA
4-Nitrophenol	EPA8270	ug/kg	6.5900	33.3300	GE
4-Nitrophenol	EPA8270	ug/kg	49.0000	165.0000	WA
Acenapthene	EPA8270	ug/kg	1.4820	33.3300	GE
Acenapthene	EPA8270	ug/kg	15.0000	33.0000	WA
Acenapthylene	EPA8270	ug/kg	0.7920	33.3300	GE
Acenapthylene	EPA8270	ug/kg	16.0000	33.0000	WA
Anthracene	EPA8270	ug/kg	0.3960	33.3300	GE
Anthracene	EPA8270	ug/kg	16.0000	33.0000	WA
Benzo(a)anthracene	EPA8270	ug/kg	1.1880	3.3300	GE
Benzo(a)anthracene	EPA8270	ug/kg	20.0000	33.0000	WA
Benzo(a)pyrene	EPA8270	ug/kg	0.9970	3.3300	GE
Benzo(a)pyrene	EPA8270	ug/kg	24.0000	33.0000	WA
Benzo(b)fluoranthene	EPA8270	ug/kg	0.9430	3.3300	GE
Benzo(b)fluoranthene	EPA8270	ug/kg	23.0000	33.0000	WA
Benzo(g,h,i)perylene	EPA8270	ug/kg	0.3960	33.3300	GE
Benzo(g,h,i)perylene	EPA8270	ug/kg	16.0000	33.0000	WA
Benzo(k)fluoranthene	EPA8270	ug/kg	0.9970	3.3300	GE
Benzo(k)fluoranthene	EPA8270	ug/kg	22.0000	33.0000	WA
Benzoic acid	EPA8270	ug/kg	4.2650	33.3300	GE
Benzoic acid	EPA8270	ug/kg	34.0000	165.0000	WA
Benzyl alcohol	EPA8270	ug/kg	3.0670	33.3300	GE
Benzyl alcohol	EPA8270	ug/kg	19.0000	33.0000	WA
Bis(2-chloroethoxy) methane	EPA8270	ug/kg	0.7920	33.3300	GE
Bis(2-chloroethoxy) methane	EPA8270	ug/kg	16.0000	33.0000	WA
Bis(2-chloroethyl) ether	EPA8270	ug/kg	2.6170	33.3300	GE
Bis(2-chloroethyl) ether	EPA8270	ug/kg	22.0000	33.0000	WA
Bis(2-chloroisopropyl) ether	EPA8270	ug/kg	1.0470	33.3300	GE
Bis(2-chloroisopropyl) ether	EPA8270	ug/kg	18.0000	33.0000	WA
Bis(2-ethylhexyl) phthalate	EPA8270	ug/kg	4.0510	33.3300	GE
Bis(2-ethylhexyl) phthalate	EPA8270	ug/kg	22.0000	33.0000	WA
Butyl benzyl phthalate	EPA8270	ug/kg	1.2100	33.3300	GE
Butyl benzyl phthalate	EPA8270	ug/kg	21.0000	33.0000	WA
Chrysene	EPA8270	ug/kg	0.7230	3.3300	GE
Chrysene	EPA8270	ug/kg	19.0000	33.0000	WA
Di-n-butyl phthalate	EPA8270	ug/kg	8.9100	33.3300	GE
Di-n-butyl phthalate	EPA8270	ug/kg	19.0000	33.0000	WA
Di-n-octyl phthalate	EPA8270	ug/kg	2.0950	33.3300	GE
Di-n-octyl phthalate	EPA8270	ug/kg	26.0000	33.0000	WA
Dibenzo(a,h)anthracene	EPA8270	ug/kg	0.5110	3.3300	GE
Dibenzo(a,h)anthracene	EPA8270	ug/kg	17.0000	33.0000	WA
Dibenzofuran	EPA8270	ug/kg	1.3330	33.3300	GE
Dibenzofuran	EPA8270	ug/kg	16.0000	33.0000	WA
Diethyl phthalate	EPA8270	ug/kg	1.0220	33.3300	GE
Diethyl phthalate	EPA8270	ug/kg	16.0000	33.0000	WA

Table 4.1. Analytical Methods and Detection Limits, continued

Analyte	Method	Units	MDL	EQL	Reference
Dimethyl phthalate	EPA8270	ug/kg	0.5110	33.3300	GE
Dimethyl phthalate	EPA8270	ug/kg	15.0000	33.0000	WA
Fluoranthene	EPA8270	ug/kg	0.5600	33.3300	GE
Fluoranthene	EPA8270	ug/kg	19.0000	33.0000	WA
Fluorene	EPA8270	ug/kg	1.2730	33.3300	GE
Fluorene	EPA8270	ug/kg	16.0000	33.0000	WA
Hexachlorobenzene	EPA8270	ug/kg	0.8240	3.3300	GE
Hexachlorobenzene	EPA8270	ug/kg	10.0000	33.0000	WA
Hexachlorobutadiene	EPA8270	ug/kg	1.8990	33.3300	GE
Hexachlorobutadiene	EPA8270	ug/kg	15.0000	33.0000	WA
Hexachlorocyclopentadiene	EPA8270	ug/kg	3.2970	33.3300	GE
Hexachlorocyclopentadiene	EPA8270	ug/kg	26.0000	33.0000	WA
Hexachloroethane	EPA8270	ug/kg	1.0480	3.3300	GE
Hexachloroethane	EPA8270	ug/kg	16.0000	33.0000	WA
Indeno(1,2,3-c,d)pyrene	EPA8270	ug/kg	0.8240	3.3300	GE
Indeno(1,2,3-c,d)pyrene	EPA8270	ug/kg	18.0000	33.0000	WA
Isophorone	EPA8270	ug/kg	1.1200	33.3300	GE
Isophorone	EPA8270	ug/kg	17.0000	33.0000	WA
N-Nitrosodi-n-propylamine	EPA8270	ug/kg	0.8240	33.3300	GE
N-Nitrosodi-n-propylamine	EPA8270	ug/kg	20.0000	33.0000	WA
N-Nitrosodiphenylamine	EPA8270	ug/kg	0.9430	33.3300	GE
N-Nitrosodiphenylamine	EPA8270	ug/kg	14.0000	33.0000	WA
Naphthalene	EPA8270	ug/kg	1.4090	33.3300	GE
Naphthalene	EPA8270	ug/kg	19.0000	33.0000	WA
Nitrobenzene	EPA8270	ug/kg	3.7640	33.3300	GE
Nitrobenzene	EPA8270	ug/kg	19.0000	33.0000	WA
Pentachlorophenol	EPA8270	ug/kg	11.4040	33.3300	GE
Pentachlorophenol	EPA8270	ug/kg	39.0000	165.0000	WA
Phenanthrene	EPA8270	ug/kg	0.5600	33.3300	GE
Phenanthrene	EPA8270	ug/kg	15.0000	33.0000	WA
Phenol	EPA8270	ug/kg	1.1660	33.3300	GE
Phenol	EPA8270	ug/kg	19.0000	33.0000	WA
Pyrene	EPA8270	ug/kg	0.6050	33.3300	GE
Pyrene	EPA8270	ug/kg	21.0000	33.0000	WA
m,p-Cresol	EPA8270	ug/kg	159.0000	330.0000	GE
o-Cresol (2-Methylphenol)	EPA8270	ug/kg	1.7560	33.3300	GE
o-Cresol (2-Methylphenol)	EPA8270	ug/kg	16.0000	33.0000	WA
p-cresol (4-methylphenol)	EPA8270	ug/kg	17.0000	33.0000	WA
para-Chloro-meta-cresol	EPA8270	ug/kg	1.1660	33.3300	GE
para-Chloro-meta-cresol	EPA8270	ug/kg	18.0000	33.0000	WA
Cyanide	EPA9010	mg/kg	0.0800	0.8000	WA
Total petroleum hydrocarbons	EPA9071	mg/kg	1.0700	10.7000	WA
Cation exchange capacity	EPA9081	Meq/	5.0000	5.0000	GE
Cation exchange capacity	EPA9081	Meq/	6.0000	60.0000	WA
Gross Alpha	EPIA-001B	pC/g	4.0000	4.0000	GP

Table 4.1. Analytical Methods and Detection Limits, continued

Analyte	Method	Units	MDL	EQL	Reference
Non-volatile Beta	EPIA-001B	pC/g	10.0000	10.0000	GP
Gross Alpha	LANLMLR 100MOD	pC/g	4.0000	4.0000	TM
Non-volatile Beta	LANLMLR 100MOD	pC/g	10.0000	10.0000	TM
Total Organic Carbon	LLOYD KAHN	mg/kg	8.4000	84.0000	WA
Water					
Aluminum	EPA6010	ug/L	14.5000	145.0000	WA
Antimony	EPA6010	ug/L	2.7000	27.0000	WA
Arsenic	EPA6010	ug/L	4.0000	40.0000	WA
Barium	EPA6010	ug/L	0.1800	1.8000	WA
Beryllium	EPA6010	ug/L	0.1600	1.6000	WA
Cadmium	EPA6010	ug/L	0.4700	4.7000	WA
Calcium	EPA6010	ug/L	47.1000	471.0000	WA
Chromium	EPA6010	ug/L	0.7000	7.0000	WA
Cobalt	EPA6010	ug/L	0.4500	4.5000	WA
Copper	EPA6010	ug/L	1.5000	15.0000	WA
Iron	EPA6010	ug/L	7.4000	74.0000	WA
Lead	EPA6010	ug/L	4.7000	47.0000	WA
Magnesium	EPA6010	ug/L	7.4000	74.0000	WA
Manganese	EPA6010	ug/L	0.7800	7.8000	WA
Nickel	EPA6010	ug/L	2.6000	26.0000	WA
Potassium	EPA6010	ug/L	18.7000	187.0000	WA
Selenium	EPA6010	ug/L	6.6000	66.0000	WA
Silver	EPA6010	ug/L	0.5000	5.0000	WA
Sodium	EPA6010	ug/L	28.5000	285.0000	WA
Thallium	EPA6010	ug/L	5.5000	55.0000	WA
Vanadium	EPA6010	ug/L	0.6900	6.9000	WA
Zinc	EPA6010	ug/L	5.3000	53.0000	WA
Mercury	EPA7470	ug/L	0.0700	0.7000	WA
Aldrin	EPA8081	ug/L	0.0200	0.0500	WA
Aroclor 1016	EPA8081	ug/L	0.3300	1.0000	WA
Aroclor 1221	EPA8081	ug/L	0.6700	2.0000	WA
Aroclor 1232	EPA8081	ug/L	0.3300	1.0000	WA
Aroclor 1242	EPA8081	ug/L	0.3300	1.0000	WA
Aroclor 1248	EPA8081	ug/L	0.3300	1.0000	WA
Aroclor 1254	EPA8081	ug/L	0.3300	1.0000	WA
Aroclor 1260	EPA8081	ug/L	0.3300	1.0000	WA
Dieldrin	EPA8081	ug/L	0.0300	0.1000	WA
Endosulfan I	EPA8081	ug/L	0.0200	0.0500	WA
Endosulfan II	EPA8081	ug/L	0.0100	0.1000	WA
Endosulfan sulfate	EPA8081	ug/L	0.0300	0.1000	WA

Table 4.1. Analytical Methods and Detection Limits, continued

Analyte	Method	Units	MDL	EQL	Reference
Endrin	EPA8081	ug/L	0.0300	0.1000	WA
Endrin ketone	EPA8081	ug/L	0.0300	0.1000	WA
Heptachlor	EPA8081	ug/L	0.0200	0.0500	WA
Heptachlor epoxide	EPA8081	ug/L	0.0200	0.0500	WA
Methoxychlor (mariate)	EPA8081	ug/L	0.1700	0.5000	WA
Toxaphene	EPA8081	ug/L	1.7000	5.0000	WA
alpha-Benzene hexachloride	EPA8081	ug/L	0.0200	0.0500	WA
alpha-Chlordane	EPA8081	ug/L	0.0200	0.0500	WA
beta-Benzene hexachloride	EPA8081	ug/L	0.0200	0.0500	WA
delta-Benzene hexachloride	EPA8081	ug/L	0.0200	0.0500	WA
gamma-Benzene hexachloride (Lindane)	EPA8081	ug/L	0.0200	0.0500	WA
gamma-Chlordane	EPA8081	ug/L	0.0200	0.0500	WA
p,p'-DDD	EPA8081	ug/L	0.0300	0.1000	WA
p,p'-DDE	EPA8081	ug/L	0.0300	0.1000	WA
p,p'-DDT	EPA8081	ug/L	0.0300	0.1000	WA
1,1,1-Trichloroethane	EPA8240	ug/L	0.9710	5.0000	WA
1,1,2,2-Tetrachloroethane	EPA8240	ug/L	3.4700	5.0000	WA
1,1,2-Trichloroethane	EPA8240	ug/L	2.4000	5.0000	WA
1,1-Dichloroethene	EPA8240	ug/L	1.4200	5.0000	WA
1,2-Dichloroethane	EPA8240	ug/L	1.3400	5.0000	WA
1,2-Dichloroethene (total)	EPA8240	ug/L	0.8540	5.0000	WA
1,2-Dichloropropane	EPA8240	ug/L	1.6700	5.0000	WA
1-1-Dichloroethane	EPA8240	ug/L	1.0500	5.0000	WA
2-Butanone (MEK)	EPA8240	ug/L	2.8100	10.0000	WA
2-Hexanone	EPA8240	ug/L	3.7700	10.0000	WA
4-Methyl-2-pentanone	EPA8240	ug/L	3.2900	10.0000	WA
Acetone	EPA8240	ug/L	4.0400	10.0000	WA
Benzene	EPA8240	ug/L	0.7520	5.0000	WA
Bromodichloromethane	EPA8240	ug/L	1.7400	5.0000	WA
Bromoform	EPA8240	ug/L	2.9300	5.0000	WA
Bromomethane (methyl bromide)	EPA8240	ug/L	2.0100	10.0000	WA
Carbon disulfide	EPA8240	ug/L	1.7100	5.0000	WA
Carbon tetrachloride	EPA8240	ug/L	0.9710	5.0000	WA
Chlorobenzene	EPA8240	ug/L	1.7400	5.0000	WA
Chlorodibromomethane	EPA8240	ug/L	2.5300	5.0000	WA
Chloroethane	EPA8240	ug/L	2.0600	10.0000	WA
Chloroform	EPA8240	ug/L	1.1100	5.0000	WA
Chloromethane (methyl chloride)	EPA8240	ug/L	3.2000	10.0000	WA
Dichloromethane (methylene chloride)	EPA8240	ug/L	1.8300	5.0000	WA
Ethylbenzene	EPA8240	ug/L	1.4700	5.0000	WA
Styrene	EPA8240	ug/L	1.9800	5.0000	WA
Tetrachloroethene	EPA8240	ug/L	1.1700	5.0000	WA
Toluene	EPA8240	ug/L	1.4500	5.0000	WA

Table 4.1. Analytical Methods and Detection Limits, continued

Analyte	Method	Units	MDL	EQL	Reference
Trichloroethene (TCE)	EPA8240	ug/L	2.0900	5.0000	WA
Vinyl acetate	EPA8240	ug/L	5.4800	10.0000	WA
Vinyl chloride	EPA8240	ug/L	2.4700	10.0000	WA
Xylenes (total)	EPA8240	ug/L	1.5300	5.0000	WA
cis-1,3-Dichloropropene	EPA8240	ug/L	1.7900	5.0000	WA
trans-1,3-Dichloropropene	EPA8240	ug/L	2.0800	5.0000	WA
1,1,1-Trichloroethane	EPA8260	ug/L	0.0220	0.0500	GE
1,1,2,2-Tetrachloroethane	EPA8260	ug/L	0.0120	0.0500	GE
1,1,2-Trichloroethane	EPA8260	ug/L	0.0170	0.0500	GE
1,1-Dichloroethene	EPA8260	ug/L	0.0180	0.0500	GE
1,2-Dichloroethane	EPA8260	ug/L	0.0150	0.0500	GE
1,2-Dichloroethene (total)	EPA8260	ug/L	0.0300	0.1000	GE
1,2-Dichloropropane	EPA8260	ug/L	0.0150	0.0500	GE
1-1-Dichloroethane	EPA8260	ug/L	0.0170	0.0500	GE
2-Butanone (MEK)	EPA8260	ug/L	0.1400	1.0000	GE
2-Hexanone	EPA8260	ug/L	0.1940	1.0000	GE
4-Methyl-2-pentanone	EPA8260	ug/L	0.2040	1.0000	GE
Acetone	EPA8260	ug/L	3.1680	5.0000	GE
Benzene	EPA8260	ug/L	0.0170	0.5000	GE
Bromodichloromethane	EPA8260	ug/L	0.0120	0.0500	GE
Bromoform	EPA8260	ug/L	0.0120	0.0500	GE
Bromomethane (methyl bromide)	EPA8260	ug/L	0.0260	0.1000	GE
Carbon disulfide	EPA8260	ug/L	0.1290	1.0000	GE
Carbon tetrachloride	EPA8260	ug/L	0.0120	0.0500	GE
Chlorobenzene	EPA8260	ug/L	0.0120	0.0500	GE
Chlorodibromomethane	EPA8260	ug/L	0.0170	0.0500	GE
Chloroethane	EPA8260	ug/L	0.0250	0.1000	GE
Chloroform	EPA8260	ug/L	0.0170	0.0500	GE
Chloromethane (methyl chloride)	EPA8260	ug/L	0.0240	0.1000	GE
Dichloromethane (methylene chloride)	EPA8260	ug/L	0.2940	0.5000	GE
Ethylbenzene	EPA8260	ug/L	0.0150	0.0500	GE
Styrene	EPA8260	ug/L	0.0170	0.0500	GE
Tetrachloroethene	EPA8260	ug/L	0.0260	0.0500	GE
Toluene	EPA8260	ug/L	0.0440	0.5000	GE
Trichloroethene (TCE)	EPA8260	ug/L	0.0170	0.0500	GE
Vinyl acetate	EPA8260	ug/L	0.1420	1.0000	GE
Vinyl chloride	EPA8260	ug/L	0.0150	0.1000	GE
Xylenes (total)	EPA8260	ug/L	0.0600	0.1500	GE
cis-1,3-Dichloropropene	EPA8260	ug/L	0.0120	0.0500	GE
trans-1,3-Dichloropropene	EPA8260	ug/L	0.0150	0.0500	GE
1,2,4-Trichlorobenzene	EPA8270	ug/L	0.6000	10.0000	WA
1,2-Dichlorobenzene	EPA8270	ug/L	0.6000	10.0000	WA
1,3-Dichlorobenzene	EPA8270	ug/L	0.6000	10.0000	WA
1,4-Dichlorobenzene	EPA8270	ug/L	0.6000	10.0000	WA

Table 4.1. Analytical Methods and Detection Limits, continued

Analyte	Method	Units	MDL	EQL	Reference
2,4,5-Trichlorophenol	EPA8270	ug/L	0.4000	50.0000	WA
2,4,6-Trichlorophenol	EPA8270	ug/L	0.3000	10.0000	WA
2,4-Dichlorophenol	EPA8270	ug/L	0.5000	10.0000	WA
2,4-Dimethyl phenol	EPA8270	ug/L	0.8000	10.0000	WA
2,4-Dinitrophenol	EPA8270	ug/L	3.0000	50.0000	WA
2,4-Dinitrotoluene	EPA8270	ug/L	0.5000	10.0000	WA
2,6-Dinitrotoluene	EPA8270	ug/L	0.5000	10.0000	WA
2-Chloronaphthalene	EPA8270	ug/L	0.5000	10.0000	WA
2-Chlorophenol	EPA8270	ug/L	0.7000	10.0000	WA
2-Methyl-4,6-dinitrophenol	EPA8270	ug/L	0.7000	50.0000	WA
2-Methylnaphthalene	EPA8270	ug/L	0.6000	10.0000	WA
2-Nitroaniline	EPA8270	ug/L	1.0000	50.0000	WA
2-Nitrophenol	EPA8270	ug/L	0.7000	10.0000	WA
3,3'-Dichlorobenzidine	EPA8270	ug/L	10.0000	30.0000	WA
3-Nitroaniline	EPA8270	ug/L	0.6000	50.0000	WA
4-Bromophenyl phenyl ether	EPA8270	ug/L	0.4000	10.0000	WA
4-Chloroaniline	EPA8270	ug/L	3.0000	10.0000	WA
4-Chlorophenyl phenyl ether	EPA8270	ug/L	0.5000	10.0000	WA
4-Nitroaniline	EPA8270	ug/L	1.0000	50.0000	WA
4-Nitrophenol	EPA8270	ug/L	1.0000	50.0000	WA
Acenapthene	EPA8270	ug/L	0.5000	10.0000	WA
Acenapthylene	EPA8270	ug/L	1.0000	10.0000	WA
Anthracene	EPA8270	ug/L	0.4000	10.0000	WA
Benzo(a)anthracene	EPA8270	ug/L	0.5000	10.0000	WA
Benzo(a)pyrene	EPA8270	ug/L	0.6000	10.0000	WA
Benzo(b)fluoranthene	EPA8270	ug/L	1.0000	10.0000	WA
Benzo(g,h,i)perylene	EPA8270	ug/L	0.8000	10.0000	WA
Benzo(k)fluoranthene	EPA8270	ug/L	0.8000	10.0000	WA
Benzoic acid	EPA8270	ug/L	6.0000	50.0000	WA
Benzyl alcohol	EPA8270	ug/L	1.0000	10.0000	WA
Bis(2-chloroethoxy) methane	EPA8270	ug/L	1.0000	10.0000	WA
Bis(2-chloroethyl) ether	EPA8270	ug/L	0.8000	10.0000	WA
Bis(2-chloroisopropyl) ether	EPA8270	ug/L	3.0000	10.0000	WA
Bis(2-ethylhexyl) phthalate	EPA8270	ug/L	1.0000	10.0000	WA
Butyl benzyl phthalate	EPA8270	ug/L	1.0000	10.0000	WA
Chrysene	EPA8270	ug/L	0.5000	10.0000	WA
Di-n-butyl phthalate	EPA8270	ug/L	0.9000	10.0000	WA
Di-n-octyl phthalate	EPA8270	ug/L	0.9000	10.0000	WA
Dibenzo(a,h)anthracene	EPA8270	ug/L	1.0000	10.0000	WA
Dibenzofuran	EPA8270	ug/L	0.5000	10.0000	WA
Diethyl phthalate	EPA8270	ug/L	0.6000	10.0000	WA
Dimethyl phthalate	EPA8270	ug/L	0.6000	10.0000	WA
Fluoranthene	EPA8270	ug/L	0.4000	10.0000	WA
Fluorene	EPA8270	ug/L	0.4000	10.0000	WA
Hexachlorobenzene	EPA8270	ug/L	0.4000	10.0000	WA

Table 4.1. Analytical Methods and Detection Limits, continued

Analyte	Method	Units	MDL	EQL	Reference
Hexachlorobutadiene	EPA8270	ug/L	0.6000	10.0000	WA
Hexachlorocyclopentadiene	EPA8270	ug/L	0.2000	10.0000	WA
Hexachloroethane	EPA8270	ug/L	0.6000	10.0000	WA
Indeno(1,2,3-c,d)pyrene	EPA8270	ug/L	0.9000	10.0000	WA
Isophorone	EPA8270	ug/L	1.0000	10.0000	WA
N-Nitrosodi-n-propylamine	EPA8270	ug/L	1.0000	10.0000	WA
N-Nitrosodiphenylamine	EPA8270	ug/L	1.0000	10.0000	WA
Naphthalene	EPA8270	ug/L	0.7000	10.0000	WA
Nitrobenzene	EPA8270	ug/L	0.8000	10.0000	WA
Pentachlorophenol	EPA8270	ug/L	1.0000	50.0000	WA
Phenanthrene	EPA8270	ug/L	0.4000	10.0000	WA
Phenol	EPA8270	ug/L	0.8000	10.0000	WA
Pyrene	EPA8270	ug/L	0.4000	10.0000	WA
o-Cresol (2-Methylphenol)	EPA8270	ug/L	0.7000	10.0000	WA
p-cresol (4-methylphenol)	EPA8270	ug/L	0.6000	10.0000	WA
para-Chloro-meta-cresol	EPA8270	ug/L	0.4000	10.0000	WA
Gross Alpha	EPA900.0 MOD	pC/L	1.5000	1.5000	TM
Non-volatile Beta	EPA900.0 MOD	pC/L	2.0000	2.0000	TM
Cyanide	EPA9010	ug/L	1.5200	15.2000	WA
Cyanide	EPA9010A	ug/L	1.5200	15.2000	WA

4.6 PERFORMANCE REVIEWS

4.6.1 ROY F. WESTON, INC. OF LIONVILLE, PENNSYLVANIA

The annual audit of RFW was conducted October 3-4, 1995. The purpose of this review was to evaluate the effectiveness of RFW's QC program in producing precise, accurate, and defensible data during the analysis of SRS samples. RFW is one of the major subcontractors of the EMS groundwater monitoring and RCRA Facility Investigation/Remedial Investigation (RFI/RI) soil programs.

RFW has strengthened its quality management program, and its staff's technical strength has been instrumental in addressing the corrective actions required on WSRC's 1994 findings and observations.

Previous audit results, corrective actions, and nonconformance reports will be reviewed as appropriate by the team and incorporated as they apply to the scope of the audit.

The 1995 audit of RFW resulted in three findings, seven observations, and five noteworthy practices.

A finding is defined as a nonconformance to the written requirements. A finding may be a lack of objective evidence of compliance or incomplete and/or unacceptable evidence of compliance. A finding should result in a direct corrective action by the laboratory.

An observation is defined as an opinion of the auditor(s). An observation may enhance safety, productivity, and reliability, or prevent potential problems. Observations should initiate an action by the laboratory to achieve best management practices (BMPs).

A noteworthy practice is one performed by the laboratory that is not required by any regulations, but that enhances the quality of laboratory's data.

A. Findings

Finding #1:

The following are deficiencies found in the metals laboratory (building 256):

- Metal standards prepared on 09/27/95 for the graphite atomic absorption furnace were not in the standard prep log. Also, containers in which the standards were stored were incorrectly dated.

- Samples sometimes are weighed out before the balance has been calibrated for the day. Samples are being weighed out to one place past the decimal (see batch #95L6035).

Finding # 2:

The following are deficiencies found in the wet chemistry laboratory (building 208):

- A wavelength check of the Lambda III UV/VIS spectrophotometer was not performed (due 09/09/95).

- The Lambda III UV/VIS spectrophotometer was not promptly labeled with a conditional tag.

- EMS total inorganic carbon QA blanks during 1995 showed higher values when compared with laboratory blanks, which indicates problems with conforming to RFW's QC practices.

Finding # 3:

Deficiencies were found, as follows, in RFW's newly implemented Operating Practice Change Form for controlling its standard operating procedures (SOPs):

- WSRC not getting copies of all affected procedures,
- not meeting 24-hour approval requirements,
- no time period defined to incorporate into existing procedure, and
- not all employees aware of system.

B. Observations:

Observation #1:

The following are observations/recommendations found in the metals laboratory (building 256):

- Standards and continuing calibration blanks (CCBs) were prepared using single deionized water; method blanks and sample dilutions were prepared using double deionized water.
- Hoods in building 256 were tested for air flow measurements, but have not been posted.

Observation #2:

The following are observations/recommendations found in wet chemistry laboratory (building 208):

- The use of old standards prepared from salts to confirm new standards is not recommended (see phosphorus).

Observation #3:

Three times during the audit, unattended balances were found with the sliding door left open.

Observation #4:

The following are observations/recommendations found in sample receiving laboratory (building 208):

- The lock on the sample receiving gate was not engaged, and no RFW personnel were in the immediate area.
- The sample storage area does not have controls for the separation of samples containing known high concentrations of analytes from unknown levels of the same analytes.

Observation #5:

Items that could be construed as uncontrolled operator aids were found in the laboratory bench areas.

Observation #6:

Problems were identified with the latest performance samples (WP-WS studies), wet-analysis pH, alkalinity, sulfate, residual chlorine, nitrate, and metals. Sodium was missed in all four studies.

C. Noteworthy Practices

Noteworthy Practice #1:

There was overall improvement in RFW's QA/QC program, specifically in internal audits, corrective action practices for open findings and observations, training documentation, and successful completion of corrective actions to close WSRC's 1994 audit findings.

Noteworthy Practice #2:

Control charts are being maintained using T-graphs, which provides instant access by laboratory personnel.

Noteworthy Practice #3:

Old chemicals were cleared out of the chemical cabinet in the wet chemistry laboratory.

Noteworthy Practice #4:

RFW has improved its labeling of potential hazardous waste during the handling of sample residues in its sample receiving area.

Noteworthy Practice #5:

There was overall improvement in RFW's documentation of technicians' training.

4.6.2 General Engineering Laboratories, Inc. of Charleston, South Carolina

The annual audit of GEL was conducted on September 12-14, 1995. GEL is one of the major subcontractors of the EMS Groundwater Monitoring programs and RFI/RI soil programs. This laboratory performs both radiological and non-radiological analyses.

The purpose of this review was to evaluate the effectiveness of the GEL QC program in producing precise, accurate, and defensible data during the analysis of samples.

Previous audit results, corrective actions, and nonconformance reports will be reviewed as appropriate by the team and incorporated as they apply to the scope.

The 1995 audit of GEL resulted in two findings, four observations, and seven noteworthy practices.

A finding is defined as a nonconformance of the written requirements. A finding may be a lack of objective evidence of compliance or incomplete and/or unacceptable evidence of compliance. A finding should result in a direct corrective action by the laboratory.

An observation is defined as an opinion of the auditor(s). An observation may enhance safety, productivity, reliability, or prevent potential problems. Observations should initiate an action by the laboratory to achieve BMPs.

A noteworthy practice is defined as a practice performed by the laboratory that is not required by any regulations, but when executed enhances the quality of laboratory data.

A. Findings

Finding #1:

A unit conversion error in two sets of reported data for tritium analysis during the first and second quarters in 1995 was discovered by WSRC personnel. GEL was notified of the error. The laboratory investigated the problem and verified that an error had been made. However, a formal Nonconformance Report (NCR) was not issued, nor was corrective action performed according to the GEL QC plan.

Finding #2:

The following are deficiencies found in the organic laboratory's procedures:

- The analytical control limits for the method are not adequately stated or controlled in SOP GL-OA-E018, Sec. 5.4. This is inconsistent with other laboratory procedures.
- The instrument maintenance section of the SOP for the gas chromatograph (GL-OA-E-008 & 009, Sec 13.0) states to change the oil at six month intervals, but the laboratory practice is to change it as the QC samples indicate potential problems, which may be shorter or longer than six months.
- SOP GL-OA-E-009 does not address the corrective action of diluting when the sample concentration is out of the dynamic range.
- An out-of-service gas chromatograph/mass spectrometer (GC/MS) was not tagged to prevent analysts from trying to operate it. The SOPs for the method did not describe actions to take to identify out-of-service/out-of-calibration equipment.

B. Observations

Observation #1:

The use of control charts or analytical trend analysis is not performed within some sections of GEL.

Observation #2:

The following are observations and/or recommendations found in the organic laboratories:

- The cross reference in SOP GL-OA-E-009, Rev. 2/4/93, to the extraction procedures was inaccurate.
- SOP GL-OA-E-008 defines the analytical standard to a certain manufacturer's product. The analytical SOPs could be revised to state requirements for chemicals and standard reference materials and/or which manufacturer GEL finds acceptable.

Observation #3:

The following are observations and/or recommendations found in the radiochemistry laboratories:

- Master lists are not used for radiological parameters and limits/criteria for calibration checks and acceptance. No procedure was in place for when or how to remove an instrument from service when out-of-control calibration conditions exist.

- Schedules for instrument maintenance within the radiochemistry laboratory need to be established (under development).

- Security levels of authority for changes of hardware, software, and data files or tables are not controlled by an internal SOP.

- The current gamma and alpha spectroscopy software version is needed for best operation and bug fixes. No background region checks for alpha spectroscopy were being performed.

Observation #4:

The following are observations or recommendations for the inorganic and wet chemistry laboratories:

- The appearance of the labels for reagent bottles could be improved with the use of standardized paper labels that include identification, concentration, date prepared, prepared by, expiration date, and logbook ID. An in-house hazard warning label, as per the Hazard Communication Standard, should be implemented when appropriate.

- The laboratory may want to consider instituting a program for independent verification of the de-ionized water used within GEL for specific conductivity, metals, and organics once or twice yearly.

- The stability of the balances in the total suspended and dissolved solids laboratory could be improved by relocating them away from the drying ovens.

NOTE: Plans for this action have already been identified.

- The quality control program in the general chemistry/wet chemistry laboratory could be enhanced by the use of external sources for laboratory control samples (LCSs). (Total solids, total suspended solids, total dissolved solids, turbidity, conductivity, COD, and pH standards are available commercially.)

- The laboratory control sample for the determination of pH should be something other than 7.0 which is typically a calibration point. The use of 7.0 as a continuing calibration check point is a good practice to ensure sample bracketing between 5 and 9.

C. Noteworthy Practices

Noteworthy Practice #1:

GEL was successful in completing the corrective actions required to close the 1994 WSRC annual audit findings, including the internal assessment by the GEL QA/QC group.

Noteworthy Practice #2:

The GEL staff's technical strengths and quality management are instrumental in achieving a fast turnaround time for the analysis of WSRC samples, with data having a high level of quality.

Noteworthy Practice #3:

The laboratory has implemented a lockout mechanism for the radiological section to keep data from going to the laboratory information management system (LIMS) database when an instrument is out of control.

Noteworthy Practice #4:

The laboratory has implemented spreadsheet programs to compile and check QA data for the radiological section.

Noteworthy Practice #5:

The laboratory has allocated a single person to be responsible for dispensing samples throughout the laboratory whenever possible. This feature is an added strength in maintaining and defending sample integrity.

Noteworthy Practice #6:

Incorporating the refrigerated storage controls to the burglar alarm for immediate response when personnel are not monitoring the system is noteworthy.

Noteworthy Practice #7:

Providing for cross training of personnel is noteworthy.

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5.0 DATA MANAGEMENT/ADMINISTRATIVE FILES

This section discusses the generation, processing, and storage of hard copy and computer records produced as part of this project. The processing of materials followed methodology prescribed by the EGG of EPD/EMS.

EGG has established administrative files that are maintained as permanent SRS records for each project. The following records were placed in the administrative files:

- bound sample collection logbooks,
- original copies of the COC records,
- case narratives from the laboratories,
- Data Review Logbook,
- copies of all correspondence between the data validation personnel and the laboratories, and
- data entry cover sheets for data files created by EGG.

Computer data files were generated from hard copy records using double-entry methods to ensure a very low transcription error rate. Analytical data files were also received from the laboratories. Proposed changes to the data were recorded in the Data Review Logbook, made to a copy of the data, and then confirmed by running a computer comparison of the modified and original data files. EGG stores the final computer data files, the original source files, and computer listings of all changes made to the original files in the administrative files.

Access to the data and administrative files is available through the manager of EGG. The administrative files will be maintained within EGG control until they are placed in long-term, permanent storage. EGG plans to have the final data files available for SRS computer users indefinitely. Please contact the manager of EGG to obtain access to this data.

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6.0 VALIDATION AND VERIFICATION

6.1 OBJECTIVE

Definitive data, as defined in Data Quality Objectives Process for Superfund, *QA/QC Guidance for Removal Activities*, and analytical quality level 3, as defined in *Data Quality Objectives for Remedial Response Activities*, have been determined most appropriate to meet the DQOs of this investigation. Validation and verification activities assessed the data in relation to these standards, especially with regard to the following:

- sample documentation,
- maintenance of COC,
- adherence to sample holding time and preservation,
- achievement of contract-required detection limits,
- analytical instrument calibration,
- analyte identification, and
- analyte quantitation.

Evaluation of each laboratory's performance for analyte identification and quantitation included examination of the following:

- analytical error,
- contamination of blanks, and
- laboratory performance in the analysis of independent standards.

6.2 DEFINITIONS OF QUALIFIER CODES

Each analytical record in the computer data files contains three qualifier fields: result qualifier (RQ), analysis qualifier (AQ), and bias qualifier (BQ). The result qualifier describes the analytical result. The analysis qualifier describes why result qualifiers are present, and the bias qualifier describes whether the result is biased high or low. The laboratory uses these fields in reporting the data. During validation and verification of analytical data, additional qualifiers may be applied to provide information about data quality.

Definitions of the qualifiers used in the data files may be found in Appendix D. See Subsection 6.3, "Qualification Policy and Findings," for details on application of these qualifiers during validation and verification.

6.3 QUALIFICATION POLICY AND FINDINGS

This section describes the EPD/EMS data validation policy for assigning qualifiers to analytical data, and summarizes the data qualified based on this policy. The qualification policy is based on the *U.S. EPA Contract Laboratory Program Statement of Work* (CLP SOW), *U.S. EPA CLP National Functional Guidelines for Inorganic and Organic Data Review* (Functional Guidelines 2/94), Data Quality Objectives Process for Superfund, Westinghouse Hanford company's Data Validation Procedures for Radiochemical Analyses, and contract-specific WSRC requirements.

Qualification criteria for instrument calibration, analyte identification, and analyte quantitation are given in the EMS informal "Procedures for Qualifying Data Based on LDRRs."

The data are final and data validation is complete. All problems detected during validation and verification were documented, and if possible, resolved as a result of communication with the samplers and laboratories during the data validation and verification process. Changes made to the data are recorded in the project's Data Review Logbook. QA/QC anomalies identified in the data were qualified according to the guidelines policy, described in the following subsections.

6.3.1 Holding Times

Criteria: Each analysis was evaluated according to U.S. EPA holding time limits for preparation (extraction/digestion) and analysis. The following holding time limits were applied to both water and soil matrices:

Determination	Extraction/Digestion	Analysis
TCL Volatiles (water)	NA	14 days from collection
TCL Volatiles (soil)	NA	14 days from collection
TCL Semivolatiles (water)	7 days from collection	40 days from extraction
TCL Semivolatiles (soil)	14 days from collection	40 days from extraction
TCL Pesticides/PCBs (water)	7 days from collection	40 days from extraction
TCL Pesticides/PCBs (soil)	14 days from collection	40 days from extraction
TAL Metals	NA	180 days from collection
Mercury	NA	28 days from collection
Cyanide	NA	14 days from collection
Total Organic Carbon (water)	NA	28 days from collection
Total Organic Carbon (soil)	NA	28 days from collection
Cation Exchange Capacity	N/A	N/A
Herbicides (water)	7 days from collection	40 days from extraction
Herbicides (soil)	14 days from collection	40 days from extraction
Total Petroleum Hydrocarbons	NA	28 days from collection
Radiochemical	NA	180 days from collection

Action: Assign RQ = *J* and AQ = *Q* to all analytes in all samples where a holding time exceedance exists.

Findings: Based on holding time exceedances, 69 analytical records were qualified. The holding time exceedances were assigned by the laboratory based on samples that were reanalyzed out of holding. See Section 6.5, "Review of the Analytical Narratives," for further information.

6.3.2 SAMPLE PRESERVATION

Criteria for Soil Samples: Soil samples submitted for mercury, metals, and cyanide (TAL inorganics), TCL VOAs, TCL SVOAs, pesticides/PCBs, and herbicides determinations require refrigeration at 4°C ± 2°C.

Soil samples submitted for TPH determinations require no preservation. However, refrigeration at 4°C ± 2°C is recommended.

Soil samples submitted for TOC and CEC determinations require refrigeration at 4°C ± 2°C.

Refrigeration of soil samples submitted for gross alpha, non-volatile beta, uranium, gamma pulse height analysis (PHA), radium, radium-228, americium-241, carbon-14, iodine-129, plutonium series, technetium-99, radium-226, uranium series, cesium-137, strontium-90, neptunium-237, curium series, nickel-59, and thorium series determinations is not necessarily required, but is recommended.

Criteria for Water Samples: Water samples submitted for TAL metals and mercury determinations require acidification with nitric acid to pH less than 2 and refrigeration at 4°C ± 2°C.

Water samples submitted for cyanide determinations require the addition of sodium hydroxide to pH greater than 12 and refrigeration at 4°C ± 2°C.

Water samples submitted for TCL VOA determinations require acidification with hydrochloric acid to pH less than 2 and refrigeration at 4°C ± 2°C.

Water samples submitted for TPH determinations require acidification with sulfuric acid to pH less than 2 and refrigeration at 4°C ± 2°C.

Water samples submitted for TOC determinations require acidification with hydrochloric acid or sulfuric acid to pH less than 2 and refrigeration at 4°C ± 2°C. In addition, the sample containers should have zero headspace.

Although there are no preservation requirements for CEC, refrigeration at 4°C ± 2°C is recommended.

Refrigeration at 4°C ± 2°C is required for water samples submitted for the analysis of TCL SVOAs and pesticides/PCBs.

At a minimum, water samples submitted for gross alpha, non-volatile beta, and gamma PHA determinations require acidification with nitric acid to pH less than 2. Although not required, refrigeration at 4°C ± 2°C is recommended for water samples submitted for other radiochemical analyses.

Action: Assign AQ = *Y* to results that have nonconformances.

Findings: The sample preservation for all analyses was validated based on the criteria specified above. The analysis qualifier *Y* was assigned if the temperature of the cooler in which the soil and water samples were shipped exceeded 6°C upon receipt at the laboratory. No analytical records were qualified based on sample preservation criteria.

6.3.3 Instrument Calibration, Analyte Identification, and Analyte Quantitation

Criteria: Criteria specific to each method were used to evaluate instrument calibration during the LDRR.

Action: When criteria are not met, the following qualifiers may be assigned: AQ = *L, M,* or *Z* and RQ = *J* or *R* for detects and *UJ* or *R* for non-detects.

Findings: No analytical records were qualified based on calibration criteria.

6.3.4 Trip Blanks

Criteria: CLP 5×/10× rule.

Action: If an analyte is detected in a trip blank, qualify the analyte in the trip blank with an AQ = *8*.

If an analyte detected in a trip blank is also detected in an associated sample, qualify the analyte in the sample with AQ = *8*.

If a detected analyte's concentration in a sample is less than 5× the concentration in the trip blank (less than 10× for common laboratory contaminants), qualify the analyte in the sample with RQ = *U*. Common laboratory contaminants include acetone, methylene chloride, and 2-butanone (MEK).

Associated samples are samples that are shipped in the same cooler as the trip blank. If cooler numbers were not recorded for a shipment, then the samples that are shipped on the same day as the trip blank are considered to be associated.

Findings: Five analytical records were qualified based on trip blank evaluation. See Section 7, "Discussion", for details on analytes detected in trip blanks.

6.3.5 FIELD BLANKS

Criteria: CLP 5×/10× rule.

Action: If an analyte is detected in a field blank, all samples that are associated with that sampling event are considered for qualification. If an analyte is detected in a field blank, qualify the analyte in the field blank with an AQ = *6*. Assign RQ = *U* and AQ = *6* to the detected analyte(s) in the associated samples where its concentration is less than 5× the concentration in the field blank (less than 10× for common laboratory contaminants). Common laboratory contaminants include acetone, methylene chloride, and 2-butanone (MEK). For AMSSB1, no qualification was done based on field blanks.

6.3.6 RINSATE BLANKS

Criteria: CLP 5×/10× rule.

Action: If an analyte is detected in a rinsate blank, all samples associated with that rinsate blank are considered for qualification. If an analyte is detected in a rinsate blank, qualify the analyte in the rinsate blank with an AQ = *7*. Assign RQ = *U* and AQ = *7* to the detected analyte(s) in the associated samples where its concentration is less than 5× the concentration in the rinsate blank (less than 10× for common laboratory contaminants). Common laboratory contaminants include acetone, methylene chloride, and 2-butanone (MEK). For AMSSB1, no qualification was done based on rinsate blanks.

6.3.7 METHOD BLANKS

Criteria: CLP 5×/10× rule. This rule applies to both non-radiochemical and radiochemical analyses. *Functional Guidelines 2/94*.

Action: If an analyte is detected in a method, blank, assign AQ = *V* to that analyte in the method blank. For samples in the same preparation batch, including quality control duplicate samples, assign AQ = *V* only to those samples where the analyte was detected. If the analyte concentration in a sample is <5× that in the method blank (<10× for common laboratory contaminants), assign RQ = *U* to the analyte in the sample. Common laboratory contaminants include acetone, methylene chloride, and 2-butanone (MEK).

Findings: Three hundred and twenty-five analytical results were qualified based on method blank evaluation. See Section 7, "Discussion", for details on analytes detected in method blanks.

6.3.8 FIELD DUPLICATES

No qualification was done based on field duplicate results.

6.3.9 LABORATORY DUPLICATES

Criteria: Inorganics: *Functional Guidelines* 2/94, pages 25-26.
Radiochemical: *Data Validation Procedures for Radiochemical Analyses.*

Action: For soil samples, if a duplicate analysis RPD exceeds criteria, assign AQ = *X* to the failed analyte(s) in the duplicate and its parent sample.

For water samples, if the RPD for a particular analyte is outside acceptance limits, assign RQ = *J* and AQ = *X* to that analyte in the parent and duplicate sample, and AQ = *X* to the failed analyte in every sample in the same preparation batch.

Findings: Thirty-seven analytical results were qualified based on laboratory duplicate evaluation.

6.3.10 MATRIX SPIKES

Criteria: In assigning qualifiers based on matrix spikes recovery, the following criteria were applied:

Volatiles:	CLP SOW OLM01.0, Table 7, page D-55/VOA
Semivolatiles:	CLP SOW OLM01.0, Table 7, page D-59/SV
Pesticides/PCBs:	CLP SOW OLM01.0, page D-61/PEST
Inorganics:	*Functional Guidelines* 2/94, pages 27-29
Herbicides:	acceptable recovery = 50-150%
Radiochemical:	acceptable recovery = 75-125% (following *Data Validation Procedures for Radiochemical Analyses*).

Action: Matrix spike recovery limits do not apply when the sample concentration is greater than four times the spike concentration. The spiked sample was flagged with RQ = *R* and AQ = *5*.

Matrix spike analysis for water samples: Each spike analyte in which the percent recovery was outside the acceptance limits was flagged in the spike sample, and the parent sample with a result qualifier, an analysis qualifier, and a bias qualifier.

Matrix spike analysis for soil samples: Each spike analyte in which the percent recovery was outside the acceptance limits was flagged in the spike sample and the original sample with a result qualifier, an analysis qualifier, and a bias qualifier as indicated below.

When a matrix spike analysis was not performed for each preparation batch, all samples in that preparation batch were flagged with an analysis qualifier.

AQ: *I*

RQ: *J* - for detects *UJ* - for non-detects
R - for non-detects in which spike recovery was:
<10% (Radiochemical) <30% (Inorganics)

BQ: *H* - for consistent spike recoveries above acceptance limits
L - for consistent spike recoveries below acceptance limits

Findings: Twenty analytical records were qualified for matrix spike recoveries outside acceptance limits. Percent recoveries for matrix spikes are shown in Table 6.1.

6.3.11 Laboratory Control Samples and Blank Spikes

Criteria: In assigning qualifiers based on LCS and blank spikes, the following criteria were applied:

Organics: Same as matrix spike criteria
Inorganics: *Functional Guidelines* 2/94, pages 27-29
Radiochemical: 80-120% recovery
Data Validation Procedures for Radiochemical Analyses.

Action: Assign AQ = *C* to the failed analyte(s) in the LCS or blank spike. Assign RQ = *J* and AQ = *C* to the failed analyte(s) in every sample in the same preparation batch as the LCS or blank spike.

Findings: Thirty-three analytical records were qualified on the basis of LCS or blank spike recoveries. Additional issues regarding LCS or blank spike recoveries are discussed in Section 6.6, "Laboratory Data Records Review."

Table 6.1. Percent Recoveries for Matrix Spikes

Sample ID	Laboratory ID	Method	Analyses	Type of Spike	Percent Recovery
102663	9604L893-001 S	EPA8240	1,2-Dichloroethane-d4	Surrogate Spike	101.0
102663	9604L893-001 S	EPA8270	2,4,6-Tribromophenol (surr)	Surrogate Spike	80.0
102663	9604L893-001 S	EPA8270	2-Fluorobiphenyl	Surrogate Spike	67.4
102663	9604L893-001 S	EPA8270	2-Fluorophenol	Surrogate Spike	66.1
102663	9604L893-001 S	EPA8081	Aldrin	Matrix Spike	70.0
102663	9604L893-001 S	EPA6010	Aluminum	Matrix Spike	
102663	9604L893-001 S	EPA6010	Antimony	Matrix Spike	79.8
102663	9604L893-001 S	EPA6010	Arsenic	Matrix Spike	93.2
102663	9604L893-001 S	EPA6010	Barium	Matrix Spike	93.2
102663	9604L893-001 S	EPA6010	Beryllium	Matrix Spike	93.2
102663	9604L893-001 S	EPA6010	Cadmium	Matrix Spike	96.9
102663	9604L893-001 S	EPA6010	Calcium	Matrix Spike	
102663	9604L893-001 S	EPA6010	Chromium	Matrix Spike	110.0
102663	9604L893-001 S	EPA6010	Cobalt	Matrix Spike	90.9
102663	9604L893-001 S	EPA6010	Copper	Matrix Spike	94.9
102663	9604L893-001 S	EPA8081	Decachlorobiphenyl	Surrogate Spike	76.0
102663	9604L893-001 S	EPA8081	Dieldrin	Matrix Spike	58.0
102663	9604L893-001 S	EPA8081	Endrin	Matrix Spike	78.0
102663	9604L893-001 S	EPA8081	Heptachlor	Matrix Spike	70.0
102663	9604L893-001 S	EPA6010	Iron	Matrix Spike	
102663	9604L893-001 S	EPA6010	Lead	Matrix Spike	101.0
102663	9604L893-001 S	EPA6010	Magnesium	Matrix Spike	94.7
102663	9604L893-001 S	EPA6010	Manganese	Matrix Spike	
102663	9604L893-001 S	EPA6010	Nickel	Matrix Spike	93.2
102663	9604L893-001 S	EPA8270	Nitrobenzene-d5	Surrogate Spike	56.2
102663	9604L893-001 S	EPA8270	Phenol-d5	Surrogate Spike	67.9
102663	9604L893-001 S	EPA6010	Potassium	Matrix Spike	97.6
102663	9604L893-001 S	EPA6010	Selenium	Matrix Spike	92.7
102663	9604L893-001 S	EPA6010	Silver	Matrix Spike	87.3
102663	9604L893-001 S	EPA6010	Sodium	Matrix Spike	91.7
102663	9604L893-001 S	EPA8081	Tetrachloro-m-xylene	Surrogate Spike	65.0
102663	9604L893-001 S	EPA6010	Thallium	Matrix Spike	91.9
102663	9604L893-001 S	EPA8240	Toluene-d8	Surrogate Spike	106.0

Table 6.1. Percent Recoveries for Matrix Spikes, continued

Sample ID	Laboratory ID	Method	Analyses	Type of Spike	Percent Recovery
102663	9604L893-001 S	LLOYDKAHN	Total Organic Carbon	Matrix Spike	116.0
102663	9604L893-001 S	EPA6010	Vanadium	Matrix Spike	
102663	9604L893-001 S	EPA6010	Zinc	Matrix Spike	89.8
102663	9604L893-001 S	EPA8081	gamma-Benzene hexachloride (Lindane)	Matrix Spike	75.0
102663	9604L893-001 S	EPA8081	p,p'-DDT	Matrix Spike	76.0
102663	9604L893-001 S	EPA8240	p-Bromofluorobenzene	Surrogate Spike	79.0
102663	9604L893-001 S	EPA8270	p-Terphenyl-d14	Surrogate Spike	74.4
102664	9604L893-002 S	EPA8240	1,2-Dichloroethane-d4	Surrogate Spike	111.0
102664	9604L893-002 S	EPA8270	2,4,6-Tribromophenol (surr)	Surrogate Spike	81.0
102664	9604L893-002 S	EPA8270	2-Fluorobiphenyl	Surrogate Spike	70.0
102664	9604L893-002 S	EPA8270	2-Fluorophenol	Surrogate Spike	71.4
102664	9604L893-002 S	EPA9010	Cyanide	Matrix Spike	82.6
102664	9604L893-002 S	EPA8081	Decachlorobiphenyl	Surrogate Spike	70.0
102664	9604L893-002 S	EPA8270	Nitrobenzene-d5	Surrogate Spike	60.5
102664	9604L893-002 S	EPA8270	Phenol-d5	Surrogate Spike	72.2
102664	9604L893-002 S	EPA8081	Tetrachloro-m-xylene	Surrogate Spike	57.5
102664	9604L893-002 S	EPA8240	Toluene-d8	Surrogate Spike	110.0
102664	9604L893-002 S	EPA8240	p-Bromofluorobenzene	Surrogate Spike	97.0
102664	9604L893-002 S	EPA8270	p-Terphenyl-d14	Surrogate Spike	79.8
102665	9604L893-003 S	EPA8240	1,2-Dichloroethane-d4	Surrogate Spike	99.7
102665	9604L893-003 S	EPA8240	Toluene-d8	Surrogate Spike	102.0
102665	9604L893-003 S	EPA8240	p-Bromofluorobenzene	Surrogate Spike	96.0
102666	9604L961-003 S	EPA8240	1,2-Dichloroethane-d4	Surrogate Spike	113.0
102666	9604L961-003 S	EPA8270	2,4,6-Tribromophenol (surr)	Surrogate Spike	59.2
102666	9604L961-003 S	EPA8270	2-Fluorobiphenyl	Surrogate Spike	63.3
102666	9604L961-003 S	EPA8270	2-Fluorophenol	Surrogate Spike	64.1
102666	9604L961-003 S	EPA8081	Decachlorobiphenyl	Surrogate Spike	63.0
102666	9604L961-003 S	EPA8270	Nitrobenzene-d5	Surrogate Spike	59.0
102666	9604L961-003 S	EPA8270	Phenol-d5	Surrogate Spike	61.0
102666	9604L961-003 S	EPA8081	Tetrachloro-m-xylene	Surrogate Spike	50.0
102666	9604L961-003 S	EPA8240	Toluene-d8	Surrogate Spike	108.0
102666	9604L961-003 S	EPA8240	p-Bromofluorobenzene	Surrogate Spike	81.0
102666	9604L961-003 S	EPA8270	p-Terphenyl-d14	Surrogate Spike	73.5
102667	9604L930-001 S	EPA8240	1,1-Dichloroethene	Matrix Spike	104.0

Table 6.1. Percent Recoveries for Matrix Spikes, continued

Sample ID	Laboratory ID	Method	Analyses	Type of Spike	Percent Recovery
102667	9604L930-001 S	EPA8270	1,2,4-Trichlorobenzene	Matrix Spike	71.1
102667	9604L930-001 S	EPA8240	1,2-Dichloroethane-d4	Surrogate Spike	100.0
102667	9604L930-001 S	EPA8270	1,4-Dichlorobenzene	Matrix Spike	65.1
102667	9604L930-001 S	EPA8270	2,4,6-Tribromophenol (surr)	Surrogate Spike	80.4
102667	9604L930-001 S	EPA8270	2,4-Dinitrotoluene	Matrix Spike	65.5
102667	9604L930-001 S	EPA8270	2-Chlorophenol	Matrix Spike	77.7
102667	9604L930-001 S	EPA8270	2-Fluorobiphenyl	Surrogate Spike	73.8
102667	9604L930-001 S	EPA8270	2-Fluorophenol	Surrogate Spike	71.6
102667	9604L930-001 S	EPA8270	4-Chloro-3-methylphenol (p-chloro-m-cresol)	Matrix Spike	76.4
102667	9604L930-001 S	EPA8270	4-Nitrophenol	Matrix Spike	68.0
102667	9604L930-001 S	EPA8270	Acenapthene	Matrix Spike	73.2
102667	9604L930-001 S	EPA8081	Aldrin	Matrix Spike	70.0
102667	9604L930-001 S	EPA6010	Aluminum	Matrix Spike	
102667	9604L930-001 S	EPA6010	Antimony	Matrix Spike	90.6
102667	9604L930-001 S	EPA6010	Arsenic	Matrix Spike	94.4
102667	9604L930-001 S	EPA6010	Barium	Matrix Spike	96.2
102667	9604L930-001 S	EPA8240	Benzene	Matrix Spike	106.0
102667	9604L930-001 S	EPA6010	Beryllium	Matrix Spike	96.0
102667	9604L930-001 S	EPA6010	Cadmium	Matrix Spike	100.0
102667	9604L930-001 S	EPA6010	Calcium	Matrix Spike	94.0
102667	9604L930-001 S	EPA8240	Chlorobenzene	Matrix Spike	101.0
102667	9604L930-001 S	EPA6010	Chromium	Matrix Spike	94.7
102667	9604L930-001 S	EPA6010	Cobalt	Matrix Spike	90.7
102667	9604L930-001 S	EPA6010	Copper	Matrix Spike	96.6
102667	9604L930-001 S	EPA8081	Decachlorobiphenyl	Surrogate Spike	89.0
102667	9604L930-001 S	EPA8081	Dieldrin	Matrix Spike	74.0
102667	9604L930-001 S	EPA8081	Endrin	Matrix Spike	80.0
102667	9604L930-001 S	EPA8081	Heptachlor	Matrix Spike	75.0
102667	9604L930-001 S	EPA6010	Iron	Matrix Spike	
102667	9604L930-001 S	EPA6010	Lead	Matrix Spike	95.0
102667	9604L930-001 S	EPA6010	Magnesium	Matrix Spike	99.7
102667	9604L930-001 S	EPA6010	Manganese	Matrix Spike	99.4
102667	9604L930-001 S	EPA7471	Mercury	Matrix Spike	98.9
102667	9604L930-001 S	EPA8270	N-Nitrosodi-n-propylamine	Matrix Spike	68.2

Table 6.1. Percent Recoveries for Matrix Spikes, continued

Sample ID	Laboratory ID	Method	Analyses	Type of Spike	Percent Recovery
102667	9604L930-001 S	EPA6010	Nickel	Matrix Spike	90.8
102667	9604L930-001 S	EPA8270	Nitrobenzene-d5	Surrogate Spike	63.5
102667	9604L930-001 S	EPA8270	Pentachlorophenol	Matrix Spike	82.5
102667	9604L930-001 S	EPA8270	Phenol	Matrix Spike	76.8
102667	9604L930-001 S	EPA8270	Phenol-d5	Surrogate Spike	70.6
102667	9604L930-001 S	EPA6010	Potassium	Matrix Spike	94.6
102667	9604L930-001 S	EPA8270	Pyrene	Matrix Spike	81.9
102667	9604L930-001 S	EPA6010	Selenium	Matrix Spike	93.8
102667	9604L930-001 S	EPA6010	Silver	Matrix Spike	92.3
102667	9604L930-001 S	EPA6010	Sodium	Matrix Spike	95.6
102667	9604L930-001 S	EPA8081	Tetrachloro-m-xylene	Surrogate Spike	75.0
102667	9604L930-001 S	EPA6010	Thallium	Matrix Spike	95.0
102667	9604L930-001 S	EPA8240	Toluene	Matrix Spike	112.0
102667	9604L930-001 S	EPA8240	Toluene-d8	Surrogate Spike	103.0
102667	9604L930-001 S	EPA8240	Trichloroethene (TCE)	Matrix Spike	96.6
102667	9604L930-001 S	EPA6010	Vanadium	Matrix Spike	91.6
102667	9604L930-001 S	EPA6010	Zinc	Matrix Spike	99.8
102667	9604L930-001 S	EPA8081	gamma-Benzene hexachloride (Lindane)	Matrix Spike	70.0
102667	9604L930-001 S	EPA8081	p,p'-DDT	Matrix Spike	82.0
102667	9604L930-001 S	EPA8240	p-Bromofluorobenzene	Surrogate Spike	93.0
102667	9604L930-001 S	EPA8270	p-Terphenyl-d14	Surrogate Spike	82.6
102668	9604L930-002 S	EPA8240	1,2-Dichloroethane-d4	Surrogate Spike	112.0
102668	9604L930-002 S	EPA8270	2,4,6-Tribromophenol (surr)	Surrogate Spike	62.4
102668	9604L930-002 S	EPA8270	2-Fluorobiphenyl	Surrogate Spike	63.2
102668	9604L930-002 S	EPA8270	2-Fluorophenol	Surrogate Spike	63.4
102668	9604L930-002 S	EPA8081	Decachlorobiphenyl	Surrogate Spike	86.0
102668	9604L930-002 S	EPA8270	Nitrobenzene-d5	Surrogate Spike	56.0
102668	9604L930-002 S	EPA8270	Phenol-d5	Surrogate Spike	62.0
102668	9604L930-002 S	EPA8081	Tetrachloro-m-xylene	Surrogate Spike	70.0
102668	9604L930-002 S	EPA8240	Toluene-d8	Surrogate Spike	104.0
102668	9604L930-002 S	EPA8240	p-Bromofluorobenzene	Surrogate Spike	94.0
102668	9604L930-002 S	EPA8270	p-Terphenyl-d14	Surrogate Spike	74.0
102669	9604L930-003 S	EPA8240	1,2-Dichloroethane-d4	Surrogate Spike	139.0
102669	9604L930-003 S	EPA8270	2,4,6-Tribromophenol (surr)	Surrogate Spike	67.4

Table 6.1. Percent Recoveries for Matrix Spikes, continued

Sample ID	Laboratory ID	Method	Analyses	Type of Spike	Percent Recovery
102669	9604L930-003 S	EPA8270	2-Fluorobiphenyl	Surrogate Spike	66.2
102669	9604L930-003 S	EPA8270	2-Fluorophenol	Surrogate Spike	66.9
102669	9604L930-003 S	EPA8081	Decachlorobiphenyl	Surrogate Spike	86.0
102669	9604L930-003 S	EPA8270	Nitrobenzene-d5	Surrogate Spike	60.6
102669	9604L930-003 S	EPA8270	Phenol-d5	Surrogate Spike	66.7
102669	9604L930-003 S	EPA8081	Tetrachloro-m-xylene	Surrogate Spike	67.5
102669	9604L930-003 S	EPA8240	Toluene-d8	Surrogate Spike	127.0
102669	9604L930-003 S	EPA8240	p-Bromofluorobenzene	Surrogate Spike	101.0
102669	9604L930-003 S	EPA8270	p-Terphenyl-d14	Surrogate Spike	78.2
102670	9604L961-004 S	EPA8240	1,2-Dichloroethane-d4	Surrogate Spike	113.0
102670	9604L961-004 S	EPA8270	2,4,6-Tribromophenol (surr)	Surrogate Spike	57.5
102670	9604L961-004 S	EPA8270	2-Fluorobiphenyl	Surrogate Spike	64.3
102670	9604L961-004 S	EPA8270	2-Fluorophenol	Surrogate Spike	65.1
102670	9604L961-004 S	EPA8081	Decachlorobiphenyl	Surrogate Spike	82.0
102670	9604L961-004 S	EPA8270	Nitrobenzene-d5	Surrogate Spike	59.6
102670	9604L961-004 S	EPA8270	Phenol-d5	Surrogate Spike	62.8
102670	9604L961-004 S	EPA8081	Tetrachloro-m-xylene	Surrogate Spike	57.5
102670	9604L961-004 S	EPA8240	Toluene-d8	Surrogate Spike	114.0
102670	9604L961-004 S	EPA8240	p-Bromofluorobenzene	Surrogate Spike	103.0
102670	9604L961-004 S	EPA8270	p-Terphenyl-d14	Surrogate Spike	68.6
102671	9604L930-004 S	EPA8240	1,2-Dichloroethane-d4	Surrogate Spike	126.0
102671	9604L930-004 S	EPA8270	2,4,6-Tribromophenol (surr)	Surrogate Spike	69.9
102671	9604L930-004 S	EPA8270	2-Fluorobiphenyl	Surrogate Spike	67.0
102671	9604L930-004 S	EPA8270	2-Fluorophenol	Surrogate Spike	67.7
102671	9604L930-004 S	EPA8081	Decachlorobiphenyl	Surrogate Spike	83.0
102671	9604L930-004 S	EPA8270	Nitrobenzene-d5	Surrogate Spike	60.4
102671	9604L930-004 S	EPA8270	Phenol-d5	Surrogate Spike	66.0
102671	9604L930-004 S	EPA8081	Tetrachloro-m-xylene	Surrogate Spike	67.5
102671	9604L930-004 S	EPA8240	Toluene-d8	Surrogate Spike	112.0
102671	9604L930-004 S	EPA8240	p-Bromofluorobenzene	Surrogate Spike	73.0
102671	9604L930-004 S	EPA8270	p-Terphenyl-d14	Surrogate Spike	74.0
102672	9604L930-005 S	EPA8240	1,2-Dichloroethane-d4	Surrogate Spike	111.0
102672	9604L930-005 S	EPA8270	2,4,6-Tribromophenol (surr)	Surrogate Spike	64.6
102672	9604L930-005 S	EPA8270	2-Fluorobiphenyl	Surrogate Spike	65.0

Table 6.1. Percent Recoveries for Matrix Spikes, continued

Sample ID	Laboratory ID	Method	Analyses	Type of Spike	Percent Recovery
102672	9604L930-005 S	EPA8270	2-Fluorophenol	Surrogate Spike	65.4
102672	9604L930-005 S	EPA8081	Decachlorobiphenyl	Surrogate Spike	93.0
102672	9604L930-005 S	EPA8270	Nitrobenzene-d5	Surrogate Spike	59.2
102672	9604L930-005 S	EPA8270	Phenol-d5	Surrogate Spike	65.9
102672	9604L930-005 S	EPA8081	Tetrachloro-m-xylene	Surrogate Spike	72.5
102672	9604L930-005 S	EPA8240	Toluene-d8	Surrogate Spike	99.0
102672	9604L930-005 S	EPA8240	p-Bromofluorobenzene	Surrogate Spike	88.0
102672	9604L930-005 S	EPA8270	p-Terphenyl-d14	Surrogate Spike	73.4
102673	9604L930-006 S	EPA8240	1,2-Dichloroethane-d4	Surrogate Spike	106.0
102673	9604L930-006 S	EPA8270	2,4,6-Tribromophenol (surr)	Surrogate Spike	70.1
102673	9604L930-006 S	EPA8270	2-Fluorobiphenyl	Surrogate Spike	63.9
102673	9604L930-006 S	EPA8270	2-Fluorophenol	Surrogate Spike	67.1
102673	9604L930-006 S	EPA8081	Decachlorobiphenyl	Surrogate Spike	89.0
102673	9604L930-006 S	EPA8270	Nitrobenzene-d5	Surrogate Spike	57.6
102673	9604L930-006 S	EPA8270	Phenol-d5	Surrogate Spike	67.5
102673	9604L930-006 S	EPA8081	Tetrachloro-m-xylene	Surrogate Spike	67.5
102673	9604L930-006 S	EPA8240	Toluene-d8	Surrogate Spike	117.0
102673	9604L930-006 S	EPA8240	p-Bromofluorobenzene	Surrogate Spike	94.0
102673	9604L930-006 S	EPA8270	p-Terphenyl-d14	Surrogate Spike	77.3
102674	9604L930-007 S	EPA8240	1,2-Dichloroethane-d4	Surrogate Spike	110.0
102674	9604L930-007 S	EPA8270	2,4,6-Tribromophenol (surr)	Surrogate Spike	62.6
102674	9604L930-007 S	EPA8270	2-Fluorobiphenyl	Surrogate Spike	63.2
102674	9604L930-007 S	EPA8270	2-Fluorophenol	Surrogate Spike	66.6
102674	9604L930-007 S	EPA8081	Decachlorobiphenyl	Surrogate Spike	75.0
102674	9604L930-007 S	EPA8270	Nitrobenzene-d5	Surrogate Spike	58.0
102674	9604L930-007 S	EPA8270	Phenol-d5	Surrogate Spike	66.7
102674	9604L930-007 S	EPA8081	Tetrachloro-m-xylene	Surrogate Spike	60.0
102674	9604L930-007 S	EPA8240	Toluene-d8	Surrogate Spike	113.0
102674	9604L930-007 S	EPA8240	p-Bromofluorobenzene	Surrogate Spike	100.0
102674	9604L930-007 S	EPA8270	p-Terphenyl-d14	Surrogate Spike	74.5
102676	9604L961-005 S	EPA8240	1,2-Dichloroethane-d4	Surrogate Spike	104.0
102676	9604L961-005 S	EPA8270	2,4,6-Tribromophenol (surr)	Surrogate Spike	73.5
102676	9604L961-005 S	EPA8270	2-Fluorobiphenyl	Surrogate Spike	72.4
102676	9604L961-005 S	EPA8270	2-Fluorophenol	Surrogate Spike	70.6

Table 6.1. Percent Recoveries for Matrix Spikes, continued

Sample ID	Laboratory ID	Method	Analyses	Type of Spike	Percent Recovery
102676	9604L961-005 S	EPA8081	Decachlorobiphenyl	Surrogate Spike	64.0
102676	9604L961-005 S	EPA8270	Nitrobenzene-d5	Surrogate Spike	64.2
102676	9604L961-005 S	EPA8270	Phenol-d5	Surrogate Spike	68.2
102676	9604L961-005 S	EPA8081	Tetrachloro-m-xylene	Surrogate Spike	47.5
102676	9604L961-005 S	EPA8240	Toluene-d8	Surrogate Spike	99.0
102676	9604L961-005 S	EPA8240	p-Bromofluorobenzene	Surrogate Spike	74.0
102676	9604L961-005 S	EPA8270	p-Terphenyl-d14	Surrogate Spike	77.4
102677	9604L930-008 S	EPA8240	1,2-Dichloroethane-d4	Surrogate Spike	108.0
102677	9604L930-008 S	EPA8270	2,4,6-Tribromophenol (surr)	Surrogate Spike	66.0
102677	9604L930-008 S	EPA8270	2-Fluorobiphenyl	Surrogate Spike	68.2
102677	9604L930-008 S	EPA8270	2-Fluorophenol	Surrogate Spike	74.2
102677	9604L930-008 S	EPA8081	Decachlorobiphenyl	Surrogate Spike	79.0
102677	9604L930-008 S	EPA8270	Nitrobenzene-d5	Surrogate Spike	59.8
102677	9604L930-008 S	EPA8270	Phenol-d5	Surrogate Spike	68.6
102677	9604L930-008 S	EPA8081	Tetrachloro-m-xylene	Surrogate Spike	65.0
102677	9604L930-008 S	EPA8240	Toluene-d8	Surrogate Spike	106.0
102677	9604L930-008 S	EPA8240	p-Bromofluorobenzene	Surrogate Spike	100.0
102677	9604L930-008 S	EPA8270	p-Terphenyl-d14	Surrogate Spike	71.3
102678	9604L961-006 S	EPA8240	1,2-Dichloroethane-d4	Surrogate Spike	100.0
102678	9604L961-006 S	EPA8270	2,4,6-Tribromophenol (surr)	Surrogate Spike	67.5
102678	9604L961-006 S	EPA8270	2-Fluorobiphenyl	Surrogate Spike	65.0
102678	9604L961-006 S	EPA8270	2-Fluorophenol	Surrogate Spike	58.5
102678	9604L961-006 S	EPA6010	Aluminum	Matrix Spike	103.0
102678	9604L961-006 S	EPA6010	Antimony	Matrix Spike	98.1
102678	9604L961-006 S	EPA6010	Arsenic	Matrix Spike	101.0
102678	9604L961-006 S	EPA6010	Barium	Matrix Spike	99.6
102678	9604L961-006 S	EPA6010	Beryllium	Matrix Spike	100.0
102678	9604L961-006 S	EPA6010	Cadmium	Matrix Spike	97.4
102678	9604L961-006 S	EPA6010	Calcium	Matrix Spike	100.0
102678	9604L961-006 S	EPA6010	Chromium	Matrix Spike	97.2
102678	9604L961-006 S	EPA6010	Cobalt	Matrix Spike	99.9
102678	9604L961-006 S	EPA6010	Copper	Matrix Spike	101.0
102678	9604L961-006 S	EPA8081	Decachlorobiphenyl	Surrogate Spike	60.0
102678	9604L961-006 S	EPA6010	Iron	Matrix Spike	102.0

Table 6.1. Percent Recoveries for Matrix Spikes, continued

Sample ID	Laboratory ID	Method	Analyses	Type of Spike	Percent Recovery
102678	9604L961-006 S	EPA6010	Lead	Matrix Spike	99.4
102678	9604L961-006 S	EPA6010	Magnesium	Matrix Spike	109.0
102678	9604L961-006 S	EPA6010	Manganese	Matrix Spike	101.0
102678	9604L961-006 S	EPA6010	Nickel	Matrix Spike	98.0
102678	9604L961-006 S	EPA8270	Nitrobenzene-d5	Surrogate Spike	69.0
102678	9604L961-006 S	EPA8270	Phenol-d5	Surrogate Spike	63.9
102678	9604L961-006 S	EPA6010	Potassium	Matrix Spike	103.0
102678	9604L961-006 S	EPA6010	Selenium	Matrix Spike	101.0
102678	9604L961-006 S	EPA6010	Silver	Matrix Spike	99.4
102678	9604L961-006 S	EPA6010	Sodium	Matrix Spike	99.7
102678	9604L961-006 S	EPA8081	Tetrachloro-m-xylene	Surrogate Spike	30.0
102678	9604L961-006 S	EPA6010	Thallium	Matrix Spike	99.3
102678	9604L961-006 S	EPA8240	Toluene-d8	Surrogate Spike	98.0
102678	9604L961-006 S	EPA6010	Vanadium	Matrix Spike	100.0
102678	9604L961-006 S	EPA6010	Zinc	Matrix Spike	97.4
102678	9604L961-006 S	EPA8240	p-Bromofluorobenzene	Surrogate Spike	95.0
102678	9604L961-006 S	EPA8270	p-Terphenyl-d14	Surrogate Spike	106.0
102679	9604L961-007 S	EPA8240	1,2-Dichloroethane-d4	Surrogate Spike	100.0
102679	9604L961-007 S	EPA8240	Toluene-d8	Surrogate Spike	99.0
102679	9604L961-007 S	EPA8240	p-Bromofluorobenzene	Surrogate Spike	94.0
102680	9604L961-008 S	EPA8240	1,2-Dichloroethane-d4	Surrogate Spike	112.0
102680	9604L961-008 S	EPA8270	2,4,6-Tribromophenol (surr)	Surrogate Spike	66.8
102680	9604L961-008 S	EPA8270	2-Fluorobiphenyl	Surrogate Spike	66.6
102680	9604L961-008 S	EPA8270	2-Fluorophenol	Surrogate Spike	66.4
102680	9604L961-008 S	EPA8081	Decachlorobiphenyl	Surrogate Spike	80.0
102680	9604L961-008 S	EPA8270	Nitrobenzene-d5	Surrogate Spike	60.3
102680	9604L961-008 S	EPA8270	Phenol-d5	Surrogate Spike	64.2
102680	9604L961-008 S	EPA8081	Tetrachloro-m-xylene	Surrogate Spike	67.5
102680	9604L961-008 S	EPA8240	Toluene-d8	Surrogate Spike	112.0
102680	9604L961-008 S	EPA8240	p-Bromofluorobenzene	Surrogate Spike	98.0
102680	9604L961-008 S	EPA8270	p-Terphenyl-d14	Surrogate Spike	73.5
102681	9604L961-009 S	EPA8240	1,2-Dichloroethane-d4	Surrogate Spike	110.0
102681	9604L961-009 S	EPA8270	2,4,6-Tribromophenol (surr)	Surrogate Spike	65.6
102681	9604L961-009 S	EPA8270	2-Fluorobiphenyl	Surrogate Spike	64.4

Table 6.1. Percent Recoveries for Matrix Spikes, continued

Sample ID	Laboratory ID	Method	Analyses	Type of Spike	Percent Recovery
102681	9604L961-009 S	EPA8270	2-Fluorophenol	Surrogate Spike	68.0
102681	9604L961-009 S	EPA8081	Decachlorobiphenyl	Surrogate Spike	83.0
102681	9604L961-009 S	EPA8270	Nitrobenzene-d5	Surrogate Spike	57.3
102681	9604L961-009 S	EPA8270	Phenol-d5	Surrogate Spike	68.3
102681	9604L961-009 S	EPA8081	Tetrachloro-m-xylene	Surrogate Spike	70.0
102681	9604L961-009 S	EPA8240	Toluene-d8	Surrogate Spike	106.0
102681	9604L961-009 S	EPA8240	p-Bromofluorobenzene	Surrogate Spike	96.0
102681	9604L961-009 S	EPA8270	p-Terphenyl-d14	Surrogate Spike	78.0
102682	9604L961-001 S	EPA8240	1,2-Dichloroethane-d4	Surrogate Spike	109.0
102682	9604L961-001 S	EPA8270	2,4,6-Tribromophenol (surr)	Surrogate Spike	58.9
102682	9604L961-001 S	EPA8270	2-Fluorobiphenyl	Surrogate Spike	69.1
102682	9604L961-001 S	EPA8270	2-Fluorophenol	Surrogate Spike	71.2
102682	9604L961-001 S	EPA6010	Aluminum	Matrix Spike	
102682	9604L961-001 S	EPA6010	Antimony	Matrix Spike	85.8
102682	9604L961-001 S	EPA6010	Arsenic	Matrix Spike	88.4
102682	9604L961-001 S	EPA6010	Barium	Matrix Spike	90.5
102682	9604L961-001 S	EPA6010	Beryllium	Matrix Spike	88.9
102682	9604L961-001 S	EPA6010	Cadmium	Matrix Spike	86.8
102682	9604L961-001 S	EPA6010	Calcium	Matrix Spike	90.0
102682	9604L961-001 S	EPA6010	Chromium	Matrix Spike	92.4
102682	9604L961-001 S	EPA6010	Cobalt	Matrix Spike	89.4
102682	9604L961-001 S	EPA6010	Copper	Matrix Spike	92.6
102682	9604L961-001 S	EPA8081	Decachlorobiphenyl	Surrogate Spike	79.0
102682	9604L961-001 S	EPA6010	Iron	Matrix Spike	
102682	9604L961-001 S	EPA6010	Lead	Matrix Spike	89.2
102682	9604L961-001 S	EPA6010	Magnesium	Matrix Spike	96.9
102682	9604L961-001 S	EPA6010	Manganese	Matrix Spike	98.3
102682	9604L961-001 S	EPA6010	Nickel	Matrix Spike	88.0
102682	9604L961-001 S	EPA8270	Nitrobenzene-d5	Surrogate Spike	65.3
102682	9604L961-001 S	EPA8270	Phenol-d5	Surrogate Spike	66.2
102682	9604L961-001 S	EPA6010	Potassium	Matrix Spike	91.8
102682	9604L961-001 S	EPA6010	Selenium	Matrix Spike	89.3
102682	9604L961-001 S	EPA6010	Silver	Matrix Spike	86.8
102682	9604L961-001 S	EPA6010	Sodium	Matrix Spike	92.1

Table 6.1. Percent Recoveries for Matrix Spikes, continued

Sample ID	Laboratory ID	Method	Analyses	Type of Spike	Percent Recovery
102682	9604L961-001 S	EPA8081	Tetrachloro-m-xylene	Surrogate Spike	62.5
102682	9604L961-001 S	EPA6010	Thallium	Matrix Spike	88.9
102682	9604L961-001 S	EPA8240	Toluene-d8	Surrogate Spike	107.0
102682	9604L961-001 S	LLOYDKAHN	Total Organic Carbon	Matrix Spike	94.2
102682	9604L961-001 S	EPA6010	Vanadium	Matrix Spike	90.7
102682	9604L961-001 S	EPA6010	Zinc	Matrix Spike	93.0
102682	9604L961-001 S	EPA8240	p-Bromofluorobenzene	Surrogate Spike	89.0
102682	9604L961-001 S	EPA8270	p-Terphenyl-d14	Surrogate Spike	75.0
102683	9604L961-002 S	EPA8240	1,2-Dichloroethane-d4	Surrogate Spike	108.0
102683	9604L961-002 S	EPA8270	2,4,6-Tribromophenol (surr)	Surrogate Spike	59.8
102683	9604L961-002 S	EPA8270	2-Fluorobiphenyl	Surrogate Spike	62.8
102683	9604L961-002 S	EPA8270	2-Fluorophenol	Surrogate Spike	64.1
102683	9604L961-002 S	EPA8081	Decachlorobiphenyl	Surrogate Spike	77.0
102683	9604L961-002 S	EPA8270	Nitrobenzene-d5	Surrogate Spike	58.6
102683	9604L961-002 S	EPA8270	Phenol-d5	Surrogate Spike	62.1
102683	9604L961-002 S	EPA8081	Tetrachloro-m-xylene	Surrogate Spike	60.0
102683	9604L961-002 S	EPA8240	Toluene-d8	Surrogate Spike	106.0
102683	9604L961-002 S	EPA8240	p-Bromofluorobenzene	Surrogate Spike	85.0
102683	9604L961-002 S	EPA8270	p-Terphenyl-d14	Surrogate Spike	67.4
102684	9604L930-009 S	EPA8240	1,2-Dichloroethane-d4	Surrogate Spike	104.0
102684	9604L930-009 S	EPA8270	2,4,6-Tribromophenol (surr)	Surrogate Spike	68.7
102684	9604L930-009 S	EPA8270	2-Fluorobiphenyl	Surrogate Spike	70.0
102684	9604L930-009 S	EPA8270	2-Fluorophenol	Surrogate Spike	74.5
102684	9604L930-009 S	EPA8081	Decachlorobiphenyl	Surrogate Spike	97.0
102684	9604L930-009 S	EPA8270	Nitrobenzene-d5	Surrogate Spike	62.3
102684	9604L930-009 S	EPA8270	Phenol-d5	Surrogate Spike	67.6
102684	9604L930-009 S	EPA8081	Tetrachloro-m-xylene	Surrogate Spike	75.0
102684	9604L930-009 S	EPA8240	Toluene-d8	Surrogate Spike	101.0
102684	9604L930-009 S	EPA8240	p-Bromofluorobenzene	Surrogate Spike	79.0
102684	9604L930-009 S	EPA8270	p-Terphenyl-d14	Surrogate Spike	68.9
102685	9604L930-010 S	EPA8240	1,2-Dichloroethane-d4	Surrogate Spike	128.0
102685	9604L930-010 S	EPA8270	2,4,6-Tribromophenol (surr)	Surrogate Spike	69.9
102685	9604L930-010 S	EPA8270	2-Fluorobiphenyl	Surrogate Spike	68.4
102685	9604L930-010 S	EPA8270	2-Fluorophenol	Surrogate Spike	72.0

Table 6.1. Percent Recoveries for Matrix Spikes, continued

Sample ID	Laboratory ID	Method	Analyses	Type of Spike	Percent Recovery
102685	9604L930-010 S	EPA8081	Decachlorobiphenyl	Surrogate Spike	89.0
102685	9604L930-010 S	EPA8270	Nitrobenzene-d5	Surrogate Spike	59.8
102685	9604L930-010 S	EPA8270	Phenol-d5	Surrogate Spike	68.9
102685	9604L930-010 S	EPA8081	Tetrachloro-m-xylene	Surrogate Spike	72.5
102685	9604L930-010 S	EPA8240	Toluene-d8	Surrogate Spike	104.0
102685	9604L930-010 S	EPA8240	p-Bromofluorobenzene	Surrogate Spike	81.0
102685	9604L930-010 S	EPA8270	p-Terphenyl-d14	Surrogate Spike	70.9
102686	9604L930-011 S	EPA8240	1,2-Dichloroethane-d4	Surrogate Spike	120.0
102686	9604L930-011 S	EPA8270	2,4,6-Tribromophenol (surr)	Surrogate Spike	69.4
102686	9604L930-011 S	EPA8270	2-Fluorobiphenyl	Surrogate Spike	67.2
102686	9604L930-011 S	EPA8270	2-Fluorophenol	Surrogate Spike	71.5
102686	9604L930-011 S	EPA9010	Cyanide	Matrix Spike	85.8
102686	9604L930-011 S	EPA8081	Decachlorobiphenyl	Surrogate Spike	86.0
102686	9604L930-011 S	EPA8270	Nitrobenzene-d5	Surrogate Spike	58.7
102686	9604L930-011 S	EPA8270	Phenol-d5	Surrogate Spike	68.0
102686	9604L930-011 S	EPA8081	Tetrachloro-m-xylene	Surrogate Spike	75.0
102686	9604L930-011 S	EPA8240	Toluene-d8	Surrogate Spike	100.0
102686	9604L930-011 S	EPA8240	p-Bromofluorobenzene	Surrogate Spike	88.0
102686	9604L930-011 S	EPA8270	p-Terphenyl-d14	Surrogate Spike	72.6
102687	9604L930-012 S	EPA8240	1,2-Dichloroethane-d4	Surrogate Spike	100.0
102687	9604L930-012 S	EPA8270	2,4,6-Tribromophenol (surr)	Surrogate Spike	68.7
102687	9604L930-012 S	EPA8270	2-Fluorobiphenyl	Surrogate Spike	64.8
102687	9604L930-012 S	EPA8270	2-Fluorophenol	Surrogate Spike	71.2
102687	9604L930-012 S	EPA8081	Decachlorobiphenyl	Surrogate Spike	87.0
102687	9604L930-012 S	EPA8270	Nitrobenzene-d5	Surrogate Spike	57.7
102687	9604L930-012 S	EPA8270	Phenol-d5	Surrogate Spike	66.5
102687	9604L930-012 S	EPA8081	Tetrachloro-m-xylene	Surrogate Spike	72.5
102687	9604L930-012 S	EPA8240	Toluene-d8	Surrogate Spike	107.0
102687	9604L930-012 S	EPA8240	p-Bromofluorobenzene	Surrogate Spike	90.0
102687	9604L930-012 S	EPA8270	p-Terphenyl-d14	Surrogate Spike	72.0
102688	9604L930-013 S	EPA8240	1,2-Dichloroethane-d4	Surrogate Spike	106.0
102688	9604L930-013 S	EPA8270	2,4,6-Tribromophenol (surr)	Surrogate Spike	66.9
102688	9604L930-013 S	EPA8270	2-Fluorobiphenyl	Surrogate Spike	65.1
102688	9604L930-013 S	EPA8270	2-Fluorophenol	Surrogate Spike	70.5

Table 6.1. Percent Recoveries for Matrix Spikes, continued

Sample ID	Laboratory ID	Method	Analyses	Type of Spike	Percent Recovery
102688	9604L930-013 S	EPA8081	Decachlorobiphenyl	Surrogate Spike	89.0
102688	9604L930-013 S	EPA8270	Nitrobenzene-d5	Surrogate Spike	56.5
102688	9604L930-013 S	EPA8270	Phenol-d5	Surrogate Spike	67.4
102688	9604L930-013 S	EPA8081	Tetrachloro-m-xylene	Surrogate Spike	65.0
102688	9604L930-013 S	EPA8240	Toluene-d8	Surrogate Spike	112.0
102688	9604L930-013 S	EPA8240	p-Bromofluorobenzene	Surrogate Spike	97.0
102688	9604L930-013 S	EPA8270	p-Terphenyl-d14	Surrogate Spike	69.4
102689	9604L930-014 S	EPA8240	1,2-Dichloroethane-d4	Surrogate Spike	126.0
102689	9604L930-014 S	EPA8270	2,4,6-Tribromophenol (surr)	Surrogate Spike	75.7
102689	9604L930-014 S	EPA8270	2-Fluorobiphenyl	Surrogate Spike	70.1
102689	9604L930-014 S	EPA8270	2-Fluorophenol	Surrogate Spike	72.6
102689	9604L930-014 S	EPA8081	Decachlorobiphenyl	Surrogate Spike	88.0
102689	9604L930-014 S	EPA8270	Nitrobenzene-d5	Surrogate Spike	58.5
102689	9604L930-014 S	EPA8270	Phenol-d5	Surrogate Spike	69.0
102689	9604L930-014 S	EPA8081	Tetrachloro-m-xylene	Surrogate Spike	70.0
102689	9604L930-014 S	EPA8240	Toluene-d8	Surrogate Spike	107.0
102689	9604L930-014 S	EPA9071	Total petroleum hydrocarbons	Matrix Spike	116.0
102689	9604L930-014 S	EPA8240	p-Bromofluorobenzene	Surrogate Spike	83.0
102689	9604L930-014 S	EPA8270	p-Terphenyl-d14	Surrogate Spike	71.6
102690	9604L961-010 S	EPA8240	1,1-Dichloroethene	Matrix Spike	84.1
102690	9604L961-010 S	EPA8240	1,2-Dichloroethane-d4	Surrogate Spike	106.0
102690	9604L961-010 S	EPA8270	2,4,6-Tribromophenol (surr)	Surrogate Spike	57.9
102690	9604L961-010 S	EPA8270	2-Fluorobiphenyl	Surrogate Spike	59.2
102690	9604L961-010 S	EPA8270	2-Fluorophenol	Surrogate Spike	61.0
102690	9604L961-010 S	EPA8240	Benzene	Matrix Spike	111.0
102690	9604L961-010 S	EPA8240	Chlorobenzene	Matrix Spike	110.0
102690	9604L961-010 S	EPA8081	Decachlorobiphenyl	Surrogate Spike	72.0
102690	9604L961-010 S	EPA8270	Nitrobenzene-d5	Surrogate Spike	52.5
102690	9604L961-010 S	EPA8270	Phenol-d5	Surrogate Spike	59.6
102690	9604L961-010 S	EPA8081	Tetrachloro-m-xylene	Surrogate Spike	57.5
102690	9604L961-010 S	EPA8240	Toluene	Matrix Spike	108.0
102690	9604L961-010 S	EPA8240	Toluene-d8	Surrogate Spike	109.0
102690	9604L961-010 S	EPA418.1	Total petroleum hydrocarbons	Matrix Spike	101.0
102690	9604L961-010 S	EPA8240	Trichloroethene (TCE)	Matrix Spike	103.0

Table 6.1. Percent Recoveries for Matrix Spikes, continued

Sample ID	Laboratory ID	Method	Analyses	Type of Spike	Percent Recovery
102690	9604L961-010 S	EPA8240	p-Bromofluorobenzene	Surrogate Spike	102.0
102690	9604L961-010 S	EPA8270	p-Terphenyl-d14	Surrogate Spike	65.4
102691	9604465-02	EPA8260	1,4-Dichlorobenzene-d4	Surrogate Spike	78.0
102691	9604465-02	EPA8270	2,4,6-Tribromophenol (surr)	Surrogate Spike	104.
102691	9604465-02	EPA8270	2-Fluorobiphenyl	Surrogate Spike	81.7
102691	9604465-02	EPA8270	2-Fluorophenol	Surrogate Spike	59.3
102691	9604465-02	EPA8260	Dibromofluoromethane	Surrogate Spike	89.8
102691	9604465-02	EPA8270	Nitrobenzene-d5	Surrogate Spike	74.7
102691	9604465-02	EPA8270	Phenol-d6	Surrogate Spike	79.5
102691	9604465-02	EPA8080	Restneide surrogate	Surrogate Spike	108.
102691	9604465-02	EPA8080	Tetrachloro-m-xylene	Surrogate Spike	78.8
102691	9604465-02	EPA8260	Toluene-d8	Surrogate Spike	127.
102691	9604465-02	EPA8270	p-Terphenyl-d14	Surrogate Spike	114.
102691	QC357084	EPA8270	1,2,4-Trichlorobenzene	Matrix Spike	81.4
102691	QC357084	EPA8270	1,4-Dichlorobenzene	Matrix Spike	78.8
102691	QC357084	EPA8270	2,4,6-Tribromophenol (surr)	Surrogate Spike	104.
102691	QC357084	EPA8270	2,4-Dinitrotoluene	Matrix Spike	101.
102691	QC357084	EPA8270	2-Chlorophenol	Matrix Spike	87.6
102691	QC357084	EPA8270	2-Fluorobiphenyl	Surrogate Spike	87.0
102691	QC357084	EPA8270	2-Fluorophenol	Surrogate Spike	74.2
102691	QC357084	EPA8270	4-Chloro-3-methylphenol (p-chloro-m-cresol)	Matrix Spike	100.
102691	QC357084	EPA8270	4-Nitrophenol	Matrix Spike	102.
102691	QC357084	EPA8270	Acenapthene	Matrix Spike	93.6
102691	QC357084	EPA8270	N-Nitrosodi-n-propylamine	Matrix Spike	86.4
102691	QC357084	EPA8270	Nitrobenzene-d5	Surrogate Spike	84.2
102691	QC357084	EPA8270	Pentachlorophenol	Matrix Spike	124.
102691	QC357084	EPA8270	Phenol	Matrix Spike	86.7
102691	QC357084	EPA8270	Phenol-d6	Surrogate Spike	90.0
102691	QC357084	EPA8270	Pyrene	Matrix Spike	120.
102691	QC357084	EPA8270	p-Terphenyl-d14	Surrogate Spike	112.
102691	QC357260	EPA7471	Mercury	Matrix Spike	82.5
102691	QC357261	EPA7471	Mercury	Matrix Spike Duplicate	82.5
102692	9604L930-015 S	EPA8240	1,2-Dichloroethane-d4	Surrogate Spike	110.0
102692	9604L930-015 S	EPA8270	2,4,6-Tribromophenol (surr)	Surrogate Spike	64.0

Table 6.1. Percent Recoveries for Matrix Spikes, continued

Sample ID	Laboratory ID	Method	Analyses	Type of Spike	Percent Recovery
102692	9604L930-015 S	EPA8270	2-Fluorobiphenyl	Surrogate Spike	67.5
102692	9604L930-015 S	EPA8270	2-Fluorophenol	Surrogate Spike	74.1
102692	9604L930-015 S	EPA8081	Decachlorobiphenyl	Surrogate Spike	77.0
102692	9604L930-015 S	EPA8270	Nitrobenzene-d5	Surrogate Spike	59.7
102692	9604L930-015 S	EPA8270	Phenol-d5	Surrogate Spike	70.4
102692	9604L930-015 S	EPA8081	Tetrachloro-m-xylene	Surrogate Spike	60.0
102692	9604L930-015 S	EPA8240	Toluene-d8	Surrogate Spike	114.0
102692	9604L930-015 S	EPA8240	p-Bromofluorobenzene	Surrogate Spike	96.0
102692	9604L930-015 S	EPA8270	p-Terphenyl-d14	Surrogate Spike	68.7
102693	9604L930-016 S	EPA8240	1,2-Dichloroethane-d4	Surrogate Spike	103.0
102693	9604L930-016 S	EPA8240	Toluene-d8	Surrogate Spike	104.0
102693	9604L930-016 S	EPA8240	p-Bromofluorobenzene	Surrogate Spike	101.0
102694	9604L930-017 S	EPA8240	1,2-Dichloroethane-d4	Surrogate Spike	95.0
102694	9604L930-017 S	EPA8270	2,4,6-Tribromophenol (surr)	Surrogate Spike	67.9
102694	9604L930-017 S	EPA8270	2-Fluorobiphenyl	Surrogate Spike	68.4
102694	9604L930-017 S	EPA8270	2-Fluorophenol	Surrogate Spike	73.0
102694	9604L930-017 S	EPA8081	Decachlorobiphenyl	Surrogate Spike	82.0
102694	9604L930-017 S	EPA8270	Nitrobenzene-d5	Surrogate Spike	61.2
102694	9604L930-017 S	EPA8270	Phenol-d5	Surrogate Spike	71.4
102694	9604L930-017 S	EPA8081	Tetrachloro-m-xylene	Surrogate Spike	62.5
102694	9604L930-017 S	EPA8240	Toluene-d8	Surrogate Spike	98.0
102694	9604L930-017 S	EPA8240	p-Bromofluorobenzene	Surrogate Spike	85.0
102694	9604L930-017 S	EPA8270	p-Terphenyl-d14	Surrogate Spike	77.3
102695	9604465-03	EPA8260	1,4-Dichlorobenzene-d4	Surrogate Spike	81.0
102695	9604465-03	EPA8270	2,4,6-Tribromophenol (surr)	Surrogate Spike	105.
102695	9604465-03	EPA8270	2-Fluorobiphenyl	Surrogate Spike	89.4
102695	9604465-03	EPA8270	2-Fluorophenol	Surrogate Spike	79.5
102695	9604465-03	EPA8260	Dibromofluoromethane	Surrogate Spike	87.6
102695	9604465-03	EPA8270	Nitrobenzene-d5	Surrogate Spike	88.6
102695	9604465-03	EPA8270	Phenol-d6	Surrogate Spike	93.5
102695	9604465-03	EPA8080	Restneide surrogate	Surrogate Spike	99.9
102695	9604465-03	EPA8080	Tetrachloro-m-xylene	Surrogate Spike	80.4
102695	9604465-03	EPA8260	Toluene-d8	Surrogate Spike	127.
102695	9604465-03	EPA8270	p-Terphenyl-d14	Surrogate Spike	103.

Table 6.1. Percent Recoveries for Matrix Spikes, continued

Sample ID	Laboratory ID	Method	Analyses	Type of Spike	Percent Recovery
102695	QC357085	EPA8270	2,4,6-Tribromophenol (surr)	Surrogate Spike	94.9
102695	QC357085	EPA8270	2-Fluorobiphenyl	Surrogate Spike	64.2
102695	QC357085	EPA8270	2-Fluorophenol	Surrogate Spike	56.4
102695	QC357085	EPA8270	Nitrobenzene-d5	Surrogate Spike	61.8
102695	QC357085	EPA8270	Phenol-d6	Surrogate Spike	72.8
102695	QC357085	EPA8270	p-Terphenyl-d14	Surrogate Spike	104.
102696	9604L930-018 S	EPA8240	1,1-Dichloroethene	Matrix Spike	95.8
102696	9604L930-018 S	EPA8240	1,2-Dichloroethane-d4	Surrogate Spike	99.0
102696	9604L930-018 S	EPA8270	2,4,6-Tribromophenol (surr)	Surrogate Spike	57.6
102696	9604L930-018 S	EPA8270	2-Fluorobiphenyl	Surrogate Spike	59.1
102696	9604L930-018 S	EPA8270	2-Fluorophenol	Surrogate Spike	56.7
102696	9604L930-018 S	EPA8240	Benzene	Matrix Spike	103.0
102696	9604L930-018 S	EPA8240	Chlorobenzene	Matrix Spike	103.0
102696	9604L930-018 S	EPA8081	Decachlorobiphenyl	Surrogate Spike	101.0
102696	9604L930-018 S	EPA7470	Mercury	Matrix Spike	95.6
102696	9604L930-018 S	EPA8270	Nitrobenzene-d5	Surrogate Spike	61.6
102696	9604L930-018 S	EPA8270	Phenol-d5	Surrogate Spike	65.0
102696	9604L930-018 S	EPA8081	Tetrachloro-m-xylene	Surrogate Spike	65.0
102696	9604L930-018 S	EPA8240	Toluene	Matrix Spike	102.0
102696	9604L930-018 S	EPA8240	Toluene-d8	Surrogate Spike	99.0
102696	9604L930-018 S	EPA8240	Trichloroethene (TCE)	Matrix Spike	102.0
102696	9604L930-018 S	EPA8240	p-Bromofluorobenzene	Surrogate Spike	96.0
102696	9604L930-018 S	EPA8270	p-Terphenyl-d14	Surrogate Spike	89.2
102697	9604L930-019 S	EPA8240	1,2-Dichloroethane-d4	Surrogate Spike	97.0
102697	9604L930-019 S	EPA8240	Toluene-d8	Surrogate Spike	99.0
102697	9604L930-019 S	EPA8240	p-Bromofluorobenzene	Surrogate Spike	97.0
102698	9604465-01	EPA8260	1,4-Dichlorobenzene-d4	Surrogate Spike	107.
102698	9604465-01	EPA8260	Dibromofluoromethane	Surrogate Spike	90.2
102698	9604465-01	EPA8260	Toluene-d8	Surrogate Spike	110.
102699	9604L961-011 S	EPA8240	1,2-Dichloroethane-d4	Surrogate Spike	97.0
102699	9604L961-011 S	EPA8240	Toluene-d8	Surrogate Spike	99.0
102699	9604L961-011 S	EPA8240	p-Bromofluorobenzene	Surrogate Spike	98.0
107049	QC358818	EPA6010A	Aluminum	Matrix Spike	
107049	QC358818	EPA6010A	Antimony	Matrix Spike	13.7

Table 6.1. Percent Recoveries for Matrix Spikes, continued

Sample ID	Laboratory ID	Method	Analyses	Type of Spike	Percent Recovery
107049	QC358818	EPA6010A	Arsenic	Matrix Spike	89.5
107049	QC358818	EPA6010A	Barium	Matrix Spike	101.
107049	QC358818	EPA6010A	Beryllium	Matrix Spike	102.
107049	QC358818	EPA6010A	Cadmium	Matrix Spike	95.8
107049	QC358818	EPA6010A	Calcium	Matrix Spike	102.
107049	QC358818	EPA6010A	Chromium	Matrix Spike	113.
107049	QC358818	EPA6010A	Cobalt	Matrix Spike	94.9
107049	QC358818	EPA6010A	Copper	Matrix Spike	98.2
107049	QC358818	EPA6010A	Iron	Matrix Spike	
107049	QC358818	EPA6010A	Lead	Matrix Spike	99.7
107049	QC358818	EPA6010A	Magnesium	Matrix Spike	119.
107049	QC358818	EPA6010A	Manganese	Matrix Spike	98.7
107049	QC358818	EPA6010A	Nickel	Matrix Spike	96.7
107049	QC358818	EPA6010A	Potassium	Matrix Spike	92.2
107049	QC358818	EPA6010A	Selenium	Matrix Spike	83.7
107049	QC358818	EPA6010A	Silver	Matrix Spike	103.
107049	QC358818	EPA6010A	Sodium	Matrix Spike	112.
107049	QC358818	EPA6010A	Thallium	Matrix Spike	103.
107049	QC358818	EPA6010A	Vanadium	Matrix Spike	126.
107049	QC358818	EPA6010A	Zinc	Matrix Spike	96.8
107049	QC358819	EPA6010A	Aluminum	Matrix Spike Duplicate	
107049	QC358819	EPA6010A	Antimony	Matrix Spike Duplicate	17.5
107049	QC358819	EPA6010A	Arsenic	Matrix Spike Duplicate	86.7
107049	QC358819	EPA6010A	Barium	Matrix Spike Duplicate	100.
107049	QC358819	EPA6010A	Beryllium	Matrix Spike Duplicate	102.
107049	QC358819	EPA6010A	Cadmium	Matrix Spike Duplicate	96.0
107049	QC358819	EPA6010A	Calcium	Matrix Spike Duplicate	102.
107049	QC358819	EPA6010A	Chromium	Matrix Spike Duplicate	105.
107049	QC358819	EPA6010A	Cobalt	Matrix Spike Duplicate	95.1
107049	QC358819	EPA6010A	Copper	Matrix Spike Duplicate	97.7
107049	QC358819	EPA6010A	Iron	Matrix Spike Duplicate	
107049	QC358819	EPA6010A	Lead	Matrix Spike Duplicate	98.8
107049	QC358819	EPA6010A	Magnesium	Matrix Spike Duplicate	120.
107049	QC358819	EPA6010A	Manganese	Matrix Spike Duplicate	95.3

Table 6.1. Percent Recoveries for Matrix Spikes, continued

Sample ID	Laboratory ID	Method	Analyses	Type of Spike	Percent Recovery
107049	QC358819	EPA6010A	Nickel	Matrix Spike Duplicate	96.6
107049	QC358819	EPA6010A	Potassium	Matrix Spike Duplicate	96.1
107049	QC358819	EPA6010A	Selenium	Matrix Spike Duplicate	83.1
107049	QC358819	EPA6010A	Silver	Matrix Spike Duplicate	103.
107049	QC358819	EPA6010A	Sodium	Matrix Spike Duplicate	114.
107049	QC358819	EPA6010A	Thallium	Matrix Spike Duplicate	105.
107049	QC358819	EPA6010A	Vanadium	Matrix Spike Duplicate	108.
107049	QC358819	EPA6010A	Zinc	Matrix Spike Duplicate	95.8
107079	QC359310	EPA8260	1,1-Dichloroethene	Matrix Spike	105.
107079	QC359310	EPA8260	1,4-Dichlorobenzene-d4	Surrogate Spike	83.6
107079	QC359310	EPA8260	Benzene	Matrix Spike	108.
107079	QC359310	EPA8260	Chlorobenzene	Matrix Spike	105.
107079	QC359310	EPA8260	Dibromofluoromethane	Surrogate Spike	90.6
107079	QC359310	EPA8260	Toluene	Matrix Spike	102.
107079	QC359310	EPA8260	Toluene-d8	Surrogate Spike	110.
107079	QC359310	EPA8260	Trichloroethene (TCE)	Matrix Spike	92.0
107079	QC359311	EPA8260	1,1-Dichloroethene	Matrix Spike Duplicate	96.5
107079	QC359311	EPA8260	1,4-Dichlorobenzene-d4	Surrogate Spike	85.8
107079	QC359311	EPA8260	Benzene	Matrix Spike Duplicate	102.
107079	QC359311	EPA8260	Chlorobenzene	Matrix Spike Duplicate	111.
107079	QC359311	EPA8260	Dibromofluoromethane	Surrogate Spike	89.4
107079	QC359311	EPA8260	Toluene	Matrix Spike Duplicate	104.
107079	QC359311	EPA8260	Toluene-d8	Surrogate Spike	101.
107079	QC359311	EPA8260	Trichloroethene (TCE)	Matrix Spike Duplicate	92.0
107083	QC357955	EPA335.3	Cyanide	Matrix Spike	30.5
107083	QC357961	EPIA-001B	Gross Alpha	Matrix Spike	80.8
107083	QC357961	EPIA-001B	Non-volatile Beta	Matrix Spike	89.1
107084	QC357952	EPA335.3	Cyanide	Matrix Spike	78.3
107084	QC359603	EPA8260	1,4-Dichlorobenzene-d4	Surrogate Spike	95.2
107084	QC359603	EPA8260	Dibromofluoromethane	Surrogate Spike	92.4
107084	QC359603	EPA8260	Toluene-d8	Surrogate Spike	119.
107084	QC359604	EPA8260	1,1-Dichloroethene	Matrix Spike	106.
107084	QC359604	EPA8260	1,4-Dichlorobenzene-d4	Surrogate Spike	91.2
107084	QC359604	EPA8260	Benzene	Matrix Spike	108.

Table 6.1. Percent Recoveries for Matrix Spikes, continued

Sample ID	Laboratory ID	Method	Analyses	Type of Spike	Percent Recovery
107084	QC359604	EPA8260	Chlorobenzene	Matrix Spike	110.
107084	QC359604	EPA8260	Dibromofluoromethane	Surrogate Spike	88.4
107084	QC359604	EPA8260	Toluene	Matrix Spike	118.
107084	QC359604	EPA8260	Toluene-d8	Surrogate Spike	126.
107084	QC359604	EPA8260	Trichloroethene (TCE)	Matrix Spike	102.
107084	QC359605	EPA8260	1,1-Dichloroethene	Matrix Spike Duplicate	111.
107084	QC359605	EPA8260	1,4-Dichlorobenzene-d4	Surrogate Spike	79.4
107084	QC359605	EPA8260	Benzene	Matrix Spike Duplicate	106.
107084	QC359605	EPA8260	Chlorobenzene	Matrix Spike Duplicate	117.
107084	QC359605	EPA8260	Dibromofluoromethane	Surrogate Spike	88.4
107084	QC359605	EPA8260	Toluene	Matrix Spike Duplicate	115.
107084	QC359605	EPA8260	Toluene-d8	Surrogate Spike	114.
107084	QC359605	EPA8260	Trichloroethene (TCE)	Matrix Spike Duplicate	105.
107222	QC358115	EPA8080	Aldrin	Matrix Spike	0.00
107222	QC358115	EPA8080	Dieldrin	Matrix Spike	
107222	QC358115	EPA8080	Endrin	Matrix Spike	0.00
107222	QC358115	EPA8080	Heptachlor	Matrix Spike	0.00
107222	QC358115	EPA8080	Restneide surrogate	Surrogate Spike	0.00
107222	QC358115	EPA8080	Tetrachloro-m-xylene	Surrogate Spike	0.00
107222	QC358115	EPA8080	gamma-Benzene hexachloride (Lindane)	Matrix Spike	
107222	QC358115	EPA8080	p,p'-DDT	Matrix Spike	0.00
107225	QC358116	EPA8080	Restneide surrogate	Surrogate Spike	84.6
107225	QC358116	EPA8080	Tetrachloro-m-xylene	Surrogate Spike	72.8
107225	QC359633	EPA415.1	Total Organic Carbon	Matrix Spike	88.3
LB	96-04-172-01 S	LANLMLR100MOD	Gross Alpha	Blank Spike	84.90
LB	96-04-172-01 S	LANLMLR100MOD	Non-volatile Beta	Blank Spike	81.01
LB	96-04-182-01 S	LANLMLR100MOD	Gross Alpha	Blank Spike	99.97
LB	96-04-182-01 S	LANLMLR100MOD	Non-volatile Beta	Blank Spike	99.19
LB	96-04-183-01 S	EPA900.0MOD	Gross Alpha	Blank Spike	85.07
LB	96-04-183-01 S	EPA900.0MOD	Non-volatile Beta	Blank Spike	93.66
LB	96-04-200-01 S	EPA900.0MOD	Gross Alpha	Blank Spike	98.20
LB	96-04-200-01 S	EPA900.0MOD	Non-volatile Beta	Blank Spike	98.09
LB	96-04-201-01 S	LANLMLR100MOD	Gross Alpha	Blank Spike	104.31
LB	96-04-201-01 S	LANLMLR100MOD	Non-volatile Beta	Blank Spike	102.83

Table 6.1. Percent Recoveries for Matrix Spikes, continued

Sample ID	Laboratory ID	Method	Analyses	Type of Spike	Percent Recovery
LB	96C0258-LC1 S	EPA7471	Mercury	Blank Spike	99.9
LB	96C0258-LC2 S	EPA7471	Mercury	Blank Spike	99.9
LB	96C0261-LC1 S	EPA7470	Mercury	Blank Spike	107.0
LB	96C0261-LC2 S	EPA7470	Mercury	Blank Spike	106.0
LB	96L0843-LC1 S	EPA6010	Aluminum	Blank Spike	98.9
LB	96L0843-LC1 S	EPA6010	Antimony	Blank Spike	98.9
LB	96L0843-LC1 S	EPA6010	Arsenic	Blank Spike	100.0
LB	96L0843-LC1 S	EPA6010	Barium	Blank Spike	97.5
LB	96L0843-LC1 S	EPA6010	Beryllium	Blank Spike	100.0
LB	96L0843-LC1 S	EPA6010	Cadmium	Blank Spike	99.6
LB	96L0843-LC1 S	EPA6010	Calcium	Blank Spike	101.0
LB	96L0843-LC1 S	EPA6010	Chromium	Blank Spike	96.2
LB	96L0843-LC1 S	EPA6010	Cobalt	Blank Spike	103.0
LB	96L0843-LC1 S	EPA6010	Copper	Blank Spike	97.9
LB	96L0843-LC1 S	EPA6010	Iron	Blank Spike	100.0
LB	96L0843-LC1 S	EPA6010	Lead	Blank Spike	100.0
LB	96L0843-LC1 S	EPA6010	Magnesium	Blank Spike	103.0
LB	96L0843-LC1 S	EPA6010	Manganese	Blank Spike	104.0
LB	96L0843-LC1 S	EPA6010	Nickel	Blank Spike	99.4
LB	96L0843-LC1 S	EPA6010	Potassium	Blank Spike	102.0
LB	96L0843-LC1 S	EPA6010	Selenium	Blank Spike	101.0
LB	96L0843-LC1 S	EPA6010	Silver	Blank Spike	98.6
LB	96L0843-LC1 S	EPA6010	Sodium	Blank Spike	97.8
LB	96L0843-LC1 S	EPA6010	Thallium	Blank Spike	99.3
LB	96L0843-LC1 S	EPA6010	Vanadium	Blank Spike	101.0
LB	96L0843-LC1 S	EPA6010	Zinc	Blank Spike	99.7
LB	96L0893-LC1 S	EPA6010	Aluminum	Blank Spike	101.0
LB	96L0893-LC1 S	EPA6010	Antimony	Blank Spike	98.9
LB	96L0893-LC1 S	EPA6010	Arsenic	Blank Spike	101.0
LB	96L0893-LC1 S	EPA6010	Barium	Blank Spike	101.0
LB	96L0893-LC1 S	EPA6010	Beryllium	Blank Spike	102.0
LB	96L0893-LC1 S	EPA6010	Cadmium	Blank Spike	104.0
LB	96L0893-LC1 S	EPA6010	Calcium	Blank Spike	101.0
LB	96L0893-LC1 S	EPA6010	Chromium	Blank Spike	101.0

Table 6.1. Percent Recoveries for Matrix Spikes, continued

Sample ID	Laboratory ID	Method	Analyses	Type of Spike	Percent Recovery
LB	96L0893-LC1 S	EPA6010	Cobalt	Blank Spike	99.7
LB	96L0893-LC1 S	EPA6010	Copper	Blank Spike	101.0
LB	96L0893-LC1 S	EPA6010	Iron	Blank Spike	102.0
LB	96L0893-LC1 S	EPA6010	Lead	Blank Spike	102.0
LB	96L0893-LC1 S	EPA6010	Magnesium	Blank Spike	105.0
LB	96L0893-LC1 S	EPA6010	Manganese	Blank Spike	101.0
LB	96L0893-LC1 S	EPA6010	Nickel	Blank Spike	96.6
LB	96L0893-LC1 S	EPA6010	Potassium	Blank Spike	99.2
LB	96L0893-LC1 S	EPA6010	Selenium	Blank Spike	103.0
LB	96L0893-LC1 S	EPA6010	Silver	Blank Spike	101.0
LB	96L0893-LC1 S	EPA6010	Sodium	Blank Spike	101.0
LB	96L0893-LC1 S	EPA6010	Thallium	Blank Spike	102.0
LB	96L0893-LC1 S	EPA6010	Vanadium	Blank Spike	98.2
LB	96L0893-LC1 S	EPA6010	Zinc	Blank Spike	102.0
LB	96L0894-LC1 S	EPA6010	Aluminum	Blank Spike	101.0
LB	96L0894-LC1 S	EPA6010	Antimony	Blank Spike	98.6
LB	96L0894-LC1 S	EPA6010	Arsenic	Blank Spike	99.2
LB	96L0894-LC1 S	EPA6010	Barium	Blank Spike	98.2
LB	96L0894-LC1 S	EPA6010	Beryllium	Blank Spike	101.0
LB	96L0894-LC1 S	EPA6010	Cadmium	Blank Spike	97.3
LB	96L0894-LC1 S	EPA6010	Calcium	Blank Spike	101.0
LB	96L0894-LC1 S	EPA6010	Chromium	Blank Spike	101.0
LB	96L0894-LC1 S	EPA6010	Cobalt	Blank Spike	102.0
LB	96L0894-LC1 S	EPA6010	Copper	Blank Spike	98.7
LB	96L0894-LC1 S	EPA6010	Iron	Blank Spike	101.0
LB	96L0894-LC1 S	EPA6010	Lead	Blank Spike	99.7
LB	96L0894-LC1 S	EPA6010	Magnesium	Blank Spike	107.0
LB	96L0894-LC1 S	EPA6010	Manganese	Blank Spike	102.0
LB	96L0894-LC1 S	EPA6010	Nickel	Blank Spike	98.4
LB	96L0894-LC1 S	EPA6010	Potassium	Blank Spike	97.9
LB	96L0894-LC1 S	EPA6010	Selenium	Blank Spike	99.7
LB	96L0894-LC1 S	EPA6010	Silver	Blank Spike	101.0
LB	96L0894-LC1 S	EPA6010	Sodium	Blank Spike	99.5
LB	96L0894-LC1 S	EPA6010	Thallium	Blank Spike	98.4

Table 6.1. Percent Recoveries for Matrix Spikes, continued

Sample ID	Laboratory ID	Method	Analyses	Type of Spike	Percent Recovery
LB	96L0894-LC1 S	EPA6010	Vanadium	Blank Spike	100.0
LB	96L0894-LC1 S	EPA6010	Zinc	Blank Spike	98.9
LB	96L0897-LC1 S	EPA6010	Aluminum	Blank Spike	101.0
LB	96L0897-LC1 S	EPA6010	Antimony	Blank Spike	97.2
LB	96L0897-LC1 S	EPA6010	Arsenic	Blank Spike	95.8
LB	96L0897-LC1 S	EPA6010	Barium	Blank Spike	97.9
LB	96L0897-LC1 S	EPA6010	Beryllium	Blank Spike	98.4
LB	96L0897-LC1 S	EPA6010	Cadmium	Blank Spike	96.0
LB	96L0897-LC1 S	EPA6010	Calcium	Blank Spike	98.2
LB	96L0897-LC1 S	EPA6010	Chromium	Blank Spike	98.2
LB	96L0897-LC1 S	EPA6010	Cobalt	Blank Spike	98.7
LB	96L0897-LC1 S	EPA6010	Copper	Blank Spike	98.2
LB	96L0897-LC1 S	EPA6010	Iron	Blank Spike	99.1
LB	96L0897-LC1 S	EPA6010	Lead	Blank Spike	97.6
LB	96L0897-LC1 S	EPA6010	Magnesium	Blank Spike	103.0
LB	96L0897-LC1 S	EPA6010	Manganese	Blank Spike	100.0
LB	96L0897-LC1 S	EPA6010	Nickel	Blank Spike	95.8
LB	96L0897-LC1 S	EPA6010	Potassium	Blank Spike	99.0
LB	96L0897-LC1 S	EPA6010	Selenium	Blank Spike	98.1
LB	96L0897-LC1 S	EPA6010	Silver	Blank Spike	99.2
LB	96L0897-LC1 S	EPA6010	Sodium	Blank Spike	99.4
LB	96L0897-LC1 S	EPA6010	Thallium	Blank Spike	96.6
LB	96L0897-LC1 S	EPA6010	Vanadium	Blank Spike	98.2
LB	96L0897-LC1 S	EPA6010	Zinc	Blank Spike	97.3
LB	96L0900-LC1 S	EPA6010	Aluminum	Blank Spike	100.0
LB	96L0900-LC1 S	EPA6010	Barium	Blank Spike	98.9
LB	96L0900-LC1 S	EPA6010	Beryllium	Blank Spike	101.0
LB	96L0900-LC1 S	EPA6010	Chromium	Blank Spike	102.0
LB	96L0900-LC1 S	EPA6010	Cobalt	Blank Spike	101.0
LB	96L0900-LC1 S	EPA6010	Copper	Blank Spike	99.1
LB	96L0900-LC1 S	EPA6010	Iron	Blank Spike	101.0
LB	96L0900-LC1 S	EPA6010	Manganese	Blank Spike	101.0
LB	96L0900-LC1 S	EPA6010	Nickel	Blank Spike	98.8
LB	96L0900-LC1 S	EPA6010	Vanadium	Blank Spike	99.4

Table 6.1. Percent Recoveries for Matrix Spikes, continued

Sample ID	Laboratory ID	Method	Analyses	Type of Spike	Percent Recovery
LB	96L0900-LC1 S	EPA6010	Zinc	Blank Spike	100.0
LB	96LC068-LC1 S	EPA9010	Cyanide	Blank Spike	89.2
LB	96LC068-LC2 S	EPA9010	Cyanide	Blank Spike	95.0
LB	96LC070-LC1 S	EPA9010	Cyanide	Blank Spike	95.8
LB	96LC070-LC2 S	EPA9010	Cyanide	Blank Spike	92.0
LB	96LC071-LC1 S	EPA9010	Cyanide	Blank Spike	98.6
LB	96LC071-LC2 S	EPA9010	Cyanide	Blank Spike	94.5
LB	96LC071A-LC1 S	EPA9010	Cyanide	Blank Spike	98.6
LB	96LC071A-LC2 S	EPA9010	Cyanide	Blank Spike	94.5
LB	96LCE004-MB1 S	EPA9081	Cation exchange capacity	Blank Spike	92.2
LB	96LCE005-MB1 S	EPA9081	Cation exchange capacity	Blank Spike	89.8
LB	96LE0648-MB1 S	EPA8081	Aldrin	Blank Spike	65.0
LB	96LE0648-MB1 S	EPA8081	Decachlorobiphenyl	Surrogate Spike	71.0
LB	96LE0648-MB1 S	EPA8081	Dieldrin	Blank Spike	68.0
LB	96LE0648-MB1 S	EPA8081	Endrin	Blank Spike	78.0
LB	96LE0648-MB1 S	EPA8081	Heptachlor	Blank Spike	75.0
LB	96LE0648-MB1 S	EPA8081	Tetrachloro-m-xylene	Surrogate Spike	65.0
LB	96LE0648-MB1 S	EPA8081	gamma-Benzene hexachloride (Lindane)	Blank Spike	70.0
LB	96LE0648-MB1 S	EPA8081	p,p'-DDT	Blank Spike	74.0
LB	96LE0668-MB1 S	EPA8270	1,2,4-Trichlorobenzene	Blank Spike	70.0
LB	96LE0668-MB1 S	EPA8270	1,4-Dichlorobenzene	Blank Spike	68.0
LB	96LE0668-MB1 S	EPA8270	2,4,6-Tribromophenol (surr)	Surrogate Spike	61.5
LB	96LE0668-MB1 S	EPA8270	2,4-Dinitrotoluene	Blank Spike	67.8
LB	96LE0668-MB1 S	EPA8270	2-Chlorophenol	Blank Spike	69.8
LB	96LE0668-MB1 S	EPA8270	2-Fluorobiphenyl	Surrogate Spike	62.1
LB	96LE0668-MB1 S	EPA8270	2-Fluorophenol	Surrogate Spike	58.5
LB	96LE0668-MB1 S	EPA8270	4-Chloro-3-methylphenol (p-chloro-m-cresol)	Blank Spike	79.9
LB	96LE0668-MB1 S	EPA8270	4-Nitrophenol	Blank Spike	56.2
LB	96LE0668-MB1 S	EPA8270	Acenapthene	Blank Spike	75.9
LB	96LE0668-MB1 S	EPA8270	N-Nitrosodi-n-propylamine	Blank Spike	67.3
LB	96LE0668-MB1 S	EPA8270	Nitrobenzene-d5	Surrogate Spike	56.3
LB	96LE0668-MB1 S	EPA8270	Pentachlorophenol	Blank Spike	73.0
LB	96LE0668-MB1 S	EPA8270	Phenol	Blank Spike	72.0
LB	96LE0668-MB1 S	EPA8270	Phenol-d5	Surrogate Spike	62.3

Table 6.1. Percent Recoveries for Matrix Spikes, continued

Sample ID	Laboratory ID	Method	Analyses	Type of Spike	Percent Recovery
LB	96LE0668-MB1 S	EPA8270	Pyrene	Blank Spike	97.5
LB	96LE0668-MB1 S	EPA8270	p-Terphenyl-d14	Surrogate Spike	76.6
LB	96LE0672-MB1 S	EPA8270	1,2,4-Trichlorobenzene	Blank Spike	52.8
LB	96LE0672-MB1 S	EPA8270	1,4-Dichlorobenzene	Blank Spike	52.1
LB	96LE0672-MB1 S	EPA8270	2,4,6-Tribromophenol (surr)	Surrogate Spike	66.4
LB	96LE0672-MB1 S	EPA8270	2,4-Dinitrotoluene	Blank Spike	70.3
LB	96LE0672-MB1 S	EPA8270	2-Chlorophenol	Blank Spike	65.4
LB	96LE0672-MB1 S	EPA8270	2-Fluorobiphenyl	Surrogate Spike	61.0
LB	96LE0672-MB1 S	EPA8270	2-Fluorophenol	Surrogate Spike	60.4
LB	96LE0672-MB1 S	EPA8270	4-Chloro-3-methylphenol (p-chloro-m-cresol)	Blank Spike	69.1
LB	96LE0672-MB1 S	EPA8270	4-Nitrophenol	Blank Spike	71.0
LB	96LE0672-MB1 S	EPA8270	Acenapthene	Blank Spike	64.6
LB	96LE0672-MB1 S	EPA8270	N-Nitrosodi-n-propylamine	Blank Spike	77.6
LB	96LE0672-MB1 S	EPA8270	Nitrobenzene-d5	Surrogate Spike	61.1
LB	96LE0672-MB1 S	EPA8270	Pentachlorophenol	Blank Spike	62.6
LB	96LE0672-MB1 S	EPA8270	Phenol	Blank Spike	71.0
LB	96LE0672-MB1 S	EPA8270	Phenol-d5	Surrogate Spike	65.8
LB	96LE0672-MB1 S	EPA8270	Pyrene	Blank Spike	82.3
LB	96LE0673-MB1 S	EPA8081	p-Terphenyl-d14	Surrogate Spike	80.4
LB	96LE0673-MB1 S	EPA8081	Aldrin	Blank Spike	85.0
LB	96LE0673-MB1 S	EPA8081	Decachlorobiphenyl	Surrogate Spike	96.0
LB	96LE0673-MB1 S	EPA8081	Dieldrin	Blank Spike	96.0
LB	96LE0673-MB1 S	EPA8081	Endrin	Blank Spike	102.0
LB	96LE0673-MB1 S	EPA8081	Heptachlor	Blank Spike	80.0
LB	96LE0673-MB1 S	EPA8081	Tetrachloro-m-xylene	Surrogate Spike	77.5
LB	96LE0673-MB1 S	EPA8081	gamma-Benzene hexachloride (Lindane)	Blank Spike	90.0
LB	96LE0673-MB1 S	EPA8081	p,p'-DDT	Blank Spike	90.0
LB	96LE0675-MB1 S	EPA8270	1,2,4-Trichlorobenzene	Blank Spike	76.5
LB	96LE0675-MB1 S	EPA8270	1,4-Dichlorobenzene	Blank Spike	68.6
LB	96LE0675-MB1 S	EPA8270	2,4,6-Tribromophenol (surr)	Surrogate Spike	72.3
LB	96LE0675-MB1 S	EPA8270	2,4-Dinitrotoluene	Blank Spike	70.4
LB	96LE0675-MB1 S	EPA8270	2-Chlorophenol	Blank Spike	77.7
LB	96LE0675-MB1 S	EPA8270	2-Fluorobiphenyl	Surrogate Spike	78.2
LB	96LE0675-MB1 S	EPA8270	2-Fluorophenol	Surrogate Spike	78.0

Table 6.1. Percent Recoveries for Matrix Spikes, continued

Sample ID	Laboratory ID	Method	Analyses	Type of Spike	Percent Recovery
LB	96LE0675-MB1 S	EPA8270	4-Chloro-3-methylphenol (p-chloro-m-cresol)	Blank Spike	74.7
LB	96LE0675-MB1 S	EPA8270	4-Nitrophenol	Blank Spike	64.0
LB	96LE0675-MB1 S	EPA8270	Acenapthene	Blank Spike	77.7
LB	96LE0675-MB1 S	EPA8270	N-Nitrosodi-n-propylamine	Blank Spike	71.3
LB	96LE0675-MB1 S	EPA8270	Nitrobenzene-d5	Surrogate Spike	71.3
LB	96LE0675-MB1 S	EPA8270	Pentachlorophenol	Blank Spike	57.6
LB	96LE0675-MB1 S	EPA8270	Phenol	Blank Spike	78.4
LB	96LE0675-MB1 S	EPA8270	Phenol-d5	Surrogate Spike	75.5
LB	96LE0675-MB1 S	EPA8270	Pyrene	Blank Spike	82.3
LB	96LE0675-MB1 S	EPA8270	p-Terphenyl-d14	Surrogate Spike	82.2
LB	96LE0676-MB1 S	EPA8081	Aldrin	Blank Spike	85.0
LB	96LE0676-MB1 S	EPA8081	Decachlorobiphenyl	Surrogate Spike	74.0
LB	96LE0676-MB1 S	EPA8081	Dieldrin	Blank Spike	94.0
LB	96LE0676-MB1 S	EPA8081	Endrin	Blank Spike	100.0
LB	96LE0676-MB1 S	EPA8081	Heptachlor	Blank Spike	90.0
LB	96LE0676-MB1 S	EPA8081	Tetrachloro-m-xylene	Surrogate Spike	57.5
LB	96LE0676-MB1 S	EPA8081	gamma-Benzene hexachloride (Lindane)	Blank Spike	85.0
LB	96LE0676-MB1 S	EPA8081	p,p'-DDT	Blank Spike	98.0
LB	96LE0687-MB1 S	EPA8270	1,2,4-Trichlorobenzene	Blank Spike	49.5
LB	96LE0687-MB1 S	EPA8270	1,4-Dichlorobenzene	Blank Spike	46.0
LB	96LE0687-MB1 S	EPA8270	2,4,6-Tribromophenol (surr)	Surrogate Spike	62.3
LB	96LE0687-MB1 S	EPA8270	2,4-Dinitrotoluene	Blank Spike	71.5
LB	96LE0687-MB1 S	EPA8270	2-Chlorophenol	Blank Spike	63.0
LB	96LE0687-MB1 S	EPA8270	2-Fluorobiphenyl	Surrogate Spike	63.4
LB	96LE0687-MB1 S	EPA8270	2-Fluorophenol	Surrogate Spike	60.3
LB	96LE0687-MB1 S	EPA8270	4-Chloro-3-methylphenol (p-chloro-m-cresol)	Blank Spike	65.5
LB	96LE0687-MB1 S	EPA8270	4-Nitrophenol	Blank Spike	68.0
LB	96LE0687-MB1 S	EPA8270	Acenapthene	Blank Spike	62.6
LB	96LE0687-MB1 S	EPA8270	N-Nitrosodi-n-propylamine	Blank Spike	73.0
LB	96LE0687-MB1 S	EPA8270	Nitrobenzene-d5	Surrogate Spike	68.7
LB	96LE0687-MB1 S	EPA8270	Pentachlorophenol	Blank Spike	63.2
LB	96LE0687-MB1 S	EPA8270	Phenol	Blank Spike	63.4
LB	96LE0687-MB1 S	EPA8270	Phenol-d5	Surrogate Spike	66.5
LB	96LE0687-MB1 S	EPA8270	Pyrene	Blank Spike	94.2

Table 6.1. Percent Recoveries for Matrix Spikes, continued

Sample ID	Laboratory ID	Method	Analyses	Type of Spike	Percent Recovery
LB	96LE0687-MB1 S	EPA8270	p-Terphenyl-d14	Surrogate Spike	97.7
LB	96LE0690-MB1 S	EPA8081	Aldrin	Blank Spike	30.0
LB	96LE0690-MB1 S	EPA8081	Decachlorobiphenyl	Surrogate Spike	70.0
LB	96LE0690-MB1 S	EPA8081	Dieldrin	Blank Spike	38.0
LB	96LE0690-MB1 S	EPA8081	Endrin	Blank Spike	38.0
LB	96LE0690-MB1 S	EPA8081	Heptachlor	Blank Spike	30.0
LB	96LE0690-MB1 S	EPA8081	Tetrachloro-m-xylene	Surrogate Spike	47.5
LB	96LE0690-MB1 S	EPA8081	gamma-Benzene hexachloride (Lindane)	Blank Spike	35.0
LB	96LE0700-MB1 S	EPA8270	p,p'-DDT	Blank Spike	40.0
LB	96LE0700-MB1 S	EPA8270	1,2,4-Trichlorobenzene	Blank Spike	63.6
LB	96LE0700-MB1 S	EPA8270	1,4-Dichlorobenzene	Blank Spike	62.2
LB	96LE0700-MB1 S	EPA8270	2,4,6-Tribromophenol (surr)	Surrogate Spike	71.4
LB	96LE0700-MB1 S	EPA8270	2,4-Dinitrotoluene	Blank Spike	61.7
LB	96LE0700-MB1 S	EPA8270	2-Chlorophenol	Blank Spike	62.6
LB	96LE0700-MB1 S	EPA8270	2-Fluorobiphenyl	Surrogate Spike	70.6
LB	96LE0700-MB1 S	EPA8270	2-Fluorophenol	Surrogate Spike	72.0
LB	96LE0700-MB1 S	EPA8270	4-Chloro-3-methylphenol (p-chloro-m-cresol)	Blank Spike	64.8
LB	96LE0700-MB1 S	EPA8270	4-Nitrophenol	Blank Spike	58.2
LB	96LE0700-MB1 S	EPA8270	Acenapthene	Blank Spike	65.5
LB	96LE0700-MB1 S	EPA8270	N-Nitrosodi-n-propylamine	Blank Spike	61.6
LB	96LE0700-MB1 S	EPA8270	Nitrobenzene-d5	Surrogate Spike	67.7
LB	96LE0700-MB1 S	EPA8270	Pentachlorophenol	Blank Spike	52.2
LB	96LE0700-MB1 S	EPA8270	Phenol	Blank Spike	62.8
LB	96LE0700-MB1 S	EPA8270	Phenol-d5	Surrogate Spike	71.2
LB	96LE0700-MB1 S	EPA8270	Pyrene	Blank Spike	70.0
LB	96LE0710-MB1 S	EPA8081	p-Terphenyl-d14	Surrogate Spike	85.8
LB	96LE0710-MB1 S	EPA8081	Aldrin	Blank Spike	75.0
LB	96LE0710-MB1 S	EPA8081	Decachlorobiphenyl	Surrogate Spike	88.0
LB	96LE0710-MB1 S	EPA8081	Dieldrin	Blank Spike	86.0
LB	96LE0710-MB1 S	EPA8081	Endrin	Blank Spike	88.0
LB	96LE0710-MB1 S	EPA8081	Heptachlor	Blank Spike	80.0
LB	96LE0710-MB1 S	EPA8081	Tetrachloro-m-xylene	Surrogate Spike	75.0
LB	96LE0710-MB1 S	EPA8081	gamma-Benzene hexachloride (Lindane)	Blank Spike	70.0
LB	96LE0710-MB1 S	EPA8081	p,p'-DDT	Blank Spike	90.0

Table 6.1. Percent Recoveries for Matrix Spikes, continued

Sample ID	Laboratory ID	Method	Analyses	Type of Spike	Percent Recovery
LB	96LHC045-MB1 S	EPA9071	Total petroleum hydrocarbons	Blank Spike	109.0
LB	96LHCA43-MB1 S	EPA418.1	Total petroleum hydrocarbons	Blank Spike	105.0
LB	96LHCA45-MB1 S	EPA418.1	Total petroleum hydrocarbons	Blank Spike	109.0
LB	96LTZ018-MB1 S	LLOYDKAHN	Total Organic Carbon	Blank Spike	92.4
LB	96LTZ019-MB1 S	LLOYDKAHN	Total Organic Carbon	Blank Spike	97.5
LB	96LVC083-MB1 S	EPA8240	1,2-Dichloroethane-d4	Surrogate Spike	106.0
LB	96LVC083-MB1 S	EPA8240	Toluene-d8	Surrogate Spike	102.0
LB	96LVC083-MB1 S	EPA8240	p-Bromofluorobenzene	Surrogate Spike	101.0
LB	96LVC084-MB1 S	EPA8240	1,1-Dichloroethene	Blank Spike	94.0
LB	96LVC084-MB1 S	EPA8240	1,2-Dichloroethane-d4	Surrogate Spike	97.0
LB	96LVC084-MB1 S	EPA8240	Benzene	Blank Spike	101.0
LB	96LVC084-MB1 S	EPA8240	Chlorobenzene	Blank Spike	101.0
LB	96LVC084-MB1 S	EPA8240	Toluene	Blank Spike	100.0
LB	96LVC084-MB1 S	EPA8240	Toluene-d8	Surrogate Spike	98.0
LB	96LVC084-MB1 S	EPA8240	Trichloroethene (TCE)	Blank Spike	101.0
LB	96LVC084-MB1 S	EPA8240	p-Bromofluorobenzene	Surrogate Spike	96.0
LB	96LVN093-MB1 S	EPA8240	1,2-Dichloroethane-d4	Surrogate Spike	103.0
LB	96LVN093-MB1 S	EPA8240	Toluene-d8	Surrogate Spike	102.0
LB	96LVN093-MB1 S	EPA8240	p-Bromofluorobenzene	Surrogate Spike	95.0
LB	96LVX077-MB1 S	EPA8240	1,1-Dichloroethene	Blank Spike	103.0
LB	96LVX077-MB1 S	EPA8240	1,2-Dichloroethane-d4	Surrogate Spike	100.0
LB	96LVX077-MB1 S	EPA8240	Benzene	Blank Spike	100.0
LB	96LVX077-MB1 S	EPA8240	Chlorobenzene	Blank Spike	105.0
LB	96LVX077-MB1 S	EPA8240	Toluene	Blank Spike	100.0
LB	96LVX077-MB1 S	EPA8240	Toluene-d8	Surrogate Spike	99.0
LB	96LVX077-MB1 S	EPA8240	Trichloroethene (TCE)	Blank Spike	105.0
LB	96LVX077-MB1 S	EPA8240	p-Bromofluorobenzene	Surrogate Spike	93.0
LB	96LVX079-MB1 S	EPA8240	1,1-Dichloroethene	Blank Spike	83.6
LB	96LVX079-MB1 S	EPA8240	1,2-Dichloroethane-d4	Surrogate Spike	98.0
LB	96LVX079-MB1 S	EPA8240	Benzene	Blank Spike	103.0
LB	96LVX079-MB1 S	EPA8240	Chlorobenzene	Blank Spike	101.0
LB	96LVX079-MB1 S	EPA8240	Toluene	Blank Spike	99.1
LB	96LVX079-MB1 S	EPA8240	Toluene-d8	Surrogate Spike	97.0
LB	96LVX079-MB1 S	EPA8240	Trichloroethene (TCE)	Blank Spike	100.0

Table 6.1. Percent Recoveries for Matrix Spikes, continued

Sample ID	Laboratory ID	Method	Analyses	Type of Spike	Percent Recovery
LB	96LVX079-MB1 S	EPA8240	p-Bromofluorobenzene	Surrogate Spike	92.0
LB	96LVX080-MB1 S	EPA8240	1,2-Dichloroethane-d4	Surrogate Spike	95.0
LB	96LVX080-MB1 S	EPA8240	Toluene-d8	Surrogate Spike	96.0
LB	96LVX080-MB1 S	EPA8240	p-Bromofluorobenzene	Surrogate Spike	87.0
LB	96LVX081-MB1 S	EPA8240	1,2-Dichloroethane-d4	Surrogate Spike	91.0
LB	96LVX081-MB1 S	EPA8240	Toluene-d8	Surrogate Spike	95.0
LB	96LVX081-MB1 S	EPA8240	p-Bromofluorobenzene	Surrogate Spike	90.0
LB	96LVX082-MB1 S	EPA8240	1,1-Dichloroethene	Blank Spike	112.0
LB	96LVX082-MB1 S	EPA8240	1,2-Dichloroethane-d4	Surrogate Spike	111.0
LB	96LVX082-MB1 S	EPA8240	Benzene	Blank Spike	102.0
LB	96LVX082-MB1 S	EPA8240	Chlorobenzene	Blank Spike	101.0
LB	96LVX082-MB1 S	EPA8240	Toluene	Blank Spike	105.0
LB	96LVX082-MB1 S	EPA8240	Toluene-d8	Surrogate Spike	105.0
LB	96LVX082-MB1 S	EPA8240	Trichloroethene (TCE)	Blank Spike	104.0
LB	96LVX082-MB1 S	EPA8240	p-Bromofluorobenzene	Surrogate Spike	98.0
LB	QC357081	EPA8270	2,4,6-Tribromophenol (surr)	Surrogate Spike	94.5
LB	QC357081	EPA8270	2-Fluorobiphenyl	Surrogate Spike	78.9
LB	QC357081	EPA8270	2-Fluorophenol	Surrogate Spike	67.7
LB	QC357081	EPA8270	Nitrobenzene-d5	Surrogate Spike	76.7
LB	QC357081	EPA8270	Phenol-d6	Surrogate Spike	79.6
LB	QC357081	EPA8270	p-Terphenyl-d14	Surrogate Spike	103.
LB	QC357082	EPA8270	1,2,4-Trichlorobenzene	Blank Spike	75.6
LB	QC357082	EPA8270	1,4-Dichlorobenzene	Blank Spike	77.8
LB	QC357082	EPA8270	2,4,6-Tribromophenol (surr)	Surrogate Spike	98.9
LB	QC357082	EPA8270	2,4-Dinitrotoluene	Blank Spike	103.
LB	QC357082	EPA8270	2-Chlorophenol	Blank Spike	79.0
LB	QC357082	EPA8270	2-Fluorobiphenyl	Surrogate Spike	81.6
LB	QC357082	EPA8270	2-Fluorophenol	Surrogate Spike	83.3
LB	QC357082	EPA8270	4-Chloro-3-methylphenol (p-chloro-m-cresol)	Blank Spike	89.6
LB	QC357082	EPA8270	4-Nitrophenol	Blank Spike	80.0
LB	QC357082	EPA8270	Acenapthene	Blank Spike	86.2
LB	QC357082	EPA8270	N-Nitrosodi-n-propylamine	Blank Spike	83.0
LB	QC357082	EPA8270	Nitrobenzene-d5	Surrogate Spike	79.6
LB	QC357082	EPA8270	Pentachlorophenol	Blank Spike	103.

Table 6.1. Percent Recoveries for Matrix Spikes, continued

Sample ID	Laboratory ID	Method	Analyses	Type of Spike	Percent Recovery
LB	QC357082	EPA8270	Phenol	Blank Spike	80.0
LB	QC357082	EPA8270	Phenol-d6	Surrogate Spike	80.0
LB	QC357082	EPA8270	Pyrene	Blank Spike	107.
LB	QC357082	EPA8270	p-Terphenyl-d14	Surrogate Spike	107.
LB	QC357083	EPA8270	1,2,4-Trichlorobenzene	Blank Spike Duplicate	81.2
LB	QC357083	EPA8270	1,4-Dichlorobenzene	Blank Spike Duplicate	80.0
LB	QC357083	EPA8270	2,4,6-Tribromophenol (surr)	Surrogate Spike	95.4
LB	QC357083	EPA8270	2,4-Dinitrotoluene	Blank Spike Duplicate	100.
LB	QC357083	EPA8270	2-Chlorophenol	Blank Spike Duplicate	82.0
LB	QC357083	EPA8270	2-Fluorobiphenyl	Surrogate Spike	88.4
LB	QC357083	EPA8270	2-Fluorophenol	Surrogate Spike	87.0
LB	QC357083	EPA8270	4-Chloro-3-methylphenol (p-chloro-m-cresol)	Blank Spike Duplicate	79.9
LB	QC357083	EPA8270	4-Nitrophenol	Blank Spike Duplicate	78.9
LB	QC357083	EPA8270	Acenapthene	Blank Spike Duplicate	87.6
LB	QC357083	EPA8270	N-Nitrosodi-n-propylamine	Blank Spike Duplicate	84.0
LB	QC357083	EPA8270	Nitrobenzene-d5	Surrogate Spike	86.8
LB	QC357083	EPA8270	Pentachlorophenol	Blank Spike Duplicate	107.
LB	QC357083	EPA8270	Phenol	Blank Spike Duplicate	77.9
LB	QC357083	EPA8270	Phenol-d6	Surrogate Spike	88.6
LB	QC357083	EPA8270	Pyrene	Blank Spike Duplicate	108.
LB	QC357083	EPA8270	p-Terphenyl-d14	Surrogate Spike	104.
LB	QC357210	EPA418.1	Total petroleum hydrocarbons	Blank Spike	82.6
LB	QC357211	EPA418.1	Total petroleum hydrocarbons	Blank Spike Duplicate	69.1
LB	QC357266	EPA7471	Mercury	Blank Spike	81.7
LB	QC357267	EPA7471	Mercury	Blank Spike Duplicate	91.9
LB	QC357957	EPA335.3	Cyanide	Blank Spike	107.
LB	QC357958	EPA335.3	Cyanide	Blank Spike Duplicate	127.
LB	QC357962	EPIA-001B	Gross Alpha	Blank Spike	81.0
LB	QC357962	EPIA-001B	Non-volatile Beta	Blank Spike	96.7
LB	QC358112	EPA8080	Restneide surrogate	Surrogate Spike	99.7
LB	QC358112	EPA8080	Tetrachloro-m-xylene	Surrogate Spike	78.1
LB	QC358113	EPA8080	Aldrin	Blank Spike	104.
LB	QC358113	EPA8080	Dieldrin	Blank Spike	113.
LB	QC358113	EPA8080	Endrin	Blank Spike	102.

Table 6.1. Percent Recoveries for Matrix Spikes, continued

Sample ID	Laboratory ID	Method	Analyses	Type of Spike	Percent Recovery
LB	QC358113	EPA8080	Heptachlor	Blank Spike	114.
LB	QC358113	EPA8080	Restneide surrogate	Surrogate Spike	109.
LB	QC358113	EPA8080	Tetrachloro-m-xylene	Surrogate Spike	83.0
LB	QC358113	EPA8080	gamma-Benzene hexachloride (Lindane)	Blank Spike	116.
LB	QC358113	EPA8080	p,p'-DDT	Blank Spike	110.
LB	QC358114	EPA8080	Aldrin	Blank Spike Duplicate	108.
LB	QC358114	EPA8080	Dieldrin	Blank Spike Duplicate	114.
LB	QC358114	EPA8080	Endrin	Blank Spike Duplicate	103.
LB	QC358114	EPA8080	Heptachlor	Blank Spike Duplicate	118.
LB	QC358114	EPA8080	Restneide surrogate	Surrogate Spike	108.
LB	QC358114	EPA8080	Tetrachloro-m-xylene	Surrogate Spike	82.4
LB	QC358114	EPA8080	gamma-Benzene hexachloride (Lindane)	Blank Spike Duplicate	119.
LB	QC358114	EPA8080	p,p'-DDT	Blank Spike Duplicate	111.
LB	QC358820	EPA6010A	Aluminum	Blank Spike	75.0
LB	QC358820	EPA6010A	Antimony	Blank Spike	82.1
LB	QC358820	EPA6010A	Arsenic	Blank Spike	105.
LB	QC358820	EPA6010A	Barium	Blank Spike	103.
LB	QC358820	EPA6010A	Beryllium	Blank Spike	110.
LB	QC358820	EPA6010A	Cadmium	Blank Spike	98.9
LB	QC358820	EPA6010A	Calcium	Blank Spike	97.0
LB	QC358820	EPA6010A	Chromium	Blank Spike	93.8
LB	QC358820	EPA6010A	Cobalt	Blank Spike	109.
LB	QC358820	EPA6010A	Copper	Blank Spike	102.
LB	QC358820	EPA6010A	Iron	Blank Spike	58.1
LB	QC358820	EPA6010A	Lead	Blank Spike	98.4
LB	QC358820	EPA6010A	Magnesium	Blank Spike	93.7
LB	QC358820	EPA6010A	Manganese	Blank Spike	89.1
LB	QC358820	EPA6010A	Nickel	Blank Spike	98.7
LB	QC358820	EPA6010A	Potassium	Blank Spike	95.6
LB	QC358820	EPA6010A	Selenium	Blank Spike	93.2
LB	QC358820	EPA6010A	Silver	Blank Spike	101.
LB	QC358820	EPA6010A	Sodium	Blank Spike	132.
LB	QC358820	EPA6010A	Thallium	Blank Spike	141.
LB	QC358820	EPA6010A	Vanadium	Blank Spike	90.0

Table 6.1. Percent Recoveries for Matrix Spikes, continued

Sample ID	Laboratory ID	Method	Analyses	Type of Spike	Percent Recovery
LB	QC358820	EPA6010A	Zinc	Blank Spike	90.3
LB	QC358821	EPA6010A	Aluminum	Blank Spike Duplicate	70.8
LB	QC358821	EPA6010A	Antimony	Blank Spike Duplicate	71.5
LB	QC358821	EPA6010A	Arsenic	Blank Spike Duplicate	97.1
LB	QC358821	EPA6010A	Barium	Blank Spike Duplicate	98.7
LB	QC358821	EPA6010A	Beryllium	Blank Spike Duplicate	104.
LB	QC358821	EPA6010A	Cadmium	Blank Spike Duplicate	94.1
LB	QC358821	EPA6010A	Calcium	Blank Spike Duplicate	91.9
LB	QC358821	EPA6010A	Chromium	Blank Spike Duplicate	88.8
LB	QC358821	EPA6010A	Cobalt	Blank Spike Duplicate	103.
LB	QC358821	EPA6010A	Copper	Blank Spike Duplicate	96.5
LB	QC358821	EPA6010A	Iron	Blank Spike Duplicate	51.3
LB	QC358821	EPA6010A	Lead	Blank Spike Duplicate	91.9
LB	QC358821	EPA6010A	Magnesium	Blank Spike Duplicate	88.4
LB	QC358821	EPA6010A	Manganese	Blank Spike Duplicate	84.2
LB	QC358821	EPA6010A	Nickel	Blank Spike Duplicate	94.0
LB	QC358821	EPA6010A	Potassium	Blank Spike Duplicate	88.6
LB	QC358821	EPA6010A	Selenium	Blank Spike Duplicate	90.8
LB	QC358821	EPA6010A	Silver	Blank Spike Duplicate	95.1
LB	QC358821	EPA6010A	Sodium	Blank Spike Duplicate	124.
LB	QC358821	EPA6010A	Thallium	Blank Spike Duplicate	134.
LB	QC358821	EPA6010A	Vanadium	Blank Spike Duplicate	83.8
LB	QC358821	EPA6010A	Zinc	Blank Spike Duplicate	85.9
LB	QC359286	EPA9081	Cation exchange capacity	Blank Spike	89.2
LB	QC359287	EPA9081	Cation exchange capacity	Blank Spike Duplicate	87.2
LB	QC359308	EPA8260	1,4-Dichlorobenzene-d4	Surrogate Spike	96.6
LB	QC359308	EPA8260	Dibromofluoromethane	Surrogate Spike	84.2
LB	QC359308	EPA8260	Toluene-d8	Surrogate Spike	105.
LB	QC359602	EPA8260	1,4-Dichlorobenzene-d4	Surrogate Spike	93.2
LB	QC359602	EPA8260	Dibromofluoromethane	Surrogate Spike	84.0
LB	QC359602	EPA8260	Toluene-d8	Surrogate Spike	107.
LB	QC359634	EPA415.1	Total Organic Carbon	Blank Spike	109.
LB	QC359635	EPA415.1	Total Organic Carbon	Blank Spike Duplicate	101.
ZZZZZZZZ	QC357213	EPA418.1	Total petroleum hydrocarbons	Matrix Spike	95.4

Table 6.1. Percent Recoveries for Matrix Spikes, continued

Sample ID	Laboratory ID	Method	Analyses	Type of Spike	Percent Recovery
ZZZZZZZZ	QC357263	EPA7471	Mercury	Matrix Spike	80.6
ZZZZZZZZ.	QC357264	EPA7471	Mercury	Matrix Spike Duplicate	82.0

6.3.12 SURROGATE RECOVERY

Criteria: in **assigning qualifiers based on surrogate recovery, the following criteria were applied:**

Volatiles by Method 8240:	**SW-846, Table 8, page 8240-38**
Volatiles by Method 8260:	**SW-846, Table 9, page 8260A-42**
Pesticides by Method 8080:	**60-150% recovery (from CLP SOW/OLM0 1.0, page D-56/PEST)**
Semivolatiles by Method 8270:	**SW-846, Table 8, page 8270-31**
Herbicides by Method 8 150:	**SW-846, Table 8, page 8150-7**

Action: For a **VOA analysis, when a surrogate recovery is outside method limits, all the** analytes **included in the analysis for the sample require an analysis qualifier, a result qualifier and a bias qualifier as indicated** below.

For a pesticide/PCB analysis, when the surrogate recovery is outside method limits, all analytes included **in the** analysis for the sample require an analysis qualifier, a result qualifier **and** a **bias qualifier as indicated below.**

For an SVOA analysis, when two surrogate recoveries within one fraction (base/neutral or acid) are outside method limits or one surrogate is less than **10%, all** the analytes in that **fraction** require an **analysis** qualifier, a result qualifier and a bias qualifier **as** indicated below.

For a herbicide analysis, when a surrogate recovery is outside method limits, all the analytes included in the analysis for the sample require an analysis qualifier, a result qualifier and a bias qualifier as indicated below.

AQ: ***O***

RQ: ***J*** - for detects ***UJ*** - for non-detects

R - for non-detects with a surrogate recovery < 10%
(when detection does not impact the recovery)
no flag - for non-detects with a surrogate recovery above acceptance limits

BQ: ***H*** - for consistent spike recoveries above acceptance **limits**
L - for consistent spike recoveries below acceptance limits

Findings; Seven hundred eight **analytical** results were qualified based on surrogate recovery.

6.3.13 INTERNAL STANDARDS

Criteria: in assigning qualifiers based on internal standards, the following criteria were applied:

Volatiles by Method 8240:	SW-846, Table S, **page 8240-30.**
Volatiles by Method 8260:	SW-846, Table 6, page **8260A-37.**

Semivolatiles by Method 8270: SW-846, Table 5, page 8270-20.
Herbicides by Method 8 150: SW-846, page 8150-7.

Action: If an internal standard area count in a sample differs by more than a factor of 2 from its area **count in the associated continuing calibration, assign RQ = *J*, AQ = *H* to all detected analytes in the sample that arc** quantitated **by that internal standard. In addition, if the internal standard area count was** too low **(<50%** of **its area in the continuing calibration), assign** RQ **= *UJ*, AQ = *H* to all** non-detected **analytes in the sample that are quantitated by that internal standard. No qualifier flags are required for non-detects when internal standard area counts exceed limits.**

Findings: four analytical results were qualified based on **intemal standard deviations.**

6.4 VALIDATION AND VERIFICATION: PROCESS

6.4.1 SCOPE

The validation and verification process conducted by EPD/EMS consisted of several independent operations. The changes and data qualification identified by these operations were incorporated into the Data Review Logbook and were made to the **electronic** data files. The Project Technical Manager was responsible for overseeing and controlling this process.

The operations conducted included examining the electronic data files and hard copy records and conducting on-site reviews of the laboratory records. The validation and **verification** operations are summarized in this section.

6.4.2 REVIEW OF THE ELECTRONIC DATA FILES

Data reviewers used computer programs and lookup tables to review the computer data files on **sample collection, shipping,** and analytical data. The computer programs performed the following **types** of examinations of the data:

The following fields were checked to ensure they were not blank:

- **analyte** code,
- sample identification number,
- sample collection date,
- lab receipt date,
- analysis date,
- analysis batch,
- laboratory code,
- laboratory sample identification number,
- analytical method,
- instrument,
- analyst's initials, and
- EPD/EMS receipt date.

The following **fields** were checked to ensure the data were within **a range of values:**

- sample identification number (between 100,000 and 999,999);
- sample collection date (after January 1, 1994, and before the date the program was run);
- laboratory receipt date (between the sample collection date and the program run date, except for laboratory blanks);
- analysis date (same as or later than laboratory receipt date and before the date the program was run);
- analysis time (an integer between 1 and 2,400 or blank);
- detection limit (greater than 0);
- accuracy (a real number or blank);
- residual weight (a positive number for radionuclide analyses, blank for others);
- number of dilutions (0 or a positive integer);
- dilution factor, number of dilutions (if the dilution factor is 1, then the number of dilutions must be 0; if number of dilutions is greater than 0, the dilution factor cannot equal 1);
- nominal concentration (a positive number or blank; cannot equal 0 if result units indicate a percent recovery); percent solids (less than or equal to 100 or blank);
- bottle number (an integer equal to or between 10,000,000 and 99,999,999); and
- material [if the percent solids is greater than 0, material must equal *S* (soil); if percent solids is less than 0, material must equal *W* (water)].

The following fields were checked against a lookup table or a list of valid codes: laboratory code. laboratory duplicate code, analyte code (test name), analytical method, result qualifier, analysis qualifier, bias qualifier, result units, and sample fraction.

6.4.3 SPECIFIC EXAMINATIONS

The computer review of the analytical data also included the following specific examinations:

Sample holding times on the EDD sent by the analytical laboratory were checked. The sample collection date was subtracted from the date the analysis was performed, and the result was checked against a lookup table of holding times. Any analyses performed after the holding times were exceeded were qualified with a *Q* in the analysis qualifier field and a *J* or a *UJ* in the result qualifier field.

Relationships between analytical, sample, and station records were checked to ensure that the station field in the station data records was identical to the first eight characters of the planned sample name in the planned analyses data records. The planned sample name is generally a concatenation of facility identifier, sampling point, and sample number.

Additionally, the computer program checked for duplicate records and for matching records as follows:

- There must be a station record for each sample record. The station and sample records must have the same entry in the station field.

- There must be at least one planned analysis record for each sample record. The planned analysis record and the sample record must have the same entries in the planned station, planned top of interval; and planned bottom of interval fields.

- There must be a sample record for each analytical record except for laboratory standards and blanks. The sample and analytical records must have the same sample identification number and sample collection date.

- There must be a COC record for each analytical record except for laboratory blanks and laboratory-generated QA/QC samples. The COC and analytical records must have the same sample identification number, sample collection date, and laboratory sample identification number.

- There must be a planned analysis record for each analysis record except for laboratory standards and blanks. Each analytical record should match a sample record by sample identification number. The analyte from the analysis record and the planned sample name, planned top of interval, and planned bottom of interval fields from the sample record should match a planned analysis record.

- There must be a COC record for each sample record and for each analytical record except for laboratory standards and blanks. The sample, COC, and analytical records must have the same sample identification number and sample collection date.

- There must be a sample record for each planned analysis record. The planned analysis record and the sample record must have the same entries in the planned station, planned top of interval, and pfanned bottom of interval fields.

- There must be at least one analytical record for each planned analysis record. The analytical record and the planned analysis record combined with the sample record must have the same entries in the analyte and sample identification number fields.

The data validation team resolved anomalies wherever possible. An anomaly might result in qualification of the data or a determination and recording of it as unresolvable (e.g., break in COC).

6.4.4 Checking QA/QC Samples

QA/QC samples included duplicates, internal standards, and others. Laboratory-generated blanks were checked for contamination that might affect sample results, and environmental samples were qualified when contamination was above established levels.

The recoveries obtained by the laboratory for matrix spikes were examined, and the number of matrix spikes checked for adherence to the criteria for definitive data. Internal standards and calibration samples for a portion of the samples were examined during the LDRR. Qualification of environmental samples was done when any of these QA/QC samples exceeded criteria.

6.5 REVIEW OF THE ANALYTICAL NARRATIVES

The cover letters, analysis summaries, 01 analytical narratives that accompany the EDDs from the laboratories contain information about the data that does not appear elsewhere. The narratives were reviewed and used as a reference during computerized checking of the EDDs.

Laboratory: Roy **F. Weston, Inc.**

RFW Batch / EDD Nos.: **9604L893 (L9604893.EDD), 9604L930 (L9604930.EDD), and 9604L961 (L9604961.EDD)**

The analytical case narratives for the data batches listed have been **reviewed.** The following information was obtained:

GC/MS Volatiles, SW846 Method 824Q

Batch No. 9604L893

The required holding time for analysis was met.

Non-target compounds were not detected in these **samples.**

All surrogate percent recoveries were within EPA **QC** limits.

Soil matrix spike (MS) analyses are associated with **RFW** lot **9604L894.**

All blank spike recoveries were within EPA QC limits.

The **method** blanks contained the common contaminants methylene chloride and acetone at levels less than the contract required quantitation limit (CRQL).

No other client samples were batched with this reported batch of WSRC samples.

The data were reported using RFW reporting conventions and data qualifiers; the associated **EDD** reflects the appropriate WSRC flags.

Batch No. 9604L930

The required holding time for analysis was met.

Non-target compounds were detected in these samples.

Ten of 102 surrogate recoveries were outside EPA QC limits. Samples 102669, 10267 1, 102685, and 102689 were reanalyzed on **05/03/96.**

All MS recoveries were within EPA QC limits.

All blank spike recoveries were within EPA QC limits.

The method blanks contained the common contaminants methylene chloride and acetone at levels **less** than five times the CRQL.

Bracketing blanks were analyzed and confirmed that cross-contamination did not occur.

The data were reported using RFW reporting conventions and data qualifiers; the associated EDD reflects the appropriate WSRC flags.

Batch No. 9604L961

The required holding time for analysis was **met.**

Sample 102679 required a two-fold dilution because **it** contained high levels of target compounds.

Non-target compounds were detected in these samples.

All surrogate recoveries were within EPA QC limits.

All MS recoveries were within EPA QC limits.

All blank spike recoveries were within EPA QC limits.

The method blanks contained the common contaminants methylene chloride and acetone at levels less than three times the CRQL.

Bracketing blanks were analyzed and confirmed that cross-contamination did not occur.

The data were reported using RFW reporting conventions and data qualifiers; the associated EDD **reflects** the appropriate WSRC flags.

Semivolatiles. SW846 Method 8270

Batch No. 9604L893

The required holding times for extraction and analysis were met.

Non-target compounds were detected in these samples.

All surrogate percent recoveries were within EPA QC limits.

All blank spike recoveries were within EPA QC limits.

Bracketing blanks were analyzed and confirmed that cross-contamination did **not occur.**

The data were reported using RFW reporting conventions and data qualifiers; the associated EDD reflects the appropriate WSRC flags.

Batch No. 9604L930

The required holding times for extraction and analysis were met.

Non-target compounds were detected in these samples.

All surrogate percent recoveries were within EPA QC limits.

All blank spike recoveries were within EPA QC limits.

All MS recoveries were within EPA QC limits.

The water method blank contained the common contaminant bis(2-ethylhexyl)phthalate at a level less than the CRQL.

Bracketing blanks were analyzed and confirmed that cross-contamination did not occur.

The data were reported using RFW reporting conventions and data qualifiers; the associated EDD reflects the appropriate WSRC flags.

Batch No. 9604L961

The required holding times for extraction and analysis were met.

Non-target compounds were detected in these samples.

All surrogate percent recoveries were within EPA QC limits.

All blank spike recoveries were within EPA QC limits.

All MS recoveries were within EPA QC limits.

The water method blank contained the common contaminants di-n-butylphthalate and bis(2-ethylhexyl)phthalate at a level less than the CRQL.

Bracketing blanks were analyzed and confirmed that cross-contamination did not occur.

The data were reported using RFW reporting conventions and data qualifiers; the associated EDD reflects the appropriate WSRC flags.

Pesticides/PCBs. SW846 Method 8081

Batch No. 9604L893

The required holding times for extraction and analysis were met.

The method blank was below the reporting limits for all target compounds.

All surrogate percent recoveries were within EPA QC limits.

All blank spike'recoveries were within EPA QC limits.

All MS percent recoveries were within acceptance limits.

All initial calibrations associated with this dataset were within acceptance criteria.

All continuing calibration standards analyzed prior to sample extract were within acceptance criteria.

These samples received a gel permeation chromatography (GPC) cleanup.

The target compound methoxychlor was present in the method blank spike above the reporting limit. Methoxychlor was not present in the sample extracts; therefore, the data should not be affected.

Instrument blanks bracketing these samples did not contain target compounds at or above the contract reporting limits.

The data were reported using RFW reporting conventions and data qualifiers; the associated EDD reflects the appropriate WSRC flags.

Batch No. 9604L930

The required holding times for extraction and analysis were met.

The method blank was below the reporting limits for all target compounds.

All surrogate percent recoveries were within EPA QC limits.

All blank spike recoveries were within EPA QC limits.

All MS percent recoveries were within acceptance limits.

All initial calibrations associated with this dataset were within acceptance criteria.

All continuing calibration standards analyzed prior to sample extract were within acceptance! criteria.

These samples received a GPC cleanup.

Instrument blanks bracketing these samples did not contain target compounds at or above the contract reporting limits.

The data were reported using RFW reporting conventions and data qualifiers; the associated EDD reflects the appropriate WSRC flags.

Batch No. 9604L961

The required holding times for extraction and analysis were met.

The method blanks were below the reporting limits for all target compounds.

All surrogate percent recoveries were within EPA QC limits.

Five of 12 blank spike recoveries were outside acceptance criteria. All blank spike recoveries were within acceptance criteria for the blank spike associated with extraction batch 96LE0710. Sample 102678 associated with the blank spike from extraction batch 96LE0690 was not re-extracted because it was an quipment blank.

All MS percent recoveries were within acceptance limits.

AH initial calibrations associated with this dataset were within acceptance criteria.

All continuing calibration standards analyzed prior to sample extract were within acceptance criteria.

These samples received a GPC cleanup.

No evidence of carry-over was observed in instrument blanks or standards bracketing the sample extracts.

The data were reported using RFW reporting conventions and data qualifiers; the associated EDD reflects the appropriate WSRC flags.

Metals, SW846 Methods 6010 and 7471

Batch No. 9604L893

All sample holding times as required by the methods were met.

All initial calibration verification (ICV) and continuing calibration verification (CCV) percent recoveries were within the required control limits of 90-110% (80-120%) for mercury.

All initial calibration blank (ICB) and CCB results were within control limits.

All method blank results were below the MDL with the exception of 96L0900-MB 1 for beryllium.

All LCS percent recoveries were within the 80-120% control limits. The duplicate LCS for mercury was within the 20% RPD control limits.

All MS and matrix spike duplicate (MSD) percent recoveries were within the 75125% acceptance limits with the exception of the following:

Sample ID	Element	MS % Recovery	MSD % Recovery
102663	Aluminum	1,208	909
102663	Calcium	24.1	24.5
102663	Iron	-3,500	-2,900
102663	Manganese	-120	154
102663	Vanadium	71.7	71.5

All MSD percent recoveries were within the 20% RPD control limits except for the following:

Sample ID	Element	RPD (%)
102663	Afuminum	28.2
102663	Chromium	21.1
102663	Manganese	24.6
102663	Zinc	21.9

All replicate results above the MDL were within the 20% RPD guidance limit with the exception of magnesium, calcium, barium, potassium, and manganese.

The data were reported using RFW reporting conventions and data qualifiers; the associated EDD reflects the appropriate WSRC flags.

Batch-No. 9604L930

All sample holding times as required by the methods were met.

All ICV and CCV percent recoveries were within the required control limits of 90-1 10% (80-120%) for mercury.

All ICB and CCB results were within control limits.

All method blank results were below the MDL with the exception of 96L0893-MB1 for aluminum, beryllium, and calcium and 96L0894-MB1 for silver, chromium, iron, and zinc.

All LCS percent recoveries were within the 80-120% control limits. The duplicate LCS for mercury was within the 20% RFD control limits.

All MS percent recoveries were within the 75-125% acceptance limits with the exception of the following:

Sample ID	Element	MS % Recovery	MSD % Recovery
102667	Aluminum	743	765
102667	Iron	212	193

All MSD percent recoveries were within the 20% RPD control limits.

All replicate results above the MDL were within the 20% RPD guidance limit with the exception of cadmium, mercury, and zinc.

The data were reported using RFW reporting conventions and data qualifiers; the associated EDD reflects the appropriate WSRC flags.

Batch No. 9604L961

All sample holding times as required by the methods were met.

All ICV and CCV percent recoveries were within the required control limits of 90-110% (80- 120%) for mercury.

All ICB and CCB results were within control limits.

All method blank results were below the MDL with the exception of' 96L0894-MB1 for silver, chromium, iron, and zinc.

All LCS percent recoveries were within the 80-120% control limits. The duplicate LCS for mercury was within the 20% RPD control limits.

All MS percent recoveries were within the 75-125% acceptance limits with the exception of the following:

Sample ID	Element	MS % Recovery	MSD % Recovery
102682	Aluminum	685	581
102682	Iron	198	125

All replicate results above the MDL were within the 20% RPD guidance limit with the exception of zinc (sample 102682) and silver, aluminum, arsenic, barium, cobalt, chromium, copper, antimony, and zinc (sample 102678).

The data were reported using RFW reporting conventions and data qualifiers; the associated EDD reflects the appropriate WSRC flags.

Cyanide, SW846 Method 9010

Batch No. 9604L893

Sample holding times as required by the method and/or contract were met.

The method blank for total cyanide sample 96LC07 l-MB 1 was above the MDL, but below the EQL.

The LCS percent recoveries were within the laboratory control limits. The duplicate LCS was within the 20% RPD control limit.

The MS recovery for sample 102664 was within the 75-125% control limit.

The replicate analyses were within the 20% RPD control limit.

The results are reported on a dry weight basis.

Batch No. 9604L930

Sample holding times as required by the method and/or contract were met.

The method blank for total cyanide sample 96LC071 A-MB 1 was above the MDL, but below the EQL.

The LCS percent recoveries were within the laboratory control limits. The duplicate LCS was within the 20% RPD control limit.

The MS recovery was within the 75-125% control limit.

The MSD was within the 20% RPD control limit.

The replicate analyses were within the 20% RPD control limit.

The results are reported on a dry weight basis.

Batch No. 9604L961

Sample holding times as required by the method and/or contract were met.

The method blank for total cyanide sample 96LC070-MB1 was above the MDL, but below the EQL.

The LCS percent recoveries were within the laboratory control limits. The duplicate LCS was within the 20% RPD control limit.

The results are reported on a dry weight basis.

Cation Exchange Capacity, Method EPA9081

Batch No. 9604L893

Sample holding times as required by the method and/or contract were met.

The method blank result was within method criteria.

The LCS percent recoveries were within the laboratory control limits. The duplicate LCS was within the 20% RPD control limit.

The replicate analyses were within the 20% RPD control limit.

The results are reported on a dry weight basis.

Batch No. 9604L930

Sample holding times as required by the method and/or contract were met.

The method blank result was within method criteria.

The LCS percent recoveries were within the laboratory control limits. The duplicate LCS was within the 20% RPD control limit.

The replicate analyses were within the 20% RPD control limit.

The results are reported on a dry weight basis.

Batch No. **9604L961**

Sample holding times as required by the method and/or contract were met.

The method blank result was within method criteria.

The LCS percent recoveries were within the laboratory control limits. The duplicate LCS was within the 20% RPD control limit.

The replicate analyses were within the 20% RPD control limit.

The results are reported on a dry weight basis.

Total Recoverable Petroleum **Hydrocarbons, EPA418.1**

Batch No. **9604L893**

Holding time for total recoverable petroleum hydrocarbons is not specified in the SW846 extraction method 907 l or test method EPA4 18.1.

The method blank result was within method criteria.

The LCS percent recoveries w&e within the laboratory control limits. The duplicate LCS was within the 20% RPD control limit.

The replicate analyses were within the 20% RPD control limit.

The results are reported on a dry weight basis.

Batch No. 9604L930

Holding time for total recoverable petroleum hydrocarbons is not specified in the SW846 **extraction** method 907 l or test method EPA41 8.1.

The method blank result was within method criteria.

The LCS percent recoveries were within the laboratory control limits. The duplicate LCS was within the 20% RPD control limit.

The MS recovery for sample 102289 was within the 75125% control limit.

The replicate analyses were not within the 20% RPD control limit.

The results are reported on a dry weight basis.

Batch No. 9604L961

Holding time for total recoverable petroleum hydrocarbons is not specified in the SW846 extraction method 907 1 or test method EPA41 8.1. Preservation of water samples with **acid and refrigeration** are required for a delay between sampling and analysis of greater than 48 hours.

The method blank result was within method criteria.

The **LCS** percent recoveries were within the laboratory **control limits. The duplicate LCS was within** the 20% RPD control **limit.**

The MS recovery for sample 102690 was within the **75-** 125% control limit.

The replicate analyses were not within the 20% RPD control limit.

The results are reported on a dry weight **basis.**

Total Organic Carbon. Method LLOYDKAHN

Batch No. 9604L893

Sample holding times as required by the method and/or contract were met.

The method blank for TOC sample 96LZO 18-MB 1 was above the MDL, but below the EQL.

The LCS recoveries were within the laboratory control limits. The duplicate LCS was within the 20% RPD control limit.

The MS recovery was within the **75-125%** control limit.

The replicate analyses were within the 20% **RPD** control limit.

TOC samples **are dried** prior to analysis.

Batch No. 9604L930

Sample holding times as required by the method and/or contract were met.

The method blank for TOC sample 96LTZO 18-MB 1 was above the MDL, but below the EQL.

The **LCS** recoveries were within the laboratory control limits. The duplicate **LCS was** within the 20% RPD control limit.

TOC samples **are** dried prior to analysis.

Batch No. 9604L961

Sample holding times as required by the method and/or contract were **met.**

The **method** blanks were within method criteria.

The LCS recoveries were **within the laboratory** control limits. **The duplicate LCS was within the** 20% **RPD** control limit.

The MS recovery **for TOC** sample 102682 were within the **75-** 125% control limits.

The replicate analyses were within the 20% RPD control limit.

TOC samples are dried prior to analysis.

Laboratory: **Thermo NUtech**

RFW **Batch /** EDD Nos.: **9604L893 (9604172.TXT), 9604L930 (9604182.TXT** and **9604183.TXT),** and **9604L961 (9604200.TXT and 9604201.TXT)**

The analytical case narratives for the data batches listed have been reviewed. The following information was obtained:

Gross Alpha and Non-volatile Beta (EPA Method 900.0 MOD and LANLMLR100MOD)

Batch No. 9604L893

No problems or unusual circumstances were noted during the analytical process.

Batch No. 9604L930

No problems or unusual circumstances were noted during **the** analytical process.

Batch No. 9604L961

No problems or unusual circumstances were noted during the analytical **process.**

Laboratory: **General Engineering Laboratories, Inc.**

GEL Batch No.: **9604465 (SC051596.DT3)**

The analytical **case** narrative for the data batch listed has been reviewed. The following information was obtained:

Two soil and one trip blank samples were received on April 24, 1996. One of the eight containers for sample 102691 was not received by the laboratory. There was enough sample in the remaining seven containers to complete all requested tests, so the sample was logged in.

On April 26, 1996, GEL received a cooler from Weston that contained one sample container without the COC. WSRC was notified and sent by fax a copy of the COC for that sample. The sample number was 10269 1. The COC indicated that there were eight containers shipped. Since only one was received and the volume was not enough to conduct all of the analyses requested, WSRC was notified and the sample was put on hold. At the time it was not realized that this container was the missing one from the April 24th delivery, but rather a new project sample.

On Friday, May 10, 1996, WSRC requested results for these samples because *they* were to have been completed on this day. The COC did not contain a line item which would have indicated a need for rush turnaround, so the samples were logged for a routine turnaround. However, the delivery order did indicate by line item that the samples would include rush turnaround. The discrepancy was not identified when the samples were received. The samples were put on rush turnaround as soon as the discrepancy was identified.

Recoveries for the blank spike and blank spike duplicate were not within the guidance limits, but were within the laboratory established control limits The results were flagged with a C analysis qualifier.

Acceptance limits for ail matrix spike, matrix spike duplicate, and duplicate control data are based on laboratory generated values.

Samples 102691 and 102695 for method EPA 8260 were originally conducted within holding time on May 7, 1996. Due to instrument failure, the samples needed to be reanalyzed on May 9, 1996, which was out of the recommended holding time.

Dilutions were not performed on these samples.

6.6 LABORATORY DATA RECORDS REVIEW

On June 3 and 4, 1996, laboratory data records were reviewed for organic and inorganic analyses associated with the AMSSB 1 Project. The review was conducted by Paul J. Mark.

The purpose of the review was to investigate technical validation issues discussed in the *QA/QC* Guidance *for Removal Activities* (EPA/540/G-90/004), that are not adequately addressed by computer checking of the EDD, review of analytical narratives, or review of COC forms. These technical issues include instrument calibration, analyte identification, and analyte quantitation. These issues are addressed by comparing the instrument printouts associated with particular analyses against validation checklist. These checklist each consist of 12 to 20 questions and were prepared from five sources: *QA/QC Guidance for Removal Activities, SW-846,* Analytical Methods, U.S. *EPA Contract Laboratory Program National Functional Guidelines for Organics Analyses, U.S. EPA Contract Laboratory Program National Functional Guidelines for Inorganic Analyses,* and Roy F. Weston, Inc. Standard Operating Procedures.

For each analytical method, approximately 10% of the samples analyzed by that method were chosen for review.

In all, 22 worksheets were completed during the review for organic and inorganic analyses for the AMSSB1 Project. Each worksheet represents one sample reviewed for one analytical method (i.e., one sample/method combination [SMC]). The number of worksheets and methods reviewed are given in Table 6.2. A summary of tie samples reviewed is given in Table 6.3.

Table 6.2. Laboratory Data Records Review Methods/Analyses Inventory

Method	Descriptions	Checklist Title	No. of SMCs
6010	ICP Metals	6010	6
7471	Mercury	7000	3
9010	Cyanide	335	2
8081	Pesticides/PCBs	8080	3
8240	GC/MS Volatiles	8240	5
8270	GUMS Semivolatiles	8270	3
		Total	22

Table 6.3. Summary of Samples Reviewed

WSRC ID	LAB ID	Analysis Date	Analysis Time	Analysis Method
102674	9604L930-007 S	050396	1546	EPA 6010
102678	9604L961-006 S	050396	0121	EPA 6010
102694	9604L930-017 S	050396	1724	EPA 6010
102664	9604L893-002 S	050196	1638	EPA 7471
102674	9604L930-007 S	050396	1546	EPA 7471
102694	9604L930-017 S	050396	1724	EPA 7471
102671	9604L930-004 S	050296	1242	EPA 808 1
102676	9604L961-005 S	050596	2212	EPA 8081
102685	9604L930-010 S	050296	1755	EPA 8081
10267 1	9604L930-004 S	050296	1013	EPA 8240
102676	9604L96 i-005 S	050196	2328	EPA 8240
102685	9604L930-010 S	050296	1443	EPA 8240
102671	9604L930-004 S	042996	1834	EPA 8270

Table 6.3. Summary of Samples Reviewed, continued

WSRC ID	LAB ID	Analysis Date	Analysis Time	Analysis Method
102676	9604L961-005 S	050296	1426	EPA 8270
102685	9604L930-0 10 S	043096	0216	EPA 8270
102671	9604L930-004 S	042996	1834	EPA 8270M
102676	9604L961-005 S	050296	0426	EPA 8270M
102685	9604L930-010 S	043096	0216	EPA 8270M
102674	9604L930-007 S	042996	1700	EPA 9010
102694	9604L930-0 17 S	050296	1154	EPA 9010

6.6.7 SCORING

The following paragraphs describe the results of the review by the WSRC EMS review team.

6010 ICP Metals

Two of six samples reviewed did not meet the Method Checklist criteria for Questions #11 and # 12: There was no evidence that a final interference check sample was analyzed following sample analysis.

Sample ID	Prep/Instrument Batch .
9604L930-007 S	96L0893
9604L930-0 17 S	96L0893

Four of six samples reviewed did not meet the Method Checklist criterion for Question #1: The date and time of analysis did not match the laboratory's analytical records.

Sample ID	Reported Date - Time	Actual Date - Time
9604L961-006S	0502% at 0121	050396 at 0121
9604L961-006S 1	050296 at 0136	0503% at 0136
9604L961-006S 2A	050296 at 0142	050396 at 0142
9604L961-006S 2B	050296 at 0148	050396 at 0148

7471 *Mercury by AA*

All Method Checklist criteria were met in three samples reviewed.

9010 *Cyanide*

All Method Checklist criteria were met in two samples reviewed.

8081 Pesticides/PCBs

Three of three samples reviewed did **not meet** the Method Checklist **criterion** for Question **#4: The** percent breakdown for DDT and endrin was not provided for review.

Sample ID	No DDT and Endrin Breakdown
9604L930-004 S	**050296 at 0** 12 1
9604L930-010 S	050296 at 0136
9604L96 I-005 S	050596 at 22 12

8240 *GC/MS Volatiles*

Two of five samples reviewed did not meet the Method Checklist criterion for Question **#14:** The peak areas of the internal standards were not within a factor of 2 of the peak areas of the internal standards in the continuing calibration analysis.

Sample ID	Date/Time of Affected Analysis	CV Lower/Upper Limit	Sample Area
9604L930-004 S	050296 at 1013	**48392 /** 193566	40324
9604L930-0 10 S	**050296** at **1443**	**48392 / 193566**	**46461**

Four of five samples reviewed did not meet the Method Checklist criterion for Question **#16:** The surrogate recoveries were not within specified limits.

Sample ID	Date/Time of Affected **Analysis**	Surrogate Recovery	Recovery Limit .
9604L930-004 s	**050296 at 1013**	PBFB at 73% **12DCD4** at 126%	PBFB lower limit 74% **12DCD4** upper limit 121%
9604L930-0 10 S	050296 at 1443	**12DCD4** at 128%	**12DCD4** upper limit 121%
9604L930-004 S	050396 at 0103	**MEC6D8** at 127%	**MEC6D8** upper limit 117%
9604L930-010 S	050393 at 0551	**MEC6D8** at 120%	**MEC6D8** upper limit 117%

One of five samples reviewed did not meet the Method Checklist criterion for Question **#17:** The relative retention times **(RRTs)** were not within 0.06 of the **RRTs** in the continuing calibration analysis.

Sample ID	Date-/Time of Affected Analysis	RRT difference
9604L96 I-005 S	050 196 at 2328	**RRT** could not be verified because no continuing calibration verification chromatograms were **provided.**

82 70 GC/MS Semivolatiles

All Method Checklist criteria were met in three **samples reviewed.**

6.6.2 QUALIFICATION OF ANALYSES

The following describes the qualifications necessary based on the results of the review.

6010 ICP Metals

Prep/Instrument Batch	Analyte(s)	R Q	AQ	BQ	Failed Questions
96L0893	all	*J* ♦ detects *UJ* ♦ non-detects	*R* ♦		11 and 12

♦ Qualify **all** analytes only if the sample contains any one of Al, Ca, or Mg > 50,000 **mg/kg,** or Fe > *20,000* **mg/kg.** Qualify all results meeting above criteria with times of analysis from 050396 @1405 to 050396 @ 1759.

8081 *Pesticides/PCBs*

Sample ID	Date/Time of Analysis	RQ	AQ	Failed Question
All samples	050596 @ 1603 to 050696 @ 8117, and from 050296 @ 03 18 to 050296 @ 1948	*J* v detects *UJ* v non-detects	*G*	4

♥ **Qualify** DDT, DDE, DDD, endrin, endrin aldehyde, and endrin ketone results for samples affected.

8240 GC/MS Volatiles

Sample ID	Date/Time of Analysis	RQ	AQ	BQ	Failed Questions
9604L930-004 S	050296 at 1013	*R*	HO		14
9604L930-010 S	050296 at 1443	*R*	HO		14
9604L930-004 S	050396 at 0103	*J* detects No action; non-detects	0	*H*	16
9604L930-010 S	050396 at 0551	*J* *No* action; non-detects	0	*H*	16
9604L961-005 S	050 196 at 2328	*J* detects *UJ:* non-detects	*A*		17

6.7 ADDITIONAL INFORMATION

Section 7.0, "Discussion," contains a table showing the total number of samples having various types of qualifiers.

The AN95 format only permits three analysis qualifiers to be input. One sample had more than three analysis qualifiers applied during validation. In this case, the three most significant qualifiers were applied to the data. The table below documents the qualifiers that were applied to the data during validation and then the final analysis qualifiers used in the AN95 data set.

Sample ID	Analyte	Rep Code	Laboratory Draft	Final AQ AN95
102695	MEC6H5		EQO8	QO8

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7.0 DISCUSSION

7.1 QUALIFICATION OF DATA

7.1.1 QUALIFIERS APPLIED

Table 7.1 presents the number of samples requested, received, and qualified for each analyte. The numbers in the "Samples Requested" column are the total number of times each analyte was in the file of analyses planned for environmental samples, duplicates, rinsate blanks, and trip blanks.

The numbers in the "Samples Received" column are the total number of samples for which at feast one analytical record was reported. Missing analyses are discussed in the "Introduction," "Sample Collection," and "Validation and Verification" sections of this report.

The numbers in the "Analyses Reported" column are the total number of reported results for the analyte. This number includes laboratory-initiated replicate analyses and re-analysis results. These values do not include analyses of associated laboratory blanks.

The remaining columns in the table Iist the number of analyses that meet the specified conditions.

The column labeled "Rejected" reports the number of records for which the result qualifier was *R*. Because samples may have an acceptable re-analysis result, the count in this column represents only the number of records that were rejected, not the number of samples for which onfy rejected results were reported.

The column labeled "Out of Holding" contains the number of records for which the time between sample collection and analysis exceeded the maximum allowed by the analytical method. These have an analysis qualifier of *Q*.

The column labeled "QA Problems" reports the number of records with an analysis qualifier of *V*, 0, *I*, *H*, C, *X*, or *T* because at least one associated, assigned laboratory quality control sample did not meet the required acceptance limits.

The column labeled "Preservation" reports the number of records with an analysis qualifier of Y because of preservation problems. In most of these cases, the samples were not maintained at the appropriate temperatures.

The number of records with identified calibration problems are listed in the column labeled "Calibration." These have an analysis qualifier of *L*.

7.1.2 TYPES AND NUMBERS OF QA/QC SAMPLES

EPA-published methods, used for most of the analyses for this project, require specific types and numbers of QC analyses. Table 7.2 provides a breakdown of the number of analytical records by method and type.

Table 7.1. Numbers of Qualified Samples

	Samples Requested	Samples Received	Analyses Reported	Rejected	Out of Holding	QA Problems	Preservation	Calibration
Physical Parameters								
Cation Exchange Capacity	28	28	44	0	1	0	0	0
Total Organic Carbon	28	28	45	0	0	22	0	0
Total Petroleum Hydrocarbons	28	28	45	0	0	20	0	0
TAL Inorganics								
Aluminum	30	30	58	8	0	33	0	0
Antimony	30	30	56	0	0	1	0	0
Arsenic	30	30	56	0	0	0	0	0
Barium	30	30	58	0	0	1	0	0
Beryllium	30	30	58	0	0	22	0	0
Cadmium	30	30	56	0	0	0	0	0
Calcium	30	30	56	2	0	31	0	0
Chromium	30	30	58	0	0	7	0	0
Cobalt	30	30	58	0	0	0	0	0
Copper	30	30	58	0	0	0	0	0
Cyanide	30	30	60	0	0	24	0	0
Iron	30	30	58	8	0	21	0	0
Lead	29	29	55	0	0	0	0	0
Magnesium	30	30	56	0	0	1	0	0
Manganese	30	30	58	2	0	2	0	0
Mercury	30	30	84	0	0	0	0	0
Nickel	30	30	58	2	0	2	0	0
Potassium	30	30	56	0	0	1	0	0
Selenium	30	30	56	0	0	0	0	0
Silver	30	30	56	0	0	7	0	0
Sodium	30	30	56	0	0	0	0	0
Thallium	30	30	56	0	0	0	0	0
Vanadium	30	30	58	2	0	3	0	0
Zinc	30	30	58	0	0	I5	0	0

Table 7.1. Numbers of Qualified Samples, continued

Semivolatiles	Samples Requested	Samples Received	Analyses Reported	Rejected	Out of Holding	QA Problems	Preservation	Calibration
1,2,4-Trichlorobenzene	30	30	47	0	0	0	0	0
I ,2-Dichlorobenzene	30	30	44	0	0	0	0	0
1,3-Dichlorobenzene	30	3 0	44	0	0	0	0	0
1,4-Dichlorobenzene	30	30	47	0	0	0	0	0
2,4,5-Trichlorophenol	30	30	44	0	0	0	0	0
*2,4,6-Tribromophenol	0	0	47	0	0	0	0	0
2,4,6-Trichlorophenol	30	30	44	0	0	0	0	0
2,4-Dichlorophenol	30	30	44	0	0	0	0	0
2,4-Dimethylphenol	30	30	44	0	0	0	0	0
2,4-Dinitrophenol	30	30	44	0	0	0	0	0
2,4-Dinitrotoluene	30	30	47	0	0	0	0	0
2,6-Dinitrotoluene	30	30	44	0	0	0	0	0
2-Chloronaphthalene	30	30	44	0	0	0	0	0
2-Chlorophenol	30	30	47	0	0	0	0	0
*2-Fluorobiphenyl	0	0	47	0	0	0	0	0
2=Fluorophtnol	0	0	47	0	0	0	0	0
2-Methyl-4,6-dinitrophenol	30	30	44	0	0	0	0	0
2-Methylnaphthalene	30	30	44	0	0	0	0	0
2-Nitroaniline	30	30	44	0	0	0	0	0
2-Nitrophenol	30	30	44	0	0	0	0	0
3,3'-Dichlorobenzidine	30	30	44	0	0	0	0	0
3-Nitroaniline	30	30	44	0	0	0	0	0
4-Bromophenyl phenyl ether	30	30	44	0	0	0	0	0
4-Chloro-3-methylphenol (p-chloro-m-cresol)	30	30	47	0	0	0	0	0
4-Chloroaniline	30	30	44	0	0	0	0	0
4-Chlorophenylphenylether	30	30	44	0	0	0	0	0
4-Nitroaniline	30	30	44	0	0	0	0	0
4-Nitrophenol	30	30	47	0	0	0	0	0
Aldol Condensate	14	14	14	0	0	0	0	0

Table 7.1. Numbers of Qualified Sanrples, continued

Semivolatiles, continued	Samples Requested	Samples Received	Analyses Reported	Rejected	Out of Holding	QA Problems	Preservation	Calibration
Alkane	1	1	1	0	0	0	0	0
Terpene	3	3	3	0	0	0	0	0
Aromatic	1	1	1	0	0	0	0	0
Acenapthcne	30	30	47	0	0	0	0	0
Acenapthyltne	30	30	44	0	0	0	0	0
Anthracenc	30	30	44	0	0	0	0	0
Benzo(a)anthracene	30	30	44	0	0	0	0	0
Benzo(a)pyrene	30	30	44	0	0	0	0	0
Benzo(b)fluoranthene	30	30	44	0	0	0	0	0
Benzo(g,h,i)perylene	30	30	44	0	0	0	0	0
Benzo(k)fluoranthene	30	30	44	0	0	0	0	0
Benzoic acid	30	30	44	0	0	0	0	0
Benzyl alcohol	30	30	44	0	0	0	0	0
Bis(2-chloroethoxy) methane	30	30	44	0	0	0	0	0
Bis(2-chloroethyl) ether	30	30	44	0	0	0	0	0
Bis(2-chloroisopropyl) ether	30	30	44	0	0	0	0	0
Bis(2-ethylhexyl) phthalate	30	30	44	0	0	5	0	0
Butyl **benzyl** phthalate	30	30	44	0	0	0	0	0
Chrysene	30	30	44	0	0	0	0	0
Di-n-butyl phthalate	30	30	44	0	0	2	0	0
Di-n-octyl phthalate	30	30	44	0	0	0	0	0
Dibenzo(a,h)anthracene	30	30	44	0	0	0	0	0
Dibenzofuran	30	30	44	0	0	0	0	0
Diethyl phthafate	30	30	44	0	0	0	0	0
Dimethyl phthalatt	30	30	44	0	0	0	0	0
Fluoranthene	30	30	44	0	0	0	0	0
Fluorene	30	30	44	0	0	0	0	0
Hexachlorobenzene	30	30	44	0	0	0	0	0
Hexachlorobutadienc	30	30	44	0	0	0	0	0
Htxachlorocyclopentadiene	30	30	44	0	0	0	0	0

Table 7.1, Numbers of Qualified Samples, continued

	Samples Requested	Samples Received	Analyses Reported	Rejected	Out of Holding	QA Problems	Preservation	Calibration
Semivolatiles, continued								
Hexachloroethane	30	30	44	0	0	0	0	0
Indeno(1,2,3-c,d)pyrene	30	30	44	0	0	0	0	0
Isophorone	30	30	44	0	0	0	0	0
N-Nitrosodi-n-propylamine	30	30	47	0	0	0	0	0
N-Nitrosodiphenylamine	30	30	44	0	0	0	0	0
Naphthaltnc	30	30	44	0	0	0	0	0
Nitrobenzene	30	30	44	0	0	0	0	0
• Nitrobenzene-d5	0	0	47	0	0	0	0	0
Ptntachlorophenol	30	30	47	0	0	0	0	0
Phtnanthrene	30	30	44	0	0	0	0	0
Phenol	30	30	47	0	0	0	0	0
*Phenol-d5	0	0	40	0	0	0	0	0
Pyrene	30	30	47	0	0	7	0	0
o-cresol (2-methylphenol)	30	30	44	0	0	0	0	0
*p-Terphenyl-d 14	0	0	47	0	0	0	0	0
p-cresol (4-methylphenol)	28	28	40	0	0	0	0	0
* Phenol-d6	0	0	7	0	0	0	0	0
Unknown Hydrocarbon	2	2	2	0	0	0	0	0
m,p-Cresol	2	2	4	0	0	0	0	0
Volatiles								
1,1,1-Trichloroethane	36	36	61	2	2	12	0	0
1,1,2,2-Tetrachloroethane	36	36	61	2	2	12	0	0
1,1,2-Trichloroethane	36	36	61	2	2	12	0	0
1,1-Dichloroethane	36	36	61	2	2	12	0	0
1,1-Dichloroethene	36	36	65	2	2	13	0	0
1,2-Dichloroethane	36	36	61	2	2	12	0	0
1,2-Dichloroethene(total)	36	36	61	2	2	12	0	0
1,2-Dichloropropane	36	36	61	2	2	12	0	0

Table 7.1. Numbers of Qualified Samples, continued

Volatiles, continued	Samples Requested	Samples Received	Analyses Reported	Rejected	Out of Holding	QA Problems	Preservation	Calibration
1,4-Dichlorobenzene-d4	0	0	10	0	0	0	0	0
2-Butanone(MEK)	36	36	61	2	2	12	0	0
2-Hexanone	36	36	61	2	2	12	0	0
4-Methyl-2-pentanone	36	36	61	2	2	12	0	0
Unknown	60	60	60	0	0	0	0	0
Chlorodifluromethane	2	2	2	0	0	0	0	0
Unknown Siloxane	1	1	1	0	0	0	0	0
Unknown Silane	1	1	1	0	0	0	0	0
Acetone	36	36	62	2	2	46	0	0
Benzene	36	36	65	2	2	13	0	0
Bromodichloromethane	36	36	61	2	2	12	0	0
Bromoform	36	36	61	2	2	12	0	0
Bromomethane (Methyl bromide)	36	36	61	2	2	12	0	0
Carbondisulfide	36	36	61	2	2	12	0	0
Carbontetrachloride	36	36	61	2	2	12	0	0
Chlorobenzene	36	36	65	2	2	13	0	0
Chlorodibromomethane	36	36	61	2	2	12	0	0
Chloroethane	36	36	61	2	2	12	0	0
Chloroform	36	36	61	2	2	12	0	0
Chloromethane (methyl chloride)	36	36	61	2	2	12	0	0
*Dibromofluoromethane	0	0	IO	0	0	0	0	0
Dichloromethane (methylene chloride)	36	36	61	2	2	60	0	0
Ethylbenzene	36	36	61	2	2	13	0	0
Styrene	36	36	61	2	2	13	0	0
Tetrachloroethene	36	36	61	2	2	12	0	0
Toiuene	36	36	65	2	2	13	0	0
*Toluene-d8	0	0	66	2	0	7	0	0
Trichloroethene (TCE)	36	36	65	2	2	13	0	0
Vinyl acetate	36	36	61	2	2	12	0	0

Table 7.1. Numbers of Qualified Samples, continued

	Samples Requested	Samples Received	Analyses Reported	Rejected	Out of Holding	QA Problems	Preservation	Calibration
Volatiles, continued								
Vinyl chloride	36	36	61	2	2	12	0	0
Xylenes (total)	36	36	61	2	2	13	0	0
cis-1,3-Dichloropropene	36	36	61	2	2	12	0	0
trans-1,3-Dichloropropene	36	36	61	2	2	12	0	0
*1,2-Dichloroethane-d4	0	0	56.	2	0	6	0	0
*p-Bromofluorobenzene	0	0	56	2	0	4	0	0
Pesticides/PCBs								
Aldrin	30	30	49	1	0	11	0	0
Aroclor 1016	30	30	46	0	0	IO	0	0
Aroclor 1221	30	30	46	0	0	10	0	0
Aroclor 1232	30	30	46	0	0	10	0	0
Aroclor 1242	30	30	46	0	0	10	0	0
Aroclor 1248	30	30	46	0	0	10	0	0
Aroclor 1254	30	30	46	0	0	10	0	0
Aroclor 1260	30	30	46	0	0	10	0	0
● Decachlorobiphenyl	0	0	42	0	0	0	0	0
Dicldrin	30	30	49	2	0	11	0	0
Endosulfan I	30	30	46	0	0	10	0	0
Endosulfan II	30	30	46	0	0	10	0	0
Endosulfan sulfate	30	30	46	0	0	10	0	0
Endrin	30	30	49	1	0	11	0	0
Endrin aldehyde	0	0	2	0	0	2	0	0
Endrin ketone	30	30	46	0	0	10	0	0
Heptachlor	30	30	49	1	0	11	0	0
Heptachlor cpoxide	30	30	46	0	0	10	0	0
Methoxychlor (Mariate)	30	30	46	0	0	10	0	0
* Restneide surrogate	0	0	7	0	0	1	0	0
*Tetrachloro-m-xylene	0	0	49	0	0	1	0	0

Table 7.1. Numbers of Qualified Samples, continued

	Samples Requested	Samples Received	Analyses Reported	Rejected	Out of Holding	QA Problems	Preservation	Calibration
Pesticides/PCBs, continued								
Toxaphcne	30	30	46	0	0	10	0	0
alpha-Benzene hexachioride	30	30	46	0	0	10	0	0
alpha-Chlordane	30	30	46	0	0	IO	0	0
beta-Benzene hexachloride	30	30	46	0	0	10	0	0
delta-Benzene hexachloride	30	30	46	0	0	10	0	0
gamma-Benzene hexachloride (Lindane)	30	30	49	2	0	11	0	0
gamma-Chlordane	30	30	46	0	0	IO	0	0
p,p'-DDD	30	30	46	0	0	10	0	0
p,p'-DDE	30	30	46	0	0	IO	0	0
p,p'-DDT	30	30	49	0	0	11	0	0
Radionuclides								
Gross Alpha	30	30	49	0	0	18	0	0
Non-volatile Beta	30	30	49	0	0	0	0	0

* = Surrogate Compounds

Table 7.2. Number of Analytical Records by Method and Type of Record

	Sample Records		Laboratory Duplicates		Laboratory Blanks		Matrix Spikes/ Matrix Spike Duplicates		Calibration Checks		Total	
Method	Water	Soil	Water	Soil	Water	Soil	Water	Soil	Water	Soil	Water	Soil
EPA335.3	0	2	0	2	0	2	0	4	0	0	0	10
EPA415.1	0	2	0	1	0	1	0	3	0	0	0	7
EPA418.1	0	12	0	2	0	3	0	6	0	0	0	23
EPA60 10	44	571	22	66	22	77	66	209	0	0	154	923
EPA60 I OA	0	44	0	22	0	22	0	88	0	0	0	176
EPA7470	2	0	1	0	2	0	4	0	12	0	21	0
EPA747 1	0	28	0	2	0	5	0	12	0	16	0	63
EPA8080	0	54	0	27	0	27	0	32	0	0	0	140
EPA8081	54	702	42	160	54	82	24	102	0	0	174	1046
EPA8240	240	888	93	349	102	170	52	151	0	0	487	1558
EPA8260	34	75	0	34	34	34	22	28	0	0	90	171
EPA8270	130	I 892	108	346	130	260	58	323	0	0	426	282 1
EPA900.0MOD	4	0	4	0	4	0	4	0	0	0	16	0
EPA9010	1	26	0	2	1	3	2	11	0	0	4	42
EPA9010A	1	0	0	0	1	0	2	0	0	0	4	0
EPA907 1	0	16	0	1	0	2	0	3	0	0	0	22
EPA908 1	0	28	0	4	0	4	0	8	0	0	0	44
EPIA-00 1 B	0	4	0	2	0	2	0	4	0	0	0	12
LANLMLR100MOD	0	52	0	6	0	6	0	6	0	0	0	70
LLOYDKAHN	0	26	0	2	0	2	0	8	0	0	0	38

7.2 ACCURACY

The examination of the accuracy of analytical methods evaluates the extent of bias within the result. This report examines the analytical results from blank and spiked samples to determine how accurate the results are and whether the results are biased. The discussion addresses each type of sample. Recoveries are given as percentages.

7.2.1 ACCURACY OF ANALYTICAL METHOD

The accuracy of the laboratory's performance with each analytical method is evaluated by reviewing the results of the analysis of LCS, blank spikes, and laboratory blanks. LCS data for this project are presented in Tables 7.3 and 7.4.

Table 7.3. Laboratoty Control Samples for Soil

Analyte	Number	Mean Percent Recovery	Standard Deviation	Minimum Recovery	Maximum Recovery
Method EPA6010					
Silver	3	99.6	1.2	98.6	101.0
Aluminum	4	100.2	1.0	93.9	101.0
Arsenic	3	98.9	2.8	95.8	101.0
Barium	4	98.8	1.6	97.5	101.0
Beryllium	4	100.4	1.5	98.4	102.0
Calcium	3	100.1	1.6	98.2	101.0
Cadmium	3	99.9	4.0	96.0	104.0
Cobalt	4	100.6	1.9	98.7	103.0
Chromium	4	99.4	2.6	96.2	102.0
Copper	4	99.1	1.4	97.9	101.0
Iron	4	100.5	1.3	99.1	102.0
Potassium	3	100.1	1.7	99.0	102.0
Magnesium	3	103.7	1.2	103.0	105.0
Manganese	4	101.5	1.7	100.0	104.0
Sodium	3	99.4	1.6	97.8	101.0
Nickel	4	97.7	1.7	95.8	99.4
Lead	3	99.9	2.2	97.6	102.0
Antimony	3	98.3	1.0	97.2	98.9
Selenium	3	100.7	2.5	98.1	103.0
Thallium	3	99.3	2.7	96.6	102.0
Vanadium	4	99.2	1.3	98.2	101.0
Zinc	4	99.8	1.9	97.3	102.0
Method EPA6010A					
Silver	2	98.1	4.2	95.1	101.0
Aluminum	2	72.9	3.0	70.8	75.0
Arsenic	2	101.1	5.6	97.1	105.0
Barium	2	100.9	3.0	98.7	103.0
Beryllium	2	107.0	4.2	104.0	110.0
Calcium	2	94.5	3.6	91.9	97.0
Cadmium	2	96.5	3.4	94.1	98.9

Table 7.3. Laboratory Control Samples for Soil, continued

Analyte	Number	Mean Percent Recovery	Standard Deviation	Minimum Recovery	Maximum Recovery
Method EPA6010A, continued					
Cobalt	2	106.0	4.2	103.0	109.0
Chromium	2	91.3	3.5	88.8	93.8
Copper	2	99.3	3.9	96.5	102.0
Iron	2	54.7	4.8	51.3	58.1
Potassium	2	92.1	4.9	88.6	95.6
Magnesium	2	91.1	3.7	88.4	93.7
Manganese	2	86.7	3.5	84.2	89.1
Sodium	2	128.0	5.7	124.0	132.0
Nickel	2	96.4	3.3	94.0	98.7
Lead	2	95.2	4.6	91.9	98.4
Antimony	2	76.8	7.5	71.5	82.1
Selenium	2	92.0	1.7	90.8	93.2
Thallium	2	137.5	4.9	134.0	141.0
Vanadium	2	86.9	4.4	83.8	90.0
Zinc	2	88.1	3.1	85.9	90.3
Method EPA7471					
Mercury	6	95.5	7.5	81.7	99.9

Table 7.4. Laboratory Control Samples for Water

Analyte	Number	Mean Percent Recovery	Standard Deviation	Manimum Recovery	Maximum Recovery
Method EPA6010					
Silver	1	101.0		101.0	101.0
Aluminum	1	101.0		101.0	101.0
Arsenic	1	99.2		99.2	99.2
Barium	1	98.2		98.2	98.2
Beryllium	1	101.0		101.0	101.0
Calcium	1	101.0		101.0	101.0
Cadmium	1	97.3		97.3	97.3
Cobalt	1	102.0		102.0	102.0
Chromium	1	101.0		101.0	101.0
Copper	1	98.7		98.7	98.7
Iron	1	101.0		101.0	101.0
Potassium	1	97.9		97.9	97.9
Magnesium	1	107.0		107.0	107.0
Manganese	1	102.0		102.0	102.0
Sodium	1	99.5		99.5	99.5
Nickel	1	98.4		98.4	98.4
Lead	1	99.7		99.7	99.7

Table 7.4. Laboratory Control Samples for Water, continued

Analyte	Number	Mean Percent Recovery	Standard Deviation	Manimum Recovery	Maximum Recovery
Method EPA6010, continued					
Antimony	1	98.6	.	98.6	98.6
Selenium	1	99.1	.	99.7	99.7
Thallium	1	98.4	.	98.4	98.4
Vanadium	1	100.0	.	100.0	100.0
Zinc	1	98.9	.	98.9	98.9
Method EPA7470					
Mercury	2	106.5	0.7	106.0	107.0

Blank Spikes

Blank **spikes are** sodium sulfate powder spiked with selected target **analytes,** extracted, and analyzed along with the regular samples for organic analyses. Blank spikes serve as a monitor of the overall performance of all steps in the analysis, including sample preparation. Tables **7.5 and 7.6 list the blank spikes conducted** for AMSSB 1. Tables 7.7 through 7.10 summarize the **analytes** detected and not detected **in** each matrix.

Table 7.5. Blank Spikes for Soil

Analyte	Number	Mean Percent Recovery	Standard Deviation	Minimum Recovery	Maximum Recovery
Method EPA3353					
Cyanide	2	117.0	14.1	107.0	127.0
Method EPA415.1					
Total **Organic Carbon**	2	105.0	5.7	101.0	109.0
Method EPA418.1					
Total Petroleum Hydrocarbons	4	91.4	18.9	69.1	109.0
Method EPA6010					
Silver	3	99.6	1.2	98.6	101.0
Aluminum	4	100.2	1.0	98.9	101.0
Arsenic	3	98.9	2.8	95.8	101.0
Barium	4	98.8	1.6	97.5	101.0
Beryllium	4	100.4	1.5	98.4	102.0
Calcium	3	100.1	1.6	98.2	101.0
Cadmium	3	99.9	4.0	96.0	104.0

Table 7.5. Blank Spikes for Soil, continued

Analyte	Number	Mean Percent Recovery	Standard Deviation	Minimum Recovery	Maximum Recovery
Method EPA6010, continued					
Cobalt	4	100.6	1.9	98.7	103.0
Chromium	4	99.4	2.6	96.2	102.0
Copper	4	99.1	1.4	97.9	101.0
Iron	4	100.5	1.3	99.1	102.0
Potassium	3	100.1	1.7	99.0	102.0
Magnesium	3	103.7	1.2	103.0	105.0
Manganese	4	101.5	1.7	100.0	104.0
Sodium	3	99.4	1.6	97.8	101.0
Nickel	4	97.7	1.7	95.8	99.4
Lead	3	99.9	2.2	97.6	102.0
Antimony	3	98.3	1.0	97.2	98.9
Selenium	3	100.7	2.5	98.1	103.0
Thallium	3	99.3	2.7	96.6	102.0
Vanadium	4	99.2	1.3	98.2	101.0
Zinc	4	99.8	1.9	97.3	102.0
Method EPA6010A					
Silver	2	98.1	4.2	95.1	101.0
Aluminum	2	72.9	3.0	70.8	75.0
Arsenic	2	101.1	5.6	97.1	105.0
Barium	2	100.9	3.0	98.7	103.0
Beryllium	2	107.0	4.2	104.0	110.0
Calcium	2	94.5	3.6	91.9	97.0
Cadmium	2	96.5	3.4	94.1	98.9
Cobalt	2	106.0	4.2	103.0	109.0
Chromium	2	91.3	3.5	88.8	93.8
Copper	2	99.3	3.9	96.5	102.0
iron	2	54.7	4.8	51.3	58.1
Potassium	2	92.1	4.9	88.6	95.6
Magnesium	2	91.1	3.7	88.4	93.7
Manganese	2	86.7	3.5	84.2	89.1
Sodium	2	128.0	5.7	124.0	132.0
Nickel	2	96.4	3.3	94.0	98.7
Lead	2	95.2	4.6	91.9	98.4
Antimony	2	76.8	7.5	71.5	82.1
Selenium	2	92.0	1.7	90.8	93.2
Thallium	2	137.5	4.9	134.0	141.0
Vanadium	2	86.9	4.4	83.8	90.0
Zinc	2	88.1	3.1	85.9	90.3
Met hod EPA7471					
Mercury	6	95.5	7.5	81.7	99.9

Table 7.5. Blank Spikes for Soil, continued

Analyte	Number	Mean Percent Recovery	Standard Deviation	Minimum Recovery	Maximum Recovery
Method EPA8080					
Aldrin	2	106.0	2.8	104.0	108.0
Dieldrin	2	113.5	0.7	113.0	114.0
Endrin	2	102.5	0.7	102.0	103.0
Heptachlor	2	116.0	2.8	114.0	118.0
gamma-Benzene hexachloride (Lindane)	2	117.5	2.1	116.0	119.0
p,p'-DDT	2	110.5	0.7	110.0	111.0
Method EPA8081					
Aldrin	3	75.0	10.0	65.0	85.0
Dieldrin	3	82.7	13.3	68.0	94.0
Endrin	3	88.7	11.0	78.0	100.0
Heptachlor	3	81.7	7.6	75.0	90.0
gamma-Benzene hexachloride (Lindane)	3	75.0	a.7	70.0	85.0
p,p'-DDT	3	87.3	12.2	74.0	98.0
Method EPA8240					
1,1-Dichloroethene	3	99.5	14.5	83.6	112.0
Benzene	3	101.7	1.5	100.0	103.0
Chlorobenzene	3	102.3	2.3	101.0	105.0
Toluene	3	101.4	3.2	99.1	105.0
Trichloroethene (TCE)	3.	103.0	2.6	100.0	105.0
Method EPA8270					
1,2,4-Trichlorobenzene	5	73.4	6.8	63.6	81.2
1,4-Dichlorobenzene	5	71.3	7.4	62.2	80.0
2,4-Dinitrotoluene	5	80.6	19.4	61.7	103.0
2-Chlorophenol	5	74.2	7.9	62.6	82.0
4-Chloro-3-methylphenol (p-chloro-m-cresol)	5	77.8	9.0	64.8	89.6
4-Nitrophenol	5	67.5	11.3	56.2	80.0
Acenapthene	5	78.6	a.9	65.5	87.6
N-Nitrosodi-n-propylamine	5	73.4	9.8	61.6	84.0
Pentachlorophenol	5	78.6	25.4	52.2	107.0
Phenol	5	74.2	7.1	62.8	80.0
Pyrene	5	93.0	16.5	70.0	108.0
Method EPA9010					
Cyanide	8	94.1	2.9	89.2	98.6
Method EPA9071					
Total Petroleum. Hydrocarbons	2	107.0	2.8	105.0	109.0

Table 7.5. Blank Spikes for Soil, continued

Analyte	Number	Mean Percent Recovery	Standard Deviation	Minimum Recovery	Maximum Recovery
Method EPA9081					
Cation Exchange Capacity	8	**89.7**	1.8	87.2	92.2
Method EPIA-001B					
Gross Alpha	1	**81.0**	.	81.0	81.0
Non-volatile Beta	1	**96.7**	.	96.7	96.7
Met hod **LANLMLR100MOD**					
Gross Alpha	3	**96.4**	10.2	84.9	104.3
Non-volatile Beta	3	**94.3**	11.7	81.0	102.8
Method LLOYDKAHN					
Total Organic Carbon	6	**94.5**	2.0	92.4	97.5

Table 7.6. Blank Spikes for Water

Analyte	Number	Mean Percent Recovery	Standard Deviation	Minimum Recovery	Maximum Recovery
Met hod EPA601 0					
Silver	1	101.0	.	101.0	101.0
Aluminum	1	101.0		101.0	101.0
Arsenic	1	99.2	.	99.2	99.2
Barium	1	98.2	.	98.2	98.2
Beryllium	1	101.0	.	101.0	101.0
Calcium	1	101.0	.	101.0	101.0
Cadmium	1	97.3		97.3	97.3
Cobalt	1	102.0	.	102.0	102.0
Chromium	1	101.0	. .	101.0	101.0
Copper	1	98.7		98.7	98.7
Iron	1	101.0		101.0	101 .o
Potassium	1	97.9		97.9	97.9
Magnesium	1	107.0		107.0	107.0
Manganese	1	102.0		102.0	102.0
Sodium	1	99.5		99.5	99.5
Nickel	1	98.4	.	98.4	98.4
Lead	1	99.7		99.7	99.1
Antimony	1	98.6	.	98.6	98.6
Selenium	1	99.7		99.7	99.7
Thallium	1	98.4		98.4	98.4
Vanadium	1	loo.0		100.0	100.0
Zinc	1	98.9	.	98.9	98.9

Table 7.6. Blank Spikes for Water, continued

Analyte	Number	Mean Percent Recovery	Standard Deviation	Minimum Recovery	Maximum Recovery
Method EPA7470					
Mercury	2	106.5	0.7	106.0	107.0
Method EPA8081					
A ldrin	1	85.0	.	85.0	85.0
Dieldrin	1	96.0	.	96.0	96.0
Endrin	1	102.0	.	102.0	102.0
Heptachlor	1	80.0	.	80.0	80.0
gamma-Benzene hexachloride (Lindane)	1	90.0	.	90.0	90.0
p,p'-DDT	2	65.0	35.4	40.0	90.0
Method EPA8240					
1,1-Dichloroethene	1	94.0	.	94.0	94.0
Benzene	1	101.0	.	101.0	101.0
Chlorobenzene	1	101.0	.	101.0	101.0
Toluene	1	100.0		100.0	100.0
Trichloroethene (TCE)	1	101.0		101.0	101.0
Method EPA8270					
1,2,4-Trichlorobenzene	2	51.2	2.3	49.5	52.8
1,4-Dichlorobenzene	2	49.1	4.3	46.0	52.1
2,4-Dinitrotoluene	2	70.9	0.8	70.3	71.5
2-Chlorophenol	2	64.2	1.7	63.0	65.4
4-Chloro-3-methylphenol (p-chloro-m-cresol)	2	67.3	2.5	65.5	69.1
4-Nitrophenol	2	69.5	2.1	68.0	71.0
Acenapthene	2	63.6	1.4	62.6	64.6
N-Nitrosodi-n-propylam ine	2	75.3	3.3	73.0	77.6
Pentachlorophenol	2	62.9	0.4	62.6	63.2
Phenol	2	67.2	5.4	63.4	71.0
Pyrene	2	88.3	8.4	82.3	94.2
Method EPA900.0MOD					
Gross Alpha	2	91.6	9.3	85.1	98.2
Non-volatile Beta	2	95.9	3.1	93.7	98.1
Method EPA9010					
Cyanide	2	96.6	2.9	94.5	98.6
Method EPA9010A					
Cyanide	2	96.6	2.9	94.5	98.6

Table 7.7. Analytes Detected in Laboratory Blanks for Soil

Analyte	Number Above Detection	Number Below Detection	Mean Detected Result	Standard Deviation	Min. Result	Max Result	Units
Method EPA335.3							
Cyanide	2	0	159.0	7.071	154.0	164.0	ug/kg
Method EPA6010							
Aluminum	1	3	2.200		2.200	2.200	mg/kg
Beryllium	2	2	0.035	d.007	0.030	0.040	mg/kg
Calcium	1	2	1.700	.	1.700	1.700	mg/kg
Method EPA6010A							
Aluminum	1	0	1.030	.	1.030	1.030	mg/kg
Calcium	1	0	1.540	.	1.540	1.540	mg/kg
iron	1	0	0.609		0.609	0.609	mg/kg
Zinc	1	0	0.210	.	0.210	0.210	mg/kg
Method EPA7471							
Mercury	8	5	0.004	0.005	0.000	0.010	mg/kg
Method EPA8240							
Acetone	5	0	t 2.75	8.105	1.920	23.30	ug/kg
Dichloromethane (methylene chloride)	5	0	8.252	7.857	1.500	21.50	ug/kg
Met bod EPA8260							
Ethylbenzene	1	0	0.070	.	0.070	0.070	ug/kg
Styrene	1	0	0.060	.	0.060	0.060	ug/kg
Xylenes (total)	1	0	0.150		0.150	0.150	ug/kg
Method EPA8270							
Pyrene	1	3	24.10	.	24.10	24.10	ug/kg
Method EPA9010							
Cyanide	2	1	0.131	0.062	0.087	0.174	mg/kg
Method EPA9071							
Total Petroleum Hydrocarbons	1	1	2.540		2.540	2.540	mg/kg
Method LANLMLR100MOD							
Gross Alpha	1	2	0.280		0.280	0.280	pC/g
Method LLOYDKAHN							
Total Organic Carbon	1	1	8.800		8.800	8.800	mg/kg

Table 7.8. Analytes Detected in Laboratory Blanks for Water

Analyte	Number Above Detection	Number Below Detection	Mean Detected Result	Standard Deviation	Min. Result	Max. Result	Units
Method EPA6010							
Silver	1	0	1.200		1.200	1.200	ug/L
Chromium	1	0	1.300		1.300	1.300	ug/L
Iron	1	0	9.300		9.300	9.300	ug/L
Zinc	1	0	30.90		30.90	30.90	ug/L
Method EPA7470							
Mercury	6	2	0.000	0.000	0.000	0.000	ug/L
Method EPA8240							
Acetone	3	0	1.793	0.384	1.350	2.020	ug/L
Dichloromethane (methylene chloride)	3	0	2.063	0.235	1.830	2.300	ug/L
Method EPA8260							
Dichloromethane (methytene chloride)		0	0.300		0.300	0.300	ug/L
Method EPA8270							
Bis(2-ethylhexyl) phthalate	2	0	2.210	1.513	1.140	3.280	ug/L
Di-n-butyl phthalate	1	1	1.110		1.110	1.110	ug/L
Method EPA9010							
Cyanide	1	0	3.480		3.480	3.480	ug/L
Method EPA9010A							
Cyanide	1	0	3.480		3.480	3.480	ug/L

Table 7.9. Analytes Not Detected in Laboratory Blanks for Soil

Analyte	Number	Analyte	Number
Method EPA415.1			
Total Organic Carbon	1		
Method EPA418.1			
Total Petroleum Hydrocarbons	3		
Method EPA6010			
Silver	3	Arsenic	3
Barium	4	Cadmium	3
Cobalt	4	Chronium	4
Copper	4	Iron	4
Potassium	3	Magnesium	3

Table 7.9. Analytes Not Detected in Laboratory Blanks for Soil, continued

Analyte	Number	Analyte	Number
Method **EPA6010,** continued			
Manganese	4	Sodium	3
Nickle	4	Lead	3
Antimony	3	Selenium	3
Thallium	3	Vanadium	4
Zinc	4		
Method **EPA6010A**			
Silver	1	Arsenic	1
Barium	1	Beryllium	1
Cadmium	1	Cobalt	1
Chromium	1	**Copper**	1
Potassium	1	Magnesium	1
Manganese	1	Sodium	1
Nickle	1	Lead	1
Antimony	1	Selenium	1
Thallium	1	Vanadium	1
Method EPA8080			
alpha-Benzene hexachloride	1	Alpha-Chlordane	1
Aldrin	1	beta-Benzene hexachloride	1
delta-Benzene hexachloride	1	Dieldrin	1
Endrin ketone	1	Endrin	1
Endosulfan I	1	Endosulfan II	1
Endosulfan **sulfate**	1	**gamma-Chlordane**	1
Heptachlor	1	Heptachlor epoxide	1
gamma-Benzene hexachloride (Lindane)	1	Methoxychlor (Mariate)	1
Arochlor 1016	1	**Aroclor** 122 1	1
Arochior 1232	1	Aroclor 1242	1
Aroclor 1248	1	Aroclor 1254	1
Aroclor **1260**	1	**p,p'-DDD**	1
p,p'-DDE	1	**p,p'-DDT**	1
Toxaphene	1		
Method EPA808 **1**			
alpha-Benzene hexachloride	3	alpha-Chlordane	3
Aldrin	3	beta-Benzene hexchloride	3
delta-Benzene hexachloride	3	Dieldrin	3
Endrin aldehyde	1	Endrin ketone	3
Endrin	3	Endosulfan **I**	3
Endosulfan II	3	Endosulfan sulfate	3
gamma-Chlordane	3	Heptachlor	3
Heptachlor epoxide	3	gamma-Benzene hexachloride *(Lindane)*	3
Methoxychlor (Mariate)	3	Aroclor 1016	3
Aroclor 122 1	3	Aroclor 1232	3
Aroclor 1242	3	Aroclor 1248	3
Aroclor 1254	3	Aroclor 1260	3

Table 7.9. Analytes Not Detected in Laboratory Blanks for Soil, continued

Analyte	Number	Analyte	Number
Method EPA8081, continued			
p,p'-DDD	3	p,p'-DDE	3
p,p'-DDT	3	Toxaphene	3
Method EPA8240			
1,1,1-Trichloroethane	5	1,1,2-Trichloroethane	5
1,1-Dichloroethene	5	1,1-Dichloroethane	5
1,2-Dichloroethene (total)	5	1,2-Dichloroethane	5
1,2-Dichloropropane	5	cis-1,3-Dichloropropene	5
trans-1,3-Dichloropropene	5	2-Hexanone	5
Bromodichloromethane	5	Vinyl chloride	5
Chloroethane	5	Benzene	5
Carbon tetrachloride	5	Bromomethane (Methyl bromide)	5
Chloromethane (methyl chloride)	5	Bromoform	5
Chloroform	5	Chlorobenzene	5
Carbon diilfide	5	Chlorodibromomethane	5
Ethylbenzene	5	Toluene	5
2-Butanone (MEK)	5	4-Methyl-2-pentanone	5
Styrene	5	1,1,2,2-Tetrachloroethane	5
Tetrachloroethene	5	Trichloroethene (TCE)	5
Vinyl acetate	5	Xylenes (total)	5
Method EPA8260			
1,1,1-Trichloroethane	1	1,1,2-Trichloroethane	1
1,1-Dichloroethene	1	1,1-Dichloroethane	1
1,2-Dichloroethene (total)	1	1,2-Dichloroethane	1
1,2-Dichloropropane	1	cis-1,3-Dichloropropene	1
trans-1,3-Dichloropropene	1	2-Hexanone	1
Acetone	1	Bromodichloromethane	1
Vinyl chloride	1	Chloroethane	1
Benzene	1	Carbon tetrachloride	1
Dichloromethane (methylene chloride)	1	Bromomethane (Methyl bromide)	1
Chloromethane (methyl chloride)	1	Bromoform	1
Chloroform	1	Chlorobenzene	1
Carbon disulfide	1	Chlorodibromomethane	1
Toluene	1	2-Butanone (MEK)	1
4-Methyl-2-pentanone	1	I,1,2,2-Tetrachloroethane	1
Tetrachloroethene	1	Trichloroethene (TCE)	1
Vinyl acetate	1		
Method EPA8270			
1,2,4-Trichlorobenzene	4	1,2-Dichlorobenzene	4
1,3-Dichlorobenzene	4	1,4-Dichlorobenzene	4
2,4,5-Trichlorophenol	4	2,4,6-Trichlorophenol	4
2,4-Dichlorophenol	4	2,4-Dimethyl phenol	4
2,4-Dinitrophenol	4	2,4-Dinitrotoluene	4
2,6-Dinitrotoluene	4	2-Chlorophenol	4

Table 7.9. Analytes Not Detected in Laboratory Blanks for Soil, continued

Analyte	Number	Analyte	Number
Method EPA8270, continued			
2-Chloronaphthalene	4	2-Methylnaphthalene	4
o-cresol (2-methylphenol)	4	2-Nitroaniline	4
2-Nitrophenol	4	3,3'-Dichlorobenzidine	4
m,p-Cresol	1	3-Nitroaniline	4
2-Methyl-4,6-dinitrophenol	4	4-Bromophenyl phynyl ether	4
4-Chloroaniline	4	4-Chloro-3-methylphenol (p-chloro-m-cresol)	4
4-Chlorophenyl phynyl ether	4	p-cresol (4-methylphenol)	3
4-Nitroaniline	4	4-Nitrophenol	4
Acenapthene	4	Acenapthylene	4
Anthracene	4	Bis(2-chloroethoxy) methane	4
Bis(2-chloroethyl)ether	4	Bis(2-ethylhexyl) phthalate	4
Benzo(a)anthracene	4	Benzo(a)pyrene	4
Benzo(b)fluoranthene	4	Butyl benzyl phthalate	4
Bis(2-chloroisopropyl) ether	4	Benzoic acid	4
Benzo(g,h,i)perylene	4	Benzo(k)fluoranthene	4
Benzyl alcohol	4	Chrysene	4
Hexachlorobenzene	4	Hexachlorocyclopentadiene	4
Hexachloroethane	4	Dibenzo(a,h)anthracene	4
Diethyl phthalate	4	Dibenzofuran	4
Dimcthyl phthalate	4	Di-n-butyl phthalate	4
Di-n-octyl phthalate	4	Fluoranthene	4
Fluorene	4	Hexachlorobutadiene	4
Indeno(1,2,3-c,d)pyrene	4	Isophorone	4
Naphthalene	4	Nitrobenzene	4
N-Nitrosodi-n-propylamine	4	N-Nitrosodiphenylamine	4
Pentachlorophenol	4	Phenanthrene	
Phenol	4		
Method EPA9081			
Cation Exchange Capacity	4		
Method EPIA-001 B			
Gross Alpha	1	Non-volatile Beta	
Method LANLMLR100MOD			
Non-volatile Beta	3		

Table 7.10. Analytes Not Detected in Laboratory Blanks for Water

Analyte	Number	Analyte	Number
Method EPA6010			
Aluminum	1	Arsenic	1
Barium	1	Beryllium	1

Table 7.10. Analytes Not Detected in Laboratory Blanks for Water, continued

Analyte	Number	Analyte	Number
Method EPA6010, continued			
Calcium	1	Cadmium	1
Cobalt	1	Copper	1
Potassium	1	Magnesium	1
Manganese	1	Sodium	1
Nickel	1	Lead	1
Antimony	1	Selenium	1
Thallium	1	Vanadium	1
Method EPA8081			
alpha-Benzene hexachloride	2	alpha-Chlordane	2
Aldrin	2	beta-Benzene hexachloride	2
delta-Benzene hexachloride	2	Dieldrin	2
Endrin ketone	2	Endrin	2
Endosulfan I	2	Endosulfan II	2
Endosulfan sulfate	2	gamma-Chlordane	2
Heptachlor	2	Heptachlor epoxide	2
gamma-Benzene hexachloride (Lindane)	2	Methoxychlor (Mariate)	2
Aroclor 1016	2	Aroclor 1221	2
Aroclor 1232	2	Aroclor 1242	2
Aroclor 1248	2	Aroclor 1254	2
Aroclor I260	2	p,p'-DDD	2
p,p'-DDE	2	p,p'-DDT	2
Toxaphene	2		
Method EPA8240			
I, 1,1-Trichloroethane	3	1,1,2-Trichloroethane	3
1,1-Dichloroethene	3	1,1-Dichloroethane	3
I ,2-Dichloroethene (total)	3	1,2-Dichloroethane	3
1 ,2-Dichloropropane	3	cis-1,3-Dichloropropene	3
trans-1,3-Dichloropropene	3	2-Hexanone	3
Bromodichloromethane	3	Vinyl chloride	3
Chloroethane	3	Benzene	3
Carbon tetrachloride	3	Bromomethane (Methyl bromide)	3
Chloromethane (methyl chloride)	3	Bromoform	3
Chloroform	3	Chlorobenzene	3
Carbon disulfide	3	Chlorodibromomethane	3
Ethylbenzene	3	Tolucne	3
2-Butanone (MEK)	3	4-Methyl-2-pentanone	3
Styrene	3	1,1,2,2-Tetrachloroethane	3
Tetrachloroethtne	3	Trichloroethene (TCE)	3
Vinyl acetate	3	Xylems (total)	3
Method EPA8260			
1,1, 1 -Trichloroethane	1	1,1,2-Trichloroethane	1
1,1-Dichloroethene	1	1, 1-Dichloroethane	1
1,2-Dichloroethene (total)	1	1,2-Dichloroethane	1
1 ,2-Dichloropropane	1	cis- 1,3-Dichloropropene	1

Table 7.10. Analytes Not Detected in Laboratory Blanks for Water, continued

Analyte	Number	Analyte	Number
Method EPA8260, continued			
trans-1,3-Dichloropropene	1	2-Hexanone	1
Acetone	1	Bromodichloromethane	1
Vinyl chloride	1	Chloroethane	1
Benzene	1	Carbon tetrachloride	1
Bromomethane (Methyl bromide)	1	Chloromethane (methyl chloride)	1
Bromofotm	1	Chloroform	1
Chlorobenzene	1	Carbon disulfide	1
Chlorodibromomethane	1	Ethylbenzene	1
Toluene	1	2-Butanone (MEK)	1
4-Methyl-2-pentanone	1	Styrene	1
1,1,2,2-Tetrachloroethane	1	Tetrachloroethene	1
Trichloroethene (TCE)	1	Vinyl acetate	1
xylenes (total)	1		
Method EPA8270			
1,2,4-Trichlorobenzene	2	1,2-Dichlorobenzene	2
1,3-Dichlorobenzene	2	1,4-Dichlorobenzene	2
2,4,5-Trichlorophenol	2	2,4,6-Trichlorophenol	2
2,4-Dichlorophenol	2	2,4-Dimethyl phenol	2
2,4-Dinitrophenol	2	2,4-Dinitrotoluene	2
2,6-Dinitrotoluene	2	2-Chlorophenol	2
2-Chloronaphthalene	2	2-Methylnaphthalene	2
o-cresol (2-methylphenol)	2	2-Nitroaniline	2
2-Nitrophenol	2	3,3'-Dichlorobenzidine	2
3-Nitroaniline	2	2-Methyl-4,6-dinitrophenol	2
4-Bromophenyl phenyl ether	2	4-Chloraniline	2
4-Chloro-3-methylphenol (p-chloro-m-cresol)	2	4-Chlorophynl phenyl ether	2
p-cresol (4-methylphenol)	2	4-Nitroaniline	2
4-Nitrophenol	2	Acenapthene	2
Acenapthylene	2	Anthracene	2
Bis(2-chloroethoxy) methane	2	Bis(2-chloroethyl) ether	2
Benzo(a)anthracene	2	Benzo(a)pyrene	2
Benzo(b)fluoranthene	2	Butyl benzyl phthalate	2
Bis(2-chloroisopropyl) ether	2	Benzoic acid	2
Benzo(g,h,i)perylene	2	Benzo(k)fluoranthene	2
Benzyl alcohol	2	Chrysene	2
Hexachlorobenzene	2	Hexachlorocyclopentadadiene	2
Hexachloroethane	2	Dibenzo(a,h)anthracene	2
Diethyl phthalate	2	Dibenzofuran	2
Dimethyl phthalate	2	Di-n-octyl phthalate	2
Fluoranthene	2	Fluorene	2
Hexachiorobutadiene	2	Indeno(1,2,3-c,d)pyrene	2
Isophorone	2	Naphthalene	2
Nitrobenzene	2	N-Nitrosodi-n-propylamine	2

Table 7.10. Analytes Not Detected in Laboratory Blanks for Water, continued

Analyte	Number	Analyte	Number
Method EPA8270, continued			
N-Nitrosodiphenylamine	2	Pentachlorophenol	2
Phenanthrene	2	Phenol	2
Pyrene	2		
Method 900.0MOD			
Gross alpha	2	Non-volatile Beta	2

7.2.2 MATRIX EFFECTS

The matrix of a sample can interfere with the accuracy of the analysis. This report evaluates the results of surrogate and matrix spike recoveries to evaluate the interference caused by the matrix.

Surrogates

Surrogate spikes are performed for organic anaiyses. All samples for organic analyses are spiked with surrogates prior to sample preparation to examine the laboratory's performance. The evaluation of surrogate spikes is not necessarily straightforward. The sample may produce effects due to such factors as interferences and high concentrations of analytes. Tables 7.1 I and 7.12 describe the surrogates associated with AMSSB 1.

Table 7.11 Surrogates for Soil

Analyte	Number	Mean Percent Recovery	Standard Deviation	Min Recovery	Max. Recovery
Method EPA8080					
Tetrachloro-m-xylene	4	58.0	38.8	0.0	80.4
Restneide surrogate	4	73.1	49.7	0.0	108.0
Method EPA8081					
Tetrachloro-m-xylene	30	65.3	6.9	47.5	75.0
Decachlorobiphenyl	30	81.2	7.9	63.0	97.0
Method EPA8240					
1,2-Dichloroethane-d4	32	109.9	8.6	95.0	139.0
Toluene-d8	32	108.7	8.0	97.0	127.0
p-Bromofluorobenzene	32	91.5	7.6	74.0	103.0
Method EPA8260					
1,4-Dichlorobenzene-d4	5	85.0	7.7	78.0	95.2
Dibromofluoromethane	5	89.3	1.9	87.6	92.4
Toluene-d8	5	122.6	5.9	114.0	127.0

Table 7.11 Surrogates for Soil, continued

Analyte	Number	Mean Percent Recovery	Standard Deviation	Mill Recovery	Max. Recovery
Met hod EPA8270					
2,4,6-Tribromophenol (SUIT)	32	71.9	13.2	57.5	**105.0**
2-Fluorobiphenyl	32	68.2	6.7	59.2	89.4
2-Fluorophenol	32	68.4	5.3	56.4	**79.5**
Nitrobenzene-d5	32	61.5	7.7	51.8	88.6
Phenol-d5	28	66.6	3.5	58.5	72.2
Phenol-d6	4	84.0	9.5	72.8	93.5
p-Terphenyl-d 14	32	77.8	12.5	65.4	114.0

Table 7.12 Surrogates for Water

Analyte	Number	Mean Percent Recovery	Standard Deviation	Min. Recovery	Max. Recovery
Method EPA8081					
Tetrachloro-m-xylene	2	47.5	24.7	30.0	65.0
Decachlorobiphenyl	2	80.5	29.0	60.0	101.0
Method EPA8240					
1 **,2-Dichloroethane-d4**	**10**	98.3	**2.5**	**95.0**	103.0
Toluene-d8	10	99.0	2.4	96.0	104.0
p-Bromofluorobenzene	10	96.4	2.2	94.0	101.0
Method EPA8260					
1,4-Dichlorobenzene-d4	3	**92.1**	**12.9**	**83.6**	107.0
Dibromofluoromethane	3	**90.1**	**0.6**	**89.4**	90.6
Toluene-d8	3	**107.0**	**5.2**	101.0	110.0
Method EPA8270					
2,4,6-Tribromophenol (SUIT)	2	**62.6**	**7.0**	**57.6**	67.5
2-Fluorobiphenyl	2	**62.1**	**4.2**	**59.1**	65.0
2-Fluorophenol	2	**57.6**	**1.3**	**56.7**	58.5
Nitrobenzene-d5	2	**65.3**	**5.2**	**61.6**	69.0
Phenol-d5	2	**64.5**	**0.8**	**63.9**	65.0
p-Terphenyl-d 14	2	**97.6**	**11.9**	**89.2**	106.0

Matrix Spikes

Selected samples are spiked to provide information about the effect of each sample matrix on the digestion and measurement methodology. Matrix spikes are rejected if the concentration of the analyte in the sample is greater than four times the concentration of the spike. Percent bias in Tables 7.13 and 7.14 is the difference between 100% and the mean recovery; a negative value indicates that the mean recovery was below 100%.

Table 7.13. Matrix Spikes for Soil

Analyte	Bias (%)	Number	Mean Percent Recovery	Standard Deviation	Min. Recovery	Max. Recovery
Method EPA335.3						
Cyanide	**-45.6**	2	54.4	33.8	**30.5**	78.3
Method EPA415.1						
Total Organic Carbon	**-11.7**	1	88.3		**88.3**	88.3
Method EPA418.1						
Total Petroleum Hydrocarbons	**-1.8**	2	98.2	4.0	**95.4**	101.0
Method EPA601 0						
Silver	**-10.6**	6	89.4	2.4	**86.8**	92.3
Arsenic	**-7.7**	6	92.3	3.0	**88.4**	95.0
Barium	**-7.1**	6	92.9	2.9	**90.3**	96.6
Beryllium	-6.7	6	93.3	3.6	**88.9**	**96.8**
Calcium	-8.0	4	92.0	2.4	**89.8**	94.2
Cadmium	-4.8	6	95.2	5.9	**86.8**	100.0
Cobalt	-10.0	6	90.0	0.9	**88.9**	90.9
Chromium	-4.9	6	95.2	7.7	**89.0**	110.0
Copper	-5.7	6	94.3	2.2	**92.3**	96.9
Potassium	-5.1	6	94.9	3.0	**91.5**	98.8
Magnesium	-3.1	6	96.9	2.7	**93.2**	100.0
Manganese	-2.9	4	97.1	2.7	**93.2**	99.4
Sodium	-6.6	6	93.4	1.8	**91.7**	95.6
Nickel	-10.7	4	89.3	1.8	**87.5**	90.8
Lead	-5.8	6	94.2	4.5	**89.2**	101.0
Antimony	-15.1	6	84.9	5.3	**77.3**	90.6
Selenium	-7.6	6	92.4	2.4	**89.3**	94.8
Thallium	-7.6	6	92.4	2.8	**88.9**	95.4
Vanadium	-9.0	4	91.0	0.8	**90.1**	91.8
Zinc	-2.1	6	97.9	8.2	**89.8**	**112.0**
Method **EPA6010A**						
Silver	3.0	2	103.0	0.0	**103.0**	103.0
Arsenic	**-11.9**	2	88. I	2.0	**86.7**	89.5
Barium	0.5	2	loo.5	0.7	**100.0**	101.0

Table 7.13. Matrix Spikes for Soil, continued

Analyte	Bias (%)	Number	Mean Percent Recovery	Standard Deviation	Min. Recovery	Max. Recovery
Method EPA6010A, continued						
Beryllium	2.0	2	102.0	0.0	102.0	102.0
Calcium	2.0	2	102.0	0.0	102.0	102.0
Cadmium	-4.1	2	95.9	0.1	95.8	96.0
Cobalt	-5.0	2	95.0	0.1	94.9	95.1
Chromium	9.0	2	109.0	5.7	105.0	113.0
Copper	-2.0	2	98.0	0.4	97.7	98.2
Potassium	-5.8	2	94.2	2.8	92.2	96.1
Magnesium	19.5	2	119.5	0.7	119.0	120.0
Manganese	-3.0	2	97.0	2.4	95.3	98.7
Sodium	13.0	2	113.0	1.4	112.0	114.0
Nickel	-3.3	2	96.7	0.1	96.6	96.7
Lead	-0.8	2	99.3	0.6	98.8	99.7
Antimony	-84.4	2	15.6	2.7	13.7	17.5
Selenium	-16.6	2	83.4	0.4	83.1	83.7
Thallium	4.0	2	104.0	1.4	103.0	105.0
Vanadium	17.0	2	117.0	12.7	108.0	126.0
Zinc	-3.7	2	96.3	0.7	95.8	96.8
Method EPA7471						
Mercury	-12.7	6	87.3	8.4	80.6	98.9
Method EPA8080						
Aldrin	-100	1	0.0		0.0	0.0
Endrin	-100	1	0.0		0.0	0.0
Heptachlor	-100	1	0.0		0.0	0.0
p,p'-DDT	-100	1	0.0		0.0	0.0
Method EPA8081						
Aldrin	-30.0	2	70.0	0.0	70.0	70.0
Dieldrin	-34.0	2	66.0	11.3	58.0	74.0
Endrin	-21.0	2	79.0	1.4	78.0	80.0
Heptachlor	-27.5	2	72.5	3.5	70.0	75.0
gamma-Benzene hexachloride (Lindane)	-27.5	2	72.5	3.5	70.0	75.0
p,p'-DDT	-21.0	2	79.0	4.2	76.0	82.0
Method EPA8240						
1,1-Dichloroethene	-6.0	2	94.1	14.1	84.1	104.0
Benzene	8.5	2	108.5	3.5	106.0	111.0
Chlorobenzene	5.5	2	105.5	6.4	101.0	110.0
Toluene	10.0	2	110.0	2.8	108.0	112.0
Trichloroethene (TCE)	-0.2	2	99.8	4.5	96.6	103.0

Table 7.13. Matrix Spikes for Soil, continued

Analyte	Bias (%)	Number	Mean Percent Recovery	Standard Deviation	Min. Recovery	Max. Recovery
Method EPA8260						
1,1-Dichloroethene	8.5	2	108.5	3.5	106.0	111.0
Benzene	7.0	2	107.0	1.4	106.0	108.0
Chlorobenzene	13.5	2	113.5	4.9	110.0	117.0
Toluene	16.5	2	116.5	2.1	115.0	118.0
Trichlorocthene (TCE)	3.5	2	103.5	2.1	102.0	105.0
Method EPA8270						
1,2,4-Trichlorobenzene	-23.3	2	76.3	7.3	71.1	81.4
1,4-Dichlorobenzene	-28.1	2	72.0	9.7	65.1	78.8
2,4-Dinitrotoluene	-16.8	2	83.3	25.1	65.5	101.0
2-Chlorophenol	-17.3	2	82.7	7.0	77.7	87.6
4-Chloro-3-methylphenol (p-chloro-m-cresol)	-11.8	2	88.2	16.7	76.4	100.0
4-Nitrophenol	-15.0	2	85.0	24.0	68.0	102.0
Acenapthene	-16.6	2	83.4	14.4	73.2	93.6
N-Nitrosodi-n-propylamine	-22.7	2	77.3	12.9	68.2	86.4
Pentachlorophenol	3.3	2	103.3	29.3	82.5	124.0
Phenol	-18.3	2	81.8	7.0	76.8	86.7
Pyrene	1.0	2	101.0	26.9	81.9	120.0
Method EPA9010						
Cyanide	-12.0	3	88.0	6.8	82.6	95.6
Method EPA907 1						
Total Petroleum Hydrocarbons	16.0	1	116.0		116.0	116.0
Method EPIA-001B						
Gross Alpha	-19.2	1	80.8		80.8	80.8
Non-volatile Beta	- 10.9	1	89.1		89. 1	89.1
Method LLOYDKAHN						
Total Organic Carbon	5.1	2	105.1	15.4	94.2	116.0

Table 7.14. Matrix Spikes for Water

Analyte	Bias (%)	Number	Mean Percent Recovery	Standard Deviation	Min. Recovery	Max. Recovery
Method EPA6010						
Silver	-1.6	2	98.4	1.4	97.4	99.4
Aluminum	4.5	2	104.5	2.1	103.0	106.0
Arsenic	0.3	2	100.4	0.9	99.7	101.0

Table 7.14. Matrix Spikes for Water, continued

Analyte	Bias (%)	Number	Mean Percent Recovery	Standard Deviation	Min. Recovery	Max. Recovery
Method EPA6010, continued						
Barium	-0.7	2	99.3	0.4	99.0	99.6
Beryllium	-0.3	2	99.7	0.4	99.4	100.0
Calcium	-0.3	2	99.7	0.5	99.3	100.0
Cadmium	-3.5	2	96.5	1.3	95.6	97.4
Cobalt	-0.5	2	99.5	0.6	99.1	99.9
Chromium	-3.3	2	96.7	0.7	96.2	97.2
Copper	1.0	2	101.0	0.0	101.0	101.0
Iron	1.0	2	101.0	1.4	100.0	102.0
Potassium	3.0	2	103.0	0.0	103.0	103.0
Magnesium	8.5	2	108.5	0.7	108.0	109.0
Manganese	0.4	2	100.4	0.8	99.8	101.0
Sodium	-1.0	2	99.0	1.0	98.3	99.7
Nickel	-1.8	2	98.2	0.2	98.0	98.3
Lead	-1.1	2	98.9	0.7	98.4	99.4
Antimony	-1.9	2	98.1	0.0	98.1	98.1
Selenium	0.4	2	100.4	0.8	99.8	101.0
Thallium	-1.1	2	99.0	0.5	98.6	99.3
Vanadium	-0.3	2	99.7	0.4	99.4	100.0
Zinc	-2.9	2	97.1	0.5	96.7	97.4
Method EPA7470						
Mercury	-5.4	2	94.6	1.4	93.6	95.6
Method EPA8240						
1,1-Dichloroethene	-4.2	1	95.8	.	95.8	95.8
Benzene	3.0	1	103.0	.	103.0	103.0
Chlorobenzene	3.0	1	103.0	.	103.0	103.0
Toluene	2.0	1	102.0		102.0	102.0
Trichloroethene (TCE)	2.0	1	102.0		102.0	102.0
Met hod EPA8260						
1,1-Dichloroethene	0.8	2	100.8	6.0	96.5	105.0
Benzene	5.0	2	105.0	4.2	102.0	108.0
Chlorobenzene	8.0	2	108.0	4.2	105.0	111.0
Toluene	3.0	2	103.0	1.4	102.0	104.0
Trichloroethene (TCE)	-8.0	2	92.0	0.0	92.0	92.0

7.2.3 EFFECTS OF SAMPLING AND TRANSPORT

Sampling and sample transport can add variability to the sample results.

Trip Blanks

Trip blanks are used to detect contamination or false positive results caused during shipping, primarily due to depressurization during air transport. Trip blanks are only used for VOA analyses. Tables 7.15 and 7.16 summarize the analytes that were and were not detected in trip blanks.

Table 7.15. Analytes Detected in Trip Blanks

Analyte	Number Above Detection	Number Below Detection	Mean Detected Result	Standard Deviation	Min. Result	Max. Result	Units
Method EPA8260							
Toluene	1	0	0.1	.	0.1	0.1	ug/L
2-Butanone (MEK)	1	0	0.8	.	0.8	0.8	ug/L
Styrene	1	0	0.1	.	0.1	0.1	ug/L
Xylenes (total)	1	0	0.3	.	0.3	0.3	ug/L

Table 7.16. Analytes Not Detected in Trip Blanks

Analyte	Number	Analyte	Number
Method EPA8240			
1,1,1-Trichloroethane	3	1,1,2-Trichloroethane	3
1,1-Dichloroethene	3	1,1-Dichloroethane	3
1,2-Dichloroethene (total)	3	1,2-Dichloroethane	3
1,2-Dichloropropane	3	cis-1,3-Dichloropropene	3
trans-1,3-Dichloropropene	3	2-Hexanone	3
Acetone	3	Bromodichloromethane	3
Vinyl chloride	3	Chloroethane	3
Benzene	3	Carbon tetrachloride	3
Dichloromethane (methylene chloride)	3	Bromomethane (Methyl bromide)	3
Chloromethane (methyl chloride)	3	Bromoform	3
Chloroform	3	Chlorobenzene	3
Carbon disulfide	3	Chlorodibromomethane	3
Ethylbenzene	3	Toluene	3
2-Butanone (MEK)	3	4-Methyl-2-pentanone	3
Styrene	3	1,1,2,2-Tetrachloroethane	3
Tetrachloroethene	3	Trichloroethene (TCE)	3
Vinyl acetate	3	Xylenes (total)	3

Table 7.16. Analytes Not Detected in Trip Blanks, continued

Analyte	Number	Analyte	Number
Mctbod EPA8260			
1,1,1-Trichloroethane	1	1,1,2-Trichloroethane	1
1,1-Dichloroethene	1	1,1-Dichloroethane	1
1,2-Dichloroethene (total)	1	1,2-Dichloroethane	1
1,2-Dichloropropane	1	cis-1,3-Dichloropropene	1
trans-1,3-Dichloropropene	1	2-Hexanone	1
Acetone	1	Bromodichloromethane	1
Vinyl chloride	1	Chloroethane	1
Benzene	1	Carbon tetrachloride	1
Dichloromethane (methylene chloride)	1	Bromomethane (Methyl bromide)	1
Chloromethane (methyl chloride)	1	Bromoform	1
Chloroform	1	Chlorobenzene	1
Carbon disulfide	1	Chlorodibromomethane	1
Ethylbenzene	1	4-Methyl-2-pentanone	1
1,1,2,2-Tetrachloroethane	1	Tetrachloroethene	1
Trichloroethene (TCE)	1	Vinyl acetate	1

Field Blanks

No qualification was done based on field blank results. Tables 7.17 and 7.18 summarize the analytes that were and were not detected in field blanks.

Table 7.17. Analytes Detected in Field Blanks for Soil

Analyte	Number Above Detection	Number Below Detection	Mean Detected Result	Standard Deviation	Min. Result	Max. Result	Units
Method EPA8240							
Acetone	1	1	51.6	.	51.6	51.6	ug/L
unknown	1	0	8.0	.	8.0	8.0	ug/L
2-Butanone (MEK)	1	1	26.4	.	26.4	26.4	ug/L

Table 7.18. Analytes Not Detected in Field Blanks for Soil

Analyte	Number	Analyte	Number
Method EPA8240			
1,1,1-Trichloroethane	2	1,1,2-Trichloroethane	2
1,1-Dichloroethene	2	1,1-Dichloroethane	2
1,2-Dichloroethene (total)	2	1,2-Dichloroethane	2
1,2-Dichloropropane	2	cis-1,3-Dichloropropene	2

Table 7.18. Analytes Not Detected in Field Blanks for Soil, continued

Analyte	Number	Analyte	Number
Method EPA8240, continued			
trans-1,3-Dichloropropene	2	2-Hexanone	2
Bromodichloromethane	2	Vinyl chloride	2
Chloroethane	2	Benzene	2
Carbon tetrachloride	2	Dichloromethane (mcthylene chloride)	2
Bromomethane (Methyl bromide)	2	Chloromethane (methyl chloride)	2
Bromoform	2	Chloroform	2
Chlorobenzene	2	Carbon disulfide	2
Chlorodibromomethane	2	Ethylbenzene	2
Toluene	2	4-Methyl-2-pentanone	2
Styrene	2	1,1,2,2-Tetrachloroethane	2
Tetrachloroethene	2	Trichloroethene (TCE)	2
Vinyl acetate	2	Xylenes (total)	2

Rinsate Blanks

No qualification was done based on rinsate blank results. Tables 7.19 and 7.20 summarize the analytes that were and were not detected in rinsate blanks.

Table 7.19. Analytes Detected in Rinsate Blanks

Analyte	Number Above Detection	Number Below Detection	Mean Detected Result	Standard Deviation	Min. Result	Max. Result	Units
Method EPA6010							
Aluminum	1	1	64.2	.		64.2	ug/L
Barium	2	0	0.9	0.1	64.20.9	1.0	ug/L
Calcium	1	1	72.0		72.0	72.0	ug/L
Cadmium	1	1	0.5	.	0.5	0.5	ug/L
Cobalt	1	I	0.7	.		0.7	ug/L
Copper	2	0	2.7	1. 1	0.7 1.9	3.4	ug/L
Iron	1	1	47.1	19.8	342.0 47.1	47.1	ug/L
Potassium	2	0	356.0	.		370.0	ug/L
Manganese	1	1	1.1	2333	33800 1.1	1.1	ug/L
Sodium	2	0	35450			37100	ug/L
Vanadium	1	1	1.0		1.0	1.0	ug/L
Method EPA8240							
Acetone	2	0	128.5	101.1	57.0	200.0	ug/L
unknown	1	0	10.0	.	10.0	10.0	ug/L
2-Butanone (MEK)	1	1	23.5		23.5	23.5	ug/L

Table 7.19. Analytes Detected in Rinsate Blanks, continued

Analyte	Number Above Detection	Number Below Detection	Mean Detected Result	Standard Deviation	Min. Result	Max. Result	Units
Method EPA8270							
Diethyl phthalate	1	1	1.0	.	1.0	1.0	ug/L
Method EPA900.0MOD							
Non-volatile Beta	1	1	3.0	.	3.0	3.0	pC/L

Table 7.20. Analytes Not Detected in Rinsate Blanks

Analyte	Number	Analyte	Number
Method EPA6010			
Silver	2	Arsenic	2
Beryllium	2	Chromium	2
Magnesium	2	Nickel	2
Lead	2	Antimony	2
Selenium	2	Thallium	2
Zinc	2		
Method EPA7470			
Mercury	2		
Method EPA8081			
alpha-Benzene hexachloride	2	alpha-Chlordane	2
Aldrin	2	beta-Benzene hexachloride	2
delta-Benzene hexachloride	2	Dieldrin	2
Endrin ketone	2	Endrin	2
Endosulfan I	2	Endosulfan II	2
Endosulfan sulfate	2	gamma-Chlordane	2
Heptachlor	2	Heptachlor epoxide	2
ganima-Benzene hexachloride (Lindane)	2	Methoxychlor (Mariate)	2
Aroclor 1016	2	Aroclor 122 1	2
Aroclor 1232	2	Aroclor 1242	2
Aroclor 1248	2	Aroclor 1254	2
Aroclor 1260	2	p,p'-DDD	2
p,p'-DDE	2	p,p'-DDT	2
Toxaphene	2		
Method EPA8240			
1 ,1,1-Trichloroethane	2	1,1,2-Trichloroethane	2
1,1-Dichloroethene	2	I, 1-Dichloroethane	2
1,2-Dichloroethene (total)	2	1 ,2-Dichloroethane	2
1 ,2-Dichloropropane	2	cis- 1 ,3-Dichloropropene	2
trans- 1,3-Dichloropropene	2	2-Hexanone	2
Bromodichloromethane	2	Vinyl chloride	2
Chloroethane	2	Benzene	2

Table 7.20. Analytes Not Detected in Rinsate Blanks, continued

Analyte	Number	Analyte	Number
Method EPA8240, continued			
Carbon tetrachloride	2	Dichloromethane (methylene chloride)	2
Bromomethane (Methyl bromide)	2	Chloromethane (methyl chloride)	2
Bromoform	2	Chloroform	2
Chlorobenzene	2	Carbon disulfide	2
Chlorodibromomethane	2	Ethylbenzene	2
Toluene	2	4-Methyl-2-pentanone	2
Styrene	2	1,1,2,2-Tetrachloroethane	2
Tetrachloroethene	2	Trichloroethene (TCE)	2
Vinyl acetate	2	Xylenes (total)	2
Method EPA8270			
1,2,4-Trichlorobenzene	2	1,2-Dichlorobenzene	2
1,3-Dichlorobenzene	2	1,4-Dichlorobenzene	2
2,4,5-Trichlorophenol	2	2,4,6-Trichlorophenol	2
2,4-Dichlorophenol	2	2,4-Dimethyl phenol	2
2,4-Dinitrophenol	2	2,4-Dinitrotoluene	2
2,6-Dinitrotoluene	2	2-Chlorophenol	2
2-Chloronaphthalene	2	2-Methylnaphthalene	2
o-cresol (2-methylphenol)	2	2-Nitroaniline	2
2-Nitrophenol	2	3,3'-Dichlorobenzidine	2
3-Nitroaniline	2	2-Methyl-4,6-dinitrophenol	2
4-Bromophenyl phenyl ether	2	4-Chloroaniline	2
4-Chloro-3-methylphenol (p-chloro-m-cresol)	2	4-Chlorophenyl phenyl ether	2
p-cresol (4-methylphenol)	2	4-Nitroaniline	2
4-Nitrophenol	2	Acenapthene	2
Acenapthylene	2	Anthracene	2
Bis(2-chloroethoxy) methane	2	Bis(2-chloroethyl) ether	2
Bis(2-ethylhexyl) phthalate	2	Benzo(a)anthracene	2
Benzo(a)pyrene	2	Benzo(b)fluoranthene	2
Butyl benzyl phthalate	2	Bis(2-chloroisopropyl) ether	2
Benzoic acid	2	Benzo(g,h,i)perylene	2
Benzo(k)fluoranthene	2	Benzyl alcohol	2
Chrysene	2	Hexachlorobenzene	2
Hexachlorocyclopentadiene	2	Hexachloroethane	2
Dibenzo(a,h)anthracene	2	Dibenzofuran	2
Dimethyl phthalate	2	Di-n-butyl phthalate	2
Di-n-octyl phthalate	2	Fluoranthene	2
Fluorene	2	Hexachiorobutadiene	2
Indeno(1,2,3-c,d)pyrene	2	lsophorone	2
Naphthalene	2	Nitrobenzene	2
N-Nitrosodi-n-propylamine	2	N-Nitrosodiphenylamine	2
Pentachlorophenol	2	Phenanthrene	2
Phenol	2	Pyrene	2
Method EPA900.0MOD			
Gross Alpha	2		

Table 7.20. Analytes Not Detected in Rinsate Blanks, continued

Analyte	Number	Analyte	Number
Method EPA9010			
Cyanide	1		
Method EPA9010A			
Cyanide	1		

7.3 PRECISION

Examination of the precision of analytical methods evaluates the variability of the results. This report examines the analytical results from laboratory blanks and replicated samples and the variability of spiked samples to determine the precision of the results. The discussion addresses each type of sample.

7.3.1 PRECISION OF ANALYTICAL METHOD

The precision of each analytical method is evaluated by reviewing the results of the analysis of laboratory blanks and of laboratory control samples and blank spikes.

Results of the analysis of laboratory control samples, blank spikes, and laboratory blanks are listed in Section 7.2, "Accuracy." The tables list the mean and the standard deviation of the results. The magnitude of the standard deviation in relation to the magnitude of the mean reflects the precision of the results.

7.3.2 MATRIX EFFECTS AND INTRA-SAMPLE HETEROGENEITY

The matrix of a sample can interfere with the precision of the analysis. This report examinesthe results of matrix spike recoveries to evaluate the interference caused by the matrix.

Results of the analysis of matrix spikes are listed in Section 7.2, "Accuracy." The tables list the mean and the standard deviation of the results. The magnitude of the standard deviation in relation to the magnitude of the mean reflects the precision of the result.

The laboratory routinely analyzes 10% of the samples twice and reports both results. The RPD of the results reflects the precision of the analyses. RPDs were not calculated for pairs of samples with both results below detection. If one result was below detection, the detection limit was used to calculate the RPD. Tables 7.21 through 7.24 summarize the results of the laboratory replicates.

Table 7.21. Analytes Detected in Laboratory Replicates for Soil

Analyte	Sample	Relative Percent Difference		First Result		Second Result	Units
Method EPA418.1							
Total Petroleum Hydrocarbons	102690	2.1		18.9		18.5	mg/kg
Method EPA601 0							
Aluminum	102663	4.3	J	9990	J	9570	mg/kg
Aluminum	102667	9.8	J	2460	J	2230	mg/kg
Aluminum	102682	5.9	J	2110	J	1990	mg/kg
Arsenic	102663	0.0	J	5	J	5	mg/kg
Arsenic	102667	.	U	11.6	U	11.6	mg/kg
Arsenic	102682	.	U	11.7.	U	11.7	mg/kg
Barium	102663	21.8	J	15.1		18.8	mg/kg
Barium	102667	0.9		11.6		11.5	mg/kg
Barium	102682	3.1		9.9		9.6	mg/kg
Beryllium	102663	12.0		0.274		0.309	mg/kg
Beryllium	102667	.	U	0.105	U	0.12	mg/kg
Beryllium	102682	5.0	J	0.0885	J	0.0842	mg/kg
Calcium	102663	50.3	J	2810	J	1680	mg/kg
Calcium	102667	10.5		46.7		51.9	mg/kg
Calcium	102682	5.4		55.6		58.7	mg/kg
Cadmium	102663	2.8		0.972		0.945	mg/kg
Cadmium	102667	157.2	UJ	0.418	J	0.050 1	mg/kg
Cadmium	102682		U	0.42 1	U	0.42 l	mg/kg
Cobalt	102663	14.3		1.3		1.5	mg/kg
Cobalt	102667	16.1	J	0.644	J	0.548	mg/kg
Cobalt	102682	4.9	J	0.769	J	0.732	mg/kg
Chromium	102663	3.8		25.5		26.5	mg/kg
Chromium	102667	16.0		2.7		2.3	mg/kg
Chromium	102682	6.9		3		2.8	mg/kg
Copper	102663	11.8		4		4.5	mg/kg
Copper	102667	8.7		12		1.1	mg/kg
Copper	102682	6.1	J	0.936	J	0.995	mg/kg
iron	102663	2.9	J	20700	J	20100	mg/kg
Iron	102667	4.2	J	1460	J	1400	mg/kg
Iron	102682	0.7	J	1420	J	1430	mg/kg
Potassium	102663	46.3	J	191		306	mg/kg
Potassium	102667	11.8	J	37.7	J	33.5	mg/kg
Potassium	102682	4.8	J	40.6	J	42.6	mg/kg
Magnesium	102663	20.4	J	467		573	mg/kg
Magnesium	102667	11.9		45.4		40.3	mg/kg
Magnesium	102682	11.9		49.8		44.2	mg/kg
Manganese	102663	37.8	J	239	J	163	mg/kg
Manganese	102667	6.5		72.9		68.3	mg/kg
Manganese	102682	0.0		27.3		27.3	mg/kg

Table 7.21. Aaalytes Detected in Laboratory Replicates for Soil, continued

Analyte	Sample	Relative Percent Difference		First Result		Second Result	Units
Method EPA6010, continued							
Sodium	102663	8.7	J	20.9	J	22.8	mg/kg
sodium	102667	0.7	J	14.8	J	14.9	mg/kg
Sodium	102682		U	136	U	136	mg/kg
Nickel	102663	28.6	J	2.1	J	2.8	mg/kg
Nickel	102667	16.7	J	1.3	J	1.1	mg/kg
Nickel	102682	0.0	J	1.3	J	1.3	mg/kg
Lead	102663	4.7		8.7		8.3	mg/kg
Lead	102667	0.0	J	2.9	J	2.9	mg/kg
Lead	102682	0.0	J	1.7	J	1.7	mg/kg
Antimony	102663	13.2	J	0.659	J	0.752	mg/kg
Antimony	102667	.	U	3.65	U	3.65	mg/kg
Antimony	102682	.	U	3.69	U	3.69	mg/kg
Vanadium	102663	5.3	J	50.1	J	47.5	mg/kg
Vanadium	102667	6.1		3.4		3.2	mg/kg
Vanadium	102682	0.0		3.1		3.1	mg/kg
Zinc	102663	13.4		23.1		20.2	mg/kg
Zinc	102667	43.5	J	2.7	J	4.2	mg/kg
Zinc	102682	28.6	J	1.8	J	2.4	mg/kg
Method EPA747 I							
Mercury	102667	0.0	J	0.02	J	0.02	mg/kg
Mercury	10269 1	12.5	J	0.0195	J	0.0172	mg/kg
Method EPA8240							
1,1,1-Trichloroethane	102667	23.6	J	2.5 1	J	3.18	ug/kg
1,1,1-Trichloroethane	102667	43.6	J	251	J	3.91	ug/kg
1,1,1-Trichloroethane	102669	53.5	J	7.16	J	4.14	ug/kg
1,1,1-Trichloroethane	102689	14.3	J	7.8	J	6.76	ug/kg
1,1,1-Trichloroethane	102690	.	U	5.5	U	5.5	ug/kg
1,1,1-Trichloroethane	102690		U	5.5	U	5.5	ug/kg
Tetrachloroethene	102667	24.7		7.88		10.1	ug/kg
Tetrachloroethene	102667	45.3		7.88		12.5	ug/kg
Tetrachloroethene	102669	30.2	J	9.79	J	7.22	ug/kg
Tetrachloroethene	102689	21.2	J	9.62	J	11.9	ug/kg
Tetrachloroethene	102690	652	J	3.54	J	1.8	ug/kg
Tetrachloroethene	102690	65.2	J	3.54	J	1.8	ug/kg
Xylems (total)	102667	40.4	J	1.62	J	2.44	ug/kg
Xylenes (total)	102667	77.3	J	1.62	J	3.66	ug/kg
Xylenes (total)	102669	127.4	J	1.22	UJ	5.5	ug/kg
Xylencs (total)	102689	.	UJ	5	UJ	5.5	ug/kg
Xylenes (total)	102690	.	U	5.5	U	5.5	ug/kg
Xylenes (total)	102690	.	U	5.5	U	5.5	ug/kg

Table 7.21. Analytes Detected in Laboratory Replicates for Soil, continued

Analyte	Sample	Relative Percent Difference		First Result		Second Result	Units
Method EPA8270							
Di-n-butyl phthalate	102667	.	U	348	U	348	ug/kg
Di-n-butyl phthalate	102667	.	U	348	U	348	ug/kg
Di-n-butyl phthalate	102695	8.4	J	27.4	J	29.8	ug/kg
Di-n-octyl phthalate	102667		U	348	U	348	ug/kg
Di-n-octyl phthalate	102667	.	U	348	U	348	ug/kg
Di-n-octyl phthalate	102695	48.7	J	21.9	U	36	ug/kg
Method EPA9071							
Total Petroleum Hydrocarbons	102689	146.9		82.3		12.6	mg/kg
Method LANLMLR100MOD							
Gross Alpha	102663	34.2		11.68		8.27	pC/g
Gross Alpha	102667	50.1		21.04		12.61	pC/g
Gross Alpha	102682		UI	3.2	UI	5.41	pC/g
Non-volatile Beta	102663	1.2		12.51		12.36	pC/g
Non-volatile Beta	102667	50.9		16.33		9.7	pC/g
Non-volatile Beta	102682	81.5	UI	3.85		9.15	pC/g
Method LLOYDKAHN							
Total Organic Carbon	102663	10.2		3390		3060	mg/kg
Totaf Organic Carbon	102682	12.1		464		411	mg/kg

Table 7.22. Analytes Detected in Laboratory Replicates for Water

Analyte	Sample	Relative Percent Difference		First Result		Second Result	Units
Method EPA601 0							
Aluminum	102678	136.8	UJ	146	J	27.4	ug/L
Arsenic	102678	111.3	UJ	40	J	11.4	ug/L
Barium	102678	28.9	J	0.87	J	0.65	ug/L
Cobalt	102678	51.4	J	0.65	J	1.1	ug/L
Copper	102678	23.3	J	I.9	J	2.4	ug/L
Potassium	102678	3.7		370		384	ug/L
Sodium	102678	0.8		37100		37400	ug/L
Antimony	102678	112.1	UJ	27	J	7.6	ug/L
Vanadium	102678	3.1	J	0.98	J	0.95	ug/L

Table 7.22. Analytes Detected in Laboratory Replicates for Water, continued

Analyte	Sample	Relative Percent Difference		First Result		Second Result	Units
Metbod EPA8240							
Acetone	102679	.	L	.		189	ug/L
Acetone	102696	18.6		57		47.3	ug/L
Acetone	102696	13.3		57		49.9	ug/L
Method EPA900.0MOD							
Non-volatile Beta	102678	.	UI	0.52	UI	0.8 1	pC/L
Non-volatile Beta	102696	62.3		3.03	UI	1.59	pC/L

Table 7.23. Analytes Not Detected in Laboratory Replicates for Soil

Analyte	Number of Pairs	Analyte	Number of Pairs
Metbod EPA601 0			
Silver	3	Selenium	3
Thallium	3		
Method EPA8081			
alpha-Benzene hexachloride	4	alpha-Chlordane	4
Aldrin	2	beta-Benzene hexachloride	4
delta-Benzene hexachloride	4	Dieldrin	2
Endrin ketone	4	Endrin	2
Endosulfan I	4	Endosulfan II	4
Endosulfan sulfate	4	gamma-Chlordane	4
Heptachlor	2	Heptachlor epoxide	4
gamma-Benzene hexachloride (Lindane)	2	Methoxychlor (Mariate)	4
Aroclor 1016	4	Aroclor 1221	4
Aroclor 1232	4	Aroclor 1242	4
Aroclor 1248	4	Aroclor 1254	4
Aroclor 1260	4	p,p'-DDD	4
p,p'-DDE	4	p,p'-DDT	2
Toxaphene	4		
Method EPA8240			
1,1,2-Trichloroethane	6	1,1-Dichloroethene	4
1,1-Dichloroethane	6	1,2-Dichloroethene (total)	6
1,2-Dichloroethane	6	1,2-Dichloropropane	6
cis-1,3-Dichloropropene	6	trans-1,3-Dichloropropene	6
2-Hexanone	6	Acetone	6
Bromodichloromethane	6	Vinyl chloride	6
Chloroethane	6	Benzene	4
Carbon tetrachloride	6	Dichlorometbane (methylene chloride)	6
Bromomethane (Methyl bromide)	6	Chloromethane (methyl chloride)	6

Table 7.23. Analytes Not Detected in Laboratory Replicates for Soil, continued

Analyte	Number of Pairs	Analyte	Number of Pairs
Method EPA8240, continued			
Bromoform	6	Chloroform	6
Chlorobenzene	4	Carbon disulfide	6
Chlorodibromomethane	6	Ethylbenzene	6
Toluene	4	2-Butanone (MEK)	6
4-Methyl-2-pentanone	6	Styrene	6
1,1,2,2-Tetrachloroethane	6	Trichloroethene (TCE)	4
Vinyl acetate	6		
Method EPA8270			
1,2,4-Trichlorobenzene	2	1,2-Dichlorobenzene	3
1,3-Dichlorobenzene	3	1,4-Dichlorobenzene	2
2,4,5-Trichlorophenol	3	2,4,6-Trichlorophenol	3
2,4-Dichlorophenol	3	2,4-Dimethyl phenol	3
2,4-Dinitrophenol	3	2,4-Dinitrotoluene	2
2,6-Dinitrotoluene	3	2-Chlorophenol	2
2-Chloronaphthalene	3	2-Methylnaphthalene	3
o-cresol (2-methylphenol)	3	2-Nitroaniline	3
2-Nitrophenol	3	3,3'-Dichlorobenzidine	3
m,p-Cresol	1	3-Nitroaniline	3
2-Methyl-4,6-dinitrophenol	3	4-Bromophenyl phenyl ether	3
4-Chloroaniline	3	4-Chloro-3-methylphenol (p-chloro-m-cresol)	2
4-Chlorophenyl phenyl ether	3	p-cresol (4-methylphenol)	2
4-Nitroaniline	3	4-Nitrophenol	2
Acenapthene	2	Acenapthylene	3
Anthracene	3	Bis(2-chloroethoxy) methane	3
Bis(2-chloroethyl) ether:	3	Bis(2-ethylhexyl) phthalate	3
Benzo(a)anthracene	3	Benzo(a)pyrene	3
Benzo(b)fluoranthene	3	Butyl benzyl phthalate	3
Bis(2-chloroisopropyl) ether	3	Benzoic acid	3
Benzo(g,h,i)perylene	3	Benzo(k)fluoranthene	3
Benzyl alcohol	3	Chrysene	3
Hexachlorobenzene	3	Hexachlorocyclopentadiene	3
Hexachloroethane	3	Dibenzo(a,h)anthracene	3
Diethyl phthalate	3	Dibenzofuran	3
Dimethyl phthaiate	3	Fluoranthene	3
Fluorene	3	Hexachlorobutadiene	3
Indeno(1,2,3-c,d)pyrene	3	Isophorone	3
Naphthalene	3	Nitrobenzene	3
N-Nitrosodi-n-propylamine	2	N-Nitrosodiphenylamine	3
Pentachlorophenol	2	Phenanthrene	3
Phenol	2	Pyrene	2
Method EPA9010			
Cyanide	2		
Method EPA9081			
Cation Exchange Capacity	2		

Table 7.24. Analytes Not Detected in Laboratory Replicates for Water

Analyte	Number of Pairs	Analyte	Number of Pairs
Method EPA6010			
Silver	1	Beryllium	1
Calcium	1	Cadmium	1
Chromium	1	Iron	1
Magnesium	1	Manganese	1
Nickel	1	Lead	1
Selenium	1	Thallium	1
Zinc			
Method EPA7470			
Mercury	1		
Method EPA8240			
1,1,1-Trichloroethane	2	1,1,2-Trichloroethane	2
1,1-Dichloroethene	1	1,1-Dichloroethane	2
1,2-Dichloroethene (total)	2	1,2-Dichloroethane	2
1,2-Dichloropropane	2	cis-1,3-Dichloropropene	2
trans-1,3-Dichloropropene	2	2-Hexanone	2
Bromodichloramethane	2	Vinyl chloride	2
Chloroethane	2	Benzene	1
Carbon tetrachloride	2	Dichloromethane (methylene chloride)	2
Bromomethane (Methyl bromide)	2	Chloromethane (methyl chloride)	2
Bromoform	2	Chloroform	2
Chlorobenzene	1	Carbon disuifide	2
Chlorodibromomethane	2	Ethylbenzene	2
Toluene	1	2-Butanone (MEK)	2
4-Methyl-2-pentanone	2	Styrene	2
1,1,2,2-Tetrachloroethane	2	Tetrachloroethene	2
Trichloroethene (TCE)	1	Vinyl acetate	
Xylenes (total)	2		
Method EPA900.0MOD			
Gross Alpha	2		

7.3.3 Sampling Effects and Inter-Sample Heterogeneity

This report evaluates the effects of sampling and inter-sample heterogeneity on precision by examining the variability of rinsate blanks and the results of field replicate samples.

Field Replicates

Field replicates were generated by splitting samples during collection. The laboratory was not informed which samples were field replicates. The RPD of the results reflect the precision of the analyses. RPDs were not calculated for pairs of samples with both results below detection. If one result was below detection, the detection limit was used to calculate the RPD. Details of field replicate analyses are shown in Tables 7.25 and 7.26.

Table 7.25. Analytes Detected in Field Replicates for Soil

Analyte	Sample	Relative Percent Difference		First Result		Second Result	Units
Method EPA418.1							
Total Petroleum Hydrocarbons	102666	30.4	UJ	9.5		12.9	mg/kg
Total Petroleum Hydrocarbons	10268 1	.	UJ	3.8	UJ	3.8	mg/kg
Method EPA6010							
Aluminum	102666	13.6		2820	J	2460	mg/kg
Aluminum	10268 1	6.9		1970	J	2110	mg/kg
Barium	102666	0.9		11.7		11.6	mg/kg
Barium	102681	8.4		9.1		9.9	mg/kg
Beryllium	102666	26.5	J	0.0804	U	0.105	mg/kg
Bery llium	10268 1	42.0	J	0.0578	J	0.0885	mg/kg
Calcium	102666	21.4		57.9		46.7	mg/kg
Calcium	10268 1	4.4		53.2		55.6	mg/kg
Cadmium	102666	110.8	J	0.12	UJ	0.418	mg/kg
Cadmium	102681	.	U	0.406	U	0.421	mg/kg
Cobalt	102666	4.1	J	0.67 1	J	0.644	mg/kg
Cobalt	10268 1	12.3	J	0.68	J	0.769	mg/kg
Chromium	102666	16.9		3.2		2 . 7	mg/kg
Chromium	10268 1	22.2		2.4		3	mg/kg
Copper	102666	28.6		1.6		1.2	mg/kg
Copper	102681	6.6	J	1	J	0.936	mg/kg
Iron	102666	3.4		1510	J	1460	mg/kg
Iron	102681	8.8		1300	J	1420	mg/kg
Potassium	102666	20.7	J	46.4	J	37.7	mg/kg
Potassium	10268 1	11.7	J	36.1	J	40.6	mg/kg
Magnesium	102666	22.5		56.9		45.4	mg/kg
Magnesium	10268 1	6.0		46.9		49.8	mg/kg
Manganese	102666	8.9		79.7		72.9	mg/kg
Manganese	10268 1	2.2		27.9		27.3	mg/kg
Sodium	102666	158.5	U	128	J	14.8	mg/kg
Sodium	10268 1		U	131	U	136	mg/kg
Nickel	102666	20.7	J	1.6	J	1.3	mg/kg
Nickel	10268 1	16.7	J	1.1	J	1.3	mg/kg
Lead	102666	21.5	J	3.6	J	2.9	mg/kg
Lead	IO268 1	38.1	J	2.5	J	1.7	mg/kg
Antimony	102666	.	U	3.48	U	3.65	mg/kg
Antimony	10268 1	59.4	J	2	U	3.69	mg/kg
Vanadium	102666	5.7		3.6		3.4	mg/kg
Vanadium	10268 1	10.2		2.8		3.1	mg/kg
zinc	102666	13.8	J	3.1	J	2.7	mg/kg
Zinc	102681	0.0	J	1.8	J	1.8	mg/kg

Table 7.25. Analytes Detected in Field Replicates for Soil, continued

Analyte	Sample	Relative Percent Difference		First Result		Second Result	Units
Method EPA7471							
Mercury	102666	0.0	J	0.02	J	0.02	mg/kg
Mercury	102681	0.0	J	0.02	J	0.02	mg/kg
Method EPA8240							
1,1,1-Trichloroethane	IO2666	106.1		8.18	J	2.5 1	ug/kg
1,1,1-Trichloroethane	10268 1	42.2	J	1.14	J	1.75	ug/kg
Toluene	102666	84.6	J	2.23	U	5.5	ug/kg
Toluene	IO268 1	.	U	5.5	U	5.5	ug/kg
Tetrachloroethene	102666	33.1		11		7.88	ug/kg
Tetrachloroethene	102681	18.0	J	2.97	J	2.48	ug/kg
Xylenes (total)	102666	33.4	J	3.5	J	1.62	ug/kg
Xylenes (total)	102681	.	U	5.5	U	5.5	ug/kg
Method EPA9010							
Cyanide	IO2666	139.8	U	0.79	J	0.14	mg/kg
Cyanide	102681	.	U	0.79	U	0.8	mg/kg
Method LANLMLR100MOD							
Gross Alpha	102666	127.9	UI	4.63		21.04	pC/g
Gross Alpha	102681	.	UI	1.66	UI	3.2	pC/g
Non-volatile Beta	102666	13.9		14.21		16.33	pC/g
Non-volatile Beta	10268 1	116.7		14.63	UI	3.85	pC/g
Method LLOYDKAHN							
Total Organic Carbon	102666	66.7		6860		3430	mg/kg
Total Organic Carbon	IO268 1	42.3		302		464	mg/kg

Table 7.26. Analytes Not Detected in Field Replicates for Soil

Analyte	Number of Pairs	Analyte	Number of Pairs
Method EPA6010			
Silver	2	Arsenic	2
Selenium	2	Thallium	2
Method EPA8081			
alpha-Benzene hexachloride	2	alpha-Chlordane	2
Aldrin	2	beta-Benzene hexachloride	2
delta-Benzene hexachloride	2	Dieldrin	2
Endrin ketone	2	Endrin	2
Endosulfan I	2	Endosulfan II	2
Endosulfan sulfate	2	gamma-Chlordane	2

Table 7.26. Analytes Not Detected in Field Replicates for Soil, continued

Analyte	Number of Pairs	Analyte	Number of Pairs
Method EPA8081, continued			
Heptachlor	2	Heptachlor epoxide	2
gamma-Benzene hexachloride (Lindane)	2	Methoxychlor (Mariate)	2
Aroclor 1016	2	Aroclor 122 1	2
Aroclor 1232	2	Aroclor 1242	2
Aroclor 1248	2	Aroclor 1254	2
Aroclor 1260	2	p,p'-DDD	2
p,p'-DDE	2	p,p'-DDT	2
Toxaphene	2		
Method EPA8240			
1,1,2-Trichloroethane	2	1,1-Dichloroethene	2
1,1-Dichloroethane	2	1,2-Dichloroethene (total)	2
1,2-Dichloroethane	2	1,2-Dichloropropane	2
cis-1,3-Dichloropropene	2	trans-1,3-Dichloropropene	2
2-Hexanone	2	Acetone	2
Bromodichloromethane	2	Vinyl chloride	2
Chloroethane	2	Benzene	2
Carbon tetrachloride	2	Dichloromethane (methylene chloride)	2
Bromomethane (Methyl bromide)	2	Chloromethane (methyl chloride)	2
Bromoform	2	Chloroform	2
Chlorobenzene	2	Carbon disulfide	2
Chlorodibromomethane	2	Ethylbenzene	2
2-Butanone (MEK)	2	4-Methyl-2-pentanone	2
Styrene	2	1,1,2,2-Tetrachloroethane	2
Trichloroethene (T C E)	2	Vinyl acetate	2
Method EPA8270			
1,2,4-Trichlorobenzene	2	1,2-Dichlorobenzene	2
1,3-Dichlorobenzene	2	1,4-Dichlorobenzene	2
2,4,5-Trichlorophenol	2	2,4,6-Trichlorophenol	2
2,4-Dichlorophenol	2	2,4-Dimethyl phenol	2
2,4-Dinitrophenol	2	2,4-Dinitrotoluene	2
2,6-Dinitrotoluene	2	2-Chlorophenol	2
2-Chloronaphthalene	2	2-Methylnaphthalene	2
o-cresol (2-methylphenol)	2	2-Nitroaniline	2
2-Nitrophenol	2	3,3'-Dichlorobenzidine	2
3-Nitroaniline	2	2-Methyl-4,6-dinitrophenol	2
4-Bromophenyl phenyl ether	2	4-Chloroaniline	2
4-Chloro-3-methylphenol (p-chloro-m-cresol)	2	4-Chlorophenyl phenyl ether	2
p-cresol (4-methylphenol)	2	4-Nitroaniline	2
4-Nitrophenol	2	Acenapthene	2
Acenapthylene	2	Anthracene	2
Bis(2-chloroethoxy) methane	2	Bis(2-chloroethyl) ether	2
Bis(2-ethylhexyl) phthalate	2	Benzo(a)anthracene	2
Benzo(a)pyrene	2	Benzo(b)fluoranthene	2
Butyl benzyl phthalate	2	Bis(2-chloroisopropyl) ether	2

Table 7.26. Analytes Not Detected in Field Replicates for Soil, continued

Analyte	Number of Pairs	Analyte	Number of Pairs
Method EPA8270, **continued**			
Benzoic acid	2	Benzo(g,h,i)perylene	2
Benzo(k)fluoranthene	2	Benzyl alcohol	2
Chrysene	2	Hexachlorobenzene	2
Hexachlorocyclopentadiene	2	Hexachloroethane	2
Dibenzo(a,h)anthracene	2	Diethyl phthalate	2
Dibenzofuran	2	Dimethyl phthalate	2
Di-n-butyl phthalate	2	Di-n-octyl phthalate	2
Fluoranthene	2	Fluorene	2
Hexachlorobutadiene	2	Indeno(1,2,3-c,d)pyrene	2
Isophorone	2	Naphthalene	2
Nitrobenzene	2	N-Nitrosodi-n-propylamine	2
N-Nitrosodiphenylamine	2	Pentachlorophenol	2
Phenanthrene	2	Phenol	2
Pyrene	2		
Method EPA9081			
Cation Exchange Capacity	2		

Field Splits

Field splits were generated by splitting samples during collection. The relative percent difference of the results reflect the precision of the analyses. Relative percent differences were not calculated for pairs of samples with both results below dectection. If one result was below detection, the detection limit was used to calculate the relative percent difference.

Table 7.27. Analytes Detected in Field Splits for Soil

Analyte	Sample	Relative Percent Difference		First Result		Second Result	Units
Method EPA6010							
Aluminum	102689	1.4		4270	J	4210	mg/kg
Aluminum	102694	47.7		16200	J	9960	mg/kg
Arsenic	102689	167.1	J	1.4	U	15.6	mg/kg
Arsenic	102694	137.5	J	3	U	16.2	mg/kg
Barium	102689	OS		19.6		19.7	mg/kg
Barium	102694	1.4		43.9		43.3	mg/kg
Beryllium	102689	12.5		0.23	J	0.203	mg/kg
Beryllium	102694	25.8		0.407	J	0.3 14	mg/kg
Calcium	102689	21.5		87.5		70.5	mg/kg
Calcium	102694	5.3		329		312	mg/kg
Cadmium	102689	64.9	J	0.326		0.639	mg/kg
Cadmium	102694	13.1	J	0.236	U	0.269	mg/kg

Table 7.27. Analytes Detected in Field Splits for Soil, continued

Analyte	Sample	Relative Percent Difference		First Result		Second Result	Units
Method EPA6010, continued							
Cobalt	102689	SO.8	J	0.713	J	0.424	mg/kg
Cobalt	102694	64.3		1.8		0.924	mg/kg
Chromium	102689	23.0		4.9		3.89	mg/kg
Chromium	102694	55.2		13.4		7.6	mg/kg
Copper	102689	5.8		4.4		4.15	mg/kg
Copper	102694	95.4		3.5	J	1.24	mg/kg
Iron	102689	16.0		2230	J	1900	mg/kg
Iron	102694	35.1		9870	J	6920	mg/kg
Potassium	102689	9.6		71.3	J	64.8	mg/kg
Potassium	102694	53.5		165	J	95.4	mg/kg
Magnesium	102689	14.9		74.8		64.4	mg/kg
Magnesium	102694	48.0		222		136	mg/kg
Manganese	102689	37.3		15.9		10.9	mg/kg
Manganese	102694	14.7		46.6		40.2	mg/kg
Sodium	102689	81.3	J	22.1	J	9.32	mg/kg
Sodium	102694	85.1	J	21.1	J	8.5	mg/kg
Nickel	102689	4.9		1.8		1.89	mg/kg
Nickel	102694	61.9		4		2.11	mg/kg
Lead	102689	6.5		8.2		8.75	mg/kg
Lead	102694	2.9		8.6		8.35	mg/kg
Antimony	102689	.	U	3.55	UJ	5.21	mg/kg
Antimony	102694	169.5	J	0.445	UJ	5.39	mg/kg
Thallium	102689	.	U	8.61	UJ	15.6	mg/kg
Thallium	102694	101.2	U	9.39	J	3.08	mg/kg
Vanadium	IO2689	10.9		6.8		6.1	mg/kg
Vanadium	102694	31.2		24.1		17.6	mg/kg
Zinc	102689	4.7	J	14.5		15.2	mg/kg
zinc	102694	74.0	J	7.7		3.54	mg/kg
Method EPA7471							
Mercury	102689	42.4	J	0.03	J	0.0195	mg/kg
Mercury	102694	5.2	J	0.082		0.0864	mg/kg
Method EPA8081							
alpha-Benzene hexachloride	102689	89.9	U	1.77	J	0.672	ug/kg
alpha-Benzene hexachloride	102694	.	U	1.86	U	0.913	ug/kg
Dieldrin	102689	40.4	U	3.54		2.35	ug/kg
Dieldrin	102694	120.7	U	3.72	J	0.92	ug/kg
Endrin	102689	101.9	U	3.54	J	1.15	ug/kg
Endrin	102694	.	U	3.72	U	1.83	ug/kg
p,p'-DDT	102689	17.5	U	3.54	J	2.97	ug/kg
p,p'-DDT	102694		U	3.72	U	3.65	ug/kg

Table 7.27. Analytes Detected in Field Splits for Soil, continued

Analyte	Sample	Relative Percent Difference	First Result		Second Result	Units
Method EPA8240						
1,1,1-Trichloroethane	102689	197.3	J	7.8	UJ	0.0532	ug/kg
1,1,1-Trichloroethane	102694		U	5.5	UJ	0.0349	ug/kg
Acetone	102689	.	UJ	30	UJ	5.32	ug/kg
Acetone	102694	71.9	U	11	J	5.18	ug/kg
Dichloromethane (methylene chloride)	102689	136.4	UJ	14.5	J	2.74	ug/kg
Dichloromethane (methylene chloride)	102694	2.6	U	2.72	J	2.65	ug/kg
Tetrachloroethene	102689	197.8	J	9.62	UJ	0.0532	ug/kg
Tetrachloroethene	102694	194.1	J	3.68	UJ	0.0549	ug/kg
Method EPA8270						
Di-n-butyl phthalate	102689	180.3	U	355	J	18.4	ug/kg
Di-n- buty l phthalate	102694	172.6	U	372	J	27.4	ug/kg
Di-n-octyl phthalate	102689	.	U	355	U	35.4	ug/kg
Di-n-octyl phthalate	102694	177.8	U	372	J	21.9	ug/kg
Method EPA9071						
Total Petroleum Hydrocarbons	102689	83.5		82.3	J	33.8	mg/kg
Total Petroleum Hydrocarbons	102694	13.6		12.6	UJ	11	mg/kg
Method EPA9081						
Cation Exchange Capacity	102689	154.5	U	638		81.9	Meq/
Cation Exchange Capacity	102694	169.5	U	670		55.4	Meq/
Method LANLMLR100MOD						
Gross Alpha	102689	76.0	UI	2.65		5.9	pC/g
Gross Alpha	102694	166.1		5.1		55	pC/g
Non-volatile Beta	102689	92.7	UI	2.95		8.05	pC/g
Non-volatile Beta	102694	155.8		6.88		55.4	pC/g
Method LLOYDKAHN						
Total Organic Carbon	102689	0.6		3400		3380	mg/kg
Total Organic Carbon	102694	45.6		849		1350	mg/kg

Table 7.28. **Analytes Not Detected in Field Splits for Soil**

Analyte	Number of Pairs	Analyte	Number of Pairs
Method EPA601 0			
Silver	2	Selenium	2
Method EPA8081			
alpha-Chlordane	2	Aldrin	2

Table 7.28. Analytes Not Detected in Field Splits for Soil, continued

Analyte	Number of Pairs	Analyte	Number of Pairs
Method EPA8081, continued			
beta-Benzene hexachloride	2	delta-Benzene hexachloride	2
Endrin ketone	2	Endosulfan I	2
Endosulfan II	2	Endosulfan sulfate	2
gamma-Chlordane	2	Heptachlor	2
Heptachlor epoxide	2	gamma-Benzene hexachloride (Lindane)	2
Methoxychlor (Mariate)	2	Aroclor 1016	2
Aroclor 1221	2	Aruclor 1232	2
Aroclor 1242	2	Aroclor 1248	2
Aroclor 1254	2	Aroclor 1260	2
p,p'-DDD	2	p,p'-DDE	2
Toxaphene	2		
Method EPA8240			
1,1,2-Trichloroethane	2	1,1-Dichloroethene	2
1,1-Dichloroethane	2	1,2-Dichloroethene (total)	2
1,2-Dichloroethane	2	1,2-Dichloropropane	2
cis-1,3-Dichloropropene	2	trans-1,3-Dichloropropene	2
2-Hexanone	2	Bromodichloromethane	2
Vinyl chloride	2	Chloroethane	2
Benzene	2	Carbon tetrachloride	2
Bromomethane (Methyl bromide)	2	Chloromethane (methyl chloride)	2
Bromoform	2	Chloroform	2
Chlorobenzene	2	Carbon disulfide	2
Chlorodibromomethane	2	Ethylbenzene	2
Toluene	2	2-Butanone (MEK)	2
4-Methyl-2-pentanone	2	Styrene	2
1,1,2,2-Tetrachloroethane	2	Trichloroethene (TCE)	2
Vinyl acetate	2	Xylenes (total)	2
Method EPA8270			
1,2-Dichlorobenzene	2	1,2,4-Trichlorobenzene	2
1,4-Dichlorobenzene	2	1,3-Dichlorobenzene	2
2,4,6-Trichlorophenol	2	2,4,5-Trichlorophenol	2
2,4-Dimethyl phenol	2	2,4-Dichlorophenol	2
2,4-Dinitrotoluene	2	2,4-Dinitrophenol	2
2-Chlorophenol	2	2,6-Dinitrotoluene	2
2-Methylnaphthalene	2	2-Chloronaphthalene	2
2-Nitroaniline	2	o-cresol (2-methylphenol)	2
3,3'-Dichlorobenzidine	2	2-Nitrophenol	2
2-Methyl-4,6-dinitrophenol	2	3-Nitroaniline	2
4-Chloroaniline	2	4-Bromophenyl phenyl ether	2
4-Chlorophenyl phenyl ether	2	4-Chloro-3-methylphenol (p-chloro-m-cresol)	2
Method EPA8270			
4-Nitrophenol	2	4-Nitroaniline	2
Acenapthylene	2	Acenapthene	2
Bis(2-chloroethoxy) methane	2	Anthracene	2

Table 7.28. Analytes Not Detected in Field Splits for Soil, continued

Analyte	Number of Pairs	Analyte	Number of Pairs
Method EPA8270, continued			
Bis(2-ethylhexyl) phthalate	2	Bis(2-chloroethyl) ether	2
Benzo(a)pyrene	2	Benzo(a)anthracene	2
Butyl benzyl phthalate	2	Benzo(b)fluoranthene	2
Benzoic acid	2	Bis(2-chloroisopropyl) ether	2
Benzo(k)fluoranthene	2	Benzo(g,h,i)perylene	2
Chrysene	2	Benzyl alcohol	2
Hexachlorocyclopentadiene	2	Hexachlorobenzene	2
Dibenzo(a,h)anthracene	2	Hexachloroethane	2
Dibenzofuran	2	Diethyl phthalate	2
Fluoranthene	2	Dimethyl phthalate	2
Hexachlorobutadiene	2	Fluorene	2
Isophorone	2	Indeno(1,2,3-c,d)pyrene	2
Nitrobenzene	2	Naphthakne	2
N-Nitrosodiphenylamine	2	N-Nitrosodi-n-propylamine	2
Phenanthrene	2	Pentachlorophenol	2
Pyrene	2	Phenol	2
Method EPA9010			
Cyanide	2		

7.4 CONTAMINATION IN QC SAMPLES

7.4.7 TRIP BUNKS

A total of four trip blanks were utilized to determine if any of the associated environmental samples were possibly contaminated with VOAs during transport of the samples to the analytical laboratory. Three of the four trip blanks showed no contamination at all while the other trip blank exhibited the presence of the following compounds:

2-Butanone (MEK),
Styrene,
Toluene, and
Xylenes (total).

The evaluation of the trip blank contamination caused the result for one compound (toluene) in one of the two samples (EPD/EMS Sample ID 102695) it was associated with to be qualified as not detected, associated value uncertain (*UJ*). Table 7.29 provides a list of the detected analytes in this trip blank.

The one trip blank (EPD/EMS Sample ID 102698) that exhibited contamination was associated to only two environmental samples.

Table 7.29. Trip Blanks Having Positive Results

Sample IQ	Sample Type	Analyte	Quantitation Limit	Results	Units	Result Qual.	Analysis Qual.
102698	TB	2-Butanone (MEK)	1.00	0.750	UGL	J	E8
		Styrene	0.0500	0.0700	UGL		8
		Toluene	0.500	0.0500	UGL	J	E8
		Xylenes (total)	0.150	0.280	UGL		8

7.4.2 FIELD BLANKS

No qualification was done based on field blank results.

Table 730 provides a listing of the analytes detected in the field blanks.

Table 7.30. Field Blanks Having Positive Results

WSRC ID	Sample Type	Analyte	Quantitation Limit	Results	Units	Result Qual.	Analysis Qual.
102679	FB	2-Butanone (MEK)	10.0	26.4	UGL		
		Acetone	10.0		UGL	L	V
102693	FB	Acetone	10.0	51.6	UGL		V

7.4.3 RINSATE BLANKS

No qualification was done based on rinsate blank results.

Table 7.3 1 provides a listing of the analytes detected in the rinsate blanks.

Table 731. Rinsate Blanks Having Positive Results

Sample ID	Sample Type	Analyte	Detection Limit	Results	Units	Results Qual.	Analysis Qual.
102678	RB	2-Butanone (MEK)	10.0	23.5	UGL		
		Acetone	10.0	200	UGL		V
		Barium	1.80	0.870	UGL	J	EX
		Cobalt	4.50	0.65	UGL	J	EX
		Copper	15.0	1.90	UGL	J	EX
		Diethyl phthalate	10.0	1.03	UGL	J	E
		Potassium	187	370	UGL		
		Sodium	285	37100	UGL		
		Vanadium	6.90	0.98	UGL	J	E

Table 7.31. Rinsate Blanks Having Positive Results, continued

Sample ID	Sample Type	Analyte	Detection Limit	Results	Units	Results Qual.	Analysis Qual.
102696	RB	Acetone	10.0	57.0	UGL		V
		Aluminum	146	64.2	UGL	J	E
		Barium	1.80	0.970	UGL	J	E
		Cadmium	4.70	0.530	UGL	J	E
		Calcium	471	72.0	UGL	J	E
		Copper	15.0	3.40	UGL	J	E
		Iron	74.0	47.1	UGL		V
		Manganese	7.80	1.1	UGL	J	E
		Non-volatile Beta	0.82	3.03	PCL		
		Potassium	187	342	UGL		
		Sodium	285	33800	UGL		

7.5 PROJECT SUMMARY STATISTICS

Summary statistics for the AMSSB1 project are presented in Table 7.32.

Table 7.32. Project Summary Statistics

Analyte (units)	Results >Detection Limit	Minimum Detect	Maximum Detect	Minimum Variance Mean	95% UCL of Mean	Exposure Concentration	Dist *
Semivolatiles							
Acenapthene (ug/kg)	1/ 28	100.00	100.00	164.00	179.00	100.00	D
Anthracene (ug/kg)	2/ 28	36.80	230.00	164.00	180.00	180.00	D
Benzo(a)anthracene (ug/kg)	3/ 28	50.20	503.00	170.00	197.00	197.00	D
Benzo(a)pyrene (ug/kg)	3/ 28	52.30	410.00	167.00	190.00	190.00	D
Benzo(b)fluoranthene (ug/kg)	4/ 28	57.40	410.00	163.00	187.00	187.00	D
Benzo(g,h,i)perylene (ug/kg)	2/ 28	69.80	267.00	166.00	182.00	182.00	D
Benzo(k)fluoranthene (ug/kg)	4/ 28	44.20	366.00	161.00	183.00	183.00	D
Chrysene (ug/kg)	4/ 28	58.70	534.00	170.00	199.00	199.00	D
Di-n-butyl phthalate (ug/kg)	2/ 28	18.40	27.40	167.00	181.00	27.40	D
Di-n-octyl phthalate (ug/kg)	1/ 28	21.90	21.90	167.00	181.00	21.90	D
Dibenzofuran (ug/kg)	1/ 28	59.80	59.80	163.00	178.00	59.80	D
Fluoranthene (ug/kg)	4/ 28	47.80	1100.00	195.00	255.00	255.00	D
Fluorene (ug/kg)	1/ 28	102.00	102.00	164.00	179.00	102.00	D
Indeno(1,2,3-c,d)pyrene (ug/kg)	2/ 28	66.10	222.00	163.00	180.00	180.00	D
Phenanthrene (ug/kg)	2/ 28	172.00	948.00	194.00	244.00	244.00	D
Pyrene (ug/kg)	4/ 28	40.10	895.00	186.00	233.00	233.00	D
Pesticides/PCBs							
Aroclor 1260 (ug/kg)	2/ 28	53.90	67.60	19.80	23.80	23.80	D
Dieldrin (ug/kg)	2/ 28	0.92	2.35	1.77	1.84	1.84	D
Endrin (ug/kg)	1/ 28	1.15	1.15	1.73	1.80	1.15	D
alpha-Benzene hexachloride (ug/kg)	1/ 28	0.67	0.67	0.87	0.90	0.67	D
p,p'-DDE (ug/kg)	1/ 28	5.88	5.88	1.87	2.13	2.13	D
p,p'-DDT (ug/kg)	2/ 28	2.97	5.88	1.87	2.13	2.13	D
Physical Parameters							
Cation Exchange Capacity (Meq)	2/ 28	55.40	81.90	322.00	369.00	81.90	D
Total Organic Carbon (mg/kg)	28/ 28	302.00	6860.00	2620.00	4040.00	4040.00	L
Total Petroleum Hydrocarbons (mg/kg)	17/ 28	10.90	530.00	42.90	142.00	142.00	L

Table 7.32. Project Summary Statistics, continued

Analyte (units)	Results >Detection Limit	Minimum Detect	Maximum Detect	Minimum Variance Mean	95% UCL of Mean	Exposure Concentration	Dist *
Radionuclide Indicators and Radionuclides							
Gross alpha (pC/g)	20/ 28	5.10	55.00	12.30	18.40	18.40	L
Non-volatile Beta (pC/g)	17/ 28	6.35	55.40	10.20	13.50	13.50	X
TAL Inorganics							
Aluminum (mg/kg)	28/ 28	1970.00	16200.00	5990.00	7520.00	7520.00	L
Antimony (mg/kg)	7/ 28	0.45	2.00	1.64	1.82	1.82	D
Arsenic (mg/kg)	15/ 28	1.30	5.90	4.20	4.88	4.88	X
Barium (mg/kg)	28/ 28	9.10	43.90	20.70	24.80	24.80	L
Beryllium (mg/kg)	23/ 28	0.06	0.41	0.19	0.25	0.25	L
Cadmium (mg/kg)	23/ 28	0.04	1.50	0.33	0.50	0.50	L
Calcium (mg/kg)	28/ 28	38.80	2810.00	251.00	417.00	417.00	X
Chromium (mg/kg)	28/ 28	2.40	27.40	7.81	9.93	9.93	X
Cobalt (mg/kg)	28/ 28	0.37	2.00	0.93	1.09	1.09	L
Copper (mg/kg)	28/ 28	0.94	12.10	2.93	3.70	3.70	L
Cyanide (mg/kg)	3/ 26	0.11	0.27	0.33	0.37	0.27	D
Iron (mg/kg)	28/ 28	1300.00	23800.00	5520.00	7420.00	7420.00	X
Lead (mg/kg)	27/ 27	1.70	13.00	6.47	8.05	8.05	L
Magnesium (mg/kg)	28/ 28	45.40	467.00	107.00	134.00	134.00	X
Manganese (mg/kg)	28/ 28	10.30	239.00	51.20	76.40	76.40	L
TAL Inorganics							
Mercury (mg/kg)	26/ 28	0.01	0.09	0.04	0.04	0.04	X
Nickel (mg/kg)	28/ 28	0.95	4.00	1.96	2.23	2.23	L
Potassium (mg/kg)	28/ 28	36.10	191.00	84.30	99.60	99.60	L
Sodium (mg/kg)	23/ 28	8.50	71.60	29.60	36.30	36.30	X
Thallium (mg/kg)	1/ 28	3.08	3.08	4.52	4.75	3.08	D
Vanadium (mg/kg)	28/ 28	2.80	59.80	13.90	18.60	18.60	X
Zinc (mg/kg)	28/ 28	1.80	64.60	10.20	15.80	15.80	L

Table 7.32. Project Summary Statistics, continued

Analyte (units)	Results >Detection Limit	Minimum Detect	Maximum Detect	Minimum Variance Mean	95% UCL of Mean	Exposure Concentration	Dist *
Volatiles							
1,1,1-Trichloroethane (ug/kg)	18/ 26	1.14	11.30	3.90	4.89	4.89	X
Acetone (ug/kg)	1/ 26	5.18	5.18	6.53	7.67	5.18	D
Dichloromethane (methylene chloride) (ug/kg)	2/ 26	2.65	2.74	5.84	7.03	2.74	D
Tetrachloroethene (ug/kg)	24/ 26	1.44	13.10	5.87	7.20	7.20	N
Toluene (ug/kg)	2/ 26	1.78	2.23	2.43	2.66	2.23	D
Xylenes (total) (ug/kg)	4/ 26	1.22	3.50	2.41	2.68	2.68	D

MATRIX: WATER

Analyte (units)	Results >Detection Limit	Minimum Detect	Maximum Detect	Minimum Variance Mean	95% UCL of Mean	Exposure Concentration	Dist *
Semivolatiles							
Diethyl phthalate (ug/L)	1/ 2	1.03	1.03	3.02	15.50	1.03	D
Radionuclide Indicators							
Non-volatile Beta (pC/L)	1/ 2	3.03	3.03	1.65	10.40	3.03	D
TAL Inorganics							
Aluminum (ug/L)	1/ 2	64.20	64.20	68.60	96.40	64.20	D
Barium (ug/L)	2/ 2	0.87	0.97	0.92	1.24	0.97	D
Cadmium (ug/L)	1/ 2	0.53	0.53	1.44	7.19	0.53	D
Calcium (ug/L)	1/ 2	72.00	72.00	154.00	670.00	72.00	D
Cobalt (ug/L)	1/ 2	0.65	0.65	1.45	6.50	0.65	D
Copper (ug/L)	2/ 2	1.90	3.40	2.65	7.39	3.40	D
Iron (ug/L)	1/ 2	47.10	47.10	33.60	119.00	47.10	D
Manganese (ug/L)	1/ 2	1.10	1.10	2.50	11.30	1.10	D
Potassium (ug/L)	2/ 2	342.00	370.00	356.00	444.00	370.00	D

Table 7.32. Project Summary Statistics, continued

Analyte (units)	Results >Detection Limit	Minimum Detect	Maximum Detect	Minimum Variance Mean	95% UCL of Mean	Exposure Concentration	Dist *
TAL Inorganics, continued							
Sodium (ug/L)	2/ 2	33800.00	37100.00	35500.00	45900.00	37100.00	D
Vanadium (ug/L)	1/ 2	0.98	0.98	2.22	10.00	0.98	D
Volatiles							
2-Butanone (MEK) (ug/L)	3/ 8	0.75	26.40	9.46	16.00	16.00	D
Acetone (ug/L)	3/ 7	51.60	200.00	46.10	99.00	99.00	D
Styrene (ug/L)	1/ 8	0.07	0.07	2.20	2.77	0.07	D
Toluene (ug/L)	1/ 8	0.05	0.05	2.19	2.77	0.05	D
Xylenes (total) (ug/L)	1/ 8	0.28	0.28	2.22	2.75	0.28	D

* - Results less than the detection limit were set to 1/2 the reported detection limit except for radioisotopes.

Dist. Codes: L-distribution most similar to lognormal.
N-distribution most similar to normal.
X-distribution significantly different from normal and lognormal.
D-distribution not determined because fewer than 5 detects.
Z-distribution with negative results and therefore treated as normal.

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Appendix A: Constituent Lists

fable **A-l :** Soil **Constituent List**

Physical Parameters

Cation exchange capacity
Total organic carbon
Total petroleum hydrocarbons

TAL Inorganics

Aluminum
Antimony
Arsenic
Barium
Beryllium
Cadmium
Calcium
Chromium
Cobalt
Copper
Cyanide
Iron
Lead
Magnesium
Manganese
Mercury
Nickel
Potassium
Selenium
Silver
Sodium
Thallium
Vanadium
Zinc

Semivolatiles

1,2,4-Trichlorobenzene
1,2-Dichlorobenzene
1,3-Dichlorobenzene
1,4-Dichlorobenzene
2,4,5-Trichlorophenol
2,4,6-Trichlorophenol
2,4-Dichlorophenol
2,4-Dimethyl phenol
2,4-Dinitrophenol
2,4-Dinitrotoluene
2,6-Dinitrotoluene
2-Chloronaphthalene
2-Chlorophenol
2-Methyl-4,6-dinitrophenol
2-Methylnaphthalene

Semivolatiles, continued

2-Nitroaniline
2-Nitrophenol
3,3'-Dichlorobenzidine
3-Nitroaniline
4-Bromophenyl phenyl ether
4-Chloro-3-methylphenol (p-chloro-m-cresol)
4-Chloroaniline
4-Chlorophenyl phenyl ether
4-Nitroaniline
4-Nitrophenol
Acenapthene
Acenapthylene
Anthracene
Benzo(a)anthracene
Benzo(a)pyrene
Benzo(b)fluoranthene
Benzo(g,h,i)perylene
Benzo(k)fluoranthene
Benzoic acid
Benzyl alcohol
Bis(2-chloroethoxy) methane
Bis(2-chloroethyl) ether
Bis(2-chloroisopropyl) ether
Bis(2-ethylhexyl) phthalate
Butyl benzyl phthalate
Chrysene
Di-n-butyl phthalate
Di-n-octyl phthalate
Dibenzo(a,h)anthracene
Dibenzofuran
Diethyl phthaiate
Dimethyl phthalate
Fluoranthene
Fluorene
Hexachlorobenzene
Hexachlorobutadiene
Hexachloroqclopentadiene
Hexachloroethane
Indeno(1,2,3-c,d)pyrene
Isophorone
N-Nitrosodi-n-propylamine
N-Nitrosodiphenylamine
Naphthalene
Nitrobenzene
Pentachlorophenol
Phenanthrene
Phenol
Pyrene
m,p-Cresol
o-cresol (2-methylphenol)
p-cresol (4-methylphenol)

Volatiles

1,1,1-Trichloroethane
1,1,2,2-Tetrachloroethane
1,1,2-Trichloroethane
1,1-Dichloroethane
1,1-Dichloroethene
1,2-Dichloroethane
1,2-Dichloroethene (total)
1,2-Dichloropropane
2-Butanone (MEK)
2-Hexanone
4-Methyl-2-pentanone
Acetone
Benzene
Bromodichloromethane
Bromoform
Bromomethane (Methyl bromide)
Carbondisulfide
Carbon tetrachloride
Chlorobenzene
Chlorodibromomethane
Chloroethane
Chloroform
Chloromethane (methyl chloride)
Dichloromethane (methylene chloride)
Ethylbenzene
Styrene
Tetrachloroethene
Toluene
Trichloroethene (TCE)
Vinyl acetate
Vinyl chloride
Xylenes (total)
cis-1,3-Dichloropropene
trans-1,3-Dichloropropene

Pesticides/PCBs

Aldrin
Aroclor 1016
Aroclor 1221
Aroclor 1232
Aroclor 1242
Aroclor 1248
Aroclor 1254
Aroclor 1260
Dieldrin
Endosulfan I
Endosulfan II
Endosulfan sulfate
Endrin
Endrin ketone
Heptachlor
Heptachlor epoxide
Methoxychlor (Mariate)
Toxaphene

Pesticides/PCBs, continued

alpha-Benzene hexachloride
alpha-Chlordane
beta-Benzene hexachloride
d&a-Benzene hexachloride
gamma-Benzene hexachloride (Lindane)
gamma-Chlordane
p,p'-DDD
p,p'-DDE
p,p'-DDT

Radionuclides

Gross Alpha
Non-volatile Beta

Table A-2: Water Constituent List

TAL Inorganics

Aluminum
Antimony
Arsenic
Barium
Beryllium
Cadmium
Calcium
chromium
Cobalt
Copper
Cyanide
Iron
Lead
Magnesium
Manganese
Mercury
Nickel
Potassium
Selenium
Silver
Sodium
Thallium
Vanadium
Zinc

Semivolatiles

1,2,4-Trichlorobenzene
1,2-Dichlorobenzene
1,3-Dichlorobenzene
1 ,4-Dichlorobenzene
2,4,5-Trichlorophenol
2,4,6-Trichlorophenol
2,4-Dichlorophenol
2,4-Dimethyl phenol

Semivolatiles, continued

2,4-Dinitrophenol
2,4-Dinitrotoluene
2,6-Dinitrotoluene
2-Chloronaphthalene
2-Chlorophenol
2-Methyl-4,6-dinitrophenol
2-Methylnaphthalene
2-Nitroaniline
2-Nitrophenol
3,3'-Dichlorobenzidine
3-Nitroaniline
4-Bromophenyl phenyl ether
4-Chloro-3-methylphenol (p-chloro-m-cresol)
4-Chloroaniline
4-Chlorophenyl phenyl ether
4-Nitroaniline
4-Nitrophenol
Acenapthene
Acenapthylene
Anthracene
Benzo(a)anthracene
Benzo(a)pyrene
Benzo(b)fluoranthene
Benzo(g,h,i)perylene
Benzo(k)fluoranthene
Benzoic acid
Benzyl alcohol
Bis(2-chloroethoxy) methane
Bis(2-chloroethyl) ether
Bis(2-chloroisopropyl) ether
Bis(2-ethylhexyl) phthalate
Butyl benzyl phthalate
Chrysene
Di-n-butyl phthaiate
Di-n-octyl phthalate
Dibenzo(a,h)anthracene
Dibenzofuran
Diethyl phthaiate
Dimethyl phthalate
Fluoranthene
Fluorene
Hexachlorobenzene
Hexachlorobutadiene
Hexachlorocyclopentadiene
Hexachloroethane
Indeno(1,2,3-c,d)pyrene
Isophorone
N-Nitrosodi-n-propylamine
N-Nitrosodiphenylamine
Naphthalene
Nitrobenzene
Pentachlorophenol
Phenanthrene
Phenol
Pyrene

Semivolatiles, continued

o-cresol (2-methylphenol)
p-cresol (4-methylphenol)

Volatiles

1,1,1-Trichloroethane
1,1,2,2-Tetrachloroethane
1,1,2-Trichloroethane
1,1-Dichloroethane
1,1-Dichloroethene
1,2-Dichloroethane
1,2-Dichloroethene (total)
1,2-Dichloropropane
2-Butanone (MEK)
2-Hexanone
4-Methyl-2-pentanone
Acetone
Benzene
Bromodichloromethane
Bromoform
Bromomethane (Methyl bromide)
Carbon disulfide
Carbon tetrachloride
Chlorobenzene
Chlorodibromomethane
Chloroethane
Chloroform
Chloromethane (methyl chloride)
Dichloromethane (methylene chloride)
Ethylbenzene
Styrene
Tetrachloroethene
Toluene
Trichloroethene (TCE)
Vinyl acetate
Vinyl chloride
Xylenes (total)
cis-1,3-Dichloropropene
trans-1,3-Dichloropropene

Pesticides/PCBs

Aldrin
Aroclor 1016
Aroclor 1221
Aroclor 1232
Aroclor 1242
Aroclor 1248
Aroclor 1254
Aroclor 1260
Dieldrin
Endosulfan I
Endosulfan II
Endosulfan sulfate

Pesticides/PCBs, continued

Endrin
Endrin ketone
Heptachlor
Heptachlor epoxide
Methoxychlor (Mariate)
Toxaphene
alpha-Benzene hexachloride
alpha-Chlordane
beta-Benzene hexachloride
delta-Benzene hexachloride
gamma-Benzene hexachloride (Lindane)
gamma-Chlordane
p,p'-DDD
p,p'-DDE
p,p'-DDT

Radionuclides

Gross Alpha
Non-volatile Beta

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Appendix B: Laboratory Performance Evaluation Results

Table B–1. Weston Performance Evaluation Report USEPA Water Supply Study WS035

Analyte	Sample Number	Reported Value	True Value*	Acceptance Limits	Performance Evaluation
Trace Metals (µg/L):					
Arsenic	001	61.3	61.7	52.6 - 69.7	Accept.
Barium	002	2226	2250	1910 - 2590	Accept.
Cadmium	001	2.3	2.80	2.24 - 3.36	Accept.
Chromium	001	117	119	101 - 137	Accept.
Lead	001	61.6	64.1	44.9 - 83.3	Accept.
Mercury	001	0.76	0.897	0.628 - 1.17	Accept.
Selenium	001	77.5	80.5	64.4 - 96.6	Accept.
Silver	002	74.8	76.2	65.9 - 85.2	Accept.
Copper	001	1326	1400	1260 - 1540'	Accept.
Antimony	002	34.6	30.8	21.6 - 40	Accept.
Beryllium	001	1.2	1.33	1.13 - 1.53	Accept.
Nickel	001	176	180	153 - 207	Accept.
Thallium	002	8.2	8.00	5.6 - 10.4	Accept.
Boron	002	1244	1270	1180 - 1410	Accept.
Aluminum	001	620	670	568 - 750	Accept.
Manganese	001	98.6	98.0	89 - 103	Accept.
Molybdenum	002	84.7	84.1	65.5 - 103	Accept.
Zinc	001	806	818	751 -877	Accept.

Table B-1. Weston Performance Evaluation Report USEPA Water Supply Study WS035
continued

Analyte	Sample Number	Reported Value	True Value*	Acceptance Limits	Performance Evaluation
Nitrate/Nitrite/Fluoride (mg/L):					
Nitrate as N	001	6.26	5.20	4.68 - 5.72	Not Accept.
Fluoride	001	3.78	3.80	3.42 -4.18	Accept.
Nitrite as N	001	1.89	1.90	1.62 - 2.19	Accept.
Insecticides (µg/L):					
Endrin	001	0.68	0.649	0.454-0.844	Accept.
Lindane	001	0.53	0.543	0.299-0.787	Accept.
Methoxychlor	001	62.8	62.6	34.4-90.8	Accept.
Toxaphene	002	17.9	18.3	10.1-26.5	Accept.
A lachlor	005	4.70	5.27	2.9-7.64	Accept.
Atrazine	005	7.91	8.40	4.62-12.2	Accept.
Heptachlor	004	1.79	2.54	1.4-3.68	Accept.
Heptachlor Expoxide	004	1.24	1.49	O-82-2.16	Accept.
Chlordane (Total)	003	13.5	13.6	7.48- 19.7	Accept.
Hexachlorocyclopentadien	004	1.83	1.84	D.L.-2.68	Accept.
Simazine	005	7.96	9.52	1.44-17.5	Accept.
Hexachlorobenzene	004	0.55	0.635	0.224-0.949	Accept.
Bromacil	006	63.8	64.5	5.8-98.3	Accept.
Metolachlor	006	31.3	28.4	9.65-49.5	Accept.
Metribuzin	006	7.99	9.77	1.38-13.6	Accept.
Prometon	006	23.3	24.3	6.97-36.5	Accept.

Table B-1. Weston Performance Evaluation Report USEPA Water Supply Study WS035 continued

Analyte	Sample Number	Reported Value	True Value*	Acceptance Limits	Performance Evaluation
Trifluralin	004	1.03	1.17	0.356-1.48	Accept.
Aldrin	004	0.76	1.23	0.479- 1.6 1	Accept.
Butachlor	006	24.7	24.2	8.72-36.6	Accept.
Dieldrin	004	0.62	0.857	0.605-I .07	Accept.
Propachlor	004	1.80	2.3 l	1.19-3.64	Accept.
Herbicides (µg/L):					
2,4-D	001	51.5	52.4	26.2-70.6	Accept.
2,4,5-TP (Silvex)	001	17.3	17.6	8.8-26.4	Accept.
Pentachlorophenol	001	7.3 1	8.91	4.46-13.4	Accept.
Dalapon	002	31.5	48.2	D.L.-67.6	Accept
Dinoseb	002	21.9	26.3	D.L.-42.9	Accept.
Picloram	002	56.6	62.5	D.L.-1 10	Accept.
Dicamba	002	59.3	57.3	D.L.- 103	Accept.
Polychlorinated Biphenyls **(µg/L):**					
Decachlorobiphenyl	001	0.81	0.596	D.L.-1.19	Accept.
PAH's (µg/L):					
Accnaphthalene	001	26.8	20.0	11.2-22.6	Not Accept.
Benzo (A) Pyrene	001	1.85	1.53	0.04 15-2.25	Accept.
Benzo (B) Fluoranthene	001	0.90	0.652	0.369-O-783	Not Accept.
Benzo (G,H,I) Perylene	001	5.62	5.00	1.27-6.67	Accept.
Dibenzo (A,H) Anthracene	001	0.69	0.732	0.309-0.983	Accept.
Fluoranthene	001	3.99	3.00	0.817-4.23	Accept.

Table B-1. Weston Performance Evaluation Report USEPA Water Supply Study WS035 continued

Analyte	Sample Number	Reported Value	True Value*	Acceptance Limits	Performance Evaluation
Adipate/Phthalates (µg/L):					
Bis (2-Ethylhexyl) Adipate	001	59.0	42.5	3.02-68.7	Accept.
Bis (2-Ethylhexyl) Phthalate	001	60.2	37.7	12.5-68.1	Accept.
Di-N-Butyl Phthalate	001	58.7	423	5.27-64.6	Accept.
Diethyl Phthalate	001	49.4	32.7	8.73-56.1	Accept.
Trihalomethanes (µg/L):					
Chloroform	001	11.4	12.0	9.6-14.4	Accept.
Bromoform	001	16.4	16.4	13.1-19.7	Accept
Bromodichloromethane	001	12.2	13.8	11- 16.6	Accept
Chlorodibromomethane	001	17.5	18.6	14.9-22.3	Accept
Total Trihalomethane	001	57.5	60.8	48.6-73	Accept
Volatile Organic Compounds (µg/L):					
Vinyl Chloride	001	5.32	4.91	2.95-6.87	Accept
1,1-Dichloroethylene	001	13.8	13.9	11.1-16.7	Accept
1,2-Dichloroethane	001	13.9	14.1	11.3-16.9	Accept
1,1,1-Trichloroethane	001	7.56	8.78	5.27-12.3	Accept.
Carbon Tetrachloride	001	10.8	10.8	8.64-13	Accept.
Trichloroethy lene	001	5.38	6.13	3.68-8.58	Accept.
Benzene	001	13.3	14.0	11.2-16.8	Accept.
Tetrachloroethylene	002	10.7	11.6	9.28-13.9	Accept.
1,4-Dichlorobenzene	001	14.1	16.7	13.4-20	Accept.
t 1 ,2-Dichloroethylene	002	7.24	8.41	5.05-l 1.8	Accept.
c 1,2-Dichloroethrylene	002	6.41	6.69	4.01-9.37	Accept.

Table El. **Weston** Performance **Evaluation Report USEPA** Water **Supply** Study **WS035 continued**

Analyte	Sample Number	Reported Value	True Value*	Acceptance Limits	Performance Evaluation
1,2-Dichloropropane	002	7.91	9.00	5.4-12.6	Accept.
1,2-Dibromo-3-chloropropane	004	0.52.	0.589	0.353-0.825	Accept.
Ethylene Dibromide (EDB)	004	0.67	0.609	O-365-0.853	Accept.
Toluene	002	8.67	9.92	5.95- 13.9	Accept.
Ethylbenzene	002	12.0	13.6	10.9-16.3	Accept.
Chlorobenzene	002	12.3	12.4	9.92- 14.9	Accept.
Styrene	002	14.7	16.7	13.4-20	Accept.
1,2-Dichlorobenzene	002	11.1	12.5	10-15	Accept.
Dichloromethane	001	5.55	5.83	3.5-8.16	Accept.
1,3-Dichloropropane	003	11.2	11.8	9.43- 14.1	Accept.
1,1,2-Trichloroethane	001	12.1	12.8	10.2-15.4	Accept.
1, 1,1,2-Tetrachloroethane	003	19.2	17.0	13-20.6	Accept.
1,2,3-Trichloropropane	003	15.1	15.5	7.62-2 1.6	Accept.
2-Chlorotoluene	003	12.6	13.3	10.2-16	Accept.
1,2,4-Trichlorobenzene	002	16.6	18.4	14.7-22.1	Accept
Hexachlorobutadiene	003	12.2	12.6	7.14-17.1	Accept.
Total Xylenes	002	15.4	17.4	13.9-20.9	Accept.
c 1,3-Dichloropropene	003	18.9	23.4	13.9-25	Accept.
t 1,3-Dichloropropene	003	8.48	10.5	6.3- 10.9	Accept.
Miscellaneous Analytes:					
Residual Free Chlorine (mg/L)	001	2.00	3.00	2.54-3.33	Not Accept.
Turbidity (NTU'S)	001	3.68	3.50	3.05-4.07	Accept.
Total Filterable Residue (mg/L)	001	229	306	210-454	Accept.
Calcium (mg $CaCO_3$/L)	001	118	118	110-128	Accept.

Table B-1. Weston Performance Evaluation Report USEPA Water Supply Study WS035 continued

Ph-Units	001	9.06	9.13	8.89-9.35	Accept.
Alkalinity (mg $CaCO_3$/L)	001	52.0	48.3	44.9-53.7	Accept.
Corrosivity (Langelier Ind. at 20C)	001	0.920	0.940	0.616-1.23	Accept.
Sodium (mg/L)	001	20.1	22.2	20.2-24.3	Not Accept.
Sulfate (mg/L)	001	6.06	6.40	4.39-8.16	Accept.
Total Cyanide (mg/L)	001	0.443	0.480	0.36-0.6	Accept.

*- Based on gravimetric calculations, or a reference value when necessary.
Note: For limits and true values, assume three significant digits.

Table B-2. Weston Performance Evaluation Report **USEPA** Water **Supply Study WS036**

Analyte	Sample Number	Reported Value	True Value*	Acceptance Limits	Performance Evaluation
Trace **Metals (µg/L):**					
Arsenic	001	124	120	107-136	Accept.
Barium	002	1280	1300	1110-1500	Accept.
cadmium	001	35.4	34.0	27.2-40.8	Accept.
Chromium	001	38.6	37.8	32.1-43.5	Accept.
Lead	001	39.4	39.0	27.3-50.7	Accept.
Mercury	001	2.93	3.00	2.1-3.9	Accept.
Selenium	001	30.6	31.1	24.9-37.3	Accept.
Silver	002	55.5	54.2	47.2-60.2	Accept.
Copper	001	612	630	567-693	Accept.
Antimony	002	11.5	11.0	7.7- 14.3	Accept.
Beryllium	001	7.4	7.70	6.55-8.86	Accept.
Nickel	001	400	380	323-437	Accept.
Thallium	002	3.3	4.50	3.15-5.85	Accept.
Boron	002	481	480	444-502	Accept.
Aluminum	001	75.4	51.0	43.2-67.3	Not Accept.
Manganese	001	999	970	91 l-1030	Accept.
Molybdenum	002	8.8	11.0	8.29-13.9	Accept-
Zinc	001	1430	1410	1280- 1530	Accept.
Nitrate as N	001	3.10	2.90	2.61-3.19	Accept.
Fluoride	001	7.11	7.20	6.48-7.92	Accept.
Nitrite as N	001	1.08	1.10	0.935- 1.27	Accept.

Analyte	Sample Number	Reported Value	True Value*	Acceptance Limits	Performance Evaluation
Insecticides (µg/L):					
Endrin	001	0.38	0.383	0.2684498	Accept.
Lindane	001	0.37	0.429	0.236-0.622	Accept.
Methoxychlot	001	29.4	28.9	15.9-4 1.9	Accept.
Toxaphene	002	13.3	14.7	8.09-2 1.3	Accept.
Alachlor	005	6.70	7.34	4.04- 10.6	Accept.
Atrazine	005	122	11.7	6.44-17	Accept.
Heptachlot	004	0.68	0.75 1	0.413-1.09	Accept.
Chlordane (Total)	003	15.2	16.7	9.19-242	Accept.
Hexachlotocyclopentadien	004	3.76	4.71	0.133-6.35	Accept.
Simazine	005	49.1	14.4	2.38-22.5	Not Accept.
Hexachlorobenzene	004	0.70	0.847	0.322-1.17	Accept.
Btomacil	006	35.3	43.8	10.5-66.9	Accept.
Metolachlor	-006	32.1	34.8	11 .5-54.2	Accept.
Metribuzin	006	18.5	15.7	2.5 I-22.3	Accept.
Prometon	006	15.0	14.9	4.64-2 1.9	Accept.
Trifluralin	004	5.03	4.33	2.81-6.86	Accept.
Aldrin	004	0.79	0.980	0.323- 1.3	Accept.
Butachlot	006	15.1	16.2	8.32-2 1.3	Accept.
Dieldrin	004	1.50	1.54	1.03-2.08	Accept.
Herbicides (µg/L):					
2,4-D	001	27.3	38.6	19.3-57-o	Accept.
2,4,5-TP (Silvex)	001	13.4	23.0	11.5-34.5	Accept.
Pentachlorophenol	001	8.37	14.6	7.3-2 1.9	Accept.

Analyte	Sample Number	Reported Value	True Value*	Acceptance Limits	Performance Evaluation
Dalapon	002	24.0	65.2	D.L.-90.8	Accept.
Dinoseb	002	30.9	47.2	D.L.-78.6	Accept.
Picloram	002	20.9	42.2	D.L.-64.5	Accept.
Dicamba	002	442	73.8	1.62-118	Accept.
Polychlorinated Biphenyls (µg/L):					
Decachlorobiphenyl	001	0.55	I.13	D.L.-2.26	Accept.
PAH's (µg/L):					
Anthracene	001	2.56	2.36	1.04-2.82	Accept.
Benzo (A) Anthracene	001	0.925	0.87 1	0.386-1.18	Accept.
Benzo (A) Pyrene	001	0.655	0.636	0.0676-W 17	Accept.
Benzo (K) Fluoranthene	001	0.874	0.85 1	0.108-1.09	Accept.
Chrysene	001	2.50	2.30	0.604-3.44	Accept.
Naphthalene	001	46.3	42.8	9.49-60	Accept.
Adipate/Phthalates (µg/L):					
Bis (2-Ethylhexyl) Adipate	001	18.7	16.9	326-25.8	Accept.
Butylbenzyl Phthalate	001	20.2	15.9	1.67-24.6	Accept.
Bis (2-Ethylhexyl) Phthalate	001	21.4	18.3	4.43-30.5	Accept.
Diethyl Phthalate	001	24.3	23.0	7.98-37.9	Accept.
Dimethyl Phthalate	001	19.8	27.4	5.33-38.5	Accept.
Trihalomethanes (µg/L):					
Chloroform	001	21.5	21.7	17.4-26	Accept.
Bromoform	001	38.6	38.6	30.9-46.3	Accept.

Analyte	Sample Number	Reported Value	True Value*	Acceptance Limits	Performance Evaluation
Bromodichloromethane	001	25.3	26.8	21.4-32.2	Accept.
Chlorodibromomethane	001	32.3	34.2	27.4-41	Accept.
Total Trihalomethane	001	118	121.3	97-146	Accept.
Volatile Organic Compounds (µg/L):					
Vinyl Chloride	001	14.0	9.47	5.68-13.3	Not Accept.
1,1-Dichloroethylene	001	7.16	8.49	5.09-11.9	Accept.
1,2-Dichloroethane	001	9.08	9.00	5.4-12.6	Accept.
1,1,1-Trichloroethane	001	12.2	14.5	11.6-17.4	Accept.
Carbon Tetrachloride	001	9.81	12.6	10.1-15.1	Not Accept.
Trichloroethylene	001	16.9	17.4	13.9-20.9	Accept.
Benzene	001	5.91	7.49	4.49-10.5	Accept.
Tetrachloroethylene	002	16.0	18.5	14.8-22.2	Accept.
1,4-Dichlorobenzene	001	10.9	11.9	9.52-14.3	Accept.
t1,2-Dichloroethylene	002	9.90	11.6	9.28-13.9	Accept.
1,2-Dichloropropane	002	15.4	16.4	13.1-19.7	Accept.
1,2-Dibromo-3-chloropropane	004	0.21	0.1%	0.118-0.274	Accept.
Ethylene Dibromide (EDB)	004	0.31	0283	0.17-0.396	Accept.
Toluene	002	11.6	13.2	10.6-15.8	Accept.
Ethylbenzene	002	12.8	14.8	11.8-17.8	Accept.
Chlorobenzene	002	16.7	16.3	13-19.6	Accept.
Styrene	002	11.1	12.9	10.3-15.5	Accept.
Dichloromethane	001	10.2	12.3	9.84-14.8	Accept.
Dibromomethane	003	16.7	17.7	11.9-21.6	Accept
1,1,2-Trichloroethane	001	5.58	6.46	3.88-9.04	Accept.

Analyte	Sample Number	Reported Value	True Value*	Acceptance Limits	Performance Evaluation
1,1,1,2-Tetrachloroethane	003	11.4	12.3	9.36- 14.4	Accept.
1,2,3-Trichloropropane	003	122	12.8	7.46-16.5	Accept
1,2,4-Trichlorbenzene	002	11.8	12.6	10.1-15.1	Accept.
n-Butylbenzene	003	10.5	12.6	9.63- 15.2	Accept.
Hexachlorobutadiene	003	14.3	15.1	12- 19.5	Accept.
Total Xylenes	002	9.91	10.4	8.32-12.5	Accept.
c 1,3-Dichloropropene	003	14.7	16.1	11.5-18.6	Accept.
t 1,3-Dichloropropene	003	6.05	6.39	4.77-7.96	Accept.
Miscellaneous Analytes:					
Residual Free Chlorine (mg/L)	001	0.550	0.562	0.408-0.715	Accept.
Turbidity (NTU'S)	001	7.65	6.30	5.81-8	Accept.
Total Filterable Residue (mg/L)	001	396	380	269-626	Accept.
Calcium (mg $CaCO_3$/L)	001	213	215	202-235	Accept.
Ph-Units	001	9.18	9.13	8.85-9.32	Accept.
Alkalinity (mg $CaCO_3$/L)	001	40.3	38.1	36.6-44.9	Accept.
Corrosivity (Langelier Ind. at 20C)	001	1.15	1.09	0.786-1.36	Accept.
Sodium (mg/L)	001	18.3	17.5	16.5-20. 1	Accept.
Sulfate (mg/L)	001	82.8	81.0	71.9-87.6	Accept.
Total Cyanide (mg/L)	001	0.198	0.200	0.15-0.25	Accept.

• - Based oa gravimetric calculations, or a reference value when necessary.
Note: For limits and true values, assume three significant digits.

Table B-3. EPA-EMSL Performance Evaluation Studies Program Documentation Thermo NUtech Tritium in Water Study

Known value	(a)	22002
Units		pCi/L
Results:	X_1	21890
	X_2	21510
	X_3	22370
Expected precision	(b)	2200
*Average (x)	(c)	21923
*Experimental o		431
Range	(d)	860
Mean range (1.693)(b)	(e)	3725
Range control (2.575)(e)	(f)	9591
Standard error or range (f/3-c/3)	(g)	1955
*Norm. range [if d > c then 1+d/g-c/g] [if d ≤ e then d/e]		0.2
Dev. of mean from known (c-a)	(h)	-79
Standard error of mean (b/√3)	(i)	1270
*Norm. dev. mean from known (h/i)		-0.1
Grand experimental 8		1275
Grand average	(j)	21573
Dev. mean from grand avg. (c-j)	(k)	350
*Norm dev. from grand avg. (k/i)		0.3

Table B-4. General Engineering Performance Evaluation, Water Pollution Study WP033

Analyte	Reported Value	True Value[a]	Acceptance Limits
Trace Metals (mg/L)			
Aluminum	133	130	93.8-175
	590	610	498-719
Antimony	225	233	154-281
	648	660	467-801
Arsenic	310	311	250-374
	734	743	598-891
Beryllium	350	350	294-395
	876	850	716-957
Cadmium	89.2	86.8	73.4-101
	742	750	638-870
Chromium	44.0	43.5	35.2-51.1
	530	529	454-608
Cobalt	536	530	468-577
	925	931	827--1030
Copper	33.3	33.6	28.1-38.3
	175	187	164-208
Iron	64.6	64.5	48.6-81.6
	1290	1300	1150-1450
Lead	581	645	546-721
	2570[b]	2900	2540-3240
Manganese	179	177	158-195
	4230[b]	3900	3520-4280
Mercury	5.62	5.81	4.04-7.33
	27.6	27.1	20.6-32.5
Molybdenum	107	106	84.9-128
	385	380	308-455
Nickel	270	265	234-295
	1070	1080	959-1200
Selenium	602	625	422-767
	1320	1380	933-1690
Silver	86.1	84.0	70-98.1
	423	410	342-479
Stronium	16.2	15.9	13-18.5
	195	193	162-220
Thallium	183	170	131-197
	744	680	535-776
Titanium	69.3	72.1	59.3-83.6
	190	192	160-220

Table B-4. General Engineering Performance Evaluation, Water Pollution Study WP033, Continued

Analyte	Reported Value	True Value	Acceptance Limits
Trace Metals (mg/L)			
Vanadium	416	415	364-461
	1230	1220	1070-1350
Zinc	34.1	31.9	23.9-40.3
	706	726	640-8 13
Minerals (mg/L, except as noted			
Alkalinity (as $CaCO_3$), total	28.2	28.5	24.2-33.1
	81.0	86.4	76.9-95
Calcium	12.6	12.0	10.7-13.6
	92.3	89.0	77.7-98-l
Chloride	58.3	59.2	53.5-64.1
	164	170	155-182
Fluoride	0.293[b]	0.240	O-168-0.3 10
	4.38[b]	4.00	3.5-4.46
Hardness (as $CaCO_3$), total	88.4	83.5	74.2-9 1
	248	239	2 16-259
Magnesium	13.8	13.0	11.4-14.9
	4.30	4.10	3.57-4.74
pH (pH units)	5.28	5.26	5.2 l-5.36
	4.08	4.11	4.02-4.16
Potassium	14.7	14.0	12.1-16
	5.56	5.20	4.24-6.23
Sodium	16.3	15.7	13.7-18.2
	94.5	94.2	85.7-10 1
specificconductance	316	309	284-337
(µmhos/cm at 25°C)	964	937	873-1020
Sulfate	21.0	22.0	17.6-25.4
	103	110	88.6-127
Total dissolved solids at 180°C	165	184	124-200
	545	561	441-701
Nutrients (mg/L)			
Ammonia nitrogen	5.56	6.30	4.98-7.5
	0.460	0.550	0.346-0.772
Kjeldahl nitrogen	1.82	1.60	0.863-2.38
	12.3	12.0	8.84-14.7
Nitrate as nitrogen	0.870	0.860	0.654-I .05
	0.407[c]	0.270	0.177-0.362
Orthophosphate	4.32[b]	5.00	4.28-5.67

[a] Based on gravimetric calculations, or a reference value when necessary.
[b] Acceptable, but near limits. The laboratory was warned to check for error.
[c] Not acceptable.

Table B-4. General Engineering Performance Evaluation, Water Pollution Study WP033, Continued

Analyte	Reported Value	True Value[a]	Acceptance Limits
	0.109	0.120	0.0883-0.152
Phosphorus, total	0.190	0.250	0.137-0.328
	4.44	5.40	3.98-6.4
Demands (mg/L)			
5-day Biochemical oxygen demand	9.90	12.1	5.36-18.8
	46.5	54.7	26-83.5
Chemical oxygen demand	18.4	19.5	9.75-28.9
	85.0	88.6	66.8-103
Total organic carbon	8.05	7.70	6.08-9.23
	36.6	35.0	27.3-41.5
PCBs (mg/L)			
PCB Aroclor 1232	3.11	3.67	0.717-6.07
PCB Aroclor 1254	4.58	5.40	2.57-7.06
PCBs in Oil (mg/kg)			
PCB 1016/1242	19.6	24.6	4-35.9
PCB 1254	30.4	38.4	9.07-51.1
Pesticides (mg/L)			
Aldrin	0.252	0.286	0.663-0.378
	1.86	2.16	0.653-2.89
Chlordane	5.82	7.41	3.31-10.5
	2.37	2.54	1.5-3.18
Dieldrin	1.03	1.24	0.643-1.7
	2.55	2.87	1.49-3.94
p,p'-DDD	1.37	1.52	0.611-2.29
	2.63	2.68	1.31-3.72
p,p'-DDE	1.10	1.37	0.612-1.89
	2.67	3.14	1.63-4.16
p,p'-DDT[c]	1.46	1.66	0.738-2.31
	3.33	3.55	1.87-4.77
Heptachlor	0.287	0.330	0.067-0.466
	1.76	1.87	0.543-2.54
Heptachlor epoxide	0.271	0.316	0.169-0.401
	1.61	1.72	0.945-2.28

[a] Based on gravimetric calculations, or a reference value when necessary.
[b] Acceptable, but near limits. The laboratory was warned to check for error.
[c] Not acceptable.

Table B-4. General Engineering Performance Evaluation, Water Pollution Study WP033; Continued

Analyte	Reported Value	True Value[a]	Acceptance Limits
Volatile Aromatics (mg/L)			
Benzene	67.7	69.6	48.4-92.4
	18.1	18.3	12.6-24.9
1,2-Dichlorobenzene	52.6	55.7	37-73
	16.7	16.3	11.1-21
1,3-Dichlorobenzene	51.6	53.8	36.5-65.3
	18.3	17.3	12.2-22.2
1,4-Dichlorobenzene	60.7	64.0	41.6-84.6
	15.5	14.7	9.74-19.7
Ethylbenzene	70.5	72.5	47.2-94.5
	13.2	12.5	8.14-16.9
Toluene	54.4	56.5	40.5-71.2
	16.3	15.6	11.1-19.8
Miscellaneous Parameters (mg/L)			
Cyanide, total	0.509	0.490	0.348-0.622
	0.214	0.2 10	0.139-0.27 1
Nonfilterable residue	61.9	72.0	54.6-79.6
	95.5	100	76.2-107
Oil and grease	38.5	43.0	25.1-50.6
	12.7	14.0	7.79-17.9
Phenolics, total	1.10	1.48	0.868-2.1
	0.715	0.913	0.54-l-29
Residual chlorine, total	0.868	0.839	O-632-0.996
	4.66	4.30	3.5-5

[a] Based on gravimetric calculations, or a reference value when necessary.
[b] Acceptable, but near limits. The laboratory was warned to check for error.
[c] Not acceptable.

Table B-5. General Engineering Performance Evaluation, Water Pollution Study WP034

Analyte	Reported Value	True Value	Acceptance Limits
Trace Metals (µg/L)			
Aluminum	1010	990	830-1140
	2720	2700	2290-3060
Antimony	106	127	78.1-151
	396	441	287-535
Arsenic	113	121	98.4-144
	519	462	380-544
Beryllium	12.7	13.0	9.16-16.8
	82.6	92.3	77.1-105
Cadmium	13.1	13.0	10.2-16.1
	222	210	183-240
Chromium	99.7	97.2	82.9-111
	368	361	312-409
Cobalt	133	130	114-145
	334	330	293-369
Copper	51.7	50.4	41.6-58
	913	890	792-980
Iron	631	626	555-700
	948	941	834-1070
Lead	173	190	162-218
	472	500	438-561
Manganese	284	281	251-310
	1430	1400	1260-1540
Mercury	1.32	1.33	0.929-1.77
	1.70	1.76	1.26-2.30
Molybdenum	32.2	31.0	24.0-37.7
	263	250	202-295
Nickel	80.2	80.9	67.7-91.9
	822	780	701-860
Selenium	181	199	146-239
	415	437	322-524
Silver	38.2	36.9	31.2-42.7
	271	280	225-296
Stronium	46.2	45.3	36.7-52.5
	303	290	243-334
Thallium	232	231	183-270
	905	891	708-1040
Titanium	36.9	38.0	29.6-46.7
	140	142	121-161

Note: The true value is based on gravimetric calculations, or a reference value when necessary. Reported values that were out of range appear in **BOLD**. In cases where the laboratory was asked to check for error, the reported values appear in ***BOLD ITALIC***.

Table B-5. General Engineering Performance Evaluation, Water Pollution Study, WP034, Continued

Analyte	Reported Value	True Value	Acceptance Limits
Trace Metals (µg/L)			
Vanadium	5330	5200	4600-5730
Zinc	9440	9100	8060-10000
	513	484	428-541
	1020	967	848-1080
Minerals (mg/L, except as noted			
Alkalinity (as $CaCO_3$), total	42.6	45.0	39.7-51.1
Calcium	10.3	10.0	7.41-14.2
	21.0	21.0	18.5-23.6
Chloride	78.9	78.0	69.3-86.7
	53.6	55.9	50.5-61.6
Dissolved solids at 180°C, total	**222**	246	226-267
Fluoride	230	237	172-304
	2.07	2.10	1.85-2.33
Hardness (as $CaCO_3$), total	0.530	0.560	0.464-0.651
	78.6	78.4	70.3-87.3
Magnesium	323	314	286-340
	6.37	6.30	5.52-7.16
pH (pH units)	30.7	29.0	25.3-32.9
	7.58	7.60	7.40-7.76
Potassium	9.01	9.00	8.61-9.35
	32.4	32.0	28.0-36.1
Sodium	10.8	10.2	8.73-11.7
	29.4	29.5	26.7-32.6
Specific conductance (µS/cm)	19.0	18.1	16.2-20.3
	423	414	390-450
Sulfate	874	859	805-935
	46.6	52.0	43.3-58.5
	7.39	8.10	5.56-10.2
Nutrients (mg/L)			
Ammonia nitrogen	8.48	8.80	7.05-10.4
Nitrate as nitrogen	3.72	3.90	3.07-4.70
	14.7	6.02	4.85-7.06
Nitrogen by Kjeldahl method	22.0	23.1	18.6-27.0
	4.48	3.71	2.57-4.87
Orthophosphate	**3.24**	16.0	11.9-19.4
	0.930	0.918	0.779-1.05
Phosphorus, total	0.430	0.429	0.356-0.501
	3.52	3.81	3.10-4.37
	1.93	1.90	1.51-2.24

Note: The true value is based on gravimetric calculations, or a reference value when necessary. Reported values that were out of range appear in **BOLD**. In cases where the laboratory was asked to check for error, the reported values appear in ***BOLD ITALIC***.

Table B-5. General Engineering Performance Evaluation, Water Pollution Study, WP034, Continued

Analyte	Reported Value	True Value	Acceptance Limits
Demands (mg/L)			
5-day Biochemical oxygen demand	28.2	30.2	17.3-42.3
	10.0	9.99	4.82-15.4
Chemical oxygen demand	44.4	48.1	33.4-55.6
	18.5	15.9	6.15-23.6
Total organic carbon	19.5	19.0	16.1-22.0
	6.65	6.30	5.16-7.46
PCBs (µg/L)			
Aroclor 1016/1242	5.81	6.74	1.62-9.74
Aroclor 1260	1.13	1.61	0.694-2.11
PCBs in Oil (mg/kg)			
PCB 1254	21.2	22.7	2.97-37.0
PCB 1260	35.9	42.7	3.16-62.9
Pesticides (µg/L)			
Aldrin	1.34	1.63	0.186-2.49
	0.281	0.364	0.0925-0.506
Chlordane	1.71	1.89	1.00-2.57
	3.74	4.36	1.91-6.46
p,p'-DDD	3.50	3.88	2.15-5.17
	1.04	1.14	0.573-1.62
p,p'-DDE	2.29	2.71	1.33-3.54
	0.895	1.07	0.543-1.41
p,p'-DDT	2.04	2.84	1.40-3.84
	1.09	1.42	0.680-1.87
Dieldrin	3.78	4.20	2.05-5.91
	1.42	1.57	0.743-2.28
Heptachlor	1.77	2.23	0.449-3.24
	0.327	0.426	0.0989-0.600
Heptachlor epoxide	1.63	1.93	1.05-2.53
	0.318	0.386	0.206-0.507
Volatile Halocarbons (µg/L)			
Bromodichloromethane	62.0	65.4	46.9-85.7
	17.8	18.5	13.2-24.2
Bromoform	56.2	55.0	36.0-74.7
	15.1	15.0	8.95-20.3
Carbon tetrachloride	55.7	64.2	40.7-89.4
	15.8	17.0	11.7-23.0

Note: The true value is based on gravimetric calculations, or a reference value when necessary. Reported values that were out of range appear in **BOLD**. In cases where the laboratory was asked to check for error, the reported values appear in ***BOLD ITALIC***.

Table B-5. General Engineering Performance Evaluation, Water Pollution Study, WP034, Continued

Analyte	Reported Value	True Value	Acceptance Limits
Chlorobenzene	49.3	54.7	40.3-67.2
Chloroform	13.3	15.2	11.6-18.6
	52.8	58.3	40.4-74.9
Dibromochloromethane	16.0	17.8	12.8-23.1
	51.9	53.7	36.7-70.5
1,2-Dichloroethane	12.6	12.8	8.69-16.5
	60.3	63.4	44.9-81.9
Methylene chloride	13.6	13.7	9.36-19.1
	48.1	58.1	35.4-81.7
Tetrachloroethene	10.4	12.3	7.72-17.6
	45.6	54.2	36.7-68.4
1,1,1-Trichloroethane	14.9	16.8	11.7-21.0
	41.7	48.1	31.6-62.2
Trichloroethene	16.3	18.6	12.5-23.8
	48.3	57.4	36.7-75.4
	11.7	13.3	8.82-17.2
Volatile Aromatics (µg/L)			
Benzene	9.93	11.4	7.74-14.9
1,2-Dichlorobenzene	40.8	49.1	35.3-63.6
	12.9	13.2	9.73-17.0
1,3-Dichlorobenzene	53.2	63.3	44.5-79.4
	15.1	14.9	10.6-18.7
1,4-Dichlorobenzene	50.1	57.9	42.4-72.1
	16.8	17.3	12.0-22.8
Ethylbenzene	48.1	57.0	39.8-74.9
	16.8	18.1	12.5-22.7
Toluene	37.5	46.1	30.8-60.8
	17.4	19.8	13.8-24.9
	50.3	64.3	47.1-79.5
Miscellaneous Parameters (mg/L)			
Cyanide, total	0.112	0.120	0.0757-0.156
Nonfilterable residue	0.745	0.740	0.547-0.911
	31.5	38.0	27.9-40.1
Oil and grease	19.7	23.0	15.2-24.1
	11.7	11.0	5.08-15.1
Phenolics, total	**14.9**	16.4	9.27-20.8
	28.5	.0413	0.013-0.071
Residual chlorine, total	**293**	0.381	0.170-0.611
	1.01	1.10	0.803-1.31
	0.135	0.160	0.0737-0.257

Note: The true value is based on gravimetric calculations, or a reference value when necessary. Reported values that were out of range appear in **BOLD**. In cases where the laboratory was asked to check for error, the reported values appear in ***BOLD ITALIC***.

Table B-6. General Engineering Performance Evaluation, Water Supply Study WS036

Analyte	Reported Value	True Value[a]	Acceptance Limits
Trace Metals (µg/L)			
Aluminum	58.7	51.0	43.2-67.3
Antimony	**44.4**	11.0	7.70-14.3
Arsenic	111	120	107-136
Barium	1,280	1,300	1,110-1,500
Beryllium	7.63	7.70	6.55-8.86
Boron	**503**	480	444-502
Cadmium	35.5	34.0	**27.2-40.8**
Chromium	38.4	37.8	32.1-43.5
Copper	648	630	**567-693**
Lead	34.5	39.0	27.3-50.7
Manganese	958	970	911-1030
Mercury	2.75	3.00	2.10-3.90
Molybdenum	11.7	11.0	8.29-13.9
Nickel	394	380	323-437
Selenium	27.4	31.1	**24.9-37.3**
Silver	54.4	54.2	47.2-60.2
Thallium	**21.4**	4.50	3.15-5.85
Zinc	1,450	1,410	1280-1530
Nitrate/Nitrite/Fluoride (mg/L)			
Fluoride	6.47	7.20	6.48-7.92
Nitrate as nitrogen	2.89	2.90	2.61-3.19
Nitrite as nitrogen	1.03	1.10	0.935-1.27
Insecticides (µg/L)			
Aldrin	0.696	0.980	0.323-1.80
Chlordane	17.6	16.7	9.19-24.2
Dieldrin	1.24	1.54	1.03-2.08
Endrin	0.307	0.383	0.268-0.498
Heptachlor	0.572	0.751	0.413-1.09
Lindane	0.370	0.429	0.236-0.622
Methoxychlor	26.5	28.9	15.9-41.9
Toxaphene	10.4	14.7	8.09-21.3
Herbicides (µg/L)			
2,4-D	48.4	38.6	19.3-57.9
2,4,5-TP	26.9	23.0	11.5-34.5

Note: The true value is based on gravimetric calculations, or a reference value when necessary. Reported values that were out of range appear in **BOLD.**

Table B-6. General Engineering Performance Evaluation, Water Supply Study WS036, Continued

Analyte	Reported Value	True Value*	Acceptance Limits
PAHs (µg/L)			
Anthracene	1.51	2.36	1.04-2.82
Benzo[a]anthracene	0.735	0.871	0.386-1.18
Benzo[a]pyrene	0.472	0.636	0.0676-0.917
Benzo[k]fluoranthene	0.756	0.851	0.108-1.09
Chrysene	1.91	2.30	0.604-3.44
Naphthalene	28.8	42.8	9.48-60.0
Trihalomethanes (µg/L)			
Bromodichloromethane	23.4	26.8	21.4-32.2
Bromoform	39.5	38.6	30.9-46.3
Chlorodibromomethane	32.8	34.2	27.4-41.0
Chloroform	20.3	21.7	17.4-26.0
Trihalomethane, total	116	121.3	97.0-146
Volatile Organic Compounds (µg/L)			
Benzene	6.56	7.49	4.49-10.5
n-Butylbenzene	11.9	12.6	9.63-15.2
Carbon tetrachloride	10.7	12.6	10.1-15.1
Chlorobenzene	15.0	16.3	13.0-19.6
Dibromomethane	18.7	17.7	11.9-21.6
1,4-Dichlorobenzene	10.4	11.9	9.52-14.3
1,2-Dichloroethane	8.22	9.00	5.40-12.6
1,1-Dichloroethylene	8.33	8.49	5.09-11.9
trans-1,2-Dichloroethylene	11.5	11.6	9.28-13.9
Dichloromethane	**8.43**	12.3	9.84-14.8
1,2-Dichloropropane	14.2	16.4	13.1-19.7
cis-1,3-Dichloropropene	16.7	16.1	11.5-18.6
trans-1,3-Dichloropropene	6.41	6.89	4.77-7.96
Ethylbenzene	13.2	14.8	11.8-17.8
Hexachlorobutadiene	15.0	15.1	12.0-19.5
Styrene	12.0	12.9	10.3-15.5
1,1,1,2-Tetrachloroethane	12.0	12.3	9.36-14.4
Tetrachloroethylene	15.7	18.5	14.8-22.2
Toluene	12.0	13.2	10.6-15.8
1,2,4-Trichlorobenzene	11.6	12.6	10.1-15.1
1,1,1-Trichloroethane	12.5	14.5	11.6-17.4
1,1,2-Trichloroethane	5.85	6.46	3.89-9.04
Trichloroethylene	14.6	17.4	13.9-20.9
1,2,3-Trichloropropane	14.0	12.8	7.46-16.5
Vinyl chloride	8.20	9.47	5.68-13.3
Xylenes, total	4.70	10.4	8.32-12.5

Note: The true value is based on gravimetric calculations, or a reference value when necessary. Reported values that were out of range appear in **BOLD**.

Table B-6. Genera! Engineering Performance Evaluation, Water Supply Study WS036, Continued

Analyte	Reported Value	True Value*	Acceptance Limits
Miscellaneous Analytes (mg/L, except as noted)			
Alkalinity as $CaCO_3$	**39.8**	38.1	**36.6-44.9**
Calcium $CaCO_3$	**238**	215	**202-235**
Corrosivity (Langelier Ind at 20°C)	1.20	1.09	**0.786-1.36**
Cyanide, total	0.201	0.200	**0.150-0.250**
Filterable residue, total	549	380	269626
pH(pH)	9.19	**9.13**	**8.85-9.32**
Residual free chlorine	0.548	0.562	**0.408-0.715**
sodium	19.0	17.5	**16.5-20.1**
Sulfate	**72.9**	81.0	**71.9-87.6**
Turbidity (NTUs)	7.08	6.30	5.81-8.00

Note: The true value is basai on gravimetric calculations, of a reference value when necessary. Reported values that were out of range appear in BOLD.

Table B-7. Second Quarter 1995 Laboratory Quality Control Standards Evaluation

Analyte	Certified Value	Performance Acceptance Limits	GE Results	Qualifier
Acids (Lot 563)				
4-Chloro-m-cresol (µg/L)	89.7	46.1-102	80.5	RQ
m,p-Cresol (µg/L)	24.6	10.6-27.6	25.2	RQ
o-Cresol (µg/L)	75.2	23.0-89.5	55.8	RQ
p-Cresol (µg/L)	86.3	29.1-99.2	-[a]	
Pentachlorophenol (µg/L)	118	36.8-149	111	RQ
2,4,6-Trichlorophenol (µg/L)	50.6	22.2-56.7	49.8	RQ
Base/Neutrals (Lot 563)				
Anthracene (µg/L)	111	51.9-129	88.5	RQ
Benzol[a]enthracene (µg/L)	36.3	15.8-42.5	31.2	RQ
Benzo[k]fluroanthene (µg/L)	27.2	9.93-34.8	30.2	RQ
Bis (2-ethy[hexyl] phthalate (µg/L)	55.6	21.4-71.2	63.6	RQ
Butylbenzyl phthalate (µg/L)	54.7	20.9-64.0	69.2[b]	RQ
Chrysene (µg/L)	75.2	34.8-91.7	64.3	RQ
Dibenzofuran (µg/L)	40.9	19.6-47.0	39.5	RQ
1,2-Dichlorobenzene (µg/L)	119	31.3-134	92.0	RQ
1,3-Dichlorobenzene (µg/L)	97.3	23.3-113	24.5	JQ
2,4-Dinitrotoluene (µg/L)	30.2	11.0-35.9	31.5	RQ
2,6-Dinitrotoluene (µg/L)	52.8	26.1-60.2	60.4[b]	RQ
Fluorene (µg/L)	72.1	35.5-88.7	62.9	RQ
Hexachlorobenzene (µg/L)	31.9	17.4-37.0	24.3	RQ
Naphthalene (µg/L)	148	57.6-172	101	RQ
Pyrene (µg/L)	104	45.9-132	109	RQ
1,2,4-Trichlorobenzene (µg/L)	26.1	8.43-30.8	25.3	RQ
Cations (Lot 426)				
Calcium (µg/L)	84,800	72,900-96,700	82,200	
Magnesium (µg/L)	108,000	92,900-123,000	107,000	
Potassium (µg/L)	28,800	24,500-33,100	12,600	
Sodium (µg/L)	208,000	17,7000-239,000	220,000	
Cyanide and Phenol (lot 9964)				
Cyanide (µg/L)	105	76.9-134	104	JQC
Phenois (µg/L)	218	166-270	205	JC

[a] Result not received.
[b] Result out of range.
C Criteria were not met.
E Result is between the sample-specific estimated quantitation limit and the method detection limit.
I Spike recovery not within control limits.
J Result is an estimated quantity.
O Surrogate spike recoveries are out of specification.
Q Sample held beyond normal holding time.
R Rejected because performance requirements in the sample or associated quality control analyses were not met.
NOTE: Ground water samples are unfiltered. General Engineering reported the results for metals as total recoverable metals.

Table B-7. Second Quarter 1995 Laboratory Quality Control Standards Evaluation, continued

Analyte	Certified Value	Performance Acceptance Limits	GE Results	Qualifier
Inorganics (Lot 3412				
Alkalinity (as $CaCO_3$) (µg/L)	131,000	111,000-151,000	140,000	JQ
Chloride (µg/L)	129,000	115,000-144,000	123,000	JQ
Fluoride (µg/L)	6,470	5,820-7,120	6,100	JQ
Nitrate as nitrogen (µg/L)	8,770	7,890-9,650	8,950	RQ
pH (pH Units)	9.14	8.94-9.34	9.13	RQ
Potassium (µg/L)	37,800	32,100-43,800	32,200	
Sodium (µg/L)	197,000	167,000-227,000	209,000	
Specific conductance (µg/L)	1,030	876-1,180	1,040	JQ
Sulfate (µg/L)	110,000	94,600-127,000	102,000	JQ
Total dissolved solids (µg/L)	771,000	632,000-864,000	746,000	JQ
Nutrients (Lot 9964)				
Ammonia nitrogen (µg/L)	8,780	7,370-10,200	7,700	
Nitrate-nitrite as nitrogen (µg/L)	5,490	4,880-6,090	5,480	JIC
Total dissolved soilds (µg/L)	6,640	5,650-7,640	6,280	JI
Oil and Grease (Lot 9964)				
Oil and grease, gravimetric (mg/bottle)	74.1	44.5-92.6	70.3	JQ
PCBs (Lot 563)				
PCB 1254 (µg/L)	2.72	1.84-3.16	1.98	JQ
Pesticides (Lot 563)				
Aldrin (µg/L)	4.22	2.16-5.02	3.75	JQCO
alpha-Benzene hexachloride (µg/L)	4.85	2.57-6.26	4.45	JQO
beta-Benzene hexachloride(µg/L)	8.65	4.50-10.8	8.09	JQO
alpha-Chlordane (µg/L)	4.99	2.51-6.34	4.76	JQO
p,p'-DDD (µg/L)	3.73	2.42-4.89	3.8	JQO
p,p'-DDE (µg/L)	6.27	3.47-8.03	5.8	JQO
p,p'-DDT (µg/L)	2.30	1.34-2.90	2.26	JQCO
Dieldrin (µg/L)	2.08	1.24-2.75	2.1	JQCO
Endrin (µg/L)	2.02	1.06-2.61	1.9	JQCO
Heptachlor (µg/L)	8.72	3.99-11.0	8.17	JQCO

[a] Result not received.
[b] Result out of range.
C Criteria were not met.
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I Spike recovery not within control limits.
J Result is an estimated quantity.
O Surrogate spike recoveries are out of specification.
Q Sample held beyond normal holding time.
R Rejected because performance requirements in the sample or associated quality control analyses were not met.
NOTE: Ground water samples are unfiltered. General Engineering reported the results for metals as total recoverable metals.

Table B-7. Second Quarter 1995 Laboratory Quality Control Standards Evaluation, continued

Analyte	Certified Value	Performance Acceptance Limits	GE Results	Qualifier
Heptachlor epoxide (µg/L)	1.51	0.939-1.84	1.5	JQO
Pesticides/Herbicides (Lot 3212)				
Alachlor (µg/L)	1.99	1.09-2.89	-[a]	
Atrazine (µg/L)	3.14	1.73-4.55	-[a]	
2,4-Dichlorophenoxyacetic acid (µg/L)	6.47	3.24-9.71	-[a]	
Dalapon (µg/L)	9.54	3.91-13.0	-[a]	
Dinoseb (µg/L)	7.03	1.76-8.86	-[a]	
Endrin (µg/L)	2.02	1.41-2.63	1.9	JQCO
Heptachlor (µg/L)	0.400	0.220-0.580	8.17[b]	JQCO
Heptachlor epoxide (µg/L)	0.200	0.110-0.290	1.5[b]	JQO
Hexachlorobenzene (µg/L)	1.00	0.550-1.45	0.83	RQ
Hexachlorocyclopentadiene (µg/L)	8.74	4.81-12.7	5.11	RQ
Lindane (µg/L)	0.211	0.116-0.306	<0.025[b]	JQCO
Methoxychlor (µg/L)	7.15	3.93-10.4	<0.5[b]	JQO
Pentachlorophenol (µg/L)	1.02	0.510-1.53	<1.0	RQ
Picloram (µg/L)	8.24	4.70-11.9	-[a]	
Simazine (µg/L)	4.08	3.02-5.06	-[a]	
2,4,5-TP (Silvex) (µg/L)	6.60	3.30-9.90	-[a]	
Total Petroleum Hydrocarbons (Lot 8917)				
Standard 1, fatty acids not present, gravimetric (mg/bottle)	96.0	63.2-124	99.0	JQ
Toxaphene (Lot 3212)				
Toxaphene (Lot 3212)	8.20	4.51-11.9	7.58	JQOC
Trace Metals (Lot 3412)				
Aluminum (µg/L)	3.13	266-360	316	
Antimony (µg/L)	68.8	48.2-89.4	69.1	
Arsenic (µg/L)	75.0	60.0-90.0	75.7	
Barium (µg/L)	650	553-748	613	
Beryllium (µg/L)	37.5	31.9-43.1	36.4	
Boron (µg/L)	93.8	76.9-111	102	JE

[a] Result not received.
[b] Result out of range.
C Criteria were not met.
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I Spike recovery not within control limits.
J Result is an estimated quantity.
O Surrogate spike recoveries are out of specification.
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NOTE: Ground water samples are unfiltered. General Engineering reported the results for metals as total recoverable metals.

Table B-7. Second Quarter 1995 Laboratory Quality Control Standards Evaluation, continued

Analyte	Certified Value	Performance Acceptance Limits	GE Results	Qualifier
Cadmium (µg/L)	31.3	25.0-37.6	31.6	
Calcium (µg/L)	50,100	45,100-55,100	49,700	
Chromium (µg/L)	213	181-245	212	
Copper (µg/L)	875	788-963	867	
Iron (µg/L)	150	113-179	147	
Lead (µg/L)	81.3	56.9-106	77.5	
Manganese (µg/L)	87.5	74.4-101	85.4	
Mercury (µg/L)	2.50	1.75-3.25	1.99	JQ
Molybdenum (µg/L)	106	86.9-125	109	
Nickel (µg/L)	150	128-173	145	
Selenium (µg/L)	37.5	30.0-45.0	36.4	
Silver (µg/L)	68.8	58-5-79.1	67.1	
Thallium (µg/L)	31.3	21.9-40.7	28.5	
Zinc (µg/L)	775	659-891	742	
Hardness (as $CaCO_3$) (µg/L)	125,000	106,000-144,000	124,000	
Turbidity (Lot 3412)				
Turbidity (NTU)	0.650	0.585-0.748	0.68	RQ
Volatiles (Lot 563)				
Benzene	61.4	47.5-76.1	48.2	JQ
Bromodichloromethane (µg/L)	61.8	47.6-77.3	53.1	JQ
Bromoform (µg/L)	72.1	52.6-93.0	54.7	JQ
Carbon tetrachloride (µg/L)	68.3	49.1-86.7	45.8[b]	JQ
Chlorobenzene (µg/L)	34.7	26.5-42.0	27.6	JQ
Chlorodibromomethane (µg/L)	44.3	33.5-54.9	-[a]	
Chloroform (µg/L)	124	93.5-153	107	JQ
1,2-Dichlorobenzene (µg/L)	44.3	33.6-53.6	32.1[b]	JQ
1,3-Dichlorobenzene (µg/L)	34.8	26.0-42.5	24.5[b]	JQ
1,4-Dichlorobenzene (µg/L)	73.2	55.6-90.8	47.1[b]	JQ
1,2-Dichlorethane (µg/L)	76.5	59.0-95.6	69.6	JQ
Dichloromethane (µg/L)	81.9	55.6-109	69.7	JQ
Ethylbenzene (µg/L)	71.2	52.5-88.3	52.6	JQ
Methyl isobutyl ketone (µg/L)	34.2	19.7-47.5	26.5	JQ
Tetrachloroethylene (µg/L)	60.2	43.9-73.4	37.7[b]	JQ
Toluene (µg/L)	89.1	68.7-108	66.8[b]	JQ
1,1,1-Trichlorethane (µg/L)	29.1	20.4-34.9	19.2[b]	JQ
Trichloroethylene (µg/L)	74.4	55.3-90.0	50.8[b]	JQ

[a] Result not received.
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O Surrogate spike recoveries are out of specification.
Q Sample held beyond normal holding time.
R Rejected because performance requirements in the sample or associated quality control analyses were not met.
NOTE: Ground water samples are unfiltered. General Engineering reported the results for metals as total recoverable metals.

Table B-7. Second Quarter 1995 Laboratory Quality Control Standards Evaluation, continued

Analyte	Certified Value	Performance Acceptance Limits	GE Results	Qualifier
m-Xylene (µg/L)	33.7	20.7-43.5	-[a]	JQ

[a] Result not received.
[b] Result out of range.
C Criteria were not met.
E Result is between the sample-specific estimated quantitation limit and the method detection limit.
I Spike recovery not within control limits.
J Result is an estimated quantity.
O Surrogate spike recoveries are out of specification.
Q Sample held beyond normal holding time.
R Rejected because performance requirements in the sample or associated quality control analyses were not met.
NOTE: Ground water samples are unfiltered. General Engineering reported the results for metals as total recoverable metals.

Table B-8. Third Quarter 1995 Laboratory Quality Control Standards

Analyte	Certified Value	Performance Acceptance Limits	GE Results	Qualifier
Acids (Lot 567)				
m,p-Cresol (µg/L)	49.0	13.7-56.4	32.0	
2,4-Dichlorophenol	81.9	37.2-90.1	69.1	
2,4-Dimethylphenol	59.8	20.2-73.0	46.0	
2-Methylphenol	97.0	31.2-114	59.5	
4-Nitrophenol	179	40.8-229	52.2	
Pentachlorophenol	148	45.0-185	121	
2,4,6-Trichlorophenol	71.2	31.3-80.5	60.5	
Base/Neutrals (Lot 567)				
Anthracene (µg/L)	93.7	43.3-110	81.8	
Benzo[a]pyrene (µg/L)	31.4	14.8-39.9	27.4	
Benzo[k]fluoranthene (µg/L)	85.2	27.9-110	87.4	
Bis(2-ethylhexyl) phthalate (µg/L)	130	49.1-166	98.7	
Butylbenzyl phthalate (µg/L)	64.5	18.7-78.0	47.6	
Chrysene (µg/L)	110	52.4-134	70.6	
Dibenzofuran (µg/L)	121	59.0-137	79.6	
1,2-Dichlorobenzene (µg/L)	31.9	7.62-36.7	24.4	
1,4-Dichlorobenzene (µg/L)	136	36.4-155	-	
2,4-Dinitrotoluene (µg/L)	80.2	31.3-93.8	61.2	
Di-n-octyl phthalate (µg/L)	37.9	10.5-55.3	51.4	
Naphthalene (µg/L)	41.5	15.2-47.7	34.3	
Pyrene (µg/L)	62.4	28.9-76.8	49.6	
1,2,4-Trichlorobenzene (µg/L)	97.2	28.2-115	78.1	O
Cations (Lot 427)				
Calcium (µg/L)	63,200	54,400-72,000	64,000	
Magnesium (µg/L)	58,400	50,200-66,600	58,500	
Potassium (µg/L)	40,800	34,700-46,900	42,000	
Sodium (µg/L)	75,200	63,900-86,500	79,100	
Cyanide and Phenol (Lot 9966)				
Cyanide, total (µg/L)	163	119-207	162	JV
Phenol (µg/L)	150	114-186	175	

- Result not received.
[a] Result out of range.
E Result is between the sample-specific estimated quantitation limit and the method detection limit.
J Result is an estimated quantity.
O Surrogate spike recoveries are out of specification.
V Analyte was detected in both the sample and associated method blank.
NOTE: Ground water samples are unfiltered. General Engineering reported the results for metals as total recoverable metals.

Table B-8. Third Quarter 1995 Laboratory Quality Control Standards Evaluation, continued

Analyte	Certified Value	Performance Acceptance Limits	GE Results	Qualifier
Nutrients (Lot 9966)				
Ammonia nitrogen (µg/L)	4,990	4,190-5,790	4,480	
Nitrate-nitrite as nitrogen (µg/L)	9,330	8,300-10,400	9,000	JV
Total phosphates (as P) (µg/L)	7,880	6,700-9,060	7,400	JV
PCBs (Lot 564)				
Aroclor 1260 (µg/L)	1.02	0.680-1.22	1.14	
Pesticides (Lot 564)				
Aldrin (µg/L)	1.82	0.939-2.18	1.76	
beta-Benzene hexachloride (µg/L)	6.68	3.37-8.55	5.61	
gamma-BHC (Lindane) (µg/L)	1.48	0.765-1.89	1.55	
alpha-Chlordane (µg/L)	4.66	2.54-5.87	3.82	
p,p'-DDD (µg/L)	1.70	1.07-2.18	2.10	
p,p'-DDE (µg/L)	2.11	1.19-2.68	2.22	
p,p'-DDT (µg/L)	7.19	4.16-9.13	5.62	
Dieldrin (µg/L)	6.48	3.96-8.42	5.94	
Endrin (µg/L)	5.09	3.12-6.57	4.23	
Heptachlor (µg/L)	2.40	1.10-2.98	1.80	JE
Hetachlor epoxide (µg/L)	9.11	5.57-11.3	7.44	
Methoxychlor (µg/L)	4.00	2.21-9.36	3.10	
Pesticides/Herbicides (Lot 3213)				
Alachlor (µg/L)	3.14	1.73-4.55	-	
Atrazine (µg/L)	6.50	3.58-9.43	-	
gamma-BHC (Lindane) (µg/L)	1.22	0.671-1.77	<0.025[a]	
2,4-D (µg/L)	2.92	1.46-4.38	-	
Dalapon (µg/L)	4.05	1.72-5.63	-	
Dinoseb (µg/L)	8.29	3.59-9.53	-	
Eldrin (µg/L)	2.48	1.74-3.22	2.53	
Heptachlor (µg/L)	1.09	0.600-1.58	1.19	
Heptachlor epoxide (µg/L)	0.911	0.501-1.32	0.922	
Hexachlorobenzene (µg/L)	2.20	1.50-2.95	-	
Hexachlorocyclopentadiene (µg/L)	6.62	1.34-8.08	-	
Methoxychlor (µg/L)	3.37	1.85-4.89	2.67	
Pentachlorophenol (µg/L)	5.47	2.74-8.21	-	
Picloram (µg/L)	2.47	1.19-3.33	-	
Silvex (µg/L)	8.80	4.40-13.2	-	

- Result not received.
[a] Result out of range.
E Result is between the sample-specific estimated quantitation limit and the method detection limit.
J Result is an estimated quantity.
O Surrogate spike recoveries are out of specification.
V Analyte was detected in both the sample and associated method blank.
NOTE: Ground water samples are unfiltered. General Engineering reported the results for metals as total recoverable metals.

Table B-8. Third Quarter 1995 Laboratory Quality Control Standards Evaluation, continued

Simazine (µg/L)	2.04	1.56-3.22	-	
Total Petroleum Hydrocarbons (Lot 8918)				
Standard 1, gravimetric (mg/bottle)	25.9	16.9-33.7	21.5	
Toxaphene (Lot 3213)				
Toxaphene (µg/L)	7.17	3.94-10.4	3.22[a]	
Trace Metals (Lot 3413)				
Aluminum (µg/L)	188	162-212	205	
Antimony (µg/L)	75.0	52.5-97.5	78.8	
Arsenic (µg/L)	68.8	55.0-82.6	72.8	
Barium (µg/L)	880	748-1,010	869	
Beryllium (µg/L)	56.3	47.9-64.7	56.6	
Boron (µg/L)	138	115-178	155	
Cadmium (µg/L)	68.8	55.0-82.6	72.2	
Calcium (µg/L)	62,600	54,800-72,600	63,800	
Chromium (µg/L)	288	245-331	290	
Copper (µg/L)	938	844-1,030	952	
Hardness (as $CaCO_3$) (µg/L)	156,000	133,000-179,000	160,000	
Iron (µg/L)	175	133-214	174	
Lead (µg/L)	43.8	30.7-56.9	47.2	
Manganese (µg/L)	62.5	53.1-71.9	63	
Mercury (µg/L)	5.00	3.50-6.50	5.08	V
Molybdenum (µg/L)	125	103-148	133	
Nickel (µg/L)	163	139-187	169	
Selenium (µg/L)	43.8	35.0-52.6	48.0	
Silver (µg/L)	81.3	69.8-91.9	79.9	
Thallium (µg/L)	56.3	39.4-73.2	56.7	
Zinc (µg/L)	875	741-1,070	879	
Turbidity (Lot 3413)				
Turbidity (NTU)	1.75	1.48-1.98	1.77	
Volatiles (Lot 567)				
Benzene	26.6	20.4-33.2	26.8	
Bromodichloromethane	103	78.6-130	111	
Bromoform	36.0	26.1-46.4	38.8	
Carbon tetrachloride	80.3	58.5-101	78.3	
Chlorobenzene	55.2	42.5-66.8	55.6	

- Result not received.
[a] Result out of range.
E Result is between the sample-specific estimated quantitation limit and the method detection limit.
J Result is an estimated quantity.
O Surrogate spike recoveries are out of specification.
V Analyte was detected in both the sample and associated method blank.
NOTE: Ground water samples are unfiltered. General Engineering reported the results for metals as total recoverable metals.

Table B-8. Third Quarter 1995 L&oratory Quality Control Standards Evaluation, continued

Chloroform	80.1	59.8-99.3	78.3	
Dibromochloromethane	so.4	38.4-62-S	54.9	
1 **,2-Dichlorobenzene**	21.1	**15.7-25.7**	24	
1,3-Dichlorobenzene	61.2	46.0-74.1	64	
1,4-Dichlorobenzene	6 3 . 3	**47.0-79.** I	67.2	
1, **1-Dichloroethane**	49.9	**36.1-64.9**	49.3	
1,2-Dichloroethane	81.2	**62.6-102**	85.9	
Ethylbenzene	105	78-O-128	106	
Methylene chloride	41.0	**27.9-54.1**	37.6	JV
4-Methy-2-pentanone (MIBK)	54.3	30.0-74.9	60.9	
Tetrachlorethylene	160	**118-195**	122	
Tolutnc	66.0	50.4-79.9	61.9	
1,1,1-Trichloroethane	91.5	64.6-l 10	90	
Trichloroethylene	32.2	24.0-39-O	31.1	
m,p-Xylene	67.4	**41.9-86.9**	68.6	
o-Xylene	47.0	**29.2-60.6**	47.4	

- Result not received.
* Result out of range.
E Result is between the sample-specific estimated quantitation limit and the method detection limit
J Result is an estimated quantity.
0 Surrogate spike recoveries are out of specification.
V Analyte was detected in both the sample and associated method blank.
NOTE: Ground water samples are unfiltered. General Engineering reported the results for metals as total recoverable metals.

Appendix C: Formats of the Data Files

Sample Data Format SAM93

This is the description of the SAM93 format for coding and transmitting sampling data records.

Name	Columns	Type	Description
Record format	1-8	Alphanumeric	SAM93 (The format of the data record).
Sample identification number	9-14	Integer	The number of the sample printed on the page of the sample logbook.
Sample collection date	15-20	Numeric	Sample collection date recorded using the MMDDYY format.
Sample collection time	21-24	Integer	Sample collection time recorded as military time.
Sample type	25	Alphanumeric	Sample type coded as: 1=normal 2=blank or standard 3=split 4=rinsate 5=duplicate 6=other.
Sample matrix	26	Alphanumeric	Sample matrix coded as: 1=soil 2=rock 3=sludge 4=water 5=sediment 6=other.
Delay check	27	Alphanumeric	Enter a *Y* if there was an unusual delay in bottling samples.
Sampler's initials	28-30	Alpha	Sampler's initials.
Associated sample	31-36	Integer	Sample identification of associated sample if this sample is a duplicate, split, rinsate, etc.

Alpha and alphanumeric entries must be left justified in the records; numeric entries must be right justified in the records. There will be no leading zeros except for dates and times.

Sample Data Format SAM93, Continued

Name	Columns	Type	Description
Planned sample name	37-46	Alphanumeric	Identification of the sample as it appears in the site work plan.
Sample name	47-56	Alphanumeric	Identification of the actual sample (includes any modification made in the field).
Planned top of interval	57-62	Numeric	Depth from the ground to the top of the planned sampling interval to the nearest 0.01 ft.
Top of interval	63-68	Numeric	Depth from the ground to the top of the actual sampling interval to the nearest 0.01 ft.
Planned bottom of interval	69-74	Numeric	Depth from the ground to the bottom of the planned sampling interval to the nearest 0.01 ft.
Bottom of interval	75-80	Numeric	Depth from the ground to the bottom of the actual sampling interval to the nearest 0.01 ft.
Soil moisture	81	Alphanumeric	Soil moisture coded as: 1=dry 2=damp 3=wet 4=sludge 5=liquid.
Munsell color	82-91	Alphanumeric	Munsell Color.
Secondary Munsell color	92-100	Alphanumeric	Secondary Munsell Color.
Soil classification	101-102	Alphanumeric	Unified Soil Classification.
Number of bottles	103-105	Integer	The number of bottle label numbers used during collection.
Insufficient recovery check	106	Alpha	Enter an *R* if insufficient material was recovered to perform all analyses.
Improper procedure check	107	Alpha	Enter a *P* if an improper sampling procedure was followed.

Alpha and alphanumeric entries must be left justified in the records; numeric entries must be right justified in the records. There will be no leading zeros except for dates and times.

Sample Data Format SAM93A

This is the description of the SAM93A format for coding and transmitting sample bottle data records.

Name	Columns	Type	Description
Record format	1-8	Alphanumeric	SAM93A (The format of the data record).
Sample identification number	9-14	Integer	The number of the sample printed on the page of the sample logbook.
Bottle label number	15-22	Integer	The number of the bottle label attached to the bottle.

Alpha and alphanumeric entries must be left justified in the records; numeric entries must be right justified in the records. There will be no leading zeros except for dates and times.

Station Data Format STA93

This is the description of the STA93 format for coding and transmitting station data records.

Name	Columns	Type	Description
Record format	1-8	Alphanumeric	STA93 (The format of the data record).
Station	10-16	Alphanumeric	The identification of the station (the facility identification and sampling point).
SRS north coordinate	21-30	Numeric	The SRS Grid north coordinate of the station reported in feet.
SRS east coordinate	32-41	Numeric	The SRS Grid each coordinate of the station reported in feet.
Ground elevation	44-49	Numeric	Ground ekvation reported in feet above median sea level (MSL).

Alpha and alphanumeric entries must be left justified in the records; numeric entries must be right justified in the records. There will be no leading zeros except for dates and times.

Chain-of-Custody Data Format COC93

This is the description of the COC93 format for coding and transmitting Chain-of-Custody data records. This format has been established by the Environmental Monitoring Section of the Environmental Protection Department of the Westinghouse Savannah River Company.

Name	Columns	Type	Description
Record format	1-8	Alphanumeric	COC93 (The format of the data record).
Sample identification number	9-18	Integer	The number of the sample printed on the page of the sample logbook.
Laboratory sample ID	19-33	Alphanumeric	Identifier used for the sample by the analytical laboratory.
Sample collection date	34-39	Numeric	Sample collection date recorded using the MMDDYY format.
Shipping date	40-45	Numeric	Sample shipping date recorded using the MMDDYY format.
Cooler identification	46-53	Alphanumeric	The number assigned to the cooler in which the samples are shipped to the analytical laboratory.
Sample temperature on receipt	54-57	Numeric	The temperature of the samples upon receipt at the analytical laboratory in degrees Centigrade.

Alpha and alphanumeric entries must be left justified in the records; numeric entries must be right justified in the records. There will be no leading zeros except for dates and times.

Analytical Data Format AN95

This is the description of the current version of the AN95 format for coding and transmitting analytical data records. This version is effective for reporting results for all samples that are collected on and after January 1, 1995 [first quarter 1995]. This format has been established by the Environmental Monitoring Section of the Environmental Protection Department of the Westinghouse Savannah River Company.

Name	Columns	Type*	Description♦
WSRC identifier**	1-12	Alphanumeric	WSRC identifier for the sample.
COC number	13-17	Alphanumeric	Identifier of the sample's chain-of-custody form. Required field for groundwater samples; not used for soil samples.
Sample collection**	18-23	Numeric	Date that the sample was collected. for laboratory blanks and QA samples, enter the preparation date. For TCLP samples, enter the date of the completion of TCLP sample generation.
Sample collection time	24-27	Numeric	Time of sample collection or generation.
Lab receipt date**	28-33	Numeric	Date that the sample was received by the laboratory. Leave blank for laboratory blanks and QA samples.
Extraction date	34-39	Numeric	Date that the sample extraction was started; leave blank unless the holding time is dependent upon the extraction time.
Extraction time	40-43	Numeric	Date that the sample extraction was started; leave blank unless the holding time is dependent upon the extraction time.
Extraction/digestion or preparation method	44-56	Alphanumeric	The coded identifier for the method used to perform the extraction, digestion or preparation (e.g., EPA###.#)
Analysis date**	57-62	Numeric	Date that the analyte concentration was determined.

* Alpha and alphanumeric entries must be left justified in the records; numeric entries must be right justified in the records.

♦ There will be no leading zeros except for dates and times. Dates should be in MMDDYY format; times in HHMM format.

** This field must have an entry for every record.

Analytical Data Format AN95, Continued

Name	Columns	Type*	Description◆
Analysis time**	63-66	Numeric	Time that the analyte concentration was determined.
Analysis method" *	67-79	Alphanumeric	The coded identifier for the method used to perform the analysis (e.g., EPA###.#)
Preparation batch	80-87	Alphanumeric	Identification of the sample preparation batch.
Laboratory**	88-89	Alphanumeric	Code assigned by EPD/EMS to identify the laboratory performing the analysis.
Laboratory sample ID**	90-104	Alphanumeric	Identifier used for the sample by the analytical laboratory.
Laboratory replicate	105-107	Alphanumeric	Indicates that the sample is a non-blind replicate analysis (codes attached to this document),
Analyte**	108-i 17	Alphanumeric	The coded identifier (provided by EPD/EMS) for the analyte.
Quantitation limit	118-125	Numeric	Both GE and Weston reported the sample-specific estimated quantitation limit (ssEQL) for non-radiochemistry analyses. All labs reported the minimum detectable activity (MDA) for radiochernistry analyses.
Result qualifier	126-128	Alphanumeric	The ceded field used to qualify the analytical result (reason codes attached to this document).
Analysis qualifier	129-13 1	Alphanumeric	The coded field used to qualify the analysis (reason codes attached to this document).
Bias of analysis	132	Alphanumeric	The coded field for data having result qualifiers of "J" or "R" specifying the expected bias (reason codes attached to this document).
Analytical result	133-142	Numeric	The concentration of the analyte. For non-detect, the ssEQL is reported. Results were reported on a dry weight basis for all analyses reported in per mass units.

* Alpha and alphanumeric entries must be left justified in the records; numeric entries must be right justified in the records.

◆ There will be no leading zeros except for dates and times. Dates should be in MMDDYY format; times in HHMM format.

** This field must have an entry for every record.

Analytical Data Format AN95, Continued

Name	Columns	Type*	Description♦
Result units**	143-146	Alpha	The coded identifier (provided by EPD/EMS) of the units in which the analytical result is expressed.
Accuracy	147-154	Numeric	The statistically determined value, 95% confidence level, representing a plus or minus value for the result and reported in the same units as the analytical result. Required for all radiochemical analyses above the detection limit but not generally reported for non-radiochemical analyses. Do not report more figures than are significant.
Residual weight	155-160	Numeric	The weight of material in mg on the planchet after evaporation; used for radionuclide determinations.
Nominal Concentration**	161-168	Numeric	The concentration of analyte added to the sample prior to analysis; reported in the same units as the analytical result; the value of zero must be entered if the sample was not spiked.
Percent recovery	169-174	Numeric	Recovery of the spiked constituent reported as a percentage.
Number of dilutions**	175	Numeric	The number of steps required to reach the final dilution factor; 0 if the sample was not diluted.
Dilution factor**	176-181	Numeric	The dilution used in the analysis; a value of 1 indicates the sample was not diluted.
Instrument**	182-189	Alphanumeric	The coded identifier for the instrument used to perform the analysis; each laboratory develops its own codes and provides the codes to EPD/EMS.
Instrument batch**	190-197	Alphanumeric	The number assigned by the analytical laboratory to the analysis batch (group of samples analyzed together in a single instrument run along with the associated QC samples).
Analyst's initials**	198-200	Alpha	The initials of the analyst.

* Alpha and alphanumeric entries must be left justified in the records; numeric entries must be right justified in the records.

♦ There will be no leading zeros except for dates and times. Dates should be in MMDDYY format; times in HHMM format.

** This field must have an entry for every record.

Analytical Data Format AN95, Continued

Name	Columns	Type*	Description ♦
Percent solids	201-205	Numeric	The percentage of the sample that is dry solids. Required field if result is reported in per mass units. Not applicable for water samples.
Bottle label number	206-215	Integer	The number on the bottle label. Required field if bottle label is numbered.
Sample fraction	216-219	Alphanumeric	The coded identifier (provided by EPD/EMS) for the fraction of the sample analyzed.
Validation status	220-221	Alphanumeric	The lab will report a zero ("0").
EPD/EMS receipt date	222-227	Numeric	The laboratory will leave this blank; date that the analytical data is received by EPD/EMS from the laboratory.

* Alpha and alphanumeric entries must be left justified in the records; numeric entries must be right justified in the records.

♦ There will be no leading zeros except for dates and times. Dates should be in MMDDYY format; times in HHMM format.

** This field must have an entry for every record.

WSRC Identifier for Groundwater Samples

Name	Columns	Type	Description
Well name			
Series name	1-3	Alpha	Name of the well series (except 241-H) from which the sample was collect; QA/QC laboratory deionized water samples will have LB (the first character is blank) as well series designation.
Cluster number	4-6	Numeric	Number of the cluster (except 241-H).
Well within cluster	7-8	Alphanumeric	Can be blank.
	9-10	Blank	Unused.
Duplicate ID	11	Alphanumeric	Assigned by field personnel to identify different sampling events occurring in one day.
Secondary identifier	12	Alphanumeric	Used as an alternate identifier by the Groundwater Monitoring (GM) group.

WSRC Identifier for Sediment, Core, and Surface Water Samples

Sample identification number	1-6	Numeric	The sample logbook page number.

Codes for Laboratory Replicates

When making entries in the laboratory replicate field (columns 105-107) use only the codes listed below.

Remark	Definition
(blank)	Data not remarked. The result is a routine analysis of a sample.
1	Laboratory replicate.
2A	Matrix spike.
2B	Matrix spike duplicate.
2C	Surrogate spike.
2D	Blank spike.
2E	Blank spike duplicate.
3	Laboratory blank.
4	Reanalysis of a sample at the request of EPD/EMS.
CCV	Continuing calibration verification sample.
CCB	Continuing calibration blank.
ICS	Interference check sample.
ICV	Initial calibration verification sample.
ICB	Initial calibration blank.

Codes for Fractions

When entering fraction codes in the fraction field (columns 216-219), use only the codes listed below.

Remark	Definition
(blank)	The sample was not fractionated prior to analysis.
A	Ashed fraction.
D	Dried fraction of a soil or sludge sample.
F	Liquid fraction passing through a filter was analyzed.
SL	Liquid fraction of a sample separated from the solid fraction.
SS	Suspended solids.
T	TCLP extraction.

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Appendix D: Data Tables

Abbreviations Used in the Tables

RQ	Result qualifier
AQ	Analysis qualifier
BQ	Bias qualifier
Q. Limit	Quantitation limit (sample detection limit)
sub., subst.	substituted

Qualifier Codes

Result Qualifiers

(blank)	Data not remarked. Value should be interpreted exactly as reported.
C	Calculated. Analytical result reported was not measured directly but was calculated from other data available. This does not apply to conversions, nor does it apply to calculations made as part of an analytical procedure.
D	Field measurement.
I	The value in the result field is the instrument reading, not the sample quantitation limit. Always used with the result qualifier U.
J	The analytical result is an estimated quantity.
L	Off-scale high. The actual value is not known, but is known to be greater than the value shown.
R	Rejected because performance requirements in the sample or associated quality control analysis were not met. The analyte may or may not be present.
U	Material analyzed for but not detected, The analyte concentration is less than the sample-specific estimated quantitation limit (ssEQL). NOTE: when both the result qualifier U and the result qualifier I are reported, the numerical value in the result field is the instrument reading rather than the ssEQL.

Analysis Qualifiers

A	GCMS Compound Identification: Relative Retention Time or mass spectra criteria were not met. Compound Identification: All anomalies
B	The result is below the sample quantitation limit and above or equal to the instrument detection limit.
C	Laboratory Control Sample: criteria were not met.
D	ICP Serial Dilution: Criteria were not met
E	The detected result is between the sample-specific EQL and the method detection limit. Report the actual result detected.
F	Pesticides Compound Identification: Pesticide result has been confirmed by Gas Chromatography/Mass Spectrometry (GC/MS).
G	Pesticides Instrument Performance: Use for all conditions outside criteria other than those flagged NJ (see code *N* below).
H	Internal Standards Performance: criteria not met.
I	Matrix Spike/Matrix Spike Duplicate: Spike recovery not within control limits.
K	Tentatively Identified Compounds: A tentatively identified compound is a suspected aldol-condensation product.
L	Calibration Criteria: Calibration criteria (initial or continuing) were not met. See also Z for inorganics.
M	GC/MS Tuning : Mass calibration not met.

N	Tentatively Identified Compounds: For all TIC results.
0	Surrogate Recovery: Surrogate spike recovery results are not within control limits.
P	Furnace Atomic Absorption QC: Duplicate injection precision criteria not met, or post-digestion spike recovery was not within control limits, but sample absorbance is greater than 50% of post-digestion spike absorbance.
Q	Holding Time: Sample held beyond normal holding time.
R	ICP Interference Check: Criteria are not met.
S	The reported value was determined by the method of standard additions.
V	Laboratory Blanks: Indicates the analyte was detected in both the sample and associated method blank.
W	Furnace Atomic Absorption QC: Post-digestion spike recovery for furnace atomic absorption (AA) analysis is not within control limits while sample absorbance is less than 50% of spike absorbance
X	Laboratory Duplicate Sample: Duplicate analysis relative percent difference (RPD) was not within control limits.
Y	Result obtained from unpreserved or improperly preserved sample.
Z	Atomic Absorption Calibration: Correlation coefficient was less than 0.995.
4	Matrix interference.
5	The analytical value was four times higher than the standard concentration, and percent recovery cannot be determined.
6	Indicates the analyte was detected in both the sample and associated field blank.
7	Indicates the analyte was detected in both the sample and associated rinsate or equipment blank.
8	Indicates the analyte was detected in both the sample and the associated trip blank.
9	Field Duplicate Sample Analysis relative percent difference was not within control limits.

Bias Qualifier

H	Analytical factor causing bias. The associated result may overestimate *the true* value.
L	Analytical factor causing bias. The associated result may underestimate the true value.

Codes for Fractions

(blank)	The sample was not fractionated prior to analysis.
A	Ashed fraction.
D	Dried fraction of a soil or sludge sample. Not for use with water samples.
F	Liquid fraction passing through a filter was analyzed.
SL	Liquid fraction of a sample separated from the solid fraction.
s s	Suspended solids.
T	TCLP extraction.

SAMPLE NAME: ABKSB0101 Sample ID: 102692

Location (SRS Coordinates): 50806E 103085N
Ground Elevation Above MSL: . ft
Depth of Core Interval: 0.00 to 1.00 ft
Sample Type: Normal Sample Matrix: Soil Sample Moisture: Dry
Sample Color: USC Soil Classification: Percent Solids: 95.0

Constituent	RQ	AQ	BQ	Result	Unit	Q. Limit	Method
Physical Parameters							
Cation Exchange Capacity	U			631	Meq/	631	EPA9081
Total Organic Carbon		V		1,580	mg/kg	60.0	LLOYDKAHN
Total Petroleum Hydrocarbons				11.8	mg/kg	11.2	EPA9071
TAL Inorganics							
Aluminum		V		5,890	mg/kg	18.7	EPA6010
Antimony	U			3.51	mg/kg	3.51	EPA6010
Arsenic	J	E		2.00	mg/kg	11.1	EPA6010
Barium				21.1	mg/kg	1.10	EPA6010
Beryllium		V		0.202	mg/kg	0.251	EPA6010
Cadmium	J	E		0.191	mg/kg	0.401	EPA6010
Calcium		V		186	mg/kg	16.9	EPA6010
Chromium				7.70	mg/kg	0.903	EPA6010
Cobalt				1.10	mg/kg	0.802	EPA6010
Copper				2.00	mg/kg	1.00	EPA6010
Cyanide	U			0.800	mg/kg	0.800	EPA9010
Iron				6,230	mg/kg	22.0	EPA6010
Lead				6.60	mg/kg	5.92	EPA6010
Magnesium				113	mg/kg	8.73	EPA6010
Manganese				75.5	mg/kg	0.201	EPA6010
Mercury	J	E		0.0390	mg/kg	0.140	EPA7471
Nickel				1.80	mg/kg	1.71	EPA6010
Potassium				73.5	mg/kg	67.2	EPA6010
Selenium	U			10.4	mg/kg	10.4	EPA6010
Silver	U			0.903	mg/kg	0.903	EPA6010
Sodium	J	E		39.5	mg/kg	129	EPA6010
Thallium	U			8.53	mg/kg	8.53	EPA6010
Vanadium				16.0	mg/kg	0.702	EPA6010
Zinc				30.9	mg/kg	16.1	EPA6010
Semivolatiles							
1,2,4-Trichlorobenzene	U			351	µg/kg	351	EPA8270
1,2-Dichlorobenzene	U			351	µg/kg	351	EPA8270
1,3-Dichlorobenzene	U			351	µg/kg	351	EPA8270
1,4-Dichlorobenzene	U			351	µg/kg	351	EPA8270
2,4,5-Trichlorophenol	U			1,760	µg/kg	1,760	EPA8270
2,4,6-Trichlorophenol	U			351	µg/kg	351	EPA8270
2,4-Dichlorophenol	U			351	µg/kg	351	EPA8270
2,4-Dimethyl phenol	U			351	µg/kg	351	EPA8270
2,4-Dinitrophenol	U			1,760	µg/kg	1,760	EPA8270
2,4-Dinitrotoluene	U			351	µg/kg	351	EPA8270
2,6-Dinitrotoluene	U			351	µg/kg	351	EPA8270

SAMPLE NAME: ABKSB0101 (continued) Sample ID: 102692

Constituent	RQ	AQ	BQ	Result	Unit	Q. Limit	Method
Semivolatiles							
2-Chloronaphthalene	U			351	µg/kg	351	EPA8270
2-Chlorophenol	U			351	µg/kg	351	EPA8270
2-Methyl-4,6-dinitrophenol	U			1,760	µg/kg	1,760	EPA8270
2-Methylnaphthalene	U			351	µg/kg	351	EPA8270
2-Nitroaniline	U			1,760	µg/kg	1,760	EPA8270
2-Nitrophenol	U			351	µg/kg	351	EPA8270
3,3'-Dichlorobenzidine	U			702	µg/kg	702	EPA8270
3-Nitroaniline	U			1,760	µg/kg	1,760	EPA8270
4-Bromophenyl phenyl ether	U			351	µg/kg	351	EPA8270
4-Chloro-3-methylphenol (p-chloro-m-cresol)	U			351	µg/kg	351	EPA8270
4-Chloroaniline	U			351	µg/kg	351	EPA8270
4-Chlorophenyl phenyl ether	U			351	µg/kg	351	EPA8270
4-Nitroaniline	U			1,760	µg/kg	1,760	EPA8270
4-Nitrophenol	U			1,760	µg/kg	1,760	EPA8270
Acenapthene	U			351	µg/kg	351	EPA8270
Acenapthylene	U			351	µg/kg	351	EPA8270
Anthracene	U			351	µg/kg	351	EPA8270
Benzo(a)anthracene	U			351	µg/kg	351	EPA8270
Benzo(a)pyrene	U			351	µg/kg	351	EPA8270
Benzo(b)fluoranthene	U			351	µg/kg	351	EPA8270
Benzo(g,h,i)perylene	U			351	µg/kg	351	EPA8270
Benzo(k)fluoranthene	U			351	µg/kg	351	EPA8270
Benzoic acid	U			1,760	µg/kg	1,760	EPA8270
Benzyl alcohol	U			351	µg/kg	351	EPA8270
Bis(2-chloroethoxy) methane	U			351	µg/kg	351	EPA8270
Bis(2-chloroethyl) ether	U			351	µg/kg	351	EPA8270
Bis(2-chloroisopropyl) ether	U			351	µg/kg	351	EPA8270
Bis(2-ethylhexyl) phthalate	U			351	µg/kg	351	EPA8270
Butyl benzyl phthalate	U			351	µg/kg	351	EPA8270
Chrysene	U			351	µg/kg	351	EPA8270
Di-n-butyl phthalate	U			351	µg/kg	351	EPA8270
Di-n-octyl phthalate	U			351	µg/kg	351	EPA8270
Dibenzo(a,h)anthracene	U			351	µg/kg	351	EPA8270
Dibenzofuran	U			351	µg/kg	351	EPA8270
Diethyl phthalate	U			351	µg/kg	351	EPA8270
Dimethyl phthalate	U			351	µg/kg	351	EPA8270
Fluoranthene	U			351	µg/kg	351	EPA8270
Fluorene	U			351	µg/kg	351	EPA8270
Hexachlorobenzene	U			351	µg/kg	351	EPA8270
Hexachlorobutadiene	U			351	µg/kg	351	EPA8270
Hexachlorocyclopentadiene	U			351	µg/kg	351	EPA8270
Hexachloroethane	U			351	µg/kg	351	EPA8270
Indeno(1,2,3-c,d)pyrene	U			351	µg/kg	351	EPA8270
Isophorone	U			351	µg/kg	351	EPA8270
N-Nitrosodi-n-propylamine	U			351	µg/kg	351	EPA8270
N-Nitrosodiphenylamine	U			351	µg/kg	351	EPA8270
Naphthalene	U			351	µg/kg	351	EPA8270
Nitrobenzene	U			351	µg/kg	351	EPA8270
Pentachlorophenol	U			1,760	µg/kg	1,760	EPA8270

SAMPLE NAME: ABKSB0101 (continued) Sample ID: 102692

Constituent	RQ	AQ	BQ	Result	Unit	Q. Limit	Method
Semivolatiles							
Phenanthrene	U			351	µg/kg	351	EPA8270
Phenol	U			351	µg/kg	351	EPA8270
Pyrene	U			351	µg/kg	351	EPA8270
Unknown	J	N		200	µg/kg	.	EPA8270
o-cresol (2-methylphenol)	U			351	µg/kg	351	EPA8270
p-cresol (4-methylphenol)	U			351	µg/kg	351	EPA8270
Volatiles							
1,1,1-Trichloroethane	J	E		1.84	µg/kg	5.50	EPA8240
1,1,2,2-Tetrachloroethane	U			5.50	µg/kg	5.50	EPA8240
1,1,2-Trichloroethane	U			5.50	µg/kg	5.50	EPA8240
1,1-Dichloroethane	U			5.50	µg/kg	5.50	EPA8240
1,1-Dichloroethene	U			5.50	µg/kg	5.50	EPA8240
1,2-Dichloroethane	U			5.50	µg/kg	5.50	EPA8240
1,2-Dichloroethene (total)	U			5.50	µg/kg	5.50	EPA8240
1,2-Dichloropropane	U			5.50	µg/kg	5.50	EPA8240
2-Butanone (MEK)	U			11.0	µg/kg	11.0	EPA8240
2-Hexanone	U			11.0	µg/kg	11.0	EPA8240
4-Methyl-2-pentanone	U			11.0	µg/kg	11.0	EPA8240
Acetone	U	V		14.6	µg/kg	11.0	EPA8240
Benzene	U			5.50	µg/kg	5.50	EPA8240
Bromodichloromethane	U			5.50	µg/kg	5.50	EPA8240
Bromoform	U			5.50	µg/kg	5.50	EPA8240
Bromomethane (Methyl bromide)	U			11.0	µg/kg	11.0	EPA8240
Carbon disulfide	U			5.50	µg/kg	5.50	EPA8240
Carbon tetrachloride	U			5.50	µg/kg	5.50	EPA8240
Chlorobenzene	U			5.50	µg/kg	5.50	EPA8240
Chlorodibromomethane	U			5.50	µg/kg	5.50	EPA8240
Chloroethane	U			11.0	µg/kg	11.0	EPA8240
Chloroform	U			5.50	µg/kg	5.50	EPA8240
Chloromethane (methyl chloride)	U			11.0	µg/kg	11.0	EPA8240
Dichloromethane (methylene chloride)	U	V		3.03	µg/kg	5.50	EPA8240
Ethylbenzene	U			5.50	µg/kg	5.50	EPA8240
Styrene	U			5.50	µg/kg	5.50	EPA8240
Tetrachloroethene				7.71	µg/kg	5.50	EPA8240
Toluene	U			5.50	µg/kg	5.50	EPA8240
Trichloroethene (TCE)	U			5.50	µg/kg	5.50	EPA8240
Vinyl acetate	U			11.0	µg/kg	11.0	EPA8240
Vinyl chloride	U			11.0	µg/kg	11.0	EPA8240
Xylenes (total)	U			5.50	µg/kg	5.50	EPA8240
cis-1,3-Dichloropropene	U			5.50	µg/kg	5.50	EPA8240
trans-1,3-Dichloropropene	U			5.50	µg/kg	5.50	EPA8240
Pesticides/PCBs							
Aldrin	U			1.75	µg/kg	1.75	EPA8081
Aroclor 1016	U			35.1	µg/kg	35.1	EPA8081
Aroclor 1221	U			70.2	µg/kg	70.2	EPA8081
Aroclor 1232	U			35.1	µg/kg	35.1	EPA8081

SAMPLE NAME: ABKSB0101 (continued) **Sample ID:** 102692

Constituent	RQ	AQ	BQ	Result	Unit	Q. Limit	Method
Pesticides/PCBs							
Aroclor 1242	U			35.1	µg/kg	35.1	EPA8081
Aroclor 1248	U			35.1	µg/kg	35.1	EPA8081
Aroclor 1254	U			35.1	µg/kg	35.1	EPA8081
Aroclor 1260	U			35.1	µg/kg	35.1	EPA8081
Dieldrin	U			3.51	µg/kg	3.51	EPA8081
Endosulfan I	U			1.75	µg/kg	1.75	EPA8081
Endosulfan II	U			3.51	µg/kg	3.51	EPA8081
Endosulfan sulfate	U			3.51	µg/kg	3.51	EPA8081
Endrin	U			3.51	µg/kg	3.51	EPA8081
Endrin ketone	U			3.51	µg/kg	3.51	EPA8081
Heptachlor	U			1.75	µg/kg	1.75	EPA8081
Heptachlor epoxide	U			1.75	µg/kg	1.75	EPA8081
Methoxychlor (Mariate)	U			17.5	µg/kg	17.5	EPA8081
Toxaphene	U			175	µg/kg	175	EPA8081
alpha-Benzene hexachloride	U			1.75	µg/kg	1.75	EPA8081
alpha-Chlordane	U			1.75	µg/kg	1.75	EPA8081
beta-Benzene hexachloride	U			1.75	µg/kg	1.75	EPA8081
delta-Benzene hexachloride	U			1.75	µg/kg	1.75	EPA8081
gamma-Benzene hexachloride (Lindane)	U			1.75	µg/kg	1.75	EPA8081
gamma-Chlordane	U			1.75	µg/kg	1.75	EPA8081
p,p'-DDD	U			3.51	µg/kg	3.51	EPA8081
p,p'-DDE	U			3.51	µg/kg	3.51	EPA8081
p,p'-DDT	U			3.51	µg/kg	3.51	EPA8081
Radionuclides							
Gross Alpha		V		14.3	pC/g	2.92	LANLMLR100MOD
Non-volatile Beta	UI			0.610	pC/g	1.79	LANLMLR100MOD

SAMPLE NAME: ABKSB0102 **Sample ID:** 102694

Location (SRS Coordinates): 50806E 103085N
Ground Elevation Above MSL: . ft
Depth of Core Interval: 1.00 to 4.00 ft
Sample Type: Normal
Sample Color:
Sample Matrix: Soil
USC Soil Classification:
Sample Moisture: Dry
Percent Solids: 89.6

Constituent	RQ	AQ	BQ	Result	Unit	Q. Limit	Method
Physical Parameters							
Cation Exchange Capacity	U			670	Meq/	670	EPA9081
Total Organic Carbon		V		849	mg/kg	60.0	LLOYDKAHN
Total Petroleum Hydrocarbons				12.6	mg/kg	11.9	EPA9071

SAMPLE NAME: ABKSB0102 (continued) Sample ID: 102694

Constituent	RQ	AQ	BQ	Result	Unit	Q. Limit	Method
TAL Metals							
Aluminum		V		16,200	mg/kg	20.6	EPA6010
Antimony	J	E		0.445	mg/kg	3.87	EPA6010
Arsenic	J	E		3.00	mg/kg	12.3	EPA6010
Barium				43.9	mg/kg	1.22	EPA6010
Beryllium		V		0.407	mg/kg	0.276	EPA6010
Cadmium	J	E		0.236	mg/kg	0.442	EPA6010
Calcium		V		329	mg/kg	18.6	EPA6010
Chromium				13.4	mg/kg	0.994	EPA6010
Cobalt				1.80	mg/kg	0.884	EPA6010
Copper				3.50	mg/kg	1.10	EPA6010
Cyanide	U			0.850	mg/kg	0.850	EPA9010
Iron				9,870	mg/kg	24.2	EPA6010
Lead				8.60	mg/kg	6.52	EPA6010
Magnesium				222	mg/kg	9.61	EPA6010
Manganese				46.6	mg/kg	0.221	EPA6010
Mercury	J	E		0.0820	mg/kg	0.149	EPA7471
Nickel				4.00	mg/kg	1.88	EPA6010
Potassium				165	mg/kg	74.0	EPA6010
Selenium	U			11.5	mg/kg	11.5	EPA6010
Silver	U			0.994	mg/kg	0.994	EPA6010
Sodium	J	E		21.1	mg/kg	143	EPA6010
Thallium	U			9.39	mg/kg	9.39	EPA6010
Vanadium				24.1	mg/kg	0.774	EPA6010
Zinc	J	E		7.70	mg/kg	17.8	EPA6010
Semivolatiles							
1,2,4-Trichlorobenzene	U			372	µg/kg	372	EPA8270
1,2-Dichlorobenzene	U			372	µg/kg	372	EPA8270
1,3-Dichlorobenzene	U			372	µg/kg	372	EPA8270
1,4-Dichlorobenzene	U			372	µg/kg	372	EPA8270
2,4,5-Trichlorophenol	U			1,860	µg/kg	1,860	EPA8270
2,4,6-Trichlorophenol	U			372	µg/kg	372	EPA8270
2,4-Dichlorophenol	U			372	µg/kg	372	EPA8270
2,4-Dimethyl phenol	U			372	µg/kg	372	EPA8270
2,4-Dinitrophenol	U			1,860	µg/kg	1,860	EPA8270
2,4-Dinitrotoluene	U			372	µg/kg	372	EPA8270
2,6-Dinitrotoluene	U			372	µg/kg	372	EPA8270
2-Chloronaphthalene	U			372	µg/kg	372	EPA8270
2-Chlorophenol	U			372	µg/kg	372	EPA8270
2-Methyl-4,6-dinitrophenol	U			1,860	µg/kg	1,860	EPA8270
2-Methylnaphthalene	U			372	µg/kg	372	EPA8270
2-Nitroaniline	U			1,860	µg/kg	1,860	EPA8270
2-Nitrophenol	U			372	µg/kg	372	EPA8270
3,3'-Dichlorobenzidine	U			744	µg/kg	744	EPA8270
3-Nitroaniline	U			1,860	µg/kg	1,860	EPA8270
4-Bromophenyl phenyl ether	U			372	µg/kg	372	EPA8270
4-Chloro-3-methylphenol (p-chloro-m-cresol)	U			372	µg/kg	372	EPA8270
4-Chloroaniline	U			372	µg/kg	372	EPA8270

SAMPLE NAME: ABKSB0102 (continued) Sample ID: 102694

Constituent	RQ	AQ	BQ	Result	Unit	Q. Limit	Method
Semivolatiles							
4-Chlorophenyl phenyl ether	U			372	µg/kg	372	EPA8270
4-Nitroaniline	U			1,860	µg/kg	1,860	EPA8270
4-Nitrophenol	U			1,860	µg/kg	1,860	EPA8270
Acenapthene	U			372	µg/kg	372	EPA8270
Acenapthylene	U			372	µg/kg	372	EPA8270
Aldol condensate	J	KN		500	µg/kg		EPA8270
Anthracene	U			372	µg/kg	372	EPA8270
Benzo(a)anthracene	U			372	µg/kg	372	EPA8270
Benzo(a)pyrene	U			372	µg/kg	372	EPA8270
Benzo(b)fluoranthene	U			372	µg/kg	372	EPA8270
Benzo(g,h,i)perylene	U			372	µg/kg	372	EPA8270
Benzo(k)fluoranthene	U			372	µg/kg	372	EPA8270
Benzoic acid	U			1,860	µg/kg	1,860	EPA8270
Benzyl alcohol	U			372	µg/kg	372	EPA8270
Bis(2-chloroethoxy) methane	U			372	µg/kg	372	EPA8270
Bis(2-chloroethyl) ether	U			372	µg/kg	372	EPA8270
Bis(2-chloroisopropyl) ether	U			372	µg/kg	372	EPA8270
Bis(2-ethylhexyl) phthalate	U			372	µg/kg	372	EPA8270
Butyl benzyl phthalate	U			372	µg/kg	372	EPA8270
Chrysene	U			372	µg/kg	372	EPA8270
Di-n-butyl phthalate	U			372	µg/kg	372	EPA8270
Di-n-octyl phthalate	U			372	µg/kg	372	EPA8270
Dibenzo(a,h)anthracene	U			372	µg/kg	372	EPA8270
Dibenzofuran	U			372	µg/kg	372	EPA8270
Diethyl phthalate	U			372	µg/kg	372	EPA8270
Dimethyl phthalate	U			372	µg/kg	372	EPA8270
Fluoranthene	U			372	µg/kg	372	EPA8270
Fluorene	U			372	µg/kg	372	EPA8270
Hexachlorobenzene	U			372	µg/kg	372	EPA8270
Hexachlorobutadiene	U			372	µg/kg	372	EPA8270
Hexachlorocyclopentadiene	U			372	µg/kg	372	EPA8270
Hexachloroethane	U			372	µg/kg	372	EPA8270
Indeno(1,2,3-c,d)pyrene	U			372	µg/kg	372	EPA8270
Isophorone	U			372	µg/kg	372	EPA8270
N-Nitrosodi-n-propylamine	U			372	µg/kg	372	EPA8270
N-Nitrosodiphenylamine	U			372	µg/kg	372	EPA8270
Naphthalene	U			372	µg/kg	372	EPA8270
Nitrobenzene	U			372	µg/kg	372	EPA8270
Pentachlorophenol	U			1,860	µg/kg	1,860	EPA8270
Phenanthrene	U			372	µg/kg	372	EPA8270
Phenol	U			372	µg/kg	372	EPA8270
Pyrene	U			372	µg/kg	372	EPA8270
o-cresol (2-methylphenol)	U			372	µg/kg	372	EPA8270
p-cresol (4-methylphenol)	U			372	µg/kg	372	EPA8270

SAMPLE NAME: ABKSB0102 (continued) Sample ID: 102694

Constituent	RQ	AQ	BQ	Result	Unit	Q. Limit	Method
Volatiles							
1,1,1-Trichloroethane	U			5.50	µg/kg	5.50	EPA8240
1,1,2,2-Tetrachloroethane	U			5.50	µg/kg	5.50	EPA8240
1,1,2-Trichloroethane	U			5.50	µg/kg	5.50	EPA8240
1,1-Dichloroethane	U			5.50	µg/kg	5.50	EPA8240
1,1-Dichloroethene	U			5.50	µg/kg	5.50	EPA8240
1,2-Dichloroethane	U			5.50	µg/kg	5.50	EPA8240
1,2-Dichloroethene (total)	U			5.50	µg/kg	5.50	EPA8240
1,2-Dichloropropane	U			5.50	µg/kg	5.50	EPA8240
2-Butanone (MEK)	U			11.0	µg/kg	11.0	EPA8240
2-Hexanone	U			11.0	µg/kg	11.0	EPA8240
4-Methyl-2-pentanone	U			11.0	µg/kg	11.0	EPA8240
Acetone	U			11.0	µg/kg	11.0	EPA8240
Benzene	U			5.50	µg/kg	5.50	EPA8240
Bromodichloromethane	U			5.50	µg/kg	5.50	EPA8240
Bromoform	U			5.50	µg/kg	5.50	EPA8240
Bromomethane (Methyl bromide)	U			11.0	µg/kg	11.0	EPA8240
Carbon disulfide	U			5.50	µg/kg	5.50	EPA8240
Carbon tetrachloride	U			5.50	µg/kg	5.50	EPA8240
Chlorobenzene	U			5.50	µg/kg	5.50	EPA8240
Chlorodibromomethane	U			5.50	µg/kg	5.50	EPA8240
Chloroethane	U			11.0	µg/kg	11.0	EPA8240
Chloroform	U			5.50	µg/kg	5.50	EPA8240
Chloromethane (methyl chloride)	U			11.0	µg/kg	11.0	EPA8240
Dichloromethane (methylene chloride)	U	V		2.72	µg/kg	5.50	EPA8240
Ethylbenzene	U			5.50	µg/kg	5.50	EPA8240
Styrene	U			5.50	µg/kg	5.50	EPA8240
Tetrachloroethene	J	E		3.68	µg/kg	5.50	EPA8240
Toluene	U			5.50	µg/kg	5.50	EPA8240
Trichloroethene (TCE)	U			5.50	µg/kg	5.50	EPA8240
Vinyl acetate	U			11.0	µg/kg	11.0	EPA8240
Vinyl chloride	U			11.0	µg/kg	11.0	EPA8240
Xylenes (total)	U			5.50	µg/kg	5.50	EPA8240
cis-1,3-Dichloropropene	U			5.50	µg/kg	5.50	EPA8240
trans-1,3-Dichloropropene	U			5.50	µg/kg	5.50	EPA8240
Pesticides/PCBs							
Aldrin	U			1.86	µg/kg	1.86	EPA8081
Aroclor 1016	U			37.2	µg/kg	37.2	EPA8081
Aroclor 1221	U			74.4	µg/kg	74.4	EPA8081
Aroclor 1232	U			37.2	µg/kg	37.2	EPA8081
Aroclor 1242	U			37.2	µg/kg	37.2	EPA8081
Aroclor 1248	U			37.2	µg/kg	37.2	EPA8081
Aroclor 1254	U			37.2	µg/kg	37.2	EPA8081
Aroclor 1260	U			37.2	µg/kg	37.2	EPA8081
Dieldrin	U			3.72	µg/kg	3.72	EPA8081
Endosulfan I	U			1.86	µg/kg	1.86	EPA8081
Endosulfan II	U			3.72	µg/kg	3.72	EPA8081
Endosulfan sulfate	U			3.72	µg/kg	3.72	EPA8081
Endrin	U			3.72	µg/kg	3.72	EPA8081

SAMPLE NAME: ABKSB0102 (continued) **Sample ID:** 102694

Constituent	RQ	AQ	BQ	Result	Unit	Q. Limit	Method
Pesticides/PCBs							
Endrin ketone	U			3.72	µg/kg	3.72	EPA8081
Heptachlor	U			1.86	µg/kg	1.86	EPA8081
Heptachlor epoxide	U			1.86	µg/kg	1.86	EPA8081
Methoxychlor (Mariate)	U			18.6	µg/kg	18.6	EPA8081
Toxaphene	U			186	µg/kg	186	EPA8081
alpha-Benzene hexachloride	U			1.86	µg/kg	1.86	EPA8081
alpha-Chlordane	U			1.86	µg/kg	1.86	EPA8081
beta-Benzene hexachloride	U			1.86	µg/kg	1.86	EPA8081
delta-Benzene hexachloride	U			1.86	µg/kg	1.86	EPA8081
gamma-Benzene hexachloride (Lindane)	U			1.86	µg/kg	1.86	EPA8081
gamma-Chlordane	U			1.86	µg/kg	1.86	EPA8081
p,p'-DDD	U			3.72	µg/kg	3.72	EPA8081
p,p'-DDE	U			3.72	µg/kg	3.72	EPA8081
p,p'-DDT	U			3.72	µg/kg	3.72	EPA8081
Radionuclides							
Gross Alpha		V		5.10	pC/g	2.89	LANLMLR100MOD
Non-volatile Beta				6.88	pC/g	1.73	LANLMLR100MOD

SAMPLE NAME: ABKSB0102D **Sample ID:** 102695

Sample Type: Split **Associated Sample:** 102694

Constituent	RQ	AQ	BQ	Result	Unit	Q. Limit	Method
Physical Parameters							
Cation Exchange Capacity				55.4	Meq/	5.00	EPA9081
Total Organic Carbon				1,350	mg/kg	100	EPA415.1
Total Petroleum Hydrocarbons	UJ	C		11.0	mg/kg	11.0	EPA418.1
TAL Metals							
Aluminum	J	VC		9,960	mg/kg	13.5	EPA6010A
Antimony	UJ	C		5.39	mg/kg	5.39	EPA6010A
Arsenic	U			16.2	mg/kg	16.2	EPA6010A
Barium				43.3	mg/kg	1.35	EPA6010A
Beryllium	J	E		0.314	mg/kg	0.539	EPA6010A
Cadmium	U			0.269	mg/kg	0.269	EPA6010A
Calcium		V		312	mg/kg	13.5	EPA6010A
Chromium				7.60	mg/kg	1.35	EPA6010A
Cobalt				0.924	mg/kg	0.539	EPA6010A
Copper	J	E		1.24	mg/kg	1.35	EPA6010A
Cyanide	UJ	VC		158	µg/kg	549	EPA335.3
Iron	J	VC		6,920	mg/kg	5.39	EPA6010A
Lead				8.35	mg/kg	5.39	EPA6010A
Magnesium				136	mg/kg	5.39	EPA6010A
Manganese				40.2	mg/kg	0.539	EPA6010A

SAMPLE NAME: ABKSB0102D (continued) Sample ID: 102695

Constituent	RQ	AQ	BQ	Result	Unit	Q. Limit	Method
TAL Metals							
Mercury				0.0864	mg/kg	0.0359	EPA7471
Nickel				2.11	mg/kg	1.35	EPA6010A
Potassium	J	E		95.4	mg/kg	108	EPA6010A
Selenium	U			16.2	mg/kg	16.2	EPA6010A
Silver	U			1.35	mg/kg	1.35	EPA6010A
Sodium	J	EC		8.50	mg/kg	53.9	EPA6010A
Thallium	J	EC		3.08	mg/kg	16.2	EPA6010A
Vanadium				17.6	mg/kg	0.539	EPA6010A
Zinc		V		3.54	mg/kg	1.08	EPA6010A
Semivolatiles							
1,2,4-Trichlorobenzene	U			3.66	µg/kg	3.66	EPA8270
1,2-Dichlorobenzene	U			36.6	µg/kg	36.6	EPA8270
1,3-Dichlorobenzene	U			36.6	µg/kg	36.6	EPA8270
1,4-Dichlorobenzene	U			36.6	µg/kg	36.6	EPA8270
2,4,5-Trichlorophenol	U			36.6	µg/kg	36.6	EPA8270
2,4,6-Trichlorophenol	U			36.6	µg/kg	36.6	EPA8270
2,4-Dichlorophenol	U			36.6	µg/kg	36.6	EPA8270
2,4-Dimethyl phenol	U			36.6	µg/kg	36.6	EPA8270
2,4-Dinitrophenol	U			366	µg/kg	366	EPA8270
2,4-Dinitrotoluene	U			3.66	µg/kg	3.66	EPA8270
2,6-Dinitrotoluene	U			3.66	µg/kg	3.66	EPA8270
2-Chloronaphthalene	U			36.6	µg/kg	36.6	EPA8270
2-Chlorophenol	U			36.6	µg/kg	36.6	EPA8270
2-Methyl-4,6-dinitrophenol	U			366	µg/kg	366	EPA8270
2-Methylnaphthalene	U			36.6	µg/kg	36.6	EPA8270
2-Nitroaniline	U			36.6	µg/kg	36.6	EPA8270
2-Nitrophenol	U			36.6	µg/kg	36.6	EPA8270
3.3'-Dichlorobenzidine	U			36.6	µg/kg	36.6	EPA8270
3-Nitroaniline	U			36.6	µg/kg	36.6	EPA8270
4-Bromophenyl phenyl ether	U			36.6	µg/kg	36.6	EPA8270
4-Chloro-3-methylphenol (p-chloro-m-cresol)	U			36.6	µg/kg	36.6	EPA8270
4-Chloroaniline	U			36.6	µg/kg	36.6	EPA8270
4-Chlorophenyl phenyl ether	U			36.6	µg/kg	36.6	EPA8270
4-Nitroaniline	U			36.6	µg/kg	36.6	EPA8270
4-Nitrophenol	U			36.6	µg/kg	36.6	EPA8270
Acenapthene	U			36.6	µg/kg	36.6	EPA8270
Acenapthylene	U			36.6	µg/kg	36.6	EPA8270
Anthracene	U			36.6	µg/kg	36.6	EPA8270
Benzo(a)anthracene	U			3.66	µg/kg	3.66	EPA8270
Benzo(a)pyrene	U			3.66	µg/kg	3.66	EPA8270
Benzo(b)fluoranthene	U			3.66	µg/kg	3.66	EPA8270
Benzo(g,h,i)perylene	U			36.6	µg/kg	36.6	EPA8270
Benzo(k)fluoranthene	U			3.66	µg/kg	3.66	EPA8270
Benzoic acid	U			36.6	µg/kg	36.6	EPA8270
Benzyl alcohol	U			36.6	µg/kg	36.6	EPA8270
Bis(2-chloroethoxy) methane	U			36.6	µg/kg	36.6	EPA8270
Bis(2-chloroethyl) ether	U			36.6	µg/kg	36.6	EPA8270

SAMPLE NAME: ABKSB0102D (continued) Sample ID: 102695

Constituent	RQ	AQ	BQ	Result	Unit	Q. Limit	Method
Semivolatiles							
Bis(2-chloroisopropyl) ether	U			36.6	µg/kg	36.6	EPA8270
Bis(2-ethylhexyl) phthalate	U			36.6	µg/kg	36.6	EPA8270
Butyl benzyl phthalate	U			36.6	µg/kg	36.6	EPA8270
Chrysene	U			3.66	µg/kg	3.66	EPA8270
Di-n-butyl phthalate	J	E		27.4	µg/kg	36.6	EPA8270
Di-n-octyl phthalate	J	E		21.9	µg/kg	36.6	EPA8270
Dibenzo(a,h)anthracene	U			3.66	µg/kg	3.66	EPA8270
Dibenzofuran	U			36.6	µg/kg	36.6	EPA8270
Diethyl phthalate	U			36.6	µg/kg	36.6	EPA8270
Dimethyl phthalate	U			36.6	µg/kg	36.6	EPA8270
Fluoranthene	U			36.6	µg/kg	36.6	EPA8270
Fluorene	U			36.6	µg/kg	36.6	EPA8270
Hexachlorobenzene	U			3.66	µg/kg	3.66	EPA8270
Hexachlorobutadiene	U			36.6	µg/kg	36.6	EPA8270
Hexachlorocyclopentadiene	U			36.6	µg/kg	36.6	EPA8270
Hexachloroethane	U			3.66	µg/kg	3.66	EPA8270
Indeno(1,2,3-c,d)pyrene	U			3.66	µg/kg	3.66	EPA8270
Isophorone	U			36.6	µg/kg	36.6	EPA8270
N-Nitrosodi-n-propylamine	U			36.6	µg/kg	36.6	EPA8270
N-Nitrosodiphenylamine	U			36.6	µg/kg	36.6	EPA8270
Naphthalene	U			36.6	µg/kg	36.6	EPA8270
Nitrobenzene	U			36.6	µg/kg	36.6	EPA8270
Pentachlorophenol	U			36.6	µg/kg	36.6	EPA8270
Phenanthrene	U			36.6	µg/kg	36.6	EPA8270
Phenol	U			36.6	µg/kg	36.6	EPA8270
Pyrene	U	V		36.6	µg/kg	36.6	EPA8270
Unknown hydrocarbon	J	N		5.56	mg/kg		EPA8270
m,p-Cresol	U			366	µg/kg	366	EPA8270
o-cresol (2-methylphenol)	U			36.6	µg/kg	36.6	EPA8270
Volatiles							
1,1,1-Trichloroethane	UJ	QO	H	0.0549	µg/kg	0.0549	EPA8260
1,1,2,2-Tetrachloroethane	UJ	QO	H	0.0549	µg/kg	0.0549	EPA8260
1,1,2-Trichloroethane	UJ	QO	H	0.0549	µg/kg	0.0549	EPA8260
1,1-Dichloroethane	UJ	QO	H	0.0549	µg/kg	0.0549	EPA8260
1,1-Dichloroethene	UJ	QO	H	0.0549	µg/kg	0.0549	EPA8260
1,2-Dichloroethane	UJ	QO	H	0.0549	µg/kg	0.0549	EPA8260
1,2-Dichloroethene (total)	UJ	QO	H	0.110	µg/kg	0.110	EPA8260
1,2-Dichloropropane	UJ	QO	H	0.0549	µg/kg	0.0549	EPA8260
2-Butanone (MEK)	UJ	QO	H	1.10	µg/kg	1.10	EPA8260
2-Hexanone	UJ	QO	H	1.10	µg/kg	1.10	EPA8260
4-Methyl-2-pentanone	UJ	QO	H	1.10	µg/kg	1.10	EPA8260
Acetone	J	EQO	H	5.18	µg/kg	5.49	EPA8260
Benzene	UJ	QO	H	0.549	µg/kg	0.549	EPA8260
Bromodichloromethane	UJ	QO	H	0.0549	µg/kg	0.0549	EPA8260
Bromoform	UJ	QO	H	0.0549	µg/kg	0.0549	EPA8260
Bromomethane (Methyl bromide)	UJ	QO	H	0.110	µg/kg	0.110	EPA8260
Carbon disulfide	UJ	QO	H	1.10	µg/kg	1.10	EPA8260
Carbon tetrachloride	UJ	QO	H	0.0549	µg/kg	0.0549	EPA8260

SAMPLE NAME: ABKSB0102D (continued) Sample ID: 102695

Constituent	RQ	AQ	BQ	Result	Unit	Q. Limit	Method
Volatiles							
Chlorobenzene	UJ	QO	H	0.0549	µg/kg	0.0549	EPA8260
Chlorodibromomethane	UJ	QO	H	0.0549	µg/kg	0.0549	EPA8260
Chlorodifluoromethane	J	N		1.16	µg/kg	.	EPA8260
Chloroethane	UJ	QO	H	0.110	µg/kg	0.110	EPA8260
Chloroform	UJ	QO	H	0.0549	µg/kg	0.0549	EPA8260
Chloromethane (methyl chloride)	UJ	QO	H	0.110	µg/kg	0.110	EPA8260
Dichloromethane (methylene chloride)	J	QO	H	2.65	µg/kg	0.549	EPA8260
Ethylbenzene	UJ	QO	H	0.0549	µg/kg	0.0549	EPA8260
Styrene	UJ	QO	H	0.0549	µg/kg	0.0549	EPA8260
Tetrachloroethene	UJ	QO	H	0.0549	µg/kg	0.0549	EPA8260
Toluene	UJ	QO8	H	0.121	µg/kg	0.549	EPA8260
Trichloroethene (TCE)	UJ	QO	H	0.0549	µg/kg	0.0549	EPA8260
Unknown	J	N		2.91	µg/kg	.	EPA8260
Unknown silane	J	N		6.32	µg/kg	.	EPA8260
Vinyl acetate	UJ	QO	H	1.10	µg/kg	1.10	EPA8260
Vinyl chloride	UJ	QO	H	0.110	µg/kg	0.110	EPA8260
Xylenes (total)	UJ	QVO	H	0.319	µg/kg	0.165	EPA8260
cis-1,3-Dichloropropene	UJ	QO	H	0.0549	µg/kg	0.0549	EPA8260
trans-1,3-Dichloropropene	UJ	QO	H	0.0549	µg/kg	0.0549	EPA8260
Pesticides/PCBs							
Aldrin	U			0.913	µg/kg	0.913	EPA8080
Aroclor 1016	U			4.56	µg/kg	4.56	EPA8080
Aroclor 1221	U			4.56	µg/kg	4.56	EPA8080
Aroclor 1232	U			4.56	µg/kg	4.56	EPA8080
Aroclor 1242	U			4.56	µg/kg	4.56	EPA8080
Aroclor 1248	U			4.56	µg/kg	4.56	EPA8080
Aroclor 1254	U			4.56	µg/kg	4.56	EPA8080
Aroclor 1260	U			4.56	µg/kg	4.56	EPA8080
Dieldrin	J	E		0.920	µg/kg	1.83	EPA8080
Endosulfan I	U			1.83	µg/kg	1.83	EPA8080
Endosulfan II	U			3.65	µg/kg	3.65	EPA8080
Endosulfan sulfate	U			3.65	µg/kg	3.65	EPA8080
Endrin	U			1.83	µg/kg	1.83	EPA8080
Endrin ketone	U			3.65	µg/kg	3.65	EPA8080
Heptachlor	U			1.83	µg/kg	1.83	EPA8080
Heptachlor epoxide	U			1.83	µg/kg	1.83	EPA8080
Methoxychlor (Mariate)	U			18.3	µg/kg	18.3	EPA8080
Toxaphene	U			36.5	µg/kg	36.5	EPA8080
alpha-Benzene hexachloride	U			0.913	µg/kg	0.913	EPA8080
alpha-Chlordane	U			1.83	µg/kg	1.83	EPA8080
beta-Benzene hexachloride	U			1.83	µg/kg	1.83	EPA8080
delta-Benzene hexachloride	U			1.83	µg/kg	1.83	EPA8080
gamma-Benzene hexachloride (Lindane)	U			0.913	µg/kg	0.913	EPA8080
gamma-Chlordane	U			1.83	µg/kg	1.83	EPA8080
p,p'-DDD	U			3.65	µg/kg	3.65	EPA8080
p,p'-DDE	U			1.83	µg/kg	1.83	EPA8080
p,p'-DDT	U			3.65	µg/kg	3.65	EPA8080

SAMPLE NAME: ABKSB0102D (continued) Sample ID: 102695

Constituent	RQ	AQ	BQ	Result	Unit	Q. Limit	Method
Radionuclides							
Gross Alpha				55.0	pC/g	3.26	EPIA-001B
Non-volatile Beta				55.4	pC/g	5.71	EPIA-001B

SAMPLE NAME: ABKSB0201 Sample ID: 102663

Location (SRS Coordinates): 51089E 102611N
Ground Elevation Above MSL: . ft
Depth of Core Interval: 0.00 to 1.00 ft
Sample Type: Normal Sample Matrix: Soil Sample Moisture: Dry
Sample Color: USC Soil Classification: Percent Solids: 91.3

Constituent	RQ	AQ	BQ	Result	Unit	Q. Limit	Method
Physical Parameters							
Cation Exchange Capacity	U			1,310	Meq/	1,310	EPA9081
Total Organic Carbon		V		3,390	mg/kg	60.0	LLOYDKAHN
Total Petroleum Hydrocarbons				75.6	mg/kg	36.5	EPA418.1
TAL Metals							
Aluminum	J	I		9,990	mg/kg	20.4	EPA6010
Antimony	J	E		0.659	mg/kg	3.83	EPA6010
Arsenic	J	E		5.00	mg/kg	12.2	EPA6010
Barium	J	IX		15.1	mg/kg	1.20	EPA6010
Beryllium				0.274	mg/kg	0.274	EPA6010
Cadmium				0.972	mg/kg	0.438	EPA6010
Calcium	J	IX		2,810	mg/kg	18.4	EPA6010
Chromium				25.5	mg/kg	0.986	EPA6010
Cobalt				1.30	mg/kg	0.876	EPA6010
Copper				4.00	mg/kg	1.10	EPA6010
Cyanide	U			0.830	mg/kg	0.830	EPA9010
Iron	J	I		20,700	mg/kg	24.0	EPA6010
Lead				8.70	mg/kg	6.46	EPA6010
Magnesium	J	IX		467	mg/kg	9.53	EPA6010
Manganese	J	IX		239	mg/kg	0.219	EPA6010
Mercury	U			0.142	mg/kg	0.142	EPA7471
Nickel	J	I		2.10	mg/kg	1.86	EPA6010
Potassium	J	IX		191	mg/kg	73.4	EPA6010
Selenium	U			11.4	mg/kg	11.4	EPA6010
Silver	U			0.986	mg/kg	0.986	EPA6010
Sodium	J	E		20.9	mg/kg	141	EPA6010
Thallium	U			9.31	mg/kg	9.31	EPA6010
Vanadium	J	I		50.1	mg/kg	0.766	EPA6010
Zinc				23.1	mg/kg	17.6	EPA6010

SAMPLE NAME: ABKSB0201 (continued) Sample ID: 102663

Constituent	RQ	AQ	BQ	Result	Unit	Q. Limit	Method
Semivolatiles							
1,2,4-Trichlorobenzene	U			365	µg/kg	365	EPA8270
1,2-Dichlorobenzene	U			365	µg/kg	365	EPA8270
1,3-Dichlorobenzene	U			365	µg/kg	365	EPA8270
1,4-Dichlorobenzene	U			365	µg/kg	365	EPA8270
2,4,5-Trichlorophenol	U			1,820	µg/kg	1,820	EPA8270
2,4,6-Trichlorophenol	U			365	µg/kg	365	EPA8270
2,4-Dichlorophenol	U			365	µg/kg	365	EPA8270
2,4-Dimethyl phenol	U			365	µg/kg	365	EPA8270
2,4-Dinitrophenol	U			1,820	µg/kg	1,820	EPA8270
2,4-Dinitrotoluene	U			365	µg/kg	365	EPA8270
2,6-Dinitrotoluene	U			365	µg/kg	365	EPA8270
2-Chloronaphthalene	U			365	µg/kg	365	EPA8270
2-Chlorophenol	U			365	µg/kg	365	EPA8270
2-Methyl-4,6-dinitrophenol	U			1,820	µg/kg	1,820	EPA8270
2-Methylnaphthalene	U			365	µg/kg	365	EPA8270
2-Nitroaniline	U			1,820	µg/kg	1,820	EPA8270
2-Nitrophenol	U			365	µg/kg	365	EPA8270
3,3'-Dichlorobenzidine	U			730	µg/kg	730	EPA8270
3-Nitroaniline	U			1,820	µg/kg	1,820	EPA8270
4-Bromophenyl phenyl ether	U			365	µg/kg	365	EPA8270
4-Chloro-3-methylphenol (p-chloro-m-cresol)	U			365	µg/kg	365	EPA8270
4-Chloroaniline	U			365	µg/kg	365	EPA8270
4-Chlorophenyl phenyl ether	U			365	µg/kg	365	EPA8270
4-Nitroaniline	U			1,820	µg/kg	1,820	EPA8270
4-Nitrophenol	U			1,820	µg/kg	1,820	EPA8270
Acenapthene	U			365	µg/kg	365	EPA8270
Acenapthylene	U			365	µg/kg	365	EPA8270
Aldol condensate	J	KN		300	µg/kg		EPA8270
Anthracene	J			36.8	µg/kg	365	EPA8270
Benzo(a)anthracene	J			117	µg/kg	365	EPA8270
Benzo(a)pyrene	J			113	µg/kg	365	EPA8270
Benzo(b)fluoranthene	J			104	µg/kg	365	EPA8270
Benzo(g,h,i)perylene	J			69.8	µg/kg	365	EPA8270
Benzo(k)fluoranthene	J			108	µg/kg	365	EPA8270
Benzoic acid	U			1,820	µg/kg	1,820	EPA8270
Benzyl alcohol	U			365	µg/kg	365	EPA8270
Bis(2-chloroethoxy) methane	U			365	µg/kg	365	EPA8270
Bis(2-chloroethyl) ether	U			365	µg/kg	365	EPA8270
Bis(2-chloroisopropyl) ether	U			365	µg/kg	365	EPA8270
Bis(2-ethylhexyl) phthalate	U			365	µg/kg	365	EPA8270
Butyl benzyl phthalate	U			365	µg/kg	365	EPA8270
Chrysene	J			158	µg/kg	365	EPA8270
Di-n-butyl phthalate	U			365	µg/kg	365	EPA8270
Di-n-octyl phthalate	U			365	µg/kg	365	EPA8270
Dibenzo(a,h)anthracene	U			365	µg/kg	365	EPA8270
Dibenzofuran	U			365	µg/kg	365	EPA8270
Diethyl phthalate	U			365	µg/kg	365	EPA8270
Dimethyl phthalate	U			365	µg/kg	365	EPA8270
Fluoranthene	J			249	µg/kg	365	EPA8270

SAMPLE NAME: ABKSB0201 (continued) Sample ID: 102663

Constituent	RQ	AQ	BQ	Result	Unit	Q. Limit	Method
Semivolatiles							
Fluorene	U			365	µg/kg	365	EPA8270
Hexachlorobenzene	U			365	µg/kg	365	EPA8270
Hexachlorobutadiene	U			365	µg/kg	365	EPA8270
Hexachlorocyclopentadiene	U			365	µg/kg	365	EPA8270
Hexachloroethane	U			365	µg/kg	365	EPA8270
Indeno(1,2,3-c,d)pyrene	J			66.1	µg/kg	365	EPA8270
Isophorone	U			365	µg/kg	365	EPA8270
N-Nitrosodi-n-propylamine	U			365	µg/kg	365	EPA8270
N-Nitrosodiphenylamine	U			365	µg/kg	365	EPA8270
Naphthalene	U			365	µg/kg	365	EPA8270
Nitrobenzene	U			365	µg/kg	365	EPA8270
Pentachlorophenol	U			1,820	µg/kg	1,820	EPA8270
Phenanthrene	J			172	µg/kg	365	EPA8270
Phenol	U			365	µg/kg	365	EPA8270
Pyrene	J			204	µg/kg	365	EPA8270
Unknown	J	N		200	µg/kg	.	EPA8270
Unknown	J	N		400	µg/kg	.	EPA8270
Unknown	J	N		300	µg/kg	.	EPA8270
o-cresol (2-methylphenol)	U			365	µg/kg	365	EPA8270
p-cresol (4-methylphenol)	U			365	µg/kg	365	EPA8270
Volatiles							
1,1,1-Trichloroethane	U			11.3	µg/kg	5.50	EPA8240
1,1,2,2-Tetrachloroethane	U			5.50	µg/kg	5.50	EPA8240
1,1,2-Trichloroethane	U			5.50	µg/kg	5.50	EPA8240
1,1-Dichloroethane	U			5.50	µg/kg	5.50	EPA8240
1,1-Dichloroethene	U			5.50	µg/kg	5.50	EPA8240
1,2-Dichloroethane	U			5.50	µg/kg	5.50	EPA8240
1,2-Dichloroethene (total)	U			5.50	µg/kg	5.50	EPA8240
1,2-Dichloropropane	U			5.50	µg/kg	5.50	EPA8240
2-Butanone (MEK)	U			11.0	µg/kg	11.0	EPA8240
2-Hexanone	U			11.0	µg/kg	11.0	EPA8240
4-Methyl-2-pentanone	U			11.0	µg/kg	11.0	EPA8240
Acetone	U	V		1.43	µg/kg	11.0	EPA8240
Benzene	U			5.50	µg/kg	5.50	EPA8240
Bromodichloromethane	U			5.50	µg/kg	5.50	EPA8240
Bromoform	U			5.50	µg/kg	5.50	EPA8240
Bromomethane (Methyl bromide)	U			11.0	µg/kg	11.0	EPA8240
Carbon disulfide	U			5.50	µg/kg	5.50	EPA8240
Carbon tetrachloride	U			5.50	µg/kg	5.50	EPA8240
Chlorobenzene	U			5.50	µg/kg	5.50	EPA8240
Chlorodibromomethane	U			5.50	µg/kg	5.50	EPA8240
Chloroethane	U			11.0	µg/kg	11.0	EPA8240
Chloroform	U			5.50	µg/kg	5.50	EPA8240
Chloromethane (methyl chloride)	U			11.0	µg/kg	11.0	EPA8240
Dichloromethane (methylene chloride)	U	V		19.2	µg/kg	5.50	EPA8240
Ethylbenzene	U			5.50	µg/kg	5.50	EPA8240
Styrene	U			5.50	µg/kg	5.50	EPA8240
Tetrachloroethene				10.3	µg/kg	5.50	EPA8240

SAMPLE NAME: ABKSB0201 (continued) Sample ID: 102663

Constituent	RQ	AQ	BQ	Result	Unit	Q. Limit	Method
Volatiles							
Toluene	U			5.50	µg/kg	5.50	EPA8240
Trichloroethene (TCE)	U			5.50	µg/kg	5.50	EPA8240
Vinyl acetate	U			11.0	µg/kg	11.0	EPA8240
Vinyl chloride	U			11.0	µg/kg	11.0	EPA8240
Xylenes (total)	U			5.50	µg/kg	5.50	EPA8240
cis-1,3-Dichloropropene	U			5.50	µg/kg	5.50	EPA8240
trans-1,3-Dichloropropene	U			5.50	µg/kg	5.50	EPA8240
Pesticides/PCBs							
Aldrin	U			1.83	µg/kg	1.83	EPA8081
Aroclor 1016	U			36.5	µg/kg	36.5	EPA8081
Aroclor 1221	U			73.0	µg/kg	73.0	EPA8081
Aroclor 1232	U			36.5	µg/kg	36.5	EPA8081
Aroclor 1242	U			36.5	µg/kg	36.5	EPA8081
Aroclor 1248	U			36.5	µg/kg	36.5	EPA8081
Aroclor 1254	U			36.5	µg/kg	36.5	EPA8081
Aroclor 1260	U			36.5	µg/kg	36.5	EPA8081
Dieldrin	U			3.65	µg/kg	3.65	EPA8081
Endosulfan I	U			1.83	µg/kg	1.83	EPA8081
Endosulfan II	U			3.65	µg/kg	3.65	EPA8081
Endosulfan sulfate	U			3.65	µg/kg	3.65	EPA8081
Endrin	U			3.65	µg/kg	3.65	EPA8081
Endrin ketone	U			3.65	µg/kg	3.65	EPA8081
Heptachlor	U			1.83	µg/kg	1.83	EPA8081
Heptachlor epoxide	U			1.83	µg/kg	1.83	EPA8081
Methoxychlor (Mariate)	U			18.3	µg/kg	18.3	EPA8081
Toxaphene	U			183	µg/kg	183	EPA8081
alpha-Benzene hexachloride	U			1.83	µg/kg	1.83	EPA8081
alpha-Chlordane	U			1.83	µg/kg	1.83	EPA8081
beta-Benzene hexachloride	U			1.83	µg/kg	1.83	EPA8081
delta-Benzene hexachloride	U			1.83	µg/kg	1.83	EPA8081
gamma-Benzene hexachloride (Lindane)	U			1.83	µg/kg	1.83	EPA8081
gamma-Chlordane	U			1.83	µg/kg	1.83	EPA8081
p,p'-DDD	U			3.65	µg/kg	3.65	EPA8081
p,p'-DDE	U			3.65	µg/kg	3.65	EPA8081
p,p'-DDT	U			3.65	µg/kg	3.65	EPA8081
Radionuclides							
Gross Alpha				11.7	pC/g	3.13	LANLMLR100MOD
Non-volatile Beta				12.5	pC/g	1.71	LANLMLR100MOD

SAMPLE NAME: ABKSB0202 Sample ID: 102664

Location (SRS Coordinates): 51089E 102611N
Ground Elevation Above MSL: . ft
Depth of Core Interval: 1.00 to 4.00 ft
Sample Type: Normal
Sample Color:
Sample Matrix: Soil
USC Soil Classification:
Sample Moisture: Damp
Percent Solids: 91.4

Constituent	RQ	AQ	BQ	Result	Unit	Q. Limit	Method
Physical Parameters							
Cation Exchange Capacity	U			1,310	Meq/	1,310	EPA9081
Total Organic Carbon		V		839	mg/kg	60.0	LLOYDKAHN
Total Petroleum Hydrocarbons				38.1	mg/kg	36.4	EPA418.1
TAL Metals							
Aluminum				6,610	mg/kg	19.2	EPA6010
Antimony	U			3.61	mg/kg	3.61	EPA6010
Arsenic	J	E		2.70	mg/kg	11.5	EPA6010
Barium				11.9	mg/kg	1.14	EPA6010
Beryllium	J	E		0.134	mg/kg	0.258	EPA6010
Cadmium				0.436	mg/kg	0.413	EPA6010
Calcium				324	mg/kg	17.3	EPA6010
Chromium				11.9	mg/kg	0.929	EPA6010
Cobalt	J	E		0.751	mg/kg	0.826	EPA6010
Copper				2.60	mg/kg	1.03	EPA6010
Cyanide	UJ	V		0.0870	mg/kg	0.830	EPA9010
Iron				10,700	mg/kg	22.6	EPA6010
Lead				6.10	mg/kg	6.09	EPA6010
Magnesium				84.3	mg/kg	8.98	EPA6010
Manganese				37.4	mg/kg	0.206	EPA6010
Mercury	U			0.142	mg/kg	0.142	EPA7471
Nickel	J	E		0.948	mg/kg	1.75	EPA6010
Potassium				71.4	mg/kg	69.1	EPA6010
Selenium	U			10.7	mg/kg	10.7	EPA6010
Silver	U			0.929	mg/kg	0.929	EPA6010
Sodium	J	E		18.5	mg/kg	133	EPA6010
Thallium	U			8.77	mg/kg	8.77	EPA6010
Vanadium				25.2	mg/kg	0.722	EPA6010
Zinc	J	E		5.00	mg/kg	16.6	EPA6010
Semivolatiles							
1.2.4-Trichlorobenzene	U			364	µg/kg	364	EPA8270
1.2-Dichlorobenzene	U			364	µg/kg	364	EPA8270
1.3-Dichlorobenzene	U			364	µg/kg	364	EPA8270
1.4-Dichlorobenzene	U			364	µg/kg	364	EPA8270
2.4.5-Trichlorophenol	U			1.820	µg/kg	1,820	EPA8270
2.4.6-Trichlorophenol	U			364	µg/kg	364	EPA8270
2.4-Dichlorophenol	U			364	µg/kg	364	EPA8270
2.4-Dimethyl phenol	U			364	µg/kg	364	EPA8270
2.4-Dinitrophenol	U			1,820	µg/kg	1.820	EPA8270
2,4-Dinitrotoluene	U			364	µg/kg	364	EPA8270
2,6-Dinitrotoluene	U			364	µg/kg	364	EPA8270

SAMPLE NAME: ABKSB0202 (continued) Sample ID: 102664

Constituent	RQ	AQ	BQ	Result	Unit	Q. Limit	Method
Semivolatiles							
2-Chloronaphthalene	U			364	µg/kg	364	EPA8270
2-Chlorophenol	U			364	µg/kg	364	EPA8270
2-Methyl-4,6-dinitrophenol	U			1,820	µg/kg	1,820	EPA8270
2-Methylnaphthalene	U			364	µg/kg	364	EPA8270
2-Nitroaniline	U			1,820	µg/kg	1,820	EPA8270
2-Nitrophenol	U			364	µg/kg	364	EPA8270
3,3'-Dichlorobenzidine	U			728	µg/kg	728	EPA8270
3-Nitroaniline	U			1,820	µg/kg	1,820	EPA8270
4-Bromophenyl phenyl ether	U			364	µg/kg	364	EPA8270
4-Chloro-3-methylphenol (p-chloro-m-cresol)	U			364	µg/kg	364	EPA8270
4-Chloroaniline	U			364	µg/kg	364	EPA8270
4-Chlorophenyl phenyl ether	U			364	µg/kg	364	EPA8270
4-Nitroaniline	U			1,820	µg/kg	1,820	EPA8270
4-Nitrophenol	U			1,820	µg/kg	1,820	EPA8270
Acenapthene	U			364	µg/kg	364	EPA8270
Acenapthylene	U			364	µg/kg	364	EPA8270
Aldol condensate	J	KN		800	µg/kg		EPA8270
Anthracene	U			364	µg/kg	364	EPA8270
Benzo(a)anthracene	U			364	µg/kg	364	EPA8270
Benzo(a)pyrene	U			364	µg/kg	364	EPA8270
Benzo(b)fluoranthene	U			364	µg/kg	364	EPA8270
Benzo(g,h,i)perylene	U			364	µg/kg	364	EPA8270
Benzo(k)fluoranthene	U			364	µg/kg	364	EPA8270
Benzoic acid	U			1,820	µg/kg	1,820	EPA8270
Benzyl alcohol	U			364	µg/kg	364	EPA8270
Bis(2-chloroethoxy) methane	U			364	µg/kg	364	EPA8270
Bis(2-chloroethyl) ether	U			364	µg/kg	364	EPA8270
Bis(2-chloroisopropyl) ether	U			364	µg/kg	364	EPA8270
Bis(2-ethylhexyl) phthalate	U			364	µg/kg	364	EPA8270
Butyl benzyl phthalate	U			364	µg/kg	364	EPA8270
Chrysene	U			364	µg/kg	364	EPA8270
Di-n-butyl phthalate	U			364	µg/kg	364	EPA8270
Di-n-octyl phthalate	U			364	µg/kg	364	EPA8270
Dibenzo(a,h)anthracene	U			364	µg/kg	364	EPA8270
Dibenzofuran	U			364	µg/kg	364	EPA8270
Diethyl phthalate	U			364	µg/kg	364	EPA8270
Dimethyl phthalate	U			364	µg/kg	364	EPA8270
Fluoranthene	U			364	µg/kg	364	EPA8270
Fluorene	U			364	µg/kg	364	EPA8270
Hexachlorobenzene	U			364	µg/kg	364	EPA8270
Hexachlorobutadiene	U			364	µg/kg	364	EPA8270
Hexachlorocyclopentadiene	U			364	µg/kg	364	EPA8270
Hexachloroethane	U			364	µg/kg	364	EPA8270
Indeno(1,2,3-c,d)pyrene	U			364	µg/kg	364	EPA8270
Isophorone	U			364	µg/kg	364	EPA8270
N-Nitrosodi-n-propylamine	U			364	µg/kg	364	EPA8270
N-Nitrosodiphenylamine	U			364	µg/kg	364	EPA8270
Naphthalene	U			364	µg/kg	364	EPA8270
Nitrobenzene	U			364	µg/kg	364	EPA8270

SAMPLE NAME: ABKSB0202 (continued) Sample ID: 102664

Constituent	RQ	AQ	BQ	Result	Unit	Q. Limit	Method
Semivolatiles							
Pentachlorophenol	U			1,820	µg/kg	1.820	EPA8270
Phenanthrene	U			364	µg/kg	364	EPA8270
Phenol	U			364	µg/kg	364	EPA8270
Pyrene	U			364	µg/kg	364	EPA8270
Unknown	J	N		200	µg/kg	.	EPA8270
Unknown	J	N		200	µg/kg	.	EPA8270
o-cresol (2-methylphenol)	U			364	µg/kg	364	EPA8270
p-cresol (4-methylphenol)	U			364	µg/kg	364	EPA8270
Volatiles							
1,1,1-Trichloroethane	J	E		4.09	µg/kg	5.50	EPA8240
1,1,2,2-Tetrachloroethane	U			5.50	µg/kg	5.50	EPA8240
1,1,2-Trichloroethane	U			5.50	µg/kg	5.50	EPA8240
1,1-Dichloroethane	U			5.50	µg/kg	5.50	EPA8240
1,1-Dichloroethene	U			5.50	µg/kg	5.50	EPA8240
1,2-Dichloroethane	U			5.50	µg/kg	5.50	EPA8240
1,2-Dichloroethene (total)	U			5.50	µg/kg	5.50	EPA8240
1,2-Dichloropropane	U			5.50	µg/kg	5.50	EPA8240
2-Butanone (MEK)	U			11.0	µg/kg	11.0	EPA8240
2-Hexanone	U			11.0	µg/kg	11.0	EPA8240
4-Methyl-2-pentanone	U			11.0	µg/kg	11.0	EPA8240
Acetone	U			11.0	µg/kg	11.0	EPA8240
Benzene	U			5.50	µg/kg	5.50	EPA8240
Bromodichloromethane	U			5.50	µg/kg	5.50	EPA8240
Bromoform	U			5.50	µg/kg	5.50	EPA8240
Bromomethane (Methyl bromide)	U			11.0	µg/kg	11.0	EPA8240
Carbon disulfide	U			5.50	µg/kg	5.50	EPA8240
Carbon tetrachloride	U			5.50	µg/kg	5.50	EPA8240
Chlorobenzene	U			5.50	µg/kg	5.50	EPA8240
Chlorodibromomethane	U			5.50	µg/kg	5.50	EPA8240
Chloroethane	U			11.0	µg/kg	11.0	EPA8240
Chloroform	U			5.50	µg/kg	5.50	EPA8240
Chloromethane (methyl chloride)	U			11.0	µg/kg	11.0	EPA8240
Dichloromethane (methylene chloride)	U	V		8.30	µg/kg	5.50	EPA8240
Ethylbenzene	U			5.50	µg/kg	5.50	EPA8240
Styrene	U			5.50	µg/kg	5.50	EPA8240
Tetrachloroethene				5.73	µg/kg	5.50	EPA8240
Toluene	U			5.50	µg/kg	5.50	EPA8240
Trichloroethene (TCE)	U			5.50	µg/kg	5.50	EPA8240
Vinyl acetate	U			11.0	µg/kg	11.0	EPA8240
Vinyl chloride	U			11.0	µg/kg	11.0	EPA8240
Xylenes (total)	U			5.50	µg/kg	5.50	EPA8240
cis-1,3-Dichloropropene	U			5.50	µg/kg	5.50	EPA8240
trans-1,3-Dichloropropene	U			5.50	µg/kg	5.50	EPA8240

SAMPLE NAME: ABKSB0202 (continued) Sample ID: 102664

Constituent	RQ	AQ	BQ	Result	Unit	Q. Limit	Method
Pesticides/PCBs							
Aldrin	UJ	O	L	1.82	µg/kg	1.82	EPA8081
Aroclor 1016	UJ	O	L	36.4	µg/kg	36.4	EPA8081
Aroclor 1221	UJ	O	L	72.9	µg/kg	72.9	EPA8081
Aroclor 1232	UJ	O	L	36.4	µg/kg	36.4	EPA8081
Aroclor 1242	UJ	O	L	36.4	µg/kg	36.4	EPA8081
Aroclor 1248	UJ	O	L	36.4	µg/kg	36.4	EPA8081
Aroclor 1254	UJ	O	L	36.4	µg/kg	36.4	EPA8081
Aroclor 1260	UJ	O	L	36.4	µg/kg	36.4	EPA8081
Dieldrin	UJ	O	L	3.64	µg/kg	3.64	EPA8081
Endosulfan I	UJ	O	L	1.82	µg/kg	1.82	EPA8081
Endosulfan II	UJ	O	L	3.64	µg/kg	3.64	EPA8081
Endosulfan sulfate	UJ	O	L	3.64	µg/kg	3.64	EPA8081
Endrin	UJ	O	L	3.64	µg/kg	3.64	EPA8081
Endrin ketone	UJ	O	L	3.64	µg/kg	3.64	EPA8081
Heptachlor	UJ	O	L	1.82	µg/kg	1.82	EPA8081
Heptachlor epoxide	UJ	O	L	1.82	µg/kg	1.82	EPA8081
Methoxychlor (Mariate)	UJ	O	L	18.2	µg/kg	18.2	EPA8081
Toxaphene	UJ	O	L	182	µg/kg	182	EPA8081
alpha-Benzene hexachloride	UJ	O	L	1.82	µg/kg	1.82	EPA8081
alpha-Chlordane	UJ	O	L	1.82	µg/kg	1.82	EPA8081
beta-Benzene hexachloride	UJ	O	L	1.82	µg/kg	1.82	EPA8081
delta-Benzene hexachloride	UJ	O	L	1.82	µg/kg	1.82	EPA8081
gamma-Benzene hexachloride (Lindane)	UJ	O	L	1.82	µg/kg	1.82	EPA8081
gamma-Chlordane	UJ	O	L	1.82	µg/kg	1.82	EPA8081
p,p'-DDD	UJ	O	L	3.64	µg/kg	3.64	EPA8081
p,p'-DDE	UJ	O	L	3.64	µg/kg	3.64	EPA8081
p,p'-DDT	UJ	O	L	3.64	µg/kg	3.64	EPA8081
Radionuclides							
Gross Alpha				20.4	pC/g	3.06	LANLMLR100MOD
Non-volatile Beta				10.4	pC/g	1.59	LANLMLR100MOD

SAMPLE NAME: ABKSB0301 Sample ID: 102666

Location (SRS Coordinates): 51122E 102106N
Ground Elevation Above MSL: 62 ft
Depth of Core Interval: 0.00 to 1.00 ft
Sample Type: Normal Sample Matrix: Soil Sample Moisture: Dry
Sample Color: USC Soil Classification: Percent Solids: 95.9

Constituent	RQ	AQ	BQ	Result	Unit	Q. Limit	Method
Physical Parameters							
Cation Exchange Capacity	U			626	Meq/	626	EPA9081
Total Organic Carbon				6,860	mg/kg	60.0	LLOYDKAHN
Total Petroleum Hydrocarbons	UJ	V		9.50	mg/kg	11.1	EPA418.1

SAMPLE NAME: ABKSB0301 (continued) Sample ID: 102666

Constituent	RQ	AQ	BQ	Result	Unit	Q. Limit	Method
TAL Metals							
Aluminum				2,820	mg/kg	18.5	EPA6010
Antimony	U			3.48	mg/kg	3.48	EPA6010
Arsenic	U			11.0	mg/kg	11.0	EPA6010
Barium				11.7	mg/kg	1.09	EPA6010
Beryllium	J	E		0.0804	mg/kg	0.248	EPA6010
Cadmium	J	E		0.120	mg/kg	0.397	EPA6010
Calcium				57.9	mg/kg	16.7	EPA6010
Chromium				3.20	mg/kg	0.894	EPA6010
Cobalt	J	E		0.671	mg/kg	0.794	EPA6010
Copper				1.60	mg/kg	0.993	EPA6010
Cyanide	U			0.790	mg/kg	0.790	EPA9010
Iron				1,510	mg/kg	21.7	EPA6010
Lead	J	E		3.60	mg/kg	5.86	EPA6010
Magnesium				56.9	mg/kg	8.64	EPA6010
Manganese				79.7	mg/kg	0.199	EPA6010
Mercury	J	E		0.0200	mg/kg	0.139	EPA7471
Nickel	J	E		1.60	mg/kg	1.69	EPA6010
Potassium	J	E		46.4	mg/kg	66.5	EPA6010
Selenium	U			10.3	mg/kg	10.3	EPA6010
Silver	U			0.894	mg/kg	0.894	EPA6010
Sodium	U			128	mg/kg	128	EPA6010
Thallium	U			8.44	mg/kg	8.44	EPA6010
Vanadium				3.60	mg/kg	0.695	EPA6010
Zinc	J	E		3.10	mg/kg	16.0	EPA6010
Semivolatiles							
1,2,4-Trichlorobenzene	U			348	µg/kg	348	EPA8270
1,2-Dichlorobenzene	U			348	µg/kg	348	EPA8270
1,3-Dichlorobenzene	U			348	µg/kg	348	EPA8270
1,4-Dichlorobenzene	U			348	µg/kg	348	EPA8270
2,4,5-Trichlorophenol	U			1,740	µg/kg	1,740	EPA8270
2,4,6-Trichlorophenol	U			348	µg/kg	348	EPA8270
2,4-Dichlorophenol	U			348	µg/kg	348	EPA8270
2,4-Dimethyl phenol	U			348	µg/kg	348	EPA8270
2,4-Dinitrophenol	U			1,740	µg/kg	1,740	EPA8270
2,4-Dinitrotoluene	U			348	µg/kg	348	EPA8270
2,6-Dinitrotoluene	U			348	µg/kg	348	EPA8270
2-Chloronaphthalene	U			348	µg/kg	348	EPA8270
2-Chlorophenol	U			348	µg/kg	348	EPA8270
2-Methyl-4,6-dinitrophenol	U			1,740	µg/kg	1,740	EPA8270
2-Methylnaphthalene	U			348	µg/kg	348	EPA8270
2-Nitroaniline	U			1,740	µg/kg	1,740	EPA8270
2-Nitrophenol	U			348	µg/kg	348	EPA8270
3,3'-Dichlorobenzidine	U			696	µg/kg	696	EPA8270
3-Nitroaniline	U			1,740	µg/kg	1,740	EPA8270
4-Bromophenyl phenyl ether	U			348	µg/kg	348	EPA8270
4-Chloro-3-methylphenol (p-chloro-m-cresol)	U			348	µg/kg	348	EPA8270
4-Chloroaniline	U			348	µg/kg	348	EPA8270

SAMPLE NAME: ABKSB0301 (continued) Sample ID: 102666

Constituent	RQ	AQ	BQ	Result	Unit	Q. Limit	Method
Semivolatiles							
4-Chlorophenyl phenyl ether	U			348	µg/kg	348	EPA8270
4-Nitroaniline	U			1,740	µg/kg	1,740	EPA8270
4-Nitrophenol	U			1,740	µg/kg	1,740	EPA8270
Acenapthene	U			348	µg/kg	348	EPA8270
Acenapthylene	U			348	µg/kg	348	EPA8270
Aldol condensate	J	KN		700	µg/kg		EPA8270
Anthracene	U			348	µg/kg	348	EPA8270
Benzo(a)anthracene	U			348	µg/kg	348	EPA8270
Benzo(a)pyrene	U			348	µg/kg	348	EPA8270
Benzo(b)fluoranthene	U			348	µg/kg	348	EPA8270
Benzo(g,h,i)perylene	U			348	µg/kg	348	EPA8270
Benzo(k)fluoranthene	U			348	µg/kg	348	EPA8270
Benzoic acid	U			1,740	µg/kg	1,740	EPA8270
Benzyl alcohol	U			348	µg/kg	348	EPA8270
Bis(2-chloroethoxy) methane	U			348	µg/kg	348	EPA8270
Bis(2-chloroethyl) ether	U			348	µg/kg	348	EPA8270
Bis(2-chloroisopropyl) ether	U			348	µg/kg	348	EPA8270
Bis(2-ethylhexyl) phthalate	U			348	µg/kg	348	EPA8270
Butyl benzyl phthalate	U			348	µg/kg	348	EPA8270
Chrysene	U			348	µg/kg	348	EPA8270
Di-n-butyl phthalate	U			348	µg/kg	348	EPA8270
Di-n-octyl phthalate	U			348	µg/kg	348	EPA8270
Dibenzo(a,h)anthracene	U			348	µg/kg	348	EPA8270
Dibenzofuran	U			348	µg/kg	348	EPA8270
Diethyl phthalate	U			348	µg/kg	348	EPA8270
Dimethyl phthalate	U			348	µg/kg	348	EPA8270
Fluoranthene	U			348	µg/kg	348	EPA8270
Fluorene	U			348	µg/kg	348	EPA8270
Hexachlorobenzene	U			348	µg/kg	348	EPA8270
Hexachlorobutadiene	U			348	µg/kg	348	EPA8270
Hexachlorocyclopentadiene	U			348	µg/kg	348	EPA8270
Hexachloroethane	U			348	µg/kg	348	EPA8270
Indeno(1,2,3-c,d)pyrene	U			348	µg/kg	348	EPA8270
Isophorone	U			348	µg/kg	348	EPA8270
N-Nitrosodi-n-propylamine	U			348	µg/kg	348	EPA8270
N-Nitrosodiphenylamine	U			348	µg/kg	348	EPA8270
Naphthalene	U			348	µg/kg	348	EPA8270
Nitrobenzene	U			348	µg/kg	348	EPA8270
Pentachlorophenol	U			1,740	µg/kg	1,740	EPA8270
Phenanthrene	U			348	µg/kg	348	EPA8270
Phenol	U			348	µg/kg	348	EPA8270
Pyrene	U			348	µg/kg	348	EPA8270
o-cresol (2-methylphenol)	U			348	µg/kg	348	EPA8270
p-cresol (4-methylphenol)	U			348	µg/kg	348	EPA8270

SAMPLE NAME: ABKSB0301 (continued) Sample ID: 102666

Constituent	RQ	AQ	BQ	Result	Unit	Q. Limit	Method
Volatiles							
1,1,1-Trichloroethane				8.18	µg/kg	5.50	EPA8240
1,1,2,2-Tetrachloroethane	U			5.50	µg/kg	5.50	EPA8240
1,1,2-Trichloroethane	U			5.50	µg/kg	5.50	EPA8240
1,1-Dichloroethane	U			5.50	µg/kg	5.50	EPA8240
1,1-Dichloroethene	U			5.50	µg/kg	5.50	EPA8240
1,2-Dichloroethane	U			5.50	µg/kg	5.50	EPA8240
1,2-Dichloroethene (total)	U			5.50	µg/kg	5.50	EPA8240
1,2-Dichloropropane	U			5.50	µg/kg	5.50	EPA8240
2-Butanone (MEK)	U			11.0	µg/kg	11.0	EPA8240
2-Hexanone	U			11.0	µg/kg	11.0	EPA8240
4-Methyl-2-pentanone	U			11.0	µg/kg	11.0	EPA8240
Acetone	U	V		17.7	µg/kg	11.0	EPA8240
Benzene	U			5.50	µg/kg	5.50	EPA8240
Bromodichloromethane	U			5.50	µg/kg	5.50	EPA8240
Bromoform	U			5.50	µg/kg	5.50	EPA8240
Bromomethane (Methyl bromide)	U			11.0	µg/kg	11.0	EPA8240
Carbon disulfide	U			5.50	µg/kg	5.50	EPA8240
Carbon tetrachloride	U			5.50	µg/kg	5.50	EPA8240
Chlorobenzene	U			5.50	µg/kg	5.50	EPA8240
Chlorodibromomethane	U			5.50	µg/kg	5.50	EPA8240
Chloroethane	U			11.0	µg/kg	11.0	EPA8240
Chloroform	U			5.50	µg/kg	5.50	EPA8240
Chloromethane (methyl chloride)	U			11.0	µg/kg	11.0	EPA8240
Dichloromethane (methylene chloride)	U	V		15.6	µg/kg	5.50	EPA8240
Ethylbenzene	U			5.50	µg/kg	5.50	EPA8240
Styrene	U			5.50	µg/kg	5.50	EPA8240
Tetrachloroethene				11.0	µg/kg	5.50	EPA8240
Toluene	J	E		2.23	µg/kg	5.50	EPA8240
Trichloroethene (TCE)	U			5.50	µg/kg	5.50	EPA8240
Vinyl acetate	U			11.0	µg/kg	11.0	EPA8240
Vinyl chloride	U			11.0	µg/kg	11.0	EPA8240
Xylenes (total)	J	E		3.50	µg/kg	5.50	EPA8240
cis-1,3-Dichloropropene	U			5.50	µg/kg	5.50	EPA8240
trans-1,3-Dichloropropene	U			5.50	µg/kg	5.50	EPA8240
Pesticides/PCBs							
Aldrin	UJ	O	L	1.74	µg/kg	1.74	EPA8081
Aroclor 1016	UJ	O	L	34.8	µg/kg	34.8	EPA8081
Aroclor 1221	UJ	O	L	69.5	µg/kg	69.5	EPA8081
Aroclor 1232	UJ	O	L	34.8	µg/kg	34.8	EPA8081
Aroclor 1242	UJ	O	L	34.8	µg/kg	34.8	EPA8081
Aroclor 1248	UJ	O	L	34.8	µg/kg	34.8	EPA8081
Aroclor 1254	UJ	O	L	34.8	µg/kg	34.8	EPA8081
Aroclor 1260	UJ	O	L	34.8	µg/kg	34.8	EPA8081
Dieldrin	UJ	O	L	3.48	µg/kg	3.48	EPA8081
Endosulfan I	UJ	O	L	1.74	µg/kg	1.74	EPA8081
Endosulfan II	UJ	O	L	3.48	µg/kg	3.48	EPA8081
Endosulfan sulfate	UJ	O	L	3.48	µg/kg	3.48	EPA8081
Endrin	UJ	OG	L	3.48	µg/kg	3.48	EPA8081

SAMPLE NAME: ABKSB0301 (continued) Sample ID: 102666

Constituent	RQ	AQ	BQ	Result	Unit	Q. Limit	Method
Pesticides/PCBs							
Endrin ketone	UJ	OG	L	3.48	µg/kg	3.48	EPA8081
Heptachlor	UJ	O	L	1.74	µg/kg	1.74	EPA8081
Heptachlor epoxide	UJ	O	L	1.74	µg/kg	1.74	EPA8081
Methoxychlor (Mariate)	UJ	O	L	17.4	µg/kg	17.4	EPA8081
Toxaphene	UJ	O	L	174	µg/kg	174	EPA8081
alpha-Benzene hexachloride	UJ	O	L	1.74	µg/kg	1.74	EPA8081
alpha-Chlordane	UJ	O	L	1.74	µg/kg	1.74	EPA8081
beta-Benzene hexachloride	UJ	O	L	1.74	µg/kg	1.74	EPA8081
delta-Benzene hexachloride	UJ	O	L	1.74	µg/kg	1.74	EPA8081
gamma-Benzene hexachloride (Lindane)	UJ	O	L	1.74	µg/kg	1.74	EPA8081
gamma-Chlordane	UJ	O	L	1.74	µg/kg	1.74	EPA8081
p,p'-DDD	UJ	OG	L	3.48	µg/kg	3.48	EPA8081
p,p'-DDE	UJ	OG	L	3.48	µg/kg	3.48	EPA8081
p,p'-DDT	UJ	OG	L	3.48	µg/kg	3.48	EPA8081
Radionuclides							
Gross Alpha	UI			4.63	pC/g	3.28	LANLMLR100MOD
Non-volatile Beta				14.2	pC/g	1.59	LANLMLR100MOD

SAMPLE NAME: ABKSB0301A Sample ID: 102667

Sample Type: Duplicate Associated Sample: 102666

Constituent	RQ	AQ	BQ	Result	Unit	Q. Limit	Method
Physical Parameters							
Cation Exchange Capacity	U			626	Meq/	626	EPA9081
Total Organic Carbon		V		3,430	mg/kg	60.0	LLOYDKAHN
Total Petroleum Hydrocarbons		V		12.9	mg/kg	11.1	EPA9071
TAL Metals							
Aluminum	J	IV		2,460	mg/kg	19.4	EPA6010
Antimony	U			3.65	mg/kg	3.65	EPA6010
Arsenic	U			11.6	mg/kg	11.6	EPA6010
Barium				11.6	mg/kg	1.15	EPA6010
Beryllium	U	V		0.105	mg/kg	0.261	EPA6010
Cadmium	UJ	X		0.418	mg/kg	0.418	EPA6010
Calcium		V		46.7	mg/kg	17.5	EPA6010
Chromium				2.70	mg/kg	0.940	EPA6010
Cobalt	J	E		0.644	mg/kg	0.835	EPA6010
Copper				1.20	mg/kg	1.04	EPA6010
Cyanide	J	E		0.140	mg/kg	0.840	EPA9010
Iron	J	I		1,460	mg/kg	22.9	EPA6010
Lead	J	E		2.90	mg/kg	6.16	EPA6010
Magnesium				45.4	mg/kg	9.08	EPA6010
Manganese				72.9	mg/kg	0.209	EPA6010

SAMPLE NAME: ABKSB0301A (continued) Sample ID: 102667

Constituent	RQ	AQ	BQ	Result	Unit	Q. Limit	Method
TAL Metals							
Mercury	J	EX		0.0200	mg/kg	0.139	EPA7471
Nickel	J	E		1.30	mg/kg	1.77	EPA6010
Potassium	J	E		37.7	mg/kg	69.9	EPA6010
Selenium	U			10.9	mg/kg	10.9	EPA6010
Silver	U			0.940	mg/kg	0.940	EPA6010
Sodium	J	E		14.8	mg/kg	135	EPA6010
Thallium	U			8.87	mg/kg	8.87	EPA6010
Vanadium				3.40	mg/kg	0.731	EPA6010
Zinc	J	EX		2.70	mg/kg	16.8	EPA6010
Semivolatiles							
1,2,4-Trichlorobenzene	U			348	µg/kg	348	EPA8270
1,2-Dichlorobenzene	U			348	µg/kg	348	EPA8270
1,3-Dichlorobenzene	U			348	µg/kg	348	EPA8270
1,4-Dichlorobenzene	U			348	µg/kg	348	EPA8270
2,4,5-Trichlorophenol	U			1,740	µg/kg	1,740	EPA8270
2,4,6-Trichlorophenol	U			348	µg/kg	348	EPA8270
2,4-Dichlorophenol	U			348	µg/kg	348	EPA8270
2,4-Dimethyl phenol	U			348	µg/kg	348	EPA8270
2,4-Dinitrophenol	U			1,740	µg/kg	1,740	EPA8270
2,4-Dinitrotoluene	U			348	µg/kg	348	EPA8270
2,6-Dinitrotoluene	U			348	µg/kg	348	EPA8270
2-Chloronaphthalene	U			348	µg/kg	348	EPA8270
2-Chlorophenol	U			348	µg/kg	348	EPA8270
2-Methyl-4,6-dinitrophenol	U			1,740	µg/kg	1,740	EPA8270
2-Methylnaphthalene	U			348	µg/kg	348	EPA8270
2-Nitroaniline	U			1,740	µg/kg	1,740	EPA8270
2-Nitrophenol	U			348	µg/kg	348	EPA8270
3,3'-Dichlorobenzidine	U			696	µg/kg	696	EPA8270
3-Nitroaniline	U			1,740	µg/kg	1,740	EPA8270
4-Bromophenyl phenyl ether	U			348	µg/kg	348	EPA8270
4-Chloro-3-methylphenol (p-chloro-m-cresol)	U			348	µg/kg	348	EPA8270
4-Chloroaniline	U			348	µg/kg	348	EPA8270
4-Chlorophenyl phenyl ether	U			348	µg/kg	348	EPA8270
4-Nitroaniline	U			1,740	µg/kg	1,740	EPA8270
4-Nitrophenol	U			1,740	µg/kg	1,740	EPA8270
Acenapthene	U			348	µg/kg	348	EPA8270
Acenapthylene	U			348	µg/kg	348	EPA8270
Aldol condensate	J	KN		500	µg/kg		EPA8270
Alkane	J	N		200	µg/kg		EPA8270
Anthracene	U			348	µg/kg	348	EPA8270
Benzo(a)anthracene	U			348	µg/kg	348	EPA8270
Benzo(a)pyrene	U			348	µg/kg	348	EPA8270
Benzo(b)fluoranthene	U			348	µg/kg	348	EPA8270
Benzo(g,h,i)perylene	U			348	µg/kg	348	EPA8270
Benzo(k)fluoranthene	U			348	µg/kg	348	EPA8270
Benzoic acid	U			1,740	µg/kg	1,740	EPA8270
Benzyl alcohol	U			348	µg/kg	348	EPA8270

SAMPLE NAME: ABKSB0301A (continued) Sample ID: 102667

Constituent	RQ	AQ	BQ	Result	Unit	Q. Limit	Method
Semivolatiles							
Bis(2-chloroethoxy) methane	U			348	µg/kg	348	EPA8270
Bis(2-chloroethyl) ether	U			348	µg/kg	348	EPA8270
Bis(2-chloroisopropyl) ether	U			348	µg/kg	348	EPA8270
Bis(2-ethylhexyl) phthalate	U			348	µg/kg	348	EPA8270
Butyl benzyl phthalate	U			348	µg/kg	348	EPA8270
Chrysene	U			348	µg/kg	348	EPA8270
Di-n-butyl phthalate	U			348	µg/kg	348	EPA8270
Di-n-octyl phthalate	U			348	µg/kg	348	EPA8270
Dibenzo(a,h)anthracene	U			348	µg/kg	348	EPA8270
Dibenzofuran	U			348	µg/kg	348	EPA8270
Diethyl phthalate	U			348	µg/kg	348	EPA8270
Dimethyl phthalate	U			348	µg/kg	348	EPA8270
Fluoranthene	U			348	µg/kg	348	EPA8270
Fluorene	U			348	µg/kg	348	EPA8270
Hexachlorobenzene	U			348	µg/kg	348	EPA8270
Hexachlorobutadiene	U			348	µg/kg	348	EPA8270
Hexachlorocyclopentadiene	U			348	µg/kg	348	EPA8270
Hexachloroethane	U			348	µg/kg	348	EPA8270
Indeno(1.2,3-c,d)pyrene	U			348	µg/kg	348	EPA8270
Isophorone	U			348	µg/kg	348	EPA8270
N-Nitrosodi-n-propylamine	U			348	µg/kg	348	EPA8270
N-Nitrosodiphenylamine	U			348	µg/kg	348	EPA8270
Naphthalene	U			348	µg/kg	348	EPA8270
Nitrobenzene	U			348	µg/kg	348	EPA8270
Pentachlorophenol	U			1,740	µg/kg	1,740	EPA8270
Phenanthrene	U			348	µg/kg	348	EPA8270
Phenol	U			348	µg/kg	348	EPA8270
Pyrene	U			348	µg/kg	348	EPA8270
Unknown	J	N		400	µg/kg		EPA8270
Unknown	J	N		700	µg/kg		EPA8270
Unknown	J	N		200	µg/kg		EPA8270
Unknown	J	N		300	µg/kg		EPA8270
Unknown	J	N		200	µg/kg		EPA8270
o-cresol (2-methylphenol)	U			348	µg/kg	348	EPA8270
p-cresol (4-methylphenol)	U			348	µg/kg	348	EPA8270
Volatiles							
1,1,1-Trichloroethane	J	E		2.51	µg/kg	5.50	EPA8240
1.1.2.2-Tetrachloroethane	U			5.50	µg/kg	5.50	EPA8240
1.1,2-Trichloroethane	U			5.50	µg/kg	5.50	EPA8240
1.1-Dichloroethane	U			5.50	µg/kg	5.50	EPA8240
1.1-Dichloroethene	U			5.50	µg/kg	5.50	EPA8240
1.2-Dichloroethane	U			5.50	µg/kg	5.50	EPA8240
1.2-Dichloroethene (total)	U			5.50	µg/kg	5.50	EPA8240
1.2-Dichloropropane	U			5.50	µg/kg	5.50	EPA8240
2-Butanone (MEK)	U			11.0	µg/kg	11.0	EPA8240
2-Hexanone	U			11.0	µg/kg	11.0	EPA8240
4-Methyl-2-pentanone	U			11.0	µg/kg	11.0	EPA8240
Acetone	U			11.0	µg/kg	11.0	EPA8240

SAMPLE NAME: ABKSB0301A (continued) Sample ID: 102667

Constituent	RQ	AQ	BQ	Result	Unit	Q. Limit	Method
Volatiles							
Benzene	U			5.50	µg/kg	5.50	EPA8240
Bromodichloromethane	U			5.50	µg/kg	5.50	EPA8240
Bromoform	U			5.50	µg/kg	5.50	EPA8240
Bromomethane (Methyl bromide)	U			11.0	µg/kg	11.0	EPA8240
Carbon disulfide	U			5.50	µg/kg	5.50	EPA8240
Carbon tetrachloride	U			5.50	µg/kg	5.50	EPA8240
Chlorobenzene	U			5.50	µg/kg	5.50	EPA8240
Chlorodibromomethane	U			5.50	µg/kg	5.50	EPA8240
Chloroethane	U			11.0	µg/kg	11.0	EPA8240
Chloroform	U			5.50	µg/kg	5.50	EPA8240
Chloromethane (methyl chloride)	U			11.0	µg/kg	11.0	EPA8240
Dichloromethane (methylene chloride)	U	V		6.14	µg/kg	5.50	EPA8240
Ethylbenzene	U			5.50	µg/kg	5.50	EPA8240
Styrene	U			5.50	µg/kg	5.50	EPA8240
Tetrachloroethene				7.88	µg/kg	5.50	EPA8240
Toluene	U			5.50	µg/kg	5.50	EPA8240
Trichloroethene (TCE)	U			5.50	µg/kg	5.50	EPA8240
Vinyl acetate	U			11.0	µg/kg	11.0	EPA8240
Vinyl chloride	U			11.0	µg/kg	11.0	EPA8240
Xylenes (total)	J	E		1.62	µg/kg	5.50	EPA8240
cis-1,3-Dichloropropene	U			5.50	µg/kg	5.50	EPA8240
trans-1,3-Dichloropropene	U			5.50	µg/kg	5.50	EPA8240
Pesticides/PCBs							
Aldrin	U			1.74	µg/kg	1.74	EPA8081
Aroclor 1016	U			34.8	µg/kg	34.8	EPA8081
Aroclor 1221	U			69.6	µg/kg	69.6	EPA8081
Aroclor 1232	U			34.8	µg/kg	34.8	EPA8081
Aroclor 1242	U			34.8	µg/kg	34.8	EPA8081
Aroclor 1248	U			34.8	µg/kg	34.8	EPA8081
Aroclor 1254	U			34.8	µg/kg	34.8	EPA8081
Aroclor 1260	U			34.8	µg/kg	34.8	EPA8081
Dieldrin	U			3.48	µg/kg	3.48	EPA8081
Endosulfan I	U			1.74	µg/kg	1.74	EPA8081
Endosulfan II	U			3.48	µg/kg	3.48	EPA8081
Endosulfan sulfate	U			3.48	µg/kg	3.48	EPA8081
Endrin	UJ	G		3.48	µg/kg	3.48	EPA8081
Endrin ketone	UJ	G		3.48	µg/kg	3.48	EPA8081
Heptachlor	U			1.74	µg/kg	1.74	EPA8081
Heptachlor epoxide	U			1.74	µg/kg	1.74	EPA8081
Methoxychlor (Mariate)	U			17.4	µg/kg	17.4	EPA8081
Toxaphene	U			174	µg/kg	174	EPA8081
alpha-Benzene hexachloride	U			1.74	µg/kg	1.74	EPA8081
alpha-Chlordane	U			1.74	µg/kg	1.74	EPA8081
beta-Benzene hexachloride	U			1.74	µg/kg	1.74	EPA8081
delta-Benzene hexachloride	U			1.74	µg/kg	1.74	EPA8081
gamma-Benzene hexachloride (Lindane)	U			1.74	µg/kg	1.74	EPA8081
gamma-Chlordane	U			1.74	µg/kg	1.74	EPA8081
p,p'-DDD	UJ	G		3.48	µg/kg	3.48	EPA8081

SAMPLE NAME: ABKSB0301A (continued) Sample ID: 102667

Constituent	RQ	AQ	BQ	Result	Unit	Q. Limit	Method
Pesticides/PCBs							
p,p'-DDE	UJ	G		3.48	µg/kg	3.48	EPA8081
p,p'-DDT	UJ	G		3.48	µg/kg	3.48	EPA8081
Radionuclides							
Gross Alpha		V		21.0	pC/g	2.94	LANLMLR100MOD
Non-volatile Beta				16.3	pC/g	1.83	LANLMLR100MOD

SAMPLE NAME: ABKSB0302 Sample ID: 102668

Location (SRS Coordinates): 51122E 102106N
Ground Elevation Above MSL: 62 ft
Depth of Core Interval: 0.00 to 0.00 ft
Sample Type: Normal Sample Matrix: Soil Sample Moisture: Damp
Sample Color: USC Soil Classification: Percent Solids: 94.4

Constituent	RQ	AQ	BQ	Result	Unit	Q. Limit	Method
Physical Parameters							
Cation Exchange Capacity	U			636	Meq/	636	EPA9081
Total Organic Carbon		V		783	mg/kg	60.0	LLOYDKAHN
Total Petroleum Hydrocarbons	UJ	V		6.50	mg/kg	11.3	EPA9071
TAL Metals							
Aluminum		V		5,640	mg/kg	19.5	EPA6010
Antimony	U			3.67	mg/kg	3.67	EPA6010
Arsenic	U			11.6	mg/kg	11.6	EPA6010
Barium				23.6	mg/kg	1.15	EPA6010
Beryllium		V		0.227	mg/kg	0.262	EPA6010
Cadmium	J	E		0.0713	mg/kg	0.420	EPA6010
Calcium		V		90.6	mg/kg	17.6	EPA6010
Chromium				4.70	mg/kg	0.944	EPA6010
Cobalt				1.20	mg/kg	0.839	EPA6010
Copper				1.60	mg/kg	1.05	EPA6010
Cyanide	U			0.810	mg/kg	0.810	EPA9010
Iron				3,100	mg/kg	23.0	EPA6010
Lead	J	E		3.90	mg/kg	6.19	EPA6010
Magnesium				113	mg/kg	9.13	EPA6010
Manganese				38.0	mg/kg	0.210	EPA6010
Mercury	J	E		0.0300	mg/kg	0 141	EPA7471
Nickel				2.10	mg/kg	1.78	EPA6010
Potassium				84.8	mg/kg	70.3	EPA6010
Selenium	U			10.9	mg/kg	10.9	EPA6010
Silver	U			0.944	mg/kg	0.944	EPA6010
Sodium	J	E		17.7	mg/kg	135	EPA6010
Thallium	U			8.92	mg/kg	8.92	EPA6010
Vanadium				7.10	mg/kg	0.734	EPA6010

SAMPLE NAME: ABKSB0302 (continued) Sample ID: 102668

Constituent	RQ	AQ	BQ	Result	Unit	Q. Limit	Method
TAL Metals							
Zinc	J	E		4.50	mg/kg	16.9	EPA6010
Semivolatiles							
1,2,4-Trichlorobenzene	U			353	µg/kg	353	EPA8270
1,2-Dichlorobenzene	U			353	µg/kg	353	EPA8270
1,3-Dichlorobenzene	U			353	µg/kg	353	EPA8270
1,4-Dichlorobenzene	U			353	µg/kg	353	EPA8270
2,4,5-Trichlorophenol	U			1,760	µg/kg	1,760	EPA8270
2,4,6-Trichlorophenol	U			353	µg/kg	353	EPA8270
2,4-Dichlorophenol	U			353	µg/kg	353	EPA8270
2,4-Dimethyl phenol	U			353	µg/kg	353	EPA8270
2,4-Dinitrophenol	U			1,760	µg/kg	1,760	EPA8270
2,4-Dinitrotoluene	U			353	µg/kg	353	EPA8270
2,6-Dinitrotoluene	U			353	µg/kg	353	EPA8270
2-Chloronaphthalene	U			353	µg/kg	353	EPA8270
2-Chlorophenol	U			353	µg/kg	353	EPA8270
2-Methyl-4,6-dinitrophenol	U			1,760	µg/kg	1,760	EPA8270
2-Methylnaphthalene	U			353	µg/kg	353	EPA8270
2-Nitroaniline	U			1,760	µg/kg	1,760	EPA8270
2-Nitrophenol	U			353	µg/kg	353	EPA8270
3,3'-Dichlorobenzidine	U			706	µg/kg	706	EPA8270
3-Nitroaniline	U			1,760	µg/kg	1,760	EPA8270
4-Bromophenyl phenyl ether	U			353	µg/kg	353	EPA8270
4-Chloro-3-methylphenol (p-chloro-m-cresol)	U			353	µg/kg	353	EPA8270
4-Chloroaniline	U			353	µg/kg	353	EPA8270
4-Chlorophenyl phenyl ether	U			353	µg/kg	353	EPA8270
4-Nitroaniline	U			1,760	µg/kg	1,760	EPA8270
4-Nitrophenol	U			1,760	µg/kg	1,760	EPA8270
Acenapthene	U			353	µg/kg	353	EPA8270
Acenapthylene	U			353	µg/kg	353	EPA8270
Anthracene	U			353	µg/kg	353	EPA8270
Benzo(a)anthracene	U			353	µg/kg	353	EPA8270
Benzo(a)pyrene	U			353	µg/kg	353	EPA8270
Benzo(b)fluoranthene	U			353	µg/kg	353	EPA8270
Benzo(g,h,i)perylene	U			353	µg/kg	353	EPA8270
Benzo(k)fluoranthene	U			353	µg/kg	353	EPA8270
Benzoic acid	U			1,760	µg/kg	1,760	EPA8270
Benzyl alcohol	U			353	µg/kg	353	EPA8270
Bis(2-chloroethoxy) methane	U			353	µg/kg	353	EPA8270
Bis(2-chloroethyl) ether	U			353	µg/kg	353	EPA8270
Bis(2-chloroisopropyl) ether	U			353	µg/kg	353	EPA8270
Bis(2-ethylhexyl) phthalate	U			353	µg/kg	353	EPA8270
Butyl benzyl phthalate	U			353	µg/kg	353	EPA8270
Chrysene	U			353	µg/kg	353	EPA8270
Di-n-butyl phthalate	U			353	µg/kg	353	EPA8270
Di-n-octyl phthalate	U			353	µg/kg	353	EPA8270
Dibenzo(a,h)anthracene	U			353	µg/kg	353	EPA8270
Dibenzofuran	U			353	µg/kg	353	EPA8270

SAMPLE NAME: ABKSB0302 (continued) Sample ID: 102668

Constituent	RQ	AQ	BQ	Result	Unit	Q. Limit	Method
Semivolatiles							
Diethyl phthalate	U			353	µg/kg	353	EPA8270
Dimethyl phthalate	U			353	µg/kg	353	EPA8270
Fluoranthene	U			353	µg/kg	353	EPA8270
Fluorene	U			353	µg/kg	353	EPA8270
Hexachlorobenzene	U			353	µg/kg	353	EPA8270
Hexachlorobutadiene	U			353	µg/kg	353	EPA8270
Hexachlorocyclopentadiene	U			353	µg/kg	353	EPA8270
Hexachloroethane	U			353	µg/kg	353	EPA8270
Indeno(1,2,3-c,d)pyrene	U			353	µg/kg	353	EPA8270
Isophorone	U			353	µg/kg	353	EPA8270
N-Nitrosodi-n-propylamine	U			353	µg/kg	353	EPA8270
N-Nitrosodiphenylamine	U			353	µg/kg	353	EPA8270
Naphthalene	U			353	µg/kg	353	EPA8270
Nitrobenzene	U			353	µg/kg	353	EPA8270
Pentachlorophenol	U			1,760	µg/kg	1,760	EPA8270
Phenanthrene	U			353	µg/kg	353	EPA8270
Phenol	U			353	µg/kg	353	EPA8270
Pyrene	U			353	µg/kg	353	EPA8270
Terpene	J	N		2,000	µg/kg	.	EPA8270
Unknown	J	N		200	µg/kg	.	EPA8270
Unknown	J	N		200	µg/kg	.	EPA8270
Unknown	J	N		200	µg/kg	.	EPA8270
o-cresol (2-methylphenol)	U			353	µg/kg	353	EPA8270
p-cresol (4-methylphenol)	U			353	µg/kg	353	EPA8270
Volatiles							
1,1,1-Trichloroethane	J	E		1.21	µg/kg	5.00	EPA8240
1,1,2,2-Tetrachloroethane	U			5.00	µg/kg	5.00	EPA8240
1,1,2-Trichloroethane	U			5.00	µg/kg	5.00	EPA8240
1,1-Dichloroethane	U			5.00	µg/kg	5.00	EPA8240
1,1-Dichloroethene	U			5.00	µg/kg	5.00	EPA8240
1,2-Dichloroethane	U			5.00	µg/kg	5.00	EPA8240
1,2-Dichloroethene (total)	U			5.00	µg/kg	5.00	EPA8240
1,2-Dichloropropane	U			5.00	µg/kg	5.00	EPA8240
2-Butanone (MEK)	U			10.0	µg/kg	10.0	EPA8240
2-Hexanone	U			10.0	µg/kg	10.0	EPA8240
4-Methyl-2-pentanone	U			10.0	µg/kg	10.0	EPA8240
Acetone	U			10.0	µg/kg	10.0	EPA8240
Benzene	U			5.00	µg/kg	5.00	EPA8240
Bromodichloromethane	U			5.00	µg/kg	5.00	EPA8240
Bromoform	U			5.00	µg/kg	5.00	EPA8240
Bromomethane (Methyl bromide)	U			10.0	µg/kg	10.0	EPA8240
Carbon disulfide	U			5.00	µg/kg	5.00	EPA8240
Carbon tetrachloride	U			5.00	µg/kg	5.00	EPA8240
Chlorobenzene	U			5.00	µg/kg	5.00	EPA8240
Chlorodibromomethane	U			5.00	µg/kg	5.00	EPA8240
Chloroethane	U			10.0	µg/kg	10.0	EPA8240
Chloroform	U			5.00	µg/kg	5.00	EPA8240
Chloromethane (methyl chloride)	U			10.0	µg/kg	10.0	EPA8240

SAMPLE NAME: ABKSB0302 (continued) Sample ID: 102668

Constituent	RQ	AQ	BQ	Result	Unit	Q. Limit	Method
Volatiles							
Dichloromethane (methylene chloride)	U	V		23.7	µg/kg	5.00	EPA8240
Ethylbenzene	U			5.00	µg/kg	5.00	EPA8240
Styrene	U			5.00	µg/kg	5.00	EPA8240
Tetrachloroethene	J	E		2.56	µg/kg	5.00	EPA8240
Toluene	U			5.00	µg/kg	5.00	EPA8240
Trichloroethene (TCE)	U			5.00	µg/kg	5.00	EPA8240
Vinyl acetate	U			10.0	µg/kg	10.0	EPA8240
Vinyl chloride	U			10.0	µg/kg	10.0	EPA8240
Xylenes (total)	U			5.00	µg/kg	5.00	EPA8240
cis-1,3-Dichloropropene	U			5.00	µg/kg	5.00	EPA8240
trans-1,3-Dichloropropene	U			5.00	µg/kg	5.00	EPA8240
Pesticides/PCBs							
Aldrin	U			1.77	µg/kg	1.77	EPA8081
Aroclor 1016	U			35.3	µg/kg	35.3	EPA8081
Aroclor 1221	U			70.6	µg/kg	70.6	EPA8081
Aroclor 1232	U			35.3	µg/kg	35.3	EPA8081
Aroclor 1242	U			35.3	µg/kg	35.3	EPA8081
Aroclor 1248	U			35.3	µg/kg	35.3	EPA8081
Aroclor 1254	U			35.3	µg/kg	35.3	EPA8081
Aroclor 1260	U			35.3	µg/kg	35.3	EPA8081
Dieldrin	U			3.53	µg/kg	3.53	EPA8081
Endosulfan I	U			1.77	µg/kg	1.77	EPA8081
Endosulfan II	U			3.53	µg/kg	3.53	EPA8081
Endosulfan sulfate	U			3.53	µg/kg	3.53	EPA8081
Endrin	UJ	G		3.53	µg/kg	3.53	EPA8081
Endrin ketone	UJ	G		3.53	µg/kg	3.53	EPA8081
Heptachlor	U			1.77	µg/kg	1.77	EPA8081
Heptachlor epoxide	U			1.77	µg/kg	1.77	EPA8081
Methoxychlor (Mariate)	U			17.7	µg/kg	17.7	EPA8081
Toxaphene	U			177	µg/kg	177	EPA8081
alpha-Benzene hexachloride	U			1.77	µg/kg	1.77	EPA8081
alpha-Chlordane	U			1.77	µg/kg	1.77	EPA8081
beta-Benzene hexachloride	U			1.77	µg/kg	1.77	EPA8081
delta-Benzene hexachloride	U			1.77	µg/kg	1.77	EPA8081
gamma-Benzene hexachloride (Lindane)	U			1.77	µg/kg	1.77	EPA8081
gamma-Chlordane	U			1.77	µg/kg	1.77	EPA8081
p,p'-DDD	UJ	G		3.53	µg/kg	3.53	EPA8081
p,p'-DDE	UJ	G		3.53	µg/kg	3.53	EPA8081
p,p'-DDT	UJ	G		3.53	µg/kg	3.53	EPA8081
Radionuclides							
Gross Alpha	UI	V		4.33	pC/g	2.93	LANLMLR100MOD
Non-volatile Beta	UI			5.64	pC/g	1.81	LANLMLR100MOD

SAMPLE NAME: ABKSB0401 Sample ID: 102673

Location (SRS Coordinates): 51666E 102248N
Ground Elevation Above MSL: . ft
Depth of Core Interval: 0.00 to 1.00 ft
Sample Type: Normal Sample Matrix: Soil Sample Moisture: Dry
Sample Color: USC Soil Classification: Percent Solids: 94.0

Constituent	RQ	AQ	BQ	Result	Unit	Q. Limit	Method
Physical Parameters							
Cation Exchange Capacity	U			639	Meq/	639	EPA9081
Total Organic Carbon		V		4,760	mg/kg	60.0	LLOYDKAHN
Total Petroleum Hydrocarbons		V		15.1	mg/kg	11.4	EPA9071
TAL Metals							
Aluminum		V		4,000	mg/kg	19.4	EPA6010
Antimony	U			3.65	mg/kg	3.65	EPA6010
Arsenic	J	E		1.50	mg/kg	11.6	EPA6010
Barium				24.7	mg/kg	1.15	EPA6010
Beryllium		V		0.223	mg/kg	0.261	EPA6010
Cadmium	J	E		0.0876	mg/kg	0.417	EPA6010
Calcium		V		66.0	mg/kg	17.5	EPA6010
Chromium				4.00	mg/kg	0.939	EPA6010
Cobalt				1.10	mg/kg	0.834	EPA6010
Copper				1.60	mg/kg	1.04	EPA6010
Cyanide	U			0.780	mg/kg	0.780	EPA9010
Iron				2,530	mg/kg	22.8	EPA6010
Lead	J	E		5.00	mg/kg	6.15	EPA6010
Magnesium				79.6	mg/kg	9.07	EPA6010
Manganese				147	mg/kg	0.209	EPA6010
Mercury	J	E		0.0200	mg/kg	0.142	EPA7471
Nickel	J	E		1.40	mg/kg	1.77	EPA6010
Potassium	J	E		64.4	mg/kg	69.9	EPA6010
Selenium	U			10.8	mg/kg	10.8	EPA6010
Silver	U			0.939	mg/kg	0.939	EPA6010
Sodium	J	E		19.7	mg/kg	135	EPA6010
Thallium	U			8.87	mg/kg	8.87	EPA6010
Vanadium				6.40	mg/kg	0.730	EPA6010
Zinc	J	E		3.30	mg/kg	16.8	EPA6010
Semivolatiles							
1.2.4-Trichlorobenzene	U			355	µg/kg	355	EPA8270
1.2-Dichlorobenzene	U			355	µg/kg	355	EPA8270
1.3-Dichlorobenzene	U			355	µg/kg	355	EPA8270
1.4-Dichlorobenzene	U			355	µg/kg	355	EPA8270
2.4.5-Trichlorophenol	U			1.780	µg/kg	1.780	EPA8270
2.4.6-Trichlorophenol	U			355	µg/kg	355	EPA8270
2.4-Dichlorophenol	U			355	µg/kg	355	EPA8270
2.4-Dimethyl phenol	U			355	µg/kg	355	EPA8270
2.4-Dinitrophenol	U			1,780	µg/kg	1,780	EPA8270
2.4-Dinitrotoluene	U			355	µg/kg	355	EPA8270
2.6-Dinitrotoluene	U			355	µg/kg	355	EPA8270

SAMPLE NAME: ABKSB0401 (continued) Sample ID: 102673

Constituent	RQ	AQ	BQ	Result	Unit	Q. Limit	Method
Semivolatiles							
2-Chloronaphthalene	U			355	µg/kg	355	EPA8270
2-Chlorophenol	U			355	µg/kg	355	EPA8270
2-Methyl-4,6-dinitrophenol	U			1,780	µg/kg	1,780	EPA8270
2-Methylnaphthalene	U			355	µg/kg	355	EPA8270
2-Nitroaniline	U			1,780	µg/kg	1,780	EPA8270
2-Nitrophenol	U			355	µg/kg	355	EPA8270
3,3'-Dichlorobenzidine	U			710	µg/kg	710	EPA8270
3-Nitroaniline	U			1,780	µg/kg	1,780	EPA8270
4-Bromophenyl phenyl ether	U			355	µg/kg	355	EPA8270
4-Chloro-3-methylphenol (p-chloro-m-cresol)	U			355	µg/kg	355	EPA8270
4-Chloroaniline	U			355	µg/kg	355	EPA8270
4-Chlorophenyl phenyl ether	U			355	µg/kg	355	EPA8270
4-Nitroaniline	U			1,780	µg/kg	1,780	EPA8270
4-Nitrophenol	U			1,780	µg/kg	1,780	EPA8270
Acenapthene	U			355	µg/kg	355	EPA8270
Acenapthylene	U			355	µg/kg	355	EPA8270
Anthracene	U			355	µg/kg	355	EPA8270
Benzo(a)anthracene	U			355	µg/kg	355	EPA8270
Benzo(a)pyrene	U			355	µg/kg	355	EPA8270
Benzo(b)fluoranthene	U			355	µg/kg	355	EPA8270
Benzo(g,h,i)perylene	U			355	µg/kg	355	EPA8270
Benzo(k)fluoranthene	U			355	µg/kg	355	EPA8270
Benzoic acid	U			1,780	µg/kg	1,780	EPA8270
Benzyl alcohol	U			355	µg/kg	355	EPA8270
Bis(2-chloroethoxy) methane	U			355	µg/kg	355	EPA8270
Bis(2-chloroethyl) ether	U			355	µg/kg	355	EPA8270
Bis(2-chloroisopropyl) ether	U			355	µg/kg	355	EPA8270
Bis(2-ethylhexyl) phthalate	U			355	µg/kg	355	EPA8270
Butyl benzyl phthalate	U			355	µg/kg	355	EPA8270
Chrysene	U			355	µg/kg	355	EPA8270
Di-n-butyl phthalate	U			355	µg/kg	355	EPA8270
Di-n-octyl phthalate	U			355	µg/kg	355	EPA8270
Dibenzo(a,h)anthracene	U			355	µg/kg	355	EPA8270
Dibenzofuran	U			355	µg/kg	355	EPA8270
Diethyl phthalate	U			355	µg/kg	355	EPA8270
Dimethyl phthalate	U			355	µg/kg	355	EPA8270
Fluoranthene	U			355	µg/kg	355	EPA8270
Fluorene	U			355	µg/kg	355	EPA8270
Hexachlorobenzene	U			355	µg/kg	355	EPA8270
Hexachlorobutadiene	U			355	µg/kg	355	EPA8270
Hexachlorocyclopentadiene	U			355	µg/kg	355	EPA8270
Hexachloroethane	U			355	µg/kg	355	EPA8270
Indeno(1,2,3-c,d)pyrene	U			355	µg/kg	355	EPA8270
Isophorone	U			355	µg/kg	355	EPA8270
N-Nitrosodi-n-propylamine	U			355	µg/kg	355	EPA8270
N-Nitrosodiphenylamine	U			355	µg/kg	355	EPA8270
Naphthalene	U			355	µg/kg	355	EPA8270
Nitrobenzene	U			355	µg/kg	355	EPA8270
Pentachlorophenol	U			1,780	µg/kg	1,780	EPA8270

SAMPLE NAME: ABKSB0401 (continued) Sample ID: 102673

Constituent	RQ	AQ	BQ	Result	Unit	Q. Limit	Method
Semivolatiles							
Phenanthrene	U			355	µg/kg	355	EPA8270
Phenol	U			355	µg/kg	355	EPA8270
Pyrene	U			355	µg/kg	355	EPA8270
Terpene	J	N		1,000	µg/kg		EPA8270
Terpene	J	N		200	µg/kg		EPA8270
Unknown	J	N		200	µg/kg		EPA8270
Unknown	J	N		300	µg/kg		EPA8270
o-cresol (2-methylphenol)	U			355	µg/kg	355	EPA8270
p-cresol (4-methylphenol)	U			355	µg/kg	355	EPA8270
Volatiles							
1,1,1-Trichloroethane	J	E		4.61	µg/kg	5.00	EPA8240
1,1,2,2-Tetrachloroethane	U			5.00	µg/kg	5.00	EPA8240
1,1,2-Trichloroethane	U			5.00	µg/kg	5.00	EPA8240
1,1-Dichloroethane	U			5.00	µg/kg	5.00	EPA8240
1,1-Dichloroethene	U			5.00	µg/kg	5.00	EPA8240
1,2-Dichloroethane	U			5.00	µg/kg	5.00	EPA8240
1,2-Dichloroethene (total)	U			5.00	µg/kg	5.00	EPA8240
1,2-Dichloropropane	U			5.00	µg/kg	5.00	EPA8240
2-Butanone (MEK)	U			10.0	µg/kg	10.0	EPA8240
2-Hexanone	U			10.0	µg/kg	10.0	EPA8240
4-Methyl-2-pentanone	U			10.0	µg/kg	10.0	EPA8240
Acetone	U	V		22.1	µg/kg	10.0	EPA8240
Benzene	U			5.00	µg/kg	5.00	EPA8240
Bromodichloromethane	U			5.00	µg/kg	5.00	EPA8240
Bromoform	U			5.00	µg/kg	5.00	EPA8240
Bromomethane (Methyl bromide)	U			10.0	µg/kg	10.0	EPA8240
Carbon disulfide	U			5.00	µg/kg	5.00	EPA8240
Carbon tetrachloride	U			5.00	µg/kg	5.00	EPA8240
Chlorobenzene	U			5.00	µg/kg	5.00	EPA8240
Chlorodibromomethane	U			5.00	µg/kg	5.00	EPA8240
Chloroethane	U			10.0	µg/kg	10.0	EPA8240
Chloroform	U			5.00	µg/kg	5.00	EPA8240
Chloromethane (methyl chloride)	U			10.0	µg/kg	10.0	EPA8240
Dichloromethane (methylene chloride)	U	V		4.16	µg/kg	5.00	EPA8240
Ethylbenzene	U			5.00	µg/kg	5.00	EPA8240
Styrene	U			5.00	µg/kg	5.00	EPA8240
Tetrachloroethene				13.0	µg/kg	5.00	EPA8240
Toluene	U			5.00	µg/kg	5.00	EPA8240
Trichloroethene (TCE)	U			5.00	µg/kg	5.00	EPA8240
Unknown	J	N		20.0	µg/kg		EPA8240
Vinyl acetate	U			10.0	µg/kg	10.0	EPA8240
Vinyl chloride	U			10.0	µg/kg	10.0	EPA8240
Xylenes (total)	U			5.00	µg/kg	5.00	EPA8240
cis-1,3-Dichloropropene	U			5.00	µg/kg	5.00	EPA8240
trans-1,3-Dichloropropene	U			5.00	µg/kg	5.00	EPA8240

SAMPLE NAME: ABKSB0401 (continued) Sample ID: 102673

Constituent	RQ	AQ	BQ	Result	Unit	Q. Limit	Method
Pesticides/PCBs							
Aldrin	U			1.77	µg/kg	1.77	EPA8081
Aroclor 1016	U			35.5	µg/kg	35.5	EPA8081
Aroclor 1221	U			71.0	µg/kg	71.0	EPA8081
Aroclor 1232	U			35.5	µg/kg	35.5	EPA8081
Aroclor 1242	U			35.5	µg/kg	35.5	EPA8081
Aroclor 1248	U			35.5	µg/kg	35.5	EPA8081
Aroclor 1254	U			35.5	µg/kg	35.5	EPA8081
Aroclor 1260	U			35.5	µg/kg	35.5	EPA8081
Dieldrin	U			3.55	µg/kg	3.55	EPA8081
Endosulfan I	U			1.77	µg/kg	1.77	EPA8081
Endosulfan II	U			3.55	µg/kg	3.55	EPA8081
Endosulfan sulfate	U			3.55	µg/kg	3.55	EPA8081
Endrin	UJ	G		3.55	µg/kg	3.55	EPA8081
Endrin ketone	UJ	G		3.55	µg/kg	3.55	EPA8081
Heptachlor	U			1.77	µg/kg	1.77	EPA8081
Heptachlor epoxide	U			1.77	µg/kg	1.77	EPA8081
Methoxychlor (Mariate)	U			17.7	µg/kg	17.7	EPA8081
Toxaphene	U			177	µg/kg	177	EPA8081
alpha-Benzene hexachloride	U			1.77	µg/kg	1.77	EPA8081
alpha-Chlordane	U			1.77	µg/kg	1.77	EPA8081
beta-Benzene hexachloride	U			1.77	µg/kg	1.77	EPA8081
delta-Benzene hexachloride	U			1.77	µg/kg	1.77	EPA8081
gamma-Benzene hexachloride (Lindane)	U			1.77	µg/kg	1.77	EPA8081
gamma-Chlordane	U			1.77	µg/kg	1.77	EPA8081
p,p'-DDD	UJ	G		3.55	µg/kg	3.55	EPA8081
p,p'-DDE	UJ	G		3.55	µg/kg	3.55	EPA8081
p,p'-DDT	UJ	G		3.55	µg/kg	3.55	EPA8081
Radionuclides							
Gross Alpha		V		9.95	pC/g	2.87	LANLMLR100MOD
Non-volatile Beta	UI			5.06	pC/g	1.69	LANLMLR100MOD

SAMPLE NAME: ABKSB0402 Sample ID: 102674

Location (SRS Coordinates): 51666E 102248N
Ground Elevation Above MSL: . ft
Depth of Core Interval: 1.00 to 4.00 ft
Sample Type: Normal
Sample Color:
Sample Matrix: Soil
USC Soil Classification:
Sample Moisture: Damp
Percent Solids: 89.1

Constituent	RQ	AQ	BQ	Result	Unit	Q. Limit	Method
Physical Parameters							
Cation Exchange Capacity	U			673	Meq/	673	EPA9081
Total Organic Carbon		V		959	mg/kg	60.0	LLOYDKAHN
Total Petroleum Hydrocarbons	UJ	V		3.70	mg/kg	12.0	EPA9071

SAMPLE NAME: ABKSB0402 (continued) Sample ID: 102674

Constituent	RQ	AQ	BQ	Result	Unit	Q. Limit	Method
TAL Metals							
Aluminum		V		15,600	mg/kg	20.5	EPA6010
Antimony	J	E		0.484	mg/kg	3.85	EPA6010
Arsenic	J	E		3.60	mg/kg	12.2	EPA6010
Barium				42.7	mg/kg	1.21	EPA6010
Beryllium		V		0.387	mg/kg	0.275	EPA6010
Cadmium	J	E		0.411	mg/kg	0.440	EPA6010
Calcium		V		273	mg/kg	18.5	EPA6010
Chromium				15.9	mg/kg	0.990	EPA6010
Cobalt				2.00	mg/kg	0.880	EPA6010
Copper				3.50	mg/kg	1.10	EPA6010
Cyanide	U			0.850	mg/kg	0.850	EPA9010
Iron				13,200	mg/kg	24.1	EPA6010
Lead				7.80	mg/kg	6.49	EPA6010
Magnesium				171	mg/kg	9.57	EPA6010
Manganese				59.1	mg/kg	0.220	EPA6010
Mercury	J	E		0.0830	mg/kg	0.150	EPA7471
Nickel				3.80	mg/kg	1.87	EPA6010
Potassium				139	mg/kg	73.7	EPA6010
Selenium	U			11.4	mg/kg	11.4	EPA6010
Silver	U			0.990	mg/kg	0.990	EPA6010
Sodium	J	E		71.6	mg/kg	142	EPA6010
Thallium	U			9.35	mg/kg	9.35	EPA6010
Vanadium				31.6	mg/kg	0.770	EPA6010
Zinc	J	E		6.70	mg/kg	17.7	EPA6010
Semivolatiles							
1,2,4-Trichlorobenzene	U			374	µg/kg	374	EPA8270
1,2-Dichlorobenzene	U			374	µg/kg	374	EPA8270
1,3-Dichlorobenzene	U			374	µg/kg	374	EPA8270
1,4-Dichlorobenzene	U			374	µg/kg	374	EPA8270
2,4,5-Trichlorophenol	U			1,870	µg/kg	1,870	EPA8270
2,4,6-Trichlorophenol	U			374	µg/kg	374	EPA8270
2,4-Dichlorophenol	U			374	µg/kg	374	EPA8270
2,4-Dimethyl phenol	U			374	µg/kg	374	EPA8270
2,4-Dinitrophenol	U			1,870	µg/kg	1,870	EPA8270
2,4-Dinitrotoluene	U			374	µg/kg	374	EPA8270
2,6-Dinitrotoluene	U			374	µg/kg	374	EPA8270
2-Chloronaphthalene	U			374	µg/kg	374	EPA8270
2-Chlorophenol	U			374	µg/kg	374	EPA8270
2-Methyl-4,6-dinitrophenol	U			1,870	µg/kg	1,870	EPA8270
2-Methylnaphthalene	U			374	µg/kg	374	EPA8270
2-Nitroaniline	U			1,870	µg/kg	1,870	EPA8270
2-Nitrophenol	U			374	µg/kg	374	EPA8270
3,3'-Dichlorobenzidine	U			748	µg/kg	748	EPA8270
3-Nitroaniline	U			1,870	µg/kg	1,870	EPA8270
4-Bromophenyl phenyl ether	U			374	µg/kg	374	EPA8270
4-Chloro-3-methylphenol (p-chloro-m-cresol)	U			374	µg/kg	374	EPA8270
4-Chloroaniline	U			374	µg/kg	374	EPA8270

SAMPLE NAME: ABKSB0402 (continued) Sample ID: 102674

Constituent	RQ	AQ	BQ	Result	Unit	Q. Limit	Method
Semivolatiles							
4-Chlorophenyl phenyl ether	U			374	µg/kg	374	EPA8270
4-Nitroaniline	U			1,870	µg/kg	1,870	EPA8270
4-Nitrophenol	U			1,870	µg/kg	1,870	EPA8270
Acenapthene	U			374	µg/kg	374	EPA8270
Acenapthylene	U			374	µg/kg	374	EPA8270
Anthracene	U			374	µg/kg	374	EPA8270
Benzo(a)anthracene	U			374	µg/kg	374	EPA8270
Benzo(a)pyrene	U			374	µg/kg	374	EPA8270
Benzo(b)fluoranthene	U			374	µg/kg	374	EPA8270
Benzo(g,h,i)perylene	U			374	µg/kg	374	EPA8270
Benzo(k)fluoranthene	U			374	µg/kg	374	EPA8270
Benzoic acid	U			1,870	µg/kg	1,870	EPA8270
Benzyl alcohol	U			374	µg/kg	374	EPA8270
Bis(2-chloroethoxy) methane	U			374	µg/kg	374	EPA8270
Bis(2-chloroethyl) ether	U			374	µg/kg	374	EPA8270
Bis(2-chloroisopropyl) ether	U			374	µg/kg	374	EPA8270
Bis(2-ethylhexyl) phthalate	U			374	µg/kg	374	EPA8270
Butyl benzyl phthalate	U			374	µg/kg	374	EPA8270
Chrysene	U			374	µg/kg	374	EPA8270
Di-n-butyl phthalate	U			374	µg/kg	374	EPA8270
Di-n-octyl phthalate	U			374	µg/kg	374	EPA8270
Dibenzo(a,h)anthracene	U			374	µg/kg	374	EPA8270
Dibenzofuran	U			374	µg/kg	374	EPA8270
Diethyl phthalate	U			374	µg/kg	374	EPA8270
Dimethyl phthalate	U			374	µg/kg	374	EPA8270
Fluoranthene	U			374	µg/kg	374	EPA8270
Fluorene	U			374	µg/kg	374	EPA8270
Hexachlorobenzene	U			374	µg/kg	374	EPA8270
Hexachlorobutadiene	U			374	µg/kg	374	EPA8270
Hexachlorocyclopentadiene	U			374	µg/kg	374	EPA8270
Hexachloroethane	U			374	µg/kg	374	EPA8270
Indeno(1,2,3-c,d)pyrene	U			374	µg/kg	374	EPA8270
Isophorone	U			374	µg/kg	374	EPA8270
N-Nitrosodi-n-propylamine	U			374	µg/kg	374	EPA8270
N-Nitrosodiphenylamine	U			374	µg/kg	374	EPA8270
Naphthalene	U			374	µg/kg	374	EPA8270
Nitrobenzene	U			374	µg/kg	374	EPA8270
Pentachlorophenol	U			1,870	µg/kg	1,870	EPA8270
Phenanthrene	U			374	µg/kg	374	EPA8270
Phenol	U			374	µg/kg	374	EPA8270
Pyrene	U			374	µg/kg	374	EPA8270
Unknown	J	N		300	µg/kg		EPA8270
Unknown	J	N		500	µg/kg		EPA8270
o-cresol (2-methylphenol)	U			374	µg/kg	374	EPA8270
p-cresol (4-methylphenol)	U			374	µg/kg	374	EPA8270

SAMPLE NAME: ABKSB0402 (continued) Sample ID: 102674

Constituent	RQ	AQ	BQ	Result	Unit	Q. Limit	Method
Volatiles							
1,1,1-Trichloroethane	U			6.00	µg/kg	6.00	EPA8240
1,1,2,2-Tetrachloroethane	U			6.00	µg/kg	6.00	EPA8240
1,1,2-Trichloroethane	U			6.00	µg/kg	6.00	EPA8240
1,1-Dichloroethane	U			6.00	µg/kg	6.00	EPA8240
1,1-Dichloroethene	U			6.00	µg/kg	6.00	EPA8240
1,2-Dichloroethane	U			6.00	µg/kg	6.00	EPA8240
1,2-Dichloroethene (total)	U			6.00	µg/kg	6.00	EPA8240
1,2-Dichloropropane	U			6.00	µg/kg	6.00	EPA8240
2-Butanone (MEK)	U			12.0	µg/kg	12.0	EPA8240
2-Hexanone	U			12.0	µg/kg	12.0	EPA8240
4-Methyl-2-pentanone	U			12.0	µg/kg	12.0	EPA8240
Acetone	U	V		13.1	µg/kg	12.0	EPA8240
Benzene	U			6.00	µg/kg	6.00	EPA8240
Bromodichloromethane	U			6.00	µg/kg	6.00	EPA8240
Bromoform	U			6.00	µg/kg	6.00	EPA8240
Bromomethane (Methyl bromide)	U			12.0	µg/kg	12.0	EPA8240
Carbon disulfide	U			6.00	µg/kg	6.00	EPA8240
Carbon tetrachloride	U			6.00	µg/kg	6.00	EPA8240
Chlorobenzene	U			6.00	µg/kg	6.00	EPA8240
Chlorodibromomethane	U			6.00	µg/kg	6.00	EPA8240
Chloroethane	U			12.0	µg/kg	12.0	EPA8240
Chloroform	U			6.00	µg/kg	6.00	EPA8240
Chloromethane (methyl chloride)	U			12.0	µg/kg	12.0	EPA8240
Dichloromethane (methylene chloride)	U	V		3.50	µg/kg	6.00	EPA8240
Ethylbenzene	U			6.00	µg/kg	6.00	EPA8240
Styrene	U			6.00	µg/kg	6.00	EPA8240
Tetrachloroethene	J	E		3.26	µg/kg	6.00	EPA8240
Toluene	U			6.00	µg/kg	6.00	EPA8240
Trichloroethene (TCE)	U			6.00	µg/kg	6.00	EPA8240
Unknown	J	N		100	µg/kg		EPA8240
Unknown	J	N		10.0	µg/kg		EPA8240
Vinyl acetate	U			12.0	µg/kg	12.0	EPA8240
Vinyl chloride	U			12.0	µg/kg	12.0	EPA8240
Xylenes (total)	U			6.00	µg/kg	6.00	EPA8240
cis-1,3-Dichloropropene	U			6.00	µg/kg	6.00	EPA8240
trans-1,3-Dichloropropene	U			6.00	µg/kg	6.00	EPA8240
Pesticides/PCBs							
Aldrin	U			1.87	µg/kg	1.87	EPA8081
Aroclor 1016	U			37.4	µg/kg	37.4	EPA8081
Aroclor 1221	U			74.8	µg/kg	74.8	EPA8081
Aroclor 1232	U			37.4	µg/kg	37.4	EPA8081
Aroclor 1242	U			37.4	µg/kg	37.4	EPA8081
Aroclor 1248	U			37.4	µg/kg	37.4	EPA8081
Aroclor 1254	U			37.4	µg/kg	37.4	EPA8081
Aroclor 1260	U			37.4	µg/kg	37.4	EPA8081
Dieldrin	U			3.74	µg/kg	3.74	EPA8081
Endosulfan I	U			1.87	µg/kg	1.87	EPA8081
Endosulfan II	U			3.74	µg/kg	3.74	EPA8081

SAMPLE NAME: ABKSB0402 (continued) Sample ID: 102674

Constituent	RQ	AQ	BQ	Result	Unit	Q. Limit	Method
Pesticides/PCBs							
Endosulfan sulfate	U			3.74	µg/kg	3.74	EPA8081
Endrin	UJ	G		3.74	µg/kg	3.74	EPA8081
Endrin ketone	UJ	G		3.74	µg/kg	3.74	EPA8081
Heptachlor	U			1.87	µg/kg	1.87	EPA8081
Heptachlor epoxide	U			1.87	µg/kg	1.87	EPA8081
Methoxychlor (Mariate)	U			18.7	µg/kg	18.7	EPA8081
Toxaphene	U			187	µg/kg	187	EPA8081
alpha-Benzene hexachloride	U			1.87	µg/kg	1.87	EPA8081
alpha-Chlordane	U			1.87	µg/kg	1.87	EPA8081
beta-Benzene hexachloride	U			1.87	µg/kg	1.87	EPA8081
delta-Benzene hexachloride	U			1.87	µg/kg	1.87	EPA8081
gamma-Benzene hexachloride (Lindane)	U			1.87	µg/kg	1.87	EPA8081
gamma-Chlordane	U			1.87	µg/kg	1.87	EPA8081
p,p'-DDD	UJ	G		3.74	µg/kg	3.74	EPA8081
p,p'-DDE	UJ	G		3.74	µg/kg	3.74	EPA8081
p,p'-DDT	UJ	G		3.74	µg/kg	3.74	EPA8081
Radionuclides							
Gross Alpha		V		25.9	pC/g	2.92	LANLMLR100MOD
Non-volatile Beta				10.6	pC/g	1.79	LANLMLR100MOD

SAMPLE NAME: ABKSB0501 Sample ID: 102669

Location (SRS Coordinates): 50900E 102051N
Ground Elevation Above MSL: . ft
Depth of Core Interval: 0.00 to 1.00 ft
Sample Type: Normal
Sample Color:
Sample Matrix: Soil
USC Soil Classification:
Sample Moisture: Dry
Percent Solids: 94.4

Constituent	RQ	AQ	BQ	Result	Unit	Q. Limit	Method
Physical Parameters							
Cation Exchange Capacity	U			636	Meq/	636	EPA9081
Total Organic Carbon		V		3,710	mg/kg	60.0	LLOYDKAHN
Total Petroleum Hydrocarbons	UJ	V		7.70	mg/kg	11.3	EPA9071
TAL Metals							
Aluminum		V		3,680	mg/kg	19.3	EPA6010
Antimony	U			3.64	mg/kg	3.64	EPA6010
Arsenic	U			11.5	mg/kg	11.5	EPA6010
Barium				18.2	mg/kg	1.14	EPA6010
Beryllium		V		0.185	mg/kg	0.260	EPA6010
Cadmium	J	E		0.0790	mg/kg	0.416	EPA6010
Calcium		V		228	mg/kg	17.5	EPA6010
Chromium				3.90	mg/kg	0.935	EPA6010
Cobalt				0.845	mg/kg	0.831	EPA6010

SAMPLE NAME: ABKSB0501 (continued) Sample ID: 102669

Constituent	RQ	AQ	BQ	Result	Unit	Q. Limit	Method
TAL Metals							
Copper				1.60	mg/kg	1.04	EPA6010
Cyanide	U			0.800	mg/kg	0.800	EPA9010
Iron				2,350	mg/kg	22.8	EPA6010
Lead	J	E		3.40	mg/kg	6.13	EPA6010
Magnesium				68.7	mg/kg	9.04	EPA6010
Manganese				84.3	mg/kg	0.208	EPA6010
Mercury	J	E		0.0100	mg/kg	0.141	EPA7471
Nickel	J	E		1.50	mg/kg	1.77	EPA6010
Potassium	J	E		68.0	mg/kg	69.6	EPA6010
Selenium	U			10.8	mg/kg	10.8	EPA6010
Silver	U			0.935	mg/kg	0.935	EPA6010
Sodium	J	E		17.1	mg/kg	134	EPA6010
Thallium	U			8.83	mg/kg	8.83	EPA6010
Vanadium				5.10	mg/kg	0.727	EPA6010
Zinc	J	E		3.20	mg/kg	16.7	EPA6010
Semivolatiles							
1,2,4-Trichlorobenzene	U			353	µg/kg	353	EPA8270
1,2-Dichlorobenzene	U			353	µg/kg	353	EPA8270
1,3-Dichlorobenzene	U			353	µg/kg	353	EPA8270
1,4-Dichlorobenzene	U			353	µg/kg	353	EPA8270
2,4,5-Trichlorophenol	U			1,760	µg/kg	1,760	EPA8270
2,4,6-Trichlorophenol	U			353	µg/kg	353	EPA8270
2,4-Dichlorophenol	U			353	µg/kg	353	EPA8270
2,4-Dimethyl phenol	U			353	µg/kg	353	EPA8270
2,4-Dinitrophenol	U			1,760	µg/kg	1,760	EPA8270
2,4-Dinitrotoluene	U			353	µg/kg	353	EPA8270
2,6-Dinitrotoluene	U			353	µg/kg	353	EPA8270
2-Chloronaphthalene	U			353	µg/kg	353	EPA8270
2-Chlorophenol	U			353	µg/kg	353	EPA8270
2-Methyl-4,6-dinitrophenol	U			1,760	µg/kg	1,760	EPA8270
2-Methylnaphthalene	U			353	µg/kg	353	EPA8270
2-Nitroaniline	U			1,760	µg/kg	1,760	EPA8270
2-Nitrophenol	U			353	µg/kg	353	EPA8270
3,3'-Dichlorobenzidine	U			706	µg/kg	706	EPA8270
3-Nitroaniline	U			1,760	µg/kg	1,760	EPA8270
4-Bromophenyl phenyl ether	U			353	µg/kg	353	EPA8270
4-Chloro-3-methylphenol (p-chloro-m-cresol)	U			353	µg/kg	353	EPA8270
4-Chloroaniline	U			353	µg/kg	353	EPA8270
4-Chlorophenyl phenyl ether	U			353	µg/kg	353	EPA8270
4-Nitroaniline	U			1,760	µg/kg	1,760	EPA8270
4-Nitrophenol	U			1,760	µg/kg	1,760	EPA8270
Acenapthene	U			353	µg/kg	353	EPA8270
Acenapthylene	U			353	µg/kg	353	EPA8270
Anthracene	U			353	µg/kg	353	EPA8270
Benzo(a)anthracene	U			353	µg/kg	353	EPA8270
Benzo(a)pyrene	U			353	µg/kg	353	EPA8270
Benzo(b)fluoranthene	U			353	µg/kg	353	EPA8270

SAMPLE NAME: ABKSB0501 (continued) Sample ID: 102669

Constituent	RQ	AQ	BQ	Result	Unit	Q. Limit	Method
Semivolatiles							
Benzo(g,h,i)perylene	U			353	µg/kg	353	EPA8270
Benzo(k)fluoranthene	U			353	µg/kg	353	EPA8270
Benzoic acid	U			1,760	µg/kg	1,760	EPA8270
Benzyl alcohol	U			353	µg/kg	353	EPA8270
Bis(2-chloroethoxy) methane	U			353	µg/kg	353	EPA8270
Bis(2-chloroethyl) ether	U			353	µg/kg	353	EPA8270
Bis(2-chloroisopropyl) ether	U			353	µg/kg	353	EPA8270
Bis(2-ethylhexyl) phthalate	U			353	µg/kg	353	EPA8270
Butyl benzyl phthalate	U			353	µg/kg	353	EPA8270
Chrysene	U			353	µg/kg	353	EPA8270
Di-n-butyl phthalate	U			353	µg/kg	353	EPA8270
Di-n-octyl phthalate	U			353	µg/kg	353	EPA8270
Dibenzo(a,h)anthracene	U			353	µg/kg	353	EPA8270
Dibenzofuran	U			353	µg/kg	353	EPA8270
Diethyl phthalate	U			353	µg/kg	353	EPA8270
Dimethyl phthalate	U			353	µg/kg	353	EPA8270
Fluoranthene	U			353	µg/kg	353	EPA8270
Fluorene	U			353	µg/kg	353	EPA8270
Hexachlorobenzene	U			353	µg/kg	353	EPA8270
Hexachlorobutadiene	U			353	µg/kg	353	EPA8270
Hexachlorocyclopentadiene	U			353	µg/kg	353	EPA8270
Hexachloroethane	U			353	µg/kg	353	EPA8270
Indeno(1,2,3-c,d)pyrene	U			353	µg/kg	353	EPA8270
Isophorone	U			353	µg/kg	353	EPA8270
N-Nitrosodi-n-propylamine	U			353	µg/kg	353	EPA8270
N-Nitrosodiphenylamine	U			353	µg/kg	353	EPA8270
Naphthalene	U			353	µg/kg	353	EPA8270
Nitrobenzene	U			353	µg/kg	353	EPA8270
Pentachlorophenol	U			1,760	µg/kg	1,760	EPA8270
Phenanthrene	U			353	µg/kg	353	EPA8270
Phenol	U			353	µg/kg	353	EPA8270
Pyrene	U			353	µg/kg	353	EPA8270
Unknown	J	N		200	µg/kg		EPA8270
o-cresol (2-methylphenol)	U			353	µg/kg	353	EPA8270
p-cresol (4-methylphenol)	U			353	µg/kg	353	EPA8270
Volatiles							
1,1,1-Trichloroethane	J	O	H	7.16	µg/kg	5.50	EPA8240
1,1,2,2-Tetrachloroethane	UJ	O	H	5.50	µg/kg	5.50	EPA8240
1,1,2-Trichloroethane	UJ	O	H	5.50	µg/kg	5.50	EPA8240
1,1-Dichloroethane	UJ	O	H	5.50	µg/kg	5.50	EPA8240
1,1-Dichloroethene	UJ	O	H	5.50	µg/kg	5.50	EPA8240
1,2-Dichloroethane	UJ	O	H	5.50	µg/kg	5.50	EPA8240
1,2-Dichloroethene (total)	UJ	O	H	5.50	µg/kg	5.50	EPA8240
1,2-Dichloropropane	UJ	O	H	5.50	µg/kg	5.50	EPA8240
2-Butanone (MEK)	UJ	O	H	11.0	µg/kg	11.0	EPA8240
2-Hexanone	UJ	O	H	11.0	µg/kg	11.0	EPA8240
4-Methyl-2-pentanone	UJ	O	H	11.0	µg/kg	11.0	EPA8240
Acetone	UJ	VO	H	21.7	µg/kg	11.0	EPA8240

SAMPLE NAME: ABKSB0501 (continued) Sample ID: 102669

Constituent	RQ	AQ	BQ	Result	Unit	Q. Limit	Method
Volatiles							
Benzene	UJ	O	H	5.50	µg/kg	5.50	EPA8240
Bromodichloromethane	UJ	O	H	5.50	µg/kg	5.50	EPA8240
Bromoform	UJ	O	H	5.50	µg/kg	5.50	EPA8240
Bromomethane (Methyl bromide)	UJ	O	H	11.0	µg/kg	11.0	EPA8240
Carbon disulfide	UJ	O	H	5.50	µg/kg	5.50	EPA8240
Carbon tetrachloride	UJ	O	H	5.50	µg/kg	5.50	EPA8240
Chlorobenzene	UJ	O	H	5.50	µg/kg	5.50	EPA8240
Chlorodibromomethane	UJ	O	H	5.50	µg/kg	5.50	EPA8240
Chloroethane	UJ	O	H	11.0	µg/kg	11.0	EPA8240
Chloroform	UJ	O	H	5.50	µg/kg	5.50	EPA8240
Chloromethane (methyl chloride)	UJ	O	H	11.0	µg/kg	11.0	EPA8240
Dichloromethane (methylene chloride)	UJ	VO	H	23.2	µg/kg	5.50	EPA8240
Ethylbenzene	UJ	O	H	5.50	µg/kg	5.50	EPA8240
Styrene	UJ	O	H	5.50	µg/kg	5.50	EPA8240
Tetrachloroethene	J	O	H	9.79	µg/kg	5.50	EPA8240
Toluene	UJ	O	H	5.50	µg/kg	5.50	EPA8240
Trichloroethene (TCE)	UJ	O	H	5.50	µg/kg	5.50	EPA8240
Vinyl acetate	UJ	O	H	11.0	µg/kg	11.0	EPA8240
Vinyl chloride	UJ	O	H	11.0	µg/kg	11.0	EPA8240
Xylenes (total)	J	EO	H	1.22	µg/kg	5.50	EPA8240
cis-1,3-Dichloropropene	UJ	O	H	5.50	µg/kg	5.50	EPA8240
trans-1,3-Dichloropropene	UJ	O	H	5.50	µg/kg	5.50	EPA8240
Pesticides/PCBs							
Aldrin	U			1.77	µg/kg	1.77	EPA8081
Aroclor 1016	U			35.3	µg/kg	35.3	EPA8081
Aroclor 1221	U			70.6	µg/kg	70.6	EPA8081
Aroclor 1232	U			35.3	µg/kg	35.3	EPA8081
Aroclor 1242	U			35.3	µg/kg	35.3	EPA8081
Aroclor 1248	U			35.3	µg/kg	35.3	EPA8081
Aroclor 1254	U			35.3	µg/kg	35.3	EPA8081
Aroclor 1260	U			35.3	µg/kg	35.3	EPA8081
Dieldrin	U			3.53	µg/kg	3.53	EPA8081
Endosulfan I	U			1.77	µg/kg	1.77	EPA8081
Endosulfan II	U			3.53	µg/kg	3.53	EPA8081
Endosulfan sulfate	U			3.53	µg/kg	3.53	EPA8081
Endrin	UJ	G		3.53	µg/kg	3.53	EPA8081
Endrin ketone	UJ	G		3.53	µg/kg	3.53	EPA8081
Heptachlor	U			1.77	µg/kg	1.77	EPA8081
Heptachlor epoxide	U			1.77	µg/kg	1.77	EPA8081
Methoxychlor (Mariate)	U			17.7	µg/kg	17.7	EPA8081
Toxaphene	U			177	µg/kg	177	EPA8081
alpha-Benzene hexachloride	U			1.77	µg/kg	1.77	EPA8081
alpha-Chlordane	U			1.77	µg/kg	1.77	EPA8081
beta-Benzene hexachloride	U			1.77	µg/kg	1.77	EPA8081
delta-Benzene hexachloride	U			1.77	µg/kg	1.77	EPA8081
gamma-Benzene hexachloride (Lindane)	U			1.77	µg/kg	1.77	EPA8081
gamma-Chlordane	U			1.77	µg/kg	1.77	EPA8081
p,p'-DDD	UJ	G		3.53	µg/kg	3.53	EPA8081

SAMPLE NAME: ABKSB0501 (continued) Sample ID: 102669

Constituent	RQ	AQ	BQ	Result	Unit	Q. Limit	Method
Pesticides/PCBs							
p,p'-DDE	UJ	G		3.53	µg/kg	3.53	EPA8081
p,p'-DDT	UJ	G		3.53	µg/kg	3.53	EPA8081
Radionuclides							
Gross Alpha		V		11.0	pC/g	2.92	LANLMLR100MOD
Non-volatile Beta	UI			5.59	pC/g	1.79	LANLMLR100MOD

SAMPLE NAME: ABKSB0502 Sample ID: 102670

Location (SRS Coordinates): 50900E 102051N
Ground Elevation Above MSL: . ft
Depth of Core Interval: 1.00 to 4.00 ft
Sample Type: Normal
Sample Color:
Sample Matrix: Soil
USC Soil Classification:
Sample Moisture: Dry
Percent Solids: 93.4

Constituent	RQ	AQ	BQ	Result	Unit	Q. Limit	Method
Physical Parameters							
Cation Exchange Capacity	U			642	Meq/	642	EPA9081
Total Organic Carbon				5.260	mg/kg	60.0	LLOYDKAHN
Total Petroleum Hydrocarbons	UJ	V		3.10	mg/kg	11.4	EPA418.1
TAL Metals							
Aluminum				5,580	mg/kg	19.9	EPA6010
Antimony	U			3.75	mg/kg	3.75	EPA6010
Arsenic	J	E		1.50	mg/kg	11.9	EPA6010
Barium				23.7	mg/kg	1.18	EPA6010
Beryllium	J	E		0.225	mg/kg	0.268	EPA6010
Cadmium	U			0.428	mg/kg	0.428	EPA6010
Calcium				131	mg/kg	18.0	EPA6010
Chromium				5.60	mg/kg	0.964	EPA6010
Cobalt				1.30	mg/kg	0.857	EPA6010
Copper				2.10	mg/kg	1.07	EPA6010
Cyanide	U			0.810	mg/kg	0.810	EPA9010
Iron				3.810	mg/kg	23.5	EPA6010
Lead	J	E		3.70	mg/kg	6.32	EPA6010
Magnesium				94.6	mg/kg	9.32	EPA6010
Manganese				69.8	mg/kg	0.214	EPA6010
Mercury	J	E		0.0470	mg/kg	0.143	EPA7471
Nickel				2.10	mg/kg	1.82	EPA6010
Potassium	J	E		70.9	mg/kg	71.8	EPA6010
Selenium	U			11.1	mg/kg	11.1	EPA6010
Silver	U			0.964	mg/kg	0.964	EPA6010
Sodium	J	E		21.6	mg/kg	138	EPA6010
Thallium	U			9.10	mg/kg	9.10	EPA6010
Vanadium				7.80	mg/kg	0.750	EPA6010

SAMPLE NAME: ABKSB0502 (continued) Sample ID: 102670

Constituent	RQ	AQ	BQ	Result	Unit	Q. Limit	Method
TAL Metals							
Zinc	J	E		3.00	mg/kg	17.2	EPA6010
Semivolatiles							
1,2,4-Trichlorobenzene	U			357	µg/kg	357	EPA8270
1,2-Dichlorobenzene	U			357	µg/kg	357	EPA8270
1,3-Dichlorobenzene	U			357	µg/kg	357	EPA8270
1,4-Dichlorobenzene	U			357	µg/kg	357	EPA8270
2,4,5-Trichlorophenol	U			1,780	µg/kg	1,780	EPA8270
2,4,6-Trichlorophenol	U			357	µg/kg	357	EPA8270
2,4-Dichlorophenol	U			357	µg/kg	357	EPA8270
2,4-Dimethyl phenol	U			357	µg/kg	357	EPA8270
2,4-Dinitrophenol	U			1,780	µg/kg	1,780	EPA8270
2,4-Dinitrotoluene	U			357	µg/kg	357	EPA8270
2,6-Dinitrotoluene	U			357	µg/kg	357	EPA8270
2-Chloronaphthalene	U			357	µg/kg	357	EPA8270
2-Chlorophenol	U			357	µg/kg	357	EPA8270
2-Methyl-4,6-dinitrophenol	U			1,780	µg/kg	1,780	EPA8270
2-Methylnaphthalene	U			357	µg/kg	357	EPA8270
2-Nitroaniline	U			1,780	µg/kg	1,780	EPA8270
2-Nitrophenol	U			357	µg/kg	357	EPA8270
3,3'-Dichlorobenzidine	U			714	µg/kg	714	EPA8270
3-Nitroaniline	U			1,780	µg/kg	1,780	EPA8270
4-Bromophenyl phenyl ether	U			357	µg/kg	357	EPA8270
4-Chloro-3-methylphenol (p-chloro-m-cresol)	U			357	µg/kg	357	EPA8270
4-Chloroaniline	U			357	µg/kg	357	EPA8270
4-Chlorophenyl phenyl ether	U			357	µg/kg	357	EPA8270
4-Nitroaniline	U			1,780	µg/kg	1,780	EPA8270
4-Nitrophenol	U			1,780	µg/kg	1,780	EPA8270
Acenapthene	U			357	µg/kg	357	EPA8270
Acenapthylene	U			357	µg/kg	357	EPA8270
Aldol condensate	J	KN		500	µg/kg		EPA8270
Anthracene	U			357	µg/kg	357	EPA8270
Benzo(a)anthracene	U			357	µg/kg	357	EPA8270
Benzo(a)pyrene	U			357	µg/kg	357	EPA8270
Benzo(b)fluoranthene	U			357	µg/kg	357	EPA8270
Benzo(g,h,i)perylene	U			357	µg/kg	357	EPA8270
Benzo(k)fluoranthene	U			357	µg/kg	357	EPA8270
Benzoic acid	U			1,780	µg/kg	1,780	EPA8270
Benzyl alcohol	U			357	µg/kg	357	EPA8270
Bis(2-chloroethoxy) methane	U			357	µg/kg	357	EPA8270
Bis(2-chloroethyl) ether	U			357	µg/kg	357	EPA8270
Bis(2-chloroisopropyl) ether	U			357	µg/kg	357	EPA8270
Bis(2-ethylhexyl) phthalate	U			357	µg/kg	357	EPA8270
Butyl benzyl phthalate	U			357	µg/kg	357	EPA8270
Chrysene	U			357	µg/kg	357	EPA8270
Di-n-butyl phthalate	U			357	µg/kg	357	EPA8270
Di-n-octyl phthalate	U			357	µg/kg	357	EPA8270
Dibenzo(a,h)anthracene	U			357	µg/kg	357	EPA8270

SAMPLE NAME: ABKSB0502 (continued) Sample ID: 102670

Constituent	RQ	AQ	BQ	Result	Unit	Q. Limit	Method
Semivolatiles							
Dibenzofuran	U			357	µg/kg	357	EPA8270
Diethyl phthalate	U			357	µg/kg	357	EPA8270
Dimethyl phthalate	U			357	µg/kg	357	EPA8270
Fluoranthene	U			357	µg/kg	357	EPA8270
Fluorene	U			357	µg/kg	357	EPA8270
Hexachlorobenzene	U			357	µg/kg	357	EPA8270
Hexachlorobutadiene	U			357	µg/kg	357	EPA8270
Hexachlorocyclopentadiene	U			357	µg/kg	357	EPA8270
Hexachloroethane	U			357	µg/kg	357	EPA8270
Indeno(1,2,3-c,d)pyrene	U			357	µg/kg	357	EPA8270
Isophorone	U			357	µg/kg	357	EPA8270
N-Nitrosodi-n-propylamine	U			357	µg/kg	357	EPA8270
N-Nitrosodiphenylamine	U			357	µg/kg	357	EPA8270
Naphthalene	U			357	µg/kg	357	EPA8270
Nitrobenzene	U			357	µg/kg	357	EPA8270
Pentachlorophenol	U			1,780	µg/kg	1,780	EPA8270
Phenanthrene	U			357	µg/kg	357	EPA8270
Phenol	U			357	µg/kg	357	EPA8270
Pyrene	U			357	µg/kg	357	EPA8270
Unknown	J	N		200	µg/kg		EPA8270
Unknown	J	N		300	µg/kg		EPA8270
Unknown	J	N		400	µg/kg		EPA8270
o-cresol (2-methylphenol)	U			357	µg/kg	357	EPA8270
p-cresol (4-methylphenol)	U			357	µg/kg	357	EPA8270
Volatiles							
1,1,1-Trichloroethane	U			5.50	µg/kg	5.50	EPA8240
1,1,2,2-Tetrachloroethane	U			5.50	µg/kg	5.50	EPA8240
1,1,2-Trichloroethane	U			5.50	µg/kg	5.50	EPA8240
1,1-Dichloroethane	U			5.50	µg/kg	5.50	EPA8240
1,1-Dichloroethene	U			5.50	µg/kg	5.50	EPA8240
1,2-Dichloroethane	U			5.50	µg/kg	5.50	EPA8240
1,2-Dichloroethene (total)	U			5.50	µg/kg	5.50	EPA8240
1,2-Dichloropropane	U			5.50	µg/kg	5.50	EPA8240
2-Butanone (MEK)	U			11.0	µg/kg	11.0	EPA8240
2-Hexanone	U			11.0	µg/kg	11.0	EPA8240
4-Methyl-2-pentanone	U			11.0	µg/kg	11.0	EPA8240
Acetone	U	V		6.29	µg/kg	11.0	EPA8240
Benzene	U			5.50	µg/kg	5.50	EPA8240
Bromodichloromethane	U			5.50	µg/kg	5.50	EPA8240
Bromoform	U			5.50	µg/kg	5.50	EPA8240
Bromomethane (Methyl bromide)	U			11.0	µg/kg	11.0	EPA8240
Carbon disulfide	U			5.50	µg/kg	5.50	EPA8240
Carbon tetrachloride	U			5.50	µg/kg	5.50	EPA8240
Chlorobenzene	U			5.50	µg/kg	5.50	EPA8240
Chlorodibromomethane	U			5.50	µg/kg	5.50	EPA8240
Chloroethane	U			11.0	µg/kg	11.0	EPA8240
Chloroform	U			5.50	µg/kg	5.50	EPA8240
Chloromethane (methyl chloride)	U			11.0	µg/kg	11.0	EPA8240

SAMPLE NAME: ABKSB0502 (continued) Sample ID: 102670

Constituent	RQ	AQ	BQ	Result	Unit	Q. Limit	Method
Volatiles							
Dichloromethane (methylene chloride)	U	V		11.7	µg/kg	5.50	EPA8240
Ethylbenzene	U			5.50	µg/kg	5.50	EPA8240
Styrene	U			5.50	µg/kg	5.50	EPA8240
Tetrachloroethene	J	E		1.44	µg/kg	5.50	EPA8240
Toluene	U			5.50	µg/kg	5.50	EPA8240
Trichloroethene (TCE)	U			5.50	µg/kg	5.50	EPA8240
Vinyl acetate	U			11.0	µg/kg	11.0	EPA8240
Vinyl chloride	U			11.0	µg/kg	11.0	EPA8240
Xylenes (total)	U			5.50	µg/kg	5.50	EPA8240
cis-1,3-Dichloropropene	U			5.50	µg/kg	5.50	EPA8240
trans-1,3-Dichloropropene	U			5.50	µg/kg	5.50	EPA8240
Pesticides/PCBs							
Aldrin	UJ	O	L	1.78	µg/kg	1.78	EPA8081
Aroclor 1016	UJ	O	L	35.7	µg/kg	35.7	EPA8081
Aroclor 1221	UJ	O	L	71.4	µg/kg	71.4	EPA8081
Aroclor 1232	UJ	O	L	35.7	µg/kg	35.7	EPA8081
Aroclor 1242	UJ	O	L	35.7	µg/kg	35.7	EPA8081
Aroclor 1248	UJ	O	L	35.7	µg/kg	35.7	EPA8081
Aroclor 1254	UJ	O	L	35.7	µg/kg	35.7	EPA8081
Aroclor 1260	UJ	O	L	35.7	µg/kg	35.7	EPA8081
Dieldrin	UJ	O	L	3.57	µg/kg	3.57	EPA8081
Endosulfan I	UJ	O	L	1.78	µg/kg	1.78	EPA8081
Endosulfan II	UJ	O	L	3.57	µg/kg	3.57	EPA8081
Endosulfan sulfate	UJ	O	L	3.57	µg/kg	3.57	EPA8081
Endrin	UJ	OG	L	3.57	µg/kg	3.57	EPA8081
Endrin ketone	UJ	OG	L	3.57	µg/kg	3.57	EPA8081
Heptachlor	UJ	O	L	1.78	µg/kg	1.78	EPA8081
Heptachlor epoxide	UJ	O	L	1.78	µg/kg	1.78	EPA8081
Methoxychlor (Mariate)	UJ	O	L	17.8	µg/kg	17.8	EPA8081
Toxaphene	UJ	O	L	178	µg/kg	178	EPA8081
alpha-Benzene hexachloride	UJ	O	L	1.78	µg/kg	1.78	EPA8081
alpha-Chlordane	UJ	O	L	1.78	µg/kg	1.78	EPA8081
beta-Benzene hexachloride	UJ	O	L	1.78	µg/kg	1.78	EPA8081
delta-Benzene hexachloride	UJ	O	L	1.78	µg/kg	1.78	EPA8081
gamma-Benzene hexachloride (Lindane)	UJ	O	L	1.78	µg/kg	1.78	EPA8081
gamma-Chlordane	UJ	O	L	1.78	µg/kg	1.78	EPA8081
p,p'-DDD	UJ	OG	L	3.57	µg/kg	3.57	EPA8081
p,p'-DDE	UJ	OG	L	3.57	µg/kg	3.57	EPA8081
p,p'-DDT	UJ	OG	L	3.57	µg/kg	3.57	EPA8081
Radionuclides							
Gross Alpha	UI			6.92	pC/g	3.30	LANLMLR100MOD
Non-volatile Beta				14.3	pC/g	1.62	LANLMLR100MOD

SAMPLE NAME: ABKSB0601 Sample ID: 102671

Location (SRS Coordinates): 50772E 102188N
Ground Elevation Above MSL: . ft
Depth of Core Interval: 0.00 to 1.00 ft
Sample Type: Normal
Sample Color:

Sample Matrix: Soil
USC Soil Classification:

Sample Moisture: Dry
Percent Solids: 90.8

Constituent	RQ	AQ	BQ	Result	Unit	Q. Limit	Method
Physical Parameters							
Cation Exchange Capacity	U			661	Meq/	661	EPA9081
Total Organic Carbon		V		3,410	mg/kg	60.0	LLOYDKAHN
Total Petroleum Hydrocarbons		V		34.8	mg/kg	11.8	EPA9071
TAL Metals							
Aluminum		V		8,270	mg/kg	19.7	EPA6010
Antimony	J	E		0.724	mg/kg	3.71	EPA6010
Arsenic	J	E		3.90	mg/kg	11.8	EPA6010
Barium				14.9	mg/kg	1.16	EPA6010
Beryllium	U	V		0.136	mg/kg	0.265	EPA6010
Cadmium				0.515	mg/kg	0.424	EPA6010
Calcium		V		477	mg/kg	17.8	EPA6010
Chromium				18.3	mg/kg	0.953	EPA6010
Cobalt	J	E		0.800	mg/kg	0.847	EPA6010
Copper				3.70	mg/kg	1.06	EPA6010
Cyanide	U			0.840	mg/kg	0.840	EPA9010
Iron				13,900	mg/kg	23.2	EPA6010
Lead				13.0	mg/kg	6.25	EPA6010
Magnesium				143	mg/kg	9.21	EPA6010
Manganese				83.1	mg/kg	0.212	EPA6010
Mercury	J	E		0.0300	mg/kg	0.147	EPA7471
Nickel				2.30	mg/kg	1.80	EPA6010
Potassium				87.3	mg/kg	71.0	EPA6010
Selenium	U			11.0	mg/kg	11.0	EPA6010
Silver	U			0.953	mg/kg	0.953	EPA6010
Sodium	J	E		16.9	mg/kg	137	EPA6010
Thallium	U			9.00	mg/kg	9.00	EPA6010
Vanadium				38.2	mg/kg	0.741	EPA6010
Zinc	J	E		9.60	mg/kg	17.0	EPA6010
Semivolatiles							
1,2,4-Trichlorobenzene	U			367	µg/kg	367	EPA8270
1,2-Dichlorobenzene	U			367	µg/kg	367	EPA8270
1,3-Dichlorobenzene	U			367	µg/kg	367	EPA8270
1,4-Dichlorobenzene	U			367	µg/kg	367	EPA8270
2,4,5-Trichlorophenol	U			1,840	µg/kg	1,840	EPA8270
2,4,6-Trichlorophenol	U			367	µg/kg	367	EPA8270
2,4-Dichlorophenol	U			367	µg/kg	367	EPA8270
2,4-Dimethyl phenol	U			367	µg/kg	367	EPA8270
2,4-Dinitrophenol	U			1,840	µg/kg	1,840	EPA8270
2,4-Dinitrotoluene	U			367	µg/kg	367	EPA8270
2,6-Dinitrotoluene	U			367	µg/kg	367	EPA8270

SAMPLE NAME: ABKSB0601 (continued) Sample ID: 102671

Constituent	RQ	AQ	BQ	Result	Unit	Q. Limit	Method
Semivolatiles							
2-Chloronaphthalene	U			367	µg/kg	367	EPA8270
2-Chlorophenol	U			367	µg/kg	367	EPA8270
2-Methyl-4,6-dinitrophenol	U			1,840	µg/kg	1,840	EPA8270
2-Methylnaphthalene	U			367	µg/kg	367	EPA8270
2-Nitroaniline	U			1,840	µg/kg	1,840	EPA8270
2-Nitrophenol	U			367	µg/kg	367	EPA8270
3,3'-Dichlorobenzidine	U			734	µg/kg	734	EPA8270
3-Nitroaniline	U			1,840	µg/kg	1,840	EPA8270
4-Bromophenyl phenyl ether	U			367	µg/kg	367	EPA8270
4-Chloro-3-methylphenol (p-chloro-m-cresol)	U			367	µg/kg	367	EPA8270
4-Chloroaniline	U			367	µg/kg	367	EPA8270
4-Chlorophenyl phenyl ether	U			367	µg/kg	367	EPA8270
4-Nitroaniline	U			1,840	µg/kg	1,840	EPA8270
4-Nitrophenol	U			1,840	µg/kg	1,840	EPA8270
Acenapthene	U			367	µg/kg	367	EPA8270
Acenapthylene	U			367	µg/kg	367	EPA8270
Anthracene	U			367	µg/kg	367	EPA8270
Benzo(a)anthracene	J	E		50.2	µg/kg	367	EPA8270
Benzo(a)pyrene	J	E		52.3	µg/kg	367	EPA8270
Benzo(b)fluoranthene	J	E		57.4	µg/kg	367	EPA8270
Benzo(g,h,i)perylene	U			367	µg/kg	367	EPA8270
Benzo(k)fluoranthene	J	E		72.3	µg/kg	367	EPA8270
Benzoic acid	U			1,840	µg/kg	1,840	EPA8270
Benzyl alcohol	U			367	µg/kg	367	EPA8270
Bis(2-chloroethoxy) methane	U			367	µg/kg	367	EPA8270
Bis(2-chloroethyl) ether	U			367	µg/kg	367	EPA8270
Bis(2-chloroisopropyl) ether	U			367	µg/kg	367	EPA8270
Bis(2-ethylhexyl) phthalate	U			367	µg/kg	367	EPA8270
Butyl benzyl phthalate	U			367	µg/kg	367	EPA8270
Chrysene	J	E		82.1	µg/kg	367	EPA8270
Di-n-butyl phthalate	U			367	µg/kg	367	EPA8270
Di-n-octyl phthalate	U			367	µg/kg	367	EPA8270
Dibenzo(a,h)anthracene	U			367	µg/kg	367	EPA8270
Dibenzofuran	U			367	µg/kg	367	EPA8270
Diethyl phthalate	U			367	µg/kg	367	EPA8270
Dimethyl phthalate	U			367	µg/kg	367	EPA8270
Fluoranthene	J	E		115	µg/kg	367	EPA8270
Fluorene	U			367	µg/kg	367	EPA8270
Hexachlorobenzene	U			367	µg/kg	367	EPA8270
Hexachlorobutadiene	U			367	µg/kg	367	EPA8270
Hexachlorocyclopentadiene	U			367	µg/kg	367	EPA8270
Hexachloroethane	U			367	µg/kg	367	EPA8270
Indeno(1,2,3-c,d)pyrene	U			367	µg/kg	367	EPA8270
Isophorone	U			367	µg/kg	367	EPA8270
N-Nitrosodi-n-propylamine	U			367	µg/kg	367	EPA8270
N-Nitrosodiphenylamine	U			367	µg/kg	367	EPA8270
Naphthalene	U			367	µg/kg	367	EPA8270
Nitrobenzene	U			367	µg/kg	367	EPA8270
Pentachlorophenol	U			1,840	µg/kg	1,840	EPA8270

SAMPLE NAME: ABKSB0601 (continued) Sample ID: 102671

Constituent	RQ	AQ	BQ	Result	Unit	Q. Limit	Method
Semivolatiles							
Phenanthrene	U			367	µg/kg	367	EPA8270
Phenol	U			367	µg/kg	367	EPA8270
Pyrene	J	E		105	µg/kg	367	EPA8270
Unknown	J	N		200	µg/kg	.	EPA8270
Unknown	J	N		200	µg/kg	.	EPA8270
o-cresol (2-methylphenol)	U			367	µg/kg	367	EPA8270
p-cresol (4-methylphenol)	U			367	µg/kg	367	EPA8270
Volatiles							
1,1,1-Trichloroethane	R	OH		51.5	µg/kg	5.50	EPA8240
1,1,2,2-Tetrachloroethane	R	OH		5.50	µg/kg	5.50	EPA8240
1,1,2-Trichloroethane	R	OH		5.50	µg/kg	5.50	EPA8240
1,1-Dichloroethane	R	OH		5.50	µg/kg	5.50	EPA8240
1,1-Dichloroethene	R	OH		5.50	µg/kg	5.50	EPA8240
1,2-Dichloroethane	R	OH		5.50	µg/kg	5.50	EPA8240
1,2-Dichloroethene (total)	R	OH		5.50	µg/kg	5.50	EPA8240
1,2-Dichloropropane	R	OH		5.50	µg/kg	5.50	EPA8240
2-Butanone (MEK)	R	OH		11.0	µg/kg	11.0	EPA8240
2-Hexanone	R	OH		11.0	µg/kg	11.0	EPA8240
4-Methyl-2-pentanone	R	OH		11.0	µg/kg	11.0	EPA8240
Acetone	R	VOH		59.6	µg/kg	11.0	EPA8240
Benzene	R	OH		5.50	µg/kg	5.50	EPA8240
Bromodichloromethane	R	OH		5.50	µg/kg	5.50	EPA8240
Bromoform	R	OH		5.50	µg/kg	5.50	EPA8240
Bromomethane (Methyl bromide)	R	OH		11.0	µg/kg	11.0	EPA8240
Carbon disulfide	R	OH		5.50	µg/kg	5.50	EPA8240
Carbon tetrachloride	R	OH		5.50	µg/kg	5.50	EPA8240
Chlorobenzene	R	OH		5.50	µg/kg	5.50	EPA8240
Chlorodibromomethane	R	OH		5.50	µg/kg	5.50	EPA8240
Chloroethane	R	OH		11.0	µg/kg	11.0	EPA8240
Chloroform	R	OH		5.50	µg/kg	5.50	EPA8240
Chloromethane (methyl chloride)	R	OH		11.0	µg/kg	11.0	EPA8240
Dichloromethane (methylene chloride)	R	VOH		26.7	µg/kg	5.50	EPA8240
Ethylbenzene	R	OH		5.50	µg/kg	5.50	EPA8240
Styrene	R	OH		5.50	µg/kg	5.50	EPA8240
Tetrachloroethene	R	OH		34.0	µg/kg	5.50	EPA8240
Toluene	R	EOH		2.12	µg/kg	5.50	EPA8240
Trichloroethene (TCE)	R	OH		5.50	µg/kg	5.50	EPA8240
Vinyl acetate	R	OH		11.0	µg/kg	11.0	EPA8240
Vinyl chloride	R	OH		11.0	µg/kg	11.0	EPA8240
Xylenes (total)	R	EOH		3.58	µg/kg	5.50	EPA8240
cis-1,3-Dichloropropene	R	OH		5.50	µg/kg	5.50	EPA8240
trans-1,3-Dichloropropene	R	OH		5.50	µg/kg	5.50	EPA8240

SAMPLE NAME: ABKSB0601 (continued) Sample ID: 102671

Constituent	RQ	AQ	BQ	Result	Unit	Q. Limit	Method
Pesticides/PCBs							
Aldrin	U			1.84	µg/kg	1.84	EPA8081
Aroclor 1016	U			36.7	µg/kg	36.7	EPA8081
Aroclor 1221	U			73.5	µg/kg	73.5	EPA8081
Aroclor 1232	U			36.7	µg/kg	36.7	EPA8081
Aroclor 1242	U			36.7	µg/kg	36.7	EPA8081
Aroclor 1248	U			36.7	µg/kg	36.7	EPA8081
Aroclor 1254	U			36.7	µg/kg	36.7	EPA8081
Aroclor 1260	U			36.7	µg/kg	36.7	EPA8081
Dieldrin	U			3.67	µg/kg	3.67	EPA8081
Endosulfan I	U			1.84	µg/kg	1.84	EPA8081
Endosulfan II	U			3.67	µg/kg	3.67	EPA8081
Endosulfan sulfate	U			3.67	µg/kg	3.67	EPA8081
Endrin	UJ	G		3.67	µg/kg	3.67	EPA8081
Endrin ketone	UJ	G		3.67	µg/kg	3.67	EPA8081
Heptachlor	U			1.84	µg/kg	1.84	EPA8081
Heptachlor epoxide	U			1.84	µg/kg	1.84	EPA8081
Methoxychlor (Mariate)	U			18.4	µg/kg	18.4	EPA8081
Toxaphene	U			184	µg/kg	184	EPA8081
alpha-Benzene hexachloride	U			1.84	µg/kg	1.84	EPA8081
alpha-Chlordane	U			1.84	µg/kg	1.84	EPA8081
beta-Benzene hexachloride	U			1.84	µg/kg	1.84	EPA8081
delta-Benzene hexachloride	U			1.84	µg/kg	1.84	EPA8081
gamma-Benzene hexachloride (Lindane)	U			1.84	µg/kg	1.84	EPA8081
gamma-Chlordane	U			1.84	µg/kg	1.84	EPA8081
p,p'-DDD	UJ	G		3.67	µg/kg	3.67	EPA8081
p,p'-DDE	J	G		5.88	µg/kg	3.67	EPA8081
p,p'-DDT	J	G		4.78	µg/kg	3.67	EPA8081
Radionuclides							
Gross Alpha		V		27.2	pC/g	2.89	LANLMLR100MOD
Non-volatile Beta				18.5	pC/g	1.72	LANLMLR100MOD

SAMPLE NAME: ABKSB0602 Sample ID: 102672

Location (SRS Coordinates): 50772E 102188N
Ground Elevation Above MSL: . ft
Depth of Core Interval: 1.00 to 4.00 ft
Sample Type: Normal
Sample Color:
Sample Matrix: Soil
USC Soil Classification:
Sample Moisture: Damp
Percent Solids: 86.7

Constituent	RQ	AQ	BQ	Result	Unit	Q. Limit	Method
Physical Parameters							
Cation Exchange Capacity	U			1.380	Meq/	1.380	EPA9081
Total Organic Carbon		V		2.380	mg/kg	60.0	LLOYDKAHN
Total Petroleum Hydrocarbons	UJ	V		7.50	mg/kg	12.3	EPA9071

SAMPLE NAME: ABKSB0602 (continued) Sample ID: 102672

Constituent	RQ	AQ	BQ	Result	Unit	Q. Limit	Method
TAL Metals							
Aluminum		V		10,200	mg/kg	21.4	EPA6010
Antimony	J	E		0.949	mg/kg	4.04	EPA6010
Arsenic	J	E		5.90	mg/kg	12.8	EPA6010
Barium				9.20	mg/kg	1.27	EPA6010
Beryllium		V		0.164	mg/kg	0.288	EPA6010
Cadmium				0.785	mg/kg	0.461	EPA6010
Calcium		V		379	mg/kg	19.4	EPA6010
Chromium				27.4	mg/kg	1.04	EPA6010
Cobalt	J	E		0.911	mg/kg	0.922	EPA6010
Copper				3.60	mg/kg	1.15	EPA6010
Cyanide	U			0.880	mg/kg	0.880	EPA9010
Iron	J	R		23,800	mg/kg	25.3	EPA6010
Lead				8.80	mg/kg	6.80	EPA6010
Magnesium				154	mg/kg	10.0	EPA6010
Manganese				33.6	mg/kg	0.231	EPA6010
Mercury	J	E		0.0300	mg/kg	0.154	EPA7471
Nickel				2.50	mg/kg	1.96	EPA6010
Potassium	J	E		70.0	mg/kg	77.3	EPA6010
Selenium	U			12.0	mg/kg	12.0	EPA6010
Silver	U			1.04	mg/kg	1.04	EPA6010
Sodium	J	E		20.2	mg/kg	149	EPA6010
Thallium	U			9.80	mg/kg	9.80	EPA6010
Vanadium				59.8	mg/kg	0.807	EPA6010
Zinc	J	E		4.20	mg/kg	18.6	EPA6010
Semivolatiles							
1,2,4-Trichlorobenzene	U			384	µg/kg	384	EPA8270
1,2-Dichlorobenzene	U			384	µg/kg	384	EPA8270
1,3-Dichlorobenzene	U			384	µg/kg	384	EPA8270
1,4-Dichlorobenzene	U			384	µg/kg	384	EPA8270
2,4,5-Trichlorophenol	U			1,920	µg/kg	1,920	EPA8270
2,4,6-Trichlorophenol	U			384	µg/kg	384	EPA8270
2,4-Dichlorophenol	U			384	µg/kg	384	EPA8270
2,4-Dimethyl phenol	U			384	µg/kg	384	EPA8270
2,4-Dinitrophenol	U			1,920	µg/kg	1,920	EPA8270
2,4-Dinitrotoluene	U			384	µg/kg	384	EPA8270
2,6-Dinitrotoluene	U			384	µg/kg	384	EPA8270
2-Chloronaphthalene	U			384	µg/kg	384	EPA8270
2-Chlorophenol	U			384	µg/kg	384	EPA8270
2-Methyl-4,6-dinitrophenol	U			1,920	µg/kg	1,920	EPA8270
2-Methylnaphthalene	U			384	µg/kg	384	EPA8270
2-Nitroaniline	U			1,920	µg/kg	1,920	EPA8270
2-Nitrophenol	U			384	µg/kg	384	EPA8270
3,3'-Dichlorobenzidine	U			768	µg/kg	768	EPA8270
3-Nitroaniline	U			1,920	µg/kg	1,920	EPA8270
4-Bromophenyl phenyl ether	U			384	µg/kg	384	EPA8270
4-Chloro-3-methylphenol (p-chloro-m-cresol)	U			384	µg/kg	384	EPA8270
4-Chloroaniline	U			384	µg/kg	384	EPA8270

SAMPLE NAME: ABKSB0602 (continued) Sample ID: 102672

Constituent	RQ	AQ	BQ	Result	Unit	Q. Limit	Method
Semivolatiles							
4-Chlorophenyl phenyl ether	U			384	µg/kg	384	EPA8270
4-Nitroaniline	U			1,920	µg/kg	1,920	EPA8270
4-Nitrophenol	U			1,920	µg/kg	1,920	EPA8270
Acenapthene	U			384	µg/kg	384	EPA8270
Acenapthylene	U			384	µg/kg	384	EPA8270
Aldol condensate	J	KN		600	µg/kg	.	EPA8270
Anthracene	U			384	µg/kg	384	EPA8270
Benzo(a)anthracene	U			384	µg/kg	384	EPA8270
Benzo(a)pyrene	U			384	µg/kg	384	EPA8270
Benzo(b)fluoranthene	U			384	µg/kg	384	EPA8270
Benzo(g,h,i)perylene	U			384	µg/kg	384	EPA8270
Benzo(k)fluoranthene	U			384	µg/kg	384	EPA8270
Benzoic acid	U			1,920	µg/kg	1,920	EPA8270
Benzyl alcohol	U			384	µg/kg	384	EPA8270
Bis(2-chloroethoxy) methane	U			384	µg/kg	384	EPA8270
Bis(2-chloroethyl) ether	U			384	µg/kg	384	EPA8270
Bis(2-chloroisopropyl) ether	U			384	µg/kg	384	EPA8270
Bis(2-ethylhexyl) phthalate	U			384	µg/kg	384	EPA8270
Butyl benzyl phthalate	U			384	µg/kg	384	EPA8270
Chrysene	U			384	µg/kg	384	EPA8270
Di-n-butyl phthalate	U			384	µg/kg	384	EPA8270
Di-n-octyl phthalate	U			384	µg/kg	384	EPA8270
Dibenzo(a,h)anthracene	U			384	µg/kg	384	EPA8270
Dibenzofuran	U			384	µg/kg	384	EPA8270
Diethyl phthalate	U			384	µg/kg	384	EPA8270
Dimethyl phthalate	U			384	µg/kg	384	EPA8270
Fluoranthene	U			384	µg/kg	384	EPA8270
Fluorene	U			384	µg/kg	384	EPA8270
Hexachlorobenzene	U			384	µg/kg	384	EPA8270
Hexachlorobutadiene	U			384	µg/kg	384	EPA8270
Hexachlorocyclopentadiene	U			384	µg/kg	384	EPA8270
Hexachloroethane	U			384	µg/kg	384	EPA8270
Indeno(1,2,3-c,d)pyrene	U			384	µg/kg	384	EPA8270
Isophorone	U			384	µg/kg	384	EPA8270
N-Nitrosodi-n-propylamine	U			384	µg/kg	384	EPA8270
N-Nitrosodiphenylamine	U			384	µg/kg	384	EPA8270
Naphthalene	U			384	µg/kg	384	EPA8270
Nitrobenzene	U			384	µg/kg	384	EPA8270
Pentachlorophenol	U			1,920	µg/kg	1,920	EPA8270
Phenanthrene	U			384	µg/kg	384	EPA8270
Phenol	U			384	µg/kg	384	EPA8270
Pyrene	U			384	µg/kg	384	EPA8270
o-cresol (2-methylphenol)	U			384	µg/kg	384	EPA8270
p-cresol (4-methylphenol)	U			384	µg/kg	384	EPA8270

SAMPLE NAME: ABKSB0602 (continued) Sample ID: 102672

Constituent	RQ	AQ	BQ	Result	Unit	Q. Limit	Method
Volatiles							
1,1,1-Trichloroethane	J	E		4.49	µg/kg	5.50	EPA8240
1,1,2,2-Tetrachloroethane	U			5.50	µg/kg	5.50	EPA8240
1,1,2-Trichloroethane	U			5.50	µg/kg	5.50	EPA8240
1,1-Dichloroethane	U			5.50	µg/kg	5.50	EPA8240
1,1-Dichloroethene	U			5.50	µg/kg	5.50	EPA8240
1,2-Dichloroethane	U			5.50	µg/kg	5.50	EPA8240
1,2-Dichloroethene (total)	U			5.50	µg/kg	5.50	EPA8240
1,2-Dichloropropane	U			5.50	µg/kg	5.50	EPA8240
2-Butanone (MEK)	U			11.0	µg/kg	11.0	EPA8240
2-Hexanone	U			11.0	µg/kg	11.0	EPA8240
4-Methyl-2-pentanone	U			11.0	µg/kg	11.0	EPA8240
Acetone	U	V		25.8	µg/kg	11.0	EPA8240
Benzene	U			5.50	µg/kg	5.50	EPA8240
Bromodichloromethane	U			5.50	µg/kg	5.50	EPA8240
Bromoform	U			5.50	µg/kg	5.50	EPA8240
Bromomethane (Methyl bromide)	U			11.0	µg/kg	11.0	EPA8240
Carbon disulfide	U			5.50	µg/kg	5.50	EPA8240
Carbon tetrachloride	U			5.50	µg/kg	5.50	EPA8240
Chlorobenzene	U			5.50	µg/kg	5.50	EPA8240
Chlorodibromomethane	U			5.50	µg/kg	5.50	EPA8240
Chloroethane	U			11.0	µg/kg	11.0	EPA8240
Chloroform	U			5.50	µg/kg	5.50	EPA8240
Chloromethane (methyl chloride)	U			11.0	µg/kg	11.0	EPA8240
Dichloromethane (methylene chloride)	U	V		23.7	µg/kg	5.50	EPA8240
Ethylbenzene	U			5.50	µg/kg	5.50	EPA8240
Styrene	U			5.50	µg/kg	5.50	EPA8240
Tetrachloroethene				9.67	µg/kg	5.50	EPA8240
Toluene	J	E		1.78	µg/kg	5.50	EPA8240
Trichloroethene (TCE)	U			5.50	µg/kg	5.50	EPA8240
Vinyl acetate	U			11.0	µg/kg	11.0	EPA8240
Vinyl chloride	U			11.0	µg/kg	11.0	EPA8240
Xylenes (total)	J	E		2.86	µg/kg	5.50	EPA8240
cis-1,3-Dichloropropene	U			5.50	µg/kg	5.50	EPA8240
trans-1,3-Dichloropropene	U			5.50	µg/kg	5.50	EPA8240
Pesticides/PCBs							
Aldrin	U			1.92	µg/kg	1.92	EPA8081
Aroclor 1016	U			38.4	µg/kg	38.4	EPA8081
Aroclor 1221	U			76.9	µg/kg	76.9	EPA8081
Aroclor 1232	U			38.4	µg/kg	38.4	EPA8081
Aroclor 1242	U			38.4	µg/kg	38.4	EPA8081
Aroclor 1248	U			38.4	µg/kg	38.4	EPA8081
Aroclor 1254	U			38.4	µg/kg	38.4	EPA8081
Aroclor 1260	U			38.4	µg/kg	38.4	EPA8081
Dieldrin	U			3.84	µg/kg	3.84	EPA8081
Endosulfan I	U			1.92	µg/kg	1.92	EPA8081
Endosulfan II	U			3.84	µg/kg	3.84	EPA8081
Endosulfan sulfate	U			3.84	µg/kg	3.84	EPA8081
Endrin	UJ	G		3.84	µg/kg	3.84	EPA8081

SAMPLE NAME: ABKSB0602 (continued) **Sample ID:** 102672

Constituent	RQ	AQ	BQ	Result	Unit	Q. Limit	Method
Pesticides/PCBs							
Endrin ketone	UJ	G		3.84	µg/kg	3.84	EPA8081
Heptachlor	U			1.92	µg/kg	1.92	EPA8081
Heptachlor epoxide	U			1.92	µg/kg	1.92	EPA8081
Methoxychlor (Mariate)	U			19.2	µg/kg	19.2	EPA8081
Toxaphene	U			192	µg/kg	192	EPA8081
alpha-Benzene hexachloride	U			1.92	µg/kg	1.92	EPA8081
alpha-Chlordane	U			1.92	µg/kg	1.92	EPA8081
beta-Benzene hexachloride	U			1.92	µg/kg	1.92	EPA8081
delta-Benzene hexachloride	U			1.92	µg/kg	1.92	EPA8081
gamma-Benzene hexachloride (Lindane)	U			1.92	µg/kg	1.92	EPA8081
gamma-Chlordane	U			1.92	µg/kg	1.92	EPA8081
p,p'-DDD	UJ	G		3.84	µg/kg	3.84	EPA8081
p,p'-DDE	UJ	G		3.84	µg/kg	3.84	EPA8081
p,p'-DDT	UJ	G		3.84	µg/kg	3.84	EPA8081
Radionuclides							
Gross Alpha		V		17.7	pC/g	2.81	LANLMLR100MOD
Non-volatile Beta				11.3	pC/g	1.57	LANLMLR100MOD

SAMPLE NAME: AOBSB0101 **Sample ID:** 102680

Location (SRS Coordinates): 50736E 102066N
Ground Elevation Above MSL: . ft
Depth of Core Interval: 0.00 to 1.00 ft
Sample Type: Normal
Sample Color:
Sample Matrix: Soil
USC Soil Classification:
Sample Moisture: Dry
Percent Solids: 94.9

Constituent	RQ	AQ	BQ	Result	Unit	Q. Limit	Method
Physical Parameters							
Cation Exchange Capacity	U			316	Meq/	316	EPA9081
Total Organic Carbon				2.600	mg/kg	60.0	LLOYDKAHN
Total Petroleum Hydrocarbons	UJ	V		10.7	mg/kg	11.2	EPA418.1
TAL Metals							
Aluminum				3.270	mg/kg	19.4	EPA6010
Antimony	U			3.65	mg/kg	3.65	EPA6010
Arsenic	U			11.6	mg/kg	11.6	EPA6010
Barium				14.6	mg/kg	1.15	EPA6010
Beryllium	J	E		0.0855	mg/kg	0.261	EPA6010
Cadmium	J	E		0.0438	mg/kg	0.417	EPA6010
Calcium				79.6	mg/kg	17.5	EPA6010
Chromium				2.90	mg/kg	0.939	EPA6010
Cobalt	J	E		0.742	mg/kg	0.834	EPA6010
Copper				1.60	mg/kg	1.04	EPA6010
Cyanide	U			0.800	mg/kg	0.800	EPA9010

SAMPLE NAME: AOBSB0101 (continued) Sample ID: 102680

Constituent	RQ	AQ	BQ	Result	Unit	Q. Limit	Method
TAL Metals							
Iron				1,960	mg/kg	22.8	EPA6010
Lead	J	E		2.60	mg/kg	6.15	EPA6010
Magnesium				64.5	mg/kg	9.07	EPA6010
Manganese				69.9	mg/kg	0.209	EPA6010
Mercury	J	E		0.0200	mg/kg	0.140	EPA7471
Nickel	J	E		1.40	mg/kg	1.77	EPA6010
Potassium	J	E		49.3	mg/kg	69.9	EPA6010
Selenium	U			10.8	mg/kg	10.8	EPA6010
Silver	U			0.939	mg/kg	0.939	EPA6010
Sodium	U			135	mg/kg	135	EPA6010
Thallium	U			8.87	mg/kg	8.87	EPA6010
Vanadium				4.50	mg/kg	0.730	EPA6010
Zinc	J	E		2.90	mg/kg	16.8	EPA6010
Semivolatiles							
1,2,4-Trichlorobenzene	U			351	µg/kg	351	EPA8270
1,2-Dichlorobenzene	U			351	µg/kg	351	EPA8270
1,3-Dichlorobenzene	U			351	µg/kg	351	EPA8270
1,4-Dichlorobenzene	U			351	µg/kg	351	EPA8270
2,4,5-Trichlorophenol	U			1,760	µg/kg	1,760	EPA8270
2,4,6-Trichlorophenol	U			351	µg/kg	351	EPA8270
2,4-Dichlorophenol	U			351	µg/kg	351	EPA8270
2,4-Dimethyl phenol	U			351	µg/kg	351	EPA8270
2,4-Dinitrophenol	U			1,760	µg/kg	1,760	EPA8270
2,4-Dinitrotoluene	U			351	µg/kg	351	EPA8270
2,6-Dinitrotoluene	U			351	µg/kg	351	EPA8270
2-Chloronaphthalene	U			351	µg/kg	351	EPA8270
2-Chlorophenol	U			351	µg/kg	351	EPA8270
2-Methyl-4,6-dinitrophenol	U			1,760	µg/kg	1,760	EPA8270
2-Methylnaphthalene	U			351	µg/kg	351	EPA8270
2-Nitroaniline	U			1,760	µg/kg	1,760	EPA8270
2-Nitrophenol	U			351	µg/kg	351	EPA8270
3,3'-Dichlorobenzidine	U			702	µg/kg	702	EPA8270
3-Nitroaniline	U			1,760	µg/kg	1,760	EPA8270
4-Bromophenyl phenyl ether	U			351	µg/kg	351	EPA8270
4-Chloro-3-methylphenol (p-chloro-m-cresol)	U			351	µg/kg	351	EPA8270
4-Chloroaniline	U			351	µg/kg	351	EPA8270
4-Chlorophenyl phenyl ether	U			351	µg/kg	351	EPA8270
4-Nitroaniline	U			1,760	µg/kg	1,760	EPA8270
4-Nitrophenol	U			1,760	µg/kg	1,760	EPA8270
Acenapthene	U			351	µg/kg	351	EPA8270
Acenapthylene	U			351	µg/kg	351	EPA8270
Aldol condensate	J	KN		300	µg/kg	.	EPA8270
Anthracene	U			351	µg/kg	351	EPA8270
Benzo(a)anthracene	U			351	µg/kg	351	EPA8270
Benzo(a)pyrene	U			351	µg/kg	351	EPA8270
Benzo(b)fluoranthene	U			351	µg/kg	351	EPA8270
Benzo(g,h,i)perylene	U			351	µg/kg	351	EPA8270

SAMPLE NAME: AOBSB0101 (continued) Sample ID: 102680

Constituent	RQ	AQ	BQ	Result	Unit	Q. Limit	Method
Semivolatiles							
Benzo(k)fluoranthene	U			351	µg/kg	351	EPA8270
Benzoic acid	U			1,760	µg/kg	1,760	EPA8270
Benzyl alcohol	U			351	µg/kg	351	EPA8270
Bis(2-chloroethoxy) methane	U			351	µg/kg	351	EPA8270
Bis(2-chloroethyl) ether	U			351	µg/kg	351	EPA8270
Bis(2-chloroisopropyl) ether	U			351	µg/kg	351	EPA8270
Bis(2-ethylhexyl) phthalate	U			351	µg/kg	351	EPA8270
Butyl benzyl phthalate	U			351	µg/kg	351	EPA8270
Chrysene	U			351	µg/kg	351	EPA8270
Di-n-butyl phthalate	U			351	µg/kg	351	EPA8270
Di-n-octyl phthalate	U			351	µg/kg	351	EPA8270
Dibenzo(a,h)anthracene	U			351	µg/kg	351	EPA8270
Dibenzofuran	U			351	µg/kg	351	EPA8270
Diethyl phthalate	U			351	µg/kg	351	EPA8270
Dimethyl phthalate	U			351	µg/kg	351	EPA8270
Fluoranthene	U			351	µg/kg	351	EPA8270
Fluorene	U			351	µg/kg	351	EPA8270
Hexachlorobenzene	U			351	µg/kg	351	EPA8270
Hexachlorobutadiene	U			351	µg/kg	351	EPA8270
Hexachlorocyclopentadiene	U			351	µg/kg	351	EPA8270
Hexachloroethane	U			351	µg/kg	351	EPA8270
Indeno(1,2,3-c,d)pyrene	U			351	µg/kg	351	EPA8270
Isophorone	U			351	µg/kg	351	EPA8270
N-Nitrosodi-n-propylamine	U			351	µg/kg	351	EPA8270
N-Nitrosodiphenylamine	U			351	µg/kg	351	EPA8270
Naphthalene	U			351	µg/kg	351	EPA8270
Nitrobenzene	U			351	µg/kg	351	EPA8270
Pentachlorophenol	U			1,760	µg/kg	1,760	EPA8270
Phenanthrene	U			351	µg/kg	351	EPA8270
Phenol	U			351	µg/kg	351	EPA8270
Pyrene	U			351	µg/kg	351	EPA8270
Unknown	J	N		500	µg/kg		EPA8270
Unknown	J	N		400	µg/kg		EPA8270
o-cresol (2-methylphenol)	U			351	µg/kg	351	EPA8270
p-cresol (4-methylphenol)	U			351	µg/kg	351	EPA8270
Volatiles							
1,1,1-Trichloroethane	U			5.00	µg/kg	5.00	EPA8240
1,1,2,2-Tetrachloroethane	U			5.00	µg/kg	5.00	EPA8240
1,1,2-Trichloroethane	U			5.00	µg/kg	5.00	EPA8240
1,1-Dichloroethane	U			5.00	µg/kg	5.00	EPA8240
1,1-Dichloroethene	U			5.00	µg/kg	5.00	EPA8240
1,2-Dichloroethane	U			5.00	µg/kg	5.00	EPA8240
1,2-Dichloroethene (total)	U			5.00	µg/kg	5.00	EPA8240
1,2-Dichloropropane	U			5.00	µg/kg	5.00	EPA8240
2-Butanone (MEK)	U			10.0	µg/kg	10.0	EPA8240
2-Hexanone	U			10.0	µg/kg	10.0	EPA8240
4-Methyl-2-pentanone	U			10.0	µg/kg	10.0	EPA8240
Acetone	U			10.0	µg/kg	10.0	EPA8240

SAMPLE NAME: AOBSB0101 (continued) Sample ID: 102680

Constituent	RQ	AQ	BQ	Result	Unit	Q. Limit	Method
Volatiles							
Benzene	U			5.00	µg/kg	5.00	EPA8240
Bromodichloromethane	U			5.00	µg/kg	5.00	EPA8240
Bromoform	U			5.00	µg/kg	5.00	EPA8240
Bromomethane (Methyl bromide)	U			10.0	µg/kg	10.0	EPA8240
Carbon disulfide	U			5.00	µg/kg	5.00	EPA8240
Carbon tetrachloride	U			5.00	µg/kg	5.00	EPA8240
Chlorobenzene	U			5.00	µg/kg	5.00	EPA8240
Chlorodibromomethane	U			5.00	µg/kg	5.00	EPA8240
Chloroethane	U			10.0	µg/kg	10.0	EPA8240
Chloroform	U			5.00	µg/kg	5.00	EPA8240
Chloromethane (methyl chloride)	U			10.0	µg/kg	10.0	EPA8240
Dichloromethane (methylene chloride)	U	V		7.09	µg/kg	5.00	EPA8240
Ethylbenzene	U			5.00	µg/kg	5.00	EPA8240
Styrene	U			5.00	µg/kg	5.00	EPA8240
Tetrachloroethene	J	E		1.92	µg/kg	5.00	EPA8240
Toluene	U			5.00	µg/kg	5.00	EPA8240
Trichloroethene (TCE)	U			5.00	µg/kg	5.00	EPA8240
Vinyl acetate	U			10.0	µg/kg	10.0	EPA8240
Vinyl chloride	U			10.0	µg/kg	10.0	EPA8240
Xylenes (total)	U			5.00	µg/kg	5.00	EPA8240
cis-1,3-Dichloropropene	U			5.00	µg/kg	5.00	EPA8240
trans-1,3-Dichloropropene	U			5.00	µg/kg	5.00	EPA8240
Pesticides/PCBs							
Aldrin	U			1.76	µg/kg	1.76	EPA8081
Aroclor 1016	U			35.1	µg/kg	35.1	EPA8081
Aroclor 1221	U			70.2	µg/kg	70.2	EPA8081
Aroclor 1232	U			35.1	µg/kg	35.1	EPA8081
Aroclor 1242	U			35.1	µg/kg	35.1	EPA8081
Aroclor 1248	U			35.1	µg/kg	35.1	EPA8081
Aroclor 1254	U			35.1	µg/kg	35.1	EPA8081
Aroclor 1260	U			35.1	µg/kg	35.1	EPA8081
Dieldrin	U			3.51	µg/kg	3.51	EPA8081
Endosulfan I	U			1.76	µg/kg	1.76	EPA8081
Endosulfan II	U			3.51	µg/kg	3.51	EPA8081
Endosulfan sulfate	U			3.51	µg/kg	3.51	EPA8081
Endrin	UJ	G		3.51	µg/kg	3.51	EPA8081
Endrin ketone	UJ	G		3.51	µg/kg	3.51	EPA8081
Heptachlor	U			1.76	µg/kg	1.76	EPA8081
Heptachlor epoxide	U			1.76	µg/kg	1.76	EPA8081
Methoxychlor (Mariate)	U			17.6	µg/kg	17.6	EPA8081
Toxaphene	U			176	µg/kg	176	EPA8081
alpha-Benzene hexachloride	U			1.76	µg/kg	1.76	EPA8081
alpha-Chlordane	U			1.76	µg/kg	1.76	EPA8081
beta-Benzene hexachloride	U			1.76	µg/kg	1.76	EPA8081
delta-Benzene hexachloride	U			1.76	µg/kg	1.76	EPA8081
gamma-Benzene hexachloride (Lindane)	U			1.76	µg/kg	1.76	EPA8081
gamma-Chlordane	U			1.76	µg/kg	1.76	EPA8081
p,p'-DDD	UJ	G		3.51	µg/kg	3.51	EPA8081

SAMPLE NAME: AOBSB0101 (continued) Sample ID: 102680

Constituent	RQ	AQ	BQ	Result	Unit	Q. Limit	Method
Pesticides/PCBs							
p,p'-DDE	UJ	G		3.51	µg/kg	3.51	EPA8081
p,p'-DDT	UJ	G		3.51	µg/kg	3.51	EPA8081
Radionuclides							
Gross Alpha	UI			1.67	pC/g	3.33	LANLMLR100MOD
Non-volatile Beta	UI			4.43	pC/g	1.67	LANLMLR100MOD

SAMPLE NAME: AOBSB0102 Sample ID: 102681

Location (SRS Coordinates): 50736E 102066N
Ground Elevation Above MSL: . ft
Depth of Core Interval: 1.00 to 4.00 ft
Sample Type: Normal Sample Matrix: Soil Sample Moisture: Dry
Sample Color: USC Soil Classification: Percent Solids: 95.7

Constituent	RQ	AQ	BQ	Result	Unit	Q. Limit	Method
Physical Parameters							
Cation Exchange Capacity	U			314	Meq/	314	EPA9081
Total Organic Carbon				302	mg/kg	60.0	LLOYDKAHN
Total Petroleum Hydrocarbons	UJ	V		3.80	mg/kg	11.1	EPA418.1
TAL Metals							
Aluminum				1,970	mg/kg	18.9	EPA6010
Antimony	J	E		2.00	mg/kg	3.55	EPA6010
Arsenic	U			11.3	mg/kg	11.3	EPA6010
Barium				9.10	mg/kg	1.12	EPA6010
Beryllium	J	E		0.0578	mg/kg	0.254	EPA6010
Cadmium	U			0.406	mg/kg	0.406	EPA6010
Calcium				53.2	mg/kg	17.0	EPA6010
Chromium				2.40	mg/kg	0.913	EPA6010
Cobalt	J	E		0.680	mg/kg	0.811	EPA6010
Copper	J	E		1.00	mg/kg	1.01	EPA6010
Cyanide	U			0.790	mg/kg	0.790	EPA9010
Iron				1,300	mg/kg	22.2	EPA6010
Lead	J	E		2.50	mg/kg	5.98	EPA6010
Magnesium				46.9	mg/kg	8.82	EPA6010
Manganese				27.9	mg/kg	0.203	EPA6010
Mercury	J	E		0.0200	mg/kg	0.139	EPA7471
Nickel	J	E		1.10	mg/kg	1.72	EPA6010
Potassium	J	E		36.1	mg/kg	67.9	EPA6010
Selenium	U			10.5	mg/kg	10.5	EPA6010
Silver	U			0.913	mg/kg	0.913	EPA6010
Sodium	U			131	mg/kg	131	EPA6010
Thallium	U			8.62	mg/kg	8.62	EPA6010
Vanadium				2.80	mg/kg	0.710	EPA6010

SAMPLE NAME: AOBSB0102 (continued) Sample ID: 102681

Constituent	RQ	AQ	BQ	Result	Unit	Q. Limit	Method
TAL Metals							
Zinc	J	E		1.80	mg/kg	16.3	EPA6010
Semivolatiles							
1,2,4-Trichlorobenzene	U			348	µg/kg	348	EPA8270
1,2-Dichlorobenzene	U			348	µg/kg	348	EPA8270
1,3-Dichlorobenzene	U			348	µg/kg	348	EPA8270
1,4-Dichlorobenzene	U			348	µg/kg	348	EPA8270
2,4,5-Trichlorophenol	U			1,740	µg/kg	1,740	EPA8270
2,4,6-Trichlorophenol	U			348	µg/kg	348	EPA8270
2,4-Dichlorophenol	U			348	µg/kg	348	EPA8270
2,4-Dimethyl phenol	U			348	µg/kg	348	EPA8270
2,4-Dinitrophenol	U			1,740	µg/kg	1,740	EPA8270
2,4-Dinitrotoluene	U			348	µg/kg	348	EPA8270
2,6-Dinitrotoluene	U			348	µg/kg	348	EPA8270
2-Chloronaphthalene	U			348	µg/kg	348	EPA8270
2-Chlorophenol	U			348	µg/kg	348	EPA8270
2-Methyl-4,6-dinitrophenol	U			1,740	µg/kg	1,740	EPA8270
2-Methylnaphthalene	U			348	µg/kg	348	EPA8270
2-Nitroaniline	U			1,740	µg/kg	1,740	EPA8270
2-Nitrophenol	U			348	µg/kg	348	EPA8270
3,3'-Dichlorobenzidine	U			696	µg/kg	696	EPA8270
3-Nitroaniline	U			1,740	µg/kg	1,740	EPA8270
4-Bromophenyl phenyl ether	U			348	µg/kg	348	EPA8270
4-Chloro-3-methylphenol (p-chloro-m-cresol)	U			348	µg/kg	348	EPA8270
4-Chloroaniline	U			348	µg/kg	348	EPA8270
4-Chlorophenyl phenyl ether	U			348	µg/kg	348	EPA8270
4-Nitroaniline	U			1,740	µg/kg	1,740	EPA8270
4-Nitrophenol	U			1,740	µg/kg	1,740	EPA8270
Acenapthene	U			348	µg/kg	348	EPA8270
Acenapthylene	U			348	µg/kg	348	EPA8270
Aldol condensate	J	KN		300	µg/kg		EPA8270
Anthracene	U			348	µg/kg	348	EPA8270
Benzo(a)anthracene	U			348	µg/kg	348	EPA8270
Benzo(a)pyrene	U			348	µg/kg	348	EPA8270
Benzo(b)fluoranthene	U			348	µg/kg	348	EPA8270
Benzo(g,h,i)perylene	U			348	µg/kg	348	EPA8270
Benzo(k)fluoranthene	U			348	µg/kg	348	EPA8270
Benzoic acid	U			1,740	µg/kg	1,740	EPA8270
Benzyl alcohol	U			348	µg/kg	348	EPA8270
Bis(2-chloroethoxy) methane	U			348	µg/kg	348	EPA8270
Bis(2-chloroethyl) ether	U			348	µg/kg	348	EPA8270
Bis(2-chloroisopropyl) ether	U			348	µg/kg	348	EPA8270
Bis(2-ethylhexyl) phthalate	U			348	µg/kg	348	EPA8270
Butyl benzyl phthalate	U			348	µg/kg	348	EPA8270
Chrysene	U			348	µg/kg	348	EPA8270
Di-n-butyl phthalate	U			348	µg/kg	348	EPA8270
Di-n-octyl phthalate	U			348	µg/kg	348	EPA8270
Dibenzo(a,h)anthracene	U			348	µg/kg	348	EPA8270

SAMPLE NAME: AOBSB0102 (continued) Sample ID: 102681

Constituent	RQ	AQ	BQ	Result	Unit	Q. Limit	Method
Semivolatiles							
Dibenzofuran	U			348	µg/kg	348	EPA8270
Diethyl phthalate	U			348	µg/kg	348	EPA8270
Dimethyl phthalate	U			348	µg/kg	348	EPA8270
Fluoranthene	U			348	µg/kg	348	EPA8270
Fluorene	U			348	µg/kg	348	EPA8270
Hexachlorobenzene	U			348	µg/kg	348	EPA8270
Hexachlorobutadiene	U			348	µg/kg	348	EPA8270
Hexachlorocyclopentadiene	U			348	µg/kg	348	EPA8270
Hexachloroethane	U			348	µg/kg	348	EPA8270
Indeno(1,2,3-c,d)pyrene	U			348	µg/kg	348	EPA8270
Isophorone	U			348	µg/kg	348	EPA8270
N-Nitrosodi-n-propylamine	U			348	µg/kg	348	EPA8270
N-Nitrosodiphenylamine	U			348	µg/kg	348	EPA8270
Naphthalene	U			348	µg/kg	348	EPA8270
Nitrobenzene	U			348	µg/kg	348	EPA8270
Pentachlorophenol	U			1,740	µg/kg	1,740	EPA8270
Phenanthrene	U			348	µg/kg	348	EPA8270
Phenol	U			348	µg/kg	348	EPA8270
Pyrene	U			348	µg/kg	348	EPA8270
Unknown	J	N		200	µg/kg		EPA8270
o-cresol (2-methylphenol)	U			348	µg/kg	348	EPA8270
p-cresol (4-methylphenol)	U			348	µg/kg	348	EPA8270
Volatiles							
1,1,1-Trichloroethane	J	E		1.14	µg/kg	5.50	EPA8240
1,1,2,2-Tetrachloroethane	U			5.50	µg/kg	5.50	EPA8240
1,1,2-Trichloroethane	U			5.50	µg/kg	5.50	EPA8240
1,1-Dichloroethane	U			5.50	µg/kg	5.50	EPA8240
1,1-Dichloroethene	U			5.50	µg/kg	5.50	EPA8240
1,2-Dichloroethane	U			5.50	µg/kg	5.50	EPA8240
1,2-Dichloroethene (total)	U			5.50	µg/kg	5.50	EPA8240
1,2-Dichloropropane	U			5.50	µg/kg	5.50	EPA8240
2-Butanone (MEK)	U			11.0	µg/kg	11.0	EPA8240
2-Hexanone	U			11.0	µg/kg	11.0	EPA8240
4-Methyl-2-pentanone	U			11.0	µg/kg	11.0	EPA8240
Acetone	U	V		7.70	µg/kg	11.0	EPA8240
Benzene	U			5.50	µg/kg	5.50	EPA8240
Bromodichloromethane	U			5.50	µg/kg	5.50	EPA8240
Bromoform	U			5.50	µg/kg	5.50	EPA8240
Bromomethane (Methyl bromide)	U			11.0	µg/kg	11.0	EPA8240
Carbon disulfide	U			5.50	µg/kg	5.50	EPA8240
Carbon tetrachloride	U			5.50	µg/kg	5.50	EPA8240
Chlorobenzene	U			5.50	µg/kg	5.50	EPA8240
Chlorodibromomethane	U			5.50	µg/kg	5.50	EPA8240
Chloroethane	U			11.0	µg/kg	11.0	EPA8240
Chloroform	U			5.50	µg/kg	5.50	EPA8240
Chloromethane (methyl chloride)	U			11.0	µg/kg	11.0	EPA8240
Dichloromethane (methylene chloride)	U	V		24.3	µg/kg	5.50	EPA8240
Ethylbenzene	U			5.50	µg/kg	5.50	EPA8240

SAMPLE NAME: AOBSB0102 (continued) Sample ID: 102681

Constituent	RQ	AQ	BQ	Result	Unit	Q. Limit	Method
Volatiles							
Styrene	U			5.50	µg/kg	5.50	EPA8240
Tetrachloroethene	J	E		2.97	µg/kg	5.50	EPA8240
Toluene	U			5.50	µg/kg	5.50	EPA8240
Trichloroethene (TCE)	U			5.50	µg/kg	5.50	EPA8240
Vinyl acetate	U			11.0	µg/kg	11.0	EPA8240
Vinyl chloride	U			11.0	µg/kg	11.0	EPA8240
Xylenes (total)	U			5.50	µg/kg	5.50	EPA8240
cis-1,3-Dichloropropene	U			5.50	µg/kg	5.50	EPA8240
trans-1,3-Dichloropropene	U			5.50	µg/kg	5.50	EPA8240
Pesticides/PCBs							
Aldrin	U			1.74	µg/kg	1.74	EPA8081
Aroclor 1016	U			34.8	µg/kg	34.8	EPA8081
Aroclor 1221	U			69.7	µg/kg	69.7	EPA8081
Aroclor 1232	U			34.8	µg/kg	34.8	EPA8081
Aroclor 1242	U			34.8	µg/kg	34.8	EPA8081
Aroclor 1248	U			34.8	µg/kg	34.8	EPA8081
Aroclor 1254	U			34.8	µg/kg	34.8	EPA8081
Aroclor 1260	U			34.8	µg/kg	34.8	EPA8081
Dieldrin	U			3.48	µg/kg	3.48	EPA8081
Endosulfan I	U			1.74	µg/kg	1.74	EPA8081
Endosulfan II	U			3.48	µg/kg	3.48	EPA8081
Endosulfan sulfate	U			3.48	µg/kg	3.48	EPA8081
Endrin	UJ	G		3.48	µg/kg	3.48	EPA8081
Endrin ketone	UJ	G		3.48	µg/kg	3.48	EPA8081
Heptachlor	U			1.74	µg/kg	1.74	EPA8081
Heptachlor epoxide	U			1.74	µg/kg	1.74	EPA8081
Methoxychlor (Mariate)	U			17.4	µg/kg	17.4	EPA8081
Toxaphene	U			174	µg/kg	174	EPA8081
alpha-Benzene hexachloride	U			1.74	µg/kg	1.74	EPA8081
alpha-Chlordane	U			1.74	µg/kg	1.74	EPA8081
beta-Benzene hexachloride	U			1.74	µg/kg	1.74	EPA8081
delta-Benzene hexachloride	U			1.74	µg/kg	1.74	EPA8081
gamma-Benzene hexachloride (Lindane)	U			1.74	µg/kg	1.74	EPA8081
gamma-Chlordane	U			1.74	µg/kg	1.74	EPA8081
p,p'-DDD	UJ	G		3.48	µg/kg	3.48	EPA8081
p,p'-DDE	UJ	G		3.48	µg/kg	3.48	EPA8081
p,p'-DDT	UJ	G		3.48	µg/kg	3.48	EPA8081
Radionuclides							
Gross Alpha	UI			1.66	pC/g	3.31	LANLMLR100MOD
Non-volatile Beta				14.6	pC/g	1.63	LANLMLR100MOD

SAMPLE NAME: AOBSB0102A Sample ID: 102682

Sample Type: Duplicate Associated Sample: 102681

Constituent	RQ	AQ	BQ	Result	Unit	Q. Limit	Method
Physical Parameters							
Cation Exchange Capacity	U			316	Meq/	316	EPA9081
Total Organic Carbon				464	mg/kg	60.0	LLOYDKAHN
Total Petroleum Hydrocarbons	UJ	V		3.80	mg/kg	11.2	EPA418.1
TAL Metals							
Aluminum	J	I		2,110	mg/kg	19.6	EPA6010
Antimony	U			3.69	mg/kg	3.69	EPA6010
Arsenic	U			11.7	mg/kg	11.7	EPA6010
Barium				9.90	mg/kg	1.16	EPA6010
Beryllium	J	E		0.0885	mg/kg	0.263	EPA6010
Cadmium	U			0.421	mg/kg	0.421	EPA6010
Calcium				55.6	mg/kg	17.7	EPA6010
Chromium				3.00	mg/kg	0.948	EPA6010
Cobalt	J	E		0.769	mg/kg	0.842	EPA6010
Copper	J	E		0.936	mg/kg	1.05	EPA6010
Cyanide	U			0.800	mg/kg	0.800	EPA9010
Iron	J	I		1,420	mg/kg	23.1	EPA6010
Lead	J	E		1.70	mg/kg	6.21	EPA6010
Magnesium				49.8	mg/kg	9.16	EPA6010
Manganese				27.3	mg/kg	0.211	EPA6010
Mercury	J	E		0.0200	mg/kg	0.140	EPA7471
Nickel	J	E		1.30	mg/kg	1.79	EPA6010
Potassium	J	E		40.6	mg/kg	70.6	EPA6010
Selenium	U			11.0	mg/kg	11.0	EPA6010
Silver	U			0.948	mg/kg	0.948	EPA6010
Sodium	U			136	mg/kg	136	EPA6010
Thallium	U			8.95	mg/kg	8.95	EPA6010
Vanadium				3.10	mg/kg	0.737	EPA6010
Zinc	J	EX		1.80	mg/kg	17.0	EPA6010
Semivolatiles							
1,2,4-Trichlorobenzene	U			351	µg/kg	351	EPA8270
1,2-Dichlorobenzene	U			351	µg/kg	351	EPA8270
1,3-Dichlorobenzene	U			351	µg/kg	351	EPA8270
1,4-Dichlorobenzene	U			351	µg/kg	351	EPA8270
2,4,5-Trichlorophenol	U			1,760	µg/kg	1,760	EPA8270
2,4,6-Trichlorophenol	U			351	µg/kg	351	EPA8270
2,4-Dichlorophenol	U			351	µg/kg	351	EPA8270
2,4-Dimethyl phenol	U			351	µg/kg	351	EPA8270
2,4-Dinitrophenol	U			1,760	µg/kg	1,760	EPA8270
2,4-Dinitrotoluene	U			351	µg/kg	351	EPA8270
2,6-Dinitrotoluene	U			351	µg/kg	351	EPA8270
2-Chloronaphthalene	U			351	µg/kg	351	EPA8270
2-Chlorophenol	U			351	µg/kg	351	EPA8270
2-Methyl-4,6-dinitrophenol	U			1,760	µg/kg	1,760	EPA8270
2-Methylnaphthalene	U			351	µg/kg	351	EPA8270

SAMPLE NAME: AOBSB0102A (continued) Sample ID: 102682

Constituent	RQ	AQ	BQ	Result	Unit	Q. Limit	Method
Semivolatiles							
2-Nitroaniline	U			1,760	µg/kg	1,760	EPA8270
2-Nitrophenol	U			351	µg/kg	351	EPA8270
3,3'-Dichlorobenzidine	U			702	µg/kg	702	EPA8270
3-Nitroaniline	U			1,760	µg/kg	1,760	EPA8270
4-Bromophenyl phenyl ether	U			351	µg/kg	351	EPA8270
4-Chloro-3-methylphenol (p-chloro-m-cresol)	U			351	µg/kg	351	EPA8270
4-Chloroaniline	U			351	µg/kg	351	EPA8270
4-Chlorophenyl phenyl ether	U			351	µg/kg	351	EPA8270
4-Nitroaniline	U			1,760	µg/kg	1,760	EPA8270
4-Nitrophenol	U			1,760	µg/kg	1,760	EPA8270
Acenapthene	U			351	µg/kg	351	EPA8270
Acenapthylene	U			351	µg/kg	351	EPA8270
Aldol condensate	J	KN		700	µg/kg		EPA8270
Anthracene	U			351	µg/kg	351	EPA8270
Benzo(a)anthracene	U			351	µg/kg	351	EPA8270
Benzo(a)pyrene	U			351	µg/kg	351	EPA8270
Benzo(b)fluoranthene	U			351	µg/kg	351	EPA8270
Benzo(g,h,i)perylene	U			351	µg/kg	351	EPA8270
Benzo(k)fluoranthene	U			351	µg/kg	351	EPA8270
Benzoic acid	U			1,760	µg/kg	1,760	EPA8270
Benzyl alcohol	U			351	µg/kg	351	EPA8270
Bis(2-chloroethoxy) methane	U			351	µg/kg	351	EPA8270
Bis(2-chloroethyl) ether	U			351	µg/kg	351	EPA8270
Bis(2-chloroisopropyl) ether	U			351	µg/kg	351	EPA8270
Bis(2-ethylhexyl) phthalate	U			351	µg/kg	351	EPA8270
Butyl benzyl phthalate	U			351	µg/kg	351	EPA8270
Chrysene	U			351	µg/kg	351	EPA8270
Di-n-butyl phthalate	U			351	µg/kg	351	EPA8270
Di-n-octyl phthalate	U			351	µg/kg	351	EPA8270
Dibenzo(a,h)anthracene	U			351	µg/kg	351	EPA8270
Dibenzofuran	U			351	µg/kg	351	EPA8270
Diethyl phthalate	U			351	µg/kg	351	EPA8270
Dimethyl phthalate	U			351	µg/kg	351	EPA8270
Fluoranthene	U			351	µg/kg	351	EPA8270
Fluorene	U			351	µg/kg	351	EPA8270
Hexachlorobenzene	U			351	µg/kg	351	EPA8270
Hexachlorobutadiene	U			351	µg/kg	351	EPA8270
Hexachlorocyclopentadiene	U			351	µg/kg	351	EPA8270
Hexachloroethane	U			351	µg/kg	351	EPA8270
Indeno(1,2,3-c,d)pyrene	U			351	µg/kg	351	EPA8270
Isophorone	U			351	µg/kg	351	EPA8270
N-Nitrosodi-n-propylamine	U			351	µg/kg	351	EPA8270
N-Nitrosodiphenylamine	U			351	µg/kg	351	EPA8270
Naphthalene	U			351	µg/kg	351	EPA8270
Nitrobenzene	U			351	µg/kg	351	EPA8270
Pentachlorophenol	U			1,760	µg/kg	1,760	EPA8270
Phenanthrene	U			351	µg/kg	351	EPA8270
Phenol	U			351	µg/kg	351	EPA8270
Pyrene	U			351	µg/kg	351	EPA8270

SAMPLE NAME: AOBSB0102A (continued) Sample ID: 102682

Constituent	RQ	AQ	BQ	Result	Unit	Q. Limit	Method
Semivolatiles							
o-cresol (2-methylphenol)	U			351	µg/kg	351	EPA8270
p-cresol (4-methylphenol)	U			351	µg/kg	351	EPA8270
Volatiles							
1,1,1-Trichloroethane	J	E		1.75	µg/kg	5.50	EPA8240
1,1,2,2-Tetrachloroethane	U			5.50	µg/kg	5.50	EPA8240
1,1,2-Trichloroethane	U			5.50	µg/kg	5.50	EPA8240
1,1-Dichloroethane	U			5.50	µg/kg	5.50	EPA8240
1,1-Dichloroethene	U			5.50	µg/kg	5.50	EPA8240
1,2-Dichloroethane	U			5.50	µg/kg	5.50	EPA8240
1,2-Dichloroethene (total)	U			5.50	µg/kg	5.50	EPA8240
1,2-Dichloropropane	U			5.50	µg/kg	5.50	EPA8240
2-Butanone (MEK)	U			11.0	µg/kg	11.0	EPA8240
2-Hexanone	U			11.0	µg/kg	11.0	EPA8240
4-Methyl-2-pentanone	U			11.0	µg/kg	11.0	EPA8240
Acetone	U	V		7.36	µg/kg	11.0	EPA8240
Benzene	U			5.50	µg/kg	5.50	EPA8240
Bromodichloromethane	U			5.50	µg/kg	5.50	EPA8240
Bromoform	U			5.50	µg/kg	5.50	EPA8240
Bromomethane (Methyl bromide)	U			11.0	µg/kg	11.0	EPA8240
Carbon disulfide	U			5.50	µg/kg	5.50	EPA8240
Carbon tetrachloride	U			5.50	µg/kg	5.50	EPA8240
Chlorobenzene	U			5.50	µg/kg	5.50	EPA8240
Chlorodibromomethane	U			5.50	µg/kg	5.50	EPA8240
Chloroethane	U			11.0	µg/kg	11.0	EPA8240
Chloroform	U			5.50	µg/kg	5.50	EPA8240
Chloromethane (methyl chloride)	U			11.0	µg/kg	11.0	EPA8240
Dichloromethane (methylene chloride)	U	V		14.3	µg/kg	5.50	EPA8240
Ethylbenzene	U			5.50	µg/kg	5.50	EPA8240
Styrene	U			5.50	µg/kg	5.50	EPA8240
Tetrachloroethene	J	E		2.48	µg/kg	5.50	EPA8240
Toluene	U			5.50	µg/kg	5.50	EPA8240
Trichloroethene (TCE)	U			5.50	µg/kg	5.50	EPA8240
Vinyl acetate	U			11.0	µg/kg	11.0	EPA8240
Vinyl chloride	U			11.0	µg/kg	11.0	EPA8240
Xylenes (total)	U			5.50	µg/kg	5.50	EPA8240
cis-1,3-Dichloropropene	U			5.50	µg/kg	5.50	EPA8240
trans-1,3-Dichloropropene	U			5.50	µg/kg	5.50	EPA8240
Pesticides/PCBs							
Aldrin	U			1.75	µg/kg	1.75	EPA8081
Aroclor 1016	U			35.1	µg/kg	35.1	EPA8081
Aroclor 1221	U			70.1	µg/kg	70.1	EPA8081
Aroclor 1232	U			35.1	µg/kg	35.1	EPA8081
Aroclor 1242	U			35.1	µg/kg	35.1	EPA8081
Aroclor 1248	U			35.1	µg/kg	35.1	EPA8081
Aroclor 1254	U			35.1	µg/kg	35.1	EPA8081
Aroclor 1260	U			35.1	µg/kg	35.1	EPA8081

SAMPLE NAME: AOBSB0102A (continued) Sample ID: 102682

Constituent	RQ	AQ	BQ	Result	Unit	Q. Limit	Method
Pesticides/PCBs							
Dieldrin	U			3.51	µg/kg	3.51	EPA8081
Endosulfan I	U			1.75	µg/kg	1.75	EPA8081
Endosulfan II	U			3.51	µg/kg	3.51	EPA8081
Endosulfan sulfate	U			3.51	µg/kg	3.51	EPA8081
Endrin	UJ	G		3.51	µg/kg	3.51	EPA8081
Endrin ketone	UJ	G		3.51	µg/kg	3.51	EPA8081
Heptachlor	U			1.75	µg/kg	1.75	EPA8081
Heptachlor epoxide	U			1.75	µg/kg	1.75	EPA8081
Methoxychlor (Mariate)	U			17.5	µg/kg	17.5	EPA8081
Toxaphene	U			175	µg/kg	175	EPA8081
alpha-Benzene hexachloride	U			1.75	µg/kg	1.75	EPA8081
alpha-Chlordane	U			1.75	µg/kg	1.75	EPA8081
beta-Benzene hexachloride	U			1.75	µg/kg	1.75	EPA8081
delta-Benzene hexachloride	U			1.75	µg/kg	1.75	EPA8081
gamma-Benzene hexachloride (Lindane)	U			1.75	µg/kg	1.75	EPA8081
gamma-Chlordane	U			1.75	µg/kg	1.75	EPA8081
p,p'-DDD	UJ	G		3.51	µg/kg	3.51	EPA8081
p,p'-DDE	UJ	G		3.51	µg/kg	3.51	EPA8081
p,p'-DDT	UJ	G		3.51	µg/kg	3.51	EPA8081
Radionuclides							
Gross Alpha	UI			3.20	pC/g	3.34	LANLMLR100MOD
Non-volatile Beta	UI			3.85	pC/g	1.69	LANLMLR100MOD

SAMPLE NAME: AOBSB0201 Sample ID: 102676

Location (SRS Coordinates): 50696E 102063N
Ground Elevation Above MSL: . ft
Depth of Core Interval: 0.00 to 1.00 ft
Sample Type: Normal
Sample Color:
Sample Matrix: Soil
USC Soil Classification:
Sample Moisture: Dry
Percent Solids: 94.7

Constituent	RQ	AQ	BQ	Result	Unit	Q. Limit	Method
Physical Parameters							
Cation Exchange Capacity	U			634	Meq/	634	EPA9081
Total Organic Carbon				2,740	mg/kg	60.0	LLOYDKAHN
Total Petroleum Hydrocarbons		V		423	mg/kg	22.5	EPA418.1
TAL Metals							
Aluminum				3,700	mg/kg	19.5	EPA6010
Antimony	U			3.66	mg/kg	3.66	EPA6010
Arsenic	J	E		1.70	mg/kg	11.6	EPA6010
Barium				16.3	mg/kg	1.15	EPA6010
Beryllium	J	E		0.0973	mg/kg	0.262	EPA6010
Cadmium				1.50	mg/kg	0.418	EPA6010

SAMPLE NAME: **AOBSB0201 (continued)** **Sample ID: 102676**

Constituent	RQ	AQ	BQ	Result	Unit	Q. Limit	Method
TAL Metals							
Calcium				271	mg/kg	17.6	EPA6010
Chromium				6.10	mg/kg	0.941	EPA6010
Cobalt	J	E		0.774	mg/kg	0.837	EPA6010
Copper				12.1	mg/kg	1.05	EPA6010
Cyanide	U			0.800	mg/kg	0.800	EPA9010
Iron				3,500	mg/kg	22.9	EPA6010
Lead				13.0	mg/kg	6.17	EPA6010
Magnesium				115	mg/kg	9.10	EPA6010
Manganese				30.6	mg/kg	0.209	EPA6010
Mercury	J	E		0.0560	mg/kg	0.141	EPA747 I
N i l				2.40	mg/kg	1.78	EPA6010
Potassium				141	mg/kg	70. I	EPA6010
Selenium	U			10.9	mg/kg	10.9	EPA6010
S i i	U			0.94 1	mg/kg	0.941	EPA6010
Sodium	J	E		143	mg/kg	135	EPA6010
Thallium	U			8.89	mg/kg	8.89	EPA6010
Vanadium				8.10	mg/kg	0.732	EPA6010
Zinc				64.6	mg/kg	16.8	EPA6010
Semivolatiles							
1.2,4-Trichlorobenzene	U			352	µg/kg	352	EPA8270
1,2-Dichlorobenzene	U			352	µg/kg	352	EPA8270
1,3-Dichlorobenzene	U			352	µg/kg	352	EPA8270
1,4-Dichlorobenzene	U			352	µg/kg	352	EPA8270
2.4,5-Trichlorophenol	U			1,760	µg/kg	1.760	EPA8270
2.4,6-Trichlorophenol	U			352	µg/kg	352	EPA8270
2.4-Dichlorophenol	U			352	µg/kg	352	EPA8270
2,4-Dimethyl phenol	U			352	µg/kg	352	EPA8270
2.4-Dinitrophenol	U			1,760	µg/kg	1,760	EPA8270
2.4-Dinitrotoluene	U			352	µg/kg	352	EPA8270
2.6-Dinitrotoluene	U			352	µg/kg	352	EPA8270
2-Chloronaphthalene	U			352	µg/kg	352	EPA8270
2-Chlorophenol	U			352	µg/kg	352	EPA8270
2-Methyl-4,6-dinitrophenol	U			1,760	µg/kg	1.760	EPA8270
2-Methylnaphthalene	U			352	µg/kg	352	EPA8270
2-Nitroaniline	U			1,760	µg/kg	1.760	EPA8270
2-Nitrophenol	U			352	µg/kg	352	EPA8270
3.3'-Dichlorobenzidine	U			704	µg/kg	704	EPA8270
3-Nitroaniline	U			1,760	µg/kg	1.760	EPA8270
4-Bromophenyl phenyl ether	U			352	µg/kg	352	EPA8270
4-Chloro-3-methylphenol (p-chloro-m-cresol)	U			352	µg/kg	352	EPA8270
4-Chloroaniline	U			352	µg/kg	352	EPA8270
4-Chlorophenyl phenyl ether	U			352	µg/kg	352	EPA8270
4-Nitroaniline	U			1,760	µg/kg	1.760	EPA8270
4-Nitrophenol	U			1,760	µg/kg	1.760	EPA8270
A -	I	E		100	µg/kg	352	EPA8270
Acenapthylene	U			352	µg/kg	352	EPA8270
Aldol condensate	J	KN		600	µg/kg		EPA8270

SAMPLE NAME: AOBSB0201 (continued) Sample ID: 102676

Constituent	RQ	AQ	BQ	Result	Unit	Q. Limit	Method
Semivolatiles							
Anthracene	J	E		230	µg/kg	352	EPA8270
Aromatic	J	N		200	µg/kg	.	EPA8270
Benzo(a)anthracene				503	µg/kg	352	EPA8270
Benzo(a)pyrene				410	µg/kg	352	EPA8270
Benzo(b)fluoranthene				410	µg/kg	352	EPA8270
Benzo(g,h,i)perylene	J	E		267	µg/kg	352	EPA8270
Benzo(k)fluoranthene				366	µg/kg	352	EPA8270
Benzoic acid	U			1,760	µg/kg	1,760	EPA8270
Benzyl alcohol	U			352	µg/kg	352	EPA8270
Bis(2-chloroethoxy) methane	U			352	µg/kg	352	EPA8270
Bis(2-chloroethyl) ether	U			352	µg/kg	352	EPA8270
Bis(2-chloroisopropyl) ether	U			352	µg/kg	352	EPA8270
Bis(2-ethylhexyl) phthalate	U			352	µg/kg	352	EPA8270
Butyl benzyl phthalate	U			352	µg/kg	352	EPA8270
Chrysene				534	µg/kg	352	EPA8270
Di-n-butyl phthalate	U			352	µg/kg	352	EPA8270
Di-n-octyl phthalate	U			352	µg/kg	352	EPA8270
Dibenzo(a,h)anthracene	U			352	µg/kg	352	EPA8270
Dibenzofuran	J	E		59.8	µg/kg	352	EPA8270
Diethyl phthalate	U			352	µg/kg	352	EPA8270
Dimethyl phthalate	U			352	µg/kg	352	EPA8270
Fluoranthene				1,100	µg/kg	352	EPA8270
Fluorene	J	E		102	µg/kg	352	EPA8270
Hexachlorobenzene	U			352	µg/kg	352	EPA8270
Hexachlorobutadiene	U			352	µg/kg	352	EPA8270
Hexachlorocyclopentadiene	U			352	µg/kg	352	EPA8270
Hexachloroethane	U			352	µg/kg	352	EPA8270
Indeno(1,2,3-c,d)pyrene	J	E		222	µg/kg	352	EPA8270
Isophorone	U			352	µg/kg	352	EPA8270
N-Nitrosodi-n-propylamine	U			352	µg/kg	352	EPA8270
N-Nitrosodiphenylamine	U			352	µg/kg	352	EPA8270
Naphthalene	U			352	µg/kg	352	EPA8270
Nitrobenzene	U			352	µg/kg	352	EPA8270
Pentachlorophenol	U			1,760	µg/kg	1,760	EPA8270
Phenanthrene				948	µg/kg	352	EPA8270
Phenol	U			352	µg/kg	352	EPA8270
Pyrene				895	µg/kg	352	EPA8270
Unknown	J	N		400	µg/kg	.	EPA8270
Unknown	J	N		500	µg/kg	.	EPA8270
Unknown	J	N		700	µg/kg	.	EPA8270
o-cresol (2-methylphenol)	U			352	µg/kg	352	EPA8270
p-cresol (4-methylphenol)	U			352	µg/kg	352	EPA8270
Volatiles							
1,1,1-Trichloroethane	J	A		10.3	µg/kg	5.50	EPA8240
1,1,2,2-Tetrachloroethane	UJ	A		5.50	µg/kg	5.50	EPA8240
1,1,2-Trichloroethane	UJ	A		5.50	µg/kg	5.50	EPA8240
1,1-Dichloroethane	UJ	A		5.50	µg/kg	5.50	EPA8240
1,1-Dichloroethene	UJ	A		5.50	µg/kg	5.50	EPA8240

SAMPLE NAME: AOBSB0201 (continued) Sample ID: 102676

Constituent	RQ	AQ	BQ	Result	Unit	Q. Limit	Method
Volatiles							
1,2-Dichloroethane	UJ	A		5.50	µg/kg	5.50	EPA8240
1,2-Dichloroethene (total)	UJ	A		5.50	µg/kg	5.50	EPA8240
1,2-Dichloropropane	UJ	A		5.50	µg/kg	5.50	EPA8240
2-Butanone (MEK)	UJ	A		11.0	µg/kg	11.0	EPA8240
2-Hexanone	UJ	A		11.0	µg/kg	11.0	EPA8240
4-Methyl-2-pentanone	UJ	A		11.0	µg/kg	11.0	EPA8240
Acetone	UJ	VA		15.0	µg/kg	11.0	EPA8240
Benzene	UJ	A		5.50	µg/kg	5.50	EPA8240
Bromodichloromethane	UJ	A		5.50	µg/kg	5.50	EPA8240
Bromoform	UJ	A		5.50	µg/kg	5.50	EPA8240
Bromomethane (Methyl bromide)	UJ	A		11.0	µg/kg	11.0	EPA8240
Carbon disulfide	UJ	A		5.50	µg/kg	5.50	EPA8240
Carbon tetrachloride	UJ	A		5.50	µg/kg	5.50	EPA8240
Chlorobenzene	UJ	A		5.50	µg/kg	5.50	EPA8240
Chlorodibromomethane	UJ	A		5.50	µg/kg	5.50	EPA8240
Chloroethane	UJ	A		11.0	µg/kg	11.0	EPA8240
Chloroform	UJ	A		5.50	µg/kg	5.50	EPA8240
Chloromethane (methyl chloride)	UJ	A		11.0	µg/kg	11.0	EPA8240
Dichloromethane (methylene chloride)	UJ	VA		12.4	µg/kg	5.50	EPA8240
Ethylbenzene	UJ	A		5.50	µg/kg	5.50	EPA8240
Styrene	UJ	A		5.50	µg/kg	5.50	EPA8240
Tetrachloroethene	J	A		6.32	µg/kg	5.50	EPA8240
Toluene	UJ	A		5.50	µg/kg	5.50	EPA8240
Trichloroethene (TCE)	UJ	A		5.50	µg/kg	5.50	EPA8240
Vinyl acetate	UJ	A		11.0	µg/kg	11.0	EPA8240
Vinyl chloride	UJ	A		11.0	µg/kg	11.0	EPA8240
Xylenes (total)	UJ	A		5.50	µg/kg	5.50	EPA8240
cis-1,3-Dichloropropene	UJ	A		5.50	µg/kg	5.50	EPA8240
trans-1,3-Dichloropropene	UJ	A		5.50	µg/kg	5.50	EPA8240
Pesticides/PCBs							
Aldrin	UJ	O	L	1.76	µg/kg	1.76	EPA8081
Aroclor 1016	UJ	O	L	35.2	µg/kg	35.2	EPA8081
Aroclor 1221	UJ	O	L	70.4	µg/kg	70.4	EPA8081
Aroclor 1232	UJ	O	L	35.2	µg/kg	35.2	EPA8081
Aroclor 1242	UJ	O	L	35.2	µg/kg	35.2	EPA8081
Aroclor 1248	UJ	O	L	35.2	µg/kg	35.2	EPA8081
Aroclor 1254	UJ	O	L	35.2	µg/kg	35.2	EPA8081
Aroclor 1260	J	O	L	67.6	µg/kg	35.2	EPA8081
Dieldrin	UJ	O	L	3.52	µg/kg	3.52	EPA8081
Endosulfan I	UJ	O	L	1.76	µg/kg	1.76	EPA8081
Endosulfan II	UJ	O	L	3.52	µg/kg	3.52	EPA8081
Endosulfan sulfate	UJ	O	L	3.52	µg/kg	3.52	EPA8081
Endrin	UJ	OG	L	3.52	µg/kg	3.52	EPA8081
Endrin ketone	UJ	OG	L	3.52	µg/kg	3.52	EPA8081
Heptachlor	UJ	O	L	1.76	µg/kg	1.76	EPA8081
Heptachlor epoxide	UJ	O	L	1.76	µg/kg	1.76	EPA8081
Methoxychlor (Mariate)	UJ	O	L	17.6	µg/kg	17.6	EPA8081
Toxaphene	UJ	O	L	176	µg/kg	176	EPA8081

SAMPLE NAME: AOBSB0201 (continued) Sample ID: 102676

Constituent	RQ	AQ	BQ	Result	Unit	Q. Limit	Method
Pesticides/PCBs							
alpha-Benzene hexachloride	UJ	O	L	1.76	µg/kg	1.76	EPA8081
alpha-Chlordane	UJ	O	L	1.76	µg/kg	1.76	EPA8081
beta-Benzene hexachloride	UJ	O	L	1.76	µg/kg	1.76	EPA8081
delta-Benzene hexachloride	UJ	O	L	1.76	µg/kg	1.76	EPA8081
gamma-Benzene hexachloride (Lindane)	UJ	O	L	1.76	µg/kg	1.76	EPA8081
gamma-Chlordane	UJ	O	L	1.76	µg/kg	1.76	EPA8081
p,p'-DDD	UJ	OG	L	3.52	µg/kg	3.52	EPA8081
p,p'-DDE	UJ	OG	L	3.52	µg/kg	3.52	EPA8081
p,p'-DDT	UJ	OG	L	3.52	µg/kg	3.52	EPA8081
Radionuclides							
Gross Alpha				14.6	pC/g	3.34	LANLMLR100MOD
Non-volatile Beta				15.9	pC/g	1.68	LANLMLR100MOD

SAMPLE NAME: AOBSB0202 Sample ID: 102677

Location (SRS Coordinates): 50696E 102063N
Ground Elevation Above MSL: . ft
Depth of Core Interval: 0.00 to 0.00 ft
Sample Type: Normal
Sample Color:
Sample Matrix: Soil
USC Soil Classification:
Sample Moisture: Dry
Percent Solids: 94.2

Constituent	RQ	AQ	BQ	Result	Unit	Q. Limit	Method
Physical Parameters							
Cation Exchange Capacity	U			637	Meq/	637	EPA9081
Total Organic Carbon		V		482	mg/kg	60.0	LLOYDKAHN
Total Petroleum Hydrocarbons		V		20.4	mg/kg	11.3	EPA9071
TAL Metals							
Aluminum		V		4,370	mg/kg	19.0	EPA6010
Antimony	U			3.57	mg/kg	3.57	EPA6010
Arsenic	U			11.3	mg/kg	11.3	EPA6010
Barium				19.7	mg/kg	1.12	EPA6010
Beryllium		V		0.212	mg/kg	0.255	EPA6010
Cadmium	J	E		0.128	mg/kg	0.408	EPA6010
Calcium		V		149	mg/kg	17.2	EPA6010
Chromium				4.40	mg/kg	0.919	EPA6010
Cobalt				1.00	mg/kg	0.817	EPA6010
Copper				2.10	mg/kg	1.02	EPA6010
Cyanide	J	E		0.110	mg/kg	0.850	EPA9010
Iron				2,790	mg/kg	22.4	EPA6010
Magnesium				89.6	mg/kg	8.88	EPA6010
Manganese				50.3	mg/kg	0.204	EPA6010
Mercury	J	E		0.0300	mg/kg	0.142	EPA7471
Nickel				1.80	mg/kg	1.74	EPA6010

SAMPLE NAME: AOBSB0202 (continued) Sample ID: 102677

Constituent	RQ	AQ	BQ	Result	Unit	Q. Limit	Method
TAL Metals							
Potassium				86.2	mg/kg	68.4	EPA6010
Selenium	U			10.6	mg/kg	10.6	EPA6010
Silver	U			0.919	mg/kg	0.919	EPA6010
Sodium	J	E		19.3	mg/kg	132	EPA6010
Thallium	U			8.68	mg/kg	8.68	EPA6010
Vanadium				6.20	mg/kg	0.715	EPA6010
Zinc	J	E		6.90	mg/kg	16.4	EPA6010
Semivolatiles							
1,2,4-Trichlorobenzene	U			354	µg/kg	354	EPA8270
1,2-Dichlorobenzene	U			354	µg/kg	354	EPA8270
1,3-Dichlorobenzene	U			354	µg/kg	354	EPA8270
1,4-Dichlorobenzene	U			354	µg/kg	354	EPA8270
2,4,5-Trichlorophenol	U			1,770	µg/kg	1,770	EPA8270
2,4,6-Trichlorophenol	U			354	µg/kg	354	EPA8270
2,4-Dichlorophenol	U			354	µg/kg	354	EPA8270
2,4-Dimethyl phenol	U			354	µg/kg	354	EPA8270
2,4-Dinitrophenol	U			1,770	µg/kg	1,770	EPA8270
2,4-Dinitrotoluene	U			354	µg/kg	354	EPA8270
2,6-Dinitrotoluene	U			354	µg/kg	354	EPA8270
2-Chloronaphthalene	U			354	µg/kg	354	EPA8270
2-Chlorophenol	U			354	µg/kg	354	EPA8270
2-Methyl-4,6-dinitrophenol	U			1,770	µg/kg	1,770	EPA8270
2-Methylnaphthalene	U			354	µg/kg	354	EPA8270
2-Nitroaniline	U			1,770	µg/kg	1,770	EPA8270
2-Nitrophenol	U			354	µg/kg	354	EPA8270
3,3'-Dichlorobenzidine	U			708	µg/kg	708	EPA8270
3-Nitroaniline	U			1,770	µg/kg	1,770	EPA8270
4-Bromophenyl phenyl ether	U			354	µg/kg	354	EPA8270
4-Chloro-3-methylphenol (p-chloro-m-cresol)	U			354	µg/kg	354	EPA8270
4-Chloroaniline	U			354	µg/kg	354	EPA8270
4-Chlorophenyl phenyl ether	U			354	µg/kg	354	EPA8270
4-Nitroaniline	U			1,770	µg/kg	1,770	EPA8270
4-Nitrophenol	U			1,770	µg/kg	1,770	EPA8270
Acenapthene	U			354	µg/kg	354	EPA8270
Acenapthylene	U			354	µg/kg	354	EPA8270
Anthracene	U			354	µg/kg	354	EPA8270
Benzo(a)anthracene	U			354	µg/kg	354	EPA8270
Benzo(a)pyrene	U			354	µg/kg	354	EPA8270
Benzo(b)fluoranthene	U			354	µg/kg	354	EPA8270
Benzo(g,h,i)perylene	U			354	µg/kg	354	EPA8270
Benzo(k)fluoranthene	U			354	µg/kg	354	EPA8270
Benzoic acid	U			1,770	µg/kg	1,770	EPA8270
Benzyl alcohol	U			354	µg/kg	354	EPA8270
Bis(2-chloroethoxy) methane	U			354	µg/kg	354	EPA8270
Bis(2-chloroethyl) ether	U			354	µg/kg	354	EPA8270
Bis(2-chloroisopropyl) ether	U			354	µg/kg	354	EPA8270
Bis(2-ethylhexyl) phthalate	U			354	µg/kg	354	EPA8270

SAMPLE NAME: AOBSB0202 (continued) Sample ID: 102677

Constituent	RQ	AQ	BQ	Result	Unit	Q. Limit	Method
Semivolatiles							
Butyl benzyl phthalate	U			354	µg/kg	354	EPA8270
Chrysene	U			354	µg/kg	354	EPA8270
Di-n-butyl phthalate	U			354	µg/kg	354	EPA8270
Di-n-octyl phthalate	U			354	µg/kg	354	EPA8270
Dibenzo(a,h)anthracene	U			354	µg/kg	354	EPA8270
Dibenzofuran	U			354	µg/kg	354	EPA8270
Diethyl phthalate	U			354	µg/kg	354	EPA8270
Dimethyl phthalate	U			354	µg/kg	354	EPA8270
Fluoranthene	U			354	µg/kg	354	EPA8270
Fluorene	U			354	µg/kg	354	EPA8270
Hexachlorobenzene	U			354	µg/kg	354	EPA8270
Hexachlorobutadiene	U			354	µg/kg	354	EPA8270
Hexachlorocyclopentadiene	U			354	µg/kg	354	EPA8270
Hexachloroethane	U			354	µg/kg	354	EPA8270
Indeno(1,2,3-c,d)pyrene	U			354	µg/kg	354	EPA8270
Isophorone	U			354	µg/kg	354	EPA8270
N-Nitrosodi-n-propylamine	U			354	µg/kg	354	EPA8270
N-Nitrosodiphenylamine	U			354	µg/kg	354	EPA8270
Naphthalene	U			354	µg/kg	354	EPA8270
Nitrobenzene	U			354	µg/kg	354	EPA8270
Pentachlorophenol	U			1,770	µg/kg	1,770	EPA8270
Phenanthrene	U			354	µg/kg	354	EPA8270
Phenol	U			354	µg/kg	354	EPA8270
Pyrene	U			354	µg/kg	354	EPA8270
Unknown	J	N		300	µg/kg		EPA8270
o-cresol (2-methylphenol)	U			354	µg/kg	354	EPA8270
p-cresol (4-methylphenol)	U			354	µg/kg	354	EPA8270
Volatiles							
1,1,1-Trichloroethane	J	E		1.17	µg/kg	5.50	EPA8240
1,1,2,2-Tetrachloroethane	U			5.50	µg/kg	5.50	EPA8240
1,1,2-Trichloroethane	U			5.50	µg/kg	5.50	EPA8240
1,1-Dichloroethane	U			5.50	µg/kg	5.50	EPA8240
1,1-Dichloroethene	U			5.50	µg/kg	5.50	EPA8240
1,2-Dichloroethane	U			5.50	µg/kg	5.50	EPA8240
1,2-Dichloroethene (total)	U			5.50	µg/kg	5.50	EPA8240
1,2-Dichloropropane	U			5.50	µg/kg	5.50	EPA8240
2-Butanone (MEK)	U			11.0	µg/kg	11.0	EPA8240
2-Hexanone	U			11.0	µg/kg	11.0	EPA8240
4-Methyl-2-pentanone	U			11.0	µg/kg	11.0	EPA8240
Acetone	U			11.0	µg/kg	11.0	EPA8240
Benzene	U			5.50	µg/kg	5.50	EPA8240
Bromodichloromethane	U			5.50	µg/kg	5.50	EPA8240
Bromoform	U			5.50	µg/kg	5.50	EPA8240
Bromomethane (Methyl bromide)	U			11.0	µg/kg	11.0	EPA8240
Carbon disulfide	U			5.50	µg/kg	5.50	EPA8240
Carbon tetrachloride	U			5.50	µg/kg	5.50	EPA8240
Chlorobenzene	U			5.50	µg/kg	5.50	EPA8240
Chlorodibromomethane	U			5.50	µg/kg	5.50	EPA8240

SAMPLE NAME: AOBSB0202 (continued) Sample ID: 102677

Constituent	RQ	AQ	BQ	Result	Unit	Q. Limit	Method
Volatiles							
Chloroethane	U			11.0	µg/kg	11.0	EPA8240
Chloroform	U			5.50	µg/kg	5.50	EPA8240
Chloromethane (methyl chloride)	U			11.0	µg/kg	11.0	EPA8240
Dichloromethane (methylene chloride)	U	V		12.6	µg/kg	5.50	EPA8240
Ethylbenzene	U			5.50	µg/kg	5.50	EPA8240
Styrene	U			5.50	µg/kg	5.50	EPA8240
Tetrachloroethene	J	E		4.32	µg/kg	5.50	EPA8240
Toluene	U			5.50	µg/kg	5.50	EPA8240
Trichloroethene (TCE)	U			5.50	µg/kg	5.50	EPA8240
Vinyl acetate	U			11.0	µg/kg	11.0	EPA8240
Vinyl chloride	U			11.0	µg/kg	11.0	EPA8240
Xylenes (total)	U			5.50	µg/kg	5.50	EPA8240
cis-1,3-Dichloropropene	U			5.50	µg/kg	5.50	EPA8240
trans-1,3-Dichloropropene	U			5.50	µg/kg	5.50	EPA8240
Pesticides/PCBs							
Aldrin	U			1.77	µg/kg	1.77	EPA8081
Aroclor 1016	U			35.4	µg/kg	35.4	EPA8081
Aroclor 1221	U			70.7	µg/kg	70.7	EPA8081
Aroclor 1232	U			35.4	µg/kg	35.4	EPA8081
Aroclor 1242	U			35.4	µg/kg	35.4	EPA8081
Aroclor 1248	U			35.4	µg/kg	35.4	EPA8081
Aroclor 1254	U			35.4	µg/kg	35.4	EPA8081
Aroclor 1260	U			35.4	µg/kg	35.4	EPA8081
Dieldrin	U			3.54	µg/kg	3.54	EPA8081
Endosulfan I	U			1.77	µg/kg	1.77	EPA8081
Endosulfan II	U			3.54	µg/kg	3.54	EPA8081
Endosulfan sulfate	U			3.54	µg/kg	3.54	EPA8081
Endrin	UJ	G		3.54	µg/kg	3.54	EPA8081
Endrin ketone	UJ	G		3.54	µg/kg	3.54	EPA8081
Heptachlor	U			1.77	µg/kg	1.77	EPA8081
Heptachlor epoxide	U			1.77	µg/kg	1.77	EPA8081
Methoxychlor (Mariate)	U			17.7	µg/kg	17.7	EPA8081
Toxaphene	U			177	µg/kg	177	EPA8081
alpha-Benzene hexachloride	U			1.77	µg/kg	1.77	EPA8081
alpha-Chlordane	U			1.77	µg/kg	1.77	EPA8081
beta-Benzene hexachloride	U			1.77	µg/kg	1.77	EPA8081
delta-Benzene hexachloride	U			1.77	µg/kg	1.77	EPA8081
gamma-Benzene hexachloride (Lindane)	U			1.77	µg/kg	1.77	EPA8081
gamma-Chlordane	U			1.77	µg/kg	1.77	EPA8081
p,p'-DDD	UJ	G		3.54	µg/kg	3.54	EPA8081
p,p'-DDE	UJ	G		3.54	µg/kg	3.54	EPA8081
p,p'-DDT	UJ	G		3.54	µg/kg	3.54	EPA8081

SAMPLE NAME: AOBSB0202 (continued) Sample ID: 102677

Constituent	RQ	AQ	BQ	Result	Unit	Q. Limit	Method
Radionuclides							
Gross Alpha		V		8.40	pC/g	2.90	LANLMLR100MOD
Non-volatile Beta	UI			3.12	pC/g	1.74	LANLMLR100MOD

SAMPLE NAME: AOBSB0301 Sample ID: 102683

Location (SRS Coordinates): 50627E 102046N
Ground Elevation Above MSL: . ft
Depth of Core Interval: 0.00 to 1.00 ft
Sample Type: Normal
Sample Color:
Sample Matrix: Soil
USC Soil Classification:
Sample Moisture: Dry
Percent Solids: 96.3

Constituent	RQ	AQ	BQ	Result	Unit	Q. Limit	Method
Physical Parameters							
Cation Exchange Capacity	U			623	Meq/	623	EPA9081
Total Organic Carbon				2,920	mg/kg	60.0	LLOYDKAHN
Total Petroleum Hydrocarbons		V		24.1	mg/kg	11.1	EPA418.1
TAL Metals							
Aluminum				3.620	mg/kg	18.7	EPA6010
Antimony	U			3.53	mg/kg	3.53	EPA6010
Arsenic	U			11.2	mg/kg	11.2	EPA6010
Barium				11.5	mg/kg	1.11	EPA6010
Beryllium	J	E		0.114	mg/kg	0.252	EPA6010
Cadmium	J	E		0.136	mg/kg	0.403	EPA6010
Calcium				77.9	mg/kg	16.9	EPA6010
Chromium				3.80	mg/kg	0.907	EPA6010
Cobalt	J	E		0.429	mg/kg	0.806	EPA6010
Copper				2.70	mg/kg	1.01	EPA6010
Cyanide	U			0.790	mg/kg	0.790	EPA9010
Iron				1,820	mg/kg	22.1	EPA6010
Lead	J	E		4.90	mg/kg	5.95	EPA6010
Magnesium				54.8	mg/kg	8.77	EPA6010
Manganese				11.2	mg/kg	0.202	EPA6010
Mercury	J	E		0.0200	mg/kg	0.138	EPA7471
Nickel	J	E		1.30	mg/kg	1.71	EPA6010
Potassium	J	E		60.9	mg/kg	67.5	EPA6010
Selenium	U			10.5	mg/kg	10.5	EPA6010
Silver	U			0.907	mg/kg	0.907	EPA6010
Sodium	U			130	mg/kg	130	EPA6010
Thallium	U			8.57	mg/kg	8.57	EPA6010
Vanadium				6.20	mg/kg	0.706	EPA6010
Zinc	J	E		11.0	mg/kg	16.2	EPA6010

SAMPLE NAME: AOBSB0301 (continued) Sample ID: 102683

Constituent	RQ	AQ	BQ	Result	Unit	Q. Limit	Method
Semivolatiles							
1,2,4-Trichlorobenzene	U			346	µg/kg	346	EPA8270
1,2-Dichlorobenzene	U			346	µg/kg	346	EPA8270
1,3-Dichlorobenzene	U			346	µg/kg	346	EPA8270
1,4-Dichlorobenzene	U			346	µg/kg	346	EPA8270
2,4,5-Trichlorophenol	U			1,730	µg/kg	1,730	EPA8270
2,4,6-Trichlorophenol	U			346	µg/kg	346	EPA8270
2,4-Dichlorophenol	U			346	µg/kg	346	EPA8270
2,4-Dimethyl phenol	U			346	µg/kg	346	EPA8270
2,4-Dinitrophenol	U			1,730	µg/kg	1,730	EPA8270
2,4-Dinitrotoluene	U			346	µg/kg	346	EPA8270
2,6-Dinitrotoluene	U			346	µg/kg	346	EPA8270
2-Chloronaphthalene	U			346	µg/kg	346	EPA8270
2-Chlorophenol	U			346	µg/kg	346	EPA8270
2-Methyl-4,6-dinitrophenol	U			1,730	µg/kg	1,730	EPA8270
2-Methylnaphthalene	U			346	µg/kg	346	EPA8270
2-Nitroaniline	U			1,730	µg/kg	1,730	EPA8270
2-Nitrophenol	U			346	µg/kg	346	EPA8270
3,3'-Dichlorobenzidine	U			692	µg/kg	692	EPA8270
3-Nitroaniline	U			1,730	µg/kg	1,730	EPA8270
4-Bromophenyl phenyl ether	U			346	µg/kg	346	EPA8270
4-Chloro-3-methylphenol (p-chloro-m-cresol)	U			346	µg/kg	346	EPA8270
4-Chloroaniline	U			346	µg/kg	346	EPA8270
4-Chlorophenyl phenyl ether	U			346	µg/kg	346	EPA8270
4-Nitroaniline	U			1,730	µg/kg	1,730	EPA8270
4-Nitrophenol	U			1,730	µg/kg	1,730	EPA8270
Acenapthene	U			346	µg/kg	346	EPA8270
Acenapthylene	U			346	µg/kg	346	EPA8270
Aldol condensate	J	KN		700	µg/kg		EPA8270
Anthracene	U			346	µg/kg	346	EPA8270
Benzo(a)anthracene	U			346	µg/kg	346	EPA8270
Benzo(a)pyrene	U			346	µg/kg	346	EPA8270
Benzo(b)fluoranthene	J	E		66.1	µg/kg	346	EPA8270
Benzo(g,h,i)perylene	U			346	µg/kg	346	EPA8270
Benzo(k)fluoranthene	J	E		44.2	µg/kg	346	EPA8270
Benzoic acid	U			1,730	µg/kg	1,730	EPA8270
Benzyl alcohol	U			346	µg/kg	346	EPA8270
Bis(2-chloroethoxy) methane	U			346	µg/kg	346	EPA8270
Bis(2-chloroethyl) ether	U			346	µg/kg	346	EPA8270
Bis(2-chloroisopropyl) ether	U			346	µg/kg	346	EPA8270
Bis(2-ethylhexyl) phthalate	U			346	µg/kg	345	EPA8270
Butyl benzyl phthalate	U			346	µg/kg	346	EPA8270
Chrysene	J	E		58.7	µg/kg	346	EPA8270
Di-n-butyl phthalate	U			346	µg/kg	346	EPA8270
Di-n-octyl phthalate	U			346	µg/kg	346	EPA8270
Dibenzo(a,h)anthracene	U			346	µg/kg	346	EPA8270
Dibenzofuran	U			346	µg/kg	346	EPA8270
Diethyl phthalate	U			346	µg/kg	346	EPA8270
Dimethyl phthalate	U			346	µg/kg	346	EPA8270
Fluoranthene	J	E		47.8	µg/kg	346	EPA8270

SAMPLE NAME: AOBSB0301 (continued) Sample ID: 102683

Constituent	RQ	AQ	BQ	Result	Unit	Q. Limit	Method
Semivolatiles							
Fluorene	U			346	µg/kg	346	EPA8270
Hexachlorobenzene	U			346	µg/kg	346	EPA8270
Hexachlorobutadiene	U			346	µg/kg	346	EPA8270
Hexachlorocyclopentadiene	U			346	µg/kg	346	EPA8270
Hexachloroethane	U			346	µg/kg	346	EPA8270
Indeno(1,2,3-c,d)pyrene	U			346	µg/kg	346	EPA8270
Isophorone	U			346	µg/kg	346	EPA8270
N-Nitrosodi-n-propylamine	U			346	µg/kg	346	EPA8270
N-Nitrosodiphenylamine	U			346	µg/kg	346	EPA8270
Naphthalene	U			346	µg/kg	346	EPA8270
Nitrobenzene	U			346	µg/kg	346	EPA8270
Pentachlorophenol	U			1,730	µg/kg	1,730	EPA8270
Phenanthrene	U			346	µg/kg	346	EPA8270
Phenol	U			346	µg/kg	346	EPA8270
Pyrene	J	E		40.1	µg/kg	346	EPA8270
Unknown	J	N		300	µg/kg	.	EPA8270
Unknown	J	N		800	µg/kg	.	EPA8270
Unknown	J	N		400	µg/kg	.	EPA8270
o-cresol (2-methylphenol)	U			346	µg/kg	346	EPA8270
p-cresol (4-methylphenol)	U			346	µg/kg	346	EPA8270
Volatiles							
1,1,1-Trichloroethane	J	E		3.46	µg/kg	5.00	EPA8240
1,1,2,2-Tetrachloroethane	U			5.00	µg/kg	5.00	EPA8240
1,1,2-Trichloroethane	U			5.00	µg/kg	5.00	EPA8240
1,1-Dichloroethane	U			5.00	µg/kg	5.00	EPA8240
1,1-Dichloroethene	U			5.00	µg/kg	5.00	EPA8240
1,2-Dichloroethane	U			5.00	µg/kg	5.00	EPA8240
1,2-Dichloroethene (total)	U			5.00	µg/kg	5.00	EPA8240
1,2-Dichloropropane	U			5.00	µg/kg	5.00	EPA8240
2-Butanone (MEK)	U			10.0	µg/kg	10.0	EPA8240
2-Hexanone	U			10.0	µg/kg	10.0	EPA8240
4-Methyl-2-pentanone	U			10.0	µg/kg	10.0	EPA8240
Acetone	U			10.0	µg/kg	10.0	EPA8240
Benzene	U			5.00	µg/kg	5.00	EPA8240
Bromodichloromethane	U			5.00	µg/kg	5.00	EPA8240
Bromoform	U			5.00	µg/kg	5.00	EPA8240
Bromomethane (Methyl bromide)	U			10.0	µg/kg	10.0	EPA8240
Carbon disulfide	U			5.00	µg/kg	5.00	EPA8240
Carbon tetrachloride	U			5.00	µg/kg	5.00	EPA8240
Chlorobenzene	U			5.00	µg/kg	5.00	EPA8240
Chlorodibromomethane	U			5.00	µg/kg	5.00	EPA8240
Chloroethane	U			10.0	µg/kg	10.0	EPA8240
Chloroform	U			5.00	µg/kg	5.00	EPA8240
Chloromethane (methyl chloride)	U			10.0	µg/kg	10.0	EPA8240
Dichloromethane (methylene chloride)	U	V		14.1	µg/kg	5.00	EPA8240
Ethylbenzene	U			5.00	µg/kg	5.00	EPA8240
Styrene	U			5.00	µg/kg	5.00	EPA8240
Tetrachloroethene	J	E		3.87	µg/kg	5.00	EPA8240

SAMPLE NAME: AOBSB0301 (continued) Sample ID: 102683

Constituent	RQ	AQ	BQ	Result	Unit	Q. Limit	Method
Volatiles							
Toluene	U			5.00	µg/kg	5.00	EPA8240
Trichloroethene (TCE)	U			5.00	µg/kg	5.00	EPA8240
Unknown	J	N		100	µg/kg	.	EPA8240
vinyl acetate	U			10.0	µg/kg	10.0	EPA8240
vinyl chloride	U			10.0	µg/kg	10.0	EPA8240
Xylenes (total)	U			5.00	µg/kg	5.00	EPA8240
cis-1,3-Dichloropropene	U			5.00	µg/kg	5.00	EPA8240
trans-1,3-Dichloropropene	U			5.00	µg/kg	5.00	EPA8240
Pesticides/PCBs							
Aldrin	U			1.73	µg/kg	1.73	EPA808 I
Aroclor 1016	U			34.6	µg/kg	34.6	EPA808 1
Aroclor 1221	U			69.2	µg/kg	69.2	EPA8081
Aroclor 1232	U			34.6	µg/kg	34.6	EPA8081
Aroclor 1242	U			34.6	µg/kg	34.6	EPA808 1
Aroclor 1248	U			34.6	µg/kg	34.6	EPA808 I
Aroclor 1254	U			34.6	µg/kg	34.6	EPA8081
Aroclor 1260	U			34.6	µg/kg	34.6	EPA808 1
Dieldrin	U			3.46	µg/kg	3.46	EPA808 I
Endosulfan I	U			1.73	µg/kg	1.73	EPA808 I
Endosulfan II	U			3.46	µg/kg	3.46	EPA808 I
Endosulfan sulfate	U			3.46	µg/kg	3.46	EPA8081
Endrin	UJ	G		3.46	µg/kg	3.46	EP.4808 I
Endrin ketone	UJ	G		3.46	µg/kg	3.46	EPA808 1
Heptachlor	U			1.73	µg/kg	1.73	EPA808 I
Heptachlor epoxide	U			1.73	µg/kg	1.73	EPA808 I
Methoxychlor (Mariate)	U			17.3	µg/kg	17.3	EPA808 I
Toxaphene	U			173	µg/kg	173	EPA808 1
alpha-Benzene hexachloride	U			1.73	µg/kg	1.73	EPA808 I
alpha-Chlordane	U			1.73	µg/kg	I.73	EPA808 1
beta-Benzene hexachloride	U			I.73	µg/kg	1.73	EPA808 I
delta-Benzene hexachloride	U			1.73	µg/kg	1.73	EPA808 1
gamma-Benzene hexachloride (Lindane)	U			1.73	µg/kg	1.73	EPA808 I
gamma-Chlordane	U			1.73	µg/kg	1.73	EPA808 I
p,p'-DDD	UJ	G		3.46	µg/kg	3.46	EPA8081
p,p'-DDE	UJ	G		3.46	µg/kg	3.46	EPA808 I
p,p'-DDT	UJ	G		3.46	µg/kg	3.46	EPA8081
Radionuclides							
Gross Alpha	UI			6.12	pC/g	3.28	LANLMLR100MOD
Non-volatile Beta				15.6	pC/g	1.58	LANLMLR100MOD

SAMPLE NAME: AOBSB0302 Sample ID: 102684

Location (SRS Coordinates): 50627E 102046N
Ground Elevation Above MSL: . ft
Depth of Core Interval: 1.00 to 4.00 ft
Sample Type: Normal Sample Matrix: Soil Sample Moisture: Dry
Sample Color: USC Soil Classification: Percent Solids: 94.0

Constituent	RQ	AQ	BQ	Result	Unit	Q. Limit	Method
Physical Parameters							
Cation Exchange Capacity	U			638	Meq/	638	EPA9081
Total Organic Carbon		V		1.300	mg/kg	60.0	LLOYDKAHN
Total Petroleum Hydrocarbons	UJ	V		8.10	mg/kg	11.4	EPA9071
TAL Metals							
Aluminum		V		5,230	mg/kg	19.2	EPA6010
Antimony	U			3.62	mg/kg	3.62	EPA6010
Arsenic	J	E		1.30	mg/kg	11.5	EPA6010
Barium				21.4	mg/kg	1.14	EPA6010
Beryllium	U			0.258	mg/kg	0.258	EPA6010
Cadmium	J	E		0.114	mg/kg	0.413	EPA6010
Calcium		V		92.4	mg/kg	17.4	EPA6010
Chromium				4.40	mg/kg	0.930	EPA6010
Cobalt	J	E		0.684	mg/kg	0.826	EPA6010
Copper				2.30	mg/kg	1.03	EPA6010
Cyanide	U			0.810	mg/kg	0.810	EPA9010
Iron				2,480	mg/kg	22.6	EPA6010
Lead	J	E		4.50	mg/kg	6.09	EPA6010
Magnesium				69.7	mg/kg	8.99	EPA6010
Manganese				14.1	mg/kg	0.207	EPA6010
Mercury	J	E		0.0300	mg/kg	0.142	EPA7471
Nickel				1.80	mg/kg	1.76	EPA6010
Potassium				94.0	mg/kg	69.2	EPA6010
Selenium	U			10.7	mg/kg	10.7	EPA6010
Silver	U			0.930	mg/kg	0.930	EPA6010
Sodium	J	E		16.5	mg/kg	133	EPA6010
Thallium	U			8.78	mg/kg	8.78	EPA6010
Vanadium				7.10	mg/kg	0.723	EPA6010
Zinc	J	E		7.80	mg/kg	16.6	EPA6010
Semivolatiles							
1,2,4-Trichlorobenzene	U			355	µg/kg	355	EPA8270
1,2-Dichlorobenzene	U			355	µg/kg	355	EPA8270
1,3-Dichlorobenzene	U			355	µg/kg	355	EPA8270
1,4-Dichlorobenzene	U			355	µg/kg	355	EPA8270
2,4,5-Trichlorophenol	U			1,780	µg/kg	1,780	EPA8270
2,4,6-Trichlorophenol	U			355	µg/kg	355	EPA8270
2,4-Dichlorophenol	U			355	µg/kg	355	EPA8270
2,4-Dimethyl phenol	U			355	µg/kg	355	EPA8270
2,4-Dinitrophenol	U			1,780	µg/kg	1,780	EPA8270
2,4-Dinitrotoluene	U			355	µg/kg	355	EPA8270
2,6-Dinitrotoluene	U			355	µg/kg	355	EPA8270

SAMPLE NAME: AOBSB0302 (continued) Sample ID: 102684

Constituent	RQ	AQ	BQ	Result	Unit	Q. Limit	Method
Semivolatiles							
2-Chloronaphthalene	U			355	µg/kg	355	EPA8270
2-Chlorophenol	U			355	µg/kg	355	EPA8270
2-Methyl-4,6-dinitrophenol	U			1,780	µg/kg	1,780	EPA8270
2-Methylnaphthalene	U			355	µg/kg	355	EPA8270
2-Nitroaniline	U			1,780	µg/kg	1,780	EPA8270
2-Nitrophenol	U			355	µg/kg	355	EPA8270
3,3'-Dichlorobenzidine	U			710	µg/kg	710	EPA8270
3-Nitroaniline	U			1,780	µg/kg	1,780	EPA8270
4-Bromophenyl phenyl ether	U			355	µg/kg	355	EPA8270
4-Chloro-3-methylphenol (p-chloro-m-cresol)	U			355	µg/kg	355	EPA8270
4-Chloroaniline	U			355	µg/kg	355	EPA8270
4-Chlorophenyl phenyl ether	U			355	µg/kg	355	EPA8270
4-Nitroaniline	U			1,780	µg/kg	1,780	EPA8270
4-Nitrophenol	U			1,780	µg/kg	1,780	EPA8270
Acenapthene	U			355	µg/kg	355	EPA8270
Acenapthylene	U			355	µg/kg	355	EPA8270
Anthracene	U			355	µg/kg	355	EPA8270
Benzo(a)anthracene	U			355	µg/kg	355	EPA8270
Benzo(a)pyrene	U			355	µg/kg	355	EPA8270
Benzo(b)fluoranthene	U			355	µg/kg	355	EPA8270
Benzo(g,h,i)perylene	U			355	µg/kg	355	EPA8270
Benzo(k)fluoranthene	U			355	µg/kg	355	EPA8270
Benzoic acid	U			1,780	µg/kg	1,780	EPA8270
Benzyl alcohol	U			355	µg/kg	355	EPA8270
Bis(2-chloroethoxy) methane	U			355	µg/kg	355	EPA8270
Bis(2-chloroethyl) ether	U			355	µg/kg	355	EPA8270
Bis(2-chloroisopropyl) ether	U			355	µg/kg	355	EPA8270
Bis(2-ethylhexyl) phthalate	U			355	µg/kg	355	EPA8270
Butyl benzyl phthalate	U			355	µg/kg	355	EPA8270
Chrysene	U			355	µg/kg	355	EPA8270
Di-n-butyl phthalate	U			355	µg/kg	355	EPA8270
Di-n-octyl phthalate	U			355	µg/kg	355	EPA8270
Dibenzo(a,h)anthracene	U			355	µg/kg	355	EPA8270
Dibenzofuran	U			355	µg/kg	355	EPA8270
Diethyl phthalate	U			355	µg/kg	355	EPA8270
Dimethyl phthalate	U			355	µg/kg	355	EPA8270
Fluoranthene	U			355	µg/kg	355	EPA8270
Fluorene	U			355	µg/kg	355	EPA8270
Hexachlorobenzene	U			355	µg/kg	355	EPA8270
Hexachlorobutadiene	U			355	µg/kg	355	EPA8270
Hexachlorocyclopentadiene	U			355	µg/kg	355	EPA8270
Hexachloroethane	U			355	µg/kg	355	EPA8270
Indeno(1,2,3-c,d)pyrene	U			355	µg/kg	355	EPA8270
Isophorone	U			355	µg/kg	355	EPA8270
N-Nitrosodi-n-propylamine	U			355	µg/kg	355	EPA8270
N-Nitrosodiphenylamine	U			355	µg/kg	355	EPA8270
Naphthalene	U			355	µg/kg	355	EPA8270
Nitrobenzene	U			355	µg/kg	355	EPA8270
Pentachlorophenol	U			1,780	µg/kg	1,780	EPA8270

SAMPLE NAME: AOBSB0302 (continued) Sample ID: 102684

Constituent	RQ	AQ	BQ	Result	Unit	Q. Limit	Method
Semivolatiles							
Phenanthrene	U			355	µg/kg	355	EPA8270
Phenol	U			355	µg/kg	355	EPA8270
Pyrene	U			355	µg/kg	355	EPA8270
Unknown	J	N		200	µg/kg		EPA8270
o-cresol (2-methylphenol)	U			355	µg/kg	355	EPA8270
p-cresol (4-methylphenol)	U			355	µg/kg	355	EPA8270
Volatiles							
1,1,1-Trichloroethane				6.15	µg/kg	5.00	EPA8240
1,1,2,2-Tetrachloroethane	U			5.00	µg/kg	5.00	EPA8240
1,1,2-Trichloroethane	U			5.00	µg/kg	5.00	EPA8240
1,1-Dichloroethane	U			5.00	µg/kg	5.00	EPA8240
1,1-Dichloroethene	U			5.00	µg/kg	5.00	EPA8240
1,2-Dichloroethane	U			5.00	µg/kg	5.00	EPA8240
1,2-Dichloroethene (total)	U			5.00	µg/kg	5.00	EPA8240
1,2-Dichloropropane	U			5.00	µg/kg	5.00	EPA8240
2-Butanone (MEK)	U			10.0	µg/kg	10.0	EPA8240
2-Hexanone	U			10.0	µg/kg	10.0	EPA8240
4-Methyl-2-pentanone	U			10.0	µg/kg	10.0	EPA8240
Acetone	U			10.0	µg/kg	10.0	EPA8240
Benzene	U			5.00	µg/kg	5.00	EPA8240
Bromodichloromethane	U			5.00	µg/kg	5.00	EPA8240
Bromoform	U			5.00	µg/kg	5.00	EPA8240
Bromomethane (Methyl bromide)	U			10.0	µg/kg	10.0	EPA8240
Carbon disulfide	U			5.00	µg/kg	5.00	EPA8240
Carbon tetrachloride	U			5.00	µg/kg	5.00	EPA8240
Chlorobenzene	U			5.00	µg/kg	5.00	EPA8240
Chlorodibromomethane	U			5.00	µg/kg	5.00	EPA8240
Chloroethane	U			10.0	µg/kg	10.0	EPA8240
Chloroform	U			5.00	µg/kg	5.00	EPA8240
Chloromethane (methyl chloride)	U			10.0	µg/kg	10.0	EPA8240
Dichloromethane (methylene chloride)	U	V		16.0	µg/kg	5.00	EPA8240
Ethylbenzene	U			5.00	µg/kg	5.00	EPA8240
Styrene	U			5.00	µg/kg	5.00	EPA8240
Tetrachloroethene				6.04	µg/kg	5.00	EPA8240
Toluene	U			5.00	µg/kg	5.00	EPA8240
Trichloroethene (TCE)	U			5.00	µg/kg	5.00	EPA8240
Vinyl acetate	U			10.0	µg/kg	10.0	EPA8240
Vinyl chloride	U			10.0	µg/kg	10.0	EPA8240
Xylenes (total)	U			5.00	µg/kg	5.00	EPA8240
cis-1,3-Dichloropropene	U			5.00	µg/kg	5.00	EPA8240
trans-1,3-Dichloropropene	U			5.00	µg/kg	5.00	EPA8240
Pesticides/PCBs							
Aldrin	U			1.77	µg/kg	1.77	EPA8081
Aroclor 1016	U			35.5	µg/kg	35.5	EPA8081
Aroclor 1221	U			70.9	µg/kg	70.9	EPA8081
Aroclor 1232	U			35.5	µg/kg	35.5	EPA8081

SAMPLE NAME: AOBSB0302 (continued) Sample ID: 102684

Constituent	RQ	AQ	BQ	Result	Unit	Q. Limit	Method
Pesticides/PCBs							
Aroclor 1242	U			35.5	µg/kg	35.5	EPA8081
Aroclor 1248	U			35.5	µg/kg	35.5	EPA8081
Aroclor 1254	U			35.5	µg/kg	35.5	EPA8081
Aroclor 1260	U			35.5	µg/kg	35.5	EPA8081
Dieldrin	U			3.55	µg/kg	3.55	EPA8081
Endosulfan I	U			1.77	µg/kg	1.77	EPA8081
Endosulfan II	U			3.55	µg/kg	3.55	EPA8081
Endosulfan sulfate	U			3.55	µg/kg	3.55	EPA8081
Endrin	UJ	G		3.55	µg/kg	3.55	EPA8081
Endrin ketone	UJ	G		3.55	µg/kg	3.55	EPA8081
Heptachlor	U			1.77	µg/kg	1.77	EPA8081
Heptachlor epoxide	U			1.77	µg/kg	1.77	EPA8081
Methoxychlor (Mariate)	U			17.7	µg/kg	17.7	EPA8081
Toxaphene	U			177	µg/kg	177	EPA8081
alpha-Benzene hexachloride	U			1.77	µg/kg	1.77	EPA8081
alpha-Chlordane	U			1.77	µg/kg	1.77	EPA8081
beta-Benzene hexachloride	U			1.77	µg/kg	1.77	EPA8081
delta-Benzene hexachloride	U			1.77	µg/kg	1.77	EPA8081
gamma-Benzene hexachloride (Lindane)	U			1.77	µg/kg	1.77	EPA8081
gamma-Chlordane	U			1.77	µg/kg	1.77	EPA8081
p,p'-DDD	UJ	G		3.55	µg/kg	3.55	EPA8081
p,p'-DDE	UJ	G		3.55	µg/kg	3.55	EPA8081
p,p'-DDT	UJ	G		3.55	µg/kg	3.55	EPA8081
Radionuclides							
Gross Alpha		V		7.55	pC/g	2.89	LANLMLR100MOD
Non-volatile Beta	UI			3.29	pC/g	1.72	LANLMLR100MOD

SAMPLE NAME: AOBSB0401 Sample ID: 102685

Location (SRS Coordinates): 50666E 102043N
Ground Elevation Above MSL: . ft
Depth of Core Interval: 0.00 to 1.00 ft
Sample Type: Normal Sample Matrix: Soil Sample Moisture: Dry
Sample Color: USC Soil Classification: Percent Solids: 94.7

Constituent	RQ	AQ	BQ	Result	Unit	Q. Limit	Method
Physical Parameters							
Cation Exchange Capacity	U			634	Meq/	634	EPA9081
Total Organic Carbon		V		6,700	mg/kg	60.0	LLOYDKAHN
Total Petroleum Hydrocarbons		V		530	mg/kg	22.5	EPA9071

SAMPLE NAME: AOBSB0401 (continued) Sample ID: 102685

Constituent	RQ	AQ	BQ	Result	Unit	Q. Limit	Method
TAL Metals							
Aluminum		V		2,980	mg/kg	19.5	EPA6010
Antimony	U			3.66	mg/kg	3.66	EPA6010
Arsenic	U			11.6	mg/kg	11.6	EPA6010
Barium				13.2	mg/kg	1.15	EPA6010
Beryllium	U	V		0.144	mg/kg	0.262	EPA6010
Cadmium	J	E		0.284	mg/kg	0.418	EPA6010
Calcium		V		38.8	mg/kg	17.6	EPA6010
Chromium				7.20	mg/kg	0.941	EPA6010
Cobalt	J	E		0.374	mg/kg	0.837	EPA6010
Copper				6.20	mg/kg	1.05	EPA6010
Cyanide	J	E		0.270	mg/kg	0.840	EPA9010
Iron				1,470	mg/kg	22.9	EPA6010
Lead				9.90	mg/kg	6.17	EPA6010
Magnesium				56.5	mg/kg	9.10	EPA6010
Manganese				10.3	mg/kg	0.209	EPA6010
Mercury	J	E		0.0200	mg/kg	0.141	EPA7471
Nickel	J	E		1.20	mg/kg	1.78	EPA6010
Potassium	J	E		50.4	mg/kg	70.1	EPA6010
Selenium	U			10.9	mg/kg	10.9	EPA6010
Silver	U			0.941	mg/kg	0.941	EPA6010
Sodium	J	E		24.3	mg/kg	135	EPA6010
Thallium	U			8.89	mg/kg	8.89	EPA6010
Vanadium				4.70	mg/kg	0.732	EPA6010
Zinc	J	E		8.10	mg/kg	16.8	EPA6010
Semivolatiles							
1,2,4-Trichlorobenzene	U			352	µg/kg	352	EPA8270
1,2-Dichlorobenzene	U			352	µg/kg	352	EPA8270
1,3-Dichlorobenzene	U			352	µg/kg	352	EPA8270
1,4-Dichlorobenzene	U			352	µg/kg	352	EPA8270
2,4,5-Trichlorophenol	U			1,760	µg/kg	1,760	EPA8270
2,4,6-Trichlorophenol	U			352	µg/kg	352	EPA8270
2,4-Dichlorophenol	U			352	µg/kg	352	EPA8270
2,4-Dimethyl phenol	U			352	µg/kg	352	EPA8270
2,4-Dinitrophenol	U			1,760	µg/kg	1,760	EPA8270
2,4-Dinitrotoluene	U			352	µg/kg	352	EPA8270
2,6-Dinitrotoluene	U			352	µg/kg	352	EPA8270
2-Chloronaphthalene	U			352	µg/kg	352	EPA8270
2-Chlorophenol	U			352	µg/kg	352	EPA8270
2-Methyl-4,6-dinitrophenol	U			1,760	µg/kg	1,760	EPA8270
2-Methylnaphthalene	U			352	µg/kg	352	EPA8270
2-Nitroaniline	U			1,760	µg/kg	1,760	EPA8270
2-Nitrophenol	U			352	µg/kg	352	EPA8270
3,3'-Dichlorobenzidine	U			704	µg/kg	704	EPA8270
3-Nitroaniline	U			1,760	µg/kg	1,760	EPA8270
4-Bromophenyl phenyl ether	U			352	µg/kg	352	EPA8270
4-Chloro-3-methylphenol (p-chloro-m-cresol)	U			352	µg/kg	352	EPA8270
4-Chloroaniline	U			352	µg/kg	352	EPA8270

SAMPLE NAME: AOBSB0401 (continued) Sample ID: 102685

Constituent	RQ	AQ	BQ	Result	Unit	Q. Limit	Method
Semivolatiles							
4-Chlorophenyl phenyl ether	U			352	µg/kg	352	EPA8270
4-Nitroaniline	U			1,760	µg/kg	1,760	EPA8270
4-Nitrophenol	U			1,760	µg/kg	1,760	EPA8270
Acenapthene	U			352	µg/kg	352	EPA8270
Acenapthylene	U			352	µg/kg	352	EPA8270
Aldol condensate	J	KN		500	µg/kg		EPA8270
Anthracene	U			352	µg/kg	352	EPA8270
Benzo(a)anthracene	U			352	µg/kg	352	EPA8270
Benzo(a)pyrene	U			352	µg/kg	352	EPA8270
Benzo(b)fluoranthene	U			352	µg/kg	352	EPA8270
Benzo(g,h,i)perylene	U			352	µg/kg	352	EPA8270
Benzo(k)fluoranthene	U			352	µg/kg	352	EPA8270
Benzoic acid	U			1,760	µg/kg	1,760	EPA8270
Benzyl alcohol	U			352	µg/kg	352	EPA8270
Bis(2-chloroethoxy) methane	U			352	µg/kg	352	EPA8270
Bis(2-chloroethyl) ether	U			352	µg/kg	352	EPA8270
Bis(2-chloroisopropyl) ether	U			352	µg/kg	352	EPA8270
Bis(2-ethylhexyl) phthalate	U			352	µg/kg	352	EPA8270
Butyl benzyl phthalate	U			352	µg/kg	352	EPA8270
Chrysene	U			352	µg/kg	352	EPA8270
Di-n-butyl phthalate	U			352	µg/kg	352	EPA8270
Di-n-octyl phthalate	U			352	µg/kg	352	EPA8270
Dibenzo(a,h)anthracene	U			352	µg/kg	352	EPA8270
Dibenzofuran	U			352	µg/kg	352	EPA8270
Diethyl phthalate	U			352	µg/kg	352	EPA8270
Dimethyl phthalate	U			352	µg/kg	352	EPA8270
Fluoranthene	U			352	µg/kg	352	EPA8270
Fluorene	U			352	µg/kg	352	EPA8270
Hexachlorobenzene	U			352	µg/kg	352	EPA8270
Hexachlorobutadiene	U			352	µg/kg	352	EPA8270
Hexachlorocyclopentadiene	U			352	µg/kg	352	EPA8270
Hexachloroethane	U			352	µg/kg	352	EPA8270
Indeno(1,2,3-c,d)pyrene	U			352	µg/kg	352	EPA8270
Isophorone	U			352	µg/kg	352	EPA8270
N-Nitrosodi-n-propylamine	U			352	µg/kg	352	EPA8270
N-Nitrosodiphenylamine	U			352	µg/kg	352	EPA8270
Naphthalene	U			352	µg/kg	352	EPA8270
Nitrobenzene	U			352	µg/kg	352	EPA8270
Pentachlorophenol	U			1,760	µg/kg	1,760	EPA8270
Phenanthrene	U			352	µg/kg	352	EPA8270
Phenol	U			352	µg/kg	352	EPA8270
Pyrene	U			352	µg/kg	352	EPA8270
Unknown	J	N		500	µg/kg		EPA8270
Unknown	J	N		100	µg/kg		EPA8270
Unknown	J	N		200	µg/kg		EPA8270
Unknown	J	N		100	µg/kg		EPA8270
Unknown	J	N		1,000	µg/kg		EPA8270
o-cresol (2-methylphenol)	U			352	µg/kg	352	EPA8270
p-cresol (4-methylphenol)	U			352	µg/kg	352	EPA8270

SAMPLE NAME: AOBSB0401 (continued) Sample ID: 102685

Constituent	RQ	AQ	BQ	Result	Unit	Q. Limit	Method
Volatiles							
1,1,1-Trichloroethane	R	OH	H	17.7	µg/kg	5.50	EPA8240
1,1,2,2-Tetrachloroethane	R	OH	H	5.50	µg/kg	5.50	EPA8240
1,1,2-Trichloroethane	R	OH	H	5.50	µg/kg	5.50	EPA8240
1,1-Dichloroethane	R	OH	H	5.50	µg/kg	5.50	EPA8240
1,1-Dichloroethene	R	OH	H	5.50	µg/kg	5.50	EPA8240
1,2-Dichloroethane	R	OH	H	5.50	µg/kg	5.50	EPA8240
1,2-Dichloroethene (total)	R	OH	H	5.50	µg/kg	5.50	EPA8240
1,2-Dichloropropane	R	OH	H	5.50	µg/kg	5.50	EPA8240
2-Butanone (MEK)	R	OH	H	11.0	µg/kg	11.0	EPA8240
2-Hexanone	R	OH	H	11.0	µg/kg	11.0	EPA8240
4-Methyl-2-pentanone	R	OH	H	11.0	µg/kg	11.0	EPA8240
Acetone	R	OH	H	11.0	µg/kg	11.0	EPA8240
Benzene	R	OH	H	5.50	µg/kg	5.50	EPA8240
Bromodichloromethane	R	OH	H	5.50	µg/kg	5.50	EPA8240
Bromoform	R	OH	H	5.50	µg/kg	5.50	EPA8240
Bromomethane (Methyl bromide)	R	OH	H	11.0	µg/kg	11.0	EPA8240
Carbon disulfide	R	OH	H	5.50	µg/kg	5.50	EPA8240
Carbon tetrachloride	R	OH	H	5.50	µg/kg	5.50	EPA8240
Chlorobenzene	R	OH	H	5.50	µg/kg	5.50	EPA8240
Chlorodibromomethane	R	OH	H	5.50	µg/kg	5.50	EPA8240
Chloroethane	R	OH	H	11.0	µg/kg	11.0	EPA8240
Chloroform	R	OH	H	5.50	µg/kg	5.50	EPA8240
Chloromethane (methyl chloride)	R	OH	H	11.0	µg/kg	11.0	EPA8240
Dichloromethane (methylene chloride)	R	VOH	H	18.2	µg/kg	5.50	EPA8240
Ethylbenzene	R	OH	H	5.50	µg/kg	5.50	EPA8240
Styrene	R	OH	H	5.50	µg/kg	5.50	EPA8240
Tetrachloroethene	R	OH	H	17.6	µg/kg	5.50	EPA8240
Toluene	R	OH	H	5.50	µg/kg	5.50	EPA8240
Trichloroethene (TCE)	R	OH	H	5.50	µg/kg	5.50	EPA8240
Vinyl acetate	R	OH	H	11.0	µg/kg	11.0	EPA8240
Vinyl chloride	R	OH	H	11.0	µg/kg	11.0	EPA8240
Xylenes (total)	R	OH	H	5.50	µg/kg	5.50	EPA8240
cis-1,3-Dichloropropene	R	OH	H	5.50	µg/kg	5.50	EPA8240
trans-1,3-Dichloropropene	R	OH	H	5.50	µg/kg	5.50	EPA8240
Pesticides/PCBs							
Aldrin	U			1.76	µg/kg	1.76	EPA8081
Aroclor 1016	U			35.2	µg/kg	35.2	EPA8081
Aroclor 1221	U			70.4	µg/kg	70.4	EPA8081
Aroclor 1232	U			35.2	µg/kg	35.2	EPA8081
Aroclor 1242	U			35.2	µg/kg	35.2	EPA8081
Aroclor 1248	U			35.2	µg/kg	35.2	EPA8081
Aroclor 1254	U			35.2	µg/kg	35.2	EPA8081
Aroclor 1260				53.9	µg/kg	35.2	EPA8081
Dieldrin	U			3.52	µg/kg	3.52	EPA8081
Endosulfan I	U			1.76	µg/kg	1.76	EPA8081
Endosulfan II	U			3.52	µg/kg	3.52	EPA8081
Endosulfan sulfate	U			3.52	µg/kg	3.52	EPA8081
Endrin	UJ	G		3.52	µg/kg	3.52	EPA8081

SAMPLE NAME: AOBSB0401 (continued) **Sample ID:** 102685

Constituent	RQ	AQ	BQ	Result	Unit	Q. Limit	Method
Pesticides/PCBs							
Endrin ketone	UJ	G		3.52	µg/kg	3.52	EPA8081
Heptachlor	U			1.76	µg/kg	1.76	EPA8081
Heptachlor epoxide	U			1.76	µg/kg	1.76	EPA8081
Methoxychlor (Mariate)	U			17.6	µg/kg	17.6	EPA8081
Toxaphene	U			176	µg/kg	176	EPA8081
alpha-Benzene hexachloride	U			1.76	µg/kg	1.76	EPA8081
alpha-Chlordane	U			1.76	µg/kg	1.76	EPA8081
beta-Benzene hexachloride	U			1.76	µg/kg	1.76	EPA8081
delta-Benzene hexachloride	U			1.76	µg/kg	1.76	EPA8081
gamma-Benzene hexachloride (Lindane)	U			1.76	µg/kg	1.76	EPA8081
gamma-Chlordane	U			1.76	µg/kg	1.76	EPA8081
p,p'-DDD	UJ	G		3.52	µg/kg	3.52	EPA8081
p,p'-DDE	UJ	G		3.52	µg/kg	3.52	EPA8081
p,p'-DDT	UJ	G		3.52	µg/kg	3.52	EPA8081
Radionuclides							
Gross Alpha		V		14.1	pC/g	2.88	LANLMLR100MOD
Non-volatile Beta				6.35	pC/g	1.70	LANLMLR100MOD

SAMPLE NAME: AOBSB0402 **Sample ID:** 102686

Location (SRS Coordinates): 50666E 102043N
Ground Elevation Above MSL: . ft
Depth of Core Interval: 1.00 to 4.00 ft
Sample Type: Normal
Sample Color:
Sample Matrix: Soil
USC Soil Classification:
Sample Moisture: Dry
Percent Solids: 93.7

Constituent	RQ	AQ	BQ	Result	Unit	Q. Limit	Method
Physical Parameters							
Cation Exchange Capacity	U			640	Meq/	640	EPA9081
Total Organic Carbon		V		658	mg/kg	60.0	LLOYDKAHN
Total Petroleum Hydrocarbons				97.6	mg/kg	11.4	EPA9071
TAL Metals							
Aluminum		V		6.380	mg/kg	19.8	EPA6010
Antimony	U			3.73	mg/kg	3.73	EPA6010
Arsenic	J	E		1.40	mg/kg	11.8	EPA6010
Barium				21.8	mg/kg	1.17	EPA6010
Beryllium		V		0.264	mg/kg	0.267	EPA6010
Cadmium				0.535	mg/kg	0.427	EPA6010
Calcium		V		68.4	mg/kg	17.9	EPA6010
Chromium				5.90	mg/kg	0.960	EPA6010
Cobalt				0.948	mg/kg	0.854	EPA6010
Copper				2.90	mg/kg	1.07	EPA6010
Cyanide	U			0.810	mg/kg	0.810	EPA9010

SAMPLE NAME: AOBSB0402 (continued) Sample ID: 102686

Constituent	RQ	AQ	BQ	Result	Unit	Q. Limit	Method
TAL Metals							
Iron				3,260	mg/kg	23.4	EPA6010
Lead	J	E		5.50	mg/kg	6.30	EPA6010
Magnesium				102	mg/kg	9.28	EPA6010
Manganese				16.0	mg/kg	0.213	EPA6010
Mercury	J	E		0.0200	mg/kg	0.142	EPA7471
Nickel				2.40	mg/kg	1.81	EPA6010
Potassium				98.2	mg/kg	71.5	EPA6010
Selenium	U			11.1	mg/kg	11.1	EPA6010
Silver	U			0.960	mg/kg	0.960	EPA6010
Sodium	J	E		20.4	mg/kg	138	EPA6010
Thallium	U			9.07	mg/kg	9.07	EPA6010
Vanadium				9.00	mg/kg	0.747	EPA6010
Zinc				24.5	mg/kg	17.2	EPA6010
Semivolatiles							
1,2,4-Trichlorobenzene	U			356	µg/kg	356	EPA8270
1,2-Dichlorobenzene	U			356	µg/kg	356	EPA8270
1,3-Dichlorobenzene	U			356	µg/kg	356	EPA8270
1,4-Dichlorobenzene	U			356	µg/kg	356	EPA8270
2,4,5-Trichlorophenol	U			1,780	µg/kg	1,780	EPA8270
2,4,6-Trichlorophenol	U			356	µg/kg	356	EPA8270
2,4-Dichlorophenol	U			356	µg/kg	356	EPA8270
2,4-Dimethyl phenol	U			356	µg/kg	356	EPA8270
2,4-Dinitrophenol	U			1,780	µg/kg	1,780	EPA8270
2,4-Dinitrotoluene	U			356	µg/kg	356	EPA8270
2,6-Dinitrotoluene	U			356	µg/kg	356	EPA8270
2-Chloronaphthalene	U			356	µg/kg	356	EPA8270
2-Chlorophenol	U			356	µg/kg	356	EPA8270
2-Methyl-4,6-dinitrophenol	U			1,780	µg/kg	1,780	EPA8270
2-Methylnaphthalene	U			356	µg/kg	356	EPA8270
2-Nitroaniline	U			1,780	µg/kg	1,780	EPA8270
2-Nitrophenol	U			356	µg/kg	356	EPA8270
3,3'-Dichlorobenzidine	U			712	µg/kg	712	EPA8270
3-Nitroaniline	U			1,780	µg/kg	1,780	EPA8270
4-Bromophenyl phenyl ether	U			356	µg/kg	356	EPA8270
4-Chloro-3-methylphenol (p-chloro-m-cresol)	U			356	µg/kg	356	EPA8270
4-Chloroaniline	U			356	µg/kg	356	EPA8270
4-Chlorophenyl phenyl ether	U			356	µg/kg	356	EPA8270
4-Nitroaniline	U			1,780	µg/kg	1,780	EPA8270
4-Nitrophenol	U			1,780	µg/kg	1,780	EPA8270
Acenapthene	U			356	µg/kg	356	EPA8270
Acenapthylene	U			356	µg/kg	356	EPA8270
Anthracene	U			356	µg/kg	356	EPA8270
Benzo(a)anthracene	U			356	µg/kg	356	EPA8270
Benzo(a)pyrene	U			356	µg/kg	356	EPA8270
Benzo(b)fluoranthene	U			356	µg/kg	356	EPA8270
Benzo(g,h,i)perylene	U			356	µg/kg	356	EPA8270
Benzo(k)fluoranthene	U			356	µg/kg	356	EPA8270

SAMPLE NAME: AOBSB0402 (continued) Sample ID: 102686

Constituent	RQ	AQ	BQ	Result	Unit	Q. Limit	Method
Semivolatiles							
Benzoic rid	U			I.780	µg/kg	1.780	EPA8270
Benzyl alcohol	U			356	µg/kg	356	EPA8270
Bis(2-chloroethoxy) methane	U			356	µg/kg	356	EPA8270
Bis(2-chloroethyl) ether	U			356	µg/kg	356	EPA8270
Bis(2-chloroisopropyl) ether	U			356	µg/kg	356	EPA8270
Bis(2-ethylhexyl) phthalate	U			356	µg/kg	356	EPA8270
Butyl benzyl phthalate	U			356	µg/kg	356	EPA8270
Chrysene	U			356	µg/kg	356	EPA8270
Di-n-butyl phthalate	U			356	µg/kg	356	EPA8270
Di-n-octyl phthalate	U			356	µg/kg	356	EPA8270
Dibenzo(a,h)anthracene	U			356	µg/kg	356	EPA8270
Dibenzofuran	U			356	µg/kg	356	EPA8270
Diethyl phthalate	U			356	µg/kg	356	EPA8270
Dimethyl phthalate	U			356	µg/kg	356	EPA8270
Fluoranthene	U			356	µg/kg	356	EPA8270
Fluorene	U			356	µg/kg	356	EPA8270
Hexachlorobenzene	U			356	µg/kg	356	EPA8270
Hexachlorobutadiene	U			356	µg/kg	356	EPA8270
Hexachlorocyclopentadiene	U			356	µg/kg	356	EPA8270
Hexachloroethane	U			356	µg/kg	356	EPA8270
Indeno(1,2,3-c,d)pyrene	U			356	µg/kg	356	EPA8270
Isophorone	U			356	µg/kg	356	EPA8270
N-Nitrosodi-n-propylamine	U			356	µg/kg	356	EPA8270
N-Nitrosodiphenylamine	U			356	µg/kg	356	EPA8270
Naphthalene	U			356	µg/kg	356	EP.48270
Nitrobenzene	U			356	µg/kg	356	EPA8270
Pentachlorophenol	U			1.780	µg/kg	1,780	EPA8270
Phenanthrene	U			356	µg/kg	356	EPA8270
Phenol	U			356	µg/kg	356	EPA8270
Pyrene	U			356	µg/kg	356	EPA8270
Unknown	J	N		300	µg/kg		EPA8270
Unknown	J	N		100	µg/kg		EPA8270
Unknown	J	N		200	µg/kg		EPA8270
o-cresol (2-methylphenol)	U			356	µg/kg	356	EPA8270
p-cresol (4-methylphenol)	U			356	µg/kg	356	EPA8270
Volatiles							
1,1,1-Trichloroethane	J	E		4.13	µg/kg	5.50	EPA8240
1,1,2,2-Tetrachloroethane	U			5.50	µg/kg	5.50	EPA8240
1,1,2-Trichloroethane	U			5.50	µg/kg	5.50	EPA8240
1,1-Dichloroethane	U			5.50	µg/kg	5.50	EPA8240
1.1-Dichloroethene	U			5.50	µg/kg	5.50	EPA8240
1,2-Dichloroethane	U			5 CO	µg/kg	5.50	EPA8240
1.2-Dichloroethene (total)	U			5.50	µg/kg	5.50	EPA8240
1.2-Dichloropropane	U			5.50	µg/kg	5.50	EPA8240
2-Butanone (MEK)	U			11 0	µg/kg	11.0	EPA8240
2-Hexanone	U			110	µg/kg	11.0	EPA8240
4-Methyl-2-pentanone	U			11.0	µg/kg	11.0	EPA8240
Acetone	U			II 0	µg/kg	I I.0	EPA8240

SAMPLE NAME: AOBSB0402 (continued) Sample ID: 102686

Constituent	RQ	AQ	BQ	Result	Unit	Q. Limit	Method
Volatiles							
Benzene	U			5.50	µg/kg	5.50	EPA8240
Bromodichloromethane	U			5.50	µg/kg	5.50	EPA8240
Bromoform	U			5.50	µg/kg	5.50	EPA8240
Bromomethane (Methyl bromide)	U			11.0	µg/kg	11.0	EPA8240
Carbon disulfide	U			5.50	µg/kg	5.50	EPA8240
Carbon tetrachloride	U			5.50	µg/kg	5.50	EPA8240
Chlorobenzene	U			5.50	µg/kg	5.50	EPA8240
Chlorodibromomethane	U			5.50	µg/kg	5.50	EPA8240
Chloroethane	U			11.0	µg/kg	11.0	EPA8240
Chloroform	U			5.50	µg/kg	5.50	EPA8240
Chloromethane (methyl chloride)	U			11.0	µg/kg	11.0	EPA8240
Dichloromethane (methylene chloride)	U	V		14.0	µg/kg	5.50	EPA8240
Ethylbenzene	U			5.50	µg/kg	5.50	EPA8240
Styrene	U			5.50	µg/kg	5.50	EPA8240
Tetrachloroethene				10.4	µg/kg	5.50	EPA8240
Toluene	U			5.50	µg/kg	5.50	EPA8240
Trichloroethene (TCE)	U			5.50	µg/kg	5.50	EPA8240
Vinyl acetate	U			11.0	µg/kg	11.0	EPA8240
Vinyl chloride	U			11.0	µg/kg	11.0	EPA8240
Xylenes (total)	U			5.50	µg/kg	5.50	EPA8240
cis-1,3-Dichloropropene	U			5.50	µg/kg	5.50	EPA8240
trans-1,3-Dichloropropene	U			5.50	µg/kg	5.50	EPA8240
Pesticides/PCBs							
Aldrin	U			1.78	µg/kg	1.78	EPA8081
Aroclor 1016	U			35.6	µg/kg	35.6	EPA8081
Aroclor 1221	U			71.1	µg/kg	71.1	EPA8081
Aroclor 1232	U			35.6	µg/kg	35.6	EPA8081
Aroclor 1242	U			35.6	µg/kg	35.6	EPA8081
Aroclor 1248	U			35.6	µg/kg	35.6	EPA8081
Aroclor 1254	U			35.6	µg/kg	35.6	EPA8081
Aroclor 1260	U			35.6	µg/kg	35.6	EPA8081
Dieldrin	U			3.56	µg/kg	3.56	EPA8081
Endosulfan I	U			1.78	µg/kg	1.78	EPA8081
Endosulfan II	U			3.56	µg/kg	3.56	EPA8081
Endosulfan sulfate	U			3.56	µg/kg	3.56	EPA8081
Endrin	UJ	G		3.56	µg/kg	3.56	EPA8081
Endrin ketone	UJ	G		3.56	µg/kg	3.56	EPA8081
Heptachlor	U			1.78	µg/kg	1.78	EPA8081
Heptachlor epoxide	U			1.78	µg/kg	1.78	EPA8081
Methoxychlor (Mariate)	U			17.8	µg/kg	17.8	EPA8081
Toxaphene	U			178	µg/kg	178	EPA8081
alpha-Benzene hexachloride	U			1.78	µg/kg	1.78	EPA8081
alpha-Chlordane	U			1.78	µg/kg	1.78	EPA8081
beta-Benzene hexachloride	U			1.78	µg/kg	1.78	EPA8081
delta-Benzene hexachloride	U			1.78	µg/kg	1.78	EPA8081
gamma-Benzene hexachloride (Lindane)	U			1.78	µg/kg	1.78	EPA8081
gamma-Chlordane	U			1.78	µg/kg	1.78	EPA8081
p,p'-DDD	UJ	G		3.56	µg/kg	3.56	EPA8081

SAMPLE NAME: AOBSB0402 (continued) Sample ID: 102686

Constituent	RQ	AQ	BQ	Result	Unit	Q. Limit	Method
Pesticides/PCBs							
p,p'-DDE	UJ	G		3.56	µg/kg	3.56	EPA8081
p,p'-DDT	UJ	G		3.56	µg/kg	3.56	EPA8081
Radionuclides							
Gross Alpha		V		12.6	pC/g	2.91	LANLMLR100MOD
Non-volatile Beta				7.25	pC/g	1.77	LANLMLR100MOD

SAMPLE NAME: AOBSB0501 Sample ID: 102687

Location (SRS Coordinates): 50634E 102033N
Ground Elevation Above MSL: . ft
Depth of Core Interval: 0.00 to 1.00 ft
Sample Type: Normal
Sample Color:
Sample Matrix: Soil
USC Soil Classification:
Sample Moisture: Dry
Percent Solids: 94.9

Constituent	RQ	AQ	BQ	Result	Unit	Q. Limit	Method
Physical Parameters							
Cation Exchange Capacity	U			632	Meq/	632	EPA9081
Total Organic Carbon		V		3,990	mg/kg	60.0	LLOYDKAHN
Total Petroleum Hydrocarbons				25.2	mg/kg	11.2	EPA9071
TAL Metals							
Aluminum		V		4,010	mg/kg	19.4	EPA6010
Antimony	U			3.65	mg/kg	3.65	EPA6010
Arsenic	U			11.6	mg/kg	11.6	EPA6010
Barium				34.9	mg/kg	1.15	EPA6010
Beryllium	U			0.261	mg/kg	0.261	EPA6010
Cadmium				0.522	mg/kg	0.417	EPA6010
Calcium		V		96.9	mg/kg	17.5	EPA6010
Chromium				4.90	mg/kg	0.939	EPA6010
Cobalt	J	E		0.615	mg/kg	0.834	EPA6010
Copper				3.50	mg/kg	1.04	EPA6010
Cyanide	UJ	V		0.120	mg/kg	0.840	EPA9010
Iron				2,010	mg/kg	22.8	EPA6010
Lead				8.20	mg/kg	6.15	EPA6010
Magnesium				72.7	mg/kg	9.07	EPA6010
Manganese				14.4	mg/kg	0.209	EPA6010
Mercury	J	E		0.0200	mg/kg	0.140	EPA7471
Nickel				1.80	mg/kg	1.77	EPA6010
Potassium				76.0	mg/kg	69.9	EPA6010
Selenium	U			10.8	mg/kg	10.8	EPA6010
Silver	U			0.939	mg/kg	0.939	EPA6010
Sodium	J	E		20.5	mg/kg	135	EPA6010
Thallium	U			8.87	mg/kg	8.87	EPA6010
Vanadium				5.60	mg/kg	0.730	EPA6010

SAMPLE NAME: AOBSB0501 (continued) **Sample ID: 102687**

Constituent	RQ	AQ	BQ	Result	Unit	Q. Limit	Method
TAL Metals							
Zinc	J	E		15.0	mg/kg	16.8	EPA6010
Semivolatiles							
1,2,4-Trichlorobenzene	U			351	µg/kg	351	EPA8270
1.2-Dichlorobenzene	U			351	µg/kg	351	EPA8270
1.3-Dichlorobenzene	U			351	µg/kg	351	EPA8270
1.4-Dichlorobenzene	U			351	µg/kg	351	EPA8270
2.4,5-Trichlorophenol	U			1,760	µg/kg	1,760	EPA8270
2.4,6-Trichlorophenol	U			351	µg/kg	351	EPA8270
2.4-Dichlorophenol	U			351	µg/kg	351	EPA8270
2,4-Dimethyl phenol	U			351	µg/kg	351	EPA8270
2,4-Dinitrophenol	U			1,760	µg/kg	1,760	EPA8270
2.4-Dinitrotoluene	U			351	µg/kg	351	EPA8270
2.6-Dinitrotoluene	U			351	µg/kg	351	EPA8270
2-Chloronaphthalene	U			351	µg/kg	351	EPA8270
2-Chlorophenol	U			351	µg/kg	351	EPA8270
2-Methyl-4,6-dinitrophenol	U			1,760	µg/kg	1,760	EPA8270
2-Methylnaphthalene	U			351	µg/kg	351	EPA8270
2-Nitroaniline	U			1,760	µg/kg	1,760	EPA8270
2-Nitrophenol	U			351	µg/kg	351	EPA8270
3,3'-Dichlorobenzidine	U			702	µg/kg	702	EPA8270
3-Nitroaniline	U			1,760	µg/kg	1,760	EPA8270
4-Bromophenyl phenyl ether	U			351	µg/kg	351	EPA8270
4-Chloro-3-methylphenol (p-chloro-m-cresol)	U			351	µg/kg	351	EPA8270
4-Chloroaniline	U			351	µg/kg	351	EPA8270
4-Chlorophenyl phenyl ether	U			351	µg/kg	351	EPA8270
4-Nitroaniline	U			1,760	µg/kg	1,760	EPA8270
4-Nitrophenol	U			1,760	µg/kg	1,760	EPA8270
Acenapthene	U			351	µg/kg	351	EPA8270
Acenapthylene	U			351	µg/kg	351	EPA8270
Anthracene	U			351	µg/kg	351	EPA8270
Benzo(a)anthracene	U			351	µg/kg	351	EPA8270
Benzo(a)pyrene	U			351	µg/kg	351	EPA8270
Benzo(b)fluoranthene	U			351	µg/kg	351	EPA8270
Benzo(g,h,i)perylene	U			351	µg/kg	351	EPA8270
Benzo(k)fluoranthene	U			351	µg/kg	351	EPA8270
Benzoic acid	U			1,760	µg/kg	1,760	EPA8270
Benzyl alcohol	U			351	µg/kg	351	EPA8270
Bis(2-chloroethoxy) methane	U			351	µg/kg	351	EPA8270
Bis(2-chloroethyl) ether	U			351	µg/kg	351	EPA8270
Bis(2-chloroisopropyl) ether	U			351	µg/kg	351	EPA8270
Bis(2-ethylhexyl) phthalate	U			351	µg/kg	351	EPA8270
Butyl benzyl phthalate	U			351	µg/kg	351	EPA8270
Chrysene	U			351	µg/kg	351	EPA8270
Di-n-butyl phthalate	U			351	µg/kg	351	EPA8270
Di-n-octyl phthalate	U			351	µg/kg	351	EPA8270
Dibenzo(a,h)anthracene	U			351	µg/kg	351	EPA8270
Dibenzofuran	U			351	µg/kg	351	EPA8270

SAMPLE NAME: AOBSB0501 (continued) **Sample ID: 102687**

Constituent	RQ	AQ	BQ	Result	Unit	Q. Limit	Method
Semivolatiles							
Diethyl phthalate	U			351	µg/kg	351	EPA8270
Dimethyl phthalate	U			351	µg/kg	351	EPA8270
Fluoranthene	U			351	µg/kg	351	EPA8270
Fluorene	U			351	µg/kg	351	EPA8270
Hexachlorobenzene	U			351	µg/kg	351	EPA8270
Hexachlorobutadiene	U			351	µg/kg	351	EPA8270
Hexachlorocyclopentadiene	U			351	µg/kg	351	EPA8270
Hexachloroethane	U			351	µg/kg	351	EPA8270
Indeno(1,2,3-c,d)pyrene	U			351	µg/kg	351	EPA8270
Isophorone	U			351	µg/kg	351	EPA8270
N-Nitrosodi-n-propylamine	U			351	µg/kg	351	EPA8270
N-Nitrosodiphenylamine	U			351	µg/kg	351	EPA8270
Naphthalene	U			351	µg/kg	351	EPA8270
Nitrobenzene	U			351	µg/kg	351	EPA8270
Pentachlorophenol	U			1,760	µg/kg	1,760	EPA8270
Phenanthrene	U			351	µg/kg	351	EPA8270
Phenol	U			351	µg/kg	351	EPA8270
Pyrene	U			351	µg/kg	351	EPA8270
Unknown	J	N		200	µg/kg		EPA8270
Unknown	J	N		400	µg/kg		EPA8270
Unknown	J	N		900	µg/kg		EPA8270
o-cresol (2-methylphenol)	U			351	µg/kg	351	EPA8270
p-cresol (4-methylphenol)	U			351	µg/kg	351	EPA8270
Volatiles							
1,1,1-Trichloroethane	J	E		3.74	µg/kg	5.00	EPA8240
1,1,2,2-Tetrachloroethane	U			5.00	µg/kg	5.00	EPA8240
1,1,2-Trichloroethane	U			5.00	µg/kg	5.00	EPA8240
1,1-Dichloroethane	U			5.00	µg/kg	5.00	EPA8240
1,1-Dichloroethene	U			5.00	µg/kg	5.00	EPA8240
1,2-Dichloroethane	U			5.00	µg/kg	5.00	EPA8240
1,2-Dichloroethene (total)	U			5.00	µg/kg	5.00	EPA8240
1,2-Dichloropropane	U			5.00	µg/kg	5.00	EPA8240
2-Butanone (MEK)	U			10.0	µg/kg	10.0	EPA8240
2-Hexanone	U			10.0	µg/kg	10.0	EPA8240
4-Methyl-2-pentanone	U			10.0	µg/kg	10.0	EPA8240
Acetone	U	V		25.0	µg/kg	10.0	EPA8240
Benzene	U			5.00	µg/kg	5.00	EPA8240
Bromodichloromethane	U			5.00	µg/kg	5.00	EPA8240
Bromoform	U			5.00	µg/kg	5.00	EPA8240
Bromomethane (Methyl bromide)	U			10.0	µg/kg	10.0	EPA8240
Carbon disulfide	U			5.00	µg/kg	5.00	EPA8240
Carbon tetrachloride	U			5.00	µg/kg	5.00	EPA8240
Chlorobenzene	U			5.00	µg/kg	5.00	EPA8240
Chlorodibromomethane	U			5.00	µg/kg	5.00	EPA8240
Chloroethane	U			10.0	µg/kg	10.0	EPA8240
Chloroform	U			5.00	µg/kg	5.00	EPA8240
Chloromethane (methyl chloride)	U			10.0	µg/kg	10.0	EPA8240
Dichloromethane (methylene chloride)	U	V		4.14	µg/kg	5.00	EPA8240

SAMPLE NAME: AOBSB0501 (continued) **Sample ID: 102687**

Constituent	RQ	AQ	BQ	Result	Unit	Q. Limit	Method
Volatiles							
Ethylbenzene	U			5.00	µg/kg	5.00	EPA8240
Styrene	U			5.00	µg/kg	5.00	EPA8240
Tetrachloroethene				13.1	µg/kg	5.00	EPA8240
Toluene	U			5.00	µg/kg	5.00	EPA8240
Trichloroethene (TCE)	U			5.00	µg/kg	5.00	EPA8240
Vinyl acetate	U			10.0	µg/kg	10.0	EPA8240
Vinyl chloride	U			10.0	µg/kg	10.0	EPA8240
Xylenes (total)	U			5.00	µg/kg	5.00	EPA8240
cis-1,3-Dichloropropene	U			5.00	µg/kg	5.00	EPA8240
trans-1,3-Dichloropropene	U			5.00	µg/kg	5.00	EPA8240
Pesticides/PCBs							
Aldrin	U			1.76	µg/kg	1.76	EPA8081
Aroclor 1016	U			35.1	µg/kg	35.1	EPA8081
Aroclor 1221	U			70.2	µg/kg	70.2	EPA8081
Aroclor 1232	U			35.1	µg/kg	35.1	EPA8081
Aroclor 1242	U			35.1	µg/kg	35.1	EPA8081
Aroclor 1248	U			35.1	µg/kg	35.1	EPA8081
Aroclor 1254	U			35.1	µg/kg	35.1	EPA8081
Aroclor 1260	U			35.1	µg/kg	35.1	EPA8081
Dieldrin	U			3.51	µg/kg	3.51	EPA8081
Endosulfan I	U			1.76	µg/kg	1.76	EPA8081
Endosulfan II	U			3.51	µg/kg	3.51	EPA8081
Endosulfan sulfate	U			3.51	µg/kg	3.51	EPA8081
Endrin	UJ	G		3.51	µg/kg	3.51	EPA8081
Endrin ketone	UJ	G		3.51	µg/kg	3.51	EPA8081
Heptachlor	U			1.76	µg/kg	1.76	EPA8081
Heptachlor epoxide	U			1.76	µg/kg	1.76	EPA8081
Methoxychlor (Mariate)	U			17.6	µg/kg	17.6	EPA8081
Toxaphene	U			176	µg/kg	176	EPA8081
alpha-Benzene hexachloride	U			1.76	µg/kg	1.76	EPA8081
alpha-Chlordane	U			1.76	µg/kg	1.76	EPA8081
beta-Benzene hexachloride	U			1.76	µg/kg	1.76	EPA8081
delta-Benzene hexachloride	U			1.76	µg/kg	1.76	EPA8081
gamma-Benzene hexachloride (Lindane)	U			1.76	µg/kg	1.76	EPA8081
gamma-Chlordane	U			1.76	µg/kg	1.76	EPA8081
p,p'-DDD	UJ	G		3.51	µg/kg	3.51	EPA8081
p,p'-DDE	UJ	G		3.51	µg/kg	3.51	EPA8081
p,p'-DDT	UJ	G		3.51	µg/kg	3.51	EPA8081
Radionuclides							
Gross Alpha		V		5.81	pC/g	2.84	LANLMLR100MOD
Non-volatile Beta	UI			1.14	pC/g	1.62	LANLMLR100MOD

SAMPLE NAME: AOBSB0502 **Sample ID: 102688**

Location (SRS Coordinates): 50634E 102033N
Ground Elevation Above MSL: . ft
Depth of Core Interval: 1.00 to 4.00 ft
Sample Type: Normal **Sample Matrix: Soil** **Sample Moisture: Dry**
Sample Color: **USC Soil Classification:** **Percent Solids: 93.2**

Constituent	RQ	AQ	BQ	Result	Unit	Q. Limit	Method
Physical Parameters							
Cation Exchange Capacity	U			644	Meq/	644	EPA9081
Total Organic Carbon		V		664	mg/kg	60.0	LLOYDKAHN
Total Petroleum Hydrocarbons	J	E		10.9	mg/kg	11.4	EPA9071
TAL Metals							
Aluminum		V		7,110	mg/kg	18.8	EPA6010
Antimony	U			3.54	mg/kg	3.54	EPA6010
Arsenic	J	E		1.50	mg/kg	11.2	EPA6010
Barium				24.5	mg/kg	1.11	EPA6010
Beryllium		V		0.332	mg/kg	0.253	EPA6010
Cadmium	J	E		0.142	mg/kg	0.405	EPA6010
Calcium		V		80.1	mg/kg	17.0	EPA6010
Chromium				6.50	mg/kg	0.911	EPA6010
Cobalt				1.10	mg/kg	0.810	EPA6010
Copper				2.60	mg/kg	1.01	EPA6010
Cyanide	UJ	V		0.0940	mg/kg	0.860	EPA9010
Iron				3,430	mg/kg	22.2	EPA6010
Lead	J	E		5.30	mg/kg	5.97	EPA6010
Magnesium				96.6	mg/kg	8.80	EPA6010
Manganese				18.2	mg/kg	0.202	EPA6010
Mercury	J	E		0.0400	mg/kg	0.143	EPA7471
Nickel				2.60	mg/kg	1.72	EPA6010
Potassium				116	mg/kg	67.8	EPA6010
Selenium	U			10.5	mg/kg	10.5	EPA6010
Silver	U			0.911	mg/kg	0.911	EPA6010
Sodium	J	E		17.5	mg/kg	131	EPA6010
Thallium	U			8.60	mg/kg	8.60	EPA6010
Vanadium				9.90	mg/kg	0.708	EPA6010
Zinc	J	E		10.3	mg/kg	16.3	EPA6010
Semivolatiles							
1,2,4-Trichlorobenzene	U			358	µg/kg	358	EPA8270
1,2-Dichlorobenzene	U			358	µg/kg	358	EPA8270
1,3-Dichlorobenzene	U			358	µg/kg	358	EPA8270
1,4-Dichlorobenzene	U			358	µg/kg	358	EPA8270
2,4,5-Trichlorophenol	U			1,790	µg/kg	1,790	EPA8270
2,4,6-Trichlorophenol	U			358	µg/kg	358	EPA8270
2,4-Dichlorophenol	U			358	µg/kg	358	EPA8270
2,4-Dimethyl phenol	U			358	µg/kg	358	EPA8270
2,4-Dinitrophenol	U			1,790	µg/kg	1,790	EPA8270
2,4-Dinitrotoluene	U			358	µg/kg	358	EPA8270
2,6-Dinitrotoluene	U			358	µg/kg	358	EPA8270

SAMPLE NAME: AOBSB0502 (continued) Sample ID: 102688

Constituent	RQ	AQ	BQ	Result	Unit	Q. Limit	Method
Semivolatiles							
2-Chloronaphthalene	U			358	µg/kg	358	EPA8270
2-Chlorophenol	U			358	µg/kg	358	EPA8270
2-Methyl-4,6-dinitrophenol	U			1,790	µg/kg	1,790	EPA8270
2-Methylnaphthalene	U			358	µg/kg	358	EPA8270
2-Nitroaniline	U			1,790	µg/kg	1,790	EPA8270
2-Nitrophenol	U			358	µg/kg	358	EPA8270
3,3'-Dichlorobenzidine	U			716	µg/kg	716	EPA8270
3-Nitroaniline	U			1,790	µg/kg	1,790	EPA8270
4-Bromophenyl phenyl ether	U			358	µg/kg	358	EPA8270
4-Chloro-3-methylphenol (p-chloro-m-cresol)	U			358	µg/kg	358	EPA8270
4-Chloroaniline	U			358	µg/kg	358	EPA8270
4-Chlorophenyl phenyl ether	U			358	µg/kg	358	EPA8270
4-Nitroaniline	U			1,790	µg/kg	1,790	EPA8270
4-Nitrophenol	U			1,790	µg/kg	1,790	EPA8270
Acenapthene	U			358	µg/kg	358	EPA8270
Acenapthylene	U			358	µg/kg	358	EPA8270
Anthracene	U			358	µg/kg	358	EPA8270
Benzo(a)anthracene	U			358	µg/kg	358	EPA8270
Benzo(a)pyrene	U			358	µg/kg	358	EPA8270
Benzo(b)fluoranthene	U			358	µg/kg	358	EPA8270
Benzo(g,h,i)perylene	U			358	µg/kg	358	EPA8270
Benzo(k)fluoranthene	U			358	µg/kg	358	EPA8270
Benzoic acid	U			1,790	µg/kg	1,790	EPA8270
Benzyl alcohol	U			358	µg/kg	358	EPA8270
Bis(2-chloroethoxy) methane	U			358	µg/kg	358	EPA8270
Bis(2-chloroethyl) ether	U			358	µg/kg	358	EPA8270
Bis(2-chloroisopropyl) ether	U			358	µg/kg	358	EPA8270
Bis(2-ethylhexyl) phthalate	U			358	µg/kg	358	EPA8270
Butyl benzyl phthalate	U			358	µg/kg	358	EPA8270
Chrysene	U			358	µg/kg	358	EPA8270
Di-n-butyl phthalate	U			358	µg/kg	358	EPA8270
Di-n-octyl phthalate	U			358	µg/kg	358	EPA8270
Dibenzo(a,h)anthracene	U			358	µg/kg	358	EPA8270
Dibenzofuran	U			358	µg/kg	358	EPA8270
Diethyl phthalate	U			358	µg/kg	358	EPA8270
Dimethyl phthalate	U			358	µg/kg	358	EPA8270
Fluoranthene	U			358	µg/kg	358	EPA8270
Fluorene	U			358	µg/kg	358	EPA8270
Hexachlorobenzene	U			358	µg/kg	358	EPA8270
Hexachlorobutadiene	U			358	µg/kg	358	EPA8270
Hexachlorocyclopentadiene	U			358	µg/kg	358	EPA8270
Hexachloroethane	U			358	µg/kg	358	EPA8270
Indeno(1,2,3-c,d)pyrene	U			358	µg/kg	358	EPA8270
Isophorone	U			358	µg/kg	358	EPA8270
N-Nitrosodi-n-propylamine	U			358	µg/kg	358	EPA8270
N-Nitrosodiphenylamine	U			358	µg/kg	358	EPA8270
Naphthalene	U			358	µg/kg	358	EPA8270
Nitrobenzene	U			358	µg/kg	358	EPA8270
Pentachlorophenol	U			1,790	µg/kg	1,790	EPA8270

SAMPLE NAME: AOBSB0502 (continued) Sample ID: 102688

Constituent	RQ	AQ	BQ	Result	Unit	Q. Limit	Method
Semivolatiles							
Phenanthrene	U			358	µg/kg	358	EPA8270
Phenol	U			358	µg/kg	358	EPA8270
Pyrene	U			358	µg/kg	358	EPA8270
Unknown	J	N		300	µg/kg	.	EPA8270
Unknown	J	N		400	µg/kg	.	EPA8270
o-cresol (2-methylphenol)	U			358	µg/kg	358	EPA8270
p-cresol (4-methylphenol)	U			358	µg/kg	358	EPA8270
Volatiles							
1,1,1-Trichloroethane	U			5.00	µg/kg	5.00	EPA8240
1,1,2,2-Tetrachloroethane	U			5.00	µg/kg	5.00	EPA8240
1,1,2-Trichloroethane	U			5.00	µg/kg	5.00	EPA8240
1,1-Dichloroethane	U			5.00	µg/kg	5.00	EPA8240
1,1-Dichloroethene	U			5.00	µg/kg	5.00	EPA8240
1,2-Dichloroethane	U			5.00	µg/kg	5.00	EPA8240
1,2-Dichloroethene (total)	U			5.00	µg/kg	5.00	EPA8240
1,2-Dichloropropane	U			5.00	µg/kg	5.00	EPA8240
2-Butanone (MEK)	U			10.0	µg/kg	10.0	EPA8240
2-Hexanone	U			10.0	µg/kg	10.0	EPA8240
4-Methyl-2-pentanone	U			10.0	µg/kg	10.0	EPA8240
Acetone	U			10.0	µg/kg	10.0	EPA8240
Benzene	U			5.00	µg/kg	5.00	EPA8240
Bromodichloromethane	U			5.00	µg/kg	5.00	EPA8240
Bromoform	U			5.00	µg/kg	5.00	EPA8240
Bromomethane (Methyl bromide)	U			10.0	µg/kg	10.0	EPA8240
Carbon disulfide	U			5.00	µg/kg	5.00	EPA8240
Carbon tetrachloride	U			5.00	µg/kg	5.00	EPA8240
Chlorobenzene	U			5.00	µg/kg	5.00	EPA8240
Chlorodibromomethane	U			5.00	µg/kg	5.00	EPA8240
Chloroethane	U			10.0	µg/kg	10.0	EPA8240
Chloroform	U			5.00	µg/kg	5.00	EPA8240
Chloromethane (methyl chloride)	U			10.0	µg/kg	10.0	EPA8240
Dichloromethane (methylene chloride)	U	V		2.26	µg/kg	5.00	EPA8240
Ethylbenzene	U			5.00	µg/kg	5.00	EPA8240
Styrene	U			5.00	µg/kg	5.00	EPA8240
Tetrachloroethene	J	E		2.08	µg/kg	5.00	EPA8240
Toluene	U			5.00	µg/kg	5.00	EPA8240
Trichloroethene (TCE)	U			5.00	µg/kg	5.00	EPA8240
Vinyl acetate	U			10.0	µg/kg	10.0	EPA8240
Vinyl chloride	U			10.0	µg/kg	10.0	EPA8240
Xylenes (total)	U			5.00	µg/kg	5.00	EPA8240
cis-1,3-Dichloropropene	U			5.00	µg/kg	5.00	EPA8240
trans-1,3-Dichloropropene	U			5.00	µg/kg	5.00	EPA8240

SAMPLE NAME: AOBSB0502 (continued) **Sample ID: 102688**

Constituent	RQ	AQ	BQ	Result	Unit	Q. Limit	Method
Pesticides/PCBs							
Aldrin	U			1.79	µg/kg	1.79	EPA8081
Aroclor 1016	U			35.8	µg/kg	35.8	EPA8081
Aroclor 1221	U			71.5	µg/kg	71.5	EPA8081
Aroclor 1232	U			35.8	µg/kg	35.8	EPA8081
Aroclor 1242	U			35.8	µg/kg	35.8	EPA8081
Aroclor 1248	U			35.8	µg/kg	35.8	EPA8081
Aroclor 1254	U			35.8	µg/kg	35.8	EPA8081
Aroclor 1260	U			35.8	µg/kg	35.8	EPA8081
Dieldrin	U			3.58	µg/kg	3.58	EPA8081
Endosulfan I	U			1.79	µg/kg	1.79	EPA8081
Endosulfan II	U			3.58	µg/kg	3.58	EPA8081
Endosulfan sulfate	U			3.58	µg/kg	3.58	EPA8081
Endrin	U			3.58	µg/kg	3.58	EPA8081
Endrin ketone	U			3.58	µg/kg	3.58	EPA8081
Heptachlor	U			1.79	µg/kg	1.79	EPA8081
Heptachlor epoxide	U			1.79	µg/kg	1.79	EPA8081
Methoxychlor (Mariate)	U			17.9	µg/kg	17.9	EPA8081
Toxaphene	U			179	µg/kg	179	EPA8081
alpha-Benzene hexachloride	U			1.79	µg/kg	1.79	EPA8081
alpha-Chlordane	U			1.79	µg/kg	1.79	EPA8081
beta-Benzene hexachloride	U			1.79	µg/kg	1.79	EPA8081
delta-Benzene hexachloride	U			1.79	µg/kg	1.79	EPA8081
gamma-Benzene hexachloride (Lindane)	U			1.79	µg/kg	1.79	EPA8081
gamma-Chlordane	U			1.79	µg/kg	1.79	EPA8081
p,p'-DDD	U			3.58	µg/kg	3.58	EPA8081
p,p'-DDE	U			3.58	µg/kg	3.58	EPA8081
p,p'-DDT	U			3.58	µg/kg	3.58	EPA8081
Radionuclides							
Gross Alpha		V		10.9	pC/g	2.91	LANLMLR100MOD
Non-volatile Beta	UI			0.390	pC/g	1.78	LANLMLR100MOD

SAMPLE NAME: AOBSB0601 **Sample ID: 102689**

Location (SRS Coordinates): 50585E 102024N
Ground Elevation Above MSL: . ft
Depth of Core Interval: 0.00 to 1.00 ft
Sample Type: Normal — Sample Matrix: Soil — Sample Moisture: Dry
Sample Color: — USC Soil Classification: — Percent Solids: 94.0

Constituent	RQ	AQ	BQ	Result	Unit	Q. Limit	Method
Physical Parameters							
Cation Exchange Capacity	U			638	Meq/	638	EPA9081
Total Organic Carbon		V		3,400	mg/kg	60.0	LLOYDKAHN
Total Petroleum Hydrocarbons				82.3	mg/kg	11.3	EPA9071

SAMPLE NAME: AOBSB0601 (continued) **Sample ID:** 102689

Constituent	RQ	AQ	BQ	Result	Unit	Q. Limit	Method
TAL Metals							
Aluminum		V		4,270	mg/kg	18.8	EPA6010
Antimony	U			3.55	mg/kg	3.55	EPA6010
Arsenic	J	E		1.40	mg/kg	11.2	EPA6010
Barium				19.6	mg/kg	1.11	EPA6010
Beryllium		V		0.230	mg/kg	0.253	EPA6010
Cadmium	J	E		0.326	mg/kg	0.405	EPA6010
Calcium		V		87.5	mg/kg	17.0	EPA6010
Chromium				4.90	mg/kg	0.912	EPA6010
Cobalt	J	E		0.713	mg/kg	0.810	EPA6010
Copper				4.40	mg/kg	1.01	EPA6010
Cyanide	UJ	V		0.120	mg/kg	0.850	EPA9010
Iron				2,230	mg/kg	22.2	EPA6010
Lead				8.20	mg/kg	5.98	EPA6010
Magnesium				74.8	mg/kg	8.81	EPA6010
Manganese				15.9	mg/kg	0203	EPA6010
Mercury	J	E		0.0300	mg/kg	0.142	EPA747 1
Nickel				1.80	mg/kg	1.72	EPA6010
Potassium				71.3	mg/kg	67.9	EPA6010
Selenium	U			10.5	mg/kg	10.5	EPA6010
Silver	U			0.912	mg/kg	0.912	EPA6010
Sodium	J	E		22.1	mg/kg	131	EPA6010
Thallium	U			8.61	mg/kg	8.61	EPA6010
Vanadium				6.80	mg/kg	0.709	EPA6010
Zinc	J	E		14.5	mg/kg	16.3	EPA6010
Semivolatiles							
1.2,4-Trichlorobenzene	U			355	µg/kg	355	EPA8270
1.2-Dichlorobenzene	U			355	µg/kg	355	EPA8270
1.3-Dichlorobenzene	U			355	µg/kg	355	EPA8270
1.4-Dichlorobenzene	U			355	µg/kg	355	EPA8270
2,4,5-Trichlorophenol	U			1,780	µg/kg	1,780	EPA8270
2,4,6-Trichlorophenol	U			355	µg/kg	355	EPA8270
2,4-Dichlorophenol	U			355	µg/kg	355	EPA8270
2,4-Dimethyl phenol	U			355	µg/kg	355	EPA8270
2,4-Dinitrophenol	U			1,780	µg/kg	1.780	EPA8270
2,4-Dinitrotoluene	U			355	µg/kg	355	EPA8270
2.6-Dinitrotoluene	U			355	µg/kg	355	EPA8270
2-Chloronaphthalene	U			355	µg/kg	355	EPA8270
2-Chlorophenol	U			355	µg/kg	355	EPA8270
2-Methyl-4,6-dinitrophenol	U			1,780	µg/kg	1,780	EPA8270
2-Methylnaphthalene	U			355	µg/kg	355	EPA8270
2-Nitroaniline	U			1.780	µg/kg	1.780	EPA8270
2-Nitrophenol	U			355	µg/kg	355	EPA8270
3.3'-Dichlorobenzidine	U			710	µg/kg	710	EPA8270
3-Nitroaniline	U			1,780	µg/kg	1.780	EPA8270
4-Bromophenyl phenyl ether	U			355	µg/kg	355	EPA8270
4-Chloro-3-methylphenol (p-chloro-m-cresol)	U			355	µg/kg	355	EPA8270
4-Chloroaniline	U			355	µg/kg	355	EPA8270

SAMPLE NAME: AOBSB0601 (continued) Sample ID: 102689

Constituent	RQ	AQ	BQ	Result	Unit	Q. Limit	Method
Semivolatiles							
4-Chlorophenyl phenyl ether	U			355	µg/kg	355	EPA8270
4-Nitroaniline	U			1,780	µg/kg	1,780	EPA8270
4-Nitrophenol	U			1,780	µg/kg	1,780	EPA8270
Acenapthene	U			355	µg/kg	355	EPA8270
Acenapthylene	U			355	µg/kg	355	EPA8270
Anthracene	U			355	µg/kg	355	EPA8270
Benzo(a)anthracene	U			355	µg/kg	355	EPA8270
Benzo(a)pyrene	U			355	µg/kg	355	EPA8270
Benzo(b)fluoranthene	U			355	µg/kg	355	EPA8270
Benzo(g,h,i)perylene	U			355	µg/kg	355	EPA8270
Benzo(k)fluoranthene	U			355	µg/kg	355	EPA8270
Benzoic acid	U			1,780	µg/kg	1,780	EPA8270
Benzyl alcohol	U			355	µg/kg	355	EPA8270
Bis(2-chloroethoxy) methane	U			355	µg/kg	355	EPA8270
Bis(2-chloroethyl) ether	U			355	µg/kg	355	EPA8270
Bis(2-chloroisopropyl) ether	U			355	µg/kg	355	EPA8270
Bis(2-ethylhexyl) phthalate	U			355	µg/kg	355	EPA8270
Butyl benzyl phthalate	U			355	µg/kg	355	EPA8270
Chrysene	U			355	µg/kg	355	EPA8270
Di-n-butyl phthalate	U			355	µg/kg	355	EPA8270
Di-n-octyl phthalate	U			355	µg/kg	355	EPA8270
Dibenzo(a,h)anthracene	U			355	µg/kg	355	EPA8270
Dibenzofuran	U			355	µg/kg	355	EPA8270
Diethyl phthalate	U			355	µg/kg	355	EPA8270
Dimethyl phthalate	U			355	µg/kg	355	EPA8270
Fluoranthene	U			355	µg/kg	355	EPA8270
Fluorene	U			355	µg/kg	355	EPA8270
Hexachlorobenzene	U			355	µg/kg	355	EPA8270
Hexachlorobutadiene	U			355	µg/kg	355	EPA8270
Hexachlorocyclopentadiene	U			355	µg/kg	355	EPA8270
Hexachloroethane	U			355	µg/kg	355	EPA8270
Indeno(1,2,3-c,d)pyrene	U			355	µg/kg	355	EPA8270
Isophorone	U			355	µg/kg	355	EPA8270
N-Nitrosodi-n-propylamine	U			355	µg/kg	355	EPA8270
N-Nitrosodiphenylamine	U			355	µg/kg	355	EPA8270
Naphthalene	U			355	µg/kg	355	EPA8270
Nitrobenzene	U			355	µg/kg	355	EPA8270
Pentachlorophenol	U			1,780	µg/kg	1,780	EPA8270
Phenanthrene	U			355	µg/kg	355	EPA8270
Phenol	U			355	µg/kg	355	EPA8270
Pyrene	U			355	µg/kg	355	EPA8270
Unknown	J	N		200	µg/kg	.	EPA8270
Unknown	J	N		200	µg/kg	.	EPA8270
Unknown	J	N		1,000	µg/kg	.	EPA8270
o-cresol (2-methylphenol)	U			355	µg/kg	355	EPA8270
p-cresol (4-methylphenol)	U			355	µg/kg	355	EPA8270

SAMPLE NAME: AOBSB0601 (continued) Sample ID: 102689

Constituent	RQ	AQ	BQ	Result	Unit	Q. Limit	Method
Volatiles							
1,1,1-Trichloroethane	J	O	H	7.80	µg/kg	5.00	EPA8240
1,1,2,2-Tetrachloroethane	UJ	O	H	5.00	µg/kg	5.00	EPA8240
1,1,2-Trichloroethane	UJ	O	H	5.00	µg/kg	5.00	EPA8240
1,1-Dichloroethane	UJ	O	H	5.00	µg/kg	5.00	EPA8240
1,1-Dichloroethene	UJ	O	H	5.00	µg/kg	5.00	EPA8240
1,2-Dichloroethane	UJ	O	H	5.00	µg/kg	5.00	EPA8240
1,2-Dichloroethene (total)	UJ	O	H	5.00	µg/kg	5.00	EPA8240
1,2-Dichloropropane	UJ	O	H	5.00	µg/kg	5.00	EPA8240
2-Butanone (MEK)	UJ	O	H	10.0	µg/kg	10.0	EPA8240
2-Hexanone	UJ	O	H	10.0	µg/kg	10.0	EPA8240
4-Methyl-2-pentanone	UJ	O	H	10.0	µg/kg	10.0	EPA8240
Acetone	UJ	VO	H	30.0	µg/kg	10.0	EPA8240
Benzene	UJ	O	H	5.00	µg/kg	5.00	EPA8240
Bromodichloromethane	UJ	O	H	5.00	µg/kg	5.00	EPA8240
Bromoform	UJ	O	H	5.00	µg/kg	5.00	EPA8240
Bromomethane (Methyl bromide)	UJ	O	H	10.0	µg/kg	10.0	EPA8240
Carbon disulfide	UJ	O	H	5.00	µg/kg	5.00	EPA8240
Carbon tetrachloride	UJ	O	H	5.00	µg/kg	5.00	EPA8240
Chlorobenzene	UJ	O	H	5.00	µg/kg	5.00	EPA8240
Chlorodibromomethane	UJ	O	H	5.00	µg/kg	5.00	EPA8240
Chloroethane	UJ	O	H	10.0	µg/kg	10.0	EPA8240
Chloroform	UJ	O	H	5.00	µg/kg	5.00	EPA8240
Chloromethane (methyl chloride)	UJ	O	H	10.0	µg/kg	10.0	EPA8240
Dichloromethane (methylene chloride)	UJ	VO	H	14.5	µg/kg	5.00	EPA8240
Ethylbenzene	UJ	O	H	5.00	µg/kg	5.00	EPA8240
Styrene	UJ	O	H	5.00	µg/kg	5.00	EPA8240
Tetrachloroethene	J	O	H	9.62	µg/kg	5.00	EPA8240
Toluene	UJ	O	H	5.00	µg/kg	5.00	EPA8240
Trichloroethene (TCE)	UJ	O	H	5.00	µg/kg	5.00	EPA8240
Vinyl acetate	UJ	O	H	10.0	µg/kg	10.0	EPA8240
Vinyl chloride	UJ	O	H	10.0	µg/kg	10.0	EPA8240
Xylenes (total)	UJ	O	H	5.00	µg/kg	5.00	EPA8240
cis-1,3-Dichloropropene	UJ	O	H	5.00	µg/kg	5.00	EPA8240
trans-1,3-Dichloropropene	UJ	O	H	5.00	µg/kg	5.00	EPA8240
Pesticides/PCBs							
Aldrin	U			1.77	µg/kg	1.77	EPA8081
Aroclor 1016	U			35.4	µg/kg	35.4	EPA8081
Aroclor 1221	U			70.9	µg/kg	70.9	EPA8081
Aroclor 1232	U			35.4	µg/kg	35.4	EPA8081
Aroclor 1242	U			35.4	µg/kg	35.4	EPA8081
Aroclor 1248	U			35.4	µg/kg	35.4	EPA8081
Aroclor 1254	U			35.4	µg/kg	35.4	EPA8081
Aroclor 1260	U			35.4	µg/kg	35.4	EPA8081
Dieldrin	U			3.54	µg/kg	3.54	EPA8081
Endosulfan I	U			1.77	µg/kg	1.77	EPA8081
Endosulfan II	U			3.54	µg/kg	3.54	EPA8081
Endosulfan sulfate	U			3.54	µg/kg	3.54	EPA8081
Endrin	U			3.54	µg/kg	3.54	EPA8081

SAMPLE NAME: AOBSB0601 (continued) **Sample ID: 102689**

Constituent	RQ	AQ	BQ	Result	Unit	Q. Limit	Method
Pesticides/PCBs							
Endrin ketone	U			3.54	µg/kg	3.54	EPA8081
Heptachlor	U			1.77	µg/kg	1.77	EPA8081
Heptachlor epoxide	U			1.77	µg/kg	1.77	EPA8081
Methoxychlor (Mariate)	U			17.7	µg/kg	17.7	EPA8081
Toxaphene	U			177	µg/kg	177	EPA8081
alpha-Benzene hexachloride	U			1.77	µg/kg	1.77	EPA8081
alpha-Chlordane	U			1.77	µg/kg	1.77	EPA8081
beta-Benzene hexachloride	U			1.77	µg/kg	1.77	EPA8081
delta-Benzene hexachloride	U			1.77	µg/kg	1.77	EPA8081
gamma-Benzene hexachloride (Lindane)	U			1.77	µg/kg	1.77	EPA8081
gamma-Chlordane	U			1.77	µg/kg	1.77	EPA8081
p,p'-DDD	U			3.54	µg/kg	3.54	EPA8081
p,p'-DDE	U			3.54	µg/kg	3.54	EPA8081
p,p'-DDT	U			3.54	µg/kg	3.54	EPA8081
Radionuclides							
Gross Alpha	UI			2.65	pC/g	2.91	LANLMLR100MOD
Non-volatile Beta	UI			2.95	pC/g	1.77	LANLMLR100MOD

SAMPLE NAME: AOBSB0601D **Sample ID: 102691**

Sample Type: Split Associated Sample: 102689

Constituent	RQ	AQ	BQ	Result	Unit	Q. Limit	Method
Physical Parameters							
Cation Exchange Capacity				81.9	Meq/	5.00	EPA9081
Total Organic Carbon				3,380	mg/kg	100	EPA415.1
Total Petroleum Hydrocarbons	J	C		33.8	mg/kg	10.6	EPA418.1
TAL Metals							
Aluminum	J	VC		4,210	mg/kg	13.0	EPA6010A
Antimony	UJ	C		5.21	mg/kg	5.21	EPA6010A
Arsenic	U			15.6	mg/kg	15.6	EPA6010A
Barium				19.7	mg/kg	1.30	EPA6010A
Beryllium	J	E		0.203	mg/kg	0.521	EPA6010A
Cadmium				0.639	mg/kg	0.261	EPA6010A
Calcium		V		70.5	mg/kg	13.0	EPA6010A
Chromium				3.89	mg/kg	1.30	EPA6010A
Cobalt	J	E		0.424	mg/kg	0.521	EPA6010A
Copper				4.15	mg/kg	1.30	EPA6010A
Cyanide	UJ	VC		157	µg/kg	532	EPA335.3
Iron	J	VC		1,900	mg/kg	5.21	EPA6010A
Lead				8.75	mg/kg	5.21	EPA6010A
Magnesium				64.4	mg/kg	5.21	EPA6010A
Manganese				10.9	mg/kg	0.521	EPA6010A

SAMPLE NAME: AOBSB0601D (continued) **Sample ID: 102691**

Constituent	RQ	AQ	BQ	Result	Unit	Q. Limit	Method
TAL Metals							
Mercury	J	E		0.0195	mg/kg	0.0330	EPA7471
Nickel				1.89	mg/kg	1.30	EPA6010A
Potassium	J	E		64.8	mg/kg	104	EPA6010A
Selenium	U			15.6	mg/kg	15.6	EPA6010A
Silver	U			1.30	mg/kg	1.30	EPA6010A
Sodium	J	EC		9.32	mg/kg	52.1	EPA6010A
Thallium	UJ	C		15.6	mg/kg	15.6	EPA6010A
Vanadium				6.10	mg/kg	0.521	EPA6010A
Zinc		V		15.2	mg/kg	1.04	EPA6010A
Semivolatiles							
1,2,4-Trichlorobenzene	U			3.54	µg/kg	3.54	EPA8270
1,2-Dichlorobenzene	U			35.4	µg/kg	35.4	EPA8270
1,3-Dichlorobenzene	U			35.4	µg/kg	35.4	EPA8270
1,4-Dichlorobenzene	U			35.4	µg/kg	35.4	EPA8270
2,4,5-Trichlorophenol	U			35.4	µg/kg	35.4	EPA8270
2,4,6-Trichlorophenol	U			35.4	µg/kg	35.4	EPA8270
2,4-Dichlorophenol	U			35.4	µg/kg	35.4	EPA8270
2,4-Dimethyl phenol	U			35.4	µg/kg	35.4	EPA8270
2,4-Dinitrophenol	U			354	µg/kg	354	EPA8270
2,4-Dinitrotoluene	U			3.54	µg/kg	3.54	EPA8270
2,6-Dinitrotoluene	U			3.54	µg/kg	3.54	EPA8270
2-Chloronaphthalene	U			35.4	µg/kg	35.4	EPA8270
2-Chlorophenol	U			35.4	µg/kg	35.4	EPA8270
2-Methyl-4,6-dinitrophenol	U			354	µg/kg	354	EPA8270
2-Methylnaphthalene	U			35.4	µg/kg	35.4	EPA8270
2-Nitroaniline	U			35.4	µg/kg	35.4	EPA8270
2-Nitrophenol	U			35.4	µg/kg	35.4	EPA8270
3,3'-Dichlorobenzidine	U			35.4	µg/kg	35.4	EPA8270
3-Nitroaniline	U			35.4	µg/kg	35.4	EPA8270
4-Bromophenyl phenyl ether	U			35.4	µg/kg	35.4	EPA8270
4-Chloro-3-methylphenol (p-chloro-m-cresol)	U			35.4	µg/kg	35.4	EPA8270
4-Chloroaniline	U			35.4	µg/kg	35.4	EPA8270
4-Chlorophenyl phenyl ether	U			35.4	µg/kg	35.4	EPA8270
4-Nitroaniline	U			35.4	µg/kg	35.4	EPA8270
4-Nitrophenol	U			35.4	µg/kg	35.4	EPA8270
Acenapthene	U			35.4	µg/kg	35.4	EPA8270
Acenapthylene	U			35.4	µg/kg	35.4	EPA8270
Anthracene	U			35.4	µg/kg	35.4	EPA8270
Benzo(a)anthracene	U			3.54	µg/kg	3.54	EPA8270
Benzo(a)pyrene	U			3.54	µg/kg	3.54	EPA8270
Benzo(b)fluoranthene	U			3.54	µg/kg	3.54	EPA8270
Benzo(g,h,i)perylene	U			35.4	µg/kg	35.4	EPA8270
Benzo(k)fluoranthene	U			3.54	µg/kg	3.54	EPA8270
Benzoic acid	U			35.4	µg/kg	35.4	EPA8270
Benzyl alcohol	U			35.4	µg/kg	35.4	EPA8270
Bis(2-chloroethoxy) methane	U			35.4	µg/kg	35.4	EPA8270
Bis(2-chloroethyl) ether	U			35.4	µg/kg	35.4	EPA8270

SAMPLE NAME: AOBSB0601D (continued) Sample ID: 102691

Constituent	RQ	AQ	BQ	Result	Unit	Q. Limit	Method
Semivolatiles							
Bis(2-chloroisopropyl) ether	U			35.4	µg/kg	35.4	EPA8270
Bis(2-ethylhexyl) phthalate	U			35.4	µg/kg	35.4	EPA8270
Butyl benzyl phthalate	U			35.4	µg/kg	35.4	EPA8270
Chrysene	U			3.54	µg/kg	3.54	EPA8270
Di-n-butyl phthalate	J	E		18.4	µg/kg	35.4	EPA8270
Di-n-octyl phthalate	U			35.4	µg/kg	35.4	EPA8270
Dibenzo(a,h)anthracene	U			3.54	µg/kg	3.54	EPA8270
Dibenzofuran	U			35.4	µg/kg	35.4	EPA8270
Diethyl phthalate	U			35.4	µg/kg	35.4	EPA8270
Dimethyl phthalate	U			35.4	µg/kg	35.4	EPA8270
Fluoranthene	U			35.4	µg/kg	35.4	EPA8270
Fluorene	U			35.4	µg/kg	35.4	EPA8270
Hexachlorobenzene	U			3.54	µg/kg	3.54	EPA8270
Hexachlorobutadiene	U			35.4	µg/kg	35.4	EPA8270
Hexachlorocyclopentadiene	U			35.4	µg/kg	35.4	EPA8270
Hexachloroethane	U			3.54	µg/kg	3.54	EPA8270
Indeno(1,2,3-c,d)pyrene	U			3.54	µg/kg	3.54	EPA8270
Isophorone	U			35.4	µg/kg	35.4	EPA8270
N-Nitrosodi-n-propylamine	U			35.4	µg/kg	35.4	EPA8270
N-Nitrosodiphenylamine	U			35.4	µg/kg	35.4	EPA8270
Naphthalene	U			35.4	µg/kg	35.4	EPA8270
Nitrobenzene	U			35.4	µg/kg	35.4	EPA8270
Pentachlorophenol	U			35.4	µg/kg	35.4	EPA8270
Phenanthrene	U			35.4	µg/kg	35.4	EPA8270
Phenol	U			35.4	µg/kg	35.4	EPA8270
Pyrene	U	V		35.4	µg/kg	35.4	EPA8270
Unknown hydrocarbon	J	N		4.51	mg/kg	.	EPA8270
m,p-Cresol	U			354	µg/kg	354	EPA8270
o-cresol (2-methylphenol)	U			35.4	µg/kg	35.4	EPA8270
Volatiles							
1,1,1-Trichloroethane	UJ	QO	H	0.0532	µg/kg	0.0532	EPA8260
1,1,2,2-Tetrachloroethane	UJ	QO	H	0.0532	µg/kg	0.0532	EPA8260
1,1,2-Trichloroethane	UJ	QO	H	0.0532	µg/kg	0.0532	EPA8260
1,1-Dichloroethane	UJ	QO	H	0.0532	µg/kg	0.0532	EPA8260
1,1-Dichloroethene	UJ	QO	H	0.0532	µg/kg	0.0532	EPA8260
1,2-Dichloroethane	UJ	QO	H	0.0532	µg/kg	0.0532	EPA8260
1,2-Dichloroethene (total)	UJ	QO	H	0.106	µg/kg	0.106	EPA8260
1,2-Dichloropropane	UJ	QO	H	0.0532	µg/kg	0.0532	EPA8260
2-Butanone (MEK)	UJ	QO	H	1.06	µg/kg	1.06	EPA8260
2-Hexanone	UJ	QO	H	1.06	µg/kg	1.06	EPA8260
4-Methyl-2-pentanone	UJ	QO	H	1.06	µg/kg	1.06	EPA8260
Acetone	UJ	QO	H	5.32	µg/kg	5.32	EPA8260
Benzene	UJ	QO	H	0.532	µg/kg	0.532	EPA8260
Bromodichloromethane	UJ	QO	H	0.0532	µg/kg	0.0532	EPA8260
Bromoform	UJ	QO	H	0.0532	µg/kg	0.0532	EPA8260
Bromomethane (Methyl bromide)	UJ	QO	H	0.106	µg/kg	0.106	EPA8260
Carbon disulfide	UJ	QO	H	1.06	µg/kg	1.06	EPA8260
Carbon tetrachloride	UJ	QO	H	0.0532	µg/kg	0.0532	EPA8260

SAMPLE NAME: AOBSB0601D (continued) **Sample ID:** 102691

Constituent	RQ	AQ	BQ	Result	Unit	Q. Limit	Method
Volatiles							
Chlorobenzene	UJ	QO	H	0.0532	µg/kg	0.0532	EPA8260
Chlorodibromomethane	UJ	QO	H	0.0532	µg/kg	0.0532	EPA8260
Chlorodifluoromethane	J	N		1.50	µg/kg		EPA8260
Chloroethane	UJ	QO	H	0.106	µg/kg	0.106	EPA8260
Chloroform	UJ	QO	H	0.0532	µg/kg	0.0532	EPA8260
Chloromethane (methyl chloride)	UJ	QO	H	0.106	µg/kg	0.106	EPA8260
Dichloromethane (methylene chloride)	J	QO	H	2.74	µg/kg	0.532	EPA8260
Ethylbenzene	UJ	QO	H	0.0532	µg/kg	0.0532	EPA8260
Styrene	UJ	QO	H	0.0532	µg/kg	0.0532	EPA8260
Tetrachloroethene	UJ	QO	H	0.0532	µg/kg	0.0532	EPA8260
Toluene	UJ	QO	H	0.532	µg/kg	0.532	EPA8260
Trichloroethene (TCE)	UJ	QO	H	0.0532	µg/kg	0.0532	EPA8260
Unknown	J	N		2.26	µg/kg		EPA8260
Unknown	J	N		0.600	µg/kg		EPA8260
Unknown siloxane	J	N		0.700	µg/kg		EPA8260
Vinyl acetate	UJ	QO	H	1.06	µg/kg	1.06	EPA8260
Vinyl chloride	UJ	QO	H	0.106	µg/kg	0.106	EPA8260
Xylenes (total)	UJ	QO	H	0.160	µg/kg	0.160	EPA8260
cis-1,3-Dichloropropene	UJ	QO	H	0.0532	µg/kg	0.0532	EPA8260
trans-1,3-Dichloropropene	UJ	QO	H	0.0532	µg/kg	0.0532	EPA8260
Pesticides/PCBs							
Aldrin	U			0.871	µg/kg	0.871	EPA8080
Aroclor 1016	U			4.35	µg/kg	4.35	EPA8080
Aroclor 1221	U			4.35	µg/kg	4.35	EPA8080
Aroclor 1232	U			4.35	µg/kg	4.35	EPA8080
Aroclor 1242	U			4.35	µg/kg	4.35	EPA8080
Aroclor 1248	U			4.35	µg/kg	4.35	EPA8080
Aroclor 1254	U			4.35	µg/kg	4.35	EPA8080
Aroclor 1260	U			4.35	µg/kg	4.35	EPA8080
Dieldrin				2.35	µg/kg	1.74	EPA8080
Endosulfan I	U			1.74	µg/kg	1.74	EPA8080
Endosulfan II	U			3.48	µg/kg	3.48	EPA8080
Endosulfan sulfate	U			3.48	µg/kg	3.48	EPA8080
Endrin	J	E		1.15	µg/kg	1.74	EPA8080
Endrin ketone	U			3.48	µg/kg	3.48	EPA8080
Heptachlor	U			1.74	µg/kg	1.74	EPA8080
Heptachlor epoxide	U			1.74	µg/kg	1.74	EPA8080
Methoxychlor (Mariate)	U			17.4	µg/kg	17.4	EPA8080
Toxaphene	U			34.8	µg/kg	34.8	EPA8080
alpha-Benzene hexachloride	J	E		0.672	µg/kg	0.871	EPA8080
alpha-Chlordane	U			1.74	µg/kg	1.74	EPA8080
beta-Benzene hexachloride	U			1.74	µg/kg	1.74	EPA8080
delta-Benzene hexachloride	U			1.74	µg/kg	1.74	EPA8080
gamma-Benzene hexachloride (Lindane)	U			0.871	µg/kg	0.871	EPA8080
gamma-Chlordane	U			1.74	µg/kg	1.74	EPA8080
p,p'-DDD	U			3.48	µg/kg	3.48	EPA8080
p,p'-DDE	U			1.74	µg/kg	1.74	EPA8080
p,p'-DDT	J	E		2.97	µg/kg	3.48	EPA8080

SAMPLE NAME: AOBSB0601D (continued) Sample ID: 102691

Constituent	RQ	AQ	BQ	Result	Unit	Q. Limit	Method
Radionuclides							
Gross Alpha				5.90	pC/g	2.36	EPIA-001B
Non-volatile Beta				8.05	pC/g	5.31	EPIA-001B

SAMPLE NAME: AOBSB0602 Sample ID: 102690

Location (SRS Coordinates): 50585E 102024N
Ground Elevation Above MSL: . ft
Depth of Core Interval: 1.00 to 4.00 ft
Sample Type: Normal
Sample Color:
Sample Matrix: Soil
USC Soil Classification:
Sample Moisture: Dry
Percent Solids: 92.1

Constituent	RQ	AQ	BQ	Result	Unit	Q. Limit	Method
Physical Parameters							
Cation Exchange Capacity	U			652	Meq/	652	EPA9081
Total Organic Carbon				869	mg/kg	60.0	LLOYDKAHN
Total Petroleum Hydrocarbons		V		18.9	mg/kg	11.6	EPA418.1
TAL Metals							
Aluminum				8,510	mg/kg	19.2	EPA6010
Antimony	J	E		0.827	mg/kg	3.62	EPA6010
Arsenic	J	E		2.20	mg/kg	11.5	EPA6010
Barium				30.8	mg/kg	1.14	EPA6010
Beryllium	J	E		0.352	mg/kg	0.258	EPA6010
Cadmium	J	E		0.120	mg/kg	0.414	EPA6010
Calcium				110	mg/kg	17.4	EPA6010
Chromium				6.60	mg/kg	0.931	EPA6010
Cobalt				1.50	mg/kg	0.827	EPA6010
Copper				3.00	mg/kg	1.03	EPA6010
Cyanide	U			0.830	mg/kg	0.830	EPA9010
Iron				4,800	mg/kg	22.6	EPA6010
Lead				7.30	mg/kg	6.10	EPA6010
Magnesium				103	mg/kg	9.00	EPA6010
Manganese				23.9	mg/kg	0.207	EPA6010
Mercury	J	E		0.0530	mg/kg	0.145	EPA7471
Nickel				2.60	mg/kg	1.76	EPA6010
Potassium				114	mg/kg	69.3	EPA6010
Selenium	U			10.8	mg/kg	10.8	EPA6010
Silver	U			0.931	mg/kg	0.931	EPA6010
Sodium	J	E		27.0	mg/kg	133	EPA6010
Thallium	U			8.79	mg/kg	8.79	EPA6010
Vanadium				12.5	mg/kg	0.724	EPA6010
Zinc	J	E		6.90	mg/kg	16.6	EPA6010

SAMPLE NAME: AOBSB0602 (continued) Sample ID: 102690

Constituent	RQ	AQ	BQ	Result	Unit	Q. Limit	Method
Semivolatiles							
1,2,4-Trichlorobenzene	U			362	µg/kg	362	EPA8270
1,2-Dichlorobenzene	U			362	µg/kg	362	EPA8270
1,3-Dichlorobenzene	U			362	µg/kg	362	EPA8270
1,4-Dichlorobenzene	U			362	µg/kg	362	EPA8270
2,4,5-Trichlorophenol	U			1,810	µg/kg	1,810	EPA8270
2,4,6-Trichlorophenol	U			362	µg/kg	362	EPA8270
2,4-Dichlorophenol	U			362	µg/kg	362	EPA8270
2,4-Dimethyl phenol	U			362	µg/kg	362	EPA8270
2,4-Dinitrophenol	U			1,810	µg/kg	1,810	EPA8270
2,4-Dinitrotoluene	U			362	µg/kg	362	EPA8270
2.6-Dinitrotoluene	U			362	µg/kg	362	EPA8270
2-Chloronaphthalene	U			362	µg/kg	362	EPA8270
2-Chlorophenol	U			362	µg/kg	362	EPA8270
2-Methyl-4,6-dinitrophenol	U			1,810	µg/kg	1,810	EPA8270
2-Methylnaphthalene	U			362	µg/kg	362	EPA8270
2-Nitroaniline	U			1,810	µg/kg	1,810	EPA8270
2-Nitrophenol	U			362	µg/kg	362	EPA8270
3,3'-Dichlorobenzidine	U			724	µg/kg	724	EPA8270
3-Nitroaniline	U			1,810	µg/kg	1,810	EPA8270
4-Bromophenyl phenyl ether	U			362	µg/kg	362	EPA8270
4-Chloro-3-methylphenol (p-chloro-m-cresol)	U			362	µg/kg	362	EPA8270
4-Chloroaniline	U			362	µg/kg	362	EPA8270
4-Chlorophenyl phenyl ether	U			362	µg/kg	362	EPA8270
4-Nitroaniline	U			1,810	µg/kg	1,810	EPA8270
4-Nitrophenol	U			1,810	µg/kg	1,810	EPA8270
Acenapthene	U			362	µg/kg	362	EPA8270
Acenapthylene	U			362	µg/kg	362	EPA8270
Aldol condensate	J	KN		300	µg/kg		EPA8270
Anthracene	U			362	µg/kg	362	EPA8270
Benzo(a)anthracene	U			362	µg/kg	362	EPA8270
Benzo(a)pyrene	U			362	µg/kg	362	EPA8270
Benzo(b)fluoranthene	U			362	µg/kg	362	EPA8270
Benzo(g,h,i)perylene	U			362	µg/kg	362	EPA8270
Benzo(k)fluoranthene	U			362	µg/kg	362	EPA8270
Benzoic acid	U			1,810	µg/kg	1,810	EPA8270
Benzyl alcohol	U			362	µg/kg	362	EPA8270
Bis(2-chloroethoxy) methane	U			362	µg/kg	362	EPA8270
Bis(2-chloroethyl) ether	U			362	µg/kg	362	EPA8270
Bis(2-chloroisopropyl) ether	U			362	µg/kg	362	EPA8270
Bis(2-ethylhexyl) phthalate	U			362	µg/kg	362	EPA8270
Butyl benzyl phthalate	U			362	µg/kg	362	EPA8270
Chrysene	U			362	µg/kg	362	EPA8270
Di-n-butyl phthalate	U			362	µg/kg	362	EPA8270
Di-n-octyl phthalate	U			362	µg/kg	362	EPA8270
Dibenzo(a,h)anthracene	U			362	µg/kg	362	EPA8270
Dibenzofuran	U			362	µg/kg	362	EPA8270
Diethyl phthalate	U			362	µg/kg	362	EPA8270
Dimethyl phthalate	U			362	µg/kg	362	EPA8270
Fluoranthene	U			362	µg/kg	362	EPA8270

SAMPLE NAME: AOBSB0602 (continued) Sample ID: 102690

Constituent	RQ	AQ	BQ	Result	Unit	Q. Limit	Method
Semivolatiles							
Fluorene	U			362	µg/kg	362	EPA8270
Hexachlorobenzene	U			362	µg/kg	362	EPA8270
Hexachlorobutadiene	U			362	µg/kg	362	EPA8270
Hexachlorocyclopentadiene	U			362	µg/kg	362	EPA8270
Hexachloroethane	U			362	µg/kg	362	EPA8270
Indeno(1,2,3-c,d)pyrene	U			362	µg/kg	362	EPA8270
Isophorone	U			362	µg/kg	362	EPA8270
N-Nitrosodi-n-propylamine	U			362	µg/kg	362	EPA8270
N-Nitrosodiphenylamine	U			362	µg/kg	362	EPA8270
Naphthalene	U			362	µg/kg	362	EPA8270
Nitrobenzene	U			362	µg/kg	362	EPA8270
Pentachlorophenol	U			1,810	µg/kg	1,810	EPA8270
Phenanthrene	U			362	µg/kg	362	EPA8270
Phenol	U			362	µg/kg	362	EPA8270
Pyrene	U			362	µg/kg	362	EPA8270
o-cresol (2-methylphenol)	U			362	µg/kg	362	EPA8270
p-cresol (4-methylphenol)	U			362	µg/kg	362	EPA8270
Volatiles							
1,1,1-Trichloroethane	U			5.50	µg/kg	5.50	EPA8240
1,1,2,2-Tetrachloroethane	U			5.50	µg/kg	5.50	EPA8240
1,1,2-Trichloroethane	U			5.50	µg/kg	5.50	EPA8240
1,1-Dichloroethane	U			5.50	µg/kg	5.50	EPA8240
1,1-Dichloroethene	U			5.50	µg/kg	5.50	EPA8240
1,2-Dichloroethane	U			5.50	µg/kg	5.50	EPA8240
1,2-Dichloroethene (total)	U			5.50	µg/kg	5.50	EPA8240
1,2-Dichloropropane	U			5.50	µg/kg	5.50	EPA8240
2-Butanone (MEK)	U			11.0	µg/kg	11.0	EPA8240
2-Hexanone	U			11.0	µg/kg	11.0	EPA8240
4-Methyl-2-pentanone	U			11.0	µg/kg	11.0	EPA8240
Acetone	U			11.0	µg/kg	11.0	EPA8240
Benzene	U			5.50	µg/kg	5.50	EPA8240
Bromodichloromethane	U			5.50	µg/kg	5.50	EPA8240
Bromoform	U			5.50	µg/kg	5.50	EPA8240
Bromomethane (Methyl bromide)	U			11.0	µg/kg	11.0	EPA8240
Carbon disulfide	U			5.50	µg/kg	5.50	EPA8240
Carbon tetrachloride	U			5.50	µg/kg	5.50	EPA8240
Chlorobenzene	U			5.50	µg/kg	5.50	EPA8240
Chlorodibromomethane	U			5.50	µg/kg	5.50	EPA8240
Chloroethane	U			11.0	µg/kg	11.0	EPA8240
Chloroform	U			5.50	µg/kg	5.50	EPA8240
Chloromethane (methyl chloride)	U			11.0	µg/kg	11.0	EPA8240
Dichloromethane (methylene chloride)	U	V		12.0	µg/kg	5.50	EPA8240
Ethylbenzene	U			5.50	µg/kg	5.50	EPA8240
Styrene	U			5.50	µg/kg	5.50	EPA8240
Tetrachloroethene	J	E		3.54	µg/kg	5.50	EPA8240
Toluene	U			5.50	µg/kg	5.50	EPA8240
Trichloroethene (TCE)	U			5.50	µg/kg	5.50	EPA8240
Vinyl acetate	U			11.0	µg/kg	11.0	EPA8240

SAMPLE NAME: AOBSB0602 (continued) Sample ID: 102690

Constituent	RQ	AQ	BQ	Result	Unit	Q. Limit	Method
Volatiles							
Vinyl chloride	U			I1.0	µg/kg	11.0	EPA8240
Xylenes (total)	U			5.50	µg/kg	5.50	EPA8240
cis-1,3-Dichloropropene	U			5.50	µg/kg	5.50	EPA8240
trans-1,3-Dichloropropene	U			5.50	µg/kg	5.50	EPA8240
Pesticides/PCBs							
Aldrin	UJ	O	L	1.81	µg/kg	I.81	EPA808 I
Aroclor 1016	UJ	0	L	36.2	µg/kg	36.2	EPA8081
Aroclor 1221	UJ	0	L	72.4	µg/kg	72.4	EPA8081
Aroclor 1232	UJ	0	L	36.2	µg/kg	36.2	EPA808 1
Aroclor 1242	UJ	0	L	36.2	µg/kg	3 6 . 2	EPA808 1
Aroclor 1248	UJ	0	L	36.2	µg/kg	36.2	EPA8081
Aroclor 1254	UJ	0	L	36.2	µg/kg	36.2	EPA8081
Aroclor 1260	UJ	0	L	36.2	µg/kg	36.2	EPA8081
Dieldrin	UJ	0	L	3.62	µg/kg	3.62	EPA808 1
Endosulfan I	UJ	0	L	1.81	µg/kg	I.81	EPA808 I
Endosulfan II	UJ	0	L	3.62	µg/kg	3.62	EPA808 I
Endosulfan sulfate	UJ	0	L	3.62	µg/kg	3.62	EPA808 1
Endrin	UJ	OG	L	3.62	µg/kg	3.62	EPA808 I
Endrin ketone	UJ	OG	L	3.62	µg/kg	3.62	EPA808 I
Hcptachlor	UJ	0	L	1.81	µg/kg	1.81	EPA808 1
Hcptachlor epoxide	UJ	0	L	1.81	µg/kg	1.81	EPA808 1
Methoxychlor (Mariatc)	UJ	0	L	18.1	µg/kg	18.1	EPA8081
Toxaphene	UJ	0	L	181·	µg/kg	181	EPA808 I
alpha-Benzene hexachloride	UJ	0	L	1.81	µg/kg	I.81	E PA808 I
alpha-Chlordane	UJ	0	L	I.81	µg/kg	I.81	EPA808 I
beta-Benzene hcxachloride	UJ	0	L	1.81	µg/kg	1.81	EPA808 1
delta-Benzene hcxachloridc	UJ	0	L	1.81	µg/kg	f.81	EPA808 1
gamma-Benzene hcxachloride (Lindanc)	UJ	0	L	1.81	µg/kg	1.81	EPA808 I
gamma-Chlordane	UJ	0	L	1.81	µg/kg	1.81	EPA808 I
p,p'-DDD	UJ	OG	L	3.62	µg/kg	3.42	EPA808 I
p,p'-DDE	UJ	OG	L	3.62	µg/kg	3.62	EPA808 I
p,p'-DDT	UJ	OG	L	3.62	µg/kg	3.62	EPA8081
Radionuclides							
Gross Alpha				9.95	pC/g	3.31	LANLMLR100MOD
Non-volatile Beta				II.1	pC/g	1.63	LANLMLR100MOD

SAMPLE NAME: ABKSBFB01C Sample ID: 102693

Location (SRS Coordinates): .E .N
Ground Elevation Above MSL: ft
Depth of Core Interval: 0.00 to 1.00 ft
Sample Type: 7 Sample Matrix: Water Sample Moisture:

Coastitucat	RQ	AQ	BQ	Result	Unit	Q. Limit	Method
Volatiles							
1,1,1-Trichloroethane	U			5.00	µg/L	5.00	EPA8240
1. 1.2,2-Tetrachloroethane	U			5.00	µg/L	5.00	EPA8240
1,1.2-Trichloroethane	U			5.00	µg/L	5.00	EPA8240
1,1-Dichloroethane	U			5.00	µg/L	5.00	EPA8240
1,1-Dichloroethene	U			5.00	µg/L	5.00	EPA8240
1,2-Dichloroethane	U			5.00	µg/L	5.00	EPA8240
1.2-Dichloroethene (total)	U			5.00	µg/L	5.00	EPA8240
1,2-Dichloropropane	U			5.00	µg/L	5.00	EPA8240
2-Butanone (MEK)	U			10.0	µg/L	IO.0	EPA8240
2-Hexanone	U			10.0	µg/L	10.0	EPA8240
4-Methyl-2-pentanone	U			10.0	µg/L	10.0	EPA8240

Acetone		V	51.6	µg/L	10.0	EPA8240
Benzene	U		5.00	µg/L	5.00	EPA8240
Bromodichloromethane	U		5.00	µg/L	5.00	EPA8240
Bromoform	U		5.00	µg/L	5.00	EPA8240
Bromomethane (Methyl bromide)	U		10.0	µg/L	10.0	EPA8240
Carbon disulfide	U		5.00	µg/L	5.00	EPA8240
Carbon tetrachloride	U		5.00	µg/L	5.00	EPA8240
Chlorobenzene	U		5.00	µg/L	5.00	EPA8240
Chlorodibromomethane	U		5.00	µg/L	5.00	EPA8240
Chloroethane	U		10.0	µg/L	10.0	EPA8240
Chloroform	U		5.00	µg/L	5.00	EPA8240
Chloromethane (methyl chloride)	U		10.0	µg/L	10.0	EPA8240
Dichloromethane (methylene chloride)	U	V	5.20	µg/L	5.00	EPA8240
Ethylbenzene	U		5.00	µg/L	5.00	EPA8240
Styrene	U		5.00	µg/L	5.00	EPA8240
Tetrachloroethene	U		5.00	µg/L	5.00	EPA8240
Toluene	U		5.00	µg/L	5.00	EPA8240
Trichloroethene (TCE)	U		5.00	µg/L	5.00	EPA8240
Vinyl acetate	U		10.0	µg/L	10.0	EPA8240
Vinyl chloride	U		10.0	µg/L	10.0	EPA8240
Xylenes (total)	U		5.00	µg/L	5.00	EPA8240
cis-1,3-Dichloropropene	U		5.00	µg/L	5.00	EPA8240
trans-1,3-Dichloropropene	U		5.00	µg/L	5.00	EPA8240

SAMPLE NAME: ABKSBRB01E **Sample ID: 102696**

Sample Type: Rinsate **Associated Sample: 102694**

Constituent	RQ	AQ	BQ	Result	Unit	Q. Limit	Method
TAL Metals							
Aluminum	J	E		64.2	µg/L	146	EPA6010
Antimony	U			27.0	µg/L	27.0	EPA6010
Arsenic	U			40.0	µg/L	40.0	EPA6010
Barium	J	E		0.970	µg/L	1.80	EPA6010
Beryllium	U			1.60	µg/L	1.60	EPA6010
Cadmium	J	E		0.530	µg/L	4.70	EPA6010
Calcium	J	E		72.0	µg/L	471	EPA6010
Chromium	U	VX		2.30	µg/L	7.00	EPA6010
Cobalt	U			4.50	µg/L	4.50	EPA6010
Copper	J	E		3.40	µg/L	15.0	EPA6010
Iron		V		47.1	µg/L	74.0	EPA6010
Lead	U			47.0	µg/L	47.0	EPA6010
Magnesium	U			74.0	µg/L	74.0	EPA6010
Manganese	J	E		1.10	µg/L	7.80	EPA6010
Mercury	U			0.700	µg/L	0.700	EPA7470
Nickel	U			26.0	µg/L	26.0	EPA6010
Potassium				342	µg/L	187	EPA6010
Selenium	U			66.0	µg/L	66.0	EPA6010
Silver	U	V		1.70	µg/L	5.00	EPA6010
Sodium				33,800	µg/L	285	EPA6010
Thallium	U			55.0	µg/L	55.0	EPA6010
Vanadium	U			6.90	µg/L	6.90	EPA6010
Zinc	U	V		29.1	µg/L	53.0	EPA6010
Semivolatiles							
1,2,4-Trichlorobenzene	U			10.0	µg/L	10.0	EPA8270
1,2-Dichlorobenzene	U			10.0	µg/L	10.0	EPA8270
1,3-Dichlorobenzene	U			10.0	µg/L	10.0	EPA8270
1,4-Dichlorobenzene	U			10.0	µg/L	10.0	EPA8270
2,4,5-Trichlorophenol	U			50.0	µg/L	50.0	EPA8270
2,4,6-Trichlorophenol	U			10.0	µg/L	10.0	EPA8270
2,4-Dichlorophenol	U			10.0	µg/L	10.0	EPA8270
2,4-Dimethyl phenol	U			10.0	µg/L	10.0	EPA8270
2.4-Dinitrophenol	U			50.0	µg/L	50.0	EPA8270
2.4-Dinitrotoluene	U			10.0	µg/L	10.0	EPA8270
2.6-Dinitrotoluene	U			10.0	µg/L	10.0	EPA8270
2-Chloronaphthalene	U			10.0	µg/L	10.0	EPA8270
2-Chlorophenol	U			10.0	µg/L	10.0	EPA8270
2-Methyl-4,6-dinitrophenol	U			50.0	µg/L	50.0	EPA8270
2-Methylnaphthalene	U			10.0	µg/L	10.0	EPA8270
2-Nitroaniline	U			50.0	µg/L	50.0	EPA8270
2-Nitrophenol	U			10.0	µg/L	10.0	EPA8270
3.3'-Dichlorobenzidine	U			20.0	µg/L	20.0	EPA8270
3-Nitroaniline	U			50.0	µg/L	50.0	EPA8270
4-Bromophenyl phenyl ether	U			10.0	µg/L	10.0	EPA8270
4-Chloro-3-methylphenol (p-chloro-m-cresol)	U			10.0	µg/L	10.0	EPA8270

SAMPLE NAME: ABKSBRB01E (continued) Sample ID: 102696

Constituent	RQ	AQ	BQ	Result	Unit	Q. Limit	Method
Semivolatiles							
4-Chloroaniline	U			10.0	µg/L	10.0	EPA8270
4-Chlorophenyl phenyl ether	U			10.0	µg/L	10.0	EPA8270
4-Nitroaniline	U			50.0	µg/L	50.0	EPA8270
4-Nitrophenol	U			50.0	µg/L	50.0	EPA8270
Acenapthene	U			10.0	µg/L	10.0	EPA8270
Acenapthylene	U			10.0	µg/L	10.0	EPA8270
Anthracene	U			10.0	µg/L	10.0	EPA8270
Benzo(a)anthracene	U			10.0	µg/L	10.0	EPA8270
Benzo(a)pyrene	U			10.0	µg/L	10.0	EPA8270
Benzo(b)fluoranthene	U			10.0	µg/L	10.0	EPA8270
Benzo(g,h,i)perylene	U			10.0	µg/L	10.0	EPA8270
Benzo(k)fluoranthene	U			10.0	µg/L	10.0	EPA8270
Benzoic acid	U			50.0	µg/L	50.0	EPA8270
Benzyl alcohol	U			10.0	µg/L	10.0	EPA8270
Bis(2-chloroethoxy) methane	U			10.0	µg/L	10.0	EPA8270
Bis(2-chloroethyl) ether	U			10.0	µg/L	10.0	EPA8270
Bis(2-chloroisopropyl) ether	U			10.0	µg/L	10.0	EPA8270
Bis(2-ethylhexyl) phthalate	U	V		3.60	µg/L	10.0	EPA8270
Butyl benzyl phthalate	U			10.0	µg/L	10.0	EPA8270
Chrysene	U			10.0	µg/L	10.0	EPA8270
Di-n-butyl phthalate	U			10.0	µg/L	10.0	EPA8270
Di-n-octyl phthalate	U			10.0	µg/L	10.0	EPA8270
Dibenzo(a,h)anthracene	U			10.0	µg/L	10.0	EPA8270
Dibenzofuran	U			10.0	µg/L	10.0	EPA8270
Diethyl phthalate	U			10.0	µg/L	10.0	EPA8270
Dimethyl phthalate	U			10.0	µg/L	10.0	EPA8270
Fluoranthene	U			10.0	µg/L	10.0	EPA8270
Fluorene	U			10.0	µg/L	10.0	EPA8270
Hexachlorobenzene	U			10.0	µg/L	10.0	EPA8270
Hexachlorobutadiene	U			10.0	µg/L	10.0	EPA8270
Hexachlorocyclopentadiene	U			10.0	µg/L	10.0	EPA8270
Hexachloroethane	U			10.0	µg/L	10.0	EPA8270
Indeno(1,2,3-c,d)pyrene	U			10.0	µg/L	10.0	EPA8270
Isophorone	U			10.0	µg/L	10.0	EPA8270
N-Nitrosodi-n-propylamine	U			10.0	µg/L	10.0	EPA8270
N-Nitrosodiphenylamine	U			10.0	µg/L	10.0	EPA8270
Naphthalene	U			10.0	µg/L	10.0	EPA8270
Nitrobenzene	U			10.0	µg/L	10.0	EPA8270
Pentachlorophenol	U			50.0	µg/L	50.0	EPA8270
Phenanthrene	U			10.0	µg/L	10.0	EPA8270
Phenol	U			10.0	µg/L	10.0	EPA8270
Pyrene	U			10.0	µg/L	10.0	EPA8270
o-cresol (2-methylphenol)	U			10.0	µg/L	10.0	EPA8270
p-cresol (4-methylphenol)	U			10.0	µg/L	10.0	EPA8270

SAMPLE NAME: ABKSBRB01E (continued) Sample ID: 102696

Constituent	RQ	AQ	BQ	Result	Unit	Q. Limit	Method
Volatiles							
1,1,1-Trichloroethane	U			5.00	µg/L	5.00	EPA8240
1,1,2,2-Tetrachloroethane	U			5.00	µg/L	5.00	EPA8240
1,1,2-Trichloroethane	U			5.00	µg/L	5.00	EPA8240
1,1-Dichloroethane	U			5.00	µg/L	5.00	EPA8240
1,1-Dichloroethene	U			5.00	µg/L	5.00	EPA8240
1,2-Dichloroethane	U			5.00	µg/L	5.00	EPA8240
1,2-Dichloroethene (total)	U			5.00	µg/L	5.00	EPA8240
1,2-Dichloropropane	U			5.00	µg/L	5.00	EPA8240
2-Butanone (MEK)	U			10.0	µg/L	10.0	EPA8240
2-Hexanone	U			10.0	µg/L	10.0	EPA8240
4-Methyl-2-pentanone	U			10.0	µg/L	10.0	EPA8240
Acetone		V		57.0	µg/L	10.0	EPA8240
Benzene	U			5.00	µg/L	5.00	EPA8240
Bromodichloromethane	U			5.00	µg/L	5.00	EPA8240
Bromoform	U			5.00	µg/L	5.00	EPA8240
Bromomethane (Methyl bromide)	U			10.0	µg/L	10.0	EPA8240
Carbon disulfide	U			5.00	µg/L	5.00	EPA8240
Carbon tetrachloride	U			5.00	µg/L	5.00	EPA8240
Chlorobenzene	U			5.00	µg/L	5.00	EPA8240
Chlorodibromomethane	U			5.00	µg/L	5.00	EPA8240
Chloroethane	U			10.0	µg/L	10.0	EPA8240
Chloroform	U			5.00	µg/L	5.00	EPA8240
Chloromethane (methyl chloride)	U			10.0	µg/L	10.0	EPA8240
Dichloromethane (methylene chloride)	U	V		5.10	µg/L	5.00	EPA8240
Ethylbenzene	U			5.00	µg/L	5.00	EPA8240
Styrene	U			5.00	µg/L	5.00	EPA8240
Tetrachloroethene	U			5.00	µg/L	5.00	EPA8240
Toluene	U			5.00	µg/L	5.00	EPA8240
Trichloroethene (TCE)	U			5.00	µg/L	5.00	EPA8240
Vinyl acetate	U			10.0	µg/L	10.0	EPA8240
Vinyl chloride	U			10.0	µg/L	10.0	EPA8240
Xylenes (total)	U			5.00	µg/L	5.00	EPA8240
cis-1,3-Dichloropropene	U			5.00	µg/L	5.00	EPA8240
trans-1,3-Dichloropropene	U			5.00	µg/L	5.00	EPA8240
Pesticides/PCBs							
Aldrin	U			0.0510	µg/L	0.0510	EPA8081
Aroclor 1016	U			1.02	µg/L	1.02	EPA8081
Aroclor 1221	U			2.04	µg/L	2.04	EPA8081
Aroclor 1232	U			1.02	µg/L	1.02	EPA8081
Aroclor 1242	U			1.02	µg/L	1.02	EPA8081
Aroclor 1248	U			1.02	µg/L	1.02	EPA8081
Aroclor 1254	U			1.02	µg/L	1.02	EPA8081
Aroclor 1260	U			1.02	µg/L	1.02	EPA8081
Dieldrin	U			0.102	µg/L	0.102	EPA8081
Endosulfan I	U			0.0510	µg/L	0.0510	EPA8081
Endosulfan II	U			0.102	µg/L	0.102	EPA8081
Endosulfan sulfate	U			0.102	µg/L	0.102	EPA8081
Endrin	U			0.102	µg/L	0.102	EPA8081

SAMPLE NAME: ABKSBRB01E (continued) Sample ID: 102696

Constituent	RQ	AQ	BQ	Result	Unit	Q. Limit	Method
Pesticides/PCBs							
Endrin ketone	U			0.102	µg/L	0.102	EPA8081
Heptachlor	U			0.0510	µg/L	0.0510	EPA8081
Heptachlor epoxide	U			0.0510	µg/L	0.0510	EPA8081
Methoxychlor (Mariate)	U			0.510	µg/L	0.510	EPA8081
Toxaphene	U			5.10	µg/L	5.10	EPA8081
alpha-Benzene hexachloride	U			0.0510	µg/L	0.0510	EPA8081
alpha-Chlordane	U			0.0510	µg/L	0.0510	EPA8081
beta-Benzene hexachloride	U			0.0510	µg/L	0.0510	EPA8081
delta-Benzene hexachloride	U			0.0510	µg/L	0.0510	EPA8081
gamma-Benzene hexachloride (Lindane)	U			0.0510	µg/L	0.0510	EPA8081
gamma-Chlordane	U			0.0510	µg/L	0.0510	EPA8081
p,p'-DDD	U			0.102	µg/L	0.102	EPA8081
p,p'-DDE	U			0.102	µg/L	0.102	EPA8081
p,p'-DDT	U			0.102	µg/L	0.102	EPA8081
Radionuclides							
Gross Alpha	UI			0.160	pC/L	1.09	EPA900.0MOD
Non-volatile Beta				3.03	pC/L	0.820	EPA900.0MOD
E							
Cyanide	U			15.2	µg/L	15.2	EPA9010A

SAMPLE NAME: ABKSBTB01B Sample ID: 102665

Sample Type: Blank or Standard

Constituent	RQ	AQ	BQ	Result	Unit	Q. Limit	Method
Volatiles							
1,1,1-Trichloroethane	U			5.00	µg/L	5.00	EPA8240
1,1,2,2-Tetrachloroethane	U			5.00	µg/L	5.00	EPA8240
1,1,2-Trichloroethane	U			5.00	µg/L	5.00	EPA8240
1,1-Dichloroethane	U			5.00	µg/L	5.00	EPA8240
1,1-Dichloroethene	U			5.00	µg/L	5.00	EPA8240
1,2-Dichloroethane	U			5.00	µg/L	5.00	EPA8240
1,2-Dichloroethene (total)	U			5.00	µg/L	5.00	EPA8240
1,2-Dichloropropane	U			5.00	µg/L	5.00	EPA8240
2-Butanone (MEK)	U			10.0	µg/L	10.0	EPA8240
2-Hexanone	U			10.0	µg/L	10.0	EPA8240
4-Methyl-2-pentanone	U			10.0	µg/L	10.0	EPA8240
Acetone	U	V		3.63	µg/L	10.0	EPA8240
Benzene	U			5.00	µg/L	5.00	EPA8240
Bromodichloromethane	U			5.00	µg/L	5.00	EPA8240
Bromoform	U			5.00	µg/L	5.00	EPA8240
Bromomethane (Methyl bromide)	U			10.0	µg/L	10.0	EPA8240
Carbon disulfide	U			5.00	µg/L	5.00	EPA8240

SAMPLE NAME: ABKSBTB01B (continued) Sample ID: 102665

Constituent	RQ	AQ	BQ	Result	Unit	Q. Limit	Method
Volatiles							
Carbon tetrachloride	U			5.00	µg/L	5.00	EPA8240
Chlorobenzene	U			5.00	µg/L	5.00	EPA8240
Chlorodibromomethane	U			5.00	µg/L	5.00	EPA8240
Chloroethane	U			10.0	µg/L	10.0	EPA8240
Chloroform	U			5.00	µg/L	5.00	EPA8240
Chloromethane (methyl chloride)	U			10.0	µg/L	10.0	EPA8240
Dichloromethane (methylene chloride)	U	V		1.22	µg/L	5.00	EPA8240
Ethylbenzene	U			5.00	µg/L	5.00	EPA8240
Styrene	U			5.00	µg/L	5.00	EPA8240
Tetrachloroethene	U			5.00	µg/L	5.00	EPA8240
Toluene	U			5.00	µg/L	5.00	EPA8240
Trichloroethene (TCE)	U			5.00	µg/L	5.00	EPA8240
Vinyl acetate	U			10.0	µg/L	10.0	EPA8240
Vinyl chloride	U			10.0	µg/L	10.0	EPA8240
Xylenes (total)	U			5.00	µg/L	5.00	EPA8240
cis-1,3-Dichloropropene	U			5.00	µg/L	5.00	EPA8240
trans-1,3-Dichloropropene	U			5.00	µg/L	5.00	EPA8240

SAMPLE NAME: ABKSBTB02B Sample ID: 102697

Sample Type: Blank or Standard

Constituent	RQ	AQ	BQ	Result	Unit	Q. Limit	Method
Volatiles							
1,1,1-Trichloroethane	U			5.00	µg/L	5.00	EPA8240
1,1,2,2-Tetrachloroethane	U			5.00	µg/L	5.00	EPA8240
1,1,2-Trichloroethane	U			5.00	µg/L	5.00	EPA8240
1,1-Dichloroethane	U			5.00	µg/L	5.00	EPA8240
1,1-Dichloroethene	U			5.00	µg/L	5.00	EPA8240
1,2-Dichloroethane	U			5.00	µg/L	5.00	EPA8240
1,2-Dichloroethene (total)	U			5.00	µg/L	5.00	EPA8240
1,2-Dichloropropane	U			5.00	µg/L	5.00	EPA8240
2-Butanone (MEK)	U			10.0	µg/L	10.0	EPA8240
2-Hexanone	U			10.0	µg/L	10.0	EPA8240
4-Methyl-2-pentanone	U			10.0	µg/L	10.0	EPA8240
Acetone	U			10.0	µg/L	10.0	EPA8240
Benzene	U			5.00	µg/L	5.00	EPA8240
Bromodichloromethane	U			5.00	µg/L	5.00	EPA8240
Bromoform	U			5.00	µg/L	5.00	EPA8240
Bromomethane (Methyl bromide)	U			10.0	µg/L	10.0	EPA8240
Carbon disulfide	U			5.00	µg/L	5.00	EPA8240
Carbon tetrachloride	U			5.00	µg/L	5.00	EPA8240
Chlorobenzene	U			5.00	µg/L	5.00	EPA8240
Chlorodibromomethane	U			5.00	µg/L	5.00	EPA8240
Chloroethane	U			10.0	µg/L	10.0	EPA8240
Chloroform	U			5.00	µg/L	5.00	EPA8240
Chloromethane (methyl chloride)	U			10.0	µg/L	10.0	EPA8240

SAMPLE NAME: ABKSBTB02B (continued) Sample ID: 102697

Constituent	RQ	AQ	BQ	Result	Unit	Q. Limit	Method
Volatiles							
Dichloromethane (methylene chloride)	U	V		1.54	µg/L	5.00	EPA8240
Ethylbenzene	U			5.00	µg/L	5.00	EPA8240
Styrene	U			5.00	µg/L	5.00	EPA8240
Tetrachloroethene	U			5.00	µg/L	5.00	EPA8240
Toluene	U			5.00	µg/L	5.00	EPA8240
Trichloroethene (TCE)	U			5.00	µg/L	5.00	EPA8240
Vinyl acetate	U			10.0	µg/L	10.0	EPA8240
Vinyl chloride	U			10.0	µg/L	10.0	EPA8240
Xylenes (total)	U			5.00	µg/L	5.00	EPA8240
cis-1,3-Dichloropropene	U			5.00	µg/L	5.00	EPA8240
trans-1,3-Dichloropropene	U			5.00	µg/L	5.00	EPA8240

SAMPLE NAME: ABKSBTB03B Sample ID: 102698

Sample Type: Blank or Standard

Constituent	RQ	AQ	BQ	Result	Unit	Q. Limit	Method
Volatiles							
1,1,1-Trichloroethane	U			0.0500	µg/L	0.0500	EPA8260
1,1,2,2-Tetrachloroethane	U			0.0500	µg/L	0.0500	EPA8260
1,1,2-Trichloroethane	U			0.0500	µg/L	0.0500	EPA8260
1,1-Dichloroethane	U			0.0500	µg/L	0.0500	EPA8260
1,1-Dichloroethene	U			0.0500	µg/L	0.0500	EPA8260
1,2-Dichloroethane	U			0.0500	µg/L	0.0500	EPA8260
1,2-Dichloroethene (total)	U			0.100	µg/L	0.100	EPA8260
1,2-Dichloropropane	U			0.0500	µg/L	0.0500	EPA8260
2-Butanone (MEK)	J	E8		0.750	µg/L	1.00	EPA8260
2-Hexanone	U			1.00	µg/L	1.00	EPA8260
4-Methyl-2-pentanone	U			1.00	µg/L	1.00	EPA8260
Acetone	U			5.00	µg/L	5.00	EPA8260
Benzene	U			0.500	µg/L	0.500	EPA8260
Bromodichloromethane	U			0.0500	µg/L	0.0500	EPA8260
Bromoform	U			0.0500	µg/L	0.0500	EPA8260
Bromomethane (Methyl bromide)	U			0.100	µg/L	0.100	EPA8260
Carbon disulfide	U			1.00	µg/L	1.00	EPA8260
Carbon tetrachloride	U			0.0500	µg/L	0.0500	EPA8260
Chlorobenzene	U			0.0500	µg/L	0.0500	EPA8260
Chlorodibromomethane	U			0.0500	µg/L	0.0500	EPA8260
Chloroethane	U			0.100	µg/L	0.100	EPA8260
Chloroform	U			0.0500	µg/L	0.0500	EPA8260
Chloromethane (methyl chloride)	U			0.100	µg/L	0.100	EPA8260
Dichloromethane (methylene chloride)	U	V		1.77	µg/L	0.500	EPA8260
Ethylbenzene	U			0.0500	µg/L	0.0500	EPA8260
Styrene		8		0.0700	µg/L	0.0500	EPA8260
Tetrachloroethene	U			0.0500	µg/L	0.0500	EPA8260
Toluene	J	E8		0.0500	µg/L	0.500	EPA8260
Trichloroethene (TCE)	U			0.0500	µg/L	0.0500	EPA8260

SAMPLE NAME: ABKSBTB03B (continued) Sample ID: 102698

Constituent	RQ	AQ	BQ	Result	Unit	Q. Limit	Method
Volatiles							
Vinyl acetate	U			1.00	µg/L	1.00	EPA8260
Vinyl chloride	U			0.100	µg/L	0.100	EPA8260
Xylenes (total)		8		0.280	µg/L	0.150	EPA8260
cis-1,3-Dichloropropene	U			0.0500	µg/L	0.0500	EPA8260
trans-1,3-Dichloropropene	U			0.0500	µg/L	0.0500	EPA8260

SAMPLE NAME: AOBSBFB02C Sample ID: 102679

Location (SRS Coordinates): .E .N
Ground Elevation Above MSL: . ft
Depth of Core Interval: 1.00 to 4.00 ft
Sample Type: 7 Sample Matrix: Water Sample Moisture:

Constituent	RQ	AQ	BQ	Result	Unit	Q. Limit	Method
Volatiles							
1,1,1-Trichloroethane	U			5.00	µg/L	5.00	EPA8240
1,1,2,2-Tetrachloroethane	U			5.00	µg/L	5.00	EPA8240
1,1,2-Trichloroethane	U			5.00	µg/L	5.00	EPA8240
1,1-Dichloroethane	U			5.00	µg/L	5.00	EPA8240
1,1-Dichloroethene	U			5.00	µg/L	5.00	EPA8240
1,2-Dichloroethane	U			5.00	µg/L	5.00	EPA8240
1,2-Dichloroethene (total)	U			5.00	µg/L	5.00	EPA8240
1,2-Dichloropropane	U			5.00	µg/L	5.00	EPA8240
2-Butanone (MEK)				26.4	µg/L	10.0	EPA8240
2-Hexanone	U			10.0	µg/L	10.0	EPA8240
4-Methyl-2-pentanone	U			10.0	µg/L	10.0	EPA8240
Acetone	L	V			µg/L	10.0	EPA8240
Benzene	U			5.00	µg/L	5.00	EPA8240
Bromodichloromethane	U			5.00	µg/L	5.00	EPA8240
Bromoform	U			5.00	µg/L	5.00	EPA8240
Bromomethane (Methyl bromide)	U			10.0	µg/L	10.0	EPA8240
Carbon disulfide	U			5.00	µg/L	5.00	EPA8240
Carbon tetrachloride	U			5.00	µg/L	5.00	EPA8240
Chlorobenzene	U			5.00	µg/L	5.00	EPA8240
Chlorodibromomethane	U			5.00	µg/L	5.00	EPA8240
Chloroethane	U			10.0	µg/L	10.0	EPA8240
Chloroform	U			5.00	µg/L	5.00	EPA8240
Chloromethane (methyl chloride)	U			10.0	µg/L	10.0	EPA8240
Dichloromethane (methylene chloride)	U	V		5.47	µg/L	5.00	EPA8240
Ethylbenzene	U			5.00	µg/L	5.00	EPA8240
Styrene	U			5.00	µg/L	5.00	EPA8240
Tetrachloroethene	U			5.00	µg/L	5.00	EPA8240
Toluene	U			5.00	µg/L	5.00	EPA8240
Trichloroethene (TCE)	U			5.00	µg/L	5.00	EPA8240
Unknown	J	N		8.00	µg/L	.	EPA8240
Vinyl acetate	U			10.0	µg/L	10.0	EPA8240
Vinyl chloride	U			10.0	µg/L	10.0	EPA8240

SAMPLE NAME: AOBSBFB02C (continued) Sample ID: 102679

Constituent	RQ	AQ	BQ	Result	Unit	Q. Limit	Method
Volatiles							
Xylenes (total)	U			5.00	µg/L	5.00	EPA8240
cis-1,3-Dichloropropene	U			5.00	µg/L	5.00	EPA8240
trans-1,3-Dichloropropene	U			5.00	µg/L	5.00	EPA8240

SAMPLE NAME: AOBSBRB02E Sample ID: 102678

Sample Type: Rinsate Associated Sample: 102676

Constituent	RQ	AQ	BQ	Result	Unit	Q. Limit	Method
TAL Metals							
Aluminum	UJ	X		146	µg/L	146	EPA6010
Antimony	UJ	X		27.0	µg/L	27.0	EPA6010
Arsenic	UJ	X		40.0	µg/L	40.0	EPA6010
Barium	J	EX		0.870	µg/L	1.80	EPA6010
Beryllium	U			1.60	µg/L	1.60	EPA6010
Cadmium	U			4.70	µg/L	4.70	EPA6010
Calcium	U			471	µg/L	471	EPA6010
Chromium	UJ	VX		5.80	µg/L	7.00	EPA6010
Cobalt	J	EX		0.650	µg/L	4.50	EPA6010
Copper	J	EX		1.90	µg/L	15.0	EPA6010
Cyanide	U	V		1.58	µg/L	15.2	EPA9010
Iron	U	V		40.2	µg/L	74.0	EPA6010
Lead	U			47.0	µg/L	47.0	EPA6010
Magnesium	U			74.0	µg/L	74.0	EPA6010
Manganese	U			7.80	µg/L	7.80	EPA6010
Mercury	U			0.700	µg/L	0.700	EPA7470
Nickel	U			26.0	µg/L	26.0	EPA6010
Potassium				370	µg/L	187	EPA6010
Selenium	U			66.0	µg/L	66.0	EPA6010
Silver	UJ	VX		1.70	µg/L	5.00	EPA6010
Sodium				37,100	µg/L	285	EPA6010
Thallium	U			55.0	µg/L	55.0	EPA6010
Vanadium	J	E		0.980	µg/L	6.90	EPA6010
Zinc	UJ	VX		15.5	µg/L	53.0	EPA6010
Semivolatiles							
1.2.4-Trichlorobenzene	U			10.0	µg/L	10.0	EPA8270
1.2-Dichlorobenzene	U			10.0	µg/L	10.0	EPA8270
1.3-Dichlorobenzene	U			10.0	µg/L	10.0	EPA8270
1.4-Dichlorobenzene	U			10.0	µg/L	10.0	EPA8270
2.4.5-Trichlorophenol	U			50.0	µg/L	50.0	EPA8270
2.4.6-Trichlorophenol	U			10.0	µg/L	10.0	EPA8270
2.4-Dichlorophenol	U			10.0	µg/L	10.0	EPA8270
2.4-Dimethyl phenol	U			10.0	µg/L	10.0	EPA8270
2.4-Dinitrophenol	U			50.0	µg/L	50.0	EPA8270
2.4-Dinitrotoluene	U			10.0	µg/L	10.0	EPA8270

SAMPLE NAME: AOBSBRB02E (continued) Sample ID: 102678

Constituent	RQ	AQ	BQ	Result	Unit	Q. Limit	Method
Semivolatiles							
2,6-Dinitrotoluene	U			10.0	µg/L	10.0	EPA8270
2-Chloronaphthalene	U			10.0	µg/L	10.0	EPA8270
2-Chlorophenol	U			10.0	µg/L	10.0	EPA8270
2-Methyl-4,6-dinitrophenol	U			50.0	µg/L	50.0	EPA8270
2-Methylnaphthalene	U			10.0	µg/L	10.0	EPA8270
2-Nitroaniline	U			50.0	µg/L	50.0	EPA8270
2-Nitrophenol	U			10.0	µg/L	10.0	EPA8270
3,3'-Dichlorobenzidine	U			20.0	µg/L	20.0	EPA8270
3-Nitroaniline	U			50.0	µg/L	50.0	EPA8270
4-Bromophenyl phenyl ether	U			10.0	µg/L	10.0	EPA8270
4-Chloro-3-methylphenol (p-chloro-m-cresol)	U			10.0	µg/L	10.0	EPA8270
4-Chloroaniline	U			10.0	µg/L	10.0	EPA8270
4-Chlorophenyl phenyl ether	U			10.0	µg/L	10.0	EPA8270
4-Nitroaniline	U			50.0	µg/L	50.0	EPA8270
4-Nitrophenol	U			50.0	µg/L	50.0	EPA8270
Acenapthene	U			10.0	µg/L	10.0	EPA8270
Acenapthylene	U			10.0	µg/L	10.0	EPA8270
Anthracene	U			10.0	µg/L	10.0	EPA8270
Benzo(a)anthracene	U			10.0	µg/L	10.0	EPA8270
Benzo(a)pyrene	U			10.0	µg/L	10.0	EPA8270
Benzo(b)fluoranthene	U			10.0	µg/L	10.0	EPA8270
Benzo(g,h,i)perylene	U			10.0	µg/L	10.0	EPA8270
Benzo(k)fluoranthene	U			10.0	µg/L	10.0	EPA8270
Benzoic acid	U			50.0	µg/L	50.0	EPA8270
Benzyl alcohol	U			10.0	µg/L	10.0	EPA8270
Bis(2-chloroethoxy) methane	U			10.0	µg/L	10.0	EPA8270
Bis(2-chloroethyl) ether	U			10.0	µg/L	10.0	EPA8270
Bis(2-chloroisopropyl) ether	U			10.0	µg/L	10.0	EPA8270
Bis(2-ethylhexyl) phthalate	U	V		3.28	µg/L	10.0	EPA8270
Butyl benzyl phthalate	U			10.0	µg/L	10.0	EPA8270
Chrysene	U			10.0	µg/L	10.0	EPA8270
Di-n-butyl phthalate	U	V		1.71	µg/L	10.0	EPA8270
Di-n-octyl phthalate	U			10.0	µg/L	10.0	EPA8270
Dibenzo(a,h)anthracene	U			10.0	µg/L	10.0	EPA8270
Dibenzofuran	U			10.0	µg/L	10.0	EPA8270
Diethyl phthalate	J	E		1.03	µg/L	10.0	EPA8270
Dimethyl phthalate	U			10.0	µg/L	10.0	EPA8270
Fluoranthene	U			10.0	µg/L	10.0	EPA8270
Fluorene	U			10.0	µg/L	10.0	EPA8270
Hexachlorobenzene	U			10.0	µg/L	10.0	EPA8270
Hexachlorobutadiene	U			10.0	µg/L	10.0	EPA8270
Hexachlorocyclopentadiene	U			10.0	µg/L	10.0	EPA8270
Hexachloroethane	U			10.0	µg/L	10.0	EPA8270
Indeno(1.2.3-c.d)pyrene	U			10.0	µg/L	10.0	EPA8270
Isophorone	U			10.0	µg/L	10.0	EPA8270
N-Nitrosodi-n-propylamine	U			10.0	µg/L	10.0	EPA8270
N-Nitrosodiphenylamine	U			10.0	µg/L	10.0	EPA8270
Naphthalene	U			10.0	µg/L	10.0	EPA8270
Nitrobenzene	U			10.0	µg/L	10.0	EPA8270

SAMPLE NAME: AOBSBRB02E (continued) **Sample ID: 102678**

Constituent	RQ	AQ	BQ	Result	Unit	Q. Limit	Method
Semivolatiles							
Pentachlorophenol	U			50.0	µg/L	50.0	EPA8270
Phenanthrene	U			10.0	µg/L	10.0	EPA8270
Phenol	U			10.0	µg/L	10.0	EPA8270
Pyrene	U			10.0	µg/L	10.0	EPA8270
o-cresol (2-methylphenol)	U			10.0	µg/L	10.0	EPA8270
p-cresol (4-methylphenol)	U			10.0	µg/L	10.0	EPA8270
Volatiles							
1,1,1-Trichloroethane	U			5.00	µg/L	5.00	EPA8240
1,1,2,2-Tetrachloroethane	U			5.00	µg/L	5.00	EPA8240
1,1,2-Trichloroethane	U			5.00	µg/L	5.00	EPA8240
1,1-Dichloroethane	U			5.00	µg/L	5.00	EPA8240
1,1-Dichloroethene	U			5.00	µg/L	5.00	EPA8240
1,2-Dichloroethane	U			5.00	µg/L	5.00	EPA8240
1,2-Dichloroethene (total)	U			5.00	µg/L	5.00	EPA8240
1,2-Dichloropropane	U			5.00	µg/L	5.00	EPA8240
2-Butanone (MEK)				23.5	µg/L	10.0	EPA8240
2-Hexanone	U			10.0	µg/L	10.0	EPA8240
4-Methyl-2-pentanone	U			10.0	µg/L	10.0	EPA8240
Acetone		V		200	µg/L	10.0	EPA8240
Benzene	U			5.00	µg/L	5.00	EPA8240
Bromodichloromethane	U			5.00	µg/L	5.00	EPA8240
Bromoform	U			5.00	µg/L	5.00	EPA8240
Bromomethane (Methyl bromide)	U			10.0	µg/L	10.0	EPA8240
Carbon disulfide	U			5.00	µg/L	5.00	EPA8240
Carbon tetrachloride	U			5.00	µg/L	5.00	EPA8240
Chlorobenzene	U			5.00	µg/L	5.00	EPA8240
Chlorodibromomethane	U			5.00	µg/L	5.00	EPA8240
Chloroethane	U			10.0	µg/L	10.0	EPA8240
Chloroform	U			5.00	µg/L	5.00	EPA8240
Chloromethane (methyl chloride)	U			10.0	µg/L	10.0	EPA8240
Dichloromethane (methylene chloride)	U	V		5.27	µg/L	5.00	EPA8240
Ethylbenzene	U			5.00	µg/L	5.00	EPA8240
Styrene	U			5.00	µg/L	5.00	EPA8240
Tetrachloroethene	U			5.00	µg/L	5.00	EPA8240
Toluene	U			5.00	µg/L	5.00	EPA8240
Trichloroethene (TCE)	U			5.00	µg/L	5.00	EPA8240
Unknown	J	N		10.0	µg/L		EPA8240
Vinyl acetate	U			10.0	µg/L	10.0	EPA8240
Vinyl chloride	U			10.0	µg/L	10.0	EPA8240
Xylenes (total)	U			5.00	µg/L	5.00	EPA8240
cis-1,3-Dichloropropene	U			5.00	µg/L	5.00	EPA8240
trans-1,3-Dichloropropene	U			5.00	µg/L	5.00	EPA8240

SAMPLE NAME: AOBSBRB02E (continued) Sample ID: 102678

Constituent	RQ	AQ	BQ	Result	Unit	Q. Limit	Method
Pesticides/PCBs							
Aldrin	UJ	IO	L	0.0545	µg/L	0.0545	EPA8081
Aroclor 1016	UJ	IO	L	1.09	µg/L	1.09	EPA8081
Aroclor 1221	UJ	IO	L	2.18	µg/L	2.18	EPA8081
Aroclor 1232	UJ	IO	L	1.09	µg/L	1.09	EPA8081
Aroclor 1242	UJ	IO	L	1.09	µg/L	1.09	EPA8081
Aroclor 1248	UJ	IO	L	1.09	µg/L	1.09	EPA8081
Aroclor 1254	UJ	IO	L	1.09	µg/L	1.09	EPA8081
Aroclor 1260	UJ	IO	L	1.09	µg/L	1.09	EPA8081
Dieldrin	UJ	IO	L	0.109	µg/L	0.109	EPA8081
Endosulfan I	UJ	IO	L	0.0545	µg/L	0.0545	EPA8081
Endosulfan II	UJ	IO	L	0.109	µg/L	0.109	EPA8081
Endosulfan sulfate	UJ	IO	L	0.109	µg/L	0.109	EPA8081
Endrin	UJ	IO	L	0.109	µg/L	0.109	EPA8081
Endrin ketone	UJ	IO	L	0.109	µg/L	0.109	EPA8081
Heptachlor	UJ	IO	L	0.0545	µg/L	0.0545	EPA8081
Heptachlor epoxide	UJ	IO	L	0.0545	µg/L	0.0545	EPA8081
Methoxychlor (Mariate)	UJ	IO	L	0.545	µg/L	0.545	EPA8081
Toxaphene	UJ	IO	L	5.45	µg/L	5.45	EPA8081
alpha-Benzene hexachloride	UJ	IO	L	0.0545	µg/L	0.0545	EPA8081
alpha-Chlordane	UJ	IO	L	0.0545	µg/L	0.0545	EPA8081
beta-Benzene hexachloride	UJ	IO	L	0.0545	µg/L	0.0545	EPA8081
delta-Benzene hexachloride	UJ	IO	L	0.0545	µg/L	0.0545	EPA8081
gamma-Benzene hexachloride (Lindane)	UJ	IO	L	0.0545	µg/L	0.0545	EPA8081
gamma-Chlordane	UJ	IO	L	0.0545	µg/L	0.0545	EPA8081
p,p'-DDD	UJ	IO	L	0.109	µg/L	0.109	EPA8081
p,p'-DDE	UJ	IO	L	0.109	µg/L	0.109	EPA8081
p,p'-DDT	UJ	IO	L	0.109	µg/L	0.109	EPA8081
Radionuclides							
Gross Alpha	UI			0.900	pC/L	0.910	EPA900.0MOD
Non-volatile Beta	UI			0.520	pC/L	0.750	EPA900.0MOD

SAMPLE NAME: AOBSBTB01B Sample ID: 102699

Sample Type: Blank or Standard

Constituent	RQ	AQ	BQ	Result	Unit	Q. Limit	Method
Volatiles							
1,1,1-Trichloroethane	U			5.00	µg/L	5.00	EPA8240
1,1,2,2-Tetrachloroethane	U			5.00	µg/L	5.00	EPA8240
1,1,2-Trichloroethane	U			5.00	µg/L	5.00	EPA8240
1,1-Dichloroethane	U			5.00	µg/L	5.00	EPA8240
1,1-Dichloroethene	U			5.00	µg/L	5.00	EPA8240
1,2-Dichloroethane	U			5.00	µg/L	5.00	EPA8240
1,2-Dichloroethene (total)	U			5.00	µg/L	5.00	EPA8240
1,2-Dichloropropane	U			5.00	µg/L	5.00	EPA8240

SAMPLE NAME: AOBSBTB01B (continued) Sample ID: 102699

Constituent	RQ	AQ	BQ	Result	Unit	Q. Limit	Method
Volatiles							
2-Butanone (MEK)	U			10.0	µg/L	10.0	EPA8240
2-Hexanone	U			10.0	µg/L	10.0	EPA8240
4-Methyl-2-pentanone	U			10.0	µg/L	10.0	EPA8240
Acetone	U			10.0	µg/L	10.0	EPA8240
Benzene	U			5.00	µg/L	5.00	EPA8240
Bromodichloromethane	U			5.00	µg/L	5.00	EPA8240
Bromoform	U			5.00	µg/L	5.00	EPA8240
Bromomethane (Methyl bromide)	U			10.0	µg/L	10.0	EPA8240
Carbon disulfide	U			5.00	µg/L	5.00	EPA8240
Carbon tetrachloride	U			5.00	µg/L	5.00	EPA8240
Chlorobenzene	U			5.00	µg/L	5.00	EPA8240
Chlorodibromomethane	U			5.00	µg/L	5.00	EPA8240
Chloroethane	U			10.0	µg/L	10.0	EPA8240
Chloroform	U			5.00	µg/L	5.00	EPA8240
Chloromethane (methyl chloride)	U			10.0	µg/L	10.0	EPA8240
Dichloromethane (methylene chloride)	U	V		1.60	µg/L	5.00	EPA8240
Ethylbenzene	U			5.00	µg/L	5.00	EPA8240
Styrene	U			5.00	µg/L	5.00	EPA8240
Tetrachloroethene	U			5.00	µg/L	5.00	EPA8240
Toluene	U			5.00	µg/L	5.00	EPA8240
Trichloroethene (TCE)	U			5.00	µg/L	5.00	EPA8240
Vinyl acetate	U			10.0	µg/L	10.0	EPA8240
Vinyl chloride	U			10.0	µg/L	10.0	EPA8240
Xylenes (total)	U			5.00	µg/L	5.00	EPA8240
cis-1,3-Dichloropropene	U			5.00	µg/L	5.00	EPA8240
trans-1,3-Dichloropropene	U			5.00	µg/L	5.00	EPA8240

Appendix E: TIC KEY

Code	Constituent
AMSSB1	Aldol Condensate
AMSSB2	unknown
AMSSB3	Alkane
AMSSB4	Terpene
AMSSBS	Aromatic
AMSSB6	Chlorodifluoromethane
AMSSB7	Unknown Siloxane
AMSSB8	Unknown Hydrocarbon
AMSSB9	Unknown Silane

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APPENDIX C

BASELINE RISK ASSESSMENT

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APPENDIX C.l
STATISTICAL DATA SUMMARY REPORT

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WSRC-RP-97-102
JANUARY 1997

Statistical Data Summary Report

for the

716-A MOTOR SHOPS SEEPAGE BASIN

Prepared for
WESTINGHOUSE SAVANNAH RIVER COMPANY

Prepared by
Parsons Engineering Science, Inc.
1997 Centennial Drive, Building 2, Suite 101
Aiken, South Carolina 29803

January 1997

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APPENDIX C.1

COMPILATION OF SUMMARY STATISTICS FOR 716-A MOTOR SHOPS SEEPAGE BASIN

The following procedure was used to compile the summary statistics for the 716-A Motor Shops Seepage Basin site:

1. Soil data received:

Station	Depth (ft)	Description
ABKSB0101	0-1	Background
ABKSB0102	1-4	
ABKSB0201	0-1	
ABKSB0202	1-4	
ABKSB0301	0-1	
ABKSB0302	1-4	
ABKSB0401	0-1	
ABKSB0402	1-4	
ABKSB0501	0-1	
ABKSB0502	1-4	
ABKSB0601	0-1	
ABKSB0602	1-4	
AOBSB0101	0-1	On-site
AOBSB0102	1-4	
AOBSB0201	0-1	
AOBSB0202	1-4	
AOBSB0301	0-1	
AOBSB0302	1-4	
AOBSB0401	0-1	
AOBSB0402	1-4	
AOBSB0501	0-1	
AOBSB0502	1-4	
AOBSB0601	0-1	
AOBSB0602	1-4	

* No Quality Assurance/Quality Control samples were received.

2. The original analytical data received (file 716mastr.xls) used the estimated quantitation limit (EQL) value as the surrogate value for non-detects. Per WSRC's (Greg Rucker) instructions, the EQL value was to be replaced with the method detection limit (MDL) value from Table 4.1 from the Quality Control Summary Report (QCSR) (for non-detects only). As Table 4.1 had data from both Roy F. Weston, Inc. (WA), and General Engineering Laboratories (GEL), WSRC confirmed that the MDL data from Weston should be used and not the MDL data from General Engineering. The MDL from Weston was chosen because Weston was the primary laboratory used to analyze the samples and GEL served as the secondary laboratory. This procedure is standard protocol for the SRS Quality Control program.

a. Table 4.1 was copied directly from an electronic copy of the QCSR into an Excel® spreadsheet. The GEL data were then removed, leaving only the WA MDL values to be used for updating the analytical data.

b. The resulting MDL file was matched to the analytical data file, using analyte name as the matching key, and the result for non-detects was replaced with the corresponding MDL value.

3. Summary statistics were then compiled for detected chemicals grouped as follows:

- On-site, 0-1 ft
- On-site, 0-4 ft
- Background, 0-1 ft
- Background, 0-4 ft

a. For both on-site and background data, one-half the MDL value was used for calculation purposes for non-detects.

b. Resulting summary statistics are in file MSSB_SUM.XLS.

c. The statistics were derived as follows:

The distribution of sampling data for the soil was analyzed to determine whether the data were normally or lognormally distributed. If the data distributions indicated both normal and lognormal distributions, 95 percent upper confidence

limits (UCLs) of the mean were calculated for both untransformed (normal) and transformed (lognormal) data. To calculate the 95 percent UCL of the arithmetic mean for lognormally distributed data, the data were first transformed using the natural logarithm function (ln(x)). The arithmetic mean and standard deviation of the transformed data were calculated and the H-statistic was determined or interpolated (Gilbert 1987). When calculating the 95 percent UCL and mean, non-detected values were considered as one-half the MDL. The 95 percent UCL was calculated as follows for transformed data:

$$95\%\ UCL = e^{(\bar{x}+0.5s^2+sH/(n-1)^{0.5})}$$

where:

95% UCL = 95 percent upper confidence limit of mean

e = constant (base of the natural log, equal to 2.718)

$\bar{x}$ = arithmetic mean of the transformed data

s = standard deviation of the transformed data

H = H-statistic (from Table X in Gilbert 1987, or interpolated)

n = number of samples

To calculate the 95 percent UCL for normally distributed data, the arithmetic mean and standard deviation of the untransformed data were calculated, and the one-tailed student-t statistics were determined from Gilbert (1987). Nondetected values were considered as one-half the MDL for the 95 percent UCL calculations. The 95 percent UCL was then calculated for each chemical as follows for untransformed data:

$$95\%\ UCL = \bar{x}+t(s/(n^{0.5}))$$

where:

95% UCL = 95 percent upper confidence limit of the mean

$\bar{x}$ = arithmetic mean of the untransformed data

s = standard deviation of the untransformed data

t = one-tailed student-t statistic (from Gilbert 1987)

n = number of samples

To assure use of a conservative (i.e., health-protective) exposure-point concentration in risk assessment calculations, a tiered approach was adopted for determining that value. Key elements remained consistent throughout the approach. First, given that lognormality of data can be assumed for environmental media (USEPA, 1992- Calculating the Concentration Term), chemicals detected in over 50 percent of samples were log-transformed. Second, for chemicals detected in 25 percent up to 50 percent of samples, where the distribution of the data is not clear given the large number of non-detects, a comparison was made between untransformed and transformed data, with the more conservative value used. Finally, for chemicals with less than 25 percent detections (or with less than 5 samples), a distribution cannot be determined given the large number of non-detects and log-transformation was inappropriate, therefore, the maximum detected concentration was used as the exposure-point concentration. The following rationale was used in the derivation of media-specific exposure-point concentrations.

Reasonable Maximum Exposure (RME) Exposure-Point Concentration

1. For chemicals detected in 50 percent or more of the samples, the 95 percent UCL of the log-transformed data was compared to the maximum detected concentration, and the lesser value was used as the exposure-point concentration.

2. For chemicals detected in 25 percent or more, but less than 50 percent, of the samples, the 95 percent UCL from the untransformed data was compared to the 95 percent UCL from the transformed data. The greater of these two values was then compared to the maximum detected concentration, and the lesser value of this second comparison was used as the exposure-point concentration.

3. For chemicals detected in fewer than 25 percent of the samples or with less than five total samples, the maximum detected concentration was used as the exposure-point concentration.

Savannah River/Motor Shops Seepage Basin
Statistical Summary

Media: Surface Soil (0-1 ft)

Class	Analyte	Freq of Detect	Units	Max Detect	Mean	Standard Deviation	95% UCL	Log Mean	Log 95% UCL	CT EP Conc	RME EP Conc
Volatiles	1,1,1-Trichloroethane	4 / 5	mg/kg	1.03E-02	5.16E-03	3.88E-03	8.85E-03	3.47E-03	2.21E-01	3.47E-03	1.03E-02
	Tetrachloroethene	5 / 5	mg/kg	1.31E-02	6.97E-03	4.48E-03	1.12E-02	5.68E-03	3.34E-02	5.68E-03	1.31E-02
Semi-Vols	Acenapthene	1 / 6	mg/kg	1.00E-01	2.29E-02	3.78E-02	5.40E-02	1.15E-02	1.56E-01	2.29E-02	1.00E-01
	Aldol condensate	4 / 4	mg/kg	7.00E-01	5.25E-01	1.71E-01	7.26E-01	5.01E-01	1.02E+00	5.01E-01	7.00E-01
	Anthracene	1 / 6	mg/kg	2.30E-01	4.50E-02	9.06E-02	1.20E-01	1.40E-02	9.94E-01	4.50E-02	2.30E-01
	Aromatic	1 / 1	mg/kg	2.00E-01	2.00E-01	--	--	2.00E-01	--	2.00E-01	2.00E-01
	Benzo(a)anthracene	1 / 6	mg/kg	5.03E-01	9.22E-02	2.01E-01	2.58E-01	1.92E-02	5.99E+00	9.22E-02	5.03E-01
	Benzo(a)pyrene	1 / 6	mg/kg	4.10E-01	7.83E-02	1.62E-01	2.12E-01	2.16E-02	2.36E+00	7.83E-02	4.10E-01
	Benzo(b)fluoranthene	2 / 6	mg/kg	4.10E-01	8.70E-02	1.60E-01	2.18E-01	2.79E-02	4.18E+00	8.70E-02	4.10E-01
	Benzo(g,h,i)perylene	1 / 6	mg/kg	2.67E-01	5.12E-02	1.06E-01	1.38E-01	1.44E-02	1.48E+00	5.12E-02	2.67E-01
	Benzo(k)fluoranthene	2 / 6	mg/kg	3.66E-01	7.57E-02	1.43E-01	1.93E-01	2.49E-02	2.53E+00	7.57E-02	3.66E-01
	Chrysene	2 / 6	mg/kg	5.34E-01	1.05E-01	2.11E-01	2.79E-01	2.52E-02	1.24E+01	1.05E-01	5.34E-01
	Dibenzofuran	1 / 6	mg/kg	5.98E-02	1.66E-02	2.11E-02	3.40E-02	1.12E-02	5.76E-02	1.66E-02	5.98E-02
	Fluoranthene	2 / 6	mg/kg	1.10E+00	1.98E-01	4.42E-01	5.62E-01	2.75E-02	1.00E+02	1.98E-01	1.10E+00
	Fluorene	1 / 6	mg/kg	1.02E-01	2.37E-02	3.84E-02	5.52E-02	1.22E-02	1.52E-01	2.37E-02	1.02E-01
	Indeno(1,2,3-c,d)pyrene	1 / 6	mg/kg	2.22E-01	4.45E-02	8.70E-02	1.16E-01	1.54E-02	7.57E-01	4.45E-02	2.22E-01
	Phenanthrene	1 / 6	mg/kg	9.48E-01	1.64E-01	3.84E-01	4.80E-01	1.68E-02	9.86E+01	1.64E-01	9.48E-01
	Pyrene	2 / 6	mg/kg	8.95E-01	1.63E-01	3.59E-01	4.58E-01	2.75E-02	3.45E+01	1.63E-01	8.95E-01
Pest/PCBs	Aroclor 1260	2 / 6	mg/kg	6.76E-02	2.39E-02	2.89E-02	4.77E-02	1.22E-02	4.10E-01	2.39E-02	6.76E-02
Metals	Aluminum	6 / 6	mg/kg	4.27E+03	3.64E+03	4.71E+02	4.03E+03	3.62E+03	4.10E+03	3.62E+03	4.10E+03
	Arsenic	2 / 6	mg/kg	1.70E+00	8.87E-01	5.23E-01	1.32E+00	7.80E-01	1.71E+00	8.87E-01	1.70E+00
	Barium	6 / 6	mg/kg	3.49E+01	1.84E+01	8.57E+00	2.54E+01	1.71E+01	2.82E+01	1.71E+01	2.82E+01
	Beryllium	4 / 6	mg/kg	2.30E-01	9.28E-02	7.93E-02	1.58E-01	6.05E-02	1.17E+00	6.05E-02	2.30E-01
	Cadmium	6 / 6	mg/kg	1.50E+00	4.69E-01	5.31E-01	9.06E-01	2.75E-01	7.45E+00	2.75E-01	1.50E+00
	Calcium	6 / 6	mg/kg	2.71E+02	1.09E+02	8.20E+01	1.76E+02	9.06E+01	2.53E+02	9.06E+01	2.53E+02
	Chromium	6 / 6	mg/kg	7.20E+00	4.97E+00	1.54E+00	6.24E+00	4.76E+00	6.99E+00	4.76E+00	6.99E+00
	Cobalt	6 / 6	mg/kg	7.74E-01	6.08E-01	1.69E-01	7.47E-01	5.86E-01	8.36E-01	5.86E-01	7.74E-01
	Copper	6 / 6	mg/kg	1.21E+01	5.08E+00	3.78E+00	8.19E+00	4.13E+00	1.41E+01	4.13E+00	1.21E+01
	Cyanide	1 / 6	mg/kg	2.70E-01	7.83E-02	9.39E-02	1.56E-01	5.50E-02	2.45E-01	7.83E-02	2.70E-01
	Iron	6 / 6	mg/kg	3.50E+03	2.17E+03	7.01E+02	2.74E+03	2.09E+03	2.89E+03	2.09E+03	2.89E+03

Savannah River/Motor Shops Seepage Basin
Statistical Summary

Media: Surface Soil (0-1 ft)

Class	Analyte	Freq of Detect	Units	Max Detect	Mean	Standard Deviation	95% UCL	Log Mean	Log 95% UCL	CT EP Conc	RME EP Conc
	Lead	6 / 6	mg/kg	1.30E+01	7.80E+00	3.67E+00	1.08E+01	6.92E+00	1.70E+01	6.92E+00	1.30E+01
	Magnesium	6 / 6	mg/kg	1.15E+02	7.31E+01	2.21E+01	9.12E+01	7.07E+01	9.53E+01	7.07E+01	9.53E+01
	Manganese	6 / 6	mg/kg	6.99E+01	2.54E+01	2.30E+01	4.43E+01	1.96E+01	7.47E+01	1.96E+01	6.99E+01
	Mercury	6 / 6	mg/kg	5.60E-02	2.77E-02	1.44E-02	3.95E-02	2.54E-02	4.40E-02	2.54E-02	4.40E-02
	Nickel	6 / 6	mg/kg	2.40E+00	1.65E+00	4.46E-01	2.02E+00	1.60E+00	2.13E+00	1.60E+00	2.13E+00
	Potassium	6 / 6	mg/kg	1.41E+02	7.48E+01	3.42E+01	1.03E+02	6.98E+01	1.14E+02	6.98E+01	1.14E+02
	Sodium	4 / 6	mg/kg	2.43E+01	1.57E+01	7.89E+00	2.22E+01	1.37E+01	3.64E+01	1.37E+01	2.43E+01
	Vanadium	6 / 6	mg/kg	8.10E+00	5.98E+00	1.36E+00	7.10E+00	5.86E+00	7.42E+00	5.86E+00	7.42E+00
	Zinc	6 / 6	mg/kg	6.46E+01	1.94E+01	2.26E+01	3.80E+01	1.24E+01	1.35E+02	1.24E+01	6.46E+01
Rads	Gross Alpha	3 / 6	pCi/g	1.46E+01	6.75E+00	6.06E+00	1.17E+01	4.61E+00	4.26E+01	4.61E+00	1.46E+01
	Nonvolatile Beta	3 / 6	pCi/g	1.59E+01	8.81E+00	5.41E+00	1.33E+01	7.63E+00	1.84E+01	7.63E+00	1.59E+01
Misc	Total Organic Carbon	6 / 6	mg/kg	6.70E+03	3.73E+03	1.54E+03	4.99E+03	3.52E+03	5.39E+03	3.52E+03	5.39E+03
	Total petroleum hydrocarbons	5 / 6	mg/kg	5.30E+02	1.81E+02	2.33E+02	3.73E+02	5.14E+01	1.39E+06	5.14E+01	5.30E+02

Savannah River/Motor Shops Seepage Basin
Statistical Summary

Media: Subsurface Soil (0-4 ft)

Class	Analyte	Freq of Detect	Units	Max Detect	Mean	Standard Deviation	95% UCL	Log Mean	Log 95% UCL	CT EP Conc	RME EP Conc
Volatiles	1,1,1-Trichloroethane	8 / 11	mg/kg	1.03E-02	3.58E-03	3.32E-03	5.39E-03	2.13E-03	1.43E-02	2.13E-03	1.03E-02
	Tetrachloroethene	11 / 11	mg/kg	1.31E-02	5.83E-03	3.71E-03	7.86E-03	4.85E-03	9.68E-03	4.85E-03	9.68E-03
Semi-Vols	Acenapthene	1 / 12	mg/kg	1.00E-01	1.52E-02	2.67E-02	2.91E-02	9.31E-03	2.16E-02	1.52E-02	1.00E-01
	Aldol condensate	6 / 6	mg/kg	7.00E-01	4.50E-01	1.76E-01	5.95E-01	4.22E-01	6.91E-01	4.22E-01	6.91E-01
	Anthracene	1 / 12	mg/kg	2.30E-01	2.65E-02	6.41E-02	5.97E-02	1.06E-02	3.91E-02	2.65E-02	2.30E-01
	Aromatic	1 / 1	mg/kg	2.00E-01	2.00E-01	--	--	2.00E-01	--	2.00E-01	2.00E-01
	Benzo(a)anthracene	1 / 12	mg/kg	5.03E-01	5.11E-02	1.42E-01	1.25E-01	1.39E-02	7.72E-02	5.11E-02	5.03E-01
	Benzo(a)pyrene	1 / 12	mg/kg	4.10E-01	4.52E-02	1.15E-01	1.05E-01	1.61E-02	6.71E-02	4.52E-02	4.10E-01
	Benzo(b)fluoranthene	2 / 12	mg/kg	4.10E-01	4.93E-02	1.15E-01	1.09E-01	1.79E-02	9.34E-02	4.93E-02	4.10E-01
	Benzo(g,h,i)perylene	1 / 12	mg/kg	2.67E-01	2.96E-02	7.48E-02	6.83E-02	1.07E-02	4.39E-02	2.96E-02	2.67E-01
	Benzo(k)fluoranthene	2 / 12	mg/kg	3.66E-01	4.34E-02	1.02E-01	9.63E-02	1.65E-02	7.51E-02	4.34E-02	3.66E-01
	Chrysene	2 / 12	mg/kg	5.34E-01	5.73E-02	1.51E-01	1.35E-01	1.55E-02	1.15E-01	5.73E-02	5.34E-01
	Dibenzofuran	1 / 12	mg/kg	5.98E-02	1.23E-02	1.50E-02	2.01E-02	9.46E-03	1.66E-02	1.23E-02	5.98E-02
	Fluoranthene	2 / 12	mg/kg	1.10E+00	1.04E-01	3.14E-01	2.66E-01	1.61E-02	2.10E-01	1.04E-01	1.10E+00
	Fluorene	1 / 12	mg/kg	1.02E-01	1.58E-02	2.71E-02	2.99E-02	9.89E-03	2.24E-02	1.58E-02	1.02E-01
	Indeno(1,2,3-c,d)pyrene	1 / 12	mg/kg	2.22E-01	2.68E-02	6.15E-02	5.86E-02	1.18E-02	3.92E-02	2.68E-02	2.22E-01
	Phenanthrene	1 / 12	mg/kg	9.48E-01	8.59E-02	2.71E-01	2.27E-01	1.12E-02	1.41E-01	8.59E-02	9.48E-01
	Pyrene	2 / 12	mg/kg	8.95E-01	8.67E-02	2.55E-01	2.19E-01	1.70E-02	1.58E-01	8.67E-02	8.95E-01
Pest/PCBs	Aroclor 1260	2 / 12	mg/kg	6.76E-02	1.47E-02	2.17E-02	2.60E-02	8.20E-03	2.79E-02	1.47E-02	6.76E-02
Metals	Aluminum	12 / 12	mg/kg	8.51E+03	4.62E+03	1.88E+03	5.59E+03	4.29E+03	5.96E+03	4.29E+03	5.96E+03
	Antimony	2 / 12	mg/kg	2.00E+00	3.81E-01	5.43E-01	6.63E-01	2.44E-01	6.23E-01	3.81E-01	2.00E+00
	Arsenic	6 / 12	mg/kg	2.20E+00	1.07E+00	5.82E-01	1.37E+00	9.30E-01	1.57E+00	9.30E-01	1.57E+00
	Barium	12 / 12	mg/kg	3.49E+01	1.98E+01	7.65E+00	2.38E+01	1.85E+01	2.54E+01	1.85E+01	2.54E+01
	Beryllium	9 / 12	mg/kg	3.52E-01	1.49E-01	1.24E-01	2.13E-01	8.99E-02	6.34E-01	8.99E-02	3.52E-01
	Cadmium	11 / 12	mg/kg	1.50E+00	3.23E-01	4.08E-01	5.34E-01	1.80E-01	1.09E+00	1.80E-01	1.09E+00
	Calcium	12 / 12	mg/kg	2.71E+02	1.00E+02	6.05E+01	1.32E+02	8.89E+01	1.37E+02	8.89E+01	1.37E+02
	Chromium	12 / 12	mg/kg	7.20E+00	5.00E+00	1.51E+00	5.78E+00	4.76E+00	6.17E+00	4.76E+00	6.17E+00
	Cobalt	12 / 12	mg/kg	1.50E+00	7.97E-01	3.07E-01	9.56E-01	7.45E-01	1.01E+00	7.45E-01	1.01E+00
	Copper	12 / 12	mg/kg	1.21E+01	3.70E+00	2.97E+00	5.24E+00	3.01E+00	5.76E+00	3.01E+00	5.76E+00
	Cyanide	2 / 12	mg/kg	2.70E-01	6.50E-02	6.76E-02	1.00E-01	5.10E-02	9.21E-02	6.50E-02	2.70E-01

Savannah River/Motor Shops Seepage Basin
Statistical Summary

Media: Subsurface Soil (0-4 ft)

Class	Analyte	Freq of Detect	Units	Max Detect	Mean	Standard Deviation	95% UCL	Log Mean	Log 95% UCL	CT EP Conc	RME EP Conc
	Iron	12 / 12	mg/kg	4.80E+03	2.59E+03	1.01E+03	3.11E+03	2.42E+03	3.29E+03	2.42E+03	3.29E+03
	Lead	11 / 11	mg/kg	1.30E+01	6.54E+00	3.17E+00	8.27E+00	5.83E+00	9.56E+00	5.83E+00	9.56E+00
	Magnesium	12 / 12	mg/kg	1.15E+02	7.88E+01	2.19E+01	9.02E+01	7.60E+01	9.34E+01	7.60E+01	9.34E+01
	Manganese	12 / 12	mg/kg	6.99E+01	2.52E+01	1.79E+01	3.45E+01	2.11E+01	3.75E+01	2.11E+01	3.75E+01
	Mercury	12 / 12	mg/kg	5.60E-02	2.99E-02	0.01316	3.67E-02	2.77E-02	3.81E-02	2.77E-02	3.81E-02
	Nickel	12 / 12	mg/kg	2.60E+00	1.85E+00	5.42E-01	2.13E+00	1.78E+00	2.22E+00	1.78E+00	2.22E+00
	Potassium	12 / 12	mg/kg	1.41E+02	8.28E+01	3.14E+01	9.91E+01	7.71E+01	1.07E+02	7.71E+01	1.07E+02
	Sodium	9 / 12	mg/kg	2.70E+01	1.68E+01	7.07E+00	2.04E+01	1.50E+01	2.46E+01	1.50E+01	2.46E+01
	Vanadium	12 / 12	mg/kg	1.25E+01	6.95E+00	2.63E+00	8.32E+00	6.49E+00	8.95E+00	6.49E+00	8.95E+00
	Zinc	12 / 12	mg/kg	6.46E+01	1.45E+01	1.69E+01	2.33E+01	9.60E+00	3.21E+01	9.60E+00	3.21E+01
Rads	Gross Alpha	8 / 12	pCi/g	1.46E+01	7.66E+00	4.88E+00	1.02E+01	5.87E+00	1.61E+01	5.87E+00	1.46E+01
	Nonvolatile Beta	6 / 12	pCi/g	1.59E+01	8.41E+00	4.57E+00	1.08E+01	7.45E+00	1.16E+01	7.45E+00	1.16E+01
Misc	Total Organic Carbon	12 / 12	mg/kg	6.70E+03	2.22E+03	1.90E+03	3.20E+03	1.51E+03	5.65E+03	1.51E+03	5.65E+03
	Total petroleum hydrocarbons	9 / 12	mg/kg	5.30E+02	1.03E+02	1.79E+02	1.96E+02	2.29E+01	3.18E+03	2.29E+01	5.30E+02

Savannah River/Motor Shops Seepage Basin
Statistical Summary

Media: Background Surface Soil (0-1 ft)

Class	Analyte	Freq of Detect	Units	Max Detect	Mean	2x Mean
Volatiles	1,1,1-Trichloroethane	5 / 5	mg/kg	1.13E-02	6.62E-03	1.32E-02
	Tetrachloroethene	5 / 5	mg/kg	1.30E-02	1.04E-02	2.07E-02
	Toluene	1 / 5	mg/kg	2.23E-03	1.03E-03	2.05E-03
	Xylenes (total)	2 / 5	mg/kg	3.50E-03	1.40E-03	2.81E-03
Semi-Vols	Aldol condensate	2 / 2	mg/kg	7.00E-01	5.00E-01	1.00E+00
	Anthracene	1 / 6	mg/kg	3.68E-02	1.28E-02	2.56E-02
	Benzo(a)anthracene	2 / 6	mg/kg	1.17E-01	3.45E-02	6.91E-02
	Benzo(a)pyrene	2 / 6	mg/kg	1.13E-01	3.56E-02	7.11E-02
	Benzo(b)fluoranthene	2 / 6	mg/kg	1.04E-01	3.46E-02	6.91E-02
	Benzo(g,h,i)perylene	1 / 6	mg/kg	6.98E-02	1.83E-02	3.66E-02
	Benzo(k)fluoranthene	2 / 6	mg/kg	1.08E-01	3.74E-02	7.48E-02
	Chrysene	2 / 6	mg/kg	1.58E-01	4.64E-02	9.27E-02
	Fluoranthene	2 / 6	mg/kg	2.49E-01	6.70E-02	1.34E-01
	Indeno(1,2,3-c,d)pyrene	1 / 6	mg/kg	6.61E-02	1.85E-02	3.70E-02
	Phenanthrene	1 / 6	mg/kg	1.72E-01	3.49E-02	6.98E-02
	Pyrene	2 / 6	mg/kg	2.04E-01	5.85E-02	1.17E-01
	Terpene	2 / 2	mg/kg	1.00E+00	6.00E-01	1.20E+00
Pest/PCBs	p,p'-DDE	1 / 6	mg/kg	5.88E-03	1.36E-03	2.71E-03
	p,p'-DDT	1 / 6	mg/kg	4.78E-03	1.26E-03	2.51E-03
Metals	Aluminum	6 / 6	mg/kg	9.99E+03	5.78E+03	1.16E+04
	Antimony	2 / 6	mg/kg	7.24E-01	3.47E-01	6.94E-01
	Arsenic	4 / 6	mg/kg	5.00E+00	2.25E+00	4.50E+00
	Barium	6 / 6	mg/kg	2.47E+01	1.76E+01	3.52E+01
	Beryllium	5 / 6	mg/kg	2.74E-01	1.63E-01	3.26E-01
	Cadmium	6 / 6	mg/kg	9.72E-01	3.27E-01	6.55E-01
	Calcium	6 / 6	mg/kg	2.81E+03	6.37E+02	1.27E+03
	Chromium	6 / 6	mg/kg	2.55E+01	1.04E+01	2.09E+01
	Cobalt	6 / 6	mg/kg	1.30E+00	9.69E-01	1.94E+00
	Copper	6 / 6	mg/kg	4.00E+00	2.42E+00	4.83E+00
	Iron	6 / 6	mg/kg	2.07E+04	7.87E+03	1.57E+04

Savannah River/Motor Shops Seepage Basin
Statistical Summary

Media: Background Surface Soil (0-1 ft)

Class	Analyte	Freq of Detect	Units	Max Detect	Mean	2x Mean
	Lead	6 / 6	mg/kg	1.30E+01	6.72E+00	1.34E+01
	Magnesium	6 / 6	mg/kg	4.67E+02	1.55E+02	3.09E+02
	Manganese	6 / 6	mg/kg	2.39E+02	1.18E+02	2.36E+02
	Mercury	5 / 6	mg/kg	3.90E-02	2.09E-02	4.18E-02
	Nickel	6 / 6	mg/kg	2.30E+00	1.78E+00	3.57E+00
	Potassium	6 / 6	mg/kg	1.91E+02	8.84E+01	1.77E+02
	Sodium	5 / 6	mg/kg	3.95E+01	2.01E+01	4.02E+01
	Vanadium	6 / 6	mg/kg	5.01E+01	1.99E+01	3.98E+01
	Zinc	6 / 6	mg/kg	3.09E+01	1.22E+01	2.44E+01
Rads	Gross Alpha	5 / 6	pCi/g	2.72E+01	1.27E+01	2.54E+01
	Nonvolatile Beta	3 / 6	pCi/g	1.85E+01	1.00E+01	2.01E+01
Misc	Total Organic Carbon	6 / 6	mg/kg	6.86E+03	3.95E+03	7.90E+03
	Total petroleum hydrocarbons	4 / 6	mg/kg	7.56E+01	2.34E+01	4.69E+01

Savannah River/Motor Shops Seepage Basin
Statistical Summary

Media: Background Subsurface Soil (0-4 ft)

Class	Analyte	Freq of Detect	Units	Max Detect	Mean	2x Mean
Volatiles	1,1,1-Trichloroethane	8 / 11	mg/kg	1.13E-02	4.03E-03	8.06E-03
	Tetrachloroethene	11 / 11	mg/kg	1.30E-02	7.10E-03	1.42E-02
	Toluene	2 / 11	mg/kg	2.23E-03	9.58E-04	1.92E-03
	Xylenes (total)	3 / 11	mg/kg	3.50E-03	1.25E-03	2.49E-03
Semi-Vols	Aldol condensate	6 / 6	mg/kg	8.00E-01	5.67E-01	1.13E+00
	Anthracene	1 / 12	mg/kg	3.68E-02	1.04E-02	2.08E-02
	Benzo(a)anthracene	2 / 12	mg/kg	1.17E-01	2.23E-02	4.45E-02
	Benzo(a)pyrene	2 / 12	mg/kg	1.13E-01	2.38E-02	4.76E-02
	Benzo(b)fluoranthene	2 / 12	mg/kg	1.04E-01	2.30E-02	4.61E-02
	Benzo(g,h,i)perylene	1 / 12	mg/kg	6.98E-02	1.32E-02	2.63E-02
	Benzo(k)fluoranthene	2 / 12	mg/kg	1.08E-01	2.42E-02	4.84E-02
	Chrysene	2 / 12	mg/kg	1.58E-01	2.79E-02	5.59E-02
	Fluoranthene	2 / 12	mg/kg	2.49E-01	3.83E-02	7.65E-02
	Indeno(1,2,3-c,d)pyrene	1 / 12	mg/kg	6.61E-02	1.38E-02	2.75E-02
	Phenanthrene	1 / 12	mg/kg	1.72E-01	2.12E-02	4.24E-02
	Pyrene	2 / 12	mg/kg	2.04E-01	3.45E-02	6.90E-02
	Terpene	3 / 3	mg/kg	2.00E+00	1.07E+00	2.13E+00
Pest/PCBs	p,p'-DDE	1 / 12	mg/kg	5.88E-03	9.03E-04	1.81E-03
	p,p'-DDT	1 / 12	mg/kg	4.78E-03	9.03E-04	1.81E-03
Metals	Aluminum	12 / 12	mg/kg	1.62E+04	7.87E+03	1.57E+04
	Antimony	5 / 12	mg/kg	9.49E-01	3.74E-01	7.48E-01
	Arsenic	9 / 12	mg/kg	5.90E+00	2.56E+00	5.13E+00
	Barium	12 / 12	mg/kg	4.39E+01	2.17E+01	4.35E+01
	Beryllium	11 / 12	mg/kg	4.07E-01	2.10E-01	4.21E-01
	Cadmium	11 / 12	mg/kg	9.72E-01	3.27E-01	6.54E-01
	Calcium	12 / 12	mg/kg	2.81E+03	4.46E+02	8.92E+02
	Chromium	12 / 12	mg/kg	2.74E+01	1.18E+01	2.36E+01
	Cobalt	12 / 12	mg/kg	2.00E+00	1.15E+00	2.30E+00
	Copper	12 / 12	mg/kg	4.00E+00	2.62E+00	5.23E+00
	Iron	12 / 12	mg/kg	2.38E+04	9.31E+03	1.86E+04

Savannah River/Motor Shops Seepage Basin
Statistical Summary

Media: Background Subsurface Soil (0-4 ft)

Class	Analyte	Freq of Detect	Units	Max Detect	Mean	2x Mean
	Lead	12 / 12	mg/kg	1.30E+01	6.60E+00	1.32E+01
	Magnesium	12 / 12	mg/kg	4.67E+02	1.47E+02	2.95E+02
	Manganese	12 / 12	mg/kg	2.39E+02	8.28E+01	1.66E+02
	Mercury	10 / 12	mg/kg	8.30E-02	3.37E-02	6.73E-02
	Nickel	12 / 12	mg/kg	4.00E+00	2.18E+00	4.36E+00
	Potassium	12 / 12	mg/kg	1.91E+02	9.43E+01	1.89E+02
	Sodium	11 / 12	mg/kg	7.16E+01	2.43E+01	4.85E+01
	Vanadium	12 / 12	mg/kg	5.98E+01	2.29E+01	4.58E+01
	Zinc	12 / 12	mg/kg	3.09E+01	8.69E+00	1.74E+01
Rads	Gross Alpha	9 / 12	pCi/g	2.72E+01	1.24E+01	2.49E+01
	Nonvolatile Beta	8 / 12	pCi/g	1.85E+01	9.89E+00	1.98E+01
Misc	Total Organic Carbon	12 / 12	mg/kg	6.86E+03	2.90E+03	5.80E+03
	Total petroleum hydrocarbons	6 / 12	mg/kg	7.56E+01	1.65E+01	3.30E+01

APPENDIX C.2
AIR MODELING - PARTICULATES

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Appendix C.2
Air Modeling - Particulates

The approach for estimating inhalation exposures to particulates released for soil in this BRA was to convert the chemical concentrations in soil to dust concentrations in air using simplified soil-to-air transmission relations specified by EPA guidance (USEPA, 1991).

Soil concentrations are multiplied by the Particulate Emissions Factor (PEF), to estimate the concentration of chemicals that will be available for inhalation on resuspended soil particles in the air. The PEF depends on physical features of the soil and site that affect the resuspension of soil particles. This is a simplified resuspension model, but it is adequate for the needs of the BRA and conforms to USEPA recommendations. USEPA provides default assumptions that were used for most parameters in this BRA (USEPA, 1991).

$$\text{Particulate emission factor (PEF)} = \frac{LS \times V \times DH \times CFa \times CFb}{A \times RF \times (1-G) \times \left(\frac{Um}{Ut}\right)^3 \times Fx}$$

Width of contaminated area (LS) =	(site specific) meters
Wind speed in mixing zone (V) =	2.25 meters/sec
Diffusion height (DH) =	2.00 meters
Area of contamination (A) =	(site specific) meters^2
Respirable fraction (RF) =	0.036 g/meters^2-hr
Fraction of vegetative cover (G) =	0.25 unitless
Mean annual wind speed (Urn) =	4.5 meters/sec
Equivalent threshold value of wind speed at 10 m (Ut) =	12.80 meters/sec
Fraction dependent on Um/Ut (Fx) =	0.0497

The USEPA default parameters were adopted in most cases for the inputs to the model equations. Site specific parameters include the width of the contaminated area (LS) which was 10 meters for the MSSB. The site specific area of contamination (A) was 685.0 meters*. The PEF calculated for the MSSB was 4.06E+9 m^3/kg. The derivation of the values used for the soil concentrations are presented with the risk and hazard calculations in Appendices C.4 through C.6.

REFERENCES

USEPA, 1991. Risk Assessment Guidance for Superfund. Volume 1 - Human Health Evaluation Manual (Part B, Development of Risk Based Preliminary Remediation Goals). Office of Emergency and Remedial Response.

APPENDIX C.3
HUMAN HEALTH EXPOSURE PARAMETERS

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Appendix C.3
Human Health Exposure Parameters

Intake Parameters

The values used for the RME exposure parameters and the guidance they are based on are presented in Table C.3-1 through C.3-5 and the tables in Appendix D. Some exposure parameters, such as body weight (BW) and averaging time (AT), have general application in all intake estimations. Other parameters, such as ingestion rates (IR_o) and inhalation rates (IR_i) and skin surface area (SA), are specific to the exposure pathway. Exposure time, frequency, and duration estimate the total time a receptor may be exposed to a contaminated medium. Exposure time (ET) is the number of hours per day that a receptor is present at a specific exposure point. Exposure frequency (EF) is the number of days per year that the exposure occurs, and exposure duration (ED) is the number of years which exposure occurs.

Known On-Unit Worker

Under an actual land use scenario, the known on-unit worker is an individual who comes to the unit on an infrequent or occasional basis, such as a researcher associated with an organization that uses SRS as an outdoor laboratory. Table C.3-1 provides the RME exposure parameters for this receptor. The ED for this worker is assumed to be five years, a reasonable maximum length of time for an individual to work on a scientific study. An EF of six days per year, or once every other month, is used in conjunction with an ET of four hours for exposure to soils. The average (default) adult BW of 70 kg (154 lbs) is used for the worker. For exposure to contaminants in the air, the inhalation rate of 2.5 m^3/hr is used, based on a reasonable upper-bound inhalation rate of 20 $m^3/8$ hour workday (EPA, 1991a) for an adult male working at a moderate level of activity (i.e., 20 $m^3/d \div 8$ hours/d = 2.5 m^3/hr).

The skin surface area of 3200 cm^2 (i.e., 50^{th} percentile value for heads, hands, and forearms) (EPA, 1992) is used to assess exposure of known on-unit workers via dermal contact with soil. The adherence factor (AF) for soil is 1 .0 mg/cm^2, which is considered appropriate for evaluation of RME value intake assumptions (EPA, 1995).

Different dermal absorption factors (ABS) for soil are used for organic and inorganic COPCs: 1 .O percent for organics and 0.1 percent for inorganics (EPA, 1995). The assumed oral IR (Ir_o) for the known on-unit worker is 50 mg/d. This value is suggested by EPA as the standard default value for adult soil ingestion in the workplace (EPA, 199 la). The fraction ingested (FI) from a contaminated source is 1 .O, a conservative estimate that all soil ingested is from the contaminated source.

Hypothetical On-Unit Industrial Worker

The RME exposure parameters for the hypothetical on-unit worker under a future scenario are presented in Table C.3-2. The ED for this worker is assumed to be 25 years, which represents the national upper-bound (95^{th} percentile) time working at the same location (EPA, 1991a). An EF of 250 days/year is assumed for the hypothetical on-unit industrial worker. Exposure time assumed for inhalation of particulates from soil is 8 hours/day based on the amount of time the worker is assumed to spend at the unit. This exposure time is a worst case estimate because it assumes that the particulate concentration indoors is equal to the concentration outdoors. The average (default) adult I3 W of 70 kg (154 lbs) is used for the worker. For exposure to contaminants in the air, the inhalation rate of 2.5 m^3/hr is used, based on a reasonable upper-bound inhalation rate of 20 m^3/8 hour workday (EPA, 1991 a) for an adult male working at a moderate level of activity (i.e., 20 $m^3/d \div 8$ hours/d = 2.5 m^3/hr).

The skin surface area of 3200 cm^2 (i.e., 50^{th} percentile value for heads, hands, and forearms) (EPA, 1992) is used to asses exposure of industrial workers via dermal contact with soil. The adherence factor (AF) for soil is 1.0 mg/cm^2, which is considered appropriate for evaluation of RME value intake assumptions (EPA, 1995). Dermal absorption factors (ABS) used for soil are 1 .O percent for organics and 0.1 percent for inorganics (EPA, 1995). The assumed oral IR (IR_o) for the known on-unit worker is 50 mg/d. The fraction ingested (FI) from a contaminated source is 1 .0, a conservative estimate that all soil ingested is from the contaminated source.

Hypothetical On-Unit Resident

The RME exposure parameters for the hypothetical on-unit resident under a future scenario are presented in Table C.3-3 and C.3-4. The ED for the resident is assumed to be 30 years, representing the national upper-bound (90^{th} percentile) time spent at one residence (EPA, 1991a). Residential ED is apportioned between adulthood and childhood exposure, with 24 years as an adult and six years as a child. An EF of 350/days is assumed for the resident. ETs assumed for inhalation of particulates from soil are 15 hours/day (adult) and 18 hours/day (child) based on average time spent at home as reported in time use studies (EPA, 1990). Particulate concentrations indoors and outdoors are assumed to be equal.

The BW values are the average weight over the exposure period: 70 kg (154 lbs) for adult and 15 kg (33 lbs for child (EPA, 1991a). In accordance with EPA guidance (EPA, 199 la) an adult body weight is used to calculate intake for older children and adults. An IR_i of 0.83 m^3/hr (i.e., 20 $m^3/d \div$ 24 hours/d) for outdoor activities is used for adult receptors in the future residential scenario (EPA, 1991a). This value represents the reasonable upper-bound IR_i over an entire day for indoor and outdoor activities, including periods of rest and light, moderate and heavy activity. The corresponding IR_i for children (used for the future residential scenario) is 1 .O m^3/hr (EPA, 1990).

Skin surface areas (SA) used for resident exposure to soil are 50^{th} percentile values for the body parts representing the RME: head, hands, forearms and lower legs. Fiftieth percentile values are used instead of 95^{th} percentile values because 95^{th} percentile values are misrepresentative of the surface area of individuals of average weight [e.g., 70 kg (154 kg)] (EPA, 1989). It is assumed that the resident adult or child wars a short-sleeve shirt, shorts, and shoes while gardening, working, or playing outdoors at home, with about 25 percent of the total skin area exposed. This equates to an SA of 5000 cm^2 for the adult and 1800 cm^2 for the child (EPA, 1992).

The adherence factor (AF) for soil is 1.0 mg/cm^2, which is considered appropriate for evaluation of RME value intake assumptions (EPA, 1995). Dermal absorption factors (ABS) used for soil are 1 .O percent for organics and 0.1 percent for inorganics (EPA, 1995). For the future on-unit residential receptor, an upper-bound soil RI of 200 mg/d is

assumed for children l-6 years of age and 100 mg/d for older children and adults (EPA, 199 1 a). The value assumed for fraction ingested (FI) from a contaminated source is 1 .O. This conservative estimate assumes that all soil ingested is from the contaminated source.

Intakes of chemicals from the ingestion of homegrown produce by the resident adult are calculated using the IR_os of 113, 202, and 123 g/d for leafy vegetables, tuberous vegetables, and fruits, respectively. Corresponding IR_os used for the resident child are 42, 75, and 45 g/d. The ingestion rates are based on a daily total consumption of fruits and vegetables at the 95^{th} percentile for both age groups (EPA, 1990) and the child rates are assumed to be 37 percent of adult rates. FI values used in the calculation of intakes from homegrown produce ingestion by the hypothetical on-unit resident adult and child are 0.042, 0.0119, and 0.487 for leafy vegetables, tuberous vegetables and fruits, respectively (EPA, 1990). The FI values represent the homegrown portion of all vegetables ingested by the adult and child resident.

Exposure Equations

The exposure equations used to calculate risk and hazards for each receptor are included with each calculation in Appendices C.4 through C.6.

Two methods were used to calculate the ingestion of homegrown produce for organics and inorganics and are included with the appropriate risk and hazard calculations. The ingestion of organics from homegrown produce is estimated from the actual RME soil concentration as recommended by EPA, *Methods of Assessing Exposure to Chemical Substances, Volume 8: Methods for Assessing Environmental Pathways of Food Contamination, 1986. This* method estimates the root concentration, tuberous concentration and transpiration stream concentration factor from the site-specific organic carbon content of soil. The constituent specific calculation is included with each risk and hazard calculations for ingestion of homegrown produce in Appendices C.4 through C.6. For ingestion of inorganics from homegrown produce, published soil-to-plant transfer factors were used to estimate the concentration in produce. Soil-to-plant transfer factors for inorganices are provided in Table C.3-5. The calculation of inorganic concentrations in homegrown produce is included with the risk and hazard in Appendices C.4 through C.6.

Table C.3-1 Human Health Exposure Parameters
Exposure Scenario for the Current On-unit Visitor

Factors	Units	Soil	Surface Water	Sediment	Reference
Body Wt. (BW)	kg	70	70	70	1
Exposure Duration (ED)	yr.	5	5	5	assumed
Exposure Frequency (EF)	d/yr.	6	6	6	assumed
Exposure Time (ET)	hr/d	1	0.5	0.5	assumed
Adherence Factor Soil to Skin (AF)	mg/cm^2	1.0	NA	0.6	3, 4
Skin Surface Area Available For Contact (SA)	cm^2	3,200 [a]	5,000	5,000	3
Ingestion Rate (IR_s)	mg/d	50	NA	50	2
Inhalation Rate (IR_i)	m^3/hr	2.5	NA	NA	2
Fraction Ingested from Contaminated Source (FI)	unitless	1.0	NA	1.0	4
Absorption Factor (ABS)	unitless	1% organics; 0.1% inorganics	NA	1% organics; .1% inorganic	4

LEGEND
NA not applicable
a Head, hands, and forearms

REFERENCES:

(1) EPA, 1990
(2) EPA, 1991a
(3) EPA, 1992
(4) EPA, 1994

Table C.3-2 Human Health Exposure Parameters
Exposure Scenario for the Hypothetical On-Unit Industrial Worker

Factors	Units	Soil	GW	Reference
Body Wt. (BW)	**kg**	**70**	**70**	**1**
Exposure Duration (ED)	**yr.**	**25**	**25**	**2**
Exposure Frequency (EF)	**d/yr.**	**250**	**250**	**2**
Exposure Time (ET)	**hr/d**	**8**	NA	**assumed**
Adherence Factor Soil to Skin (AF)	**mg/cm^2**	**1.0**	**NA**	**3,5**
Skin Surface Area Available For Contact (SA)	**cm^2**	**3,200**	**NA**	**1,3**
Ingestion Rate (IR_s)	**see legend note [a]**	**50**	**1.0**	**2**
Inhalation Rate (IR_i)	**m^3/hr**	**2.5**	**NA**	**2**
Fraction Ingested from Contaminate Source (FI)	**unitless**	**1.0**	**NA**	**4**
Absorption Factor (ABS)	**unitless**	**1% organics; 0.1% inorganics**	**NA**	**5**

LEGEND
NA not applicable
a Ingestion rates for soil are expressed in mg/d; groundwater in l/d.

REFERENCES:
(1) EPA, 1990
(2) EPA, 1991a
(3) EPA, 1992
(4) EPA, 1989
(5) EPA, 1994

Table C.3-3 Human Health Exposure Parameters
Exposure Scenario for the Hypothetical On-Unit Adult Resident

Factors	Units	Soil	GW	Vegetation	Reference
Body Wt. (BW)	kg	70	70	70	1, 2
Exposure Duration (ED)	yr.	24	24	24	2
Exposure Frequency (EF)	d/yr.	350	350	350	2
Exposure Time (ET)	hr/d	15	0.2[b]	NA	1, 3
Adherence Factor Soil to Skin (AF)	mg/cm^2	1.0	NA	NA	3, 4
Skin Surface Area Available For Contact (SA)	cm^2	5,000	20,000	NA	3
Ingestion Rate (IR)	see legend note[a]	100	2.0	113[d] 202[e] 123[f]	1, 2
Inhalation Rate (IR)	m^3/hr	0.83	see legend note[c]	NA	2, 5
Fraction Ingested from Contaminated Source (FI)	unitless	1.0	NA	0.042[d] 0.119[e] 0.487[f]	1
Absorption Factor (ABS)	unitless	1% organics 0.1% inorganics	NA	NA	4
Dermal Permeability Constant	cm/hr	NA	Contaminant Specific	NA	3
Soil-to-Plant Transfer Factor (TF)	unitless	NA	NA	Contaminant Specific	NA

LEGEND

NA not applicable

a Ingestion rates for soil are expressed in mg/d; groundwater in 1/d; homegrown produce in g/d.

b For dermal contact while bathing (12 minutes/day).

c Inhalation of volatiles in groundwater is considered equivalent to the intake from ingestion of VOCs in groundwater.

d leafy vegetables (e.g., lettuce and tossed salad)

e tuberous vegetables (e.g., white potatoes).

f fruits (tomatoes).

REFERENCES:

(1) EPA, 1989
(2) EPA, 1991a
(3) EPA, 1992
(4) EPA, 1994
(5) EPA, 1991b

Table C.3-4 Human Health Exposure Parameters
Exposure Scenario for the Hypothetical On-Unit Child Resident

Factors	Units	Soil	GW	Vegetation	SW	Sed	Reference
Body Wt. (BW)	kg	15	15	15	26	26	1, 2
Exposure Duration (ED)	yr.	6	6	6	9	9	2
Exposure Frequency (EF)	d/yr.	350	350	350	52	52	2
Exposure Time (ET)	hr/d	18	0.2[b]	NA	2	NA	1, 3
Adherence Factor Soil to Skin (AF)	mg/cm^2	1.0	NA	NA	NA	0.6	3, 4
Skin Surface Area Available for Contact (SA)	cm^2	1,800	7,300	NA	3,200	3,200	3
Ingestion Rate (IR)	see legend note[a]	200	1.0	42[d] 75[e] 45[f]	0.01	50	1, 2
Inhalation Rate (IR)	m^3/hr	1.0	see legend note[c]	NA	NA	NA	1, 5
Fraction Ingested from Contaminated Source (FI)	unitless	1.0	NA	0.042[d] 0.119[e] 0.487[f]	NA	1.0	1
Absorption Factor (ABS)	unitless	1% organics; 0.1% inorganics	NA	NA	NA	1% organics; 0.1% inorganics	4
Dermal Permeability Constant	cm/hr	NA	Contaminant Specific	NA		NA	3
Soil-to-Plant Transfer Factor (TF)	unitless	NA	NA	Contaminant Specific	NA	NA	

LEGEND
NA not applicable
a Ingestion rates for soil are expressed in mg/d; groundwater in l/d; homegrown produce in g/d.
b For dermal contact while bathing (12 minutes/day).
c Intake via inhalation of VOCs released from groundwater during domestic use will be assumed equal to the intake of VOCs via ingestion of 2 liters of groundwater a day.
d leafy vegetables (e.g., lettuce and tossed salad)
e tuberous vegetables (e.g., white potatoes).
f fruits (e.g., tomatoes).

REFERENCES:
(1) EPA, 1989
(2) EPA, 1991a
(3) EPA, 1992
(4) EPA, 1994
(5) EPA, 1991b

Table C.3-5
Soil-To-Plant Transfer Factor for Inorganic Constituents

Constituent	Transfer Factors		
	Leafy Vegetation	Tuberous Vegetation	Fruits
Aluminum	NA	NA	NA
Arsenic	4.00E-2	6.00E-3	6.00E-3
Beryllium	1.00E-2	1.50E-3	1.50E-3
Iron	4.00E-3	1.00E-3	1.00E-3

NA = Not available
Source: NUREG/CR-5512, 1992, page 6.25

Table C.3-6
Essential Human Nutrients (EHNs)
Nutrient Benchmarks[1] and Screening Levels[2] For Soil Levels

Constituent	Adult Benchmark (mg/day)	Child Benchmark (mg/day)	Adult ingestion rate (kg/day)	Child ingestion rate (kg/day)	Adult EHN Screening Level (mg/kg)	Child EHN Screening Level (mg/kg)
Calcium	1200	800	0.0001	0.0002	12,000,000	**4,000,000**
Magnesium	350	120	0.0001	0.0002	3,500,000	**600,000**
Potassium	2000	1600	0.0001	0.0002	20,000,000	**8,000,000**
Sodium	500	400	0.0001	0.0002	5,000,000	**2,000,000**

[1] Unless otherwise indicated, benchmarks are the recommended dietary allowance (RDA), National Research Council, 1989.

[2] Screening Levels are determined by dividing the nutrient benchmark by a conservative ingestion rate. The most conservative screening levels are in bold typeface.

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NRC (National Regulatory Commission), 1992. Residual Radioactive Contamination From Decommissioning, Technical Basis for Translating Contamination Levels to Annual Total Effective Dose Equivalent. Final Report, NUREG/CR -55 12, PNL-7994, Vol. 1.

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APPENDIX C.4

APPENDIX C.4
RISK AND HAZARD CALCULATIONS FOR UNIT COPCs

(Tables C.1 - C.17)

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Human Health Table C.1
716-A Motor Shops Seepage Basin
Known On-Unit Worker
Exposure Assumptions and Risk Calculations - Ingestion of Soil (0-1' bls)

EXPOSURE ASSUMPTIONS:

Receptor	Known On-Unit Worker	
Exposure	RME[1]	
Intake Rate (IR), mg/day	50	(4)
Fraction Ingested (FI), unitless	1	(4)
Exposure Frequency (EF), unitless	6	(4)
Exposure Duration (ED), yrs	5	(4)
Body Weight (BW), kg	70	(4)
Averaging Time, Carc[2] (ATC), days	25,550	
Averaging Time, Noncarc[3] (ATN), days	1,825	
Conversion Factor (CF), kg/mg	1.00E-06	

INTAKE FACTOR CALCULATIONS

Carcinogenic Intake Factor (CIF), kg/kg-day =
(IR * FI * EF * ED * CF)/(BW * ATC)
RME CIF = 8.387E-10

Noncarcinogenic Intake Factor (NIF), kg/kg-day =
(IR * FI * EF * ED * CF)/(BW * ATN)
RME NIF = 1.174E-08

CARCINOGENIC AND NONCARCINOGENIC RISK CALCULATIONS:

Chemical	CAS[5] No.	EP Conc[6] RME (mg/kg)	OSF[7] (kg-d/mg)	ORfD[8] (mg/kg-d)	Cancer Risk[9] RME	Cancer Risk[9] % of Total	Hazard Quotient[10] RME	Hazard Quotient[10] % of Total
Semivolatiles								
Benzo(a)pyrene	50-3-28	4.10E-01	7.30E+00	--	2.51E-09	100	--	--
				PATHWAY SUMS:	RME Cancer Risk 2.51E-09		RME Hazard Index 0.00E+00	

Notes:
1. Reasonable maximum exposure.
2. Calculated as 70 years (average lifetime) times 365 days per year.
3. Calculated as exposure duration (in years) times 365 days per year
4. EPA references.
5. Chemical Abstract service.
6. Exposure point concentration.
7. Slope factor
8. Reference dose.
9. Cancer Risk = (Chemical concentration, mg/kg * Carcinogenic Intake Factor, kg/kg-day * Slope Factor, kg-day/mg).
10. Hazard Quotient = Chemical Concentration, mg/kg * Noncarcinogenic Intake Factor, kg/kg-day)/(Reference Dose, mg/kg-day)

Human Health Table C.2
716-A Motor Shops Seepage Basin
Known On-Unit Worker
Exposure Assumptions and Risk Calculations -Dermal Exposure to Soil (0-1'bls)

EXPOSURE ASSUMPTIONS:

Receptor	Known On-Unit Worker	
Exposure	RME[1]	
Skin Surface Area (SA), cm^2/event	3200	(4)
Soil-to-Skin Adherance (SK),mg/cm^2	1.0	(4)
Exposure Frequency (EF),events/yr	6	(4)
Exposure Duration (ED), yrs	5	(4)
Body Weight (BW), kg	70	(4)
Averaging Time, Carc[2] (ATC), days	25,550	
Averaging Time, Noncarc[3] (ATN), days	1,825	
Conversion Factor (CF), kg/mg	1.00E-06	

INTAKE FACTOR CALCULATIONS

Carcinogenic Intake Factor (CIF), kg/kg-day =
(SA * SK * EF * ED * CF)/(BW * ATC)
RME CIF = 5.368E-08

Noncarcinogenic Intake Factor (NIF), kg/kg-day =
(SA * SK* EF * ED * CF)/(BW * ATN)
RME NIF = 7.515E-07

CARCINOGENIC AND NONCARCINOGENIC RISK CALCULATIONS:

Chemical	CAS[5] No.	EP Conc[6] RME (mg/kg)	DSF[7] (kg-d/mg)	DRfD[8] (mg/kg-d)	DABS[9] (unitless)	Cancer Risk[10] RME	Cancer Risk[10] % of Total	Hazard Quotent[11] RME	Hazard Quotent[11] % of Total
Semivolatiles									
Benzo(a)pyrene	50-3-28	4.10E-01	3.65E+01	--	1.00E-02	8.033E-09	100	--	--

	RME Cancer Risk	RME Hazard Index
PATHWAY SUMS:	8.03E-09	0.00E+00

Notes:
1. Reasonable maximum exposure.
2. Calculated as 70 years (average lifetime) times 365 days per year.
3.Calculated as exposure duration (in years) times 365 days per year
4. EPA references.
5. Chemical Abstract Service.
6. Exposure point concentration.
7. Absorbed dose slope factor = oral slope factor/ oral absorption factor, per RAGS, Vol.A, p.A-3
8. Dermal reference dose = oral RfD x oral absorption factor, per RAGS, Vol.A, p.A-2.
9.Dermal absorption factor: 0.01(organics), 0.001 (inorganics)
10. Cancer Risk = (Chemical Concentration, mg/kg * Carcinogenic Intake Factor, kg/kg-day * Absorption Factor, unitless * Slope Factor, kg-day/mg)
11. Hazard Quotient = (Chemical Concentration, mg/kg * Noncarcinogenic Intake Factor, kg/kg-day * Absorption Factor, unitless / Reference Dose, mg/kg-day)

Human Health Table C.3
716-A Motor Shops Seepage Basin
Known On-Unit Worker
Exposure Assumptions and Risk Calculations - Inhalation of Soil Particulate Contaminants (0-1' bls)

EXPOSURE ASSUMPTIONS:

Receptor	Known On-Unit Worker	
Exposure	RME[1]	
Inhalation Rate (IR), m^3/hr	2.5	(4)
Exposure Time(ET), hrs/day	1	(4)
Exposure Frequency (EF), days/yr	6	(4)
Exposure Duration (ED), yrs	5	(4)
Body weight (BW), kg	70	(4)
Averaging Time, Carc[2] (ATC), days	25,550	
Averaging Time, Noncarc[3] (ATN), days	1,825	

INTAKE FACTOR CALCULATIONS

Carcinogenic Intake Factor (CIF),m^3/kg-day =
(IR * ET* EF * ED)/(BW * ATC)
RME CIF = 4.193E-05

Noncarcinogenic Intake Factor (NIF), m^3/kg-day =
(IR *ET * EF * ED)/(BW * ATN)
RME NIF = 5.87E-04

SOIL PARTICULATE RESUSPENSION FACTOR CALCULATION[5]

Width of contaminated area (LS) =	(site)	10	meters
Wind speed in mixing zone (V) =		2.25	meters/sec
Diffusion height (DH) =		2.00	meters
Area of contamination (A) =	(site)	685.00	$meters^2$
Respirable fraction (RF) =		0.036	g/$meters^2$-hr
Fraction of vegetative cover (G) =		0.25	unitless
Mean annual wind speed (Um) =		4.50	meters/sec
Equivalent threshold value of wind speed at 10 m (Ut) =		12.80	meters/sec
Fraction dependent on Um/Ut (Fx) =		0.0497	unitless
Conversion factor (CFa) =		3600.00	sec/hr
Conversion factor (CFb) =		1000.00	g/kg

CALCULATION OF PARTICULATE EMISSION FACTOR:

Particulate emission factor (PEF) = 4.056E+09 m^3/kg
(LS*V*DH*CFa*CFb)/(A*RF*(1-G)*((Um/Ut)^3*(Fx))

CARCINOGENIC AND NONCARCINOGENIC RISK CALCULATIONS:

Chemical	CAS[6] No.	EP Conc[7] RME (mg/kg)	ISF[8] (kg-day/mg)	RfC[9] (mg/m^3)	Cancer Risk[10] RME	Cancer Risk[10] % of Total	Hazard Quotent[10] RME	Hazard Quotent[10] % of Total
Semivolatiles								
Benzo(a)pyrene	50-3-28	4.10E-01	3.10E+00	--	1.314E-14	100	--	--

	RME Cancer Risk	RME Hazard Index
PATHWAY SUMS:	1.31E-14	0.00E+00

Human Health Table C.3
716-A Motor Shops Seepage Basin
Known On-Unit Worker
Exposure Assumptions and Risk Calculations - Inhalation of Soil Particulate Contaminants (0-1' bls)

Notes:

1. Reasonable maximum exposure.
2. Calculated as 70 years (average lifetime) times 365 days per year.
3. Calculated as exposure duration (in years) times 365 days per year
4. EPA references.
5. Particulate Emission Factor calculation, EPA RAGS, Part B, 1991
6. Chemical Abstract Service.
7. Exposure point concentration in soil.
7. Slope factor
8. Reference dose.
9. Cancer Risk = (RME concentration, mg/kg * Carcinogenic Intake Factor, m^3/kg-day * Slope Factor, kg-day/mg) / (PEF, m^3/kg).
10. Hazard Quotient = Chemical Concentration, mg/kg * Noncarcinogenic Intake Factor, kg/kg-day)/(Reference Dose, mg/kg-day * PEF, m^3/kg)

Human Health Table C.4
716-A Motor Shops Seepage Basin
Hypothetical On-Unit Industrial Worker
Exposure Assumptions and Risk Calculations - Ingestion of Soil (0-1' bls)

EXPOSURE ASSUMPTIONS:

Receptor	Future Industrial Worker	
Exposure	RME[1]	
Intake Rate (IR), mg/day	50	(4)
Fraction Ingested (FI), unitless	1	(4)
Exposure Frequency (EF), unitless	250	(4)
Exposure Duration (ED), yrs	25	(4)
Body Weight (BW), kg	70	(4)
Averaging Time, Carc[2] (ATC), days	25,550	
Averaging Time, Noncarc[3] (ATN), days	9,125	
Conversion Factor (CF), kg/mg	1.00E-06	

INTAKE FACTOR CALCULATIONS

Carcinogenic Intake Factor (CIF), kg/kg-day =
(IR * FI * EF * ED * CF)/(BW * ATC)
RME CIF = 1.747E-07

Noncarcinogenic Intake Factor (NIF), kg/kg-day =
(IR * FI * EF * ED * CF)/(BW * ATN)
RME NIF = 4.892E-07

CARCINOGENIC AND NONCARCINOGENIC RISK CALCULATIONS:

Chemical	CAS[5] No.	EP Conc[6] RME (mg/kg)	OSF[7] (kg-d/mg)	ORfD[8] (mg/kg-d)	Cancer Risk[9] RME	Cancer Risk[9] % of Total	Hazard Quotient[10] RME	Hazard Quotient[10] % of Total
Semivolatiles								
Benzo(a)pyrene	50-3-28	4.10E-01	7.30E+00	--	5.23E-07	100	--	--
				PATHWAY SUMS:	RME Cancer Risk 5.23E-07		RME Hazard Index 0.00E+00	

Notes:
1. Reasonable maximum exposure.
2. Calculated as 70 years (average lifetime) times 365 days per year.
3. Calculated as exposure duration (in years) times 365 days per year
4. EPA references.
5. Chemical Abstract Service.
6. Exposure point concentration in soil.
7. Slope factor
8. Reference dose.
9. Cancer Risk = (Chemical concentration, mg/kg * Carcinogenic Intake Factor, kg/kg-day * Slope Factor, kg-day/mg).
10. Hazard Quotient = Chemical Concentration, mg/kg * Noncarcinogenic Intake Factor, kg/kg-day)/(Reference Dose, mg/kg-day)

Human Health Table C.5
716-A Motor Shops Seepage Basin
Hypothetical On-Unit Industrial Worker
Exposure Assumptions and Risk Calculations - Dermal Exposure to Soil (0-1' bls)

EXPOSURE ASSUMPTIONS:

Receptor	Future Industrial Worker	
Exposure	RME[1]	
Skin Surface Area (SA), cm^2/event	3200	(4)
Soil-to-Skin Adherance (SK),mg/cm^2	1.0	(4)
Exposure Frequency (EF),events/yr	250	(4)
Exposure Duration (ED), yrs	25	(4)
Body Weight (BW), kg	70	(4)
Averaging Time, Carc[2] (ATC), days	25,550	
Averaging Time, Noncarc[3] (ATN), days	9,125	
Conversion Factor (CF), kg/mg	1.00E-06	

INTAKE FACTOR CALCULATIONS

Carcinogenic Intake Factor (CIF), kg/kg-day =
(SA * SK * EF * ED * CF)/(BW * ATC)
RME CIF = 1.118E-05

Noncarcinogenic Intake Factor (NIF), kg/kg-day =
(SA * SK* EF * ED * CF)/(BW * ATN)
RME NIF = 3.131E-05

CARCINOGENIC AND NONCARCINOGENIC RISK CALCULATIONS:

Chemical	CAS[5] No.	EP Conc[6] RME (mg/kg)	DSF[7] (kg-d/mg)	DRfD[8] (mg/kg-d)	DABS[9] (unitless)	Cancer Risk[10] RME	Cancer Risk[10] % of Total	Hazard Quotent[11] RME	Hazard Quotent[11] % of Total
Semivolatiles									
Benzo(a)pyrene	50-3-28	4.10E-01	3.65E+01	--	1.00E-02	1.673E-06	100	--	--
					PATHWAY SUMS:	RME Cancer Risk 1.67E-06		RME Hazard Index 0.00E+00	

Notes:
1. Reasonable maximum exposure.
2. Calculated as 70 years (average lifetime) times 365 days per year.
3.Calculated as exposure duration (in years) times 365 days per year
4. EPA references.
5. Chemical Abstract Service.
6. Exposure point concentration.
7. Absorbed dose slope factor = oral SF/absorption factor, per RAGS, Vol.A, p.A-3
8. Dermal reference dose = oral RfD x oral absorption factor, per RAGS, Vol.A, p.A-2.
9.Dermal absorption factor: 0.01(organics), 0.001 (inorganics)
10. Cancer Risk = (Chemical Concentration, mg/kg * Carcinogenic Intake Factor, kg/kg-day * Absorption Factor, unitless * Slope Factor, kg-day/mg)
11. Hazard Quotient = (Chemical Concentration, mg/kg * Noncarcinogenic Intake Factor, kg/kg-day * Absorption Factor, unitless / Reference Dose, mg/kg-day)

Human Health Table C.6
716-A Motor Shops Seepage Basin
Hypothetical On-Unit Industrial Worker
Exposure Assumptions and Risk Calculations - Inhalation of Soil Particulate Contaminants (0-1' bls)

EXPOSURE ASSUMPTIONS:

Receptor	Future Industrial Worker	
Exposure	RME[1]	
Inhalation Rate (IR), m^3/hr	2.5	(4)
Exposure Time(ET), hrs/day	8	(4)
Exposure Frequency (EF), days/yr	250	(4)
Exposure Duration (ED), yrs	25	(4)
Body weight (BW), kg	70	(4)
Averaging Time, Carc[2] (ATC), days	25,550	
Averaging Time, Noncarc[3] (ATN), days	9,125	

INTAKE FACTOR CALCULATIONS

Carcinogenic Intake Factor (CIF),m^3/kg-day =
(IR * ET* EF * ED)/(BW * ATC)
RME CIF = 6.99E-02

Noncarcinogenic Intake Factor (NIF), m^3/kg-day =
(IR * ET * EF * ED)/(BW * ATN)
RME NIF = 1.96E-01

SOIL PARTICULATE RESUSPENSION FACTOR CALCULATION[5]

Width of contaminated area (LS) =	(site)	10	meters
Wind speed in mixing zone (V) =		2.25	meters/sec
Diffusion height (DH) =		2.00	meters
Area of contamination (A) =	(site)	685.00	$meters^2$
Respirable fraction (RF) =		0.036	g/$meters^2$-hr
Fraction of vegetative cover (G) =		0.25	unitless
Mean annual wind speed (Um) =		4.50	meters/sec
Equivalent threshold value of wind speed at 10 m (Ut) =		12.80	meters/sec
Fraction dependent on Um/Ut (Fx) =		0.0497	unitless
Conversion factor (CFa) =		3600.00	sec/hr
Conversion factor (CFb) =		1000.00	g/kg

CALCULATION OF PARTICULATE EMISSION FACTOR:

Particulate emission factor (PEF) = 4.056E+09 m^3/kg
$(LS*V*DH*CFa*CFb)/(A*RF*(1-G)*((Um/Ut)^3*(Fx))$

CARCINOGENIC AND NONCARCINOGENIC RISK CALCULATIONS:

Chemical	CAS[6] No.	EP Conc[7] RME (mg/kg)	ISF[8] (kg-day/mg)	RfC[9] (mg/m^3)	Cancer Risk[10] RME	Cancer Risk[10] % of Total	Hazard Quotent[11] RME	Hazard Quotent[11] % of Total
Semivolatiles								
Benzo(a)pyrene	50-3-28	4.10E-01	3.10E+00	--	2.19E-11	100	--	--

	RME Cancer Risk	RME Hazard Index
PATHWAY SUMS:	2.19E-11	0.00E+00

Human Health Table C.6
716-A Motor Shops Seepage Basin
Hypothetical On-Unit Industrial Worker
Exposure Assumptions and Risk Calculations - Inhalation of Soil Particulate Contaminants (0-1' bls)

Notes:

1. Reasonable maximum exposure.
2. Calculated as 70 years (average lifetime) times 365 days per year.
3. Calculated as exposure duration (in years) times 365 days per year
4. EPA references.
5. Particulate Emission Factor calculation, EPA RAGS, Part B, 1991
6. Chemical Abstract Service.
7. Exposure point concentration in soil.
8. Slope factor
9. Reference dose.
10. Cancer Risk = (RME concentration, mg/kg * Carcinogenic Intake Factor, m^3/kg-day * Slope Factor, kg-day/mg) / (PEF, m^3/kg).
11. Hazard Quotient = Chemical Concentration, mg/kg * Noncarcinogenic Intake Factor, kg/kg-day)/(Reference Dose, mg/kg-day * PEF, m^3/kg)

Human Health Table C.7
716-A Motor Shops Seepage Basin
Hypothetical On-Unit Industrial Worker
Exposure Assumptions and Risk Calculations - Ingestion of Soil (0-4' bls)

EXPOSURE ASSUMPTIONS:

Receptor	Future Industrial Worker	
Exposure	RME[1]	
Intake Rate (IR), mg/day	50	(4)
Fraction Ingested (FI), unitless	1	(4)
Exposure Frequency (EF), unitless	250	(4)
Exposure Duration (ED), yrs	25	(4)
Body Weight (BW), kg	70	(4)
Averaging Time, Carc[2] (ATC), days	25,550	
Averaging Time, Noncarc[3] (ATN), days	9,125	
Conversion Factor (CF), kg/mg	1.00E-06	

INTAKE FACTOR CALCULATIONS

Carcinogenic Intake Factor (CIF), kg/kg-day =
(IR * FI * EF * ED * CF)/(BW * ATC)
RME CIF = 1.747E-07

Noncarcinogenic Intake Factor (NIF), kg/kg-day =
(IR * FI * EF * ED * CF)/(BW * ATN)
RME NIF = 4.892E-07

CARCINOGENIC AND NONCARCINOGENIC RISK CALCULATIONS:

Chemical	CAS[5] No.	EP Conc[6] RME (mg/kg)	OSF[7] (kg-d/mg)	ORfD[8] (mg/kg-d)	Cancer Risk[9] RME	Cancer Risk[9] % of Total	Hazard Quotent[10] RME	Hazard Quotent[10] % of Total
Semivolatiles								
Benzo(a)pyrene	50-3-28	4.10E-01	7.30E+00	--	5.23E-07	100	--	--
			PATHWAY SUMS:		RME Cancer Risk 5.23E-07		RME Hazard Index 0.00E+00	

Notes:
1. Reasonable maximum exposure.
2. Calculated as 70 years (average lifetime) times 365 days per year.
3.Calculated as exposure duration (in years) times 365 days per year
4. EPA references.
5. Chemical Abstract Service.
6. Exposure point concentration in soil.
7. Slope factor
8. Reference dose.
9. Cancer Risk = (Chemical concentration, mg/kg * Carcinogenic Intake Factor, kg/kg-day * Slope Factor, kg-day/mg).
10. Hazard Quotient = Chemical Concentration, mg/kg * Noncarcinogenic Intake Factor, kg/kg-day)/(Reference Dose, mg/kg-day)

Human Health Table C.8
716-A Motor Shops Seepage Basin
Hypothetical On-Unit Industrial Worker
Exposure Assumptions and Risk Calculations - Dermal Exposure to Soil (0-4' bls)

EXPOSURE ASSUMPTIONS:

Receptor	Future Industrial Worker	
Exposure	RME[1]	
Skin Surface Area (SA), cm^2/event	3200	(4)
Soil-to-Skin Adherance (SK),mg/cm^2	1.0	(4)
Exposure Frequency (EF),events/yr	250	(4)
Exposure Duration (ED), yrs	25	(4)
Body Weight (BW), kg	70	(4)
Averaging Time, Carc[2] (ATC), days	25,550	
Averaging Time, Noncarc[3] (ATN), days	9,125	
Conversion Factor (CF), kg/mg	1.00E-06	

INTAKE FACTOR CALCULATIONS

Carcinogenic Intake Factor (CIF), kg/kg-day =
(SA * SK * EF * ED * CF)/(BW * ATC)
RME CIF = 1.118E-05

Noncarcinogenic Intake Factor (NIF), kg/kg-day =
(SA * SK* EF * ED * CF)/(BW * ATN)
RME NIF = 3.131E-05

CARCINOGENIC AND NONCARCINOGENIC RISK CALCULATIONS:

Chemical	CAS[5] No.	EP Conc[6] RME (mg/kg)	DSF[7] (kg-d/mg)	DRfD[8] (mg/kg-d)	DABS[9] (unitless)	Cancer Risk[10] RME	Cancer Risk[10] % of Total	Hazard Quotent[11] RME	Hazard Quotent[11] % of Total
Semivolatiles									
Benzo(a)pyrene	50-3-28	4.10E-01	3.65E+01	--	1.00E-02	1.673E-06	100	--	--
					PATHWAY SUMS:	RME Cancer Risk 1.67E-06		RME Hazard Index 0.00E+00	

Notes:
1. Reasonable maximum exposure.
2. Calculated as 70 years (average lifetime) times 365 days per year.
3.Calculated as exposure duration (in years) times 365 days per year
4. EPA references.
5. Chemical Abstract Service.
6. Exposure point concentration.
7. Absorbed dose slope factor = oral SF/absorption factor, per RAGS, Vol.A, p.A-3
8. Dermal reference dose = oral RfD x oral absorption factor, per RAGS, Vol.A, p.A-2.
9.Dermal absorption factor: 0.01(organics), 0.001 (inorganics)
10. Cancer Risk = (Chemical Concentration, mg/kg * Carcinogenic Intake Factor, kg/kg-day * Absorption Factor, unitless * Slope Factor, kg-day/mg)
11. Hazard Quotient = (Chemical Concentration, mg/kg * Noncarcinogenic Intake Factor, kg/kg-day * Absorption Factor, unitless / Reference Dose, mg/kg-day)

Human Health Table C.9
716-A Motor Shops Seepage Basin
Hypothetical On-Unit Industrial Worker
Exposure Assumptions and Risk Calculations - Inhalation of Soil Particulate Contaminants (0-4' bls)

EXPOSURE ASSUMPTIONS:

Receptor	Future Industrial Worker	
Exposure	RME[1]	
Inhalation Rate (IR), m^3/hr	2.5	(4)
Exposure Time(ET), hrs/day	8	(4)
Exposure Frequency (EF), days/yr	250	(4)
Exposure Duration (ED), yrs	25	(4)
Body weight (BW), kg	70	(4)
Averaging Time, Carc[2] (ATC), days	25,550	
Averaging Time, Noncarc[3] (ATN), days	9,125	

INTAKE FACTOR CALCULATIONS

Carcinogenic Intake Factor (CIF),m^3/kg-day =
(IR * ET* EF * ED)/(BW * ATC)
RME CIF = 6.99E-02

Noncarcinogenic Intake Factor (NIF), m^3/kg-day =
(IR * ET* EF * ED)/(BW * ATN)
RME NIF = 1.96E-01

SOIL PARTICULATE RESUSPENSION FACTOR CALCULATION[5]

Width of contaminated area (LS) =	(site)	10	meters
Wind speed in mixing zone (V) =		2.25	meters/sec
Diffusion height (DH) =		2.00	meters
Area of contamination (A) =	(site)	685.00	$meters^2$
Respirable fraction (RF) =		0.036	g/$meters^2$-hr
Fraction of vegetative cover (G) =		0.25	unitless
Mean annual wind speed (Um) =		4.50	meters/sec
Equivalent threshold value of wind speed at 10 m (Ut) =		12.80	meters/sec
Fraction dependent on Um/Ut (Fx) =		0.0497	unitless
Conversion factor (CFa) =		3600.00	sec/hr
Conversion factor (CFb) =		1000.00	g/kg

CALCULATION OF PARTICULATE EMISSION FACTOR:

Particulate emission factor (PEF) = 4.056E+09 m^3/kg
(LS*V*DH*CFa*CFb)/(A*RF*(1-G)*((Um/Ut)^3*(Fx))

CARCINOGENIC AND NONCARCINOGENIC RISK CALCULATIONS:

Chemical	CAS[6] No.	EP Conc[7] RME (mg/kg)	ISF[8] (kg-day/mg)	RfC[9] (mg/m^3)	Cancer Risk[10] RME	Cancer Risk[10] % of Total	Hazard Quotent[11] RME	Hazard Quotent[11] % of Total
Semivolatiles								
Benzo(a)pyrene	50-3-28	4.10E-01	3.10E+00	--	2.19E-11	100	--	--

PATHWAY SUMS:

RME Cancer Risk: 2.19E-11

RME Hazard Index: 0.00E+00

Human Health Table C.9
716-A Motor Shops Seepage Basin
Hypothetical On-Unit Industrial Worker
Exposure Assumptions and Risk Calculations - Inhalation of Soil Particulate Contaminants (0-4' bls)

Notes:

1. Reasonable maximum exposure.
2. Calculated as 70 years (average lifetime) times 365 days per year.
3. Calculated as exposure duration (in years) times 365 days per year
4. EPA references.
5. Particulate Emission Factor calculation, EPA RAGS, Part B, 1991
6. Chemical Abstract Service.
7. Exposure point concentration in soil.
8. Slope factor
9. Reference dose.
10. Cancer Risk = (RME concentration, mg/kg * Carcinogenic Intake Factor, m^3/kg-day * Slope Factor, kg-day/mg) / (PEF, m^3/kg).
11. Hazard Quotient = Chemical Concentration, mg/kg * Noncarcinogenic Intake Factor, kg/kg-day)/(Reference Dose, mg/kg-day * PEF, m^3/kg)

Human Health Table C.10
716-A Motor Shops Seepage Basin
Hypothetical Adult/Child Resident
Exposure Assumptions and Risk Calculations - Ingestion of Soil (0-1' bls)

EXPOSURE ASSUMPTIONS:

Receptor	Adult Future Resident		Child Future Resident		Combined Adult/Child Future Resident	
Exposure	RME[1]		RME		RME	
Intake Rate (IR), mg/day	100	(4)	200	(4)	120	(5)
Fraction Ingested (FI), unitless	1	(4)	1	(4)	1	(5)
Exposure Frequency (EF), unitless	350	(4)	350	(4)	350	(5)
Exposure Duration (ED), yrs	24	(4)	6	(4)	30	(5)
Body Weight (BW), kg	70	(4)	15	(4)	59	(5)
Averaging Time, Carc[2] (ATC), days	25,550		NA		25550	
Averaging Time, Noncarc[3] (ATN), days	8,760		2190		10950	
Conversion Factor (CF), kg/mg	1.00E-06		1.00E-06		1.00E-06	

INTAKE FACTOR CALCULATIONS

Carcinogenic Intake Factor (CIF), kg/kg-day =
(IR * FI * EF * ED * CF)/(BW * ATC)
RME CIF = 8.358E-07 (6)

Noncarcinogenic Intake Factor (NIF), kg/kg-day =
(IR * FI * EF * ED * CF)/(BW * ATN)
RME NIF = 1.279E-05 (7)

CARCINOGENIC AND NONCARCINOGENIC RISK CALCULATIONS:

Chemical	CAS[8] No.	EP Conc[9] RME (mg/kg)	OSF[10] (kg-d/mg)	ORfD[11] (mg/kg-d)	Cancer Risk[12] RME	Cancer Risk[12] % of Total	Hazard Quotent[13] RME	Hazard Quotent[13] % of Total
Semivolatiles								
Benzo(a)pyrene	50-3-28	4.10E-01	7.30E+00	--	2.502E-06	100	--	--

	RME Cancer Risk	RME Hazard Index
PATHWAY SUMS:	2.50E-06	0.00E+00

Notes:
1. Reasonable maximum exposure.
2. Calculated as 70 years (average lifetime) times 365 days per year.
3. Calculated as exposure duration (in years) times 365 days per year
4. EPA references.
5. Combined values are calculated by weighting adult and child exposure assumptions over the noted exposure duration (e.g., 24 yrs as an adult plus 6 yrs as a child for a total duration of 30 yrs).
6. Carcinogenic intake factor calculated using weighted (combined) exposure assumptions.
7. Noncarcinogenic intake factors are calculated for both adult and child, with the maximum of these used for risk calculations.
8. Chemical Abstract service.
9. Exposure point concentration.
10. Slope factor
11. Reference dose.
12. Cancer Risk = (Chemical concentration, mg/kg * Carcinogenic Intake Factor, kg/kg-day * Slope Factor, kg-day/mg).
13. Hazard Quotient = Chemical Concentration, mg/kg * Noncarcinogenic Intake Factor, kg/kg-day)/(Reference Dose, mg/kg-day)

Human Health Table C.11
716-A Motor Shops Seepage Basin
Hypothetical Adult/Child Resident
Exposure Assumptions and Risk Calculations - Dermal Exposure to Soil (0-1' bls)

EXPOSURE ASSUMPTIONS:

Receptor Exposure	Adult Future Resident RME[1]		Child Future Resident RME		Combined Adult/Child Future Resident RME	
Skin Surface Area (SA), cm^2/event	5000	(4)	1800	(4)	4360	(5)
Soil-to-Skin Adherance (SK),mg/cm^2	1	(4)	1	(4)	1	(5)
Exposure Frequency (EF),events/yr	350	(4)	350	(4)	350	(5)
Exposure Duration (ED), yrs	240	(4)	6	(4)	30	(5)
Body Weight (BW), kg	70	(4)	15	(4)	59	(5)
Averaging Time, Carc[2] (ATC), days	25,550		NA		25550	
Averaging Time, Noncarc[3] (ATN), days	8,760		2190		10950	
Conversion Factor (CF), kg/mg	1.00E-06		1.00E-06		1.00E-06	

INTAKE FACTOR CALCULATIONS

Carcinogenic Intake Factor (CIF), kg/kg-day =
(SA * SK * EF * ED * CF)/(BW * ATC)
RME CIF = 3.037E-05 (6)

Noncarcinogenic Intake Factor (NIF), kg/kg-day =
(SA * SK* EF * ED * CF)/(BW * ATN)
RME NIF = 0.0001151 (7)

CARCINOGENIC AND NONCARCINOGENIC RISK CALCULATIONS:

Chemical	CAS[8] No.	EP Conc[9] RME (mg/kg)	DSF[10] (kg-d/mg)	DRfD[11] (mg/kg-d)	DABS[12] (unitless)	Cancer Risk[13] RME	Cancer Risk[13] % of Total	Hazard Quotent[14] RME	Hazard Quotent[14] % of Total
Semivolatiles									
Benzo(a)pyrene	50-3-28	4.10E-01	3.65E+01	--	1.00E-02	4.5447E-06	100	--	--

	RME Cancer Risk	RME Hazard Index
PATHWAY SUMS:	4.54E-06	0.00E+00

Notes:

1. Reasonable maximum exposure.
2. Calculated as 70 years (average lifetime) times 365 days per year.
3. Calculated as exposure duration (in years) times 365 days per year
4. EPA references.
5. Combined values are calculated by weighting adult and child exposure assumptions over the noted exposure duration (e.g., 24 yrs as an adult plus 6 yrs as a child for a total duration of 30 yrs).
6. Carcinogenic intake factor calculated using weighted (combined) exposure assumptions.
7. Noncarcinogenic intake factors are calculated for both adult and child, with the maximum of these used for risk calculations.
8. Chemical Abstract service.
9. Exposure point concentration.
10. Absorbed dose slope factor = oral slope factor/oral absorption factor, per RAGS, Vol.A, p.A-3
11. Dermal reference dose = oral RfD x oral absorption factor, per RAGS, Vol.A, p.A-2.
12. Dermal absorption factor: 0.01(organics), 0.001 (inorganics)
13. Cancer Risk = (Chemical Concentration, mg/kg * Carcinogenic Intake Factor, kg/kg-day * Absorption Factor, unitless * Slope Factor, kg-day/mg)
14. Hazard Quotient = (Chemical Concentration, mg/kg * Noncarcinogenic Intake Factor, kg/kg-day * Absorption Factor, unitless / Reference Dose, mg/kg-day)

Human Health Table C.12
716-A Motor Shops Seepage Basin
Hypothetical Adult/Child Resident
Exposure Assumptions and Risk Calculations - Inhalation of Soil Particulate Contaminants (0-1' bls)

EXPOSURE ASSUMPTIONS:

Receptor	Adult Future Resident		Child Future Resident		Combined Adult/Child Future Resident	
Exposure	RME[1]		RME[1]		RME[1]	
Inhalation Rate (IR), m^3/hr	0.83	(4)	1	(4)	0.9	(5)
Exposure Time(ET), hrs/day	15	(4)	18	(4)	16	(5)
Exposure Frequency (EF), days/yr	350	(4)	350	(4)	350	(5)
Exposure Duration (ED), yrs	24	(4)	6	(4)	30	(5)
Body weight (BW), kg	70	(4)	15	(4)	59	(5)
Averaging Time, Carc[2] (ATC), days	25,550		NA		25,550	
Averaging Time, Noncarc[3] (ATN), days	8,760		2,190		10,950	

INTAKE FACTOR CALCULATIONS

Carcinogenic Intake Factor (CIF), m^3/kg-day =
(IR * ET* EF * ED)/(BW * ATC)
RME CIF = 1.00E-01 (6)

Noncarcinogenic Intake Factor (NIF), m^3/kg-day =
(IR * ET * EF * ED)/(BW * ATN)
RME NIF = 1.15E+00 (7)
(Child Value)

SOIL PARTICULATE RESUSPENSION FACTOR CALCULATION [8]

Width of contaminated area (LS) =	(site)	10	meters	(9)
Wind speed in mixing zone (V) =		2.25	meters/sec	(9)
Diffusion height (DH) =		2.00	meters	(9)
Area of contamination (A) =	(site)	685.00	$meters^2$	(9)
Respirable fraction (RF) =		0.036	$g/meters^2$-hr	(9)
Fraction of vegetative cover (G) =		0.25	unitless	(9)
Mean annual wind speed (Um) =		4.50	meters/sec	(9)
Equivalent threshold value of wind speed at 10 m (Ut) =		12.80	meters/sec	(9)
Fraction dependent on Um/Ut (Fx) =		0.0497	unitless	(9)
Conversion factor (CFa) =		3600.00	sec/hr	(9)
Conversion factor (CFb) =		1000.00	g/kg	(9)

CALCULATION OF PARTICULATE EMISSION FACTOR:

Particulate emission factor (PEF) = 4.056E+09 m^3/kg
$(LS*V*DH*CFa*CFb)/(A*RF*(1-G)*((Um/Ut)^3*(Fx))$

CARCINOGENIC AND NONCARCINOGENIC RISK CALCULATIONS:

Chemical	CAS[10] No	EP Conc[11] RME (mg/kg)	ISF[12] (kg-day/mg)	RfC[13] (mg/m^3)	Cancer Risk[14] RME	Cancer Risk[14] % of Total	Hazard Quotient[15] RME	Hazard Quotient[15] % of Total
Semivolatiles								
Benzo(a)pyrene	50-3-28	4.10E-01	3.10E+00	--	3.143E-11	100	--	--

	RME Cancer Risk	RME Hazard Index
PATHWAY SUMS:	3.14E-11	0.00E+00

Human Health Table C.12
716-A Motor Shops Seepage Basin
Hypothetical Adult/Child Resident
Exposure Assumptions and Risk Calculations - Inhalation of Soil Particulate Contaminants (0-1' bls)

Notes:

1. Reasonable maximum exposure.
2. Averaging time, carcinogen; calculated as 70 years (average lifetime) times 365 days per year (not applicable to child resident)
3. Averaging time, noncarcinogen; calculated as exposure duration (in years) times 365 days per year
4. EPA references.
5. Combined values are calcualted by weighting adult and child exposure assumptions over the noted exposure duration (e.g., 24 yrs as an adult plus 6 yers as a child for a total duration of 30 yrs)
6. Carcinogenic Intake factor calcualted using weighted (combined) exposure assumptions.
7. Noncarcinogenic intake factors are caluclated for both adult and child, with the maximum of these used for risk calculations.
8. USEPA, 1991: RAGS: Vol 1--Human Health Evalution Manual (Part B, Development of Risk-Based Preliminary Remediation Goals)
9. Site specific or default values from USEPA, 1991.
10. Chemical Abstract Service.
11. Exposure point concentration in soil.
12. Slope factor
13. Reference dose.
14. Cancer Risk = (RME concentration, mg/kg * Carcinogenic Intake Factor, m^3/kg-day * Slope Factor, kg-day/mg) / (PEF, m^3/kg).
15. Hazard Quotient = Chemical Concentration, mg/kg * Noncarcinogenic Intake Factor, kg/kg-day)/(Reference Dose, mg/kg-day * PEF, m^3/kg)

Human Health Table C.13
716-A Motor Shops Seepage Basin
Hypothetical Adult/Child Resident
Exposure Assumptions and Risk Calculations
Ingestion of Contaminated Tuberous Vegetables, Leafy Vegetables, and Fruits - (0-1' bls)

EXPOSURE ASSUMPTIONS:

Receptor	Adult Future Resident				Child Future Resident				Combined Adult/Child Future Resident			
Exposure (RME)[1]	Root	Leafy	Fruit		Root	Leafy	Fruit		Root	Leafy	Fruit	
Intake Rate (IR), g/day	202	113	123	(4)	75	42	45	(4)	177	99	107	(5)
Fraction Ingested (FI), unitless	0.119	0.042	0.49	(4)	0.119	0.042	0.49	(4)	0.119	0.04	0.49	(5)
Exposure Frequency (EF),days/yr	350			(4)	350			(4)	350			(5)
Exposure Duration (ED), yrs	240			(4)	6			(4)	30			(5)
Body Weight (BW), kg	70			(4)	15			(4)	59			(5)
Averaging Time, Carc[2] (ATC), days	25,550				NA				25550			
Averaging Time, Noncarc[3] (ATN), days	8,760				2190				10950			
Conversion Factor (CF), kg/g	1.00E-03				1.00E-03				1.00E-03			

INTAKE FACTOR CALCULATIONS

Carcinogenic Intake Factor (CIF), kg/kg-day =
(IR * FI * EF * ED * CF)/(BW * ATC)

	Root	Leafy	Fruit	Total CIF[6]
CIF =	1.47E-04	2.90E-05	3.63E-04	5.39E-04

Noncarcinogenic Intake Factor (NIF), kg/kg-day =
(IR * FI * EF * ED * CF)/(BW * ATC)

	Root	Leafy	Fruit	Total NIF[7]
NIF =	5.71E-04 (Child)	1.13E-04 (Child)	1.40E-03 (Child)	2.08E-03

CARCINOGENIC AND NONCARCINOGENIC RISK CALCULATIONS:

Chemical	CAS[8] No.	Total RME[9] Fruit/Veg Conc (mg/kg)	OSF[10] (kg-d/mg)	ORfD[11] (mg/kg-d)	Cancer Risk[12] RME	Cancer Risk[12] % of Total	Hazard Quotent[13] RME	Hazard Quotent[13] % of Total
Semivolatiles								
Benzo(a)pyrene	50-3-28	5.25E-04	7.30E+00	--	2.064E-06	100	--	--

	RME Cancer Risk	RME Hazard Index
PATHWAY SUMS:	2.06E-06	0.00E+00

Notes:

1. Reasonable maximum exposure.
2. Calculated as 70 years (average lifetime) times 365 days per year.
3. Calculated as exposure duration (in years) times 365 days per year
4. EPA references.
5. Combined values are calculated by weighting adult and child exposure assumptions over the noted exposure duration (e.g., 24 yrs as an adult plus 6 yrs as a child for a total duration of 30 yrs).
6. Carcinogenic intake factor calculated using weighted (combined) exposure assumptions.
7. Noncarcinogenic intake factors are calculated for both adult and child, with the maximum of these used for risk calculations.
8. Chemical Abstract service.
9. Exposure point concentration; NC = not calculated for constituents with no toxicity information.
10. Slope factor.
11. Reference dose.
12. Cancer Risk = (Chemical Concentration, mg/kg * Carcinogenic Intake Factor, kg/kg-day * Slope Factor, kg-day/mg)
13. Hazard Quotient = (Chemical Concentration, mg/kg * Noncarcinogenic Intake Factor, kg/kg-day) / (Reference Dose, mg/kg-day)

Human Health Table C.14
716-A Motor Shops Seepage Basin
Hypothetical Adult/Child Resident
Exposure Assumptions and Risk Calculations - Ingestion of Soil (0-4' bls)

EXPOSURE ASSUMPTIONS:

Receptor	Adult Future Resident		Child Future Resident		Combined Adult/Child Future Resident	
Exposure	RME[1]		RME		RME	
Intake Rate (IR), mg/day	100	(4)	200	(4)	120	(5)
Fraction Ingested (FI), unitless	1	(4)	1	(4)	1	(5)
Exposure Frequency (EF), unitless	350	(4)	350	(4)	350	(5)
Exposure Duration (ED), yrs	24	(4)	6	(4)	30	(5)
Body Weight (BW), kg	70	(4)	15	(4)	59	(5)
Averaging Time, Carc[2] (ATC), days	25,550		NA		25550	
Averaging Time, Noncarc[3] (ATN), days	8,760		2190		10950	
Conversion Factor (CF), kg/mg	1.00E-06		1.00E-06		1.00E-06	

INTAKE FACTOR CALCULATIONS

Carcinogenic Intake Factor (CIF), kg/kg-day =
(IR * FI * EF * ED * CF)/(BW * ATC)
RME CIF = 8.358E-07 (6)

Noncarcinogenic Intake Factor (NIF), kg/kg-day =
(IR * FI * EF * ED * CF)/(BW * ATN)
RME NIF = 1.279E-05 (7)

CARCINOGENIC AND NONCARCINOGENIC RISK CALCULATIONS:

Chemical	CAS[8] No.	EP Conc[9] RME (mg/kg)	OSF[10] (kg-d/mg)	ORfD[11] (mg/kg-d)	Cancer Risk[12] RME	Cancer Risk[12] % of Total	Hazard Quotent[13] RME	Hazard Quotent[13] % of Total
Semivolatiles								
Benzo(a)pyrene	50-3-28	4.10E-01	7.30E+00	--	2.502E-06	100	--	--

	RME Cancer Risk	RME Hazard Index
PATHWAY SUMS:	2.50E-06	0.00E+00

Notes:
1. Reasonable maximum exposure.
2. Calculated as 70 years (average lifetime) times 365 days per year.
3.Calculated as exposure duration (in years) times 365 days per year
4. EPA references.
5. Combined values are calculated by weighting adult and child exposure assumptions over the noted exposure duration (e.g., 24 yrs as an adult plus 6 yrs as a child for a total duration of 30 yrs).
6. Carcinogenic intake factor calculated using weighted (combined) exposure assumptions.
7. Noncarcinogenic intake factors are calculated for both adult and child, with the maximum of these used for risk calculations.
8. Chemical Abstract service.
9. Exposure point concentration.
10. Slope factor
11. Reference dose.
12. Cancer Risk = (Chemical concentration, mg/kg * Carcinogenic Intake Factor, kg/kg-day * Slope Factor, kg-day/mg).
13. Hazard Quotient = Chemical Concentration, mg/kg * Noncarcinogenic Intake Factor, kg/kg-day)/(Reference Dose, mg/kg-day)

Human Health Table C.15
716-A Motor Shops Seepage Basin
Hypothetical Adult/Child Resident
Exposure Assumptions and Risk Calculations - Dermal Exposure to Soil (0-4' bls)

EXPOSURE ASSUMPTIONS:

Receptor	Adult Future Resident		Child Future Resident		Combined Adult/Child Future Resident	
Exposure	RME[1]		RME		RME	
Skin Surface Area (SA), cm^2/event	5000	(4)	1800	(4)	4360	(5)
Soil-to-Skin Adherance (SK),mg/cm^2	1	(4)	1	(4)	1	(5)
Exposure Frequency (EF),events/yr	350	(4)	350	(4)	350	(5)
Exposure Duration (ED), yrs	240	(4)	6	(4)	30	(5)
Body Weight (BW), kg	70	(4)	15	(4)	59	(5)
Averaging Time, Carc[2] (ATC), days	25,550		NA		25550	
Averaging Time, Noncarc[3] (ATN), days	8,760		2190		10950	
Conversion Factor (CF), kg/mg	1.00E-06		1.00E-06		1.00E-06	

INTAKE FACTOR CALCULATIONS

Carcinogenic Intake Factor (CIF), kg/kg-day =
(SA * SK * EF * ED * CF)/(BW * ATC)
RME CIF = 3.037E-05 (6)

Noncarcinogenic Intake Factor (NIF), kg/kg-day =
(SA * SK* EF * ED * CF)/(BW * ATN)
RME NIF = 0.0001151 (7)

CARCINOGENIC AND NONCARCINOGENIC RISK CALCULATIONS:

Chemical	CAS[8] No.	EP Conc[9] RME (mg/kg)	DSF[10] (kg-d/mg)	DRfD[11] (mg/kg-d)	DABS[12] (unitless)	Cancer Risk[13] RME	Cancer Risk[13] % of Total	Hazard Quotent[14] RME	Hazard Quotent[14] % of Total
Semivolatiles									
Benzo(a)pyrene	50-3-28	4.10E-01	3.65E+01	--	1.00E-02	4.5447E-06	100	--	--

	RME Cancer Risk	RME Hazard Index
PATHWAY SUMS:	4.54E-06	0.00E+00

Notes:

1. Reasonable maximum exposure.
2. Calculated as 70 years (average lifetime) times 365 days per year.
3. Calculated as exposure duration (in years) times 365 days per year
4. EPA references.
5. Combined values are calculated by weighting adult and child exposure assumptions over the noted exposure duration (e.g., 24 yrs as an adult plus 6 yrs as a child for a total duration of 30 yrs).
6. Carcinogenic intake factor calculated using weighted (combined) exposure assumptions.
7. Noncarcinogenic intake factors are calculated for both adult and child, with the maximum of these used for risk calculations.
8. Chemical Abstract service.
9. Exposure point concentration.
10. Absorbed dose slope factor = oral slope factor/oral absorption factor, per RAGS, Vol.A, p.A-3
11. Dermal reference dose = oral RfD x oral absorption factor, per RAGS, Vol.A, p.A-2.
12. Dermal absorption factor: 0.01(organics), 0.001 (inorganics)
13. Cancer Risk = (Chemical Concentration, mg/kg * Carcinogenic Intake Factor, kg/kg-day * Absorption Factor, unitless * Slope Factor, kg-day/mg)
14. Hazard Quotient = (Chemical Concentration, mg/kg * Noncarcinogenic Intake Factor, kg/kg-day * Absorption Factor, unitless / Reference Dose, mg/kg-day)

Human Health Table C.16
716-A Motor Shops Seepage Basin
Hypothetical Adult/Child Resident
Exposure Assumptions and Risk Calculations - Inhalation of Soil Particulate Contaminants (0-4' bls)

EXPOSURE ASSUMPTIONS:

Receptor	Adult Future Resident		Child Future Resident		Combined Adult/Child Future Resident	
Exposure	RME[1]		RME[1]		RME[1]	
Inhalation Rate (IR), m^3/hr	0.83	(4)	1	(4)	0.9	(5)
Exposure Time(ET), hrs/day	15	(4)	18	(4)	16	(5)
Exposure Frequency (EF), days/yr	350	(4)	350	(4)	350	(5)
Exposure Duration (ED), yrs	24	(4)	6	(4)	30	(5)
Body weight (BW), kg	70	(4)	15	(4)	59	(5)
Averaging Time, Carc[2] (ATC), days	25,550		NA		25,550	
Averaging Time, Noncarc[3] (ATN), days	8,760		2,190		10,950	

INTAKE FACTOR CALCULATIONS

Carcinogenic Intake Factor (CIF), m^3/kg-day =
(IR * ET* EF * ED)/(BW * ATC)
RME CIF = 1.00E-01 (6)

Noncarcinogenic Intake Factor (NIF), m^3/kg-day =
(IR * ET * EF * ED)/(BW * ATN)
RME NIF = 1.15E+00 (7)
(Child Value)

SOIL PARTICULATE RESUSPENSION FACTOR CALCULATION [8]

Width of contaminated area (LS) =	(site)	10	meters	(9)
Wind speed in mixing zone (V) =		2.25	meters/sec	(9)
Diffusion height (DH) =		2.00	meters	(9)
Area of contamination (A) =	(site)	685.00	$meters^2$	(9)
Respirable fraction (RF) =		0.036	g/$meters^2$-hr	(9)
Fraction of vegetative cover (G) =		0.25	unitless	(9)
Mean annual wind speed (Um) =		4.50	meters/sec	(9)
Equivalent threshold value of wind speed at 10 m (Ut) =		12.80	meters/sec	(9)
Fraction dependent on Um/Ut (Fx) =		0.0497	unitless	(9)
Conversion factor (CFa) =		3600.00	sec/hr	(9)
Conversion factor (CFb) =		1000.00	g/kg	(9)

CALCULATION OF PARTICULATE EMISSION FACTOR:

Particulate emission factor (PEF) = 4.056E+09 m^3/kg
(LS*V*DH*CFa*CFb)/(A*RF*(1-G)*((Um/Ut)^3*(Fx))

CARCINOGENIC AND NONCARCINOGENIC RISK CALCULATIONS:

Chemical	CAS[10] No	EP Conc[11] RME (mg/kg)	ISF[12] (kg-day/mg)	RfC[13] (mg/m^3)	Cancer Risk[14] RME	Cancer Risk[14] % of Total	Hazard Quotient[15] RME	Hazard Quotient[15] % of Total
Semivolatiles								
Benzo(a)pyrene	50-3-28	4.10E-01	3.10E+00	--	3.143E-11	100	--	--

	RME Cancer Risk	RME Hazard Index
PATHWAY SUMS:	3.14E-11	0.00E+00

Human Health Table C.16
716-A Motor Shops Seepage Basin
Hypothetical Adult/Child Resident
Exposure Assumptions and Risk Calculations - Inhalation of Soil Particulate Contaminants (0-4' bls)

Notes:

1. Reasonable maximum exposure.
2. Averaging time, carcinogen; calculated as 70 years (average lifetime) times 365 days per year (not applicable to child resident)
3. Averaging time, noncarcinogen; calculated as exposure duration (in years) times 365 days per year
4. EPA references.
5. Combined values are calculated by weighting adult and child exposure assumptions over the noted exposure duration (e.g., 24 yrs as an adult plus 6 years as a child for a total duration of 30 yrs)
6. Carcinogenic intake factor calculated using weighted (combined) exposure assumptions.
7. Noncarcinogenic intake factors are calculated for both adult and child, with the maximum of these used for risk calculations.
8. USEPA, 1991: RAGS: Vol 1--Human Health Evalution Manual (Part B, Development of Risk-Based Preliminary Remediation Goals)
9. Site specific or default values from USEPA, 1991.
10. Chemical Abstract Service.
11. Exposure point concentration in soil.
12. Slope factor
13. Reference dose.
14. Cancer Risk = (RME concentration, mg/kg * Carcinogenic Intake Factor, m^3/kg-day * Slope Factor, kg-day/mg) / (PEF, m^3/kg).
15. Hazard Quotient = Chemical Concentration, mg/kg * Noncarcinogenic Intake Factor, kg/kg-day)/(Reference Dose, mg/kg-day * PEF, m^3/kg)

Human Health Table C.17
716-A Motor Shops Seepage Basin
Hypothetical Adult/Child Resident
Exposure Assumptions and Risk Calculations
Ingestion of Contaminated Tuberous Vegetables, Leafy Vegetables, and Fruits - (0-4' bls)

EXPOSURE ASSUMPTIONS:

Receptor	Adult Future Resident				Child Future Resident				Combined Adult/Child Future Resident			
Exposure (RME)[1]	Root	Leafy	Fruit		Root	Leafy	Fruit		Root	Leafy	Fruit	
Intake Rate (IR), g/day	202	113	123	(4)	75	42	45	(4)	177	99	107	(5)
Fraction Ingested (FI), unitless	0.119	0.042	0.49	(4)	0.119	0.042	0.49	(4)	0.119	0.04	0.49	(5)
Exposure Frequency (EF),days/yr	350			(4)	350			(4)	350			(5)
Exposure Duration (ED), yrs	240			(4)	6			(4)	30			(5)
Body Weight (BW), kg	70			(4)	15			(4)	59			(5)
Averaging Time, Carc[2] (ATC), days	25,550				NA				25550			
Averaging Time, Noncarc[3] (ATN), days	8,760				2190				10950			
Conversion Factor (CF), kg/g	1.00E-03				1.00E-03				1.00E-03			

INTAKE FACTOR CALCULATIONS

Carcinogenic Intake Factor (CIF), kg/kg-day =
(IR * FI * EF * ED * CF)/(BW * ATC)

	Root	Leafy	Fruit	Total CIF[6]
CIF =	1.47E-04	2.90E-05	3.63E-04	5.39E-04

Noncarcinogenic Intake Factor (NIF), kg/kg-day =
(IR * FI * EF * ED * CF)/(BW * ATC)

	Root	Leafy	Fruit	Total NIF[7]
NIF =	5.71E-04 (Child)	1.13E-04 (Child)	1.40E-03 (Child)	2.08E-03

CARCINOGENIC AND NONCARCINOGENIC RISK CALCULATIONS:

Chemical	CAS[8] No.	Total RME[9] Fruit/Veg Conc (mg/kg)	OSF[10] (kg-d/mg)	ORfD[11] (mg/kg-d)	Cancer Risk[12] RME	Cancer Risk[12] % of Total	Hazard Quotient[13] RME	Hazard Quotient[13] % of Total
Semivolatiles								
Benzo(a)pyrene	50-3-28	5.25E-04	7.30E+00	--	2.064E-06	100	--	--

	RME Cancer Risk	RME Hazard Index
PATHWAY SUMS:	2.06E-06	0.00E+00

Notes:

1. Reasonable maximum exposure.
2. Calculated as 70 years (average lifetime) times 365 days per year.
3. Calculated as exposure duration (in years) times 365 days per year
4. EPA references.
5. Combined values are calculated by weighting adult and child exposure assumptions over the noted exposure duration (e.g., 24 yrs as an adult plus 6 yrs as a child for a total duration of 30 yrs).
6. Carcinogenic intake factor calculated using weighted (combined) exposure assumptions.
7. Noncarcinogenic intake factors are calculated for both adult and child, with the maximum of these used for risk calculations.
8. Chemical Abstract service.
9. Exposure point concentration; NC = not calculated for constituents with no toxicity information.
10. Slope factor.
11. Reference dose.
12. Cancer Risk = (Chemical Concentration, mg/kg * Carcinogenic Intake Factor, kg/kg-day * Slope Factor, kg-day/mg)
13. Hazard Quotient = (Chemical Concentration, mg/kg * Noncarcinogenic Intake Factor, kg/kg-day) / (Reference Dose, mg/kg-day)

Human Health Table C.17
716-A Motor Shops Seepage Basin
Hypothetical Adult/Child Resident
Exposure Assumptions and Risk Calculations
Ingestion of Contaminated Tuberous Vegetables, Leafy Vegetables, and Fruits - (0-4' bls)

Chemical	Soil EP Conc (mg/kg)	Log Kow	Log Koc	TOC[1]	RCF[2] (unitless)	Root Conc.[3] (mg/kg)	TSCF [4] (unitless)	Leaf, Stem, and Fruit Conc.[5]	Total RME Fruit/Veg. Conc [6] (mg/kg)
Semivolatiles									
Benzo(a)pyrene	4.10E-01	6.06	6.74	2.00E-01	1.27E-03	5.23E-04	5.65E-06	2.32E-06	5.25E-04

Note:

1.Site-specific organic carbon content of soil.

2. Root concentration factor (RCF) estimated as Log(RCF(Koc*TOC)-0.82) = 0.77* Log(Kow)-1.52. USEPA 1986.

3.Tuberous vegetable (root) concentration = RCF * EP Conc. USEPA 1986.

4. Transpiration stream concentration factor (TSCF) = (0.784exp-((log(Kow)-1.78)^2/2.44)/(Koc*TOC). USEPA 1986

5. Leaf/stem/fruit concentration = TSCF*EP Conc. USEPA 1986.

6. Total RME = Root Concentration + Leaf/stem/fruit concentration

Reference: USEPA (1986) Methods of Assessing Exposure to Chemical Substances, Volume 8: Methods for Assessing Environmental Pathways of Food Contamination. EPA 560/5-85-008. Office of Toxic Substances.

Human Health Table C.17A
716-A Motor Shops Seepage Basin
Hypothetical Adult/Child Resident
Exposure Assumptions and Risk Calculations
Ingestion of Contaminated Tuberous Vegetables, Leafy Vegetables, and Fruits - (0-4' bls)

EXPOSURE ASSUMPTIONS:

Receptor	Adult Future Resident				Child Future Resident				Combined Adult/Child Future Resident			
Exposure (RME)[1]	Root	Leafy	Fruit		Root	Leafy	Fruit		Root	Leafy	Fruit	
Intake Rate (IR), g/day	202	113	123	(4)	75	42	45	(4)	177	99	107	(5)
Fraction Ingested (FI), unitless	0.119	0.042	0.49	(4)	0.119	0.042	0.49	(4)	0.119	0.04	0.49	(5)
Exposure Frequency (EF),days/yr	350			(4)	350			(4)	350			(5)
Exposure Duration (ED), yrs	240			(4)	6			(4)	30			(5)
Body Weight (BW), kg	70			(4)	15			(4)	59			(5)
Averaging Time, Carc[2] (ATC), days	25,550				NA				25550			
Averaging Time, Noncarc[3] (ATN), days	8,760				2190				10950			
Conversion Factor (CF), kg/g	1.00E-03				1.00E-03				1.00E-03			

INTAKE FACTOR CALCULATIONS

Carcinogenic Intake Factor (CIF), kg/kg-day =
(IR * FI * EF * ED * CF)/(BW * ATC)

	Root	Leafy	Fruit	Total CIF[6]
CIF =	1.47E-04	2.90E-05	3.63E-04	5.39E-04

Noncarcinogenic Intake Factor (NIF), kg/kg-day =
(IR * FI * EF * ED * CF)/(BW * ATC)

	Root	Leafy	Fruit	Total NIF[7]
NIF =	5.71E-04 (Child)	1.13E-04 (Child)	1.40E-03 (Child)	2.08E-03

CARCINOGENIC AND NONCARCINOGENIC RISK CALCULATIONS:

Chemical	CAS[8] No.	Total RME[9] Fruit/Veg Conc (mg/kg)	OSF[10] (kg-d/mg)	ORfD[11] (mg/kg-d)	Cancer Risk[12] RME	Cancer Risk[12] % of Total	Hazard Quotient[13] RME	Hazard Quotient[13] % of Total
Semivolatiles								
Benzo(a)pyrene	50-3-28	5.25E-04	7.30E+00	--	2.06E-06	100		

	RME Cancer Risk	RME Hazard Index
PATHWAY SUMS:	2.06E-06	0.00E+00

Notes:

1. Reasonable maximum exposure.
2. Calculated as 70 years (average lifetime) times 365 days per year.
3. Calculated as exposure duration (in years) times 365 days per year
4. EPA references.
5. Combined values are calculated by weighting adult and child exposure assumptions over the noted exposure duration (e.g., 24 yrs as an adult plus 6 yrs as a child for a total duration of 30 yrs).
6. Carcinogenic intake factor calculated using weighted (combined) exposure assumptions.
7. Noncarcinogenic intake factors are calculated for both adult and child, with the maximum of these used for risk calculations.
8. Chemical Abstract service.
9. Exposure point concentration; NC = not calculated for constituents with no toxicity information.
10. Slope factor.
11. Reference dose.
12. Cancer Risk = (Chemical Concentration, mg/kg * Carcinogenic Intake Factor, kg/kg-day * Slope Factor, kg-day/mg)
13. Hazard Quotient = (Chemical Concentration, mg/kg * Noncarcinogenic Intake Factor, kg/kg-day) / (Reference Dose, mg/kg-day)

Human Health Table C.17A
716-A Motor Shops Seepage Basin
Hypothetical Adult/Child Resident
Exposure Assumptions and Risk Calculations
Ingestion of Contaminated Tuberous Vegetables, Leafy Vegetables, and Fruits - (0-4' bls)

Chemical	Soil EP Conc (mg/kg)	Log Kow	Log Koc	TOC[1]	RCF[2] (unitless)	Root Conc.[3] (mg/kg)	TSCF [4] (unitless)	Leaf, Stem, and Fruit Conc.[5]	Total RME Fruit/Veg. Conc [6] (mg/kg)
Semivolatiles									
Benzo(a)pyrene	4.10E-01	6.06	6.74	2.00E-01	1.27E-03	5.23E-04	5.65E-06	2.32E-06	5.25E-04

Note:

1. Site-specific organic carbon content of soil.
2. Root concentration factor (RCF) estimated as Log(RCF(Koc*TOC)-0.82) = 0.77* Log(Kow)-1.52. USEPA 1986.
3. Tuberous vegetable (root) concentration = RCF * EP Conc. USEPA 1986.
4. Transpiration stream concentration factor (TSCF) = (0.784exp-((log(Kow)-1.78)^2/2.44)/(Koc*TOC). USEPA 1986
5. Leaf/stem/fruit concentration = TSCF*EP Conc. USEPA 1986.
6. Total RME = Root Concentration + Leaf/stem/fruit concentration

Reference: USEPA (1986) Methods of Assessing Exposure to Chemical Substances, Volume 8: Methods for Assessing Environmental Pathways of Food Contaminion. EPA 560/5-85-008. Office of Toxic Substances.

Table C.17B
716-A Motor Shops Seepage Basin
Hypothetical Adult/Child Resident
Risk Determination on Screened PAHs from COPC Selection Process

Analyte	RME Conc. (mg/kg)	TEF Value	Dermal Pathway	Ingestion Pathway	Inhalation Pathway	Combined Pathways
Benzo(a)pyrene	0.41	1.0	2.5E-06	4.5E-06	3.0E-11	7.0E-06
Benzo(a)anthracene	0.50	0.1	3.1E-07	5.5E-07	3.8E-12	8.6E-07
Benzo(b)fluoranthene	0.41	0.1	2.5E-07	4.5E-07	3.1E-12	7.0E-07
Benzo(k)fluoranthene	0.37	0.01	2.0E-08	4.0E-08	2.8E-13	6.0E-08
Chrysene	0.53	0.001	3.2E-09	1.0E-8	4.0E-14	1.3E-08
Indeno(1,2,3-cd) pyrene	0.22	0.10	1.3E-07	2.4E-07	1.7E-12	3.7E-07
Total Combined Soil Risk			3E-06	6E-06	4E-11	9.0E-06

APPENDIX C.5
RISK AND HAZARD CALCULATIONS FOR SCREENED CONSTITUENTS

(Tables C.18 - C.35)

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APPENDIX C.5
RISK AND HAZARD CALCULATIONS FOR SCREENED CONSTITUENTS
List of Tables for Human Health Risk Assessment

Table No.	Receptor	Exposure Route	Interval
C.18	Hypothetical Industrial Worker	Ingestion of Soil	0-1'
C.19	Hypothetical Industrial Worker	Dermal Exposure to Soil	0-1'
C.20	Hypothetical Industrial Worker	Inhalation of Soil Particulates	0-1'
C.21	Hypothetical Industrial Worker	Ingestion of Soil	0-4'
C.22	Hypothetical Industrial Worker	Dermal Exposure to Soil	0-4'
C.23	Hypothetical Industrial Worker	Inhalation of Soil Particulates	0-4'
C.24	Hypothetical Adult/Child Resident	Ingestion of Soil	0-1'
C.25	Hypothetical Adult/Child Resident	Dermal Exposure to Soil	0-1'
C.26	Hypothetical Adult/Child Resident	Inhalation of Soil Particulates	0-1'
C.27	Hypothetical Adult/Child Resident	Ingestion of Contaminated Produce (Tuberous)	0-1'
C.28	Hypothetical Adult/Child Resident	Ingestion of Contaminated Produce (Leafy)	0-1'
C.29	Hypothetical Adult/Child Resident	Ingestion of Contaminated Produce (Fruit)	0-1'
C.30	Hypothetical Adult/Child Resident	Ingestion of Soil	0-4'
C.31	Hypothetical Adult/Child Resident	Dermal Exposure to Soil	0-4'
C.32	Hypothetical Adult/Child Resident	Inhalation of Soil Particulates	0-4'
C.33	Hypothetical Adult/Child Resident	Ingestion of Contaminated Produce (Tuberous)	0-4'
C.34	Hypothetical Adult/Child Resident	Ingestion of Contaminated Produce (Leafy)	0-4'
C.35	Hypothetical Adult/Child Resident	Ingestion of Contaminated Produce (Fruit)	0-4'

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Human Health Table C.18
716-A Motor Shops Seepage Basin
Hypothetical On-Unit Industrial Worker
Exposure Assumptions and Risk Calculations For Screened Unit Constituents > RBC Values**
Ingestion of Soil (0-1' bls)

EXPOSURE ASSUMPTIONS:

Receptor	Future Industrial Worker	
Exposure	RME[1]	
Intake Rate (IR), mg/day	50	(4)
Fraction Ingested (FI), unitless	1	(4)
Exposure Frequency (EF), unitless	250	(4)
Exposure Duration (ED), yrs	25	(4)
Body Weight (BW), kg	70	(4)
Averaging Time, Carc[2] (ATC), days	25,550	
Averaging Time, Noncarc[3] (ATN), days	9,125	
Conversion Factor (CF), kg/mg	1.00E-06	

INTAKE FACTOR CALCULATIONS

Carcinogenic Intake Factor (CIF), kg/kg-day =
(IR * FI * EF * ED * CF)/(BW * ATC)
RME CIF = 1.747E-07

Noncarcinogenic Intake Factor (NIF), kg/kg-day =
(IR * FI * EF * ED * CF)/(BW * ATN)
RME NIF = 4.892E-07

CARCINOGENIC AND NONCARCINOGENIC RISK CALCULATIONS:

Chemical	CAS[5] No.	EP Conc[6] RME (mg/kg)	OSF[7] (kg-d/mg)	ORfD[8] (mg/kg-d)	Cancer Risk[9] RME	Cancer Risk[9] % of Total	Hazard Quotent[10] RME	Hazard Quotent[10] % of Total
Metals								
Arsenic	7440-38-2	1.70E+00	1.5	0.0003	4.456E-07	72.05%	2.77E-03	36.93%
Beryllium	7440-41-7	2.30E-01	4.3	0.005	1.728E-07	27.95%	2.25E-05	0.30%
Iron	7439-89-6	2.89E+03	--	3.00E-01	--	--	0.004713	62.77%
				PATHWAY SUMS:	RME Cancer Risk 6.18E-07		RME Hazard Index 7.51E-03	

Notes:

1. Reasonable maximum exposure.
2. Calculated as 70 years (average lifetime) times 365 days per year.
3. Calculated as exposure duration (in years) times 365 days per year
4. EPA references.
5. Chemical Abstract Service.
6. Exposure point concentration in soil.
7. Slope factor
8. Reference dose.
9. Cancer Risk = (Chemical concentration, mg/kg * Carcinogenic Intake Factor, kg/kg-day * Slope Factor, kg-day/mg).
10. Hazard Quotient = (Chemical Concentration, mg/kg * Noncarcinogenic Intake Factor, kg/kg-day)/(Reference Dose, mg/kg-day)

** Constituents were greater than RBC value but were less than 2x unit background and elimated from unit risk characterization. This table is provided for information only.

Human Health Table C.19
716-A Motor Shops Seepage Basin
Hypothetical On-Unit Industrial Worker
Exposure Assumptions and Risk Calculations For Screened Constituents > RBC Values**
Dermal Exposure to Soil (0-1' bls)

EXPOSURE ASSUMPTIONS:

Receptor	Future Industrial Worker	
Exposure	RME[1]	
Skin Surface Area (SA), cm^2/event	3200	(4)
Soil-to-Skin Adherance (SK),mg/cm^2	1.0	(4)
Exposure Frequency (EF),events/yr	250	(4)
Exposure Duration (ED), yrs	25	(4)
Body Weight (BW), kg	70	(4)
Averaging Time, Carc[2] (ATC), days	25,550	
Averaging Time, Noncarc[3] (ATN), days	9,125	
Conversion Factor (CF), kg/mg	1.00E-06	

INTAKE FACTOR CALCULATIONS

Carcinogenic Intake Factor (CIF), kg/kg-day =
(SA * SK * EF * ED * CF)/(BW * ATC)
RME CIF = 1.118E-05

Noncarcinogenic Intake Factor (NIF), kg/kg-day =
(SA * SK* EF * ED * CF)/(BW * ATN)
RME NIF = 3.131E-05

CARCINOGENIC AND NONCARCINOGENIC RISK CALCULATIONS:

Chemical	CAS[5] No.	EP Conc[6] RME (mg/kg)	DSF[7] (kg-d/mg)	DRfD[8] (mg/kg-d)	DABS[9] (unitless)	Cancer Risk[10] RME	Cancer Risk[10] % of Total	Hazard Quotent[11] RME	Hazard Quotent[11] % of Total
Metals									
Arsenic	7440-38-2	1.70E+00	1.88	2.40E-04	0.001	3.57E-08	3.13%	2.22E-04	11.84%
Beryllium	7440-41-7	2.30E-01	4.30E+02	5.00E-05	0.001	1.106E-06	96.87%	1.44E-04	7.69%
Iron	7439-89-6	2.89E+03	--	0.06	0.001	--	--	1.51E-03	80.48%
					PATHWAY SUMS:	RME Cancer Risk 1.14E-06		RME Hazard Index 1.87E-03	

Notes:

1. Reasonable maximum exposure.
2. Calculated as 70 years (average lifetime) times 365 days per year.
3. Calculated as exposure duration (in years) times 365 days per year
4. EPA references.
5. Chemical Abstract Service.
6. Exposure point concentration.
7. Absorbed dose slope factor = oral slope factor/oral absorption factor, per RAGS, Vol.A, p.A-3
8. Dermal reference dose = oral RfD x oral absorption factor, per RAGS, Vol.A, p.A-2.
9. Dermal absorption factor: 0.01(organics), 0.001 (inorganics)
10. Cancer Risk = (Chemical Concentration, mg/kg * Carcinogenic Intake Factor, kg/kg-day * Absorption Factor, unitless * Slope Factor, kg-day/mg)
11. Hazard Quotient = (Chemical Concentration, mg/kg * Noncarcinogenic Intake Factor, kg/kg-day * Absorption Factor, unitless / Reference Dose, mg/kg-day)

** Constituents were greater than RBC value but were less than 2x unit background and eliminated from unit risk characterization. This table is provided for information only.

Human Health Table C.20
716-A Motor Shops Seepage Basin
Hypothetical On-Unit Industrial Worker
Exposure Assumptions/Risk Calculations For Screened Unit Constituents > RBC Values**
Inhalation of Soil Particulates (0-1' bls)

EXPOSURE ASSUMPTIONS:

Receptor	Future Industrial Worker	
Exposure	RME[1]	
Inhalation Rate (IR), m^3/hr	2.5	(4)
Exposure Time(ET), hrs/day	8	(4)
Exposure Frequency (EF), days/yr	250	(4)
Exposure Duration (ED), yrs	25	(4)
Body weight (BW), kg	70	(4)
Averaging Time, Carc[2] (ATC), days	25,550	
Averaging Time, Noncarc[3] (ATN), days	9,125	

INTAKE FACTOR CALCULATIONS

Carcinogenic Intake Factor (CIF),m^3/kg-day =
(IR * ET* EF * ED)/(BW * ATC)
RME CIF = 6.99E-02

Noncarcinogenic Intake Factor (NIF), m^3/kg-day =
(IR * ET * EF * ED)/(BW * ATN)
RME NIF = 1.96E-01

SOIL PARTICULATE RESUSPENSION FACTOR CALCULATION[5]

Width of contaminated area (LS) =	(site)	10	meters
Wind speed in mixing zone (V) =		2.25	meters/sec
Diffusion height (DH) =		2.00	meters
Area of contamination (A) =	(site)	685.00	$meters^2$
Respirable fraction (RF) =		0.036	$g/meters^2$-hr
Fraction of vegetative cover (G) =		0.25	unitless
Mean annual wind speed (Um) =		4.50	meters/sec
Equivalent threshold value of wind speed at 10 m (Ut) =		12.80	meters/sec
Fraction dependent on Um/Ut (Fx) =		0.0497	unitless
Conversion factor (CFa) =		3600.00	sec/hr
Conversion factor (CFb) =		1000.00	g/kg

CALCULATION OF PARTICULATE EMISSION FACTOR:

Particulate emission factor (PEF) = 4.056E+09 m^3/kg
$(LS*V*DH*CFa*CFb)/(A*RF*(1-G)*((Um/Ut)^3*(Fx))$

CARCINOGENIC AND NONCARCINOGENIC RISK CALCULATIONS:

Chemical	CAS[6] No.	EP Conc[7] RME (mg/kg)	ISF[8] (kg-day/mg)	RfC[9] (mg/m^3)	Cancer Risk[10] RME	Cancer Risk[10] % of Total	Hazard Quotient[11] RME	Hazard Quotient[11] % of Total
Metals								
Arsenic	7440-38-2	1.70E+00	50	--	4.101E-09	97.78%	--	--
Beryllium	7440-41-7	2.30E-01	8.4	--	9.322E-11	2.22%	--	--
Iron	7439-89-6	2.89E+03	--	--	--	--		

	RME Cancer Risk	RME Hazard Index
PATHWAY SUMS:	4.19E-09	0.00E+00

Human Health Table C.20
716-A Motor Shops Seepage Basin
Hypothetical On-Unit Industrial Worker
Exposure Assumptions/Risk Calculations For Screened Unit Constituents > RBC Values**
Inhalation of Soil Particulates (0-1' bls)

Notes:

1. Reasonable maximum exposure.
2. Calculated as 70 years (average lifetime) times 365 days per year.
3. Calculated as exposure duration (in years) times 365 days per year
4. EPA references.
5. Particulate Emission Factor calculation, EPA RAGS, Part B, 1991
6. Chemical Abstract Service.
7. Exposure point concentration in soil.
8. Slope factor
9. Reference dose.
10. Cancer Risk = (RME concentration, mg/kg * Carcinogenic Intake Factor, m^3/kg-day * Slope Factor, kg-day/mg) / (PEF, m^3/kg).
11. Hazard Quotient = Chemical Concentration, mg/kg * Noncarcinogenic Intake Factor, kg/kg-day)/(Reference Dose, mg/kg-day * PEF, m^3/kg)

** Constituents were greater than RBC value but were less than 2x unit background and eliminated from unit risk characterization. This table is provided for information only.

Human Health Table C.21
716-A Motor Shops Seepage Basin
Hypothetical On-Unit Industrial Worker
Exposure Assumptions and Risk Calculations For Screened Unit Constituents > RBC Values**
Ingestion of Soil (0-4' bls)

EXPOSURE ASSUMPTIONS:

Receptor	Future Industrial Worker	
Exposure	RME[1]	
Intake Rate (IR), mg/day	50	(4)
Fraction Ingested (FI), unitless	1	(4)
Exposure Frequency (EF), unitless	250	(4)
Exposure Duration (ED), yrs	25	(4)
Body Weight (BW), kg	70	(4)
Averaging Time, Carc[2] (ATC), days	25,550	
Averaging Time, Noncarc[3] (ATN), days	9,125	
Conversion Factor (CF), kg/mg	1.00E-06	

INTAKE FACTOR CALCULATIONS

Carcinogenic Intake Factor (CIF), kg/kg-day =
(IR * FI * EF * ED * CF)/(BW * ATC)
RME CIF = 1.747E-07

Noncarcinogenic Intake Factor (NIF), kg/kg-day =
(IR * FI * EF * ED * CF)/(BW * ATN)
RME NIF = 4.892E-07

CARCINOGENIC AND NONCARCINOGENIC RISK CALCULATIONS:

Chemical	CAS[5] No.	EP Conc[6] RME (mg/kg)	OSF[7] (kg-d/mg)	ORfD[8] (mg/kg-d)	Cancer Risk[9] RME	Cancer Risk[9] % of Total	Hazard Quotient[10] RME	Hazard Quotient[10] % of Total
Metals								
Aluminum	7429-90-5	5.96E+03	--	1	--	--	2.92E-03	26.81%
Arsenic	7440-38-2	1.57E+00	1.5	0.0003	4.115E-07	60.87%	2.56E-03	23.54%
Beryllium	7440-41-7	3.52E-01	4.3	0.005	2.645E-07	39.13%	3.444E-05	0.32%
Iron	7439-89-6	3.29E+03	--	0.3	--	--	0.0053653	49.33%
				PATHWAY SUMS:	RME Cancer Risk 6.76E-07		RME Hazard Index 1.09E-02	

Notes:

1. Reasonable maximum exposure.
2. Calculated as 70 years (average lifetime) times 365 days per year.
3. Calculated as exposure duration (in years) times 365 days per year
4. EPA references.
5. Chemical Abstract Service.
6. Exposure point concentration in soil.
7. Slope factor
8. Reference dose.
9. Cancer Risk = (Chemical concentration, mg/kg * Carcinogenic Intake Factor, kg/kg-day * Slope Factor, kg-day/mg).
10. Hazard Quotient = (Chemical Concentration, mg/kg * Noncarcinogenic Intake Factor, kg/kg-day)/(Reference Dose, mg/kg-day)

** Constituents were greater than RBC value but were less than 2x unit background and eliminated from unit risk characterization. This table is provided for information only.

Human Health Table C.22
716-A Motor Shops Seepage Basin
Hypothetical On-Unit Industrial Worker
Exposure Assumptions and Risk Calculations For Screened Constituents > RBC Values**
Dermal Exposure to Soil (0-4' bls)

EXPOSURE ASSUMPTIONS:

Receptor	Future Industrial Worker	
Exposure	RME[1]	
Skin Surface Area (SA), cm^2/event	3200	(4)
Soil-to-Skin Adherance (SK),mg/cm^2	1.0	(4)
Exposure Frequency (EF),events/yr	250	(4)
Exposure Duration (ED), yrs	25	(4)
Body Weight (BW), kg	70	(4)
Averaging Time, Carc[2] (ATC), days	25,550	
Averaging Time, Noncarc[3] (ATN), days	9,125	
Conversion Factor (CF), kg/mg	1.00E-06	

INTAKE FACTOR CALCULATIONS

Carcinogenic Intake Factor (CIF), kg/kg-day =
(SA * SK * EF * ED * CF)/(BW * ATC)
RME CIF = 1.118E-05

Noncarcinogenic Intake Factor (NIF), kg/kg-day =
(SA * SK* EF * ED * CF)/(BW * ATN)
RME NIF = 3.131E-05

CARCINOGENIC AND NONCARCINOGENIC RISK CALCULATIONS:

Chemical	CAS[5] No.	EP Conc[6] RME (mg/kg)	DSF[7] (kg-d/mg)	DRfD[8] (mg/kg-d)	DABS[9] (unitless)		Cancer Risk[10] RME	Cancer Risk[10] % of Total	Hazard Quotent[11] RME	Hazard Quotent[11] % of Total
Metals										
Aluminum	7429-90-5	5.96E+03	--	4.00E-02	0.001	--	--	--	4.67E-03	68.53%
Arsenic	7440-38-2	1.57E+00	1.88	2.40E-04	0.001		3.30E-08	1.91%	2.05E-04	3.01%
Beryllium	7440-41-7	3.52E-01	4.30E+02	5.00E-05	0.001		1.69E-06	98.09%	2.20E-04	3.24%
Iron	7439-89-6	3.29E+03	--	0.06	0.001	--	--	--	1.72E-03	25.22%
					PATHWAY SUMS:		RME Cancer Risk 1.73E-06		RME Hazard Index 6.81E-03	

Notes:

1. Reasonable maximum exposure.
2. Calculated as 70 years (average lifetime) times 365 days per year.
3. Calculated as exposure duration (in years) times 365 days per year
4. EPA references.
5. Chemical Abstract Service.
6. Exposure point concentration.
7. Absorbed dose slope factor = oral slope factor/oral absorption factor, per RAGS, Vol.A, p.A-3
8. Dermal reference dose = oral RfD x oral absorption factor, per RAGS, Vol.A, p.A-2.
9. Dermal absorption factor: 0.01(organics), 0.001 (inorganics)
10. Cancer Risk = (Chemical Concentration, mg/kg * Carcinogenic Intake Factor, kg/kg-day * Absorption Factor, unitless * Slope Factor, kg-day/mg)
11. Hazard Quotient = (Chemical Concentration, mg/kg * Noncarcinogenic Intake Factor, kg/kg-day * Absorption Factor, unitless / Reference Dose, mg/kg-day)

** Constituents were greater than RBC value but were less than 2x unit background and eliminated from unit risk characterization. This table is provided for information only.

Human Health Table C.23
716-A Motor Shops Seepage Basin
Hypothetical On-Unit Industrial Worker
Exposure Assumptions/Risk Calculations For Screened Unit Constituents > RBC Values**
Inhalation of Soil Particulates (0-4' bls)

EXPOSURE ASSUMPTIONS:

Receptor	Future Industrial Worker	
Exposure	RME[1]	
Inhalation Rate (IR), m^3/hr	2.5	(4)
Exposure Time(ET), hrs/day	8	(4)
Exposure Frequency (EF), days/yr	250	(4)
Exposure Duration (ED), yrs	25	(4)
Body weight (BW), kg	70	(4)
Averaging Time, Carc[2] (ATC), days	25,550	
Averaging Time, Noncarc[3] (ATN), days	9,125	

INTAKE FACTOR CALCULATIONS

Carcinogenic Intake Factor (CIF),m^3/kg-day =
(IR * ET* EF * ED)/(BW * ATC)
RME CIF = 6.99E-02

Noncarcinogenic Intake Factor (NIF), m^3/kg-day =
(IR * ET * EF * ED)/(BW * ATN)
RME NIF = 1.96E-01

SOIL PARTICULATE RESUSPENSION FACTOR CALCULATION[5]

Width of contaminated area (LS) =	(site)	10	meters
Wind speed in mixing zone (V) =		2.25	meters/sec
Diffusion height (DH) =		2.00	meters
Area of contamination (A) =	(site)	685.00	$meters^2$
Respirable fraction (RF) =		0.036	$g/meters^2$-hr
Fraction of vegetative cover (G) =		0.25	unitless
Mean annual wind speed (Um) =		4.50	meters/sec
Equivalent threshold value of wind speed at 10 m (Ut) =		12.80	meters/sec
Fraction dependent on Um/Ut (Fx) =		0.0497	unitless
Conversion factor (CFa) =		3600.00	sec/hr
Conversion factor (CFb) =		1000.00	g/kg

CALCULATION OF PARTICULATE EMISSION FACTOR:

Particulate emission factor (PEF) = 4.056E+09 m^3/kg
(LS*V*DH*CFa*CFb)/(A*RF*(1-G)*((Um/Ut)^3*(Fx))

CARCINOGENIC AND NONCARCINOGENIC RISK CALCULATIONS:

Chemical	CAS[6] No.	EP Conc[7] RME (mg/kg)	ISF[8] (kg-day/mg)	RfC[9] (mg/m^3)	Cancer Risk[10] RME	Cancer Risk[10] % of Total	Hazard Quotent[11] RME	Hazard Quotent[11] % of Total
Metals								
Aluminum	7429-90-5	5.96E+03	--	--	--	--		
Arsenic	7440-38-2	1.57E+00	50	--	3.787E-09	96.37%	--	--
Beryllium	7440-41-7	3.52E-01	8.4	--	1.427E-10	3.63%	--	--
Iron	7439-89-6	3.29E+03	--	--	--	--		

PATHWAY SUMS:	RME Cancer Risk	RME Hazard Index
	3.93E-09	0.00E+00

Human Health Table C.23
716-A Motor Shops Seepage Basin
Hypothetical On-Unit Industrial Worker
Exposure Assumptions/Risk Calculations For Screened Unit Constituents > RBC Values**
Inhalation of Soil Particulates (0-4' bls)

Notes:

1. Reasonable maximum exposure.
2. Calculated as 70 years (average lifetime) times 365 days per year.
3. Calculated as exposure duration (in years) times 365 days per year
4. EPA references.
5. Particulate Emission Factor calculation, EPA RAGS, Part B, 1991
6. Chemical Abstract Service.
7. Exposure point concentration in soil.
8. Slope factor
9. Reference dose.
10. Cancer Risk = (RME concentration, mg/kg * Carcinogenic Intake Factor, m^3/kg-day * Slope Factor, kg-day/mg) / (PEF, m^3/kg).
11. Hazard Quotient = Chemical Concentration, mg/kg * Noncarcinogenic Intake Factor, kg/kg-day)/(Reference Dose, mg/kg-day * PEF, m^3/kg)

** Constituents were greater than RBC value but were less than 2x unit background and eliminated from unit risk characterization. This table is provided for information only.

Human Health Table C.24
716-A Motor Shops Seepage Basin
Hypothetical Adult/Child Resident
Exposure Assumptions and Risk Calculations For Screened Constituents > RBC Values**
Ingestion of Soil (0-1' bls)

EXPOSURE ASSUMPTIONS:

Receptor	Adult Future Resident		Child Future Resident		Combined Adult/Child Future Resident	
Exposure	RME[1]		RME		RME	
Intake Rate (IR), mg/day	100	(4)	200	(4)	120	(5)
Fraction Ingested (FI), unitless	1	(4)	1	(4)	1	(5)
Exposure Frequency (EF), unitless	350	(4)	350	(4)	350	(5)
Exposure Duration (ED), yrs	24	(4)	6	(4)	30	(5)
Body Weight (BW), kg	70	(4)	15	(4)	59	(5)
Averaging Time, Carc[2] (ATC), days	25,550		NA		25550	
Averaging Time, Noncarc[3] (ATN), days	8,760		2190		10950	
Conversion Factor (CF), kg/mg	1.00E-06		1.00E-06		1.00E-06	

INTAKE FACTOR CALCULATIONS

Carcinogenic Intake Factor (CIF), kg/kg-day =
(IR * FI * EF * ED * CF)/(BW * ATC)
RME CIF = 8.358E-07 (6)

Noncarcinogenic Intake Factor (NIF), kg/kg-day =
(IR * FI * EF * ED * CF)/(BW * ATN)
RME NIF = 1.279E-05 (7)

CARCINOGENIC AND NONCARCINOGENIC RISK CALCULATIONS:

Chemical	CAS[8] No.	EP Conc[9] RME (mg/kg)	OSF[10] (kg-d/mg)	ORfD[11] (mg/kg-d)	Cancer Risk[12] RME	Cancer Risk[12] % of Total	Hazard Quotient[13] RME	Hazard Quotient[13] % of Total
Metals								
Arsenic	7440-38-2	1.70E+00	1.5	0.0003	2.1314E-06	72.054253	0.0724505	36.93%
Beryllium	7440-41-7	2.30E-01	4.3	0.005	8.2665E-07	27.945747	0.0005881	0.30%
Iron	7439-89-6	2.89E+03	--	0.3	--	--	0.1231659	62.77%
				PATHWAY SUMS:	RME Cancer Risk 2.96E-06		RME Hazard Index 1.96E-01	

Notes:

1. Reasonable maximum exposure.
2. Calculated as 70 years (average lifetime) times 365 days per year.
3. Calculated as exposure duration (in years) times 365 days per year
4. EPA references.
5. Combined values are calculated by weighting adult and child exposure assumptions over the noted exposure duration (e.g., 24 yrs as an adult plus 6 yrs as a child for a total duration of 30 yrs).
6. Carcinogenic intake factor calculated using weighted (combined) exposure assumptions.
7. Noncarcinogenic intake factors are calculated for both adult and child, with the maximum of these used for risk calculations.
8. Chemical Abstract service.
9. Exposure point concentration.
10. Slope factor
11. Reference dose.
12. Cancer Risk = (Chemical concentration, mg/kg * Carcinogenic Intake Factor, kg/kg-day * Slope Factor, kg-day/mg).
13. Hazard Quotient = Chemical Concentration, mg/kg * Noncarcinogenic Intake Factor, kg/kg-day)/(Reference Dose, mg/kg-day)

** Constituents were greater than RBC value but were less than 2X unit background and eliminated from unit risk characterization. This table is provided for information only.

Human Health Table C.25
716-A Motor Shops Seepage Basin
Hypothetical Adult/Child Resident
Exposure Assumptions and Risk Calculations For Screened Constituents > RBC Values**
Dermal Exposure to Soil (0-1' bls)

EXPOSURE ASSUMPTIONS:

Receptor	Adult Future Resident		Child Future Resident		Combined Adult/Child Future Resident	
Exposure	RME[1]		RME		RME	
Skin Surface Area (SA), cm^2/event	5000	(4)	1800	(4)	4360	(5)
Soil-to-Skin Adherance (SK),mg/cm^2	1	(4)	1	(4)	1	(5)
Exposure Frequency (EF),events/yr	350	(4)	350	(4)	350	(5)
Exposure Duration (ED), yrs	240	(4)	6	(4)	30	(5)
Body Weight (BW), kg	70	(4)	15	(4)	59	(5)
Averaging Time, Carc[2] (ATC), days	25,550		NA		25550	
Averaging Time, Noncarc[3] (ATN), days	8,760		2190		10950	
Conversion Factor (CF), kg/mg	1.00E-06		1.00E-06		1.00E-06	

INTAKE FACTOR CALCULATIONS

Carcinogenic Intake Factor (CIF), kg/kg-day =
(SA * SK * EF * ED * CF)/(BW * ATC)
RME CIF = 3.037E-05 (6)

Noncarcinogenic Intake Factor (NIF), kg/kg-day =
(SA * SK* EF * ED * CF)/(BW * ATN)
RME NIF = 0.0001151 (7)

CARCINOGENIC AND NONCARCINOGENIC RISK CALCULATIONS:

Chemical	CAS[8] No.	EP Conc[9] RME (mg/kg)	DSF[10] (kg-d/mg)	DRfD[11] (mg/kg-d)	DABS[12] (unitless)	Cancer Risk[13] RME	Cancer Risk[13] % of Total	Hazard Quotent[14] RME	Hazard Quotent[14] % of Total
Metals									
Arsenic	7440-38-2	1.70E+00	1.88	2.40E-04	0.001	9.706E-08	3.13%	8.15E-04	11.84%
Beryllium	7440-41-7	2.30E-01	4.30E+02	5.00E-05	0.001	3.0035E-06	96.87%	5.29E-04	7.69%
Iron	7439-89-6	2.89E+03	--	0.06	0.001	--	--	5.54E-03	80.48%
					PATHWAY SUMS:	RME Cancer Risk 3.10E-06		RME Hazard Index 6.89E-03	

Notes:
1. Reasonable maximum exposure.
2. Calculated as 70 years (average lifetime) times 365 days per year.
3.Calculated as exposure duration (in years) times 365 days per year
4. EPA references.
5. Combined values are calculated by weighting adult and child exposure assumptions over the noted exposure duration (e.g., 24 yrs as an adult plus 6 yrs as a child for a total duration of 30 yrs).
6. Carcinogenic intake factor calculated using weighted (combined) exposure assumptions.
7. Noncarcinogenic intake factors are calculated for both adult and child, with the maximum of these used for risk calculations.
8. Chemical Abstract service.
9. Exposure point concentration.
10. Absorbed dose slope factor = oral slope factor /oral absorption factor, Vol.A, p.A-3
11. Dermal reference dose = oral RfD x oral absorption factor, per RAGS, Vol.A, p.A-2.
12.Dermal absorption factor: 0.01(organics), 0.001 (inorganics)
13. Cancer Risk = (Chemical Concentration, mg/kg * Carcinogenic Intake Factor, kg/kg-day * Absorption Factor, unitless * Slope Factor, kg-day/mg)
14. Hazard Quotient = (Chemical Concentration, mg/kg * Noncarcinogenic Intake Factor, kg/kg-day * Absorption Factor, unitless / Reference Dose, mg/kg-day)
** Constituents were greater than RBC value but were less than 2X unit background and eliminated from unit risk characterization. This table is provided for information only.

Human Health Table C.26
716-A Motor Shops Seepage Basin
Hypothetical Adult/Child Resident
Exposure Assumptions/Risk Calculations For Screened Unit Constituents > RBC Values **
Inhalation of Soil Particulate (0-1' bls)

EXPOSURE ASSUMPTIONS:

Receptor	Adult Future Resident		Child Future Resident		Combined Adult/Child Future Resident	
Exposure	RME[1]		RME[1]		RME[1]	
Inhalation Rate (IR), m^3/hr	0.83	(4)	1	(4)	0.9	(5)
Exposure Time(ET), hrs/day	15	(4)	18	(4)	16	(5)
Exposure Frequency (EF), days/yr	350	(4)	350	(4)	350	(5)
Exposure Duration (ED), yrs	24	(4)	6	(4)	30	(5)
Body weight (BW), kg	70	(4)	15	(4)	59	(5)
Averaging Time, Carc[2] (ATC), days	25,550		NA		25,550	
Averaging Time, Noncarc[3] (ATN), days	8,760		2,190		10,950	

INTAKE FACTOR CALCULATIONS

Carcinogenic Intake Factor (CIF), m^3/kg-day =
(IR * ET* EF * ED)/(BW * ATC)
RME CIF = 1.00E-01 (6)

Noncarcinogenic Intake Factor (NIF), m^3/kg-day =
(IR * ET * EF * ED)/(BW * ATN)
RME NIF = 1.15E+00 (7)
(Child Value)

SOIL PARTICULATE RESUSPENSION FACTOR CALCULATION[8]

Width of contaminated area (LS) =	(site)	10	meters	(9)
Wind speed in mixing zone (V) =		2.25	meters/sec	(9)
Diffusion height (DH) =		2.00	meters	(9)
Area of contamination (A) =	(site)	685.00	$meters^2$	(9)
Respirable fraction (RF) =		0.036	$g/meters^2$-hr	(9)
Fraction of vegetative cover (G) =		0.25	unitless	(9)
Mean annual wind speed (Um) =		4.50	meters/sec	(9)
Equivalent threshold value of wind speed at 10 m (Ut) =		12.80	meters/sec	(9)
Fraction dependent on Um/Ut (Fx) =		0.0497	unitless	(9)
Conversion factor (CFa) =		3600.00	sec/hr	(9)
Conversion factor (CFb) =		1000.00	g/kg	(9)

CALCULATION OF PARTICULATE EMISSION FACTOR:

Particulate emission factor (PEF) = 4.056E+09 m^3/kg
$(LS*V*DH*CFa*CFb)/(A*RF*(1-G)*((Um/Ut)^3*(Fx))$

CARCINOGENIC AND NONCARCINOGENIC RISK CALCULATIONS:

Chemical	CAS[10] No	EP Conc[11] RME (mg/kg)	ISF[12] (kg-day/mg)	RfC[13] (mg/m^3)	Cancer Risk[14] RME	Cancer Risk[14] % of Total	Hazard Quotent[15] RME	Hazard Quotent[15] % of Total
Metals								
Arsenic	7440-38-2	1.70E+00	5.00E+01	--	2.102E-09	97.78%	--	--
Beryllium	7440-41-7	2.30E-01	8.4	--	4.778E-11	2.22%	--	--
Iron	7439-89-6	2.89E+03	--	--	--	--	--	--

	RME Cancer Risk	RME Hazard Index
PATHWAY SUMS:	2.15E-09	0.00E+00

Human Health Table C.26
716-A Motor Shops Seepage Basin
Hypothetical Adult/Child Resident
Exposure Assumptions/Risk Calculations For Screened Unit Constituents > RBC Values **
Inhalation of Soil Particulate (0-1' bls)

Notes:

1. Reasonable maximum exposure.
2. Averaging time, carcinogen; calculated as 70 years (average lifetime) times 365 days per year (not applicable to child resident)
3. Averaging time, noncarcinogen; calculated as exposure duration (in years) times 365 days per year
4. EPA references.
5. Combined values are calcualted by weighting adult and child exposure assumptions over the noted exposure duration (e.g., 24 yrs as an adult plus 6 yers as a child for a total duration of 30 yrs)
6. Carcinogenic Intake factor calcualted using weighted (combined) exposure assumptions.
7. Noncarcinogenic intake factors are caluclated for both adult and child, with the maximum of these used for risk calculations.
8. USEPA, 1991: RAGS: Vol 1--Human Health Evalution Manual (Part B, Development of Risk-Based Preliminary Remediation Goals)
9. Site specific or default values from USEPA, 1991.
10. Chemical Abstract Service.
11. Exposure point concentration in soil.
12. Slope factor
13. Reference dose.
14. Cancer Risk = (RME concentration, mg/kg * Carcinogenic Intake Factor, m^3/kg-day * Slope Factor, kg-day/mg) / (PEF, m^3/kg).
15. Hazard Quotient = Chemical Concentration, mg/kg * Noncarcinogenic Intake Factor, kg/kg-day)/(Reference Dose, mg/kg-day * PEF, m^3/kg)

** Constituents were greater than RBC value but were less than 2X unit background and eliminated from unit risk characterization. This table is provided for information only.

Human Health Table C.27
716-A Motor Shops Seepage Basin
Hypothetical Adult/Child Resident
Exposure Assumptions and Risk Calculations For Screened Constituents > RBC Values**
Ingestion of Home Grown Produce (Tuberous) - (0-1' bls)

EXPOSURE ASSUMPTIONS:

Receptor	Adult Future Resident RME (Tuberous)[1]		Child Future Resident RME (Tuberous)[1]		Combined Adult/Child Future Resident RME (Tuberous)[1]	
Exposure (RME)[1]						
Intake Rate (IR), g/day	202	(4)	75	(4)	177	(5)
Fraction Ingested (FI), unitless	0.119	(4)	0.119	(4)	0.119	(5)
Exposure Frequency (EF),days/yr	350	(4)	350	(4)	350	(5)
Exposure Duration (ED), yrs	240	(4)	6	(4)	30	(5)
Body Weight (BW), kg	70	(4)	15	(4)	59	(5)
Averaging Time, Carc[2] (ATC), days	25,550		NA		25,550	
Averaging Time, Noncarc[3] (ATN), days	8,760		2190		10950	
Conversion Factor (CF), kg/g	1.00E-03		1.00E-03		1.00E-03	

INTAKE FACTOR CALCULATIONS

Carcinogenic Intake Factor (CIF), kg/kg-day =
(IR * FI* EF * ED * CF)/(BW * ATC) =
RME CIF = 0.0001467 (6)

Noncarcinogenic Intake Factor (NIF), kg/kg-day =
(IR * FI* EF * ED * CF)/(BW * ATN) =
RME NIF = 0.0005705 (7)
(Child)

CARCINOGENIC AND NONCARCINOGENIC RISK CALCULATIONS:

Chemical	CAS[8] No.	EP Conc[9] in Soil (mg/kg)	Soil-To-Plant[10] Transfer Factor	Concentration[11] in Produce (mg/kg)	OSF[12] (kg-d/mg)	ORfD[13] (mg/kg-d)	Cancer Risk[14] RME	Cancer Risk[14] % of Total	Hazard Quotent[15] RME	Hazard Quotent[15] % of Total
Metals										
Arsenic	7440-38-2	1.70E+00	6.00E-03	2.55E-03	1.50E+00	3.00E-04	5.6117E-07	91.16%	4.85E-03	77.80%
Beryllium	7440-41-7	2.30E-01	1.50E-03	8.63E-05	4.3	0.005	5.4412E-08	8.84%	9.84E-06	0.16%
Iron	7439-89-6	2.89E+03	1.00E-03	7.23E-01	--	3.00E-01	--	--	1.37E-03	22.04%
					PATHWAY SUMS:		RME Cancer Risk 6.16E-07		RME Hazard Index 6.23E-03	

Notes:

1. Reasonable maximum exposure.
2. Calculated as 70 years (average lifetime) times 365 days per year.
3. Calculated as exposure duration (in years) times 365 days per year
4. EPA references.
5. Combined values are calculated by weighting adult and child exposure assumptions over the noted exposure duration (e.g., 24 yrs as an adult plus 6 yrs as a child for a total duration of 30 yrs).
6. Carcinogenic intake factor calculated using weighted (combined) exposure assumptions.
7. Noncarcinogenic intake factors are calculated for both adult and child, with the maximum of these used for risk calculations.
8. Chemical Abstract service.
9. Exposure point concentration.
10. Constituent specific soil-to-plant tranfer factors for inorganics, (mg/kg dry plant per mg/kg dry soil), per NUREG/CR-5512, 1992, p.6.25
11. Concentration in Produce = (Chemical concentration, mg/kg * Soil-to-Plant Transfer Factor * dry-to-wet conversion factor)
    Dry to wet conversion factor for fruits = 0.18; leafy vegetables = 0.2; tuberous = 0.25
12. Slope factor.
13. Reference dose.
14. Cancer Risk = (Chemical Concentration in produce, mg/kg * Carcinogenic Intake Factor, kg/kg-day * Slope Factor, kg-day/mg)
15. Hazard Quotient = (Chemical Concentration in produce, mg/kg * Noncarcinogenic Intake Factor, kg/kg-day / Reference Dose, mg/kg-day)

** Constituents were greater than RBC value but were less than 2X unit background and eliminated from unit risk characterization. This table is provided for information only.

Human Health Table C.28
716-A Motor Shops Seepage Basin
Hypothetical Adult/Child Resident
Exposure Assumptions and Risk Calculations For Screened Constituents > RBC Values**
Ingestion of Home Grown Produce (Leafy) - (0-1' bls)

EXPOSURE ASSUMPTIONS:

Receptor	Adult Future Resident RME (Leafy)[1]		Child Future Resident RME (Leafy)[1]		Combined Adult/Child Future Resident RME (Leafy)[1]	
Exposure (RME)[1]						
Intake Rate (IR), g/day	113	(4)	42	(4)	99	(5)
Fraction Ingested (FI), unitless	0.119	(4)	0.119	(4)	0.119	(5)
Exposure Frequency (EF),days/yr	350	(4)	350	(4)	350	(5)
Exposure Duration (ED), yrs	240	(4)	6	(4)	30	(5)
Body Weight (BW), kg	70	(4)	15	(4)	59	(5)
Averaging Time, Carc[2] (ATC), days	25,550		NA		25,550	
Averaging Time, Noncarc[3] (ATN), days	8,760		2190		10950	
Conversion Factor (CF), kg/g	1.00E-03		1.00E-03		1.00E-03	

INTAKE FACTOR CALCULATIONS

Carcinogenic Intake Factor (CIF), kg/kg-day =
(IR * FI* EF * ED * CF)/(BW * ATC) =
RME CIF = 8.206E-05 (6)

Noncarcinogenic Intake Factor (NIF), kg/kg-day =
(IR * FI* EF * ED * CF)/(BW * ATN) =
RME NIF = 0.0003195 (7)
(Child)

CARCINOGENIC AND NONCARCINOGENIC RISK CALCULATIONS:

Chemical	CAS[8] No.	EP Conc[9] in Soil (mg/kg)	Soil-To-Plant[10] Transfer Factor	Concentration[11] in Produce (mg/kg)	OSF[12] (kg-d/mg)	ORfD[13] (mg/kg-d)	Cancer Risk[14] RME	Cancer Risk[14] % of Total	Hazard Quotent[15] RME	Hazard Quotent[15] % of Total
Metals										
Arsenic	7440-38-2	1.70E+00	4.00E-02	1.36E-02	1.50E+00	3.00E-04	1.674E-06	91.16%	1.45E-02	85.32%
Beryllium	7440-41-7	2.30E-01	1.00E-02	4.60E-04	4.3	0.005	1.6231E-07	8.84%	2.94E-05	0.17%
Iron	7439-89-6	2.89E+03	4.00E-03	2.31E+00	--	3.00E-01	--	--	2.46E-03	14.50%
					PATHWAY SUMS:		RME Cancer Risk 1.84E-06		RME Hazard Index 1.70E-02	

Notes:
1. Reasonable maximum exposure.
2. Calculated as 70 years (average lifetime) times 365 days per year.
3. Calculated as exposure duration (in years) times 365 days per year
4. EPA references.
5. Combined values are calculated by weighting adult and child exposure assumptions over the noted exposure duration (e.g., 24 yrs as an adult plus 6 yrs as a child for a total duration of 30 yrs).
6. Carcinogenic intake factor calculated using weighted (combined) exposure assumptions.
7. Noncarcinogenic intake factors are calculated for both adult and child, with the maximum of these used for risk calculations.
8. Chemical Abstract service.
9. Exposure point concentration.
10. Constituent specific soil-to-plant tranfer factors for inorganics, (mg/kg dry plant per mg/kg dry soil), per NUREG/CR-5512, 1992, p.6.25
11. Concentration in Produce = (Chemical concentration, mg/kg * Soil-to-Plant Transfer Factor * dry-to-wet conversion factor)
Dry to wet conversion factor for fruits = 0.18; leafy vegetables = 0.2; tuberous = 0.25
12. Slope factor.
13. Reference dose.
14. Cancer Risk = (Chemical Concentration in produce, mg/kg * Carcinogenic Intake Factor, kg/kg-day * Slope Factor, kg-day/mg)
15. Hazard Quotient = (Chemical Concentration in produce, mg/kg * Noncarcinogenic Intake Factor, kg/kg-day / Reference Dose, mg/kg-day)

** Constituents were greater than RBC value but were less than 2X unit background and eliminated from unit risk characterization. This table is provided for information only.

Human Health Table C.29
716-A Motor Shops Seepage Basin
Hypothetical Adult/Child Resident
Exposure Assumptions and Risk Calculations For Screened Constituents > RBC Values**
Ingestion of Home Grown Produce (Fruit) - (0-1' bls)

EXPOSURE ASSUMPTIONS:

Receptor Exposure (RME)[1]	Adult Future Resident RME (Fruit)[1]		Child Future Resident RME (Fruit)[1]		Combined Adult/Child Future Resident RME (Fruit)[1]	
Intake Rate (IR), g/day	123	(4)	45	(4)	107	(5)
Fraction Ingested (FI), unitless	0.119	(4)	0.119	(4)	0.119	(5)
Exposure Frequency (EF),days/yr	350	(4)	350	(4)	350	(5)
Exposure Duration (ED), yrs	240	(4)	6	(4)	30	(5)
Body Weight (BW), kg	70	(4)	15	(4)	59	(5)
Averaging Time, Carc[2] (ATC), days	25,550		NA		25,550	
Averaging Time, Noncarc[3] (ATN), days	8,760		2190		10950	
Conversion Factor (CF), kg/g	1.00E-03		1.00E-03		1.00E-03	

INTAKE FACTOR CALCULATIONS

Carcinogenic Intake Factor (CIF), kg/kg-day =
(IR * FI* EF * ED * CF)/(BW * ATC) =
RME CIF = 8.869E-05 (6)

Noncarcinogenic Intake Factor (NIF), kg/kg-day =
(IR * FI* EF * ED * CF)/(BW * ATN) =
RME NIF = 0.0003423 (7)
(Child)

CARCINOGENIC AND NONCARCINOGENIC RISK CALCULATIONS:

Chemical	CAS[8] No.	EP Conc[9] in Soil (mg/kg)	Soil-To-Plant[10] Transfer Factor	Concentration[11] in Produce (mg/kg)	OSF[12] (kg-d/mg)	ORfD[13] (mg/kg-d)	Cancer Risk[14] RME	Cancer Risk[14] % of Total	Hazard Quotent[15] RME	Hazard Quotent[15] % of Total
Metals										
Arsenic	7440-38-2	1.70E+00	6.00E-03	1.84E-03	1.50E+00	3.00E-04	2.4425E-07	91.16%	2.10E-03	77.80%
Beryllium	7440-41-7	2.30E-01	1.50E-03	6.21E-05	4.3	0.005	2.3683E-08	8.84%	4.25E-06	0.16%
Iron	7439-89-6	2.89E+03	1.00E-03	5.20E-01	--	3.00E-01	--	--	5.94E-04	22.04%
					PATHWAY SUMS:		RME Cancer Risk 2.68E-07		RME Hazard Index 2.69E-03	

Notes:

1. Reasonable maximum exposure.
2. Calculated as 70 years (average lifetime) times 365 days per year.
3. Calculated as exposure duration (in years) times 365 days per year
4. EPA references.
5. Combined values are calculated by weighting adult and child exposure assumptions over the noted exposure duration (e.g., 24 yrs as an adult plus 6 yrs as a child for a total duration of 30 yrs).
6. Carcinogenic intake factor calculated using weighted (combined) exposure assumptions.
7. Noncarcinogenic intake factors are calculated for both adult and child, with the maximum of these used for risk calculations.
8. Chemical Abstract service.
9. Exposure point concentration.
10. Constituent specific soil-to-plant tranfer factors for inorganics, (mg/kg dry plant per mg/kg dry soil), per NUREG/CR-5512, 1992, p.6.25
11. Concentration in Produce = (Chemical concentration, mg/kg * Soil-to-Plant Transfer Factor * dry-to-wet conversion factor)
    Dry to wet conversion factor for fruits = 0.18; leafy vegetables = 0.2; tuberous = 0.25
12. Slope factor.
13. Reference dose.
14. Cancer Risk = (Chemical Concentration in produce, mg/kg * Carcinogenic Intake Factor, kg/kg-day * Slope Factor, kg-day/mg)
15. Hazard Quotient = (Chemical Concentration in produce, mg/kg * Noncarcinogenic Intake Factor, kg/kg-day / Reference Dose, mg/kg-day)

** Constituents were greater than RBC value but were less than 2X unit background and eliminated from unit risk characterization. This table is provided for information only.

Human Health Table C.30
716-A Motor Shops Seepage Basin
Hypothetical Adult/Child Resident
Exposure Assumptions and Risk Calculations For Screened Constituents > RBC Values**
Ingestion of Soil (0-4' bls)

EXPOSURE ASSUMPTIONS:

Receptor	Adult Future Resident		Child Future Resident		Combined Adult/Child Future Resident	
Exposure	RME[1]		RME		RME	
Intake Rate (IR), mg/day	100	(4)	200	(4)	120	(5)
Fraction Ingested (FI), unitless	1	(4)	1	(4)	1	(5)
Exposure Frequency (EF), unitless	350	(4)	350	(4)	350	(5)
Exposure Duration (ED), yrs	24	(4)	6	(4)	30	(5)
Body Weight (BW), kg	70	(4)	15	(4)	59	(5)
Averaging Time, Carc[2] (ATC), days	25,550		NA		25550	
Averaging Time, Noncarc[3] (ATN), days	8,760		2190		10950	
Conversion Factor (CF), kg/mg	1.00E-06		1.00E-06		1.00E-06	

INTAKE FACTOR CALCULATIONS

Carcinogenic Intake Factor (CIF), kg/kg-day =
(IR * FI * EF * ED * CF)/(BW * ATC)
RME CIF = 8.358E-07 (6)

Noncarcinogenic Intake Factor (NIF), kg/kg-day =
(IR * FI * EF * ED * CF)/(BW * ATN)
RME NIF = 1.279E-05 (7)

CARCINOGENIC AND NONCARCINOGENIC RISK CALCULATIONS:

Chemical	CAS[8] No.	EP Conc[9] RME (mg/kg)	OSF[10] (kg-d/mg)	ORfD[11] (mg/kg-d)	Cancer Risk[12] RME	Cancer Risk[12] % of Total	Hazard Quotient[13] RME	Hazard Quotient[13] % of Total
Metals								
Aluminum	7429-90-5	5.96E+03		1	--	--	0.0762009	26.81%
Arsenic	7440-38-2	1.57E+00	1.5	0.0003	1.968E-06	60.874735	0.0669102	23.54%
Beryllium	7440-41-7	3.52E-01	4.3	0.005	1.265E-06	39.125265	0.0009001	0.32%
Iron	7439-89-6	3.29E+03	--	0.3	--	--	0.1402131	49.33%
				PATHWAY SUMS:	RME Cancer Risk 3.23E-06		RME Hazard Index 2.84E-01	

Notes:

1. Reasonable maximum exposure.
2. Calculated as 70 years (average lifetime) times 365 days per year.
3. Calculated as exposure duration (in years) times 365 days per year
4. EPA references.
5. Combined values are calculated by weighting adult and child exposure assumptions over the noted exposure duration (e.g., 24 yrs as an adult plus 6 yrs as a child for a total duration of 30 yrs).
6. Carcinogenic intake factor calculated using weighted (combined) exposure assumptions.
7. Noncarcinogenic intake factors are calculated for both adult and child, with the maximum of these used for risk calculations.
8. Chemical Abstract service.
9. Exposure point concentration.
10. Slope factor
11. Reference dose.
12. Cancer Risk = (Chemical concentration, mg/kg * Carcinogenic Intake Factor, kg/kg-day * Slope Factor, kg-day/mg).
13. Hazard Quotient = Chemical Concentration, mg/kg * Noncarcinogenic Intake Factor, kg/kg-day)/(Reference Dose, mg/kg-day)

** Constituents were greater than RBC value but were less than 2X unit background and eliminated from unit risk characterization. This table is provided for information only.

Human Health Table C.31
716-A Motor Shops Seepage Basin
Hypothetical Adult/Child Resident
Exposure Assumptions and Risk Calculations For Screened Constituents > RBC Values**
Dermal Exposure to Soil (0-4' bls)

EXPOSURE ASSUMPTIONS:

Receptor	Adult Future Resident		Child Future Resident		Combined Adult/Child Future Resident	
Exposure	RME[1]		RME		RME	
Skin Surface Area (SA), cm^2/event	5000	(4)	1800	(4)	4360	(5)
Soil-to-Skin Adherance (SK),mg/cm^2	1	(4)	1	(4)	1	(5)
Exposure Frequency (EF),events/yr	350	(4)	350	(4)	350	(5)
Exposure Duration (ED), yrs	240	(4)	6	(4)	30	(5)
Body Weight (BW), kg	70	(4)	15	(4)	59	(5)
Averaging Time, Carc[2] (ATC), days	25,550		NA		25550	
Averaging Time, Noncarc[3] (ATN), days	8,760		2190		10950	
Conversion Factor (CF), kg/mg	1.00E-06		1.00E-06		1.00E-06	

INTAKE FACTOR CALCULATIONS

Carcinogenic Intake Factor (CIF), kg/kg-day =
(SA * SK * EF * ED * CF)/(BW * ATC)
RME CIF = 3.037E-05 (6)

Noncarcinogenic Intake Factor (NIF), kg/kg-day =
(SA * SK* EF * ED * CF)/(BW * ATN)
RME NIF = 0.0001151 (7)

CARCINOGENIC AND NONCARCINOGENIC RISK CALCULATIONS:

Chemical	CAS[8] No.	EP Conc[9] RME (mg/kg)	DSF[10] (kg-d/mg)	DRfD[11] (mg/kg-d)	DABS[12] (unitless)	Cancer Risk[13] RME	Cancer Risk[13] % of Total	Hazard Quotent[14] RME	Hazard Quotent[14] % of Total
Metals									
Aluminum	7429-90-5	5.96E+03	--	4.00E-02	0.001	--	--	1.71E-02	68.53%
Arsenic	7440-38-2	1.57E+00	1.88	2.40E-04	0.001	8.9638E-08	1.91%	7.53E-04	3.01%
Beryllium	7440-41-7	3.52E-01	4.30E+02	5.00E-05	0.001	4.5967E-06	98.09%	8.10E-04	3.24%
Iron	7439-89-6	3.29E+03	--	0.06	0.001	--	--	6.31E-03	25.22%
					PATHWAY SUMS:	RME Cancer Risk 4.69E-06		RME Hazard Index 2.50E-02	

Notes:

1. Reasonable maximum exposure.
2. Calculated as 70 years (average lifetime) times 365 days per year.
3. Calculated as exposure duration (in years) times 365 days per year
4. EPA references.
5. Combined values are calculated by weighting adult and child exposure assumptions over the noted exposure duration (e.g., 24 yrs as an adult plus 6 yrs as a child for a total duration of 30 yrs).
6. Carcinogenic intake factor calculated using weighted (combined) exposure assumptions.
7. Noncarcinogenic intake factors are calculated for both adult and child, with the maximum of these used for risk calculations.
8. Chemical Abstract service.
9. Exposure point concentration.
10. Absorbed dose slope factor = oral slope factor /oral absorption factor, Vol.A, p.A-3
11. Dermal reference dose = oral RfD x oral absorption factor, per RAGS, Vol.A, p.A-2.
12. Dermal absorption factor: 0.01(organics), 0.001 (inorganics)
13. Cancer Risk = (Chemical Concentration, mg/kg * Carcinogenic Intake Factor, kg/kg-day * Absorption Factor, unitless * Slope Factor, kg-day/mg)
14. Hazard Quotient = (Chemical Concentration, mg/kg * Noncarcinogenic Intake Factor, kg/kg-day * Absorption Factor, unitless / Reference Dose, mg/kg-day)

** Constituents were greater than RBC value but were less than 2X unit background and eliminated from unit risk characterization. This table is provided for information only.

Human Health Table C.32
716-A Motor Shops Seepage Basin
Hypothetical Adult/Child Resident
Exposure Assumptions/Risk Calculations For Screened Unit Constituents > RBC Values **
Inhalation of Soil Particulate (0-4' bls)

EXPOSURE ASSUMPTIONS:

Receptor	Adult Future Resident		Child Future Resident		Combined Adult/Child Future Resident	
Exposure	RME[1]		RME[1]		RME[1]	
Inhalation Rate (IR), m^3/hr	0.83	(4)	1	(4)	0.9	(5)
Exposure Time(ET), hrs/day	15	(4)	18	(4)	16	(5)
Exposure Frequency (EF), days/yr	350	(4)	350	(4)	350	(5)
Exposure Duration (ED), yrs	24	(4)	6	(4)	30	(5)
Body weight (BW), kg	70	(4)	15	(4)	59	(5)
Averaging Time, Carc[2] (ATC), days	25,550		NA		25,550	
Averaging Time, Noncarc[3] (ATN), days	8,760		2,190		10,950	

INTAKE FACTOR CALCULATIONS

Carcinogenic Intake Factor (CIF), m^3/kg-day =
(IR * ET* EF * ED)/(BW * ATC)
RME CIF = 1.00E-01 (6)

Noncarcinogenic Intake Factor (NIF), m^3/kg-day =
(IR * ET * EF * ED)/(BW * ATN)
RME NIF = 1.15E+00 (7)
(Child Value)

SOIL PARTICULATE RESUSPENSION FACTOR CALCULATION[8]

Width of contaminated area (LS) =	(site)	10	meters	(9)
Wind speed in mixing zone (V) =		2.25	meters/sec	(9)
Diffusion height (DH) =		2.00	meters	(9)
Area of contamination (A) =	(site)	685.00	$meters^2$	(9)
Respirable fraction (RF) =		0.036	$g/meters^2$-hr	(9)
Fraction of vegetative cover (G) =		0.25	unitless	(9)
Mean annual wind speed (Um) =		4.50	meters/sec	(9)
Equivalent threshold value of wind speed at 10 m (Ut) =		12.80	meters/sec	(9)
Fraction dependent on Um/Ut (Fx) =		0.0497	unitless	(9)
Conversion factor (CFa) =		3600.00	sec/hr	(9)
Conversion factor (CFb) =		1000.00	g/kg	(9)

CALCULATION OF PARTICULATE EMISSION FACTOR:

Particulate emission factor (PEF) = 4.056E+09 m^3/kg
$(LS*V*DH*CFa*CFb)/(A*RF*(1-G)*((Um/Ut)^3*(Fx))$

CARCINOGENIC AND NONCARCINOGENIC RISK CALCULATIONS:

Chemical	CAS[10] No	EP Conc[11] RME (mg/kg)	ISF[12] (kg-day/mg)	RfC[13] (mg/m^3)	Cancer Risk[14] RME	Cancer Risk[14] % of Total	Hazard Quotent[15] RME	Hazard Quotent[15] % of Total
Metals								
Aluminum	7429-90-5	5.96E+03	--	--	--	--	--	--
Arsenic	7440-38-2	1.57E+00	5.00E+01	--	1.941E-09	96.37%	--	--
Beryllium	7440-41-7	3.52E-01	8.4	--	7.312E-11	3.63%	--	--
Iron	7439-89-6	3.29E+03	--	--	--	--	--	--

	RME Cancer Risk	RME Hazard Index
PATHWAY SUMS:	2.01E-09	0.00E+00

Human Health Table C.32
716-A Motor Shops Seepage Basin
Hypothetical Adult/Child Resident
Exposure Assumptions/Risk Calculations For Screened Unit Constituents > RBC Values **
Inhalation of Soil Particulate (0-4' bls)

Notes:

1. Reasonable maximum exposure.
2. Averaging time, carcinogen; calculated as 70 years (average lifetime) times 365 days per year (not applicable to child resident)
3. Averaging time, noncarcinogen; calculated as exposure duration (in years) times 365 days per year
4. EPA references.
5. Combined values are calcualted by weighting adult and child exposure assumptions over the noted exposure duration (e.g., 24 yrs as an adult plus 6 yers as a child for a total duration of 30 yrs)
6. Carcinogenic Intake factor calcualted using weighted (combined) exposure assumptions.
7. Noncarcinogenic intake factors are caluclated for both adult and child, with the maximum of these used for risk calculations.
8. USEPA, 1991: RAGS: Vol 1--Human Health Evalution Manual (Part B, Development of Risk-Based Preliminary Remediation Goals)
9. Site specific or default values from USEPA, 1991.
10. Chemical Abstract Service.
11. Exposure point concentration in soil.
12. Slope factor
13. Reference dose.
14. Cancer Risk = (RME concentration, mg/kg * Carcinogenic Intake Factor, m^3/kg-day * Slope Factor, kg-day/mg) / (PEF, m^3/kg).
15. Hazard Quotient = Chemical Concentration, mg/kg * Noncarcinogenic Intake Factor, kg/kg-day)/(Reference Dose, mg/kg-day * PEF, m^3/kg)

** Constituents were greater than RBC value but were less than 2X unit background and eliminated from unit risk characterization. This table is provided for information only.

Human Health Table C.33
716-A Motor Shops Seepage Basin
Hypothetical Adult/Child Resident
Exposure Assumptions and Risk Calculations For Screened Constituents > RBC Values**
Ingestion of Home Grown Produce (Tuberous) - (0-4' bls)

EXPOSURE ASSUMPTIONS:

Receptor	Adult Future Resident RME (Tuberous)[1]		Child Future Resident RME (Tuberous)[1]		Combined Adult/Child Future Resident RME (Tuberous)[1]	
Exposure (RME)[1]						
Intake Rate (IR), g/day	202	(4)	75	(4)	177	(5)
Fraction Ingested (FI), unitless	0.119	(4)	0.119	(4)	0.119	(5)
Exposure Frequency (EF),days/yr	350	(4)	350	(4)	350	(5)
Exposure Duration (ED), yrs	240	(4)	6	(4)	30	(5)
Body Weight (BW), kg	70	(4)	15	(4)	59	(5)
Averaging Time, Carc[2] (ATC), days	25,550		NA		25,550	
Averaging Time, Noncarc[3] (ATN), days	8,760		2190		10950	
Conversion Factor (CF), kg/g	1.00E-03		1.00E-03		1.00E-03	

INTAKE FACTOR CALCULATIONS

Carcinogenic Intake Factor (CIF), kg/kg-day =
(IR * FI* EF * ED * CF)/(BW * ATC) =
RME CIF = 0.0001467 (6)

Noncarcinogenic Intake Factor (NIF), kg/kg-day =
(IR * FI* EF * ED * CF)/(BW * ATN) =
RME NIF = 0.0005705 (7)
(Child)

CARCINOGENIC AND NONCARCINOGENIC RISK CALCULATIONS:

Chemical	CAS[8] No.	EP Conc[9] in Soil (mg/kg)	Soil-To-Plant[10] Transfer Factor	Concentration[11] in Produce (mg/kg)	OSF[12] (kg-d/mg)	ORfD[13] (mg/kg-d)	Cancer Risk[14] RME	Cancer Risk[14] % of Total	Hazard Quotent[15] RME	Hazard Quotent[15] % of Total
Metals										
Aluminum	7429-90-5	5.96E+03	--	--	--	1	--	--	--	--
Arsenic	7440-38-2	1.57E+00	6.00E-03	2.36E-03	1.50E+00	3.00E-04	5.1826E-07	86.16%	4.48E-03	73.93%
Beryllium	7440-41-7	3.52E-01	1.50E-03	1.32E-04	4.3	0.005	8.3274E-08	13.84%	1.51E-05	0.25%
Iron	7439-89-6	3.29E+03	1.00E-03	8.23E-01	--	3.00E-01	--	--	1.56E-03	25.82%
						PATHWAY SUMS:	RME Cancer Risk 6.02E-07		RME Hazard Index 6.06E-03	

Notes:

1. Reasonable maximum exposure.
2. Calculated as 70 years (average lifetime) times 365 days per year.
3. Calculated as exposure duration (in years) times 365 days per year
4. EPA references.
5. Combined values are calculated by weighting adult and child exposure assumptions over the noted exposure duration (e.g., 24 yrs as an adult plus 6 yrs as a child for a total duration of 30 yrs).
6. Carcinogenic intake factor calculated using weighted (combined) exposure assumptions.
7. Noncarcinogenic intake factors are calculated for both adult and child, with the maximum of these used for risk calculations.
8. Chemical Abstract service.
9. Exposure point concentration.
10. Constituent specific soil-to-plant tranfer factors for inorganics, (mg/kg dry plant per mg/kg dry soil), per NUREG/CR-5512, 1992, p.6.25
11. Concentration in Produce = (Chemical concentration, mg/kg * Soil-to-Plant Transfer Factor * dry-to-wet conversion factor)
    Dry to wet conversion factor for fruits = 0.18; leafy vegetables = 0.2; tuberous = 0.25
12. Slope factor.
13. Reference dose.
14. Cancer Risk = (Chemical Concentration in produce, mg/kg * Carcinogenic Intake Factor, kg/kg-day * Slope Factor, kg-day/mg)
15. Hazard Quotient = (Chemical Concentration in produce, mg/kg * Noncarcinogenic Intake Factor, kg/kg-day / Reference Dose, mg/kg-day)

** Constituents were greater than RBC value but were less than 2X unit background and eliminated from unit risk characterization. This table is provided for information only.

Human Health Table C.34
716-A Motor Shops Seepage Basin
Hypothetical Adult/Child Resident
Exposure Assumptions and Risk Calculations For Screened Constituents > RBC Values**
Ingestion of Home Grown Produce (Leafy) - (0-4' bls)

EXPOSURE ASSUMPTIONS:

Receptor	Adult Future Resident		Child Future Resident		Combined Adult/Child Future Resident	
Exposure (RME)[1]	RME (Leafy)[1]		RME (Leafy)[1]		RME (Leafy)[1]	
Intake Rate (IR), g/day	113	(4)	42	(4)	99	(5)
Fraction Ingested (FI), unitless	0.119	(4)	0.119	(4)	0.119	(5)
Exposure Frequency (EF),days/yr	350	(4)	350	(4)	350	(5)
Exposure Duration (ED), yrs	240	(4)	6	(4)	30	(5)
Body Weight (BW), kg	70	(4)	15	(4)	59	(5)
Averaging Time, Carc[2] (ATC), days	25,550		NA		25,550	
Averaging Time, Noncarc[3] (ATN), days	8,760		2190		10950	
Conversion Factor (CF), kg/g	1.00E-03		1.00E-03		1.00E-03	

INTAKE FACTOR CALCULATIONS

Carcinogenic Intake Factor (CIF), kg/kg-day =
(IR * FI* EF * ED * CF)/(BW * ATC) =
RME CIF = 8.206E-05 (6)

Noncarcinogenic Intake Factor (NIF), kg/kg-day =
(IR * FI* EF * ED * CF)/(BW * ATN) =
RME NIF = 0.0003195 (7)
(Child)

CARCINOGENIC AND NONCARCINOGENIC RISK CALCULATIONS:

Chemical	CAS[8] No.	EP Conc[9] in Soil (mg/kg)	Soil-To-Plant[10] Transfer Factor	Concentration[11] in Produce (mg/kg)	OSF[12] (kg-d/mg)	ORfD[13] (mg/kg-d)	Cancer Risk[14] RME	Cancer Risk[14] % of Total	Hazard Quotent[15] RME	Hazard Quotent[15] % of Total
Metals										
Aluminum	7429-90-5	5.96E+03	--	--	--	--	--	--	--	--
Arsenic	7440-38-2	1.57E+00	4.00E-02	1.26E-02	1.50E+00	3.00E-04	1.546E-06	86.16%	1.34E-02	82.45%
Beryllium	7440-41-7	3.52E-01	1.00E-02	7.04E-04	4.3	0.005	2.4841E-07	13.84%	4.50E-05	0.28%
Iron	7439-89-6	3.29E+03	4.00E-03	2.63E+00	--	3.00E-01	--	--	2.80E-03	17.28%
					PATHWAY SUMS:		RME Cancer Risk 1.79E-06		RME Hazard Index 1.62E-02	

Notes:
1. Reasonable maximum exposure.
2. Calculated as 70 years (average lifetime) times 365 days per year.
3. Calculated as exposure duration (in years) times 365 days per year
4. EPA references.
5. Combined values are calculated by weighting adult and child exposure assumptions over the noted exposure duration (e.g., 24 yrs as an adult plus 6 yrs as a child for a total duration of 30 yrs).
6. Carcinogenic intake factor calculated using weighted (combined) exposure assumptions.
7. Noncarcinogenic intake factors are calculated for both adult and child, with the maximum of these used for risk calculations.
8. Chemical Abstract service.
9. Exposure point concentration.
10. Constituent specific soil-to-plant tranfer factors for inorganics, (mg/kg dry plant per mg/kg dry soil), per NUREG/CR-5512, 1992, p.6.25
11. Concentration in Produce = (Chemical concentration, mg/kg * Soil-to-Plant Transfer Factor * dry-to-wet conversion factor)
Dry to wet conversion factor for fruits = 0.18; leafy vegetables = 0.2; tuberous = 0.25
12. Slope factor.
13. Reference dose.
14. Cancer Risk = (Chemical Concentration in produce, mg/kg * Carcinogenic Intake Factor, kg/kg-day * Slope Factor, kg-day/mg)
15. Hazard Quotient = (Chemical Concentration in produce, mg/kg * Noncarcinogenic Intake Factor, kg/kg-day / Reference Dose, mg/kg-day)

** Constituents were greater than RBC value but were less than 2X unit background and eliminated from unit risk characterization. This table is provided for information only.

Human Health Table C.35
716-A Motor Shops Seepage Basin
Hypothetical Adult/Child Resident
Exposure Assumptions and Risk Calculations For Screened Constituents > RBC Values**
Ingestion of Home Grown Produce (Fruit) - (0-4' bls)

EXPOSURE ASSUMPTIONS:

Receptor	Adult Future Resident RME (Fruit)[1]		Child Future Resident RME (Fruit)[1]		Combined Adult/Child Future Resident RME (Fruit)[1]	
Exposure (RME)[1]						
Intake Rate (IR), g/day	123	(4)	45	(4)	107	(5)
Fraction Ingested (FI), unitless	0.119	(4)	0.119	(4)	0.119	(5)
Exposure Frequency (EF),days/yr	350	(4)	350	(4)	350	(5)
Exposure Duration (ED), yrs	240	(4)	6	(4)	30	(5)
Body Weight (BW), kg	70	(4)	15	(4)	59	(5)
Averaging Time, Carc[2] (ATC), days	25,550		NA		25,550	
Averaging Time, Noncarc[3] (ATN), days	8,760		2190		10950	
Conversion Factor (CF), kg/g	1.00E-03		1.00E-03		1.00E-03	

INTAKE FACTOR CALCULATIONS

Carcinogenic Intake Factor (CIF), kg/kg-day =
(IR * FI* EF * ED * CF)/(BW * ATC) =
RME CIF = 8.869E-05 (6)

Noncarcinogenic Intake Factor (NIF), kg/kg-day =
(IR * FI* EF * ED * CF)/(BW * ATN) =
RME NIF = 0.0003423 (7)
(Child)

CARCINOGENIC AND NONCARCINOGENIC RISK CALCULATIONS:

Chemical	CAS[8] No.	EP Conc[9] in Soil (mg/kg)	Soil-To-Plant[10] Transfer Factor	Concentration[11] in Produce (mg/kg)	OSF[12] (kg-d/mg)	ORfD[13] (mg/kg-d)	Cancer Risk[14] RME	Cancer Risk[14] % of Total	Hazard Quotent[15] RME	Hazard Quotent[15] % of Total
Metals										
Aluminum	7429-90-5	5.96E+03	--	--	--	--	--	--	--	--
Arsenic	7440-38-2	1.57E+00	6.00E-03	1.70E-03	1.50E+00	3.00E-04	2.2558E-07	86.16%	1.93E-03	73.93%
Beryllium	7440-41-7	3.52E-01	1.50E-03	9.50E-05	4.3	0.005	3.6245E-08	13.84%	6.51E-06	0.25%
Iron	7439-89-6	3.29E+03	1.00E-03	5.92E-01	--	3.00E-01	--	--	6.76E-04	25.82%
						PATHWAY SUMS:	RME Cancer Risk 2.62E-07		RME Hazard Index 2.62E-03	

Notes:
1. Reasonable maximum exposure.
2. Calculated as 70 years (average lifetime) times 365 days per year.
3. Calculated as exposure duration (in years) times 365 days per year
4. EPA references.
5. Combined values are calculated by weighting adult and child exposure assumptions over the noted exposure duration (e.g., 24 yrs as an adult plus 6 yrs as a child for a total duration of 30 yrs).
6. Carcinogenic intake factor calculated using weighted (combined) exposure assumptions.
7. Noncarcinogenic intake factors are calculated for both adult and child, with the maximum of these used for risk calculations.
8. Chemical Abstract service.
9. Exposure point concentration.
10. Constituent specific soil-to-plant tranfer factors for inorganics, (mg/kg dry plant per mg/kg dry soil), per NUREG/CR-5512, 1992, p.6.25
11. Concentration in Produce = (Chemical concentration, mg/kg * Soil-to-Plant Transfer Factor * dry-to-wet conversion factor)
Dry to wet conversion factor for fruits = 0.18; leafy vegetables = 0.2; tuberous = 0.25
12. Slope factor.
13. Reference dose.
14. Cancer Risk = (Chemical Concentration in produce, mg/kg * Carcinogenic Intake Factor, kg/kg-day * Slope Factor, kg-day/mg)
15. Hazard Quotient = (Chemical Concentration in produce, mg/kg * Noncarcinogenic Intake Factor, kg/kg-day / Reference Dose, mg/kg-day)

** Constituents were greater than RBC value but were less than 2X unit background and eliminated from unit risk characterization. This table is provided for information only.

APPENDIX C.6
RISK AND HAZARD CALCULATIONS FOR BACKGROUND CONSTITUENTS

(Tables C.36 - C.53)

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APPENDIX C.6
RISK AND HAZARD CALCULATIONS FOR BACKGROUND CONSTITUENTS
List of Tables for Human Health Risk Assessment

Table No.	Receptor	Exposure Route	Interval
C.36	Hypothetical Industrial Worker	Ingestion of Soil	0-1'
C.37	Hypothetical Industrial Worker	Dermal Exposure to Soil	0-1'
C.38	Hypothetical Industrial Worker	Inhalation of Soil Particulates	0-1'
C.39	Hypothetical Industrial Worker	Ingestion of Soil	0-4'
C.40	Hypothetical Industrial Worker	Dermal Exposure to Soil	0-4'
C.41	Hypothetical Industrial Worker	Inhalation of Soil Particulates	0-4'
C.42	Hypothetical Adult/Child Resident	Ingestion of Soil	0-1'
C.43	Hypothetical Adult/Child Resident	Dermal Exposure to Soil	0-1'
C.44	Hypothetical Adult/Child Resident	Inhalation of Soil Particulates	0-1'
C.45	Hypothetical Adult/Child Resident	Ingestion of Contaminated Produce (Tuberous)	0-1'
C.46	Hypothetical Adult/Child Resident	Ingestion of Contaminated Produce (Leafy)	0-1'
C.47	Hypothetical Adult/Child Resident	Ingestion of Contaminated Produce (Fruit)	0-1'
C.48	Hypothetical Adult/Child Resident	Ingestion of Soil	0-4'
C.49	Hypothetical Adult/Child Resident	Dermal Exposure to Soil	0-4'
C.50	Hypothetical Adult/Child Resident	Inhalation of Soil Particulates	0-4'
C.51	Hypothetical Adult/Child Resident	Ingestion of Contaminated Produce (Tuberous)	0-4'
C.52	Hypothetical Adult/Child Resident	Ingestion of Contaminated Produce (Leafy)	0-4'
C.53	Hypothetical Adult/Child Resident	Ingestion of Contaminated Produce (Fruit)	0-4'

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Human Health Table C.36
716-A Motor Shops Seepage Basin
Hypothetical On-Unit Industrial Worker
Background Exposure Assumptions and Risk Calculations **
Ingestion of Soil (0-1' bls)

EXPOSURE ASSUMPTIONS:

Receptor	Future Industrial Worker	
Exposure	RME[1]	
Intake Rate (IR), mg/day	50	(4)
Fraction Ingested (FI), unitless	1	(4)
Exposure Frequency (EF), unitless	250	(4)
Exposure Duration (ED), yrs	25	(4)
Body Weight (BW), kg	70	(4)
Averaging Time, Carc[2] (ATC), days	25,550	
Averaging Time, Noncarc[3] (ATN), days	9,125	
Conversion Factor (CF), kg/mg	1.00E-06	

INTAKE FACTOR CALCULATIONS

Carcinogenic Intake Factor (CIF), kg/kg-day =
(IR * FI * EF * ED * CF)/(BW * ATC)
RME CIF = 1.747E-07

Noncarcinogenic Intake Factor (NIF), kg/kg-day =
(IR * FI * EF * ED * CF)/(BW * ATN)
RME NIF = 4.892E-07

CARCINOGENIC AND NONCARCINOGENIC RISK CALCULATIONS:

Chemical	CAS[5] No.	EP Conc[6] Max (mg/kg)	OSF[7] (kg-d/mg)	ORfD[8] (mg/kg-d)	Cancer Risk[9] RME	Cancer Risk[9] % of Total	Hazard Quotent[10] RME	Hazard Quotent[10] % of Total
Metals								
Arsenic	7440-38-2	5.00E+00	1.5	0.0003	1.31E-06	86.42%	8.15E-03	19.44%
Beryllium	7440-41-7	2.74E-01	4.3	0.005	2.059E-07	13.58%	2.681E-05	0.06%
Iron	7439-89-6	2.07E+04	--	3.00E-01	--	--	0.0337573	80.49%
				PATHWAY SUMS:	RME Cancer Risk 1.52E-06		RME Hazard Index 4.19E-02	

Notes:

1. Reasonable maximum exposure.
2. Calculated as 70 years (average lifetime) times 365 days per year.
3. Calculated as exposure duration (in years) times 365 days per year
4. EPA references.
5. Chemical Abstract Service.
6. Maximum detected exposure point concentration in background soil.
7. Slope factor
8. Reference dose.
9. Cancer Risk = (Chemical concentration, mg/kg * Carcinogenic Intake Factor, kg/kg-day * Slope Factor, kg-day/mg).
10. Hazard Quotient = (Chemical Concentration, mg/kg * Noncarcinogenic Intake Factor, kg/kg-day)/(Reference Dose, mg/kg-day)

** A risk and hazard assessment is performed on the maximum background value for those unit constituents that were less than 2x background . This table is provided for information only.

Human Health Table C.37
716-A Motor Shops Seepage Basin
Hypothetical On-Unit Industrial Worker
Background Exposure Assumptions and Risk Calculations **
Dermal Exposure to Soil (0-1' bls)

EXPOSURE ASSUMPTIONS:

Receptor	Future Industrial Worker	
Exposure	RME[1]	
Skin Surface Area (SA), cm^2/event	3200	(4)
Soil-to-Skin Adherance (SK),mg/cm^2	1.0	(4)
Exposure Frequency (EF),events/yr	250	(4)
Exposure Duration (ED), yrs	25	(4)
Body Weight (BW), kg	70	(4)
Averaging Time, Carc[2] (ATC), days	25,550	
Averaging Time, Noncarc[3] (ATN), days	9,125	
Conversion Factor (CF), kg/mg	1.00E-06	

INTAKE FACTOR CALCULATIONS

Carcinogenic Intake Factor (CIF), kg/kg-day =
(SA * SK * EF * ED * CF)/(BW * ATC)
RME CIF = 1.118E-05

Noncarcinogenic Intake Factor (NIF), kg/kg-day =
(SA * SK* EF * ED * CF)/(BW * ATN)
RME NIF = 3.131E-05

CARCINOGENIC AND NONCARCINOGENIC RISK CALCULATIONS:

Chemical	CAS[5] No.	EP Conc[6] Max (mg/kg)	DSF[7] (kg-d/mg)	DRfD[8] (mg/kg-d)	DABS[9] (unitless)	Cancer Risk[10] RME	Cancer Risk[10] % of Total	Hazard Quotent[11] RME	Hazard Quotent[11] % of Total
Metals									
Arsenic	7440-38-2	5.00E+00	1.88	2.40E-04	0.001	1.05E-07	7.39%	6.52E-04	5.61%
Beryllium	7440-41-7	2.74E-01	4.30E+02	5.00E-05	0.001	1.318E-06	92.61%	1.72E-04	1.48%
Iron	7439-89-6	2.07E+04	--	0.06	0.001	--	--	1.08E-02	92.91%
					PATHWAY SUMS:	RME Cancer Risk 1.42E-06		RME Hazard Index 1.16E-02	

Notes:

1. Reasonable maximum exposure.
2. Calculated as 70 years (average lifetime) times 365 days per year.
3. Calculated as exposure duration (in years) times 365 days per year
4. EPA references.
5. Chemical Abstract Service.
6. Maximum detected exposure point concentration in background soil.
7. Absorbed dose slope factor = oral slope factor/ oral absorption factor, per RAGS, Vol.A, p.A-3
8. Dermal reference dose = oral RfD x oral absorption factor, per RAGS, Vol.A, p.A-2.
9. Dermal absorption factor: 0.01(organics), 0.001 (inorganics)
10. Cancer Risk = (Chemical Concentration, mg/kg * Carcinogenic Intake Factor, kg/kg-day * Absorption Factor, unitless * Slope Factor, kg-day/mg)
11. Hazard Quotient = (Chemical Concentration, mg/kg * Noncarcinogenic Intake Factor, kg/kg-day * Absorption Factor, unitless / Reference Dose, mg/kg-day)

** A risk and hazard assessment is performed on the maximum background value for those unit constituents that were less than 2x background . This table is provided for information only.

Human Health Table C.38
716-A Motor Shops Seepage Basin
Hypothetical On-Unit Industrial Worker
Background Exposure Assumptions/Risk Calculations **
Inhalation of Soil Particulates (0-1' bls)

EXPOSURE ASSUMPTIONS:

Receptor	Future Industrial Worker	
Exposure	RME[1]	
Inhalation Rate (IR), m^3/hr	2.5	(4)
Exposure Time(ET), hrs/day	8	(4)
Exposure Frequency (EF), days/yr	250	(4)
Exposure Duration (ED), yrs	25	(4)
Body weight (BW), kg	70	(4)
Averaging Time, Carc[2] (ATC), days	25,550	
Averaging Time, Noncarc[3] (ATN), days	9,125	

INTAKE FACTOR CALCULATIONS

Carcinogenic Intake Factor (CIF), m^3/kg-day =
(IR * ET* EF * ED)/(BW * ATC)
RME CIF = 6.99E-02

Noncarcinogenic Intake Factor (NIF), m^3/kg-day =
(IR * ET * EF * ED)/(BW * ATN)
RME NIF = 1.96E-01

SOIL PARTICULATE RESUSPENSION FACTOR CALCULATION [5]

Width of contaminated area (LS) =	(site)	10	meters
Wind speed in mixing zone (V) =		2.25	meters/sec
Diffusion height (DH) =		2.00	meters
Area of contamination (A) =	(site)	685.00	$meters^2$
Respirable fraction (RF) =		0.036	$g/meters^2$-hr
Fraction of vegetative cover (G) =		0.25	unitless
Mean annual wind speed (Um) =		4.50	meters/sec
Equivalent threshold value of wind speed at 10 m (Ut) =		12.80	meters/sec
Fraction dependent on Um/Ut (Fx) =		0.0497	unitless
Conversion factor (CFa) =		3600.00	sec/hr
Conversion factor (CFb) =		1000.00	g/kg

CALCULATION OF PARTICULATE EMISSION FACTOR:

Particulate emission factor (PEF) = 4.056E+09 m^3/kg
$(LS*V*DH*CFa*CFb)/(A*RF*(1-G)*((Um/Ut)^3*(Fx))$

CARCINOGENIC AND NONCARCINOGENIC RISK CALCULATIONS:

Chemical	CAS[6] No.	EP Conc[7] Max (mg/kg)	ISF[8] (kg-day/mg)	RfC[9] (mg/m^3)	Cancer Risk[10] RME	Cancer Risk[10] % of Total	Hazard Quotient[11] RME	Hazard Quotient[11] % of Total
Metals								
Arsenic	7440-38-2	5.00E+00	50	--	1.206E-08	99.09%	--	--
Beryllium	7440-41-7	2.74E-01	8.4	--	1.11E-10	0.91%	--	--
Iron	7439-89-6	2.07E+04	--	--	--	--		

PATHWAY SUMS:	RME Cancer Risk	RME Hazard Index
	1.22E-08	0.00E+00

Human Health Table C.38
716-A Motor Shops Seepage Basin
Hypothetical On-Unit Industrial Worker
Background Exposure Assumptions/Risk Calculations **
Inhalation of Soil Particulates (0-1' bls)

Notes:

1. Reasonable maximum exposure.
2. Calculated as 70 years (average lifetime) times 365 days per year.
3. Calculated as exposure duration (in years) times 365 days per year
4. EPA references.
5. Particulate Emission Factor calculation, EPA RAGS, Part B, 1991
6. Chemical Abstract Service.
7. Maximum detected exposure point concentration in background soil.
8. Slope factor
9. Reference dose.
10. Cancer Risk = (RME concentration, mg/kg * Carcinogenic Intake Factor, m^3/kg-day * Slope Factor, kg-day/mg) / (PEF, m^3/kg).
11. Hazard Quotient = Chemical Concentration, mg/kg * Noncarcinogenic Intake Factor, kg/kg-day)/(Reference Dose, mg/kg-day * PEF, m^3/kg)

** A risk and hazard assessment is performed on the maximum background value for those unit constituents that were less than 2x background . This table is provided for information only.

Human Health Table C.39
716-A Motor Shops Seepage Basin
Hypothetical On-Unit Industrial Worker
Background Exposure Assumptions and Risk Calculations**
Ingestion of Soil (0-4' bls)

EXPOSURE ASSUMPTIONS:

Receptor	Future Industrial Worker	
Exposure	RME[1]	
Intake Rate (IR), mg/day	50	(4)
Fraction Ingested (FI), unitless	1	(4)
Exposure Frequency (EF), unitless	250	(4)
Exposure Duration (ED), yrs	25	(4)
Body Weight (BW), kg	70	(4)
Averaging Time, Carc[2] (ATC), days	25,550	
Averaging Time, Noncarc[3] (ATN), days	9,125	
Conversion Factor (CF), kg/mg	1.00E-06	

INTAKE FACTOR CALCULATIONS

Carcinogenic Intake Factor (CIF), kg/kg-day =
(IR * FI * EF * ED * CF)/(BW * ATC)
RME CIF = 1.747E-07

Noncarcinogenic Intake Factor (NIF), kg/kg-day =
(IR * FI * EF * ED * CF)/(BW * ATN)
RME NIF = 4.892E-07

CARCINOGENIC AND NONCARCINOGENIC RISK CALCULATIONS:

Chemical	CAS[5] No.	EP Conc[6] Max (mg/kg)	OSF[7] (kg-d/mg)	ORfD[8] (mg/kg-d)	Cancer Risk[9] RME	Cancer Risk[9] % of Total	Hazard Quotent[10] RME	Hazard Quotent[10] % of Total
Metals								
Aluminum	7429-90-5	1.62E+04	--	1	--	--	7.93E-03	14.05%
Arsenic	7440-38-2	5.90E+00	1.5	0.0003	1.546E-06	83.49%	9.62E-03	17.06%
Beryllium	7440-41-7	4.07E-01	4.3	0.005	3.058E-07	16.51%	3.982E-05	0.07%
Iron	7439-89-6	2.38E+04	--	0.3	--	--	0.0388128	68.82%
				PATHWAY SUMS:	RME Cancer Risk 1.85E-06		RME Hazard Index 5.64E-02	

Notes:
1. Reasonable maximum exposure.
2. Calculated as 70 years (average lifetime) times 365 days per year.
3.Calculated as exposure duration (in years) times 365 days per year
4. EPA references.
5. Chemical Abstract Service.
6. Maximum detected exposure point concentration in background soil.
7. Slope factor
8. Reference dose.
9. Cancer Risk = (Chemical concentration, mg/kg * Carcinogenic Intake Factor, kg/kg-day * Slope Factor, kg-day/mg).
10. Hazard Quotient = (Chemical Concentration, mg/kg * Noncarcinogenic Intake Factor, kg/kg-day)/(Reference Dose, mg/kg-day)
** A risk and hazard assessment is performed on the maximum background value for those unit constituents that were less than 2x background . This table is provided for information only.

Human Health Table C.40
716-A Motor Shops Seepage Basin
Hypothetical On-Unit Industrial Worker
Background Exposure Assumptions and Risk Calculations**
Dermal Exposure to Soil (0-4' bls)

EXPOSURE ASSUMPTIONS:

Receptor	Future Industrial Worker	
Exposure	RME[1]	
Skin Surface Area (SA), cm^2/event	3200	(4)
Soil-to-Skin Adherance (SK),mg/cm^2	1.0	(4)
Exposure Frequency (EF),events/yr	250	(4)
Exposure Duration (ED), yrs	25	(4)
Body Weight (BW), kg	70	(4)
Averaging Time, Carc[2] (ATC), days	25,550	
Averaging Time, Noncarc[3] (ATN), days	9,125	
Conversion Factor (CF), kg/mg	1.00E-06	

INTAKE FACTOR CALCULATIONS

Carcinogenic Intake Factor (CIF), kg/kg-day =
(SA * SK * EF * ED * CF)/(BW * ATC)
RME CIF = 1.118E-05

Noncarcinogenic Intake Factor (NIF), kg/kg-day =
(SA * SK* EF * ED * CF)/(BW * ATN)
RME NIF = 3.131E-05

CARCINOGENIC AND NONCARCINOGENIC RISK CALCULATIONS:

Chemical	CAS[5] No.	EP Conc[6] Max (mg/kg)	DSF[7] (kg-d/mg)	DRfD[8] (mg/kg-d)	DABS[9] (unitless)		Cancer Risk[10] RME	Cancer Risk[10] % of Total	Hazard Quotent[11] RME	Hazard Quotent[11] % of Total
Metals										
Aluminum	7429-90-5	1.62E+04	--	4.00E-02	0.001	--	--	--	1.27E-02	48.54%
Arsenic	7440-38-2	5.90E+00	1.88	2.40E-04	0.001		1.24E-07	5.96%	7.70E-04	2.95%
Beryllium	7440-41-7	4.07E-01	4.30E+02	5.00E-05	0.001		1.96E-06	94.04%	2.55E-04	0.98%
Iron	7439-89-6	2.38E+04	--	0.06	0.001	--	--	--	1.24E-02	47.54%
					PATHWAY SUMS:		RME Cancer Risk 2.08E-06		RME Hazard Index 2.61E-02	

Notes:

1. Reasonable maximum exposure.
2. Calculated as 70 years (average lifetime) times 365 days per year.
3. Calculated as exposure duration (in years) times 365 days per year
4. EPA references.
5. Chemical Abstract Service.
6. Maximum detected exposure point concentration in background soil.
7. Absorbed dose slope factor = oral slope factor/ oral absorption factor, per RAGS, Vol.A, p.A-3
8. Dermal reference dose = oral RfD x oral absorption factor, per RAGS, Vol.A, p.A-2.
9. Dermal absorption factor: 0.01(organics), 0.001 (inorganics)
10. Cancer Risk = (Chemical Concentration, mg/kg * Carcinogenic Intake Factor, kg/kg-day * Absorption Factor, unitless * Slope Factor, kg-day/mg)
11. Hazard Quotient = (Chemical Concentration, mg/kg * Noncarcinogenic Intake Factor, kg/kg-day * Absorption Factor, unitless / Reference Dose, mg/kg-day)

** A risk and hazard assessment is performed on the maximum background value for those unit constituents that were less than 2x background . This table is provided for information only.

Human Health Table C.41
716-A Motor Shops Seepage Basin
Hypothetical On-Unit Industrial Worker
Background Exposure Assumptions/Risk Calculations **
Inhalation of Soil Particulates (0-4' bls)

EXPOSURE ASSUMPTIONS:

Receptor	Future Industrial Worker	
Exposure	RME[1]	
Inhalation Rate (IR), m^3/hr	2.5	(4)
Exposure Time(ET), hrs/day	8	(4)
Exposure Frequency (EF), days/yr	250	(4)
Exposure Duration (ED), yrs	25	(4)
Body weight (BW), kg	70	(4)
Averaging Time, Carc[2] (ATC), days	25,550	
Averaging Time, Noncarc[3] (ATN), days	9,125	

INTAKE FACTOR CALCULATIONS

Carcinogenic Intake Factor (CIF),m^3/kg-day =
(IR * ET* EF * ED)/(BW * ATC)
RME CIF = 6.99E-02

Noncarcinogenic Intake Factor (NIF), m^3/kg-day =
(IR * ET * EF * ED)/(BW * ATN)
RME NIF = 1.96E-01

SOIL PARTICULATE RESUSPENSION FACTOR CALCULATION[5]

Width of contaminated area (LS) =	(site)	10	meters
Wind speed in mixing zone (V) =		2.25	meters/sec
Diffusion height (DH) =		2.00	meters
Area of contamination (A) =	(site)	685.00	$meters^2$
Respirable fraction (RF) =		0.036	g/$meters^2$-hr
Fraction of vegetative cover (G) =		0.25	unitless
Mean annual wind speed (Um) =		4.50	meters/sec
Equivalent threshold value of wind speed at 10 m (Ut) =		12.80	meters/sec
Fraction dependent on Um/Ut (Fx) =		0.0497	unitless
Conversion factor (CFa) =		3600.00	sec/hr
Conversion factor (CFb) =		1000.00	g/kg

CALCULATION OF PARTICULATE EMISSION FACTOR:

Particulate emission factor (PEF) = 4.056E+09 m^3/kg
(LS*V*DH*CFa*CFb)/(A*RF*(1-G)*((Um/Ut)^3*(Fx))

CARCINOGENIC AND NONCARCINOGENIC RISK CALCULATIONS:

Chemical	CAS[6] No.	EP Conc[7] Max (mg/kg)	ISF[8] (kg-day/mg)	RfC[9] (mg/m^3)	Cancer Risk[10] RME	Cancer Risk[10] % of Total	Hazard Quotent[11] RME	Hazard Quotent[11] % of Total
Metals								
Aluminum	7429-90-5	1.62E+04	--	--	--	--		
Arsenic	7440-38-2	5.90E+00	50	--	1.423E-08	98.85%	--	--
Beryllium	7440-41-7	4.07E-01	8.4	--	1.65E-10	1.15%	--	--
Iron	7439-89-6	2.38E+04	--	--	--	--		

	RME Cancer Risk	RME Hazard Index
PATHWAY SUMS:	1.44E-08	0.00E+00

Human Health Table C.41
716-A Motor Shops Seepage Basin
Hypothetical On-Unit Industrial Worker
Background Exposure Assumptions/Risk Calculations **
Inhalation of Soil Particulates (0-4' bls)

Notes:

1. Reasonable maximum exposure.
2. Calculated as 70 years (average lifetime) times 365 days per year.
3. Calculated as exposure duration (in years) times 365 days per year
4. EPA references.
5. Particulate Emission Factor calculation, EPA RAGS, Part B, 1991
6. Chemical Abstract Service.
7. Maximum detected exposure point concentration in background soil.
8. Slope factor
9. Reference dose.
10. Cancer Risk = (RME concentration, mg/kg * Carcinogenic Intake Factor, m^3/kg-day * Slope Factor, kg-day/mg) / (PEF, m^3/kg).
11. Hazard Quotient = Chemical Concentration, mg/kg * Noncarcinogenic Intake Factor, kg/kg-day)/(Reference Dose, mg/kg-day * PEF, m^3/kg)

** A risk and hazard assessment is performed on the maximum background value for those unit constituents that were less than 2x background . This table is provided for information only.

Human Health Table C.42
716-A Motor Shops Seepage Basin
Hypothetical Adult/Child Resident
Background Exposure Assumptions and Risk Calculations**
Ingestion of Soil (0-1' bls)

EXPOSURE ASSUMPTIONS:

Receptor Exposure	Adult Future Resident RME[1]		Child Future Resident RME		Combined Adult/Child Future Resident RME	
Intake Rate (IR), mg/day	100	(4)	200	(4)	120	(5)
Fraction Ingested (FI), unitless	1	(4)	1	(4)	1	(5)
Exposure Frequency (EF), unitless	350	(4)	350	(4)	350	(5)
Exposure Duration (ED), yrs	24	(4)	6	(4)	30	(5)
Body Weight (BW), kg	70	(4)	15	(4)	59	(5)
Averaging Time, Carc[2] (ATC), days	25,550		NA		25550	
Averaging Time, Noncarc[3] (ATN), days	8,760		2190		10950	
Conversion Factor (CF), kg/mg	1.00E-06		1.00E-06		1.00E-06	

INTAKE FACTOR CALCULATIONS

Carcinogenic Intake Factor (CIF), kg/kg-day =
(IR * FI * EF * ED * CF)/(BW * ATC)
RME CIF = 8.358E-07 (6)

Noncarcinogenic Intake Factor (NIF), kg/kg-day =
(IR * FI * EF * ED * CF)/(BW * ATN)
RME NIF = 1.279E-05 (7)

CARCINOGENIC AND NONCARCINOGENIC RISK CALCULATIONS:

Chemical	CAS[8] No.	EP Conc[9] Max (mg/kg)	OSF[10] (kg-d/mg)	ORfD[11] (mg/kg-d)	Cancer Risk[12] RME	Cancer Risk[12] % of Total	Hazard Quotient[13] RME	Hazard Quotient[13] % of Total
Metals								
Arsenic	7440-38-2	5.00E+00	1.5	0.0003	6.2689E-06	86.423452	0.2130898	19.44%
Beryllium	7440-41-7	2.74E-01	4.3	0.005	9.848E-07	13.576548	0.0007006	0.06%
Iron	7439-89-6	2.07E+04	--	0.3	--	--	0.8821918	80.49%

	RME Cancer Risk	RME Hazard Index
PATHWAY SUMS:	7.25E-06	1.10E+00

Notes:

1. Reasonable maximum exposure.
2. Calculated as 70 years (average lifetime) times 365 days per year.
3. Calculated as exposure duration (in years) times 365 days per year
4. EPA references.
5. Combined values are calculated by weighting adult and child exposure assumptions over the noted exposure duration (e.g., 24 yrs as an adult plus 6 yrs as a child for a total duration of 30 yrs).
6. Carcinogenic intake factor calculated using weighted (combined) exposure assumptions.
7. Noncarcinogenic intake factors are calculated for both adult and child, with the maximum of these used for risk calculations.
8. Chemical Abstract service.
9. Maximum detected exposure point concentration in background soil.
10. Slope factor
11. Reference dose.
12. Cancer Risk = (Chemical concentration, mg/kg * Carcinogenic Intake Factor, kg/kg-day * Slope Factor, kg-day/mg).
13. Hazard Quotient = Chemical Concentration, mg/kg * Noncarcinogenic Intake Factor, kg/kg-day)/(Reference Dose, mg/kg-day)

** A risk and hazard assessment is performed on the maximum background value for those unit constituents that were less than 2x background . This table is provided for information only.

Human Health Table C.43
716-A Motor Shops Seepage Basin
Hypothetical Adult/Child Resident
Background Exposure Assumptions and Risk Calculations **
Dermal Exposure to Soil (0-1' bls)

EXPOSURE ASSUMPTIONS:

Receptor Exposure	Adult Future Resident RME[1]		Child Future Resident RME		Combined Adult/Child Future Resident RME	
Skin Surface Area (SA), cm^2/event	5000	(4)	1800	(4)	4360	(5)
Soil-to-Skin Adherance (SK),mg/cm^2	1	(4)	1	(4)	1	(5)
Exposure Frequency (EF),events/yr	350	(4)	350	(4)	350	(5)
Exposure Duration (ED), yrs	240	(4)	6	(4)	30	(5)
Body Weight (BW), kg	70	(4)	15	(4)	59	(5)
Averaging Time, Carc[2] (ATC), days	25,550		NA		25550	
Averaging Time, Noncarc[3] (ATN), days	8,760		2190		10950	
Conversion Factor (CF), kg/mg	1.00E-06		1.00E-06		1.00E-06	

INTAKE FACTOR CALCULATIONS

Carcinogenic Intake Factor (CIF), kg/kg-day =
(SA * SK * EF * ED * CF)/(BW * ATC)
RME CIF = 3.037E-05 (6)

Noncarcinogenic Intake Factor (NIF), kg/kg-day =
(SA * SK* EF * ED * CF)/(BW * ATN)
RME NIF = 0.0001151 (7)

CARCINOGENIC AND NONCARCINOGENIC RISK CALCULATIONS:

Chemical	CAS[8] No.	EP Conc[9] Max (mg/kg)	DSF[10] (kg-d/mg)	DRfD[11] (mg/kg-d)	DABS[12] (unitless)	Cancer Risk[13] RME	Cancer Risk[13] % of Total	Hazard Quotent[14] RME	Hazard Quotent[14] % of Total
Metals									
Arsenic	7440-38-2	5.00E+00	1.88	2.40E-04	0.001	2.8547E-07	7.39%	2.40E-03	5.61%
Beryllium	7440-41-7	2.74E-01	4.30E+02	5.00E-05	0.001	3.5781E-06	92.61%	6.31E-04	1.48%
Iron	7439-89-6	2.07E+04	--	6.00E-02	0.001	--	--	3.97E-02	92.91%
					PATHWAY SUMS:	RME Cancer Risk 3.86E-06		RME Hazard Index 4.27E-02	

Notes:

1. Reasonable maximum exposure.
2. Calculated as 70 years (average lifetime) times 365 days per year.
3. Calculated as exposure duration (in years) times 365 days per year
4. EPA references.
5. Combined values are calculated by weighting adult and child exposure assumptions over the noted exposure duration (e.g., 24 yrs as an adult plus 6 yrs as a child for a total duration of 30 yrs).
6. Carcinogenic intake factor calculated using weighted (combined) exposure assumptions.
7. Noncarcinogenic intake factors are calculated for both adult and child, with the maximum of these used for risk calculations.
8. Chemical Abstract service.
9. Maximum detected exposure point concentration in background soil.
10. Absorbed dose slope factor = oral slope factor /oral absorption factor per RAGS, Vol.A, p.A-3
11. Dermal reference dose = oral RfD x oral absorption factor, per RAGS, Vol.A, p.A-2.
12. Dermal absorption factor: 0.01(organics), 0.001 (inorganics)
13. Cancer Risk = (Chemical Concentration, mg/kg * Carcinogenic Intake Factor, kg/kg-day * Absorption Factor, unitless * Slope Factor, kg-day/mg)
14. Hazard Quotient = (Chemical Concentration, mg/kg * Noncarcinogenic Intake Factor, kg/kg-day * Absorption Factor, unitless / Reference Dose, mg/kg-day)

** A risk and hazard assessment is performed on the maximum background value for those unit constituents that were less than 2x background . This table is provided for information only.

Human Health Table C.44
716-A Motor Shops Seepage Basin
Hypothetical Adult/Child Resident
Background Exposure Assumptions/Risk Calculations **
Inhalation of Soil Particulate (0-1' bls)

EXPOSURE ASSUMPTIONS:

Receptor	Adult Future Resident		Child Future Resident		Combined Adult/Child Future Resident	
Exposure	RME[1]		RME[1]		RME[1]	
Inhalation Rate (IR), m^3/hr	0.83	(4)	1	(4)	0.9	(5)
Exposure Time(ET), hrs/day	15	(4)	18	(4)	16	(5)
Exposure Frequency (EF), days/yr	350	(4)	350	(4)	350	(5)
Exposure Duration (ED), yrs	24	(4)	6	(4)	30	(5)
Body weight (BW), kg	70	(4)	15	(4)	59	(5)
Averaging Time, Carc[2] (ATC), days	25,550		NA		25,550	
Averaging Time, Noncarc[3] (ATN), days	8,760		2,190		10,950	

INTAKE FACTOR CALCULATIONS

Carcinogenic Intake Factor (CIF), m^3/kg-day =
(IR * ET* EF * ED)/(BW * ATC)
RME CIF = 1.00E-01 (6)

Noncarcinogenic Intake Factor (NIF), m^3/kg-day =
(IR * ET * EF * ED)/(BW * ATN)
RME NIF = 1.15E+00 (7)
(Child Value)

SOIL PARTICULATE RESUSPENSION FACTOR CALCULATION[8]

Width of contaminated area (LS) =	(site)	10	meters	(9)
Wind speed in mixing zone (V) =		2.25	meters/sec	(9)
Diffusion height (DH) =		2.00	meters	(9)
Area of contamination (A) =	(site)	685.00	$meters^2$	(9)
Respirable fraction (RF) =		0.036	$g/meters^2$-hr	(9)
Fraction of vegetative cover (G) =		0.25	unitless	(9)
Mean annual wind speed (Um) =		4.50	meters/sec	(9)
Equivalent threshold value of wind speed at 10 m (Ut) =		12.80	meters/sec	(9)
Fraction dependent on Um/Ut (Fx) =		0.0497	unitless	(9)
Conversion factor (CFa) =		3600.00	sec/hr	(9)
Conversion factor (CFb) =		1000.00	g/kg	(9)

CALCULATION OF PARTICULATE EMISSION FACTOR:

Particulate emission factor (PEF) = 4.056E+09 m^3/kg
(LS*V*DH*CFa*CFb)/(A*RF*(1-G)*((Um/Ut)^3*(Fx))

CARCINOGENIC AND NONCARCINOGENIC RISK CALCULATIONS:

Chemical	CAS[10] No	EP Conc[11] Max (mg/kg)	ISF[12] (kg-day/mg)	RfC[13] (mg/m^3)	Cancer Risk[14] RME	Cancer Risk[14] % of Total	Hazard Quotent[15] RME	Hazard Quotent[15] % of Total
Metals								
Arsenic	7440-38-2	5.00E+00	5.00E+01	--	6.182E-09	99.09%	--	--
Beryllium	7440-41-7	2.74E-01	8.4	--	5.692E-11	0.91%	--	--
Iron	7439-89-6	2.07E+04	--	--	--	--	--	--

PATHWAY SUMS:

RME Cancer Risk	RME Hazard Index
6.24E-09	0.00E+00

Human Health Table C.44
716-A Motor Shops Seepage Basin
Hypothetical Adult/Child Resident
Background Exposure Assumptions/Risk Calculations **
Inhalation of Soil Particulate (0-1' bls)

Notes:

1. Reasonable maximum exposure.
2. Averaging time, carcinogen; calculated as 70 years (average lifetime) times 365 days per year (not applicable to child resident)
3. Averaging time, noncarcinogen; calculated as exposure duration (in years) times 365 days per year
4. EPA references.
5. Combined values are calcualted by weighting adult and child exposure assumptions over the noted exposure duration (e.g., 24 yrs as an adult plus 6 yers as a child for a total duration of 30 yrs)
6. Carcinogenic Intake factor calcualted using weighted (combined) exposure assumptions.
7. Noncarcinogenic intake factors are caluclated for both adult and child, with the maximum of these used for risk calculations.
8. USEPA, 1991: RAGS: Vol 1--Human Health Evalution Manual (Part B, Development of Risk-Based Preliminary Remediation Goals)
9. Site specific or default values from USEPA, 1991.
10. Chemical Abstract Service.
11. Maximum detected exposure point concentration in background soil.
12. Slope factor
13. Reference dose.
14. Cancer Risk = (RME concentration, mg/kg * Carcinogenic Intake Factor, m^3/kg-day * Slope Factor, kg-day/mg) / (PEF, m^3/kg).
15. Hazard Quotient = Chemical Concentration, mg/kg * Noncarcinogenic Intake Factor, kg/kg-day)/(Reference Dose, mg/kg-day * PEF, m^3/kg)

** A risk and hazard assessment is performed on the maximum background value for those unit constituents that were less than 2x background . This table is provided for information only.

Human Health Table C.45
716-A Motor Shops Seepage Basin
Hypothetical Adult/Child Resident
Background Exposure Assumptions and Risk Calculations **
Ingestion of Home Grown Produce (Tuberous) - (0-1' bls)

EXPOSURE ASSUMPTIONS:

Receptor	Adult Future Resident RME (Tuberous)[1]		Child Future Resident RME (Tuberous)[1]		Combined Adult/Child Future Resident RME (Tuberous)[1]	
Exposure (RME)[1]						
Intake Rate (IR), g/day	202	(4)	75	(4)	177	(5)
Fraction Ingested (FI), unitless	0.119	(4)	0.119	(4)	0.119	(5)
Exposure Frequency (EF),days/yr	350	(4)	350	(4)	350	(5)
Exposure Duration (ED), yrs	240	(4)	6	(4)	30	(5)
Body Weight (BW), kg	70	(4)	15	(4)	59	(5)
Averaging Time, Carc[2] (ATC), days	25,550		NA		25,550	
Averaging Time, Noncarc[3] (ATN), days	8,760		2190		10950	
Conversion Factor (CF), kg/g	1.00E-03		1.00E-03		1.00E-03	

INTAKE FACTOR CALCULATIONS

Carcinogenic Intake Factor (CIF), kg/kg-day =
(IR * FI* EF * ED * CF)/(BW * ATC) =
RME CIF = 0.0001467 (6)

Noncarcinogenic Intake Factor (NIF), kg/kg-day =
(IR * FI* EF * ED * CF)/(BW * ATN) =
RME NIF = 0.0005705 (7)
(Child)

CARCINOGENIC AND NONCARCINOGENIC RISK CALCULATIONS:

Chemical	CAS[8] No.	EP Conc[9] Max (mg/kg)	Soil-To-Plant[10] Transfer Factor	Concentration[11] in Produce (mg/kg)	OSF[12] (kg-d/mg)	ORfD[13] (mg/kg-d)	Cancer Risk[14] RME	Cancer Risk[14] % of Total	Hazard Quotent[15] RME	Hazard Quotent[15] % of Total
Metals										
Arsenic	7440-38-2	5.00E+00	6.00E-03	7.50E-03	1.50E+00	5.00E+00	1.6505E-06	96.22%	8.56E-07	70.59%
Beryllium	7440-41-7	2.74E-01	1.50E-03	1.03E-04	4.3	2.74E-01	6.4821E-08	3.78%	2.14E-07	17.65%
Iron	7439-89-6	2.07E+04	1.00E-03	5.18E+00	--	2.07E+04	--	--	1.43E-07	11.76%
						PATHWAY SUMS:	RME Cancer Risk 1.72E-06		RME Hazard Index 1.21E-06	

Notes:

1. Reasonable maximum exposure.
2. Calculated as 70 years (average lifetime) times 365 days per year.
3. Calculated as exposure duration (in years) times 365 days per year
4. EPA references.
5. Combined values are calculated by weighting adult and child exposure assumptions over the noted exposure duration (e.g., 24 yrs as an adult plus 6 yrs as a child for a total duration of 30 yrs).
6. Carcinogenic intake factor calculated using weighted (combined) exposure assumptions.
7. Noncarcinogenic intake factors are calculated for both adult and child, with the maximum of these used for risk calculations.
8. Chemical Abstract service.
9. Maximum detected exposure point concentration in background soil.
10. Constituent specific soil-to-plant tranfer factors for inorganics, (mg/kg dry plant per mg/kg dry soil), per NUREG/CR-5512, 1992, p.6.25
11. Concentration in Produce = (Chemical concentration, mg/kg * Soil-to-Plant Transfer Factor * dry-to-wet conversion factor)
    Dry to wet conversion factor for fruits = 0.18; leafy vegetables = 0.2; tuberous = 0.25
12. Slope factor.
13. Reference dose.
14. Cancer Risk = (Chemical Concentration in produce, mg/kg * Carcinogenic Intake Factor, kg/kg-day * Slope Factor, kg-day/mg)
15. Hazard Quotient = (Chemical Concentration in produce, mg/kg * Noncarcinogenic Intake Factor, kg/kg-day / Reference Dose, mg/kg-day)

** A risk and hazard assessment is performed on the maximum background value for those unit constituents that were less than 2x background . This table is provided for information only.

Human Health Table C.46
716-A Motor Shops Seepage Basin
Hypothetical Adult/Child Resident
Background Exposure Assumptions and Risk Calculations **
Ingestion of Home Grown Produce (Leafy) - (0-1' bls)

EXPOSURE ASSUMPTIONS:

Receptor	Adult Future Resident RME (Leafy)[1]		Child Future Resident RME (Leafy)[1]		Combined Adult/Child Future Resident RME (Leafy)[1]	
Exposure (RME)[1]						
Intake Rate (IR), g/day	113	(4)	42	(4)	99	(5)
Fraction Ingested (FI), unitless	0.119	(4)	0.119	(4)	0.119	(5)
Exposure Frequency (EF),days/yr	350	(4)	350	(4)	350	(5)
Exposure Duration (ED), yrs	240	(4)	6	(4)	30	(5)
Body Weight (BW), kg	70	(4)	15	(4)	59	(5)
Averaging Time, Carc[2] (ATC), days	25,550		NA		25,550	
Averaging Time, Noncarc[3] (ATN), days	8,760		2190		10950	
Conversion Factor (CF), kg/g	1.00E-03		1.00E-03		1.00E-03	

INTAKE FACTOR CALCULATIONS

Carcinogenic Intake Factor (CIF), kg/kg-day =
(IR * FI* EF * ED * CF)/(BW * ATC) =
RME CIF = 8.206E-05 (6)

Noncarcinogenic Intake Factor (NIF), kg/kg-day =
(IR * FI* EF * ED * CF)/(BW * ATN) =
RME NIF = 0.0003195 (7)
(Child)

CARCINOGENIC AND NONCARCINOGENIC RISK CALCULATIONS:

Chemical	CAS[8] No.	EP Conc[9] Max (mg/kg)	Soil-To-Plant[10] Transfer Factor	Concentration[11] in Produce (mg/kg)	OSF[12] (kg-d/mg)	ORfD[13] (mg/kg-d)	Cancer Risk[14] RME	Cancer Risk[14] % of Total	Hazard Quotent[15] RME	Hazard Quotent[15] % of Total
Metals										
Arsenic	7440-38-2	5.00E+00	4.00E-02	4.00E-02	1.50E+00	3.00E-04	4.9236E-06	96.22%	4.26E-02	70.68%
Beryllium	7440-41-7	2.74E-01	1.00E-02	5.48E-04	4.3	0.005	1.9336E-07	3.78%	3.50E-05	0.06%
Iron	7439-89-6	2.07E+04	4.00E-03	1.66E+01	--	3.00E-01	--	--	1.76E-02	29.26%
					PATHWAY SUMS:		RME Cancer Risk 5.12E-06		RME Hazard Index 6.03E-02	

Notes:

1. Reasonable maximum exposure.
2. Calculated as 70 years (average lifetime) times 365 days per year.
3. Calculated as exposure duration (in years) times 365 days per year
4. EPA references.
5. Combined values are calculated by weighting adult and child exposure assumptions over the noted exposure duration (e.g., 24 yrs as an adult plus 6 yrs as a child for a total duration of 30 yrs).
6. Carcinogenic intake factor calculated using weighted (combined) exposure assumptions.
7. Noncarcinogenic intake factors are calculated for both adult and child, with the maximum of these used for risk calculations.
8. Chemical Abstract service.
9. Maximum detected exposure point concentration in background soil.
10. Constituent specific soil-to-plant tranfer factors for inorganics, (mg/kg dry plant per mg/kg dry soil), per NUREG/CR-5512, 1992, p.6.25
11. Concentration in Produce = (Chemical concentration, mg/kg * Soil-to-Plant Transfer Factor * dry-to-wet conversion factor)
    Dry to wet conversion factor for fruits = 0.18; leafy vegetables = 0.2; tuberous = 0.25
12. Slope factor.
13. Reference dose.
14. Cancer Risk = (Chemical Concentration in produce, mg/kg * Carcinogenic Intake Factor, kg/kg-day * Slope Factor, kg-day/mg)
15. Hazard Quotient = (Chemical Concentration in produce, mg/kg * Noncarcinogenic Intake Factor, kg/kg-day / Reference Dose, mg/kg-day)

** A risk and hazard assessment is performed on the maximum background value for those unit constituents that were less than 2x background . This table is provided for information only.

Human Health Table C.47
716-A Motor Shops Seepage Basin
Hypothetical Adult/Child Resident
Background Exposure Assumptions and Risk Calculations**
Ingestion of Home Grown Produce (Fruit) - (0-1' bls)

EXPOSURE ASSUMPTIONS:

Receptor	Adult Future Resident RME (Fruit)[1]		Child Future Resident RME (Fruit)[1]		Combined Adult/Child Future Resident RME (Fruit)[1]	
Exposure (RME)[1]						
Intake Rate (IR), g/day	123	(4)	45	(4)	107	(5)
Fraction Ingested (FI), unitless	0.119	(4)	0.119	(4)	0.119	(5)
Exposure Frequency (EF),days/yr	350	(4)	350	(4)	350	(5)
Exposure Duration (ED), yrs	240	(4)	6	(4)	30	(5)
Body Weight (BW), kg	70	(4)	15	(4)	59	(5)
Averaging Time, Carc[2] (ATC), days	25,550		NA		25,550	
Averaging Time, Noncarc[3] (ATN), days	8,760		2190		10950	
Conversion Factor (CF), kg/g	1.00E-03		1.00E-03		1.00E-03	

INTAKE FACTOR CALCULATIONS

Carcinogenic Intake Factor (CIF), kg/kg-day =
(IR * FI* EF * ED * CF)/(BW * ATC) =
RME CIF = 8.869E-05 (6)

Noncarcinogenic Intake Factor (NIF), kg/kg-day =
(IR * FI* EF * ED * CF)/(BW * ATN) =
RME NIF = 0.0003423 (7)
(Child)

CARCINOGENIC AND NONCARCINOGENIC RISK CALCULATIONS:

Chemical	CAS[8] No.	EP Conc[9] Max (mg/kg)	Soil-To-Plant[10] Transfer Factor	Concentration[11] in Produce (mg/kg)	OSF[12] (kg-d/mg)	ORfD[13] (mg/kg-d)	Cancer Risk[14] RME	Cancer Risk[14] % of Total	Hazard Quotent[15] RME	Hazard Quotent[15] % of Total
Metals										
Arsenic	7440-38-2	5.00E+00	6.00E-03	5.40E-03	1.50E+00	3.00E-04	7.1839E-07	96.22%	6.16E-03	59.14%
Beryllium	7440-41-7	2.74E-01	1.50E-03	7.40E-05	4.3	0.005	2.8214E-08	3.78%	5.07E-06	0.05%
Iron	7439-89-6	2.07E+04	1.00E-03	3.73E+00	--	3.00E-01	--	--	4.25E-03	40.81%
					PATHWAY SUMS:		RME Cancer Risk 7.47E-07		RME Hazard Index 1.04E-02	

Notes:

1. Reasonable maximum exposure.
2. Calculated as 70 years (average lifetime) times 365 days per year.
3. Calculated as exposure duration (in years) times 365 days per year
4. EPA references.
5. Combined values are calculated by weighting adult and child exposure assumptions over the noted exposure duration (e.g., 24 yrs as an adult plus 6 yrs as a child for a total duration of 30 yrs).
6. Carcinogenic intake factor calculated using weighted (combined) exposure assumptions.
7. Noncarcinogenic intake factors are calculated for both adult and child, with the maximum of these used for risk calculations.
8. Chemical Abstract service.
9. Maximum detected exposure point concentration in background soil.
10. Constituent specific soil-to-plant tranfer factors for inorganics, (mg/kg dry plant per mg/kg dry soil), per NUREG/CR-5512, 1992, p.6.25
11. Concentration in Produce = (Chemical concentration, mg/kg * Soil-to-Plant Transfer Factor * dry-to-wet conversion factor)
    Dry to wet conversion factor for fruits = 0.18; leafy vegetables = 0.2; tuberous = 0.25
12. Slope factor.
13. Reference dose.
14. Cancer Risk = (Chemical Concentration in produce, mg/kg * Carcinogenic Intake Factor, kg/kg-day * Slope Factor, kg-day/mg)
15. Hazard Quotient = (Chemical Concentration in produce, mg/kg * Noncarcinogenic Intake Factor, kg/kg-day / Reference Dose, mg/kg-day)

** A risk and hazard assessment is performed on the maximum background value for those unit constituents that were less than 2x background . This table is provided for information only.

Human Health Table C.48
716-A Motor Shops Seepage Basin
Hypothetical Adult/Child Resident
Background Exposure Assumptions and Risk Calculations **
Ingestion of Soil (0-4' bls)

EXPOSURE ASSUMPTIONS:

Receptor Exposure	Adult Future Resident RME[1]		Child Future Resident RME		Combined Adult/Child Future Resident RME	
Intake Rate (IR), mg/day	100	(4)	200	(4)	120	(5)
Fraction Ingested (FI), unitless	1	(4)	1	(4)	1	(5)
Exposure Frequency (EF), unitless	350	(4)	350	(4)	350	(5)
Exposure Duration (ED), yrs	24	(4)	6	(4)	30	(5)
Body Weight (BW), kg	70	(4)	15	(4)	59	(5)
Averaging Time, Carc[2] (ATC), days	25,550		NA		25550	
Averaging Time, Noncarc[3] (ATN), days	8,760		2190		10950	
Conversion Factor (CF), kg/mg	1.00E-06		1.00E-06		1.00E-06	

INTAKE FACTOR CALCULATIONS

Carcinogenic Intake Factor (CIF), kg/kg-day =
(IR * FI * EF * ED * CF)/(BW * ATC)
RME CIF = 8.358E-07 (6)

Noncarcinogenic Intake Factor (NIF), kg/kg-day =
(IR * FI * EF * ED * CF)/(BW * ATN)
RME NIF = 1.279E-05 (7)

CARCINOGENIC AND NONCARCINOGENIC RISK CALCULATIONS:

Chemical	CAS[8] No.	EP Conc[9] Max (mg/kg)	OSF[10] (kg-d/mg)	ORfD[11] (mg/kg-d)	Cancer Risk[12] RME	Cancer Risk[12] % of Total	Hazard Quotient[13] RME	Hazard Quotient[13] % of Total
Metals								
Aluminum	7429-90-5	1.62E+04	--	1	--	--	0.2071233	14.05%
Arsenic	7440-38-2	5.90E+00	1.5	0.0003	7.397E-06	83.489778	0.251446	17.06%
Beryllium	7440-41-7	4.07E-01	4.3	0.005	1.463E-06	16.510222	0.0010407	0.07%
Iron	7439-89-6	2.38E+04	--	0.3	--	--	1.0143075	68.82%
				PATHWAY SUMS:	RME Cancer Risk 8.86E-06		RME Hazard Index 1.47E+00	

Notes:
1. Reasonable maximum exposure.
2. Calculated as 70 years (average lifetime) times 365 days per year.
3. Calculated as exposure duration (in years) times 365 days per year
4. EPA references.
5. Combined values are calculated by weighting adult and child exposure assumptions over the noted exposure duration (e.g., 24 yrs as an adult plus 6 yrs as a child for a total duration of 30 yrs).
6. Carcinogenic intake factor calculated using weighted (combined) exposure assumptions.
7. Noncarcinogenic intake factors are calculated for both adult and child, with the maximum of these used for risk calculations.
8. Chemical Abstract service.
9. Maximum detected exposure point concentration in background soil.
10. Slope factor
11. Reference dose.
12. Cancer Risk = (Chemical concentration, mg/kg * Carcinogenic Intake Factor, kg/kg-day * Slope Factor, kg-day/mg).
13. Hazard Quotient = Chemical Concentration, mg/kg * Noncarcinogenic Intake Factor, kg/kg-day)/(Reference Dose, mg/kg-day)

** A risk and hazard assessment is performed on the maximum background value for those unit constituents that were less than 2x background . This table is provided for information only.

Human Health Table C.49
716-A Motor Shops Seepage Basin
Hypothetical Adult/Child Resident
Background Exposure Assumptions and Risk Calculations**
Dermal Exposure to Soil (0-4' bls)

EXPOSURE ASSUMPTIONS:

Receptor Exposure	Adult Future Resident RME[1]		Child Future Resident RME		Combined Adult/Child Future Resident RME	
Skin Surface Area (SA), cm^2/event	5000	(4)	1800	(4)	4360	(5)
Soil-to-Skin Adherance (SK),mg/cm^2	1	(4)	1	(4)	1	(5)
Exposure Frequency (EF),events/yr	350	(4)	350	(4)	350	(5)
Exposure Duration (ED), yrs	240	(4)	6	(4)	30	(5)
Body Weight (BW), kg	70	(4)	15	(4)	59	(5)
Averaging Time, Carc[2] (ATC), days	25,550		NA		25550	
Averaging Time, Noncarc[3] (ATN), days	8,760		2190		10950	
Conversion Factor (CF), kg/mg	1.00E-06		1.00E-06		1.00E-06	

INTAKE FACTOR CALCULATIONS

Carcinogenic Intake Factor (CIF), kg/kg-day =
(SA * SK * EF * ED * CF)/(BW * ATC)
RME CIF = 3.037E-05 (6)

Noncarcinogenic Intake Factor (NIF), kg/kg-day =
(SA * SK* EF * ED * CF)/(BW * ATN)
RME NIF = 0.0001151 (7)

CARCINOGENIC AND NONCARCINOGENIC RISK CALCULATIONS:

Chemical	CAS[8] No.	EP Conc[9] Max (mg/kg)	DSF[10] (kg-d/mg)	DRfD[11] (mg/kg-d)	DABS[12] (unitless)	Cancer Risk[13] RME	Cancer Risk[13] % of Total	Hazard Quotent[14] RME	Hazard Quotent[14] % of Total
Metals									
Aluminum	7429-90-5	1.62E+04	--	4.00E-02	0.001	--	--	4.66E-02	48.54%
Arsenic	7440-38-2	5.90E+00	1.88	2.40E-04	0.001	3.3685E-07	5.96%	2.83E-03	2.95%
Beryllium	7440-41-7	4.07E-01	4.30E+02	5.00E-05	0.001	5.3149E-06	94.04%	9.37E-04	0.98%
Iron	7439-89-6	2.38E+04	--	0.06	0.001	--	--	4.56E-02	47.54%
					PATHWAY SUMS:	RME Cancer Risk 5.65E-06		RME Hazard Index 9.60E-02	

Notes:
1. Reasonable maximum exposure.
2. Calculated as 70 years (average lifetime) times 365 days per year.
3.Calculated as exposure duration (in years) times 365 days per year
4. EPA references.
5. Combined values are calculated by weighting adult and child exposure assumptions over the noted exposure duration (e.g., 24 yrs as an adult plus 6 yrs as a child for a total duration of 30 yrs).
6. Carcinogenic intake factor calculated using weighted (combined) exposure assumptions.
7. Noncarcinogenic intake factors are calculated for both adult and child, with the maximum of these used for risk calculations.
8. Chemical Abstract service.
9. Maximum detected exposure point concentration in background soil.
10. Absorbed dose slope factor = oral slope factor /oral absorption factor per RAGS, Vol.A, p.A-3
11. Dermal reference dose = oral RfD x oral absorption factor, per RAGS, Vol.A, p.A-2.
12.Dermal absorption factor: 0.01(organics), 0.001 (inorganics)
13. Cancer Risk = (Chemical Concentration, mg/kg * Carcinogenic Intake Factor, kg/kg-day * Absorption Factor, unitless * Slope Factor, kg-day/mg)
14. Hazard Quotient = (Chemical Concentration, mg/kg * Noncarcinogenic Intake Factor, kg/kg-day * Absorption Factor, unitless / Reference Dose, mg/kg-day)
** A risk and hazard assessment is performed on the maximum background value for those unit constituents that were less than 2x background . This table is provided for information only.

Human Health Table C.50
716-A Motor Shops Seepage Basin
Hypothetical Adult/Child Resident
Background Exposure Assumptions/Risk Calculations **
Inhalation of Soil Particulate (0-4' bls)

EXPOSURE ASSUMPTIONS:

Receptor	Adult Future Resident		Child Future Resident		Combined Adult/Child Future Resident	
Exposure	RME[1]		RME[1]		RME[1]	
Inhalation Rate (IR), m^3/hr	0.83	(4)	1	(4)	0.9	(5)
Exposure Time(ET), hrs/day	15	(4)	18	(4)	16	(5)
Exposure Frequency (EF), days/yr	350	(4)	350	(4)	350	(5)
Exposure Duration (ED), yrs	24	(4)	6	(4)	30	(5)
Body weight (BW), kg	70	(4)	15	(4)	59	(5)
Averaging Time, Carc[2] (ATC), days	25,550		NA		25,550	
Averaging Time, Noncarc[3] (ATN), days	8,760		2,190		10,950	

INTAKE FACTOR CALCULATIONS

Carcinogenic Intake Factor (CIF), m^3/kg-day =
(IR * ET* EF * ED)/(BW * ATC)
RME CIF = 1.00E-01 (6)

Noncarcinogenic Intake Factor (NIF), m^3/kg-day =
(IR * ET * EF * ED)/(BW * ATN)
RME NIF = 1.15E+00 (7)
(Child Value)

SOIL PARTICULATE RESUSPENSION FACTOR CALCULATION[8]

Width of contaminated area (LS) =	(site)	10	meters	(9)
Wind speed in mixing zone (V) =		2.25	meters/sec	(9)
Diffusion height (DH) =		2.00	meters	(9)
Area of contamination (A) =	(site)	685.00	$meters^2$	(9)
Respirable fraction (RF) =		0.036	$g/meters^2$-hr	(9)
Fraction of vegetative cover (G) =		0.25	unitless	(9)
Mean annual wind speed (Um) =		4.50	meters/sec	(9)
Equivalent threshold value of wind speed at 10 m (Ut) =		12.80	meters/sec	(9)
Fraction dependent on Um/Ut (Fx) =		0.0497	unitless	(9)
Conversion factor (CFa) =		3600.00	sec/hr	(9)
Conversion factor (CFb) =		1000.00	g/kg	(9)

CALCULATION OF PARTICULATE EMISSION FACTOR:

Particulate emission factor (PEF) = 4.056E+09 m^3/kg
(LS*V*DH*CFa*CFb)/(A*RF*(1-G)*((Um/Ut)^3*(Fx))

CARCINOGENIC AND NONCARCINOGENIC RISK CALCULATIONS:

Chemical	CAS[10] No	EP Conc[11] Max (mg/kg)	ISF[12] (kg-day/mg)	RfC[13] (mg/m^3)	Cancer Risk[14] RME	Cancer Risk[14] % of Total	Hazard Quotent[15] RME	Hazard Quotent[15] % of Total
Metals								
Aluminum	7429-90-5	1.62E+04	--	--	--	--	--	--
Arsenic	7440-38-2	5.90E+00	5.00E+01	--	7.295E-09	98.85%	--	--
Beryllium	7440-41-7	4.07E-01	8.4	--	8.454E-11	1.15%	--	--
Iron	7439-89-6	2.38E+04	--	--	--	--	--	--

PATHWAY SUMS:	RME Cancer Risk	RME Hazard Index
	7.38E-09	0.00E+00

Human Health Table C.50
716-A Motor Shops Seepage Basin
Hypothetical Adult/Child Resident
Background Exposure Assumptions/Risk Calculations **
Inhalation of Soil Particulate (0-4' bls)

Notes:

1. Reasonable maximum exposure.
2. Averaging time, carcinogen; calculated as 70 years (average lifetime) times 365 days per year (not applicable to child resident)
3. Averaging time, noncarcinogen; calculated as exposure duration (in years) times 365 days per year
4. EPA references.
5. Combined values are calcualted by weighting adult and child exposure assumptions over the noted exposure duration (e.g., 24 yrs as an adult plus 6 yers as a child for a total duration of 30 yrs)
6. Carcinogenic Intake factor calcualted using weighted (combined) exposure assumptions.
7. Noncarcinogenic intake factors are caluclated for both adult and child, with the maximum of these used for risk calculations.
8. USEPA, 1991: RAGS: Vol 1--Human Health Evalution Manual (Part B, Development of Risk-Based Preliminary Remediation Goals)
9. Site specific or default values from USEPA, 1991.
10. Chemical Abstract Service.
11. Maximum detected exposure point concentration in background soil.
12. Slope factor
13. Reference dose.
14. Cancer Risk = (RME concentration, mg/kg * Carcinogenic Intake Factor, m^3/kg-day * Slope Factor, kg-day/mg) / (PEF, m^3/kg).
15. Hazard Quotient = Chemical Concentration, mg/kg * Noncarcinogenic Intake Factor, kg/kg-day)/(Reference Dose, mg/kg-day * PEF, m^3/kg)

** A risk and hazard assessment is performed on the maximum background value for those unit constituents that were less than 2x background . This table is provided for information only.

Human Health Table C.51
716-A Motor Shops Seepage Basin
Hypothetical Adult/Child Resident
Background Exposure Assumptions and Risk Calculations **
Ingestion of Home Grown Produce (Tuberous) - (0-4' bls)

EXPOSURE ASSUMPTIONS:

Receptor	Adult Future Resident RME (Tuberous)[1]		Child Future Resident RME (Tuberous)[1]		Combined Adult/Child Future Resident RME (Tuberous)[1]	
Exposure (RME)[1]						
Intake Rate (IR), g/day	202	(4)	75	(4)	177	(5)
Fraction Ingested (FI), unitless	0.119	(4)	0.119	(4)	0.119	(5)
Exposure Frequency (EF),days/yr	350	(4)	350	(4)	350	(5)
Exposure Duration (ED), yrs	240	(4)	6	(4)	30	(5)
Body Weight (BW), kg	70	(4)	15	(4)	59	(5)
Averaging Time, Carc[2] (ATC), days	25,550		NA		25,550	
Averaging Time, Noncarc[3] (ATN), days	8,760		2190		10950	
Conversion Factor (CF), kg/g	1.00E-03		1.00E-03		1.00E-03	

INTAKE FACTOR CALCULATIONS

Carcinogenic Intake Factor (CIF), kg/kg-day =
(IR * FI* EF * ED * CF)/(BW * ATC) =
RME CIF = 0.0001467 (6)

Noncarcinogenic Intake Factor (NIF), kg/kg-day =
(IR * FI* EF * ED * CF)/(BW * ATN) =
RME NIF = 0.0005705 (7)
(Child)

CARCINOGENIC AND NONCARCINOGENIC RISK CALCULATIONS:

Chemical	CAS[8] No.	EP Conc[9] Max (mg/kg)	Soil-To-Plant[10] Transfer Factor	Concentration[11] in Produce (mg/kg)	OSF[12] (kg-d/mg)	ORfD[13] (mg/kg-d)	Cancer Risk[14] RME	Cancer Risk[14] % of Total	Hazard Quotent[15] RME	Hazard Quotent[15] % of Total
Metals										
Aluminum	7429-90-5	1.62E+04	--	--	--	1	--	--	--	--
Arsenic	7440-38-2	5.90E+00	6.00E-03	8.85E-03	1.50E+00	3.00E-04	1.9476E-06	95.29%	1.68E-02	59.76%
Beryllium	7440-41-7	4.07E-01	1.50E-03	1.53E-04	4.3	0.005	9.6285E-08	4.71%	1.74E-05	0.06%
Iron	7439-89-6	2.38E+04	1.00E-03	5.95E+00	--	3.00E-01	--	--	1.13E-02	40.18%
					PATHWAY SUMS:		RME Cancer Risk 2.04E-06		RME Hazard Index 2.82E-02	

Notes:
1. Reasonable maximum exposure.
2. Calculated as 70 years (average lifetime) times 365 days per year.
3. Calculated as exposure duration (in years) times 365 days per year
4. EPA references.
5. Combined values are calculated by weighting adult and child exposure assumptions over the noted exposure duration (e.g., 24 yrs as an adult plus 6 yrs as a child for a total duration of 30 yrs).
6. Carcinogenic intake factor calculated using weighted (combined) exposure assumptions.
7. Noncarcinogenic intake factors are calculated for both adult and child, with the maximum of these used for risk calculations.
8. Chemical Abstract service.
9. Maximum detected exposure point concentration in background soil.
10. Constituent specific soil-to-plant tranfer factors for inorganics, (mg/kg dry plant per mg/kg dry soil), per NUREG/CR-5512, 1992, p.6.25
11. Concentration in Produce = (Chemical concentration, mg/kg * Soil-to-Plant Transfer Factor * dry-to-wet conversion factor)
Dry to wet conversion factor for fruits = 0.18; leafy vegetables = 0.2; tuberous = 0.25
12. Slope factor.
13. Reference dose.
14. Cancer Risk = (Chemical Concentration in produce, mg/kg * Carcinogenic Intake Factor, kg/kg-day * Slope Factor, kg-day/mg)
15. Hazard Quotient = (Chemical Concentration in produce, mg/kg * Noncarcinogenic Intake Factor, kg/kg-day / Reference Dose, mg/kg-day)

** A risk and hazard assessment is performed on the maximum background value for those unit constituents that were less than 2x background . This table is provided for information only.

Human Health Table C.52
716-A Motor Shops Seepage Basin
Hypothetical Adult/Child Resident
Background Exposure Assumptions and Risk Calculations **
Ingestion of Home Grown Produce (Leafy) - (0-4' bls)

EXPOSURE ASSUMPTIONS:

Receptor	Adult Future Resident		Child Future Resident		Combined Adult/Child Future Resident	
Exposure (RME)[1]	RME (Leafy)[1]		RME (Leafy)[1]		RME (Leafy)[1]	
Intake Rate (IR), g/day	113	(4)	42	(4)	99	(5)
Fraction Ingested (FI), unitless	0.119	(4)	0.119	(4)	0.119	(5)
Exposure Frequency (EF),days/yr	350	(4)	350	(4)	350	(5)
Exposure Duration (ED), yrs	240	(4)	6	(4)	30	(5)
Body Weight (BW), kg	70	(4)	15	(4)	59	(5)
Averaging Time, Carc[2] (ATC), days	25,550		NA		25,550	
Averaging Time, Noncarc[3] (ATN), days	8,760		2190		10950	
Conversion Factor (CF), kg/g	1.00E-03		1.00E-03		1.00E-03	

INTAKE FACTOR CALCULATIONS

Carcinogenic Intake Factor (CIF), kg/kg-day =
(IR * FI* EF * ED * CF)/(BW * ATC) =
RME CIF = 8.206E-05 (6)

Noncarcinogenic Intake Factor (NIF), kg/kg-day =
(IR * FI* EF * ED * CF)/(BW * ATN) =
RME NIF = 0.0003195 (7)
(Child)

CARCINOGENIC AND NONCARCINOGENIC RISK CALCULATIONS:

Chemical	CAS[8] No.	EP Conc[9] Max (mg/kg)	Soil-To-Plant[10] Transfer Factor	Concentration[11] in Produce (mg/kg)	OSF[12] (kg-d/mg)	ORfD[13] (mg/kg-d)	Cancer Risk[14] RME	Cancer Risk[14] % of Total	Hazard Quotent[15] RME	Hazard Quotent[15] % of Total
Metals										
Aluminum	7429-90-5	1.62E+04	--	--	--	--	--	--	--	--
Arsenic	7440-38-2	5.90E+00	4.00E-02	4.72E-02	1.50E+00	3.00E-04	5.8098E-06	95.29%	5.03E-02	71.20%
Beryllium	7440-41-7	4.07E-01	1.00E-02	8.14E-04	4.3	0.005	2.8722E-07	4.71%	5.20E-05	0.07%
Iron	7439-89-6	2.38E+04	4.00E-03	1.90E+01	--	3.00E-01	--	--	2.03E-02	28.72%
					PATHWAY SUMS:		RME Cancer Risk 6.10E-06		RME Hazard Index 7.06E-02	

Notes:

1. Reasonable maximum exposure.
2. Calculated as 70 years (average lifetime) times 365 days per year.
3. Calculated as exposure duration (in years) times 365 days per year
4. EPA references.
5. Combined values are calculated by weighting adult and child exposure assumptions over the noted exposure duration (e.g., 24 yrs as an adult plus 6 yrs as a child for a total duration of 30 yrs).
6. Carcinogenic intake factor calculated using weighted (combined) exposure assumptions.
7. Noncarcinogenic intake factors are calculated for both adult and child, with the maximum of these used for risk calculations.
8. Chemical Abstract service.
9. Maximum detected exposure point concentration in background soil.
10. Constituent specific soil-to-plant tranfer factors for inorganics, (mg/kg dry plant per mg/kg dry soil), per NUREG/CR-5512, 1992, p.6.25
11. Concentration in Produce = (Chemical concentration, mg/kg * Soil-to-Plant Transfer Factor * dry-to-wet conversion factor)
    Dry to wet conversion factor for fruits = 0.18; leafy vegetables = 0.2; tuberous = 0.25
12. Slope factor.
13. Reference dose.
14. Cancer Risk = (Chemical Concentration in produce, mg/kg * Carcinogenic Intake Factor, kg/kg-day * Slope Factor, kg-day/mg)
15. Hazard Quotient = (Chemical Concentration in produce, mg/kg * Noncarcinogenic Intake Factor, kg/kg-day / Reference Dose, mg/kg-day)

** A risk and hazard assessment is performed on the maximum background value for those unit constituents that were less than 2x background . This table is provided for information only.

Human Health Table C.53
716-A Motor Shops Seepage Basin
Hypothetical Adult/Child Resident
Background Exposure Assumptions and Risk Calculations **
Ingestion of Home Grown Produce (Fruit) - (0-4' bls)

EXPOSURE ASSUMPTIONS:

Receptor	Adult Future Resident		Child Future Resident		Combined Adult/Child Future Resident	
Exposure (RME)[1]	RME (Fruit)[1]		RME (Fruit)[1]		RME (Fruit)[1]	
Intake Rate (IR), g/day	123	(4)	45	(4)	107	(5)
Fraction Ingested (FI), unitless	0.119	(4)	0.119	(4)	0.119	(5)
Exposure Frequency (EF),days/yr	350	(4)	350	(4)	350	(5)
Exposure Duration (ED), yrs	240	(4)	6	(4)	30	(5)
Body Weight (BW), kg	70	(4)	15	(4)	59	(5)
Averaging Time, Carc[2] (ATC), days	25,550		NA		25,550	
Averaging Time, Noncarc[3] (ATN), days	8,760		2190		10950	
Conversion Factor (CF), kg/g	1.00E-03		1.00E-03		1.00E-03	

INTAKE FACTOR CALCULATIONS

Carcinogenic Intake Factor (CIF), kg/kg-day =
(IR * FI* EF * ED * CF)/(BW * ATC) =
RME CIF = 8.869E-05 (6)

Noncarcinogenic Intake Factor (NIF), kg/kg-day =
(IR * FI* EF * ED * CF)/(BW * ATN) =
RME NIF = 0.0003423 (7)
(Child)

CARCINOGENIC AND NONCARCINOGENIC RISK CALCULATIONS:

Chemical	CAS[8] No.	EP Conc[9] Max (mg/kg)	Soil-To-Plant[10] Transfer Factor	Concentration in Produce[11] (mg/kg)	OSF[12] (kg-d/mg)	ORfD[13] (mg/kg-d)	Cancer Risk[14] RME	Cancer Risk[14] % of Total	Hazard Quotent[15] RME	Hazard Quotent[15] % of Total
Metals										
Aluminum	7429-90-5	1.62E+04	--	--	--	--	--	--	--	--
Arsenic	7440-38-2	5.90E+00	6.00E-03	6.37E-03	1.50E+00	3.00E-04	8.477E-07	95.29%	7.27E-03	59.76%
Beryllium	7440-41-7	4.07E-01	1.50E-03	1.10E-04	4.3	0.005	4.1909E-08	4.71%	7.52E-06	0.06%
Iron	7439-89-6	2.38E+04	1.00E-03	4.28E+00	--	3.00E-01	--	--	4.89E-03	40.18%
						PATHWAY SUMS:	RME Cancer Risk 8.90E-07		RME Hazard Index 1.22E-02	

Notes:

1. Reasonable maximum exposure.
2. Calculated as 70 years (average lifetime) times 365 days per year.
3. Calculated as exposure duration (in years) times 365 days per year
4. EPA references.
5. Combined values are calculated by weighting adult and child exposure assumptions over the noted exposure duration (e.g., 24 yrs as an adult plus 6 yrs as a child for a total duration of 30 yrs).
6. Carcinogenic intake factor calculated using weighted (combined) exposure assumptions.
7. Noncarcinogenic intake factors are calculated for both adult and child, with the maximum of these used for risk calculations.
8. Chemical Abstract service.
9. Maximum detected exposure point concentration in background soil.
10. Constituent specific soil-to-plant tranfer factors for inorganics, (mg/kg dry plant per mg/kg dry soil), per NUREG/CR-5512, 1992, p.6.25
11. Concentration in Produce = (Chemical concentration, mg/kg * Soil-to-Plant Transfer Factor * dry-to-wet conversion factor)
    Dry to wet conversion factor for fruits = 0.18; leafy vegetables = 0.2; tuberous = 0.25
12. Slope factor.
13. Reference dose.
14. Cancer Risk = (Chemical Concentration in produce, mg/kg * Carcinogenic Intake Factor, kg/kg-day * Slope Factor, kg-day/mg)
15. Hazard Quotient = (Chemical Concentration in produce, mg/kg * Noncarcinogenic Intake Factor, kg/kg-day / Reference Dose, mg/kg-day)

** A risk and hazard assessment is performed on the maximum background value for those unit constituents that were less than 2x background . This table is provided for information only.

APPENDIX C.7
CENTRAL TENDENCY RISK AND HAZARD CALCULATIONS FOR UNIT COPCs

(Tables C.54 - C.67)

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APPENDIX C.7
CENTRAL TENDENCY RISK AND HAZARD CALCULATIONS FOR UNIT COPCs
List of Tables for Human Health Risk Assessment

Table No.	Receptor	Exposure Route	Interval
C.54	Hypothetical Industrial Worker	Ingestion of Soil	0-1'
C.55	Hypothetical Industrial Worker	Dermal Exposure to Soil	0-1'
C.56	Hypothetical Industrial Worker	Inhalation of Soil Particulates	0-1'
C.57	Hypothetical Industrial Worker	Ingestion of Soil	0-4'
C.58	Hypothetical Industrial Worker	Dermal Exposure to Soil	0-4'
C.59	Hypothetical Industrial Worker	Inhalation of Soil Particulates	0-4'
C.60	Hypothetical Adult/Child Resident	Ingestion of Soil	0-1'
C.61	Hypothetical Adult/Child Resident	Dermal Exposure to Soil	0-1'
C.62	Hypothetical Adult/Child Resident	Inhalation of Soil Particulates	0-1'
C.63	Hypothetical Adult/Child Resident	Ingestion of Contaminated Produce	0-1'
C.64	Hypothetical Adult/Child Resident	Ingestion of Soil	0-4'
C.65	Hypothetical Adult/Child Resident	Dermal Exposure to Soil	0-4'
C.66	Hypothetical Adult/Child Resident	Inhalation of Soil Particulates	0-4'
C.67	Hypothetical Adult/Child Resident	Ingestion of Contaminated Produce	0-4'

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Human Health Table C.54
716-A Motor Shops Seepage Basin
Hypothetical On-Unit Industrial Worker
Central Tendency Exposure Assumptions and Risk Calculations - Ingestion of Soil (0-1' bls)

EXPOSURE ASSUMPTIONS:

Receptor	Future Industrial Worker	
Exposure	CTE(1)	
Intake Rate (IR), mg/day	50	(4)
Fraction Ingested (FI), unitless	1	(4)
Exposure Frequency (EF), unitless	250	(4)
Exposure Duration (ED), yrs	25	(4)
Body Weight (BW), kg	70	(4)
Averaging Time, Carc[2] (ATC), days	25,550	
Averaging Time, Noncarc[3] (ATN), days	9,125	
Conversion Factor (CF), kg/mg	1.00E-06	

INTAKE FACTOR CALCULATIONS

Carcinogenic Intake Factor (CIF), kg/kg-day =
(IR * FI * EF * ED * CF)/(BW * ATC)
CTE CIF = 1.747E-07

Noncarcinogenic Intake Factor (NIF), kg/kg-day =
(IR * FI * EF * ED * CF)/(BW * ATN)
CTE NIF = 4.892E-07

CARCINOGENIC AND NONCARCINOGENIC RISK CALCULATIONS:

Chemical	CAS[5] No.	EP Conc[6] CTE (mg/kg)	OSF[7] (kg-d/mg)	ORfD[8] (mg/kg-d)	Cancer Risk[9] CTE	Cancer Risk[9] % of Total	Hazard Quotent[10] CTE	Hazard Quotent[10] % of Total
Semivolatiles								
Benzo(a)pyrene	50-3-28	7.83E-02	7.30E+00	--	9.987E-08	100	--	--
				PATHWAY SUMS:	CTE Cancer Risk 9.99E-08		CTE Hazard Index 0.00E+00	

Notes:
1. Central tendency exposure.
2. Calculated as 70 years (average lifetime) times 365 days per year.
3.Calculated as exposure duration (in years) times 365 days per year
4. EPA references.
5. Chemical Abstract Service.
6. Central tendency exposure point concentration.
7. Slope factor
8. Reference dose.
9. Cancer Risk = (Chemical concentration, mg/kg * Carcinogenic Intake Factor, kg/kg-day * Slope Factor, kg-day/mg).
10. Hazard Quotient = Chemical Concentration, mg/kg * Noncarcinogenic Intake Factor, kg/kg-day)/(Reference Dose, mg/kg-day)

Human Health Table C.55
716-A Motor Shops Seepage Basin
Hypothetical On-Unit Industrial Worker
Central Tendency Exposure Assumptions and Risk Calculations - Dermal Exposure to Soil (0-1' bls)

EXPOSURE ASSUMPTIONS:

Receptor	Future Industrial Worker	
Exposure	CTE(1)	
Skin Surface Area (SA), cm^2/event	3200	(4)
Soil-to-Skin Adherance (SK),mg/cm^2	1.0	(4)
Exposure Frequency (EF),events/yr	250	(4)
Exposure Duration (ED), yrs	25	(4)
Body Weight (BW), kg	70	(4)
Averaging Time, Carc[2] (ATC), days	25,550	
Averaging Time, Noncarc[3] (ATN), days	9,125	
Conversion Factor (CF), kg/mg	1.00E-06	

INTAKE FACTOR CALCULATIONS

Carcinogenic Intake Factor (CIF), kg/kg-day =
(SA * SK * EF * ED * CF)/(BW * ATC)
CTE CIF = 1.118E-05

Noncarcinogenic Intake Factor (NIF), kg/kg-day =
(SA * SK* EF * ED * CF)/(BW * ATN)
CTE NIF = 3.131E-05

CARCINOGENIC AND NONCARCINOGENIC RISK CALCULATIONS:

Chemical	CAS[5] No.	EP Conc[6] CTE (mg/kg)	DSF[7] (kg-d/mg)	DRfD[8] (mg/kg-d)	DABS[9] (unitless)	Cancer Risk[10] CTE	Cancer Risk[10] % of Total	Hazard Quotent[11] CTE	Hazard Quotent[11] % of Total
Semivolatiles									
Benzo(a)pyrene	50-3-28	7.83E-02	3.65E+01	--	1.00E-02	3.196E-07	100	--	--
				PATHWAY SUMS:		CTE Cancer Risk 3.20E-07		CTE Hazard Index 0.00E+00	

Notes:
1. Central tendency exposure.
2. Calculated as 70 years (average lifetime) times 365 days per year.
3.Calculated as exposure duration (in years) times 365 days per year
4. EPA references.
5. Chemical Abstract Service.
6. Central tendency exposure point concentration.
7. Absorbed dose slope factor = oral SF/absorption factor, per RAGS, Vol.A, p.A-3
8. Dermal reference dose = oral RfD x oral absorption factor, per RAGS, Vol.A, p.A-2.
9.Dermal absorption factor: 0.01(organics), 0.001 (inorganics)
10. Cancer Risk = (Chemical Concentration, mg/kg * Carcinogenic Intake Factor, kg/kg-day * Absorption Factor, unitless * Slope Factor, kg-day/mg)
11. Hazard Quotient = (Chemical Concentration, mg/kg * Noncarcinogenic Intake Factor, kg/kg-day * Absorption Factor, unitless / Reference Dose, mg/kg-day)

Human Health Table C.56
716-A Motor Shops Seepage Basin
Hypothetical On-Unit Industrial Worker
Central Tendency Exposure Assumptions and Risk Calculations - Inhalation of Soil Particulate Contaminants (0-1' bls)

EXPOSURE ASSUMPTIONS:

Receptor	Future Industrial Worker	
Exposure	CTE(1)	
Inhalation Rate (IR), m^3/hr	2.5	(4)
Exposure Time(ET), hrs/day	8	(4)
Exposure Frequency (EF), days/yr	250	(4)
Exposure Duration (ED), yrs	25	(4)
Body weight (BW), kg	70	(4)
Averaging Time, Carc(2) (ATC), days	25,550	
Averaging Time, Noncarc(3) (ATN), days	9,125	

INTAKE FACTOR CALCULATIONS

Carcinogenic Intake Factor (CIF),m^3/kg-day =
(IR * ET* EF * ED)/(BW * ATC)
CTE CIF = 6.99E-02

Noncarcinogenic Intake Factor (NIF), m^3/kg-day =
(IR * ET * EF * ED)/(BW * ATN)
CTE NIF = 1.96E-01

SOIL PARTICULATE RESUSPENSION FACTOR CALCULATION (5)

Width of contaminated area (LS) =	(site)	10	meters
Wind speed in mixing zone (V) =		2.25	meters/sec
Diffusion height (DH) =		2.00	meters
Area of contamination (A) =	(site)	685.00	$meters^2$
Respirable fraction (RF) =		0.036	g/$meters^2$-hr
Fraction of vegetative cover (G) =		0.25	unitless
Mean annual wind speed (Um) =		4.50	meters/sec
Equivalent threshold value of wind speed at 10 m (Ut) =		12.80	meters/sec
Fraction dependent on Um/Ut (Fx) =		0.0497	unitless
Conversion factor (CFa) =		3600.00	sec/hr
Conversion factor (CFb) =		1000.00	g/kg

CALCULATION OF PARTICULATE EMISSION FACTOR:

Particulate emission factor (PEF) = 4.056E+09 m^3/kg
(LS*V*DH*CFa*CFb)/(A*RF*(1-G)*((Um/Ut)^3*(Fx))

CARCINOGENIC AND NONCARCINOGENIC RISK CALCULATIONS:

Chemical	CAS(6) No.	EP Conc(7) CTE (mg/kg)	ISF (8) (kg-day/mg)	RfC(9) (mg/m^3)	Cancer Risk(10) CTE	Cancer Risk(10) % of Total	Hazard Quotent(11) CTE	Hazard Quotent(11) % of Total
Semivolatiles								
Benzo(a)pyrene	50-3-28	7.83E-02	3.10E+00	--	4.183E-12	100	--	--

	CTE Cancer Risk	CTE Hazard Index
PATHWAY SUMS:	4.18E-12	0.00E+00

Human Health Table C.56
716-A Motor Shops Seepage Basin
Hypothetical On-Unit Industrial Worker
Central Tendency Exposure Assumptions and Risk Calculations - Inhalation of Soil Particulate Contaminants (0-1' bls)

Notes:

1. Central tendency exposure.
2. Calculated as 70 years (average lifetime) times 365 days per year.
3. Calculated as exposure duration (in years) times 365 days per year
4. EPA references.
5. Particulate Emission Factor calculation, EPA RAGS, Part B, 1991
6. Chemical Abstract Service.
7. Central tendency exposure point concentration.
8. Slope factor
9. Reference dose.
10. Cancer Risk = (CTE concentration, mg/kg * Carcinogenic Intake Factor, m3/kg-day * Slope Factor, kg-day/mg) / (PEF, m3/kg).
11. Hazard Quotient = Chemical Concentration, mg/kg * Noncarcinogenic Intake Factor, kg/kg-day)/(Reference Dose, mg/kg-day * PEF, m^3/kg)

Human Health Table C.57
716-A Motor Shops Seepage Basin
Hypothetical On-Unit Industrial Worker
Central Tendency Exposure Assumptions and Risk Calculations - Ingestion of Soil (0-4' bls)

EXPOSURE ASSUMPTIONS:

Receptor	Future Industrial Worker	
Exposure	CTE(1)	
Intake Rate (IR), mg/day	50	(4)
Fraction Ingested (FI), unitless	1	(4)
Exposure Frequency (EF), unitless	250	(4)
Exposure Duration (ED), yrs	25	(4)
Body Weight (BW), kg	70	(4)
Averaging Time, Carc[2] (ATC), days	25,550	
Averaging Time, Noncarc[3] (ATN), days	9,125	
Conversion Factor (CF), kg/mg	1.00E-06	

INTAKE FACTOR CALCULATIONS

Carcinogenic Intake Factor (CIF), kg/kg-day =
(IR * FI * EF * ED * CF)/(BW * ATC)
CTE CIF = 1.747E-07

Noncarcinogenic Intake Factor (NIF), kg/kg-day =
(IR * FI * EF * ED * CF)/(BW * ATN)
CTE NIF = 4.892E-07

CARCINOGENIC AND NONCARCINOGENIC RISK CALCULATIONS:

Chemical	CAS[5] No.	EP Conc[6] CTE (mg/kg)	OSF[7] (kg-d/mg)	ORfD[8] (mg/kg-d)	Cancer Risk[9] CTE	Cancer Risk[9] % of Total	Hazard Quotent[10] CTE	Hazard Quotent[10] % of Total
Semivolatiles								
Benzo(a)pyrene	50-3-28	4.52E-02	7.30E+00	--	5.765E-08	100	--	--
				PATHWAY SUMS:	CTE Cancer Risk 5.77E-08		CTE Hazard Index 0.00E+00	

Notes:
1. Central tendency exposure.
2. Calculated as 70 years (average lifetime) times 365 days per year.
3.Calculated as exposure duration (in years) times 365 days per year
4. EPA references.
5. Chemical Abstract Service.
6. Central tendency exposure point concentration.
7. Slope factor
8. Reference dose.
9. Cancer Risk = (Chemical concentration, mg/kg * Carcinogenic Intake Factor, kg/kg-day * Slope Factor, kg-day/mg).
10. Hazard Quotient = Chemical Concentration, mg/kg * Noncarcinogenic Intake Factor, kg/kg-day)/(Reference Dose, mg/kg-day)

Human Health Table C.58
716-A Motor Shops Seepage Basin
Hypothetical On-Unit Industrial Worker
Central Tendency Exposure Assumptions and Risk Calculations - Dermal Exposure to Soil (0-4' bls)

EXPOSURE ASSUMPTIONS:

Receptor	Future Industrial Worker	
Exposure	CTE[1]	
Skin Surface Area (SA), cm^2/event	3200	(4)
Soil-to-Skin Adherance (SK),mg/cm^2	1.0	(4)
Exposure Frequency (EF),events/yr	250	(4)
Exposure Duration (ED), yrs	25	(4)
Body Weight (BW), kg	70	(4)
Averaging Time, Carc[2] (ATC), days	25,550	
Averaging Time, Noncarc[3] (ATN), days	9,125	
Conversion Factor (CF), kg/mg	1.00E-06	

INTAKE FACTOR CALCULATIONS

Carcinogenic Intake Factor (CIF), kg/kg-day =
(SA * SK * EF * ED * CF)/(BW * ATC)
CTE CIF = 1.118E-05

Noncarcinogenic Intake Factor (NIF), kg/kg-day =
(SA * SK* EF * ED * CF)/(BW * ATN)
CTE NIF = 3.131E-05

CARCINOGENIC AND NONCARCINOGENIC RISK CALCULATIONS:

Chemical	CAS[5] No.	EP Conc[6] CTE (mg/kg)	DSF[7] (kg-d/mg)	DRfD[8] (mg/kg-d)	DABS[9] (unitless)	Cancer Risk[10] CTE	Cancer Risk[10] % of Total	Hazard Quotent[11] RME	Hazard Quotent[11] % of Total
Semivolatiles									
Benzo(a)pyrene	50-3-28	4.52E-02	3.65E+01	--	1.00E-02	1.845E-07	100	--	--
					PATHWAY SUMS:	CTE Cancer Risk 1.84E-07		CTE Hazard Index 0.00E+00	

Notes:
1. Central tendency exposure.
2. Calculated as 70 years (average lifetime) times 365 days per year.
3.Calculated as exposure duration (in years) times 365 days per year
4. EPA references.
5. Chemical Abstract Service.
6. Central tendency exposure point concentration.
7. Absorbed dose slope factor = oral SF/absorption factor, per RAGS, Vol.A, p.A-3
8. Dermal reference dose = oral RfD x oral absorption factor, per RAGS, Vol.A, p.A-2.
9.Dermal absorption factor: 0.01(organics), 0.001 (inorganics)
10. Cancer Risk = (Chemical Concentration, mg/kg * Carcinogenic Intake Factor, kg/kg-day * Absorption Factor, unitless * Slope Factor, kg-day/mg)
11. Hazard Quotient = (Chemical Concentration, mg/kg * Noncarcinogenic Intake Factor, kg/kg-day * Absorption Factor, unitless / Reference Dose, mg/kg-day)

Human Health Table C.59
716-A Motor Shops Seepage Basin
Hypothetical On-Unit Industrial Worker
Central Tendency Exposure Assumptions and Risk Calculations - Inhalation of Soil Particulate Contaminants (0-4' bls)

EXPOSURE ASSUMPTIONS:

Receptor	Future Industrial Worker	
Exposure	CTE(1)	
Inhalation Rate (IR), m^3/hr	2.5	(4)
Exposure Time(ET), hrs/day	8	(4)
Exposure Frequency (EF), days/yr	250	(4)
Exposure Duration (ED), yrs	25	(4)
Body weight (BW), kg	70	(4)
Averaging Time, Carc(2) (ATC), days	25,550	
Averaging Time, Noncarc(3) (ATN), days	9,125	

INTAKE FACTOR CALCULATIONS

Carcinogenic Intake Factor (CIF),m^3/kg-day =
(IR * ET* EF * ED)/(BW * ATC)
CTE CIF = 6.99E-02

Noncarcinogenic Intake Factor (NIF), m^3/kg-day =
(IR * ET* EF * ED)/(BW * ATN)
CTE NIF = 1.96E-01

SOIL PARTICULATE RESUSPENSION FACTOR CALCULATION (5)

Width of contaminated area (LS) =	(site)	10	meters
Wind speed in mixing zone (V) =		2.25	meters/sec
Diffusion height (DH) =		2.00	meters
Area of contamination (A) =	(site)	685.00	$meters^2$
Respirable fraction (RF) =		0.036	$g/meters^2$-hr
Fraction of vegetative cover (G) =		0.25	unitless
Mean annual wind speed (Um) =		4.50	meters/sec
Equivalent threshold value of wind speed at 10 m (Ut) =		12.80	meters/sec
Fraction dependent on Um/Ut (Fx) =		0.0497	unitless
Conversion factor (CFa) =		3600.00	sec/hr
Conversion factor (CFb) =		1000.00	g/kg

CALCULATION OF PARTICULATE EMISSION FACTOR:

Particulate emission factor (PEF) = 4.056E+09 m^3/kg
$(LS*V*DH*CFa*CFb)/(A*RF*(1-G)*((Um/Ut)^3*(Fx))$

CARCINOGENIC AND NONCARCINOGENIC RISK CALCULATIONS:

Chemical	CAS(6) No.	EP Conc(7) CTE (mg/kg)	ISF (8) (kg-day/mg)	RfC(9) (mg/m^3)	Cancer Risk(10) CTE	Cancer Risk(10) % of Total	Hazard Quotent(11) CTE	Hazard Quotent(11) % of Total
Semivolatiles								
Benzo(a)pyrene	50-3-28	4.52E-02	3.10E+00	--	2.414E-12	100	--	--

PATHWAY SUMS:

CTE Cancer Risk: 2.41E-12

CTE Hazard Index: 0.00E+00

Human Health Table C.59
716-A Motor Shops Seepage Basin
Hypothetical On-Unit Industrial Worker
Central Tendency Exposure Assumptions and Risk Calculations - Inhalation of Soil Particulate Contaminants (0-4' bls)

Notes:

1. Central tendency exposure.
2. Calculated as 70 years (average lifetime) times 365 days per year.
3. Calculated as exposure duration (in years) times 365 days per year
4. EPA references.
5. Particulate Emission Factor calculation, EPA RAGS, Part B, 1991
6. Chemical Abstract Service.
7. Central tendency exposure point concentration.
8. Slope factor
9. Reference dose.
10. Cancer Risk = (CTE concentration, mg/kg * Carcinogenic Intake Factor, m3/kg-day * Slope Factor, kg-day/mg) / (PEF, m3/kg).
11. Hazard Quotient = Chemical Concentration, mg/kg * Noncarcinogenic Intake Factor, kg/kg-day)/(Reference Dose, mg/kg-day * PEF, m^3/kg)

Human Health Table C.60
716-A Motor Shops Seepage Basin
Hypothetical Adult/Child Resident
Central Tendency Exposure Assumptions and Risk Calculations - Ingestion of Soil (0-1' bls)

EXPOSURE ASSUMPTIONS:

Receptor Exposure	Adult Future Resident CTE(1)		Child Future Resident CTE		Combined Adult/Child Future Resident CTE	
Intake Rate (IR), mg/day	100	(4)	200	(4)	120	(5)
Fraction Ingested (FI), unitless	1	(4)	1	(4)	1	(5)
Exposure Frequency (EF), unitless	350	(4)	350	(4)	350	(5)
Exposure Duration (ED), yrs	24	(4)	6	(4)	30	(5)
Body Weight (BW), kg	70	(4)	15	(4)	59	(5)
Averaging Time, Carc[2] (ATC), days	25,550		NA		25550	
Averaging Time, Noncarc[3] (ATN), days	8,760		2190		10950	
Conversion Factor (CF), kg/mg	1.00E-06		1.00E-06		1.00E-06	

INTAKE FACTOR CALCULATIONS

Carcinogenic Intake Factor (CIF), kg/kg-day =
(IR * FI * EF * ED * CF)/(BW * ATC)
CTE CIF = 8.358E-07 (6)

Noncarcinogenic Intake Factor (NIF), kg/kg-day =
(IR * FI * EF * ED * CF)/(BW * ATN)
CTE NIF = 1.279E-05 (7)

CARCINOGENIC AND NONCARCINOGENIC RISK CALCULATIONS:

Chemical	CAS[8] No.	EP Conc[9] CTE (mg/kg)	OSF[10] (kg-d/mg)	ORfD[11] (mg/kg-d)	Cancer Risk[12] CTE	Cancer Risk[12] % of Total	Hazard Quotent[13] CTE	Hazard Quotent[13] % of Total
Semivolatiles								
Benzo(a)pyrene	50-3-28	7.83E-02	7.30E+00	--	4.778E-07	100	--	--

	CTE Cancer Risk	CTE Hazard Index
PATHWAY SUMS:	4.78E-07	0.00E+00

Notes:
1. Central tendency exposure.
2. Calculated as 70 years (average lifetime) times 365 days per year.
3. Calculated as exposure duration (in years) times 365 days per year
4. EPA references.
5. Combined values are calculated by weighting adult and child exposure assumptions over the noted exposure duration (e.g., 24 yrs as an adult plus 6 yrs as a child for a total duration of 30 yrs).
6. Carcinogenic intake factor calculated using weighted (combined) exposure assumptions.
7. Noncarcinogenic intake factors are calculated for both adult and child, with the maximum of these used for risk calculations.
8. Chemical Abstract service.
9. Central tendency exposure point concentration.
10. Slope factor
11. Reference dose.
12. Cancer Risk = (Chemical concentration, mg/kg * Carcinogenic Intake Factor, kg/kg-day * Slope Factor, kg-day/mg).
13. Hazard Quotient = Chemical Concentration, mg/kg * Noncarcinogenic Intake Factor, kg/kg-day)/(Reference Dose, mg/kg-day)

Human Health Table C.61
716-A Motor Shops Seepage Basin
Hypothetical Adult/Child Resident
Central Tendency Exposure Assumptions and Risk Calculations - Dermal Exposure to Soil (0-1' bls)

EXPOSURE ASSUMPTIONS:

Receptor Exposure	Adult Future Resident CTE(1)		Child Future Resident CTE		Combined Adult/Child Future Resident CTE	
Skin Surface Area (SA), cm^2/event	5000	(4)	1800	(4)	4360	(5)
Soil-to-Skin Adherance (SK),mg/cm^2	1	(4)	1	(4)	1	(5)
Exposure Frequency (EF),events/yr	350	(4)	350	(4)	350	(5)
Exposure Duration (ED), yrs	240	(4)	6	(4)	30	(5)
Body Weight (BW), kg	70	(4)	15	(4)	59	(5)
Averaging Time, Carc[2] (ATC), days	25,550		NA		25550	
Averaging Time, Noncarc[3] (ATN), days	8,760		2190		10950	
Conversion Factor (CF), kg/mg	1.00E-06		1.00E-06		1.00E-06	

INTAKE FACTOR CALCULATIONS

Carcinogenic Intake Factor (CIF), kg/kg-day =
(SA * SK * EF * ED * CF)/(BW * ATC)
CTE CIF = 3.037E-05 (6)

Noncarcinogenic Intake Factor (NIF), kg/kg-day =
(SA * SK* EF * ED * CF)/(BW * ATN)
CTE NIF = 0.0001151 (7)

CARCINOGENIC AND NONCARCINOGENIC RISK CALCULATIONS:

Chemical	CAS[8] No.	EP Conc[9] CTE (mg/kg)	DSF[10] (kg-d/mg)	DRfD[11] (mg/kg-d)	DABS[12] (unitless)	Cancer Risk[13] CTE	Cancer Risk[13] % of Total	Hazard Quotent[14] CTE	Hazard Quotent[14] % of Total
Semivolatiles									
Benzo(a)pyrene	50-3-28	7.83E-02	3.65E+01	--	1.00E-02	8.6794E-07	100	--	--

	CTE Cancer Risk	CTE Hazard Index
PATHWAY SUMS:	8.68E-07	0.00E+00

Notes:

1. Central tendency exposure.
2. Calculated as 70 years (average lifetime) times 365 days per year.
3. Calculated as exposure duration (in years) times 365 days per year
4. EPA references.
5. Combined values are calculated by weighting adult and child exposure assumptions over the noted exposure duration (e.g., 24 yrs as an adult plus 6 yrs as a child for a total duration of 30 yrs).
6. Carcinogenic intake factor calculated using weighted (combined) exposure assumptions.
7. Noncarcinogenic intake factors are calculated for both adult and child, with the maximum of these used for risk calculations.
8. Chemical Abstract service.
9. Central tendency exposure point concentration.
10. Absorbed dose slope factor = oral slope factor/oral absorption factor, per RAGS, Vol.A, p.A-3
11. Dermal reference dose = oral RfD x oral absorption factor, per RAGS, Vol.A, p.A-2.
12. Dermal absorption factor: 0.01(organics), 0.001 (inorganics)
13. Cancer Risk = (Chemical Concentration, mg/kg * Carcinogenic Intake Factor, kg/kg-day * Absorption Factor, unitless * Slope Factor, kg-day/mg)
14. Hazard Quotient = (Chemical Concentration, mg/kg * Noncarcinogenic Intake Factor, kg/kg-day * Absorption Factor, unitless / Reference Dose, mg/kg-day)

Human Health Table C.62
716-A Motor Shops Seepage Basin
Hypothetical Adult/Child Resident
Central Tendency Exposure Assumptions and Risk Calculations - Inhalation of Soil Particulate Contaminants (0-1' bls)

EXPOSURE ASSUMPTIONS:

Receptor Exposure	Adult Future Resident CTE(1)		Child Future Resident CTE(1)		Combined Adult/Child Future Resident CTE(1)	
Inhalation Rate (IR), m^3/hr	0.83	(4)	1	(4)	0.9	(5)
Exposure Time(ET), hrs/day	15	(4)	18	(4)	16	(5)
Exposure Frequency (EF), days/yr	350	(4)	350	(4)	350	(5)
Exposure Duration (ED), yrs	24	(4)	6	(4)	30	(5)
Body weight (BW), kg	70	(4)	15	(4)	59	(5)
Averaging Time, Carc[2] (ATC), days	25,550		NA		25,550	
Averaging Time, Noncarc[3] (ATN), days	8,760		2,190		10,950	

INTAKE FACTOR CALCULATIONS

Carcinogenic Intake Factor (CIF), m^3/kg-day =
(IR * ET* EF * ED)/(BW * ATC)
CTE CIF = 1.00E-01 (6)

Noncarcinogenic Intake Factor (NIF), m^3/kg-day =
(IR * ET * EF * ED)/(BW * ATN)
CTE NIF = 1.15E+00 (7)
(Child Value)

SOIL PARTICULATE RESUSPENSION FACTOR CALCULATION [8]

Width of contaminated area (LS) =	(site)	10	meters	(9)
Wind speed in mixing zone (V) =		2.25	meters/sec	(9)
Diffusion height (DH) =		2.00	meters	(9)
Area of contamination (A) =	(site)	685.00	$meters^2$	(9)
Respirable fraction (RF) =		0.036	$g/meters^2$-hr	(9)
Fraction of vegetative cover (G) =		0.25	unitless	(9)
Mean annual wind speed (Um) =		4.50	meters/sec	(9)
Equivalent threshold value of wind speed at 10 m (Ut) =		12.80	meters/sec	(9)
Fraction dependent on Um/Ut (Fx) =		0.0497	unitless	(9)
Conversion factor (CFa) =		3600.00	sec/hr	(9)
Conversion factor (CFb) =		1000.00	g/kg	(9)

CALCULATION OF PARTICULATE EMISSION FACTOR:

Particulate emission factor (PEF) = 4.056E+09 m^3/kg
$(LS*V*DH*CFa*CFb)/(A*RF*(1-G)*((Um/Ut)^3*(Fx))$

CARCINOGENIC AND NONCARCINOGENIC RISK CALCULATIONS:

Chemical	CAS[10] No	EP Conc[11] CTE (mg/kg)	ISF [12] (kg-day/mg)	RfC[13] (mg/m^3)	Cancer Risk[14] CTE	Cancer Risk[14] % of Total	Hazard Quotent[15] CTE	Hazard Quotent[15] % of Total
Semivolatiles								
Benzo(a)pyrene	50-3-28	7.83E-02	3.10E+00	--	6.003E-12	100	--	--

PATHWAY SUMS:	CTE Cancer Risk	CTE Hazard Index
	6.00E-12	0.00E+00

Human Health Table C.62
716-A Motor Shops Seepage Basin
Hypothetical Adult/Child Resident
Central Tendency Exposure Assumptions and Risk Calculations - Inhalation of Soil Particulate Contaminants (0-1' bls)

Notes:

1. Central tendency exposure.
2. Averaging time, carcinogen; calculated as 70 years (average lifetime) times 365 days per year (not applicable to child resident)
3. Averaging time, noncarcinogen; calculated as exposure duration (in years) times 365 days per year
4. EPA references.
5. Combined values are calcualted by weighting adult and child exposure assumptions over the noted exposure duration (e.g., 24 yrs as an adult plus 6 yers as a child for a total duration of 30 yrs)
6. Carcinogenic Intake factor calcualted using weighted (combined) exposure assumptions.
7. Noncarcinogenic intake factors are caluclated for both adult and child, with the maximum of these used for risk calculations.
8. USEPA, 1991: RAGS: Vol 1--Human Health Evalution Manual (Part B, Development of Risk-Based Preliminary Remediation Goals)
9. Site specific or default values from USEPA, 1991.
10. Chemical Abstract Service.
11. Central tendency exposure point concentration.
12. Slope factor
13. Reference dose.
14. Cancer Risk = (CTE concentration, mg/kg * Carcinogenic Intake Factor, m3/kg-day * Slope Factor, kg-day/mg) / (PEF, m3/kg).
15. Hazard Quotient = Chemical Concentration, mg/kg * Noncarcinogenic Intake Factor, kg/kg-day)/(Reference Dose, mg/kg-day * PEF, m^3/kg)

Human Health Table C.63
716-A Motor Shops Seepage Basin
Hypothetical Adult/Child Resident
Central Tendency Exposure Assumptions and Risk Calculations
Ingestion of Contaminated Tuberous/Leafy Vegetables and Fruits - (0-1' bls)

EXPOSURE ASSUMPTIONS:

Receptor	Adult Future Resident			Child Future Resident			Combined Adult/Child Future Resident			
Exposure (CTE)(1)	Root	Leafy	Fruit	Root	Leafy	Fruit	Root	Leafy	Fruit	
Intake Rate (IR), g/day	202	113	123 (4)	75	42	45 (4)	177	99	107	(5)
Fraction Ingested (FI), unitless	0.119	0.042	0.49 (4)	0.119	0.042	0.49 (4)	0.119	0.04	0.49	(5)
Exposure Frequency (EF),days/yr	350		(4)	350		(4)	350			(5)
Exposure Duration (ED), yrs	240		(4)	6		(4)	30			(5)
Body Weight (BW), kg	70		(4)	15		(4)	59			(5)
Averaging Time, Carc[2] (ATC), days	25,550			NA			25550			
Averaging Time, Noncarc[3] (ATN), days	8,760			2190			10950			
Conversion Factor (CF), kg/g	1.00E-03			1.00E-03			1.00E-03			

INTAKE FACTOR CALCULATIONS

Carcinogenic Intake Factor (CIF), kg/kg-day =
(IR * FI * EF * ED * CF)/(BW * ATC)

	Root	Leafy	Fruit	Total CIF[6]
CIF =	1.47E-04	2.90E-05	3.63E-04	5.39E-04

Noncarcinogenic Intake Factor (NIF), kg/kg-day =
(IR * FI * EF * ED * CF)/(BW * ATC)

	Root	Leafy	Fruit	Total NIF[7]
NIF =	5.71E-04 (Child)	1.13E-04 (Child)	1.40E-03 (Child)	2.08E-03

CARCINOGENIC AND NONCARCINOGENIC RISK CALCULATIONS:

Chemical	CAS[8] No.	Total CTE(9) Fruit/Veg Conc (mg/kg)	OSF[10] (kg-d/mg)	ORfD[11] (mg/kg-d)	Cancer Risk[12] CTE	Cancer Risk[12] % of Total	Hazard Quotent[13] CTE	Hazard Quotent[13] % of Total
Semivolatiles								
Benzo(a)pyrene	50-3-28	1.00E-04	7.30E+00	--	3.932E-07	100	--	--

	CTE Cancer Risk	CTE Hazard Index
PATHWAY SUMS:	3.93E-07	0.00E+00

Notes:

1. Central tendency exposure.
2. Calculated as 70 years (average lifetime) times 365 days per year.
3. Calculated as exposure duration (in years) times 365 days per year
4. EPA references.
5. Combined values are calculated by weighting adult and child exposure assumptions over the noted exposure duration (e.g., 24 yrs as an adult plus 6 yrs as a child for a total duration of 30 yrs).
6. Carcinogenic intake factor calculated using weighted (combined) exposure assumptions.
7. Noncarcinogenic intake factors are calculated for both adult and child, with the maximum of these used for risk calculations.
8. Chemical Abstract service.
9. Central tendency exposure point concentration; NC = not calculated for constituents with no toxicity information.
10. Slope factor.
11. Reference dose.
12. Cancer Risk = (Chemical Concentration, mg/kg * Carcinogenic Intake Factor, kg/kg-day * Slope Factor, kg-day/mg)
13. Hazard Quotient = (Chemical Concentration, mg/kg * Noncarcinogenic Intake Factor, kg/kg-day) / (Reference Dose, mg/kg-day)

Human Health Table C.63
716-A Motor Shops Seepage Basin
Hypothetical Adult/Child Resident
Central Tendency Exposure Assumptions and Risk Calculations
Ingestion of Contaminated Tuberous/Leafy Vegetables and Fruits - (0-1' bls)

Chemical	Soil EP Conc (mg/kg)	Log Kow	Log Koc	TOC[1]	RCF[2] (unitless)	Root Conc.[3] (mg/kg)	TSCF [4] (unitless)	Leaf, Stem, and Fruit Conc.[5]	Total CTE Fruit/Veg. Conc [6] (mg/kg)
Semivolatiles									
Benzo(a)pyrene	7.83E-02	6.06	6.74	2.00E-01	1.27E-03	9.98E-05	5.65E-06	4.42E-07	1.00E-04

Note:

1.Site-specific organic carbon content of soil.

2. Root concentration factor (RCF) estimated as Log(RCF(Koc*TOC)-0.82) = 0.77* Log(Kow)-1.52. USEPA 1986.

3.Tuberous vegetable (root) concentration = RCF * EP Conc. USEPA 1986.

4. Transpiration stream concentration factor (TSCF) = (0.784exp-((log(Kow)-1.78)^2/2.44)/(Koc*TOC). USEPA 1986

5. Leaf/stem/fruit concentration = TSCF*EP Conc. USEPA 1986.

6. Total CTE = Root Concentration + Leaf/stem/fruit concentration

Reference: USEPA (1986) Methods of Assessing Exposure to Chemical Substances, Volume 8: Methods for Assessing Environmental Pathways of Food Contamination. EPA 560/5-85-008. Office of Toxic Substances.

Human Health Table C.64
716-A Motor Shops Seepage Basin
Hypothetical Adult/Child Resident
Central Tendency Exposure Assumptions and Risk Calculations - Ingestion of Soil (0-4' bls)

EXPOSURE ASSUMPTIONS:

Receptor Exposure	Adult Future Resident CTE(1)		Child Future Resident CTE		Combined Adult/Child Future Resident CTE	
Intake Rate (IR), mg/day	100	(4)	200	(4)	120	(5)
Fraction Ingested (FI), unitless	1	(4)	1	(4)	1	(5)
Exposure Frequency (EF), unitless	350	(4)	350	(4)	350	(5)
Exposure Duration (ED), yrs	24	(4)	6	(4)	30	(5)
Body Weight (BW), kg	70	(4)	15	(4)	59	(5)
Averaging Time, Carc[2] (ATC), days	25,550		NA		25550	
Averaging Time, Noncarc[3] (ATN), days	8,760		2190		10950	
Conversion Factor (CF), kg/mg	1.00E-06		1.00E-06		1.00E-06	

INTAKE FACTOR CALCULATIONS

Carcinogenic Intake Factor (CIF), kg/kg-day =
(IR * FI * EF * ED * CF)/(BW * ATC)
CTE CIF = 8.358E-07 (6)

Noncarcinogenic Intake Factor (NIF), kg/kg-day =
(IR * FI * EF * ED * CF)/(BW * ATN)
CTE NIF = 1.279E-05 (7)

CARCINOGENIC AND NONCARCINOGENIC RISK CALCULATIONS:

Chemical	CAS[8] No.	EP Conc[9] CTE (mg/kg)	OSF[10] (kg-d/mg)	ORfD[11] (mg/kg-d)	Cancer Risk[12] CTE	Cancer Risk[12] % of Total	Hazard Quotent[13] CTE	Hazard Quotent[13] % of Total
Semivolatiles								
Benzo(a)pyrene	50-3-28	4.52E-02	7.30E+00	--	2.758E-07	100	--	--
				PATHWAY SUMS:	CTE Cancer Risk 2.76E-07		CTE Hazard Index 0.00E+00	

Notes:
1. Central tendency exposure.
2. Calculated as 70 years (average lifetime) times 365 days per year.
3. Calculated as exposure duration (in years) times 365 days per year
4. EPA references.
5. Combined values are calculated by weighting adult and child exposure assumptions over the noted exposure duration (e.g., 24 yrs as an adult plus 6 yrs as a child for a total duration of 30 yrs).
6. Carcinogenic intake factor calculated using weighted (combined) exposure assumptions.
7. Noncarcinogenic intake factors are calculated for both adult and child, with the maximum of these used for risk calculations.
8. Chemical Abstract service.
9. Central tendency exposure point concentration.
10. Slope factor
11. Reference dose.
12. Cancer Risk = (Chemical concentration, mg/kg * Carcinogenic Intake Factor, kg/kg-day * Slope Factor, kg-day/mg).
13. Hazard Quotient = Chemical Concentration, mg/kg * Noncarcinogenic Intake Factor, kg/kg-day)/(Reference Dose, mg/kg-day)

Human Health Table C.65
716-A Motor Shops Seepage Basin
Hypothetical Adult/Child Resident
Central Tendency Exposure Assumptions and Risk Calculations - Dermal Exposure to Soil (0-4' bls)

EXPOSURE ASSUMPTIONS:

Receptor Exposure	Adult Future Resident CTE(1)		Child Future Resident CTE		Combined Adult/Child Future Resident CTE	
Skin Surface Area (SA), cm^2/event	5000	(4)	1800	(4)	4360	(5)
Soil-to-Skin Adherance (SK),mg/cm^2	1	(4)	1	(4)	1	(5)
Exposure Frequency (EF),events/yr	350	(4)	350	(4)	350	(5)
Exposure Duration (ED), yrs	240	(4)	6	(4)	30	(5)
Body Weight (BW), kg	70	(4)	15	(4)	59	(5)
Averaging Time, Carc[2] (ATC), days	25,550		NA		25550	
Averaging Time, Noncarc[3] (ATN), days	8,760		2190		10950	
Conversion Factor (CF), kg/mg	1.00E-06		1.00E-06		1.00E-06	

INTAKE FACTOR CALCULATIONS

Carcinogenic Intake Factor (CIF), kg/kg-day =
(SA * SK * EF * ED * CF)/(BW * ATC)
CTE CIF = 3.037E-05 (6)

Noncarcinogenic Intake Factor (NIF), kg/kg-day =
(SA * SK* EF * ED * CF)/(BW * ATN)
CTE NIF = 0.0001151 (7)

CARCINOGENIC AND NONCARCINOGENIC RISK CALCULATIONS:

Chemical	CAS[8] No.	EP Conc[9] CTE (mg/kg)	DSF[10] (kg-d/mg)	DRfD[11] (mg/kg-d)	DABS[12] (unitless)	Cancer Risk[13] CTE	Cancer Risk[13] % of Total	Hazard Quotent[14] CTE	Hazard Quotent[14] % of Total
Semivolatiles									
Benzo(a)pyrene	50-3-28	4.52E-02	3.65E+01	--	1.00E-02	5.0103E-07	100	--	--

	CTE Cancer Risk	CTE Hazard Index
PATHWAY SUMS:	5.01E-07	0.00E+00

Notes:

1. Central tendency exposure.
2. Calculated as 70 years (average lifetime) times 365 days per year.
3. Calculated as exposure duration (in years) times 365 days per year
4. EPA references.
5. Combined values are calculated by weighting adult and child exposure assumptions over the noted exposure duration (e.g., 24 yrs as an adult plus 6 yrs as a child for a total duration of 30 yrs).
6. Carcinogenic intake factor calculated using weighted (combined) exposure assumptions.
7. Noncarcinogenic intake factors are calculated for both adult and child, with the maximum of these used for risk calculations.
8. Chemical Abstract service.
9. Central tendency exposure point concentration.
10. Absorbed dose slope factor = oral slope factor/oral absorption factor, per RAGS, Vol.A, p.A-3
11. Dermal reference dose = oral RfD x oral absorption factor, per RAGS, Vol.A, p.A-2.
12. Dermal absorption factor: 0.01(organics), 0.001 (inorganics)
13. Cancer Risk = (Chemical Concentration, mg/kg * Carcinogenic Intake Factor, kg/kg-day * Absorption Factor, unitless * Slope Factor, kg-day/mg)
14. Hazard Quotient = (Chemical Concentration, mg/kg * Noncarcinogenic Intake Factor, kg/kg-day * Absorption Factor, unitless / Reference Dose, mg/kg-day)

Human Health Table C.66
716-A Motor Shops Seepage Basin
Hypothetical Adult/Child Resident
Central Tendency Exposure Assumptions and Risk Calculations - Inhalation of Soil Particulate Contaminants (0-4' bls)

EXPOSURE ASSUMPTIONS:

Receptor	Adult Future Resident		Child Future Resident		Combined Adult/Child Future Resident	
Exposure	CTE(1)		CTE(1)		CTE(1)	
Inhalation Rate (IR), m^3/hr	0.83	(4)	1	(4)	0.9	(5)
Exposure Time(ET), hrs/day	15	(4)	18	(4)	16	(5)
Exposure Frequency (EF), days/yr	350	(4)	350	(4)	350	(5)
Exposure Duration (ED), yrs	24	(4)	6	(4)	30	(5)
Body weight (BW), kg	70	(4)	15	(4)	59	(5)
Averaging Time, Carc[2] (ATC), days	25,550		NA		25,550	
Averaging Time, Noncarc[3] (ATN), days	8,760		2,190		10,950	

INTAKE FACTOR CALCULATIONS

Carcinogenic Intake Factor (CIF), m^3/kg-day =
(IR * ET* EF * ED)/(BW * ATC)
CTE CIF = 1.00E-01 (6)

Noncarcinogenic Intake Factor (NIF), m^3/kg-day =
(IR * ET * EF * ED)/(BW * ATN)
CTE NIF = 1.15E+00 (7)
(Child Value)

SOIL PARTICULATE RESUSPENSION FACTOR CALCULATION [8]

Width of contaminated area (LS) =	(site)	10	meters	(9)
Wind speed in mixing zone (V) =		2.25	meters/sec	(9)
Diffusion height (DH) =		2.00	meters	(9)
Area of contamination (A) =	(site)	685.00	$meters^2$	(9)
Respirable fraction (RF) =		0.036	$g/meters^2$-hr	(9)
Fraction of vegetative cover (G) =		0.25	unitless	(9)
Mean annual wind speed (Um) =		4.50	meters/sec	(9)
Equivalent threshold value of wind speed at 10 m (Ut) =		12.80	meters/sec	(9)
Fraction dependent on Um/Ut (Fx) =		0.0497	unitless	(9)
Conversion factor (CFa) =		3600.00	sec/hr	(9)
Conversion factor (CFb) =		1000.00	g/kg	(9)

CALCULATION OF PARTICULATE EMISSION FACTOR:

Particulate emission factor (PEF) = 4.056E+09 m^3/kg
$(LS*V*DH*CFa*CFb)/(A*RF*(1-G)*((Um/Ut)^3*(Fx))$

CARCINOGENIC AND NONCARCINOGENIC RISK CALCULATIONS:

Chemical	CAS[10] No	EP Conc[11] CTE (mg/kg)	ISF [12] (kg-day/mg)	RfC[13] (mg/m^3)	Cancer Risk[14] CTE	Cancer Risk[14] % of Total	Hazard Quotient[15] CTE	Hazard Quotient[15] % of Total
Semivolatiles								
Benzo(a)pyrene	50-3-28	4.52E-02	3.10E+00	--	3.465E-12	100	--	--

PATHWAY SUMS:	CTE Cancer Risk	CTE Hazard Index
	3.47E-12	0.00E+00

Human Health Table C.66
716-A Motor Shops Seepage Basin
Hypothetical Adult/Child Resident
Central Tendency Exposure Assumptions and Risk Calculations - Inhalation of Soil Particulate Contaminants (0-4' bls)

Notes:

1. Central tendency exposure.
2. Averaging time, carcinogen; calculated as 70 years (average lifetime) times 365 days per year (not applicable to child resident)
3. Averaging time, noncarcinogen; calculated as exposure duration (in years) times 365 days per year
4. EPA references.
5. Combined values are calcualted by weighting adult and child exposure assumptions over the noted exposure duration (e.g., 24 yrs as an adult plus 6 yers as a child for a total duration of 30 yrs)
6. Carcinogenic Intake factor calcualted using weighted (combined) exposure assumptions.
7. Noncarcinogenic intake factors are caluclated for both adult and child, with the maximum of these used for risk calculations.
8. USEPA, 1991: RAGS: Vol 1--Human Health Evalution Manual (Part B, Development of Risk-Based Preliminary Remediation Goals)
9. Site specific or default values from USEPA, 1991.
10. Chemical Abstract Service.
11. Central tendency exposure point concentration..
12. Slope factor
13. Reference dose.
14. Cancer Risk = (CTE concentration, mg/kg * Carcinogenic Intake Factor, m3/kg-day * Slope Factor, kg-day/mg) / (PEF, m3/kg).
15. Hazard Quotient = Chemical Concentration, mg/kg * Noncarcinogenic Intake Factor, kg/kg-day)/(Reference Dose, mg/kg-day * PEF, m^3/kg)

Human Health Table C.67
716-A Motor Shops Seepage Basin
Hypothetical Adult/Child Resident
Central Tendency Exposure Assumptions and Risk Calculations
Ingestion of Contaminated Tuberous/Leafy Vegetables and Fruits - (0-4' bls)

EXPOSURE ASSUMPTIONS:

Receptor	Adult Future Resident			Child Future Resident			Combined Adult/Child Future Resident			
Exposure (CTE)(1)	Root	Leafy	Fruit	Root	Leafy	Fruit	Root	Leafy	Fruit	
Intake Rate (IR), g/day	202	113	123 (4)	75	42	45 (4)	177	99	107	(5)
Fraction Ingested (FI), unitless	0.119	0.042	0.49 (4)	0.119	0.042	0.49 (4)	0.119	0.04	0.49	(5)
Exposure Frequency (EF),days/yr	350		(4)	350		(4)	350			(5)
Exposure Duration (ED), yrs	240		(4)	6		(4)	30			(5)
Body Weight (BW), kg	70		(4)	15		(4)	59			(5)
Averaging Time, Carc[2] (ATC), days	25,550			NA			25550			
Averaging Time, Noncarc[3] (ATN), days	8,760			2190			10950			
Conversion Factor (CF), kg/g	1.00E-03			1.00E-03			1.00E-03			

INTAKE FACTOR CALCULATIONS

Carcinogenic Intake Factor (CIF), kg/kg-day =
(IR * FI * EF * ED * CF)/(BW * ATC)

	Root	Leafy	Fruit	Total CIF[6]
CIF =	1.47E-04	2.90E-05	3.63E-04	5.39E-04

Noncarcinogenic Intake Factor (NIF), kg/kg-day =
(IR * FI * EF * ED * CF)/(BW * ATC)

	Root	Leafy	Fruit	Total NIF[7]
NIF =	5.71E-04 (Child)	1.13E-04 (Child)	1.40E-03 (Child)	2.08E-03

CARCINOGENIC AND NONCARCINOGENIC RISK CALCULATIONS:

Chemical	CAS[8] No.	Total CTE(9) Fruit/Veg Conc (mg/kg)	OSF[10] (kg-d/mg)	ORfD[11] (mg/kg-d)	Cancer Risk[12] CTE	Cancer Risk[12] % of Total	Hazard Quotent[13] CTE	Hazard Quotent[13] % of Total
Semivolatiles								
Benzo(a)pyrene	50-3-28	5.78E-05	7.30E+00	--	2.273E-07	100	--	--

	CTE Cancer Risk	CTE Hazard Index
PATHWAY SUMS:	2.27E-07	0.00E+00

Notes:

1. Central tendency exposure.
2. Calculated as 70 years (average lifetime) times 365 days per year.
3. Calculated as exposure duration (in years) times 365 days per year
4. EPA references.
5. Combined values are calculated by weighting adult and child exposure assumptions over the noted exposure duration (e.g., 24 yrs as an adult plus 6 yrs as a child for a total duration of 30 yrs).
6. Carcinogenic intake factor calculated using weighted (combined) exposure assumptions.
7. Noncarcinogenic intake factors are calculated for both adult and child, with the maximum of these used for risk calculations.
8. Chemical Abstract service.
9. Central tendency exposure point concentration; NC = not calculated for constituents with no toxicity information.
10. Slope factor.
11. Reference dose.
12. Cancer Risk = (Chemical Concentration, mg/kg * Carcinogenic Intake Factor, kg/kg-day * Slope Factor, kg-day/mg)
13. Hazard Quotient = (Chemical Concentration, mg/kg * Noncarcinogenic Intake Factor, kg/kg-day) / (Reference Dose, mg/kg-day)

Human Health Table C.67
716-A Motor Shops Seepage Basin
Hypothetical Adult/Child Resident
Central Tendency Exposure Assumptions and Risk Calculations
Ingestion of Contaminated Tuberous/Leafy Vegetables and Fruits - (0-4' bls)

Chemical	Soil EP Conc (mg/kg)	Log Kow	Log Koc	TOC[1]	RCF[2] (unitless)	Root Conc.[3] (mg/kg)	TSCF [4] (unitless)	Leaf, Stem, and Fruit Conc.[5]	Total CTE Fruit/Veg. Conc [6] (mg/kg)
Semivolatiles									
Benzo(a)pyrene	4.52E-02	6.06	6.74	2.00E-01	1.27E-03	5.76E-05	5.65E-06	2.55E-07	5.78E-05

Note:

1.Site-specific organic carbon content of soil.

2. Root concentration factor (RCF) estimated as Log(RCF(Koc*TOC)-0.82) = 0.77* Log(Kow)-1.52. USEPA 1986.

3.Tuberous vegetable (root) concentration = RCF * EP Conc. USEPA 1986.

4. Transpiration stream concentration factor (TSCF) = $(0.784\exp-((\log(Kow)-1.78)^2/2.44)/(Koc*TOC)$. USEPA 1986

5. Leaf/stem/fruit concentration = TSCF*EP Conc. USEPA 1986.

6. Total CTE = Root Concentration + Leaf/stem/fruit concentration

Reference: USEPA (1986) Methods of Assessing Exposure to Chemical Substances, Volume 8: Methods for Assessing Environmental Pathways of Food Contamination. EPA 560/5-85-008. Office of Toxic Substances.

APPENDIX C.8
SITE-SPECIFIC DERMAL RISK AND HAZARD CALCULATIONS

(Tables C.68 - C.72)

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APPENDIX C.8
SITE-SPECIFIC DERMAL RISK AND HAZARD CALCULATIONS
List of Tables for Human Health Risk Assessment

Table No.	Receptor	Exposure Route	Interval
C.68	Known On-Unit Worker	Dermal Exposure to Soil	0-1'
C.69	Hypothetical Industrial Worker	Dermal Exposure to Soil	0-1'
C.70	Hypothetical Industrial Worker	Dermal Exposure to Soil	0-4'
C.71	Hypothetical Adult/Child Resident	Dermal Exposure to Soil	0-1'
C.72	Hypothetical Adult/Child Resident	Dermal Exposure to Soil	0-4'

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Human Health Table C.68
716-A Motor Shops Seepage Basin
Known On-Unit Worker
Exposure Assumptions and Risk Calculations -Dermal Exposure to Soil (0-1'bls)

EXPOSURE ASSUMPTIONS:

Receptor	Known On-Unit Worker	
Exposure	RME[1]	
Skin Surface Area (SA), cm^2/event	3200	(4)
Soil-to-Skin Adherance (SK),mg/cm^2	0.2	(4)
Exposure Frequency (EF),events/yr	6	(4)
Exposure Duration (ED), yrs	5	(4)
Body Weight (BW), kg	70	(4)
Averaging Time, Carc[2] (ATC), days	25,550	
Averaging Time, Noncarc[3] (ATN), days	1,825	
Conversion Factor (CF), kg/mg	1.00E-06	

INTAKE FACTOR CALCULATIONS

Carcinogenic Intake Factor (CIF), kg/kg-day =
(SA * SK * EF * ED * CF)/(BW * ATC)
RME CIF = 1.074E-08

Noncarcinogenic Intake Factor (NIF), kg/kg-day =
(SA * SK* EF * ED * CF)/(BW * ATN)
RME NIF = 1.503E-07

CARCINOGENIC AND NONCARCINOGENIC RISK CALCULATIONS:

Chemical	CAS[5] No.	EP Conc[6] RME (mg/kg)	DSF[7] (kg-d/mg)	DRfD[8] (mg/kg-d)	DABS[9] (unitless)	Cancer Risk[10] RME	Cancer Risk[10] % of Total	Hazard Quotent[11] RME	Hazard Quotent[11] % of Total
Semivolatiles									
Benzo(a)pyrene	50-3-28	4.10E-01	3.65E+01	--	1.00E-02	1.607E-09	100	--	--

PATHWAY SUMS:	RME Cancer Risk	RME Hazard Index
	1.61E-09	0.00E+00

Notes:
1. Reasonable maximum exposure.
2. Calculated as 70 years (average lifetime) times 365 days per year.
3.Calculated as exposure duration (in years) times 365 days per year
4. EPA references.
5. Chemical Abstract Service.
6. Exposure point concentration.
7. Absorbed dose slope factor = oral slope factor/ oral absorption factor, per RAGS, Vol.A, p.A-3
8. Dermal reference dose = oral RfD x oral absorption factor, per RAGS, Vol.A, p.A-2.
9.Dermal absorption factor: 0.01(organics), 0.001 (inorganics)
10. Cancer Risk = (Chemical Concentration, mg/kg * Carcinogenic Intake Factor, kg/kg-day * Absorption Factor, unitless * Slope Factor, kg-day/mg)
11. Hazard Quotient = (Chemical Concentration, mg/kg * Noncarcinogenic Intake Factor, kg/kg-day * Absorption Factor, unitless / Reference Dose, mg/kg-day)

Human Health Table C.69
716-A Motor Shops Seepage Basin
Hypothetical On-Unit Industrial Worker
Exposure Assumptions and Risk Calculations - Dermal Exposure to Soil (0-1' bls)

EXPOSURE ASSUMPTIONS:

Receptor	Future Industrial Worker	
Exposure	RME[1]	
Skin Surface Area (SA), cm^2/event	3200	(4)
Soil-to-Skin Adherance (SK),mg/cm^2	0.2	(4)
Exposure Frequency (EF),events/yr	250	(4)
Exposure Duration (ED), yrs	25	(4)
Body Weight (BW), kg	70	(4)
Averaging Time, Carc[2] (ATC), days	25,550	
Averaging Time, Noncarc[3] (ATN), days	9,125	
Conversion Factor (CF), kg/mg	1.00E-06	

INTAKE FACTOR CALCULATIONS

Carcinogenic Intake Factor (CIF), kg/kg-day =
(SA * SK * EF * ED * CF)/(BW * ATC)
RME CIF = 2.237E-06

Noncarcinogenic Intake Factor (NIF), kg/kg-day =
(SA * SK* EF * ED * CF)/(BW * ATN)
RME NIF = 6.262E-06

CARCINOGENIC AND NONCARCINOGENIC RISK CALCULATIONS:

Chemical	CAS[5] No.	EP Conc[6] RME (mg/kg)	DSF[7] (kg-d/mg)	DRfD[8] (mg/kg-d)	DABS[9] (unitless)	Cancer Risk[10] RME	Cancer Risk[10] % of Total	Hazard Quotent[11] RME	Hazard Quotent[11] % of Total
Semivolatiles									
Benzo(a)pyrene	50-3-28	4.10E-01	3.65E+01	--	1.00E-02	3.347E-07	100	--	--

	RME Cancer Risk	RME Hazard Index
PATHWAY SUMS:	3.35E-07	0.00E+00

Notes:
1. Reasonable maximum exposure.
2. Calculated as 70 years (average lifetime) times 365 days per year.
3.Calculated as exposure duration (in years) times 365 days per year
4. EPA references.
5. Chemical Abstract Service.
6. Exposure point concentration.
7. Absorbed dose slope factor = oral SF/absorption factor, per RAGS, Vol.A, p.A-3
8. Dermal reference dose = oral RfD x oral absorption factor, per RAGS, Vol.A, p.A-2.
9.Dermal absorption factor: 0.01(organics), 0.001 (inorganics)
10. Cancer Risk = (Chemical Concentration, mg/kg * Carcinogenic Intake Factor, kg/kg-day * Absorption Factor, unitless * Slope Factor, kg-day/mg)
11. Hazard Quotient = (Chemical Concentration, mg/kg * Noncarcinogenic Intake Factor, kg/kg-day * Absorption Factor, unitless / Reference Dose, mg/kg-day)

Human Health Table C.70
716-A Motor Shops Seepage Basin
Hypothetical On-Unit Industrial Worker
Exposure Assumptions and Risk Calculations - Dermal Exposure to Soil (0-4' bls)

EXPOSURE ASSUMPTIONS:

Receptor	Future Industrial Worker	
Exposure	RME[1]	
Skin Surface Area (SA), cm^2/event	3200	(4)
Soil-to-Skin Adherance (SK),mg/cm^2	0.2	(4)
Exposure Frequency (EF),events/yr	250	(4)
Exposure Duration (ED), yrs	25	(4)
Body Weight (BW), kg	70	(4)
Averaging Time, Carc[2] (ATC), days	25,550	
Averaging Time, Noncarc[3] (ATN), days	9,125	
Conversion Factor (CF), kg/mg	1.00E-06	

INTAKE FACTOR CALCULATIONS

Carcinogenic Intake Factor (CIF), kg/kg-day =
(SA * SK * EF * ED * CF)/(BW * ATC)
RME CIF = 2.237E-06

Noncarcinogenic Intake Factor (NIF), kg/kg-day =
(SA * SK* EF * ED * CF)/(BW * ATN)
RME NIF = 6.262E-06

CARCINOGENIC AND NONCARCINOGENIC RISK CALCULATIONS:

Chemical	CAS[5] No.	EP Conc[6] RME (mg/kg)	DSF[7] (kg-d/mg)	DRfD[8] (mg/kg-d)	DABS[9] (unitless)	Cancer Risk[10] RME	Cancer Risk[10] % of Total	Hazard Quotent[11] RME	Hazard Quotent[11] % of Total
Semivolatiles									
Benzo(a)pyrene	50-3-28	4.10E-01	3.65E+01	--	1.00E-02	3.347E-07	100	--	--

	RME Cancer Risk	RME Hazard Index
PATHWAY SUMS:	3.35E-07	0.00E+00

Notes:
1. Reasonable maximum exposure.
2. Calculated as 70 years (average lifetime) times 365 days per year.
3.Calculated as exposure duration (in years) times 365 days per year
4. EPA references.
5. Chemical Abstract Service.
6. Exposure point concentration.
7. Absorbed dose slope factor = oral SF/absorption factor, per RAGS, Vol.A, p.A-3
8. Dermal reference dose = oral RfD x oral absorption factor, per RAGS, Vol.A, p.A-2.
9.Dermal absorption factor: 0.01(organics), 0.001 (inorganics)
10. Cancer Risk = (Chemical Concentration, mg/kg * Carcinogenic Intake Factor, kg/kg-day * Absorption Factor, unitless * Slope Factor, kg-day/mg)
11. Hazard Quotient = (Chemical Concentration, mg/kg * Noncarcinogenic Intake Factor, kg/kg-day * Absorption Factor, unitless / Reference Dose, mg/kg-day)

Human Health Table C.71
716-A Motor Shops Seepage Basin
Hypothetical Adult/Child Resident
Exposure Assumptions and Risk Calculations - Dermal Exposure to Soil (0-1' bls)

EXPOSURE ASSUMPTIONS:

Receptor Exposure	Adult Future Resident RME[1]		Child Future Resident RME		Combined Adult/Child Future Resident RME	
Skin Surface Area (SA), cm^2/event	5000	(4)	1800	(4)	4360	(5)
Soil-to-Skin Adherance (SK),mg/cm^2	0.2	(4)	0.2	(4)	0.2	(5)
Exposure Frequency (EF),events/yr	350	(4)	350	(4)	350	(5)
Exposure Duration (ED), yrs	240	(4)	6	(4)	30	(5)
Body Weight (BW), kg	70	(4)	15	(4)	59	(5)
Averaging Time, Carc[2] (ATC), days	25,550		NA		25550	
Averaging Time, Noncarc[3] (ATN), days	8,760		2190		10950	
Conversion Factor (CF), kg/mg	1.00E-06		1.00E-06		1.00E-06	

INTAKE FACTOR CALCULATIONS

Carcinogenic Intake Factor (CIF), kg/kg-day =
(SA * SK * EF * ED * CF)/(BW * ATC)
RME CIF = 6.074E-06 (6)

Noncarcinogenic Intake Factor (NIF), kg/kg-day =
(SA * SK* EF * ED * CF)/(BW * ATN)
RME NIF = 2.301E-05 (7)

CARCINOGENIC AND NONCARCINOGENIC RISK CALCULATIONS:

Chemical	CAS[8] No.	EP Conc[9] RME (mg/kg)	DSF[10] (kg-d/mg)	DRfD[11] (mg/kg-d)	DABS[12] (unitless)	Cancer Risk[13] RME	Cancer Risk[13] % of Total	Hazard Quotent[14] RME	Hazard Quotent[14] % of Total
Semivolatiles									
Benzo(a)pyrene	50-3-28	4.10E-01	3.65E+01	--	1.00E-02	9.0895E-07	100	--	--

PATHWAY SUMS:	RME Cancer Risk	RME Hazard Index
	9.09E-07	0.00E+00

Notes:
1. Reasonable maximum exposure.
2. Calculated as 70 years (average lifetime) times 365 days per year.
3. Calculated as exposure duration (in years) times 365 days per year
4. EPA references.
5. Combined values are calculated by weighting adult and child exposure assumptions over the noted exposure duration (e.g., 24 yrs as an adult plus 6 yrs as a child for a total duration of 30 yrs).
6. Carcinogenic intake factor calculated using weighted (combined) exposure assumptions.
7. Noncarcinogenic intake factors are calculated for both adult and child, with the maximum of these used for risk calculations.
8. Chemical Abstract service.
9. Exposure point concentration.
10. Absorbed dose slope factor = oral slope factor/oral absorption factor, per RAGS, Vol.A, p.A-3
11. Dermal reference dose = oral RfD x oral absorption factor, per RAGS, Vol.A, p.A-2.
12. Dermal absorption factor: 0.01(organics), 0.001 (inorganics)
13. Cancer Risk = (Chemical Concentration, mg/kg * Carcinogenic Intake Factor, kg/kg-day * Absorption Factor, unitless * Slope Factor, kg-day/mg)
14. Hazard Quotient = (Chemical Concentration, mg/kg * Noncarcinogenic Intake Factor, kg/kg-day * Absorption Factor, unitless / Reference Dose, mg/kg-day)

Human Health Table C.72
716-A Motor Shops Seepage Basin
Hypothetical Adult/Child Resident
Exposure Assumptions and Risk Calculations - Dermal Exposure to Soil (0-4' bls)

EXPOSURE ASSUMPTIONS:

Receptor	Adult Future Resident		Child Future Resident		Combined Adult/Child Future Resident	
Exposure	RME[1]		RME		RME	
Skin Surface Area (SA), cm^2/event	5000	(4)	1800	(4)	4360	(5)
Soil-to-Skin Adherance (SK),mg/cm^2	0.2	(4)	0.2	(4)	0.2	(5)
Exposure Frequency (EF),events/yr	350	(4)	350	(4)	350	(5)
Exposure Duration (ED), yrs	240	(4)	6	(4)	30	(5)
Body Weight (BW), kg	70	(4)	15	(4)	59	(5)
Averaging Time, Carc[2] (ATC), days	25,550		NA		25550	
Averaging Time, Noncarc[3] (ATN), days	8,760		2190		10950	
Conversion Factor (CF), kg/mg	1.00E-06		1.00E-06		1.00E-06	

INTAKE FACTOR CALCULATIONS

Carcinogenic Intake Factor (CIF), kg/kg-day =
(SA * SK * EF * ED * CF)/(BW * ATC)
RME CIF = 6.074E-06 (6)

Noncarcinogenic Intake Factor (NIF), kg/kg-day =
(SA * SK* EF * ED * CF)/(BW * ATN)
RME NIF = 2.301E-05 (7)

CARCINOGENIC AND NONCARCINOGENIC RISK CALCULATIONS:

Chemical	CAS[8] No.	EP Conc[9] RME (mg/kg)	DSF[10] (kg-d/mg)	DRfD[11] (mg/kg-d)	DABS[12] (unitless)	Cancer Risk[13] RME	Cancer Risk[13] % of Total	Hazard Quotent[14] RME	Hazard Quotent[14] % of Total
Semivolatiles									
Benzo(a)pyrene	50-3-28	4.10E-01	3.65E+01	--	1.00E-02	9.0895E-07	100	--	--

	RME Cancer Risk	RME Hazard Index
PATHWAY SUMS:	9.09E-07	0.00E+00

Notes:

1. Reasonable maximum exposure.
2. Calculated as 70 years (average lifetime) times 365 days per year.
3. Calculated as exposure duration (in years) times 365 days per year
4. EPA references.
5. Combined values are calculated by weighting adult and child exposure assumptions over the noted exposure duration (e.g., 24 yrs as an adult plus 6 yrs as a child for a total duration of 30 yrs).
6. Carcinogenic intake factor calculated using weighted (combined) exposure assumptions.
7. Noncarcinogenic intake factors are calculated for both adult and child, with the maximum of these used for risk calculations.
8. Chemical Abstract service.
9. Exposure point concentration.
10. Absorbed dose slope factor = oral slope factor/oral absorption factor, per RAGS, Vol.A, p.A-3
11. Dermal reference dose = oral RfD x oral absorption factor, per RAGS, Vol.A, p.A-2.
12. Dermal absorption factor: 0.01(organics), 0.001 (inorganics)
13. Cancer Risk = (Chemical Concentration, mg/kg * Carcinogenic Intake Factor, kg/kg-day * Absorption Factor, unitless * Slope Factor, kg-day/mg)
14. Hazard Quotient = (Chemical Concentration, mg/kg * Noncarcinogenic Intake Factor, kg/kg-day * Absorption Factor, unitless / Reference Dose, mg/kg-day)

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APPENDIX D

TOXICOLOGIAL DATA

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HUMAN HEALTH TOXICOLOGICAL DATA

(Tables D-1 and D-2)

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TABLE D-1
Toxicity Values for Constituents of Potential Concern and Background Constituents
Human Health Carcinogenic and Noncarcinogenic Effects

Constituent	CARCINOGENIC TOXICITY DATA					NONCARCINOGENIC TOXICITY DATA					
	CAS#	WOE	Oral SF (kg-day/mg)	Inhalation SF (kg-day/mg)	Tumor Type	Oral RFD (mg/kg-d)	Confidence Level	Critical Effect	Inhalation RfD (mg/kg-d)	Confidence Level	Critical Effect
ORGANICS											
Benzo(a)pyrene	50-3-28	B2	7.3E+00 N	3.1E00 N	Liver cancer - mice	NA	NA	NA	NA	NA	NA
INORGANICS											
Aluminum	7429-90-5	D	NA	NA	NA	1.00E+00 N	Medium	Body Weight	NA	NA	NA
Arsenic	7440-38-2	A	1.50E+00 I	5.0E+01 H	Lung, liver kidney, and bladder cancer - humans	3.00E-4 I	Medium	Hyperpigmentation, keratosis, vascular effects			
Beryllium	7440-41-7	B2	4.30E+00 I	8.40E+00 H	Lung cancer - rat and monkey; osteosarcomas-rabbit	5.00E-3 I	Low	None observed	NA	NA	NA
Iron	7439-89-6	NA	NA	NA	NA	3.00E-1 N	NA	Liver effects	NA	NA	NA

WOE - Weight of Evidence classification (see Attachment)
NA - not available
SF - Carcinogenic Slope Factor
RfD - Reference Dose
I - Reference: Integrated Risk Information System (IRIS)
H - Reference: Health Effects Assessment Summary Tables (HEAST)
N - Reference: National Center for Environmental Assessment for provisional reference doses

Attachment to Table D-1

The EPA weight-of-evidence classification system involves characterizing a chemical's carcinogenicity based on the availability of animal, human, and other supportive data. Based on the strength of evidence that a chemical produces carcinogenic effects I humans, a chemical is assigned to one of the following classes (EPA, 1989):

- **Group A - Human Carcinogen** - this category indicates that there is sufficient evidence from epidemiological studies to demonstrate carcinogenicity in humans.

- **Group B - Probable Human Carcinogen** - this category is subdivided into Group B1 and Group B2:

Group B1 indicates that only limited data are available suggesting carcinogenicity in humans but that sufficient evidence of carcinogenicity does exist in animals.

Group B2 indicates that there is sufficient evidence of carcinogenicity in animals but inadequate or no evidence in humans.

- **Group C - Possible Human Carcinogens** - this category indicates that there is limited evidence of carcinogenicity in animals and inadequate or no evidence in humans.

- **Group D - Not Classifiable** -this category indicates that there is inadequate or no data by which to classify a chemical as a human carcinogen.

- **Group E- Evidence of Human Noncarcinogenicity** - this category indicates that in an adequate number of studies there is no evidence of carcinogenicity.

EPA (U.S. Environmental Protection Agency), 1989. Risk Assessment Guidance for Superfund (RAGS) Volume I, Human Health Evaluation Manual (Part A). EPA/540/1-89/002, Office of Emergency and Remedial Response, Washington, DC.

Table D-2
Human Health Toxicity Values For Dermal Exposure

Constituent	Oral Slope Factor (kg-d/mg)[a]	Oral Reference Dose (mg/kg-d)[a]	Oral Absorption Factor[b]	Dermal Slope Factor (kg-d/mg)[c]	Dermal Reference Dose (mg/kg-d)[d]
Organics					
Benzo(a)pyrene	7.3E+00	NA	0.20	3.65E+01	NA
Inorganics					
Aluminum	NA	1.0E+00	0.04	NA	4.0E-2
Arsenic	1.50E+00	3.00E-04	0.8	1.88E+00	2.4E-4
Beryllium	4.30E+00	5.00E-03	0.01	4.30E+2	5.00E-5
Iron	NA	3.00E-01	0.20 #	NA	0.06

(a) Oral slope factors and reference doses are from IRIS, HEAST, or provisional data was used. Refer to Table D-1 for references. Provisional reference doses were used for aluminum and iron.
(b) The absorption values were cited in the appropriate ATSDR Profiles. The pound sign (#) indicates that the ATSDR Profiles were not available and default values were used as follows: 0.8 for volatiles, 0.5 for semi-volatiles and pesticides, and 0.20 for metals.
(c) Dermal Slope Factor = Oral slope factor / oral absorption factor
(d) Dermal Reference Dose = Oral Reference Dose x oral absorption factor

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TOXICITY PROFILES FOR THE CONSTITUENTS OF POTENTIAL CONCERN

Aluminum

Antimony

Arsenic

Benzo(a)pyrene

Benzo(ghi)perylene

Beryllium

Cadmium

Iron

Phenanthrene

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ALUMINUM

CAS No.: 7429-90-5
Synonym(s) None

Aluminum is the third most abundant element (American Conference of Governmental Industrial Hygienists 1986) comprising about 8.8 percent of the earth's crust by weight (Merck Index 1983). Aluminum does not occur freely in nature, but is widely distributed combined with oxygen, fluorine, silicon, and other constituents. It is a silvery-white, malleable, ductile, light-weight metal. It is soluble in alkalies and in hydrochloric and sulfuric acid, and insoluble in concentrated nitric acid, hot acetic acid, and water (Weast 1979). It has a molecular weight of 26.98 g/mole, melts at 660°C, boils at 2,450°C (at 1 atmosphere), has a vapor pressure of 1 mm Hg at 1284°C, and has a density of 2.70 at 20°C/4°C.

FATE AND TRANSPORT

Aluminum is abundant in soils although concentrations vary with solubility, which is a function of pH (National Research Council 1981). It is amphoteric, being more soluble in acidic and basic solutions than in more neutral solutions (U.S. Environmental Protection Agency 1988). Some acid soils contain sufficient aluminum in soluble form to kill some types of plants (Farm Chemicals Handbook 1984). Soil concentrations of aluminum have been recorded up to 150 to 600 grams per kilogram (Friberg et al. 1979). Human activities tend to increase aluminum content in surface waters (Friberg et al. 1979) and acid rain can cause aluminum to leach out of soil at a higher than normal rate, thus increasing the aluminum uptake by plants and animals. Aluminum concentrations in urban air are reported as high as 10 µg per cubic meter. In nonurban areas, values as low as 0.5 µg per cubic meter have been reported (Friberg et al. 1979). Aluminum tends to bioaccumulate only slightly in aquatic organisms. Cleveland et al. (1986) reported BCFs of 50 to 230 among young brook trout.

HUMAN HEALTH EFFECTS

Humans are exposed to aluminum by ingestion of foods and beverages and by inhalation from the atmosphere. Human ingestion of aluminum is typically 30 to 50 mg per day (Bjorksten 1982), with a daily absorption rate 0.1 to 2 mg (Rosas 1978). Although not essential for human health, normal total body content of aluminum in humans is around 30 milligrams. Soluble forms of aluminum chloride, aluminum fluoride, and aluminum sulfate are potentially toxic, and may play a role in several disease conditions. Insoluble forms of aluminum do not seem to have a measurable acute response (Rumack and Spoerke 1989). Chronic inhalation of fine metallic aluminum dust, such as may occur in the manufacture of aluminum abrasives, explosives, and fireworks, has been shown to cause a distinctive type of pulmonary fibrosis with emphysema, chronic interstitial pneumonia, dyspnea, cough, and pneumothorax (Clayton and Clayton 1981). In addition, the inhalation of this aluminum dust has caused progressive encephalopathy, in which the brain shows evidence of neurofibrillary degeneration (Venugopal and Luckey 1978). Gastrointestinal problems develop when aluminum hydroxide is chronically administered orally, causing severe constipation by inhibiting muscle contraction of the

intestines (Hamilton and Hardy 1974). It can also cause flatulence, inflammation, and colitis. Aluminum salts may cause a dialysis encephalopathy syndrome among kidney patients, resulting in progressive fatal brain disease characterized by impaired speech, dementia, and seizures (Rumack and Spoerke 1989). Increasing evidence indicates that the brains of Alzheimer's victims contain a much higher than normal level of aluminum (Rumack and Spoerke 1989). Repeated contact of the skin with soluble aluminum salts results in "acid irritation". Particles of aluminum deposited in the eye may cause necrosis of the cornea. Aluminum has not been shown to be carcinogenic among humans.

Focal pulmonary fibroses were observed among rats following intratracheal injection of 100 mg of aluminum per animal (Clayton and Clayton 1981). Respiratory infections were observed in rats and rabbits where aluminum dust was inhaled or injected intratracheally (Browning, 1969). Accompanying the fibrosis was hyalinosis, emphysema, and hemorrhagic pneumonia. Fibrotic changes were also evident in the walls of the blood vessels and in the kidneys, while fibrous thickening of interstitial tissue in the spleen, liver, and meninges occurred.

ECOLOGICAL EFFECTS

Although oral toxic doses of aluminum are not well established for humans, oral mammalian LD_{50}'s range from 1 to 4 grams per kg body weight. Among aquatic plants, diatom growth is inhibited at aluminum concentrations of 810 mg/L, concentrations greater than 45.7 mg/L reduced frond production in duckweeds, and an EC_{50} of 2.5 mg/L was reported for root development in Eurasian watermilfoil (Stanley 1974 and U.S. Environmental Protection Agency 1988). Concentrations of 8E-5 M of aluminum affected population growth in a community of green algae (*Scenedesmus quadricauda*) when exposed for seven days (Rueter et al. 1987). Rotifers (*Brachionus calyciflorus*) were shown to have a twenty-four hour LC50 of concentrations greater than 3000 mg/L (Snell et al. 1991). An aluminum concentration of 5.2 mg/L inhibited growth of young rainbow trout in water at a pH of 7.0 to 9.0 (Freeman 1973).
Aluminum is often taken up and concentrated in root tissues of plants. An uptake factor (concentration of aluminum in plant/soil) of 0.004 for leafy vegetables and 0.00065 for reproductive plant parts, including roots has been reported (ATSDR 1991). These values suggest that aluminum does not bioconcentrate in plants, because the values are lower than those in the soil.

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ANTIMONY

CAS No(s): 7440-36-0
Major Synonym(s): Antimony Black, Stibium

Antimony and its compounds occur naturally in the earth's crust. It occurs in association with minerals, particularly the sulfides, and is often combined with lead, copper, and silver (ATSDR 1990). Antimony is used in alloys with other metals to increase their hardness, strength, corrosion resistance, and electrochemical stability.

Antimony is a silvery-white solid with a molecular weight of 121.75. It is insoluble in water. It volatilizes during combustion.

FATE AND TRANSPORT

Antimony is released to the environment by natural sources such as windblown dust, sea spray, forest fires, and biogenic sources (ATSDR 1990). Most anthropogenic releases occur during smelting and refining processes, refuse incineration, and coal burning (ATSDR). Antimony may enter the air in a vapor phase upon burning, but attaches to suspended particles upon condensation. Large particles are subject to gravitational settling whereas smaller particles are deposited on the earth's surface through precipitation (ATSDR 1990).

Antimony released or deposited in water is often bound to suspended particulate matter, which may settle out and rest on bottom sediments (Beijer and Jernolov 1986).

In soils, antimony may bind to organic and inorganic matter, depending on the particular antimony compound. Antimony in minerals does not adsorb to soil (ATSDR 1990). Most studies have revealed that antimony is not mobile in soils and tends to concentrate in the upper layers (Trnovsky et al. 1988; Foster 1989; Ainsworth 1988); however, several studies have presented conflicting data (Gerritse et al. 1982; Rai and Zachara 1984).

HUMAN HEALTH EFFECTS

Occupational exposure to antimony dust can produce pneumoconiosis (Cooper et al. 1968) and decreased pulmonary function (Cooper et al. 1968). Increased blood pressure and EKG changes were also noted in people occupationally exposed to antimony dust (Breiger et al. 1954). Gastrointestinal disorders, such as abdominal pain, diarrhea, vomiting, and ulcers (Breiger et al. 1954), as well as dermal irritation (Renes 1953) have also been noted in exposed individuals.

ECOLOGICAL EFFECTS

Aquatic organisms do not bioaccumulate antimony to an appreciable degree. Fish experimentally exposed to antimony for 28 days did not bioconcentrate antimony (EPA 1980); however, low levels of antimony have been reported in marine organisms (Callahan 1978). Ainsworth (1988) found that antimony uptake by plants in contaminated soils is minimal and is probably restricted to the soluble or exchangeable species of antimony. Examination of small mammals living near a smelter indicated that, while these animals ingested large amounts of antimony deposited on the surfaces of plants, only small amounts were stored in their organs (Ainsworth 1988).

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ARSENIC
CAS No: 7440-38-2
Synonym(s) None

Arsenic exists in low concentrations in all environmental media as a natural component of the earth's crust. Typical arsenic concentrations are less than ten parts per billion in water and less than 40 parts per million in soil (U.S. Department of Health and Human Services 1991). It is a silver-gray, brittle, crystalline substance (International Labour Office 1983) that is soluble in nitric acid but insoluble in water (Weast 1987-1988) and in caustic and non-oxidizing acids. It has a molecular weight of 74.92 g/mole, sublimes at 613°C, melts at 817°C (at 28 atmospheres), has a vapor pressure of 1 mm Hg at 372°C, and has a density of 5.73 at 14°C (U.S. Department of Health and Human Services 1991). Arsenic will vaporize when heated to 100°C, with rapid vaporization at 450°C (Merck 1983).

FATE AND TRANSPORT

Arsenic is found primarily in soil or rock and is transported mainly adsorbed onto particulate material. In water, soluble forms of arsenic can be carried long distances, but may be adsorbed onto sediments or soils due to chemical or biological reactions that change arsenic speciation (U.S. Department of Health and Human Services 1991). In soil, arsenic is subject to a number of transformation processes, such as oxidation-reduction reactions, ligand exchange, biotransformation, precipitation, and adsorption. It is rarely encountered as a free element in natural waters (U.S. Environmental Protection Agency 1980), where it is also subject to processes such as oxidation-reduction reactions, ligand exchange, biotransformation, precipitation, and adsorption (U.S. Department of Health and Human Services 1991). Arsenic accumulates to varying degrees in some organisms such as algae and shellfish, but does not biomagnify in the food chain. Some arsenic is absorbed via inhalation and oral routes, but dermal absorption is considered to be minor (U. S. Department of Health and Human Services 1991).

HUMAN HEALTH EFFECTS

Inorganic arsenic compounds are generally more toxic than organic forms. For inorganic arsenic, human oral exposures of approximately 1 to 3 mg per kg body weight appear to be the minimum lethal dose, based upon clinical reports (U.S. Department of Health and Human Services 1991). Populations at special risk from arsenic exposure include persons with existing diabetes, cardiovascular diseases, allergic or other skin diseases, neurologic or hepatic disease, or renal lesions. Children may be at special risk for the effects of inorganic arsenic. Exposure to high levels of arsenic results in a number of systemic effects on the respiratory system, heart and vascular system, gastrointestinal system, blood, liver, kidney, skin, eye, and nervous system. Specific effects reported include decreased production of red and white blood cells, abnormal heart and nerve function, damage to blood vessels, kidneys and liver, and possible mutagenic activity. The burden of evidence shows inorganic arsenic to be a carcinogen, resulting in an increased risk of lung and dermal cancer by inhalation and oral exposure, respectively. Organic arsenic has not been demonstrated to be carcinogenic to humans. The U.S. Environmental Protection Agency has classified arsenic as Class A, a known human carcinogen.

ECOLOGICAL EFFECTS

Arsenic toxicity to microorganisms produces a decline in growth and metabolic rates. The more tolerant species can withstand arsenic levels up to 1,000 ppm, whereas the most sensitive organisms are affected by levels less than 375 ppm (National Research Council Canada 1978). Arsenic poisoning in most animals is usually manifested by acute or subacute signs; chronic poisoning is infrequently seen (NAS 1977). The probability of chronic arsenic poisoning from continuous ingestion of small doses is rare, because detoxication and excretion are rapid (Woolson 1975).

Signs of inorganic trivalent arsenite poisoning in birds include muscular incoordination, debility, slowness, jerkiness, falling, hyperactivity, fluffed feathers, drooped eyelid, huddled position, unkempt appearance, loss of righting reflex, immobility, seizures. Signs occurred within one hour and deaths within one to six days postadministration (Hudson et al. 1984).

An LC_{50} of 10 mg/L is reported for black sea mussels (Perecladov and Erofeeva 1983). The 96 hour LC_{50} for eggs of *Gastrophyrne carolinensis* is .04 mg/L (Eisler 1988). Rainbow trout (*Salmo gairdneri*) fed diets containing up to 90 mg As^{+3} and higher, grew poorly, avoided food, and failed to metabolize food efficiently (Eisler 1988). In rats an inhalation LC_{50} of 2100 ppm is reported by Stevens et al. (1979). Among mice, dermal application of 2.5 mg organic arsenic per kg body weight was reported to be the lowest observed adverse effect level for localized hyperplasia for 18 weeks of exposure (Boutwell 1963). Mallard had an LD_{50} of 323 mg/kg BW when exposed to sodium arsenite (Hudson et al. 1984; NAS 1977; NRCC 1978). For dogs, *Canis familiaris*, and white-tailed deer, *Odocoileus virginianus*, exposed to sodium arsenite, lethal doses were found to be 50 to 100 mg and 923 to 2770 mg, respectively (NRCC 1978; NAS 1977). 2.5 - 7.5 mg/kg BW of arsenic acid was acutely toxic to the domestic goat, *Capra* sp. (NRCC 1978). For cattle, *Bos* sp., the toxic dose of arsenic trioxide was found to be 33 to 55 mg/kg BW (NRCC 1978).

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BERYLLIUM
CAS No: 7440-41-7
Synonym(s): Beryllium-9, Glucinium, Glucinum, Beryllium metallic

Beryllium does not occur naturally, but is produced commercially from bertrandite and beryl ores (Weast 1985). Most of the beryllium produced is converted to alloys used in electrical parts, metal springs, aircraft engine parts, precision instruments, non-sparking tools, and injection molded plastics (EPA 1987). Pure beryllium metal, produced from beryllium hydroxide, is used in aircraft brakes, space technology, fuel containers, and precision instruments (EPA 1987). Beryllium oxide, also produced from beryllium hydroxide, is utilized in ceramics, electronics, microwave ovens, gyroscopes, military vehicles, rocket nozzles, and laser structural components (EPA 1987).

Beryllium is a hard, gray metal having a molecular weight of 9.012. It is a solid at ambient conditions with a melting point of 1,287-1,292°C and a boiling point of 2,970°C. It is insoluble in water, but certain of its compounds are water soluble. Beryllium metal and most of its compounds are soluble in acidic and/or alkaline solvents (HSDB 1990).

FATE AND TRANSPORT

Beryllium is released to the atmosphere during processing of ores and production and use of beryllium alloys and chemicals. Combustion of fuel oils and coal account for the majority of beryllium releases to the air, however much of the beryllium contained in coal fly ash is captured by emission control devices (Holcombe et al. 1985; Fishbein 1981). Beryllium is also released atmospherically in relatively small amounts from volcanoes and as wind-blown dusts (ATSDR 1991). It is suspected that most of the beryllium released atmospherically is in the form of beryllium oxide. This compound cannot be destroyed, however it may be converted to other more water-soluble forms such as beryllium sulfate and beryllium nitrate. These compounds are subject to both wet and dry deposition to terrestrial and aquatic surfaces (ATSDR 1991; EPA 1987).

Beryllium deposited in soil is expected to adsorb tightly to particles and to displace other divalent cations with a lower affinity for soil particles (Fishbein 1981). The degree of adsorption is pH dependent with the affinity for soil higher at low pH's (Callahan et al. 1979). Beryllium in soils may be hydrolyzed (the soluble salts) and/or converted to other forms. There is no evidence that biotransformation of beryllium occurs in soils (ATSDR 1991).

Beryllium which reaches surface waters typically becomes concentrated in aquatic sediments, where it may be complexed with particles or simply present as insoluble forms of beryllium (Bowen 1979).

HUMAN HEALTH EFFECTS

In studies of inhalation exposure, the toxicity and subsequent lethality of beryllium was dependent on the water solubility of the specific beryllium compound inhaled. The soluble forms of beryllium

produced acute pneumonitis whereas the insoluble forms of beryllium have been associated with chronic beryllium disease, a disease characterized by respiratory granulomas (ATSDR 1991). Case histories indicate that chronically exposed individuals suffered from respiratory irritation, anorexia, weight loss, increased fatigue, labored breathing, cough, and hypertrophy of the right atrium and ventricle (Hardy and Tabershaw 1946). The cardiovascular changes associated with beryllium inhalation may have been secondary and compensatory to the decreased respiratory function also noted in those individuals.

Chronic beryllium disease is thought to have an immunologic component (Curtis 1951). Patients suffering from chronic beryllium disease have a cellular-mediated immune response to beryllium and corticosteroid therapy controls disease (Rossman et al. 1988; Aronchick et al. 1987). Lung granulomas containing beryllium are formed by beryllium sensitized cells which accumulate in the lungs of patients with chronic beryllium disease (Rossman et al. 1988), further indicating an immunologic link between beryllium exposure and chronic beryllium disease.

ECOLOGICAL EFFECTS

Beryllium is extremely toxic to temperate and tropical fish, however the degree of toxicity tends to decrease with increasing hardness of the water (Callahan et al. 1979). In tests with juvenile perch (*Perca fluviatilis*), beryllium concentrations of 10 µg/L or more caused increased mortality at pH 4.5 but only higher concentrations (> 50 µg/L) were lethal at pH 5.5. The 96 hour LC50 for roach was 100 µg/L regardless of pH (Jagoe et al. 1993). There is no evidence, however, that beryllium bioaccumulates in aquatic organisms. Bioconcentration factors reported for freshwater and marine fish, aquatic plants, and invertebrates are low (Callahan et al. 1979; EPA 1980) and support the notion that beryllium does not bioaccumulate in living tissues and therefore does not biomagnify within the aquatic food chain.

It is unclear whether beryllium bioaccumulates in terrestrial organisms (ATSDR 1991). Beryllium has been detected in beans, cabbage, lettuce, eggs, mushrooms, rice, bread, potatoes, and tomatoes (Meehan and Smythe 1967; Reeves 1986), indicating that plants can take up beryllium from soil.

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CADMIUM

CAS No(s).: 7440-43-9
Major Synonym(s): none

Cadmium is a naturally occurring element which occurs in nature in association with other metals such as zinc and lead, and is usually not found in its pure form. It is often combined with other elements such as oxygen (cadmium oxide), chlorine (cadmium chloride), or sulfur (cadmium sulfide). Cadmium compounds are solids which are soluble in water to varying degrees (Cd<cadmium carbonate<cadmium sulfide<cadmium oxide<cadmium chloride). Pure cadmium is a white, odorless, tasteless solid with a molecular weight of 112.40, a melting point of 320.9°C, a boiling point of 767°C, and a density of 8.642 (Sax and Lewis 1987).

FATE AND TRANSPORT

Extraction of zinc, lead, or copper also releases cadmium to the environment. Cadmium use was infrequent prior to the 20th century; however, recognition of its resistance to corrosion increased its demand, and it is now used in the manufacture of metal alloys, in nickel cadmium batteries, in pigments, metal coatings, and plastics.

Cadmium and cadmium compounds do not readily vaporize but may be suspended as particles in air. Cadmium emissions to the atmosphere result from combustion of fossil fuels, industrial emissions, or erosion of soils (Elinder 1985; Keitz 1980). Cadmium particles may be small enough to reach the gas-exchange surfaces of the lungs or large enough to be excluded from these areas, depending on the source. Small particles may be transported through the air over large distances, whereas larger particles may be deposited on the earth's surface due to gravitational settling (ATSDR 1991).

Cadmium may exist in water as the hydrated ion (Cd(+2)6H2O) or may be complexed with organic material. It tends to be more mobile in water than heavier metals (Callahan et al. 1979); however, sorption to mineral surfaces and humic materials are important transport pathways for removal of cadmium from water. Sediment bacteria are also important for transporting cadmium from the water column into the sediment (Burke and Pfister 1988). The partitioning of cadmium between water and aquatic sediments is related to the above-mentioned factors, but is also affected by pH and salinity (Callahan et al. 1979).

HUMAN HEALTH EFFECTS

Occupational exposure to cadmium at metal processing plants and smeltering operations are the major risks of exposure to airborne cadmium. However, for the general public the primary source of exposure is through ingestion of contaminated food.

Acute poisoning from inhaled cadmium produces upper respiratory irritation, chest pains, nausea, dizziness, and diarrhea. Permanent damage to the lung tissue may result in emphysema and peribronchial and perivascular fibrosis (Benton et al. 1966). In severe cases, pulmonary edema can lead to death (Klaasen 1980). Chronic inhalation of cadmium can decrease the ventilatory capacity with a corresponding increase in residual lung volume (Klaasen 1980). These are the hallmarks of emphysema.

The primary toxic effects from acute ingestion of cadmium are nausea, vomiting, excess salivation, diarrhea, and abdominal cramps. Chronic ingestion exposure to cadmium produces renal dysfunction, hypertension, and osteomalacia. In a classic case of known etiology, Japanese women suffered from a disease known as itai-itai (ouch-ouch). Women who ingested rice contaminated by an upstream effluent from a lead-zinc-cadmium mine complained of rheumatic and myalgic pains. Osteomalacia was the most prominent feature of itai-itai and it is now believed that the toxic effects of cadmium were due to interference with renal regulation of calcium/phosphate balance (Klaasen 1980).

ECOLOGICAL EFFECTS

Aquatic and terrestrial organisms bioaccumulate cadmium (Callahan et al. 1979). Bioaccumulation in fish is dependent on the pH and organic content of the water, which are the major determinants of water/sediment partitioning. Because cadmium accumulates in kidney and liver rather than muscle, and because intestinal absorption of cadmium is low, one would expect a low amount of biomagnification of cadmium in the food chain (ATSDR 1991). However, cadmium is known to be taken up and bioaccumulated by food crops grown in contaminated soil (Munshower 1977).

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IRON
CAS No.: 7439-89-6
Synonym(s) none

Iron is the 4th most abundant element in the earth's crust. Chemically unstable metallic iron is converted to the ferrous or ferric state. The ferric form of iron is insoluble in water and is found in rock and soils. Iron is used in the production of steel; oxides and carbonates are the primary ores from which the metal is extracted (Parmeggiani 1983).

Iron has a molecular weight of 55.85, a melting point of 1,535°C, and a boiling point of 2,750°C. It is insoluble in water but will dissolve in acids. It is a tough, malleable, silver magnetic metal.

FATE AND TRANSPORT

Iron is not subject to significant environmental release by natural weathering processes. However, air pollution may occur as releases of aerosols during the processing of iron. Smaller particles suspended in the air will be washed out by rain, whereas larger particles fall to the earth by gravity (Bowen 1979).

Contamination of surface waters may result from run off due to the industrial practice of using water to quench coke and slag and from scrubbing of particulates. Iron tends to sink in water and aquatic sediments act as an effective sink in both fresh and estuarine systems (Moore and Moore 1976; Bowen 1979).

HUMAN HEALTH EFFECTS

Inhalation of silica or iron oxide dusts during mining and preparing iron ores may result in siderosis and pneumoconiosis (Parmeggiani 1983). Siderosis results when the body's iron storage capacities have been exceeded and excess iron is deposited in vital organs. The liver and pancreas are primary target organs and damage to these systems produces cirrhosis of the liver and diabetes, respectively. A small amount of iron may be deposited in myocardium, producing abnormal rhythms of the heart. Pneumoconiosis is a lung disease, most commonly observed among coal miners. This disease progresses from diffuse fibroids in lung tissue to progressive massive fibrosis, affecting the air exchange tissues of the lungs. This disease is reversible prior to entering the progressive stage. Iron workers also have an increased incidence of lung cancer and hepatic cell carcinoma (Jorgensen 1973; Morgan 1978).

Ingested iron is toxic but rarely fatal in adults. Young children are most susceptible to iron poisoning. Acute symptoms include abdominal pain, diarrhea, and vomiting. Life threatening effects are manifested as cyanosis, lassitude, drowsiness, acidosis and dehydration and may culminate in cardiovascular collapse and shock (Finch 1980).

ECOLOGICAL EFFECTS

The availability of iron in nature is limited. It can be solubilized by acids or converted to organic compounds by microorganisms. Plants take up iron from soils and store it within their structures. Bacteria are also able to take up iron from soil and have adaptive mechanisms which make them efficient at this process. Iron is passed up the foodchain to higher vertebrates in the form of plant and animal food stuffs.

The common shrimp when exposed to iron as Fe +3 has been shown to have a 48 hour LC50 of 33000 to 100000 mg/L (Portmann 1972). Populations of dinoflagellates (*Gymnodinium splendens*) exposed to concentrations of 200 to 5000 mg/L iron for 48 hours showed changes in their population growth. Diatoms (*Thalassiosira guillardii*) exposed to iron concentrations of >20000 mg/L for 48 hours were effected in their individual growth and development (Wilson and Freeburg 1980). A flatworm (*Dugesia dorotocephala*) exposed to concentrations of 1000 to 50000 mg/L for 1 hour showed changes in their behavioral response to stimuli (Kapu and Schaeffer 1991).

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POLYCYLIC AROMATIC HYDROCARBONS (PAH)

CAS Nos: 82-32-9, 208-96-8, 120-12-7, 56-55-3, 50-32-8, 205-99-2, 207-08-9, 191-24-2, 218-01-9, 53-70-3, 206-44-0, 86-73-7, 193-39-5, 85-01-8, 129-00-0

Major Synonym(s) Acenaphthene, Acenapthylene, Anthracine, Benzo(a)anthracene, **Benzo(a)pyrene**, Benzo(b)fluoranthene, **Benzo(g,h,i) Perylene**, Benzo(k)fluoranthene, Chrysene, Dibenzo(a,h)anthracine, Fluoranthene, Fluorene, indeno(1,2,3-cd)pyrene, **Phenanthrene**, Pyrene

Polycyclic Aromatic Hydrocarbons (PAH) are a group of chemicals produced from combustion from automobiles and other gas-burning engines, wood-burning stoves and furnaces, tobacco smoke, industrial smoke, and char-broiled foods (IARC 1983). PAHs occur in nature in crude oil and shale oil and are released during forest fires and volcanic eruptions (HSDB 1988). Anthracene, acenaphthene, fluorene, phenanthrene and fluoranthene are produced commercially for industrial use (Hawley 1987; Windholz 1983; HSDB 1988; NRC 1983).

As a group of similar chemical compounds, PAHs typically exist as colorless, white, or pale yellow-green solids. They tend to occur as mixtures of two or more PAHs. Molecular weights range from 158.2 - 278.35. Most are insoluble in water, yet soluble in organics.

FATE AND TRANSPORT

PAHs are further classified according to molecular weight and the members within a group behave similarly in the environment (ATSDR 1989). They are grouped as follows:

- Low molecular weight PAHs (153-178 g/mol): acenapthene, acenapthylene, anthra-cene, fluorene, and phenanthrene

- Medium molecular weight PAHs (202 g/mol): fluoranthene and pyrene

- High molecular weight PAHs (228-278 g/mol): benz(a)anthracene, benzo(b)fluor-anthene, benzo(k)fluoranthene, benzo(g,h,i) perylene, benzo(a)pyrene, chrysene, dibenzo(a,h) anthracine, and indeno(1,2,3-cd)pyrene

The bulk of PAH released to the environment is to the air, where they occur as vapor or as solids adsorbed to particulate matter. PAHs sorbed to particulate matter are transported and deposited according to the size of the particles. PAHs may be photo-oxidized in the air or may interact with other atmospheric pollutants (NRC 1983). Some of the products of these reactions are also toxic (Gibson et al. 1978)

PAH contamination of surface waters arises primarily from atmospheric deposition (Santodonata 1981), however, industrial effluents and runoff, municipal and urban runoff and oil spills also contribute (Barric 1982; Snider and Manning 1982; Giger and Blumer 1974; Mackenzie and Hunter 1979). A certain amount of PAH will volatilize from water to the atmosphere, particularly low molecular weight compounds (Readman et al. 1982). Microbes will biodegrade low molecular weight compounds, whereas medium and high molecular weight compounds may sorb to particles in the water column and remain suspended or settle to the bottom (Readman et al. 1982).

PAHs are also present in soil, where they may be found adsorbed to soil and sediment. Their occurrence in soil may result from atmospheric deposition, automotive exhaust, use of compost and fertilizer, and sludge from sewage treatment plants (Perwak et al. 1982, Santodonato 1981). Most degradation of PAH in soil occurs through microbial degradation (Sims and Overcash 1983).

HUMAN HEALTH EFFECTS

Generally, the toxicity of PAHs (other than carcinogenicity) has not been of concern in exposed human populations. Several studies have shown increased incidence of lung cancer in workers exposed to coke oven emissions and coal gas (Lloyd 1972; Doll 1952; Kennaway and Kennaway 1936).

Thyssen et al. (1981) observed upper respiratory tract tumors in hamsters exposed to benzo(a)pyrene [B(a)P] by inhalation. Respiratory tract tumors have also followed intratracheal instillation of benzo(a)pyrene, dibenzo(a,i)pyrene and benzo(b)fluoranthene in various laboratory animals (Feron and Kruysse 1978; Feron et al. 1973; Stenback and Sellakumar 1974; Deutsch-Wenzel et al. 1983).

According to the U.S. EPA Region IV staff, some PAHs are considered to be carcinogenic by the inhalation route of exposure (weight of evidence B2). For these PAHs, an inhalation slope factor of 6.1 $(mg/kg/day)^{-1}$ has been used in this assessment, even though it has recently been removed from IRIS (U.S. EPA 1992b).

Oral administration of various PAHs has caused weight loss, aplastic anemia and mild liver and kidney damage in laboratory animals (U.W. EPA 1984; Robinson et al. 1975; Nebert et al. 1977, 1980).

Forestomach, esophageal and mammary tumors developed in rats and mice exposed orally to B(a)P (Rigdon and Neal 1966; Neal and Rigdon 1967; Rigdon and Neal 1969; Fedorenko and Yanysheva 1966; Huggins and Yang 1962). Similar types of tumors, along with hepatomas and lung tumors, have been seen upon oral administration of dibenzo(a,h)anthracene (Larinow and Soboleva 1938; Snell and Stewart 1962; Biancifiori and Caschera 1962).

When rats were fed benzo(a)pyrene during pregnancy (Rigdon and Rennels 1964), only one dam out of seven treated animals carried viable fetuses to term. In mice, offspring exposed *in utero* to benzo(a)pyrene had reduced fertility and reproductive capacity; almost complete sterility was noted in both sexes of offspring exposed *in utero* to 40 mg/kg/day (Mackenzie and Angevine 1981).

The U.S. EPA (1992a) has verified an oral slope factor of 5.8 $(mg/kg/day)^{-1}$ for benzo(a)pyrene (weight of evidence B2). For the other carcinogenic PAHs, slope factors are calculated from that for B(a)P using toxicity equivalency factors (U.S. EPA 1992a); see Section 4.2.3.

Workers dermally exposed to PAH-containing mixtures (coal, tar, mineral oil, petroleum waxes) have developed chronic dermatitis and hyperkeratosis (Santadonato et al. 1981).

Many experiments with repeated dermal applications of B(a)P on mice have shown that B(a)P produces skin tumors. The studies indicate that the threshold dose is affected by the strain of mouse and the solvent chosen (Wynder et al. 1957; Poel 1963; Poel 1959; Bingham and Falk 1969; Hoffman and Wynder 1966). Many other PAHs have produced skin papillomas and carcinomas in mice following skin application (Hoffman and Wynder 1966; Badger et al. 1949; Masuda and Kagawa 1972; Pai and Ranadive 1965; Barry et al. 1935; Wynder and Hoffman 1964; Wynder and Hoffman 1959).

ECOLOGICAL EFFECTS

Aquatic organisms may bioaccumulate PAH through contact with what may be low concentrations of contaminated water, sediments, and food (Jackim and Lake 1978). The higher molecular weight compounds are bioconcentrated to a greater degree than the lower molecular weight compounds (ATSDR 1989). Biomagnification, however, has not been reported at higher trophic levels, perhaps because many organisms metabolize and/or eliminate these compounds at a rapid rate (Eisler 1987). Target organs for PAH toxic action are diverse, due partly to extensive distribution in the body and also to selective attack by these chemicals on proliferating cells (EPA 1980). Metabolites of PAH have been associated with the development of tumors and mutagenesis in fish (Eisler 1987). In most cases, though, PAH concentrations acutely toxic to aquatic organisms are several orders of magnitude higher than those found in even the most heavily polluted waters (Neff 1979).

A wide variety of effects have been documented for aquatic organisms. These include: increased incidence of liver cancer in wild populations of English sole (Malins et al. 1984) and brown bullhead (Baumann et al. 1987); inhibited reproduction of daphnids and delayed emergence of larval midges by fluorene (Finger et al. 1985); decreased respiration and heart rate in mussels (*Mytilus californianus*) by benzo (a) pyrene (Sabourin and Tullis 1981); photosynthetic inhibition of algae and macrophytes by anthracene, napthalene, phenanthrene, pyrene (Neff 1985), and fluorene (Finger et al. 1985).

PAHs may accumulate in terrestrial organisms and at least one species, the gray-tailed vole, bioconcentrated PAHs above the soil concentration. This particular species was unable to metabolize PAHs, at least under the experimental conditions.

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