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

DISCLAIMER

009702

United States Department of Energy

Savannah River Site

Record of Decision
Remedial Alternative Selection for the Central Shops Burning/Rubble Pits (CSBRP) (631-1G and 631-3G) Operable Unit (U)

WSRC-RP-2001-4265

Revision 1.1

October 2002

Prepared by:
Westinghouse Savannah River Company LLC
Savannah River Site
Aiken, SC 29808

SRS

Prepared for U.S. Department of Energy under Contract No. DE-AC09-96SR18500

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Prepared for
U.S. Department of Energy
and
Westinghouse Savannah River Company LLC
Aiken, South Carolina

RECORD OF DECISION
REMEDIAL ALTERNATIVE SELECTION (U)

Central Shops Burning/Rubble Pits (631-1G and 631-3G) Operable Unit (U)

WSRC-RP-2001-4265
Revision 1.1

October 2002

Savannah River Site
Aiken, South Carolina

Prepared by:
Westinghouse Savannah River Company LLC
for the
U. S. Department of Energy under Contract DE-AC09-96SR18500
Savannah River Operations Office
Aiken, South Carolina

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DECLARATION FOR THE RECORD OF DECISION

Unit Name and Location

Central Shops Burning/Rubble Pits (631-1G and 631-3G) Operable Unit

Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS) Identification Number: OU- 50

Savannah River Site

Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) Identification Number: SC1 890 008 989

Aiken, South Carolina

United States Department of Energy

The Central Shops Burning/Rubble Pits (CSBRP) (631-1G and 631-3G) Operable Unit (OU) is listed as a Resource Conservation and Recovery Act (RCRA) 3004(u) Solid Waste Management Unit/Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) unit in Appendix C of the Federal Facility Agreement (FFA) for the Savannah River Site (SRS). The FFA is a legally binding agreement between regulatory agencies (USEPA and SCDHEC) and regulated entities (USDOE) that establishes the responsibilities and schedules for the comprehensive remediation of the SRS.

The media associated with this OU are soil and groundwater. The CSBRP OU consists of four subunits: (1) Pit 631-1G; (2) Pits 631-3G/3GA; (3) Ponded Area (includes surface water impoundment area and adjacent wetland); and (4) Intermittent Stream. Additionally, groundwater associated with the CSBRP OU is being considered as a separate OU along with other potential source areas in Central Shops.

Statement of Basis and Purpose

This decision document presents the selected remedy for the CSBRP OU at SRS in Aiken, South Carolina. The remedy was chosen in accordance with CERCLA, as amended by the Superfund Amendments Reauthorization Act (SARA), and, to the extent practicable, the National Oil and

Hazardous Substances Pollution Contingency Plan (NCP). This decision is based on the Administrative Record File for this site.

The State of South Carolina concurs with the selected remedy.

Assessment of the Site

At the CSBRP OU there has been a release of hazardous substances into the environment. The response action selected in this Record of Decision (ROD) is necessary to protect the public health or welfare or the environment from actual or threatened releases of hazardous substances into the environment.

Description of the Selected Remedy

The CSBRP OU future land use will be restricted (industrial) usage. Unrestricted land use is not appropriate due to the location of the CSBRP OU within Central Shops industrial area, which will remain an industrial area in the future. The remedial action objective for the CSBRP OU is to maintain restricted (industrial) land use. However, relative to perched/trapped water associated with the existing drainage conditions at the CSBRP OU, improved stormwater management is needed to prevent stormwater from infiltrating and accumulating at the bottom of the pits and potentially migrating to the adjacent wetland or into groundwater.

The selected remedy for the CSBRP OU is Alternative 2, Institutional Controls (in conjunction with improved stormwater management).

The results of the groundwater investigation, including collection of groundwater samples and analyses, have revealed that the CSBRP OU has not contributed to groundwater contamination adjacent to or beneath the CSBRP OU. Therefore, the groundwater is not included in the remedial action for this unit. However, because there are plumes in the general vicinity of the CSBRP in Central Shops area, the groundwater associated with CSBRP OU is included in the overall groundwater OU for the Central Shops.

The selected remedy entails the following:

- Implement institutional controls in accordance with the Land Use Control Assurance Plan (LUCAP) for SRS including erecting warning signs to mitigate the impact of the ongoing operations at the Active Burning Area (631-2G), periodic field inspections, and monitoring perched/trapped water levels. The institutional controls will be in place for an indefinite period of time.

- Install improved stormwater management including:

  - Implementing surface water runoff controls including reconfiguration of the pit surface areas and the surrounding areas

  - Routing the surface water flow away from the pits to minimize infiltration into Pit 631-1G and Pits 631-3G/3GA

  - Covering the pit surface area with vegetative cover

- Monitor the effectiveness of the above improvements (through embedded water pressure measuring transducers) during periodic site inspections included in the institutional controls for Pits 631-3G/3GA.

Additionally, this ROD will be reviewed every five years to ensure that the selected remedy is still protective of human health and the environment.

There is no principal threat source material (PTSM) at the OU.

Time to complete the construction is estimated to be three months.

Institutional controls implemented at the CSBRP OU will maintain the site for restricted (industrial) land use only and ensure the protection of human health and the environment. The improved stormwater management will prevent stormwater entry and accumulation at the bottom

of the pits, and eliminate the potential for migration to the adjacent wetland or the groundwater. The vegetative cover will reduce surface soil erosion.

The CSBRP OU is located in N Area (Central Shops), approximately in the middle of SRS. The United States Department of Energy (USDOE) currently controls access to SRS through fencing, security gates, and badging requirements. SRS activities at any specific OU are controlled through the site use/site clearance program. The field conditions at the CSBRP OU will be evaluated to determine the need to modify the program or to identify whether further or additional remedial action is appropriate for this unit during the 5-year ROD reviews.

The CSBRP is located within the Fourmile Branch Watershed. The unit is not a "source control" unit (i.e., the unit does not contain contaminated soil that may act as a source of future contamination to the groundwater through leaching). In addition to the CSBRP OU, there are many other OUs within the watershed. Under the overall site management strategy, all the source control and groundwater OUs located within the watershed will be evaluated to determine their impacts, if any, to the associated streams and wetlands. SRS will manage all source control units to prevent impact to the watershed. Upon disposition of all source control and groundwater OUs within the watershed, a final comprehensive ROD for the Fourmile Branch Watershed will be pursued.

The results of the field investigations and soil samplings conducted to completely characterize the CSBRP OU, show that the CSBRP OU has not impacted the groundwater. The groundwater does not outcrop in the vicinity of the CSBRP OU.

The risk assessments and the contaminant migration analyses also reveal that the groundwater associated with CSBRP OU does not pose unacceptable risk to human health and the environment. The contaminant migration analyses identified no refined CMCOCs; therefore, the CSBRP OU groundwater requires no remedial activities and the CSBRP OU soil does not pose a migration threat to groundwater. The contaminated soils associated with CSBRP OU are being addressed in this ROD; therefore the CSBRP OU will not impact the response actions of other OUs at SRS.

The South Carolina Department of Health and Environmental Control (SCDHEC) will modify the SRS RCRA permit to incorporate the above mentioned remedies after ROD approval.

Statutory Determinations

Based on the unit RCRA Facility Investigation/Remedial Investigation/Baseline Risk Assessment (RFI/RI/BRA) for the CSBRP OU (WSRC 2001), the CSBRP OU poses risks to human health and the environment within the acceptable range of 1×10^{-4} to 1×10^{-6} for the risk. The selected remedy will leave the hazardous substances in place that pose a future risk and will require land use restrictions for an indefinite period of time. Additionally, to prevent any future potential impact on the adjacent wetland and groundwater due to perched/trapped water associated with the CSBRP OU, improved stormwater management will be required. Therefore, remedial actions, as discussed in the *Description of the Selected Remedy,* have been identified as the selected remedy for the CSBRP OU.

Section 300.430(f)(ii) of the NCP requires that a 5-year remedy review of the ROD be performed if hazardous substances, pollutants, or contaminants above levels that allow for unlimited use and unrestricted exposure remain in the OU. The three parties, SCDHEC, United States Environmental Protection Agency (USEPA), and USDOE, have determined that a 5-year review of the ROD for the CSBRP OU will be performed to ensure that the remedy continues to provide adequate protection of human health and the environment.

The selected remedy is protective of human health and the environment, complies with federal and state requirements that are applicable or relevant and appropriate to the remedial actions, and is cost effective. This remedy does not satisfy the statutory preference for treatment as a principal element of the remedy because the wastes which create risk to human health and the environment will remain on site. As a result, institutional controls to protect against residential use are required for an undefined period of time. The institutional controls will maintain restricted (industrial) land use and ensure protection of human health and the environment.

As negotiated with the USEPA, and in accordance with USEPA–Region IV Policy (*Assuring Land Use Controls of Federal Facilities,* April 21, 1998), SRS has developed a LUC Assurance

Plan (LUCAP) (WSRC 1999) to ensure that land use restrictions are maintained and verified periodically. The unit-specific LUC Implementation Plan (LUCIP) referenced in this ROD will provide details and specific measures required for the LUCs selected as a part of this remedy. The USDOE is responsible for implementing, maintaining, monitoring, reporting upon, and enforcing the LUCs selected under this ROD. The LUCIP developed as a part of this action will be submitted concurrently with the Corrective Measures Implementation/Remedial Action Implementation Plan (CMI/RAIP), as required in the FFA for review and approval by USEPA and SCDHEC. Upon final approval, the LUCIP will be appended to the LUCAP and is considered incorporated by reference into the ROD establishing LUC implementation and maintenance requirements enforceable under CERCLA. The LUCIP will remain in effect until modified as needed to be protective of human health and the environment. LUCIP modification will only occur through another CERCLA document.

In the long term, if the property is ever transferred to nonfederal ownership, the U.S. Government will take those actions necessary pursuant to Section 120(h) of CERCLA. Those actions will include a deed notification disclosing former waste management and disposal activities as well as remedial actions taken on the site. The deed notification shall, in perpetuity, notify any potential purchaser that the property has been used for the management and disposal of waste. These requirements are also consistent with the intent of the RCRA deed notification requirements at final closure of a RCRA facility if contamination will remain at the unit.

The deed shall also include deed restrictions precluding residential use of the property. However, the need for these deed restrictions may be reevaluated at the time of transfer in the event that exposure assumptions differ and/or the residual contamination no longer poses an unacceptable risk under residential use. Any reevaluation of the need for the deed restrictions will be done through an amended ROD with USEPA and SCDHEC review and approval.

In addition, if the site is ever transferred to nonfederal ownership, a survey plat of the OU will be prepared, certified by a professional land surveyor, and recorded with the appropriate county recording agency. The CSBRP OU is located in Aiken County.

Data Certification Checklist

This is to certify that this ROD provides the following information:

- There is no PTSM at this OU (see Section VII in the Decision Summary)
- COCs and their respective concentrations (see Section VII and Table 3 in the Decision Summary)
- Baseline risk represented by the COCs (see Section VII and Table 5 in the Decision Summary)
- No cleanup levels were established for the COCs (for clarification see Section VIII in the Decision Summary)
- Current and future land and groundwater use assumptions used in the BRA and ROD (see Section VI in the Decision Summary)
- Land and groundwater use that will be available at the site as a result of the selected remedy (see Section XI in the Decision Summary)
- Estimated capital, operation and maintenance, and total present worth cost; discount rate; and the number of years over which the remedy cost estimates are projected (see Section IX in the Decision Summary)
- Decision factors that led to selecting the remedy (see Section X in the Decision Summary)

1/28/03
Date

Jeffrey M. Allison
Acting Manager
U.S. Department of Energy
Savannah River Operations Office

4/23/03
Date

Winston A. Smith
Director
Waste Management Division
U.S. Environmental Protection Agency - Region IV

5/19/03
Date

R. Lewis Shaw
Deputy Commissioner
Environmental Quality Control
South Carolina Department of Health and Environmental Control

DECISION SUMMARY
REMEDIAL ALTERNATIVE SELECTION (U)

Central Shops Burning/Rubble Pits (631-1G and 631-3G) Operable Unit

WSRC-RP-2001-4265
Rev. 1.1

October 2002

Savannah River Site
Aiken, South Carolina

Prepared By:
Westinghouse Savannah River Company LLC
for the
U. S. Department of Energy under Contract DE-AC09-96SR18500
Savannah River Operations Office
Aiken, South Carolina

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LIST OF ACRONYMS AND ABBREVIATIONS

ARAR	applicable or relevant and appropriate requirement
bls	below land surface
BRA	Baseline Risk Assessment
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CERCLIS	Comprehensive Environmental Response, Compensation, and Liability Information System
CMCOC	contaminant migration constituent of concern
CMCOPC	contaminant migration constituent of potential concern
CMI/RAIP	Corrective Measures Implementation/Remedial Action Implementation Plan
COC	constituent of concern
CPT	cone penetrometer technology
CSBRP	Central Shops Burning/Rubble Pits
CSM	conceptual site model
FFA	Federal Facility Agreement
ft	feet
ft^3	cubic feet
gal	gallon
GPR	ground penetrating radar
HSWA	Hazardous and Solid Waste Amendments
IRIS	Integrated Risk Information System, USEPA
km	kilometer
km^2	square kilometer
L	liter
LF	linear foot (feet)
LS	lump sum
LUC	Land Use Controls
LUCAP	Land Use Controls Assurance Plan
LUCIP	Land Use Controls Implementation Plan
m	meter
m^3	cubic meter
MCL	maximum contaminant level
mg/kg	milligram/kilogram
mi	mile
mi^2	square mile

LIST OF ACRONYMS AND ABBREVIATIONS (Continued)

msl	mean sea level
NAWQC	National Ambient Water Quality Criteria
NCEA	National Center for Environmental Assessment
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NEPA	National Environmental Policy Act
NPL	National Priorities List
NPDES	National Pollutant Discharge Elimination System
O&M	operation and maintenance
OU	operable unit
PCB	polychlorinated biphenyl
PCR	Post-Construction Report
PTSM	principal threat source material
RAO	remedial action objective
RBC	risk-based concentration
RCRA	Resource Conservation and Recovery Act
RFI	RCRA Facility Investigation
RFI/RI	RCRA Facility Investigation/Remedial Investigation
RG	remedial goal
RI	Remedial Investigation
ROD	Record of Decision
SARA	Superfund Amendments Reauthorization Act
SB/PP	Statement of Basis/Proposed Plan
SCDHEC	South Carolina Department of Health and Environmental Control
SCHWMR	South Carolina Hazardous Waste Management Regulations
SRS	Savannah River Site
SVOC	semi-volatile organic constituent
TAL	target analyte list
TCL	target compound list
TIC	tentatively identified compound
UCL	upper confidence level
USC	unit-specific constituent
USDOE	United States Department of Energy
USEPA	United States Environmental Protection Agency
VOC	volatile organic constituent
WSRC	Westinghouse Savannah River Company, LLC

I. SAVANNAH RIVER SITE AND OPERABLE UNIT NAME, LOCATION, AND DESCRIPTION

Unit Name, Location, and Brief Description

Central Shops Burning/Rubble Pits (631-1G and 631-3G) Operable Unit

Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS) Identification Number: OU- 50

Savannah River Site

Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) Identification Number: SC1 890 008 989

Aiken, South Carolina

United States Department of Energy (USDOE)

The Savannah River Site (SRS) occupies approximately 800 km^2 (310 mi^2) of land adjacent to the Savannah River, principally in Aiken and Barnwell counties of South Carolina (Figure 1). SRS is located approximately 40 km (25 mi) southeast of Augusta, Georgia, and 32 km (20 mi) south of Aiken, South Carolina.

The United States Department of Energy (USDOE) owns SRS, which historically produced tritium, plutonium, and other special nuclear materials for national defense and the space program. Chemical and radioactive wastes are by-products of nuclear material production processes. Hazardous substances, as defined by CERCLA, are currently present in the environment at SRS.

The Federal Facility Agreement (FFA) (FFA 1993) for SRS lists the Central Shops Burning/Rubble Pits (CSBRP) (631-1G and 631-3G) Operable Unit (OU) as a Resource Conservation and Recovery Act (RCRA) CERCLA unit requiring further evaluation. The CSBRP OU required further evaluation through an investigation process that integrates and combines the RCRA facility investigation (RFI) process with the CERCLA remedial investigation (RI) process

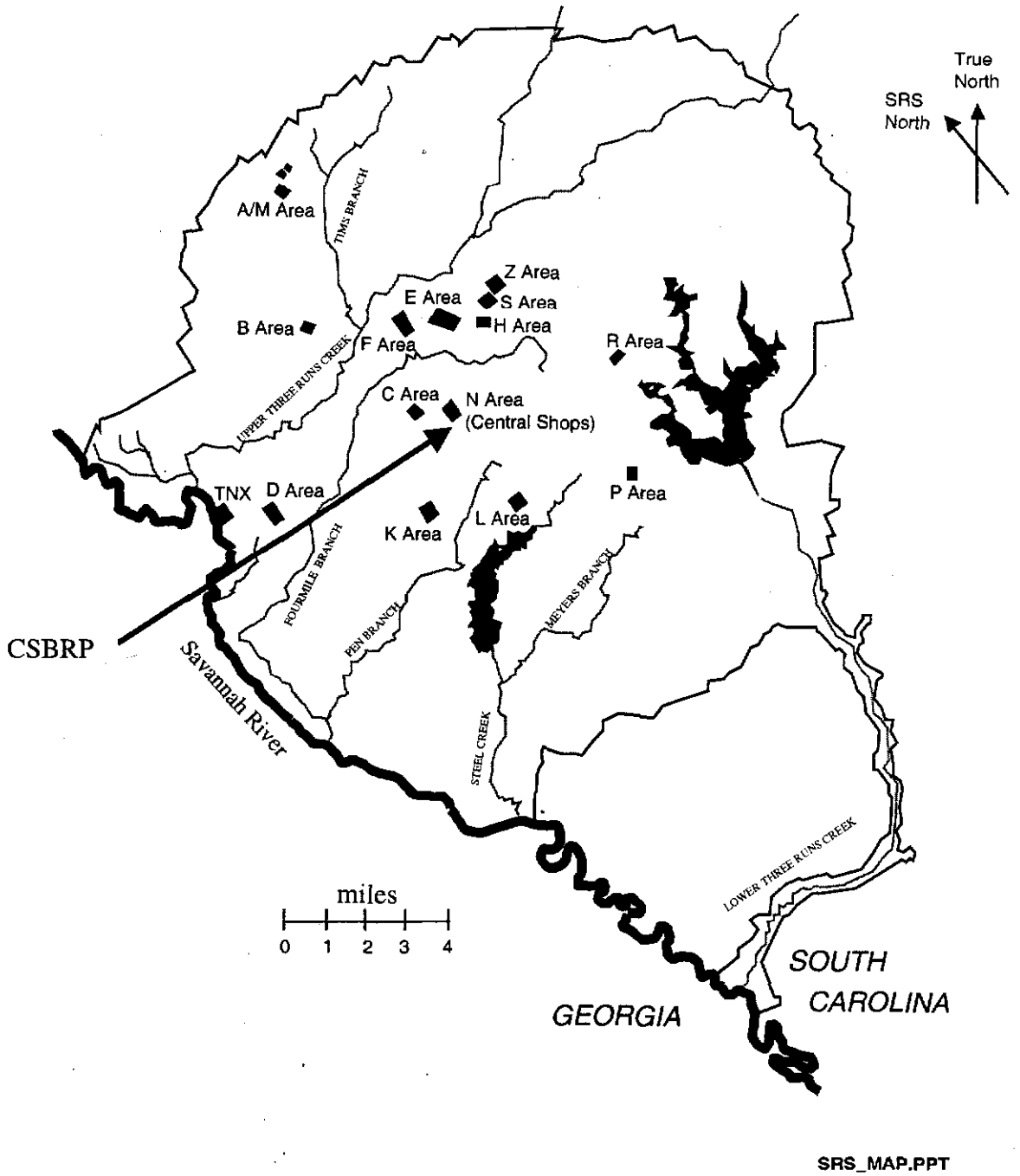


Figure 1. Location of the Central Shops Burning/Rubble Pits Operable Unit at SRS

to determine the actual or potential impact of releases of hazardous substances to human health and the environment.

II. SITE AND OPERABLE UNIT COMPLIANCE HISTORY

SRS Operational and Compliance History

The primary mission of SRS has been to produce tritium, plutonium, and other special nuclear materials for our nation's defense programs. Production of nuclear materials for the defense program was discontinued in 1988. SRS has provided nuclear materials for the space program, as well as for medical, industrial, and research efforts up to the present. Chemical and radioactive wastes are by-products of nuclear material production processes. These wastes have been treated, stored, and in some cases, disposed of at SRS. Past disposal practices have resulted in soil and groundwater contamination.

Hazardous waste materials handled at SRS are managed under RCRA, a comprehensive law requiring responsible management of hazardous waste. Certain SRS activities require South Carolina Department of Health and Environmental Control (SCDHEC) operating or post-closure permits under RCRA. SRS received a RCRA hazardous waste permit from the SCDHEC, which was most recently renewed on September 5, 1995. Module IV of the Hazardous and Solid Waste Amendments (HSWA) portion of the RCRA permit mandates corrective action requirements for non-regulated solid waste management units subject to RCRA 3004(u).

On December 21, 1989, SRS was included on the National Priorities List (NPL). The inclusion created a need to integrate the established RFI program with CERCLA requirements to provide for a focused environmental program. In accordance with Section 120 of CERCLA 42 United States Code Section 9620, USDOE has negotiated an FFA (FFA 1993) with United States Environmental Protection Agency (USEPA) and SCDHEC to coordinate remedial activities at SRS into one comprehensive strategy which fulfills these dual regulatory requirements. USDOE functions as the lead agency for

remedial activities at SRS, with concurrence by the USEPA - Region IV and the SCDHEC.

Operable Unit Operational and Compliance History

The CSBRP OU is located in the central part of the SRS, approximately 10.5 km (6.5 mi) from the nearest site boundary. It is in the northern part of N Area (also known as Central Shops), approximately 0.9 km (0.6 mi) south of the intersection of SRS Roads 5 and C. Figure 1 shows the location of the Central Shops within SRS and Figures 2 and 3 depict the layout of the CSBRP OU and the Active Burning Area (631-2G).

There are two other burning/rubble pits (Pit 631-5G and Pit 631-6G) near Central Shops that are addressed under separate FFA actions. Pit 631-6G is included in the ROD that was completed in 1997. Pit 631-5G was initially a part of the Pits 631-1G and 631-3G OU. However, when a trichloroethylene plume was identified in the groundwater beneath Pit 631-5G, the pit was included in a new OU called the "Heavy Equipment Wash Basin and Central Shops Burning/Rubble (Pit 631-5G) Operable Unit."

Initially, the CSBRP OU was composed of two inactive burning/rubble pits: Pit 631-1G and 631-3G located along the northern and western sides of the Active Burning Area (631-2G). However, trenching performed during characterization activities identified that Pit 631-3G was composed of two adjacent pits subsequently named 631-3G and 631-3GA. In this ROD, Pits 631-3G and 631-3GA are jointly addressed as Pits 631-3G/3GA.

Prior to 1951, the CSBRP OU area was farmland, an area of moderate relief. The pits are located in cleared areas adjacent to wooded lands. Drainage ditches and the flow paths of stormwater runoff have changed over time. During the disposal activities, each pit had at least one drainage ditch to receive water directly from that pit. The current surface water drainage system and surface water flow pattern associated with CSBRP OU are presented in Figure 2.

Pit 631-1G and Pits 631-3G/3GA received asbestos and empty paint cans along with ash, paper, and glass at various times from the 1950s to the mid-1980s. Pits 631-1G and 631-3G/3GA are located along the northern and western sides of the Active Burning Area as shown in Figure 2.

Pit 631-1G

Waste disposal activities at Pit 631-1G are estimated to have begun in late 1951. Historically, the pit had dimensions of approximately 61 by 9.1 by 1.8 m (200 by 30 by 6 ft). Records suggest that the pit was not excavated. Evidently, the debris was dumped into a ditch next to an access road in the Central Shops area.

During the Phase II investigation, trenching and ground penetrating radar (GPR) activities conducted at Pit 631-1G indicated a pit approximately 79.2 m (260 ft) long and 9.1 m (30 ft) wide. This pit contained debris from 0.6 to 2.7 m (2 to 9 ft) below land surface (bls), with an average waste thickness of 1.2 m (4 ft). The waste consisted of burned trash, including wood, glass, and stainless steel shavings. Overlying the debris was clay fill that varied in thickness from 0.6 to 1.2 m (2 to 4 ft). The clay fill which was added in the 1980s, was overlain by approximately 0.3 m (1 ft) of topsoil (WSRC 1998).

At Pit 631-1G, combustible wastes reportedly were also deposited in the pit and periodically burned. The combustible wastes may have included oils, rags, paper, cardboard, plastics, degreasers, wood, rubber, and drummed organic solvents. Occasionally, the pit may have received only burned material and debris.

In 1973, the periodic burning of waste ceased, and a layer of soil was placed over the ashes. The pit then received only inert rubble consisting of paper, cans, lumber, and empty galvanized steel barrels (see Figure 4). The pit remained open until about 1985.

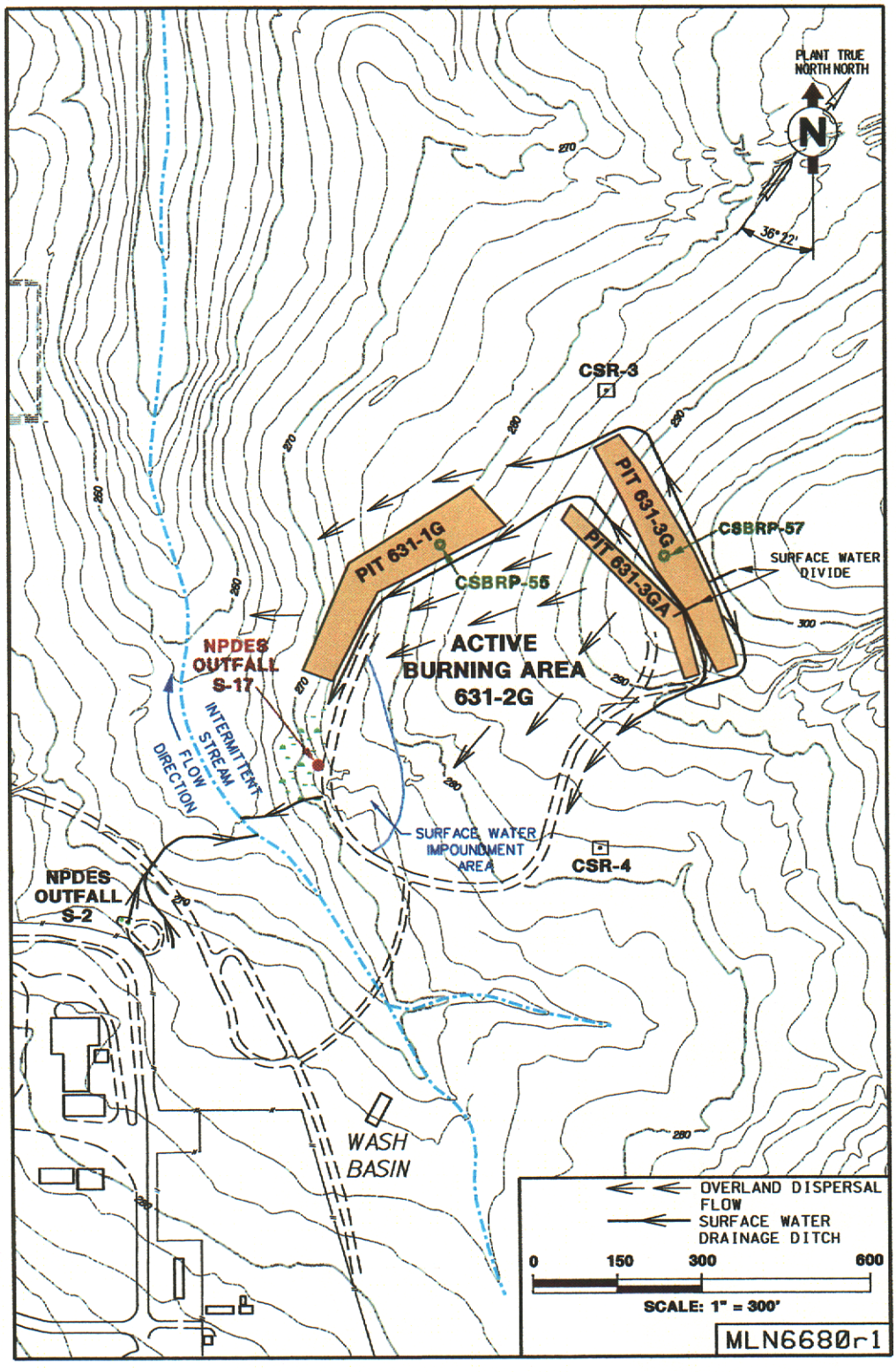


Figure 2. Layout of the Central Shops Burning/Rubble Pits Operable Unit

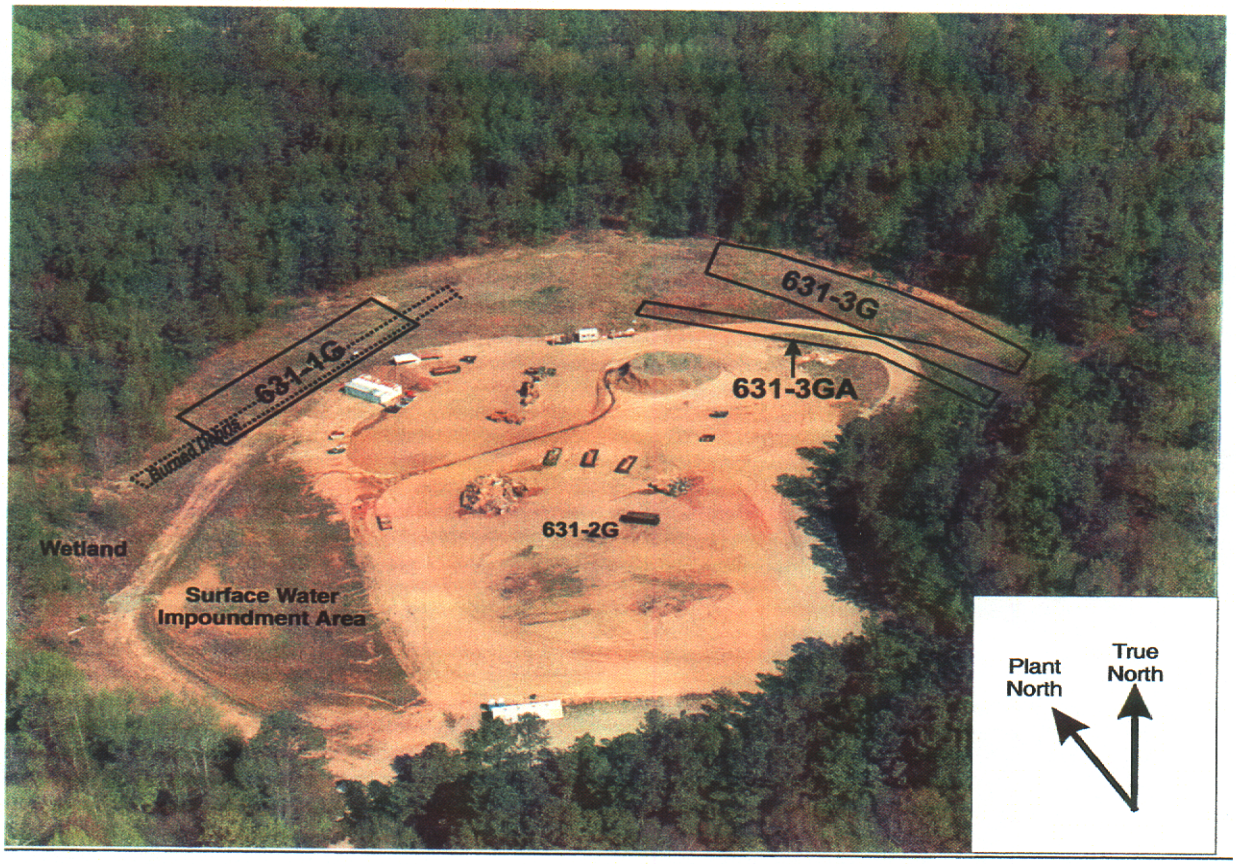


Figure 3. **Oblique Aerial Photograph of Central Shops Burning/Rubble Pits Operable Unit Taken in April 1996**

Figure 4. Photograph of Pit 631-1G Taken 4/1/85 Prior to Closure (Looking North)

The actual volume of waste disposed of in the pit was not recorded. However, estimates from the Phase II characterization indicate approximately 884 m^3 (31,200 ft^3) of waste was disposed of in the pit.

Pits 631-3G/3GA

Historically, Pit 631-3G had dimensions of 122 by 15.2 by 2.1 m (400 by 50 by 7 ft). The pit began receiving waste some time after 1975.

In 1998, boreholes drilled through Pit 631-3G determined the depth to be at least 8.2 m (27 ft) bls with the trash rising to within 2.4 m (8 ft) bls and overlain by clay fill (WSRC 1998). The pit was used to dispose of dry, inert rubble. As is evident from Figure 5, it may have received asbestos, paint cans, fluorescent light fixtures, paper, cans, lumber, barrels, metal pipes, metal shavings, and electrical switch gear. The Phase II investigation of trenching activities within Pit 631-3G identified abundant stainless steel metal shavings, sheet metal, burned wood, and one crushed 208-L (55-gal) drum. Burning operations are not known to have occurred at Pit 631-3G. In 1983, dumping ceased and the pit was covered with 2.1 to 3 m (7 to 10 ft) of soil, creating a mounded profile. Historically, the volume of waste in the pit was unknown. However, estimates from the Phase II characterization activities indicate that the volume of the waste in Pit 631-3G is approximately 10,224 m^3 (361,000 ft^3).

Subsequent activities performed during Phase II characterization revealed that Pit 631-3G is actually divided into two separate pits, designated as Pit 631-3G and a southern Pit 631-3GA. During the Phase II investigation, trenching conducted across Pit 631-3GA revealed unburned materials including metal, large concrete slabs, and transite. In addition, burned materials identified in the pit included sheet metal, stainless steel shavings, wire, glass, and wood (see Figure 6). Boreholes drilled through Pit 631-3GA indicated the depth to be at least 4.6 m (15 ft) bls, with the top of the trash varying from 1.1 to 2.4 m (3.5 to 8 ft) bls and overlain by clay fill (WSRC 1998). The estimated volume of trash in Pit 631-3GA is 1,487 m^3 (52,000 ft^3).

Figure 5. Photograph Pit 631-3G Taken 11/16/82 Prior to Closure (Looking West)

Figure 6. **Photograph of Pit 631-3GA (Looking South) with Concrete Foundation and Transite (Taken November 1997)**

Site Characteristics

The CSBRP OU is within the Fourmile Branch Watershed (see Figure 1). Surface water in the vicinity of each pit flows into an unnamed intermittent stream, which feeds directly into Fourmile Branch about 2.6 km (1.6 mi) to the northwest at approximately 55 m (180 ft) above mean sea level (msl). Fourmile Branch drains into the Savannah River approximately 14.5 km (9 mi) downstream (see Figure 1).

Directly to the north of the unnamed tributary and south of Pits 631-1G and 631-3G is a ponded area, which includes the surface-water impoundment area and the adjacent wetland. The ponded area receives surface runoff from the Active Burning Area (631-2G) and from the eastside of Pit 631-1G (see Figure 2). The ponded area also receives runoff from Pits 631-3G and 631-3GA and drains to National Pollutant Discharge Elimination System (NPDES) Outfall CS-17 on the opposite side of the road.

The topography around each pit slopes toward the intermittent stream at a gradient of approximately 0.04 (1.2 m/30.4 m [4 ft/100 ft]). Pit 631-1G has a low topographic expression with a ground surface elevation of 83.8 $\pm$ 1.5 m (275 $\pm$ 5 ft) above msl. Pit 631-3G is several feet higher than Pit 631-1G with a ground surface elevation of 89.9 $\pm$ 1.5 m (295 $\pm$ 5 ft) above msl. The elevation of the intermittent stream at the point nearest the pits is approximately 76.2 $\pm$ 3 m (250 $\pm$ 10 ft) above msl. The top of Pit 631-3G is about 4.6 m (15 ft) above the stream; the top of Pit 631-1G is about 10.6 m (35 ft) above the stream.

Soils at the surface (0 to 1 m [0 to 3 ft]) in the vicinity of the CSBRP OU belong to the Fuquay-Blanton-Dothan association, which includes well-drained and somewhat excessively drained soils that have a loamy subsoil (SCS 1990). Unconsolidated sands and clays of the Barnwell Group crop out around the CSBRP OU. A large exposure of silty sand of the "Upland Unit" is present in the walls of a 4.6 m (15 ft) deep stormwater runoff ditch located approximately 274 m (900 ft) southwest of Pit 631-1G. The exposure reveals the geologic profile at the elevation of Pit 631-1G and provides the best

exposure of the "Upland Unit" in the vicinity. Other outcrops are present along the intermittent stream at an elevation of approximately 79 ± 3 m (260 ± 10 ft) above msl. These exposures are of plastic clay that may represent the underlying Late Eocene Tobacco Road Sand.

Locally, continuous low permeability lenses are present at varying elevations in the vicinity of the pits (WSRC 1998). These layers may act as local barriers to infiltration of precipitation to the water table. In addition, they may control the flow of subsurface water draining from the pits, conducting the flow along the upper surface of the lens and away from the pit margins before discharging the water either to a surface seep or to the water table. Clay layers that may act as perching horizons and thus barriers to groundwater flow are locally present along the intermittent stream and east of Pit 631-3G.

The base of Pit 631-1G is approximately 81.4 m (267 ft) above msl. Based on the Phase II soil boring, CSBRP-55 (see Figure 2), the water table elevation is approximately 1.2 m (4 ft) below the base of the pit at an elevation of 80.2 ± 0.3 m (263 ± 1 ft) above msl. The base of Pit 631-3G is approximately 81.7 m (268 ft) above msl. Based on the Phase II soil boring, CSBRP-57, the water table under the pit has an elevation of 78.9 m (259 ft) above msl. This elevation would separate the bottom of Pit 631-3G and the water table by 2.7 m (9 ft).

The saturated conditions observed at location CSBRP-55 during the Phase I characterization and not present in subsequent soil sampling and trenching indicates that perched groundwater may be present in Pit 631-1G only following periods of high precipitation.

Phase II trenching at Pit 631-3G encountered trapped water, contained within the pit, at an elevation of 87.2 m (286 ft) above msl, which indicates there is an approximately 5.5 m (18 ft) column of trapped water within Pit 631-3G. The elevation of the water table in wells CSR-3 and CSR-4 averages about 78.6 m (258 ft) above msl, and static water level measurements did not exceed 80.2 m (263 ft) above msl during the period

from 1990 to 1995. These data suggest that the base of the pit is at least 1.5 m (5 ft) and generally 2.7 m (9 ft) above the water table. Based on these observations and an evaluation of site conditions, the trapped water appears to be the result of infiltration along the high side of the pit.

A wetland exists in the vicinity of Pit 631-1G (see Figure 2). No drinking water well exists at or near the vicinity of the CSBRP OU that can be used as a drinking water source.

No threatened or endangered and sensitive species exist in the vicinity of the CSBRP OU.

No removal action or remedial action has been conducted at CSBRP OU under CERCLA or other authorities.

III. HIGHLIGHTS OF COMMUNITY PARTICIPATION

Both RCRA and CERCLA require the public to be given an opportunity to review and comment on the draft permit modification and proposed remedial alternative. Public participation requirements are listed in South Carolina Hazardous Waste Management Regulation (SCHWMR) R.61-79.124 and Sections 113 and 117 of CERCLA 42 United States Code Sections 9613 and 9617. These requirements include establishment of an Administrative Record File that documents the investigation and selection of the remedial alternative for addressing the CSBRP OU soils and groundwater. The Administrative Record File must be established at or near the facility at issue.

The SRS Public Involvement Plan (USDOE 1994) is designed to facilitate public involvement in the decision-making process for permitting, closure, and the selection of remedial alternatives. The SRS Public Involvement Plan addresses the requirements of RCRA, CERCLA, and the National Environmental Policy Act, 1969 (NEPA). SCHWMR R.61-79.124 and Section 117(a) of CERCLA, as amended, require the advertisement of the draft permit modification and notice of any proposed remedial action and provide the public an opportunity to participate in the selection of the remedial

action. The *Statement of Basis/Proposed Plan (SB/PP) for the Central Shops Burning/Rubble Pits (631-1G and 631-3G) Operable Unit (U), Rev. 1.1* (WSRC 2001b), a part of the Administrative Record File, highlights key aspects of the investigation and identifies the preferred action for addressing the CSBRP OU.

The FFA Administrative Record File, which contains the information pertaining to the selection of the response action, is available at the following locations:

U.S. Department of Energy
Public Reading Room
Gregg-Graniteville Library
University of South Carolina – Aiken
171 University Parkway
Aiken, South Carolina 29801
(803) 641-3465

Thomas Cooper Library
Government Documents Department
University of South Carolina
Columbia, South Carolina 29208
(803) 777-4866

The RCRA Administrative Record File for SCDHEC is available for review by the public at the following locations:

The South Carolina Department of
Health and Environmental Control
Bureau of Land and Waste
Management
8901 Farrow Road
Columbia, South Carolina 29203
(803) 896-4000

Lower Savannah District
Environmental Quality Control Office
206 Beaufort Street, Northeast
Aiken, South Carolina 29801
(803) 641-7670

The public was notified of the public comment period through the *SRS Environmental Bulletin*, a newsletter sent to citizens in South Carolina and Georgia, and through notices in the *Aiken Standard*, the *Allendale Citizen Leader*, the *Augusta Chronicle*, the *Barnwell People-Sentinel*, and *The State* newspaper. The public comment period was also announced on local radio stations.

The Statement of Basis/Proposed Plan (SB/PP) 45-day public comment period began on February 7, 2002, and ended on March 23, 2002. A Responsiveness Summary, prepared to address any comments received during the public comment period, is provided in Appendix A of the Record of Decision (ROD). It will also be available in the final RCRA permit modification.

IV. SCOPE AND ROLE OF THE OPERABLE UNIT WITHIN THE SITE STRATEGY

RCRA/CERCLA Programs at SRS

RCRA/CERCLA units (including the CSBRP OU) at SRS are subject to a multi-stage RI process that integrates the requirements of RCRA and CERCLA as outlined in the FFA (FFA 1993). The RCRA/CERCLA processes are summarized below:

- investigation and characterization of potentially impacted environmental media (such as soil, groundwater, and surface water) comprising the waste site and surrounding areas
- evaluation of risk to human health and the local ecological community
- screening of possible remedial actions to identify the technology selected to protect human health and the environment
- implementation of the selected alternative
- documentation that the remediation has been performed competently
- evaluation of the effectiveness of the technology

The steps of this process are iterative in nature and include decision points that require concurrence between USDOE as owner/manager, USEPA and SCDHEC as regulatory oversight agencies, and the public. Figure 7 is a flow chart presenting the process logic and documentation.

Operable Unit Remedial Strategy

The overall strategy for addressing the CSBRP OU was to (1) characterize the waste unit, delineating the nature and extent of contamination and identifying the media of concern (perform the RCRA Facility Investigation [RFI/RI]); (2) perform a Baseline Risk Assessment (BRA) to evaluate media of concern, constituents of concern (COCs),

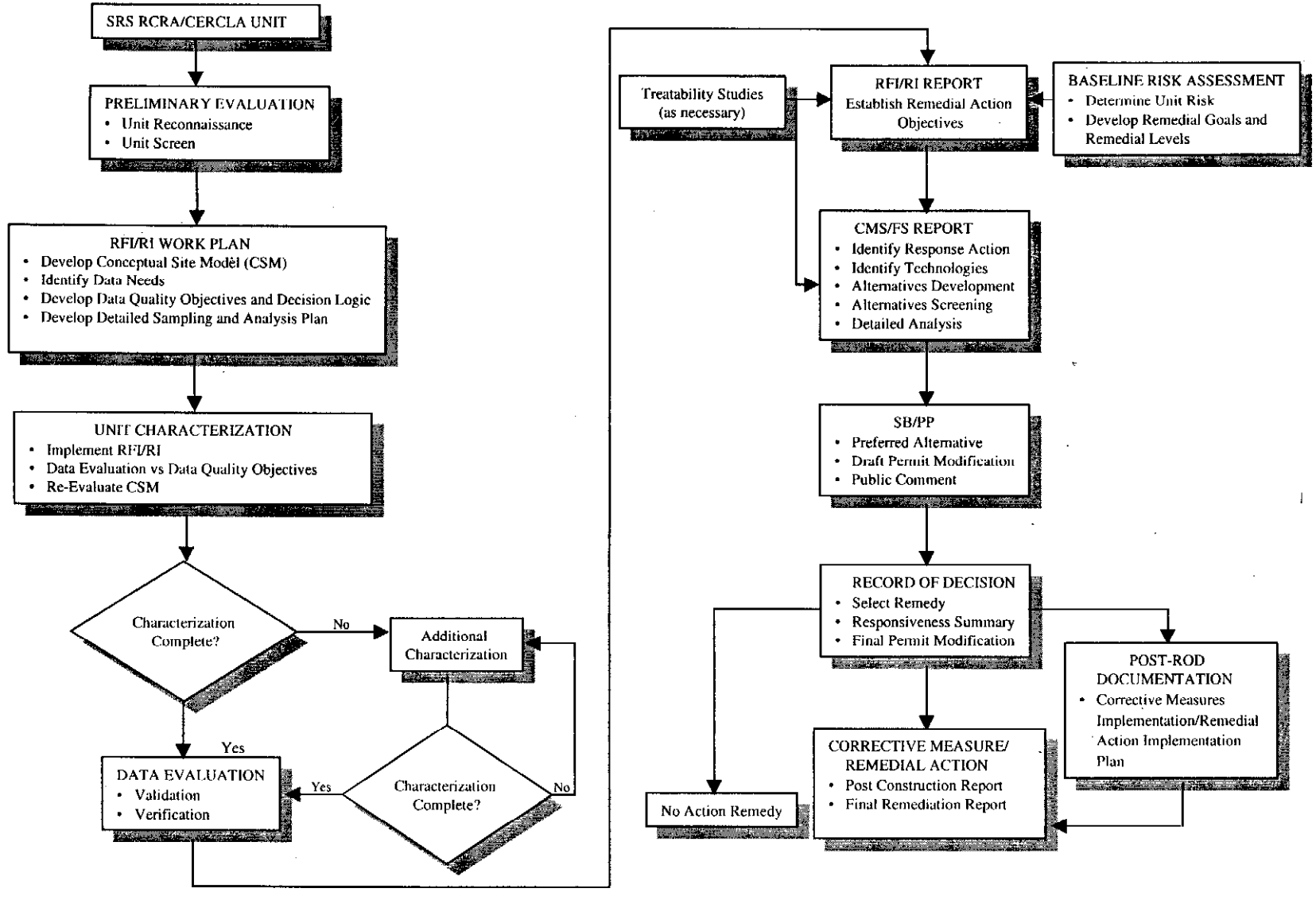


Figure 7. RCRA/CERCLA Logic and Documentation

exposure pathways, and characterize potential risks; and (3) evaluate and perform a final action to remediate, as needed, the identified media of concern.

The CSBRP OU is located within the Fourmile Branch Watershed. In addition to the CSBRP OU, there are many OUs within the watershed. All source control and groundwater OUs located within the watershed will be evaluated to determine their impacts, if any, to the associated streams and wetlands.

SRS will manage all source control units to prevent impact to the watershed. Upon disposition of all source control and groundwater OUs within the watershed, a final comprehensive ROD for the Fourmile Branch Watershed will be pursued.

The results of the field investigations and soil/groundwater samplings conducted from 1983 to 1985 and during Phase I and Phase II of the development of the RFI/RI/BRA report (WSRC 2001a) have indicated that the groundwater has not been impacted by the CSBRP OU. The groundwater does not outcrop in the vicinity of the CSBRP OU.

The risk assessment and the contaminant migration analyses, based on unrestricted use have also revealed that there is no risk to human health and the environment associated with the CSBRP OU groundwater. The contaminant migration analysis identified no contaminant migration constituents of concern (CMCOCs) associated with the OU and, therefore, CSBRP OU groundwater requires no remedial activities.

The contaminated soils associated with CSBRP OU are being addressed in this ROD. Soil remediation activities at the CSBRB OU will not impact the response actions of other OUs at SRS.

V. OPERABLE UNIT CHARACTERISTICS

This section presents the conceptual site model (CSM) for the CSBRP OU, provides an overview of the characterization activities conducted at CSBRP OU, and presents the characterization results and COCs.

Conceptual Site Model for the CSBRP OU

A detailed CSM for the Pits 631-1G and 631-3G/3GA is presented in Figure 8. The Active Burning Area (631-2G) is also included in the CSM but is not part of the CSBRP OU. The CSM (Figure 8) identifies the known and suspected sources

of contamination, the known and potential routes of migration, and the types of contaminants and potentially affected media. Additionally the CSM presents the exposure routes and the known and potential human and ecological receptors which are discussed in the summary of OU risks in Section VII.

Primary Sources of Contamination

The primary source of contamination is waste (debris, rubble, and soil) within the pits. The exact composition of waste deposited in any of the pits is unknown; however, trenching at Pit 631-1G revealed combustible construction debris such as paper, plastics, rubber, rags, wood and cardboard. The waste was burned periodically and the ashes were covered with a layer of soil. Pits 631-3G/3GA may have received asbestos, batteries, paint cans, fluorescent light fixtures, paper, cans, lumber, barrels, metal pipes, stainless steel shavings, and electrical switchgear.

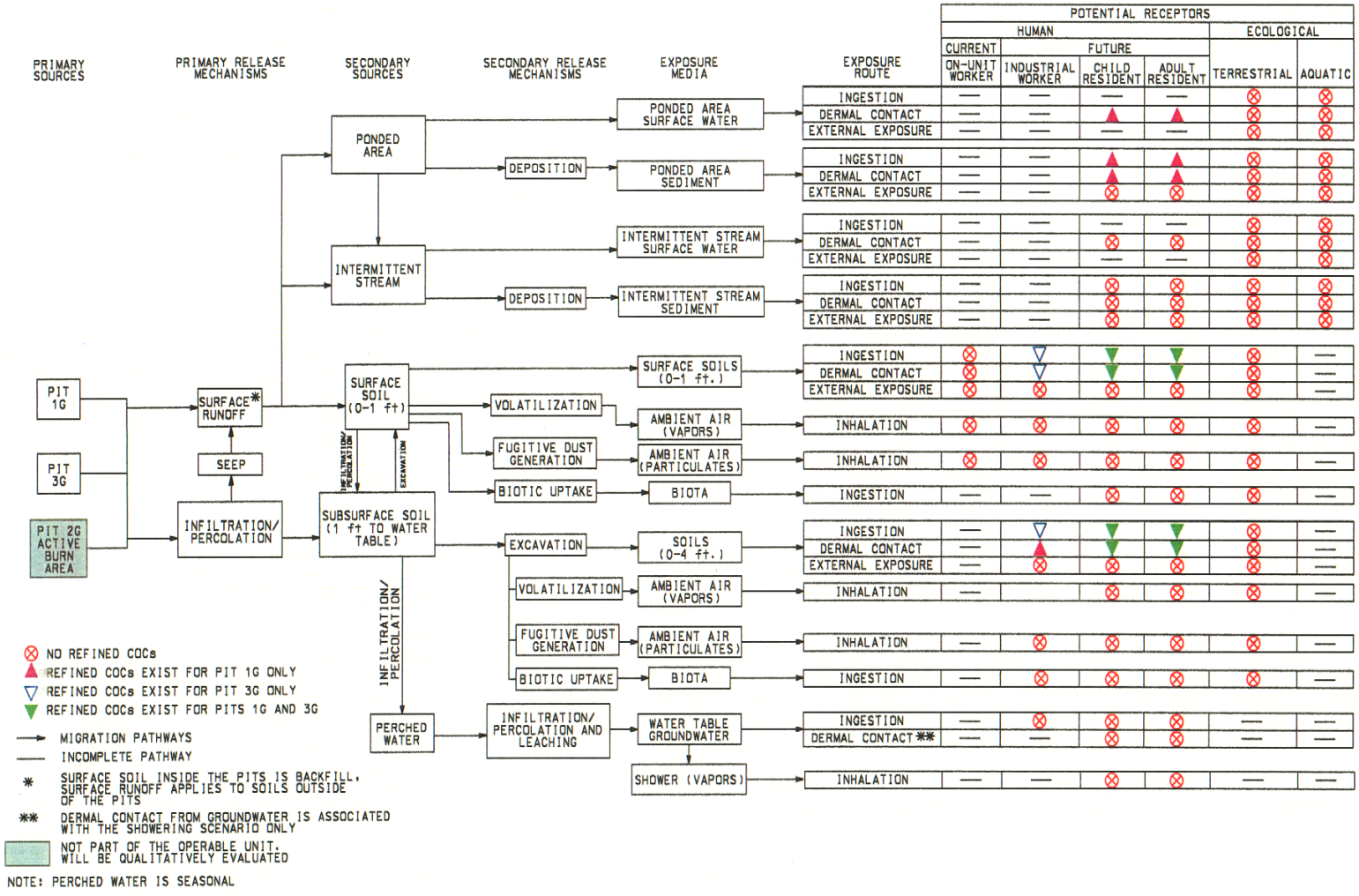


Figure 8. Conceptual Site Model for Pits 631-1G, 631-3G/3GA and Active Burn Area (631-2G)

Primary Release Mechanisms

At Pits 631-1G and 631-3G/3GA, contaminants may have been released from the primary source by three primary release mechanisms:

- Infiltration/percolation
- Surface runoff from soils outside of the pits
- Seeps

Surface soils in the pits are backfilled; therefore, surface runoff from the pits should not contribute to contaminant migration. A ponded area, consisting of a surface water impoundment area in the Active Burning Area (631-2G) and a natural wetland, is located downgradient of Pits 631-1G and 631-3G/3GA (see Figure 3). The surface water impoundment area receives surface water runoff mainly from the active Central Shops Scrap Lumber Pile (631-2G). However, minor surface water runoff from Pits 631-1G and 631-3G/3GA is also retained in the ponded area. Surface water contained within the impoundment area flows into the adjacent wetland.

Precipitation may infiltrate the pits and mix with waste. This leachate may seep to surface water runoff from soils outside of Pit 631-1G and ultimately to the surface soils outside the pit, wetland, and intermittent stream. However, trapped water in Pit 631-3G does not migrate to the surface. There are seeps along the southwest side of Pit 631-3G (see Figure 9). These seeps are a result of interflow that moves along the top of the clay fill cover to low points on the side of the pit.

Infiltration/percolation may also have impacted subsurface soil. During operations, ponded water may have infiltrated/percolated into the subsurface. Because the pits have been backfilled and capped with clayey fill, infiltration of rainwater and surface water has been reduced.

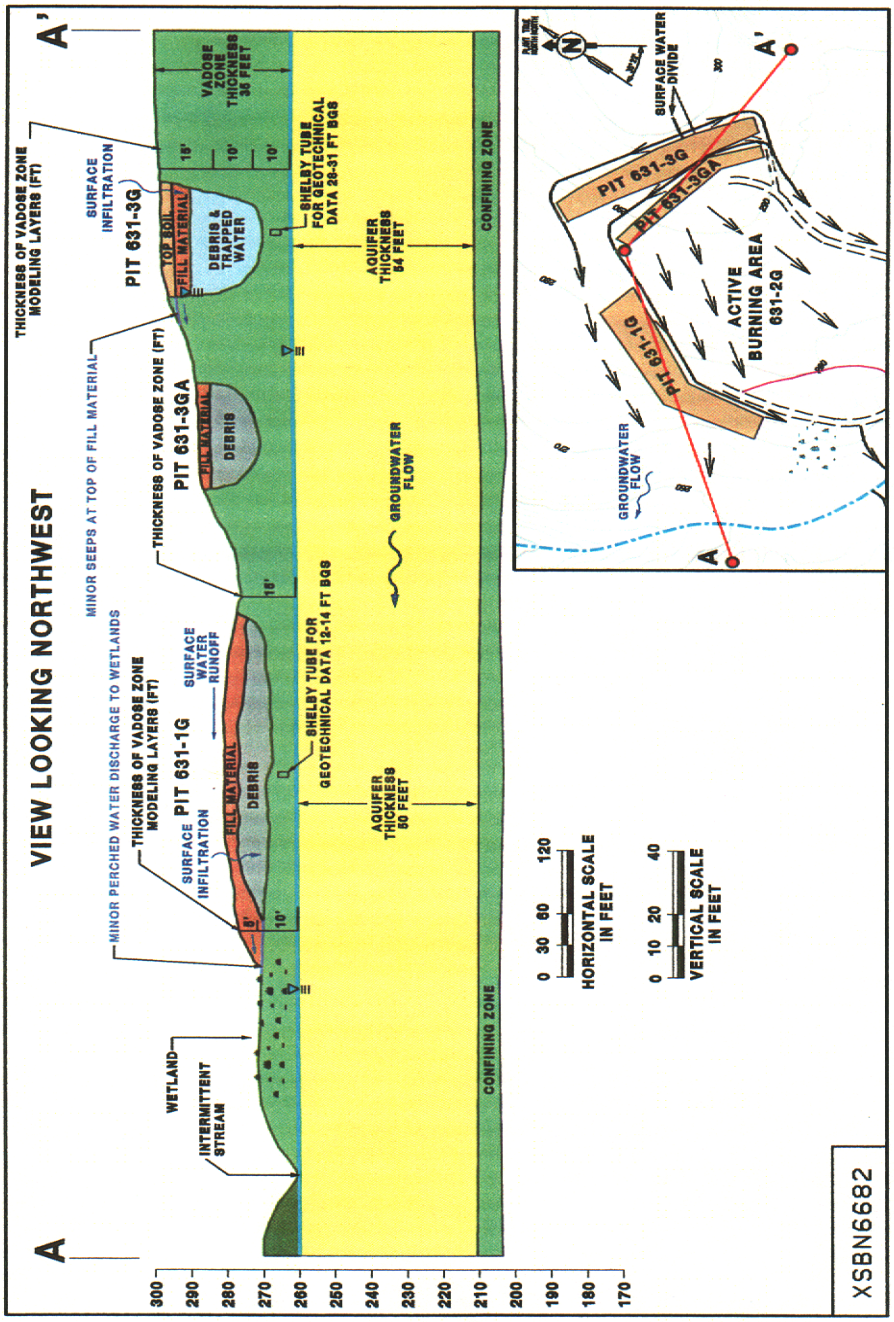


Figure 9. **Contaminant Migration Conceptual Site Model for the CSBRP Operable Unit**

Secondary Sources of Contamination

Environmental media impacted by the release of contamination from the primary sources of contamination become secondary sources. Secondary sources of contamination at Pits 631-1G and 631-3G/3GA potentially include the ponded area, perched or trapped water, the intermittent stream, surface soil, backfill surface soil (0 to 0.3 m [0 to 1 ft]), and subsurface soil (0.3 m [1 ft] to water table). Infiltration/percolation and excavation potentially allow the migration of waste constituents between backfill surface soil and subsurface soil.

Secondary Release Mechanisms

The secondary sources may release contaminants to other media through a variety of secondary release mechanisms. At Pits 631-1G and 631-3G/3GA, secondary release mechanisms include the following:

- Deposition from surface water in the ponded area and intermittent stream to sediment
- Release of volatile constituents from the soil (volatilization)
- Generation of contaminated fugitive dust by wind or other surface soil disturbance
- Biotic uptake from soil
- Excavation of soils 0 to 1.2 m (0 to 4 ft) and subsequent volatilization, fugitive dust generation, and biotic uptake
- Infiltration/percolation and leaching of contaminants from perched or trapped water, subsurface soils, and deep soils to groundwater

The most significant secondary release mechanism affecting the CSBRP OU is expected to be leaching of contaminants to deep soil. Near-surface mechanisms, such as volatilization, dust generation, biotic uptake, and stormwater runoff and erosion, are not likely to be significant secondary release mechanisms because the pit debris was covered with a layer of soil periodically during disposal as well as after disposal activities ceased. Both Pits 631-1G and 631-3G/3GA have been backfilled with clay and covered with low-permeability clay material.

Exposure Media

Contact with contaminated environmental media creates an exposure pathway for both human and ecological receptors. At Pits 631-1G and 631-3G/3GA, the contaminated environmental media include the following:

- Ponded area (surface water and sediment)
- Intermittent stream (surface water and sediment)
- Surface soils (0 to 0.3 m [0 to 1 ft])
- Subsurface soils (0.3 to 1.2m [1 to 4 ft])
- Ambient air (vapors and particulates)
- Biota
- Water table groundwater
- Vapors from showering

Media Assessment

To characterize the CSBRP OU, the OU was divided into four subunits including Pit 631-1G; Pits 631-3G/3GA; Ponded Area (includes surface water impoundment area and

adjacent wetland); and Intermittent Stream as shown in Figures 2 and 3. Additionally, groundwater associated with CSBRP OU was considered as a separate subunit. Activities were performed for characterizing each of the five subunits. The total area characterized was approximately 8 acres. The results of the characterization and the subsequent risk assessments for each of the five subunits have been summarized in the *RCRA Facility Investigation/Remedial Investigation with Baseline Risk Assessment (RFI/RI/BRA) for the Central Shops Burning/Rubble Pits (631-1G and 631-3G) (U), Rev. 1.2* (WSRC 2001a).

History of Site Investigation

The RFI/RI/BRA report (WSRC 2001a) contains the detailed information and analytical data for all the investigations conducted and samples taken in the media assessment of the CSBRP OU. This document is available in the Administrative Record File (see Section III of this document).

The investigations of the CSBRP OU were conducted in several stages. Table 1 summarizes all the environmental activities conducted at the CSBRP OU. The investigations conducted to characterize CSBRP OU soil, sediment, surface water, and groundwater are briefly described in the following sections.

Soil Investigations

For the soil investigations, the activities included the following:

- Background Investigation
  - June and July 1996, two locations; each location was sampled from 0 to 0.3 m (0 to 1 ft) bls, 0.3 to 1.2 m (1 to 4 ft) bls, and 1.8 to 2.7 m (6 to 9 ft) bls
  - January 1999, one location (Ponded Area) for aquatic toxicity testing
  - June 1999, supplemental background sampling, two locations

Table 1. History of Environmental Activities Performed at the Central Shops Burning/Rubble Pits (631-1G and 631-3G)

Investigation Dates	Event/Media Sampled	Location	Sampling
1983-1985	Groundwater Sampling	Monitoring Wells Around Pits	4 Wells, 16 Samples per Sampling Event
October 1990 to November 1991	Soil Gas Survey	Over Pits	83 Samples
1992	GPR Survey	Over Pits	Unknown
Phase I: June and July 1996	Soil Sampling	In and Around Pits	14 Locations, (11 pits, 2 background and 1 Active Burning Area) 78 Samples
	Trapped Water Sampling	Pit 631-3G	2 Samples
Phase IA: March and April 1997	Surface Water Sampling	Streams and Ponded Area	6 Samples
	Sediment Sampling	Streams and Ponded Area	6 Samples
	Seep Water	South of Pit 631-3G	2 Samples
Phase II: October 1997 to June 1998	Soil Sampling	In and Around Pits	32 Locations, 105 Samples
	Monitoring Well Installation	Around Pits	3 Wells
	Soil Coring	At Monitoring Well Locations	5 Coreholes
	Groundwater Sampling	Monitoring Wells Around Pits	7 Wells, 2 Events
	Surface Water Sampling	Streams and Ponded Area	8 Samples
	Sediment Sampling	Streams and Ponded Area	8 Samples
	Trenching	Through Pits	2 Trenches in Each Pit
	Potential PTSM Sludge Sampling	Drum in Pit 631-1G	1 Sample
	GPR Survey	Over Pits	13 Lines
	CPT Groundwater Sampling	Around Pits	40 Pushes, 109 Samples
	CPT Lithologic Logging	Around Pits	12 Lithologic Pushes
January 1999	Aquatic Toxicity Testing	Ponded Area	4 Locations 1 Background Location
Phase II Confirmation: March 1999	Mercury Confirmation Soil Sampling	In Pits	17 Samples
June 1999	Supplemental Background Sampling	Upgradient of Pits	2 Locations

GPR – ground penetrating radar
CPT – cone penetrometer test

- Soil-Gas Survey
  - October 1990 to November 1991, 83 samples over pits
- GPR Surveys
  - 1992, samples unknown
  - October 1997 to June 1998, 13 lines over pits
- Phase I Investigation
  - June and July 1996, 14 locations (including 11 from pits, 2 background and 1 inside Active Burning Area (631-2G)); 78 in the pits. The soil samples were collected from 0.0 to 0.3 m (0 to 1 ft) bls, 0.3 to 1.2 m (1 to 4 ft) bls, 1.8 to 2.7 m (6 to 9 ft) bls, +0.3 to –0.6 m (+1 to –2 ft relative to the base of the pit), and-0.6 to –1.5 m (-2 to –5 ft relative to the base of the pit)
- Phase II Investigation
  - October 1997 to June 1998, 32 locations; 105 samples. Samples were collected from 0 to 0.3 m (0 to 1 ft) bls, 0.3 to 1.2 m (1 to 4 ft) bls, 1.8 to 2.7 m (6 to 9 ft) bls, +0.3 to –0.6 m (+1 to –2 ft relative to the base of the pit), and -0.6 to –1.5 m (-2 to –5 ft) relative to the base of the pit).
- Phase II Confirmation
  - March 1999, 17 samples in pits for mercury confirmation
- Additional Investigations
  - Trenching during the Phase II characterization activities, two trenches in each pit

- Potential principal threat source material (PTSM) sludge sampling, one sample from drum in Pit 631-1G

All the soil samples, including the background samples, were analyzed for the following:

- Target analyte list (TAL) metals
- Target compound list (TCL) volatile organic compounds (VOCs)
- TCL semi-volatile organic compounds (SVOCs)
- Tentatively identified compounds (TICs)
- Polychlorinated biphenyls (PCBs)
- Pesticides
- Radiological constituents

For the radionuclide analyses, speciation was completed in accordance with the *RFI/RI Work Plan Addendum for the Central Shops Burning/Rubble Pits (631-1G, 631-3G and 631-5G) (U), Rev. 1* (WSRC 1997) and *Technical Oversight to Execute RFI/RI Work Plan Phase II for the Central Shops Burning/Rubble Pits (631-1G, 631-3G, and 631-5G (U), Rev. 0* (WSRC 1998).

Surface Water and Sediment Investigation

For the surface water and sediment investigation, the activities included the following:

- Phase IA Investigation
  - March and April 1997, six sediment samples and eight surface water samples (including two seep water samples) collected from eight locations
- Phase II Investigation

- October 1997 to June 1998, eight sediment samples and eight surface water samples from streams and ponded area

All samples were analyzed for TAL metals, TCL VOCs, TCL SVOCs, TICs, PCBs, pesticides, and radiological constituents.

Groundwater Investigation

The groundwater monitoring has been ongoing since 1983. Records from the SRS Groundwater Monitoring Program indicate that each of the four wells in the vicinity of the CSBRP OU have been sampled periodically since 1983. Additional groundwater investigations include the following:

- Phase I Investigation
  - June and July 1996, two trapped water samples in Pit 631-3G
- Phase II Investigation
  - October 1997 to June 1998, three additional wells installed and samples collected from seven wells (four existing wells and the three additional wells)

Geotechnical Investigation

To determine the physical characteristics of the soils in and around the pits, cone penetrometer testing (CPT) was used to advance borings. The soil boring cuttings were analyzed and the information pertaining to the physical characteristics and lithological measurements were logged. Additionally, Shelby tubes were collected immediately below the bottom of each pit (one below Pit 631-1G and two from Pit 631-3G). The lithological information and analytical results from the geotechnical analyses of the Shelby tube samples provided the characteristics to support the fate and transport evaluations.

Assessment Investigation Results

Soil

The COCs associated with the CSBRP OU soils were determined using standard SRS risk assessment protocols for the surface, subsurface, and deep soil exposure groups within and around the pits. CMCOCs were evaluated through contaminant fate and transport analyses using a CSM to assess the potential for adverse health effects to humans and the environment. The CSM for the CSBRP OU is depicted in Figure 8. The Active Burning Area (631-2G) is included in the CSM only to evaluate its relationship with Pits 631-1G and 631-3G/3GA. The CSM for groundwater has not been included since groundwater associated with CSBRP OU is not impacted. The results of the characterization and assessment have been summarized in the RFI/RI/BRA report (WSRC 2001a).

Table 2 summarizes of the process used to determine the refined COCs that have been retained for further remedial evaluation of the CSBRP OU subunits, including Pit 631-1G, Pits 631-3G/3GA, Ponded Area, Intermittent Stream, and groundwater. The process entailed several steps. First, from the detected constituents, the unit-specific constituents (USCs) were identified. USCs were determined by comparing each detected constituent concentration found in the soil against its respective twice-average background concentration for all depth intervals. Second, the USCs were further screened to reflect risk to human health or the environment and thereby determine preliminary COCs. The preliminary COCs, in addition to risk-based COCs, included applicable or relevant and appropriate requirement-(ARAR-) based COCs, CMCOCs, and PTSM. Risk-based COCs (human health and ecological COCs) were determined in accordance with CERCLA guidance and ARAR COCs were determined using RCRA/CERCLA screening values (lead, 400 mg/kg) and Toxic Substance Control Act standards (PCB-1254, 1 mg/kg).

Table 2. Summary of Refined COCs

COCs	Refined ARAR COCs (media)	Refined CMCOCs (media	Refined Human Health COCs (media)	Refined Ecological COCs (media)
Aluminum	No[c,d]	---	No[a]	No[a,b,c,d]
Antimony	---	---	---	No[f]
Aroclor-1242	No[b]	---	---	---
Arsenic	---	---	Yes[d,f], No[a,b,g]	No[f]
Barium	---	---	---	No[d]
Benzo(a)anthracene	---	---	Yes[b]	---
Benzo(a)pyrene	---	---	Yes[a,b]	---
Benzo(b)fluoranthene	---	---	Yes[b]	No[f]
Bis(2-ethylhexyl)phthalate	No[c]	---	---	No[cd]
Cesium-137	---	---	No[ab]	---
Chromium	No[d]	---	---	No[d,f]
Copper	No[d]	---	---	No[a,d,f]
Cyanide	No[c]	---	---	No[c]
Delta-benzene hexachloride	---	---	No[g]	---
Dibenz(a,h)anthracene	---	---	Yes[b]	No[e]
Dieldrin	---	---	---	No[f]
Heptachlor epoxide	---	---	---	No[f]
Indeno(1,2,3-cd)pyrene	---	---	Yes[b]	No[f]
Iron	No[c,d]	---	No[a]	No[c,d]
Lead	No[a,c,d]	---	---	No[c,d]
Manganese	---	---	---	No[c]
Mercury	---	---	---	No[d,f]
p,p'-DDD	---	---	---	No[a]
Potassium-40	---	---	No[a,b]	---
Ruthenium-106	---	---	No[b]	---
Selenium	---	No[b]	---	---
Silver	---	---	---	No[d]
Thorium-228	---	---	No[f]	---
Vanadium	---	---	---	No[a,b,d]
Zinc	No[c]	---	---	No[c]

Notes:
--- = Not a COC in any media
a = Constituent identified as COC in soil at Pit 631-1G
b = Constituent identified as COC in soil at Pit 631-3G
c = Constituent identified as COC in surface water at the intermittent stream
d = Constituent identified as COC in surface water at the ponded area
e = Constituent identified as COC in sediment at the intermittent stream
f = Constituent identified as COC in sediment at the ponded area
g = Constituent identified as COC in groundwater

Finally, all the preliminary COCs were carried into a formal uncertainty analysis, for which the refined COCs were determined. The refined COCs are those constituents for which remediation may be warranted. Soil was the only medium for which refined COCs were identified at the CSBRP OU. One refined COC (arsenic) was identified in surface water and sediment associated with the ponded area. However, the core team agreed to address the ponded area in the Active Burning Area (631-2G) as a subunit when the characterization efforts are initiated for 631-2G. There are no refined COCs for groundwater. No refined ecological COCs are identified for any medium. Hence, the assessment investigation identified refined COCs for soils associated with only two subunits: Pit 631-1G and Pits 631-3G/3GA. The key findings are summarized in the following sections.

Pit 631-1G

Key findings for the Pit 631-1G subunit include the following:

- The results of the characterization have revealed that there is no PTSM, no exceedance of ARARs, no CMCOCs, and no ecological COCs.

- One human health refined COC (benzo(a)pyrene) was observed in the subsurface soil (0.3 to 1.2 m [1 to 4 ft bls]) in and around the pit. However, according to the current protocols for the human health risk management for the future restricted (industrial) land use scenario, the presence of benzo(a)pyrene below a 0.3 m (1 ft) depth does not pose a human health risk to the future industrial worker. Therefore, there are no surficial exposure issues related to Pit 631-1G and based on human health risk determination (total risk 2.1 x 10^{-6}, future industrial worker), the soils at Pit 631-1G do not warrant remedial actions beyond institutional controls to maintain restricted (industrial) land use.

Pits 631-3G/3GA

Key findings for Pits 631-3G/3GA subunit include the following:

- The result of the characterization revealed that there is no PTSM, no exceedance of ARARs, no CMCOCs, and no ecological COCs.
- No human health refined COCs were identified for Pit 631-3GA.
- Five human health refined COCs, including benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, dibenz(a,h)anthracene, indeno(1,2,3-cd)pyrene, were observed in the subsurface soil (0.3 to 1.2 m [1 to 4 ft] bls) and deep soil (>1.2 m [4 ft] bls) in and around Pit 631-3G. These five COCs are also randomly distributed in the backfill soils. However, according to the current protocols for the human health risk management for the future restricted (industrial) land use scenario, the presence of COCs below a 0.3 m (1 ft) depth does not pose a human health threat to the industrial worker. Therefore, there are no surficial exposure issues related to Pits 631-3G/3GA and based on human health risk determination (total risk 3.6×10^{-5}, future industrial worker), the soils at Pits 631-3G/3GA do not warrant remedial action beyond institutional controls to maintain restricted (industrial) land use.

Groundwater

The results of the groundwater analyses have revealed no refined COCs for CSBRP OU groundwater. Therefore, the groundwater will not be included in the institutional controls.

Site-Specific Factors

No site-specific factors affect the preferred remedial action for the CSBRP OU.

Contaminant Transport Analysis

Figure 9 presents the CSM for contaminant migration analysis performed for the CSBRP OU. The analysis of contaminant fate and transport was based on chemical and hydraulic conductivity data which were collected from soil sampling investigations conducted at the CSBRP OU. The analysis was performed to determine the potential for each contaminant migration constituent of potential concern (CMCOPC) to leach to groundwater, to predict the migration data for each CMCOPC, and to project CMCOPC concentrations delivered to a hypothetical well located adjacent to the unit via vadose zone pore water and groundwater. The CMCOPCs were selected from the USCs by a screening process that involved a series of screening steps using conservative simplified assumptions. After CMCOPCs were identified through the soil leachability screening process, they were further evaluated using a more detailed contaminant migration CSM using the SESOIL, a vadose zone contaminant transport model shown in Figure 9. The purpose of the detailed model was to identify any constituents that could migrate from the unit through the vadose zone and impact groundwater above maximum contaminant levels (MCLs) within 1,000 years. MCL is the maximum concentration of a substance allowed in water that is delivered to any user of a public water supply as required by the Safe Drinking Water Act. Based on the modeling results, no CMCOCs are associated with the CSBRP OU. Therefore, the CSBRP OU soils do not pose a migration threat to groundwater.

VI. CURRENT AND POTENTIAL FUTURE SITE AND RESOURCE USES

Land Uses

Current and expected future land uses are discussed in the following paragraphs.

Current Land Use

Currently the CSBRP OU is not in use. Access to the SRS is controlled by USDOE. General public access is prohibited and site access is limited by security personnel and

fences. Once within the SRS boundaries, access to the CSBRP OU is not restricted. Access to the CSBRP OU is by unpaved roads. The nearest area surrounding the unit is Central Shops Area, which is contiguous to the southwest side of the CSBRP OU.

The only potential occasional visitors to the CSBRP OU would be the known on-unit workers who come to the area on an infrequent or occasional basis. The known on-unit workers are defined as SRS employees who work at or in the vicinity of the CSBRP OU under current land use conditions and include, but are not limited to, researchers, environmental samplers, or personnel in close proximity to the unit. However, these receptors, who may be involved in the excavation or collection of contaminated media, would be following the SRS procedures and protocols for sampling at contaminated waste units.

Groundwater near the CSBRP OU is not currently used for consumption by the on-unit workers. The potentially exposed receptor evaluated for the current land use scenario is the known on-unit worker.

Future Land Use

The CSBRP OU is located in an area that has been recommended for future industrial (non-nuclear) use by the SRS Citizens Advisory Board (CAB). According to the *Savannah River Site: Future Use Project Report* (USDOE 1996), residential uses of SRS land should be prohibited. The *Savannah River Site Federal Facility Agreement Implementation Plan* (WSRC 1996) designates the CSBRP OU as being within an industrial use area with buffer. The future-use recommendation in that report is for future industrial, which is essentially unchanged from the current land use. Under restricted (industrial) land use, the most likely human receptors will be industrial workers. Although residential development is unlikely, a hypothetical residential exposure scenario for both adults and children has been evaluated to allow comparison in accordance with USEPA – Region IV guidance (USEPA 1995). However, future use of the land is not likely to change from current use.

Groundwater Uses/Surface Water Uses

SRS does not use the water table (Upper Three Runs Aquifer) for drinking water or irrigation purposes and currently controls any drilling in this area. Therefore, as long as USDOE maintains control of SRS, the aquifer beneath the CSBRP OU will not be used as a potential drinking water source or for irrigation.

The surface water (runoff) is not currently used for irrigation and/or any other beneficial uses; nor will it be used for any such purposes in the future.

VII. SUMMARY OF OPERABLE UNIT RISKS

Baseline Risk Assessment

As a component of the RFI/RI process, a BRA was performed to evaluate risks associated with the CSBRP OU. The BRA included human health and ecological risk assessments. The exposure routes and receptors are discussed below.

Exposure Routes

Exposure routes for human and ecological receptors at the CSBRP OU may include the following:

- Ingestion of contaminated media, including surface soil, subsurface soil, sediment, groundwater, biota, and homegrown produce
- Inhalation of volatile emissions and particulates
- Dermal contact with contaminated media, including surface soil, subsurface soil, sediment, surface water, and groundwater

Receptors (Human and Ecological)

Human and ecological receptors are identified based on physical and operational knowledge of the site and local demographics, as well as known and hypothetical land uses.

Human receptors may include the following:

- Known on-unit workers
- Hypothetical on-unit industrial workers

Since the CSBRP OU is located within the controlled boundaries of SRS, trespassers are not considered to be potential receptors.

The hypothetical on-unit industrial worker 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 in direct proximity to the contaminated media for the majority of the time.

Ecological receptors may include the following:

- Terrestrial ecological receptors (e.g., soil dwelling invertebrates, omnivorous birds, and herbivorous and insectivorous mammals)
- Aquatic and semi-aquatic biota (e.g., benthic invertebrates, amphibians, fish, and top predators that feed on these species)

Summary of CSBRP OU COCs and Risks

Table 3 summarizes the refined COCs for the future industrial workers associated with subsurface soils pertaining to Pit 631-1G and Pits 631-3G/3GA and includes maximum detected concentrations, detection frequencies, and exposure point concentrations at a 95% upper confidence level (UCL).

Table 4 summarizes the cancer toxicity data associated with soils pertaining to CSBRP OU.

Table 5 summarizes the risk to future industrial workers exposed to COCs present in the subsurface soils pertaining to CSBRP OU.

Cancer risks are evaluated using the USEPA target range of 1×10^{-4} to 1×10^{-6} for incremental cancer risk. Risk levels above 1×10^{-4} are generally considered significant. Cancer risks between 1×10^{-4} and 1×10^{-6} are generally considered to represent exposure levels requiring a risk management decision regarding the need for remedial action. Cancer risks less than 1×10^{-6} are considered to be of little concern in terms of evaluating human health risk.

For noncancerous effects, a hazard index (HI) greater than 1 has been defined as the initial level of concern for adverse noncarcinogenic health effects (USEPA 1989), and a HI of 3 has been defined as an additional higher level of concern. For noncarcinogens, these health effects are evaluated for the target organ within a given medium.

Table 3. Summary of Constituents of Concern and Medium-Specific Exposure Point Concentrations for CSBRP OU

Scenario Timeframe: Future
Medium: Subsurface Soil
Exposure Medium: Subsurface Soil
Central Shops Burning/Rubble Pits – Pit 631-1G (0-4')

Exposure Route	Constituent of Concern	Concentration Detected		Units	Frequency of Detection	Exposure Point Concentration	Exposure Point Concentration Units	Statistical Measure
		Min	Max					
Soil Onsite – Direct Contact	Benzo(a) pyrene	0.0102	0.531	mg/kg	7/22	0.525	mg/kg	MAX

Scenario Timeframe: Future
Medium :Subsurface Soil
Exposure Medium :Subsurface Soil
Central Shops Burning/Rubble Pits – Pit 631-3G (0-4')

Exposure Route	Constituent of Concern	Concentration Detected		Units	Frequency of Detection	Exposure Point Concentration	Exposure Point Concentration Units	Statistical Measure
		Min	Max					
Soil Onsite – Direct Contact	Benzo(a) anthracene	0.208	1.60	mg/kg	6/31	1.59	mg/kg	MAX
	Benzo(a)pyrene	0.00825	0.931	mg/kg	12/31	0.928	mg/kg	MAX
	Benzo(b)fluoranthene	0.00573	2.00	mg/kg	11/31	1.97	mg/kg	MAX
	Dibenz(a,h)anthracene	0.0068	0.464	mg/kg	5/31	0.464	mg/kg	MAX
	Indeno(1,2,3-cd)pyrene	0.00687	1.00	mg/kg	11/31	1.00	mg/kg	MAX

Key

MAX: maximum concentration

Table 4. Cancer Toxicity Data Summary for Pit 631-1G and Pits 631-3G/3GA–CSBRP OU

Pathway: Ingestion, Dermal

Constituent of Concern	Oral Cancer *Slope* Factor	Dermal Cancer Slope *Factor*	Slope Factor Units	Weight of Evidence/ *Cancer* Guideline Description	Source	Date (M/D/Y)
Benzo(a)anthracene	0.730	2.35	$(mg/kg)/day^{-1}$	B2	NCEA	4/15/98
Benzo(a)pyrene	7.30	23.5	$(mg/kg)/day^{-1}$	B2	IRIS	7/31/98
Benzo(b)fluoranthene	0.730	2.35	$(mg/kg)/day^{-1}$	B2	NCEA	4/15/98
Dibenz(a,h)anthracene	7.30	23.5	$(mg/kg)/day^{-1}$	B2	IRIS	7/13/98
Indeno(1,2,3-cd)pyrene	0.730	2.35	$(mg/kg)/day^{-1}$	B2	NCEA	4/15/98

Pathway: Inhalation

Constituent of Concern	Unit Risk	Units	Inhalation Cancer Slope Factor	Slope Factor Units	Weight of Evidence/ Cancer Guideline Description	Source	Date (M/D/Y)
Benzo(a)anthracene	N/A	$(ug/m^3)^{-1}$	0.310	$(mg/kg)/day^{-1}$	B2	NCEA	1998
Benzo(a)pyrene	N/A	$(ug/m^3)^{-1}$	3.10	$(mg/kg)/day^{-1}$	B2	IRIS	1998
Benzo(b)fluoranthene	N/A	$(ug/m^3)^{-1}$	0.310	$(mg/kg)/day^{-1}$	B2	NCEA	1998
Dibenz(a,h)anthracene	N/A	$(ug/m^3)^{-1}$	3.10	$(mg/kg)/day^{-1}$	B2	IRIS	1998
Indeno(1,2,3-cd)pyrene	N/A	$(ug/m^3)^{-1}$	0.310	$(mg/kg)/day^{-1}$	B2	NCEA	1998

Key EPA Group
---: No information available
IRIS: Integrated Risk Information System, USEPA
NA: Not Applicable
NCEA: National Center for Environmental Assessment, USEPA

1- Used slope factor for benzo(a)pyrene as surrogate and adjusted using toxicity equivalency factors.
2. Inhalation slope factor of benzo(a)pyrene was taken from NCEA as cited in EPA 1995.
3. Inhalation slope factor of benzo(a)pyrene was used as a surrogate and adjusted with toxic equivalence factors, as specified by EPA Region IV (EPA 1995).

B2- Probable human carcinogen – indicates sufficient evidence in animals and inadequate or no evidence in humans

Table 5. Risk Characterization Summary – Carcinogens for CSBRP OU

Scenario Timeframe: Future
Receptor Population: Industrial Worker
Receptor Age: Adult
Central shops Burning/Rubble Pits – Pit 631-1G (0-4')

Medium	Exposure Medium	Exposure Route	Constituent of Concern	Carcinogenic Risk			
				Ingestion	Inhalation	Dermal	Exposure Routes Total
Subsurface Soil	Subsurface Soil (0-4') at 631-1G	Soil Onsite Direct Contact	Benzo(a)pyrene	6.7×10^{-7}	8.6×10^{-11}	1.4×10^{-6}	2×10^{-6}
							Soil Risk Total = 2.1×10^{-6}

Scenario Timeframe: Future
Receptor Population: Industrial Worker
Receptor Age: Adult
Central shops Burning/Rubble Pits – Pit 631-3G (0-4')

Medium	Exposure Medium	Exposure Route	Constituent of Concern	Carcinogenic Risk			
				Ingestion	Inhalation	Dermal	Exposure Routes Total
Subsurface Soil	Subsurface Soil (0-4') at 631-3G	Soil Onsite Direct Contact	Benzo(a)anthracene	1.8×10^{-6}	6.6×10^{-11}	1.2×10^{-6}	3.0×10^{-6}
			Benzo(a)pyrene	1.1×10^{-5}	3.9×10^{-10}	7.3×10^{-6}	1.8×10^{-5}
			Benzo(b)fluoranthene	2.3×10^{-6}	8.2×10^{-11}	1.5×10^{-6}	3.8×10^{-6}
			Dibenz(a,h)anthracene	5.3×10^{-6}	1.9×10^{-10}	3.6×10^{-6}	8.9×10^{-6}
			Indeno(1,2,3-cd)pyrene	1.1×10^{-6}	4.10×10^{-11}	7.8×10^{-7}	1.9×10^{-6}
							Soil Risk Total = 3.6×10^{-5}

Summary of Human Health Risk Assessment

Based on the existing analytical data, an evaluation was conducted to estimate the human health and environmental problems that could result from the current physical and waste characteristics of the CSBRP OU. The results of the assessment are discussed below.

Pit 631-1G

There are no ARAR COCs at the pit and there is no PTSM. ARAR COCs were determined by comparing the USCs to ARARs including MCLs established for groundwater or drinking water, risk-based concentrations (RBCs) established for soil and sediment, and National Ambient Water Quality Criteria (NAWQC) for surface water for protection of aquatic life.

One human health refined COC, benzo(a)pyrene, was found in the subsurface soil (0.3 to 1.2 m [1 to 4 ft bls]) in and around the pit. However, according to the current protocols for the human health risk management for the future restricted (industrial) land use scenario, the presence of benzo(a)pyrene below 0.3 m (1 ft) depth in soils does not pose a human health risk to the industrial worker. Therefore, there are no surficial exposure issues related to Pit 631-1G, and based on the human health risk determination (total risk 2.1×10^{-6}, future industrial worker) benzo(a)pyrene, is not a problem warranting action beyond institutional controls to maintain restricted (industrial) land use.

Pits 631-3G/3GA

There are no ARAR COCs at the pit and there is no PTSM. ARAR COCs were determined by comparing the USCs to ARARs including MCLs established for groundwater or drinking water, RBCs established for soil and sediment, and NAWQC for surface water for the protection of aquatic life.

No human health refined COCs were identified for Pit 631-3GA.

Five refined human health COCs, including benzo(a)anthracene, benzo(a)pyrene, benzo(f)fluoranthene, dibenz(a,h)anthracene, and indeno(1,2,-cd)pyrene, were observed in the subsurface soil (0.3 to 1.2 m [1 to 4 ft] bls) and deep soil (>1.2 m [4 ft] bls) in and around Pit 631-3G. These five COCs are also randomly distributed in the backfill soils. However, according to current human health risk management for the future restricted (industrial) land use scenario, the presence of COCs below a depth of 0.3 m (1 ft) in soils does not pose a human health threat to the industrial worker. Therefore, there are no surficial exposure issues related to Pits 631-3G/3GA, and based on the human health risk determination (total risk 3.6 x 10^{-5}, future industrial worker) these COCs are not a problem warranting action beyond institutional controls to maintain restricted (industrial) land use.

Summary of Ecological Risk Assessment

The purpose of the ecological risk assessment 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 line-of-evidence approach. The ecological risk assessment has concluded that no refined COCs are associated with the CSBRP OU, and, therefore, the unit poses no risk to the ecological receptors.

Summary of Contaminant Fate and Transport Analysis

The contaminant migration CSM used for the analysis of contaminant fate and transport is presented in Figure 9. The analysis was based on the data collected from soil sampling investigations conducted during Phase I and Phase II (see Table 1). The results of the migration model reveal that the concentrations of constituents detected in the CSBRP OU soils will not exceed their MCLs or RBCs within the 1,000-year modeling period. MCL is the maximum concentration of a substance allowed in water that is delivered to any user of a public water supply as required by the Safe Drinking Water Act. The contaminant migration CSM identified no refined CMCOCs. Therefore, the CSBRP OU soils do not pose a migration threat to groundwater.

The presence of trapped water in Pit 631-3G in contact with the buried waste introduces uncertainty relative to the future potential for migration of contaminants from the pit. While the condition that traps water in this pit will also tend to contain contaminants within the pit, a prudent course of action is to improve stormwater management in the area with the objective of eliminating the trapped water.

Risk Assessment Summary

The risk assessments and contaminant fate and transport analysis establish that the risk associated with the CSBRP OU is negligible and there is no PTSM at the CSBRP OU.

Conclusion

No refined COCs have been identified as a result of the RFI/RI/BRA investigation into any subunit of the CSBRP OU, including groundwater. Hence, no problems warranting action are associated with the CSBRP OU. However, it has been determined that perched/trapped water associated with existing drainage conditions requires mitigation to reduce the uncertainty of future contaminant migration. Therefore, an action is required to maintain restricted (industrial) land use at the CSBRP OU to ensure protection of human health and the environment. Hence, the preferred alternative (institutional controls in conjunction with improved stormwater management) identified in this ROD is necessary to protect public health or welfare and the environment from actual or threatened releases of hazardous substances.

VIII. REMEDIAL ACTION OBJECTIVES AND REMEDIAL GOALS

Remedial action objectives (RAOs) are unit-specific quantitative goals that define the extent of cleanup required to achieve the goal of protecting human health and the environment. The RAOs are based on the nature and extent of contamination, threatened resources, and the potential for human, environmental or ecological exposure, and ARARs. The RAOs are designed to protect human health, environmental resources, and

the ecology (i.e., biota exposure) from unacceptable exposure to COCs and are used as the framework for developing remedial alternatives.

Remedial goals (RGs) are the final acceptable exposure levels that are determined on the basis of the results of the BRA and evaluation of the expected exposures and associated risks for each alternative.

For the CSBRP OU, it has been determined that institutional controls are required to maintain the site for restricted (industrial) land use. Consequently, the only RAO is:

- Maintain restricted (industrial) land use

However, relative to perched/trapped water associated with existing drainage conditions at CSBRP OU, improved stormwater management is needed to prevent stormwater from infiltrating and accumulating at the bottom of the pits and potentially migrating to the adjacent wetland or the groundwater.

The need to set cleanup goals is also dependent on an assumed land use. Since the conditions at CSBRP OU will support industrial usage so long as land use restrictions are at place there is no need to set cleanup goals. Hence, for the CSBRP OU, no RGs have been established.

IX. DESCRIPTION OF ALTERNATIVES

Based on the unit characterization data and risk assessment results, the risk associated with the CSBRP OU is within an acceptable range. Institutional controls are required to maintain restricted (industrial) land use in conjunction with improved stormwater management to prevent any future potential impact on the adjacent wetland and groundwater due to perched/trapped water associated with the CSBRP OU. Therefore, two alternatives, including the No Action alternative, were considered.

- No Action

- Institutional Controls (in conjunction with improved stormwater management)

Remedy Components, Common Elements, and Distinguishing Features of Each Alternative

Alternative 1, No Action

Description of Alternative

This alternative entails leaving the CSBRP OU soils in the current condition with no additional controls.

The No Action alternative is required by the National Oil and Hazardous Substance Pollution Contingency Plan (NCP) to serve as a baseline for comparison with other remediation alternatives. This alternative includes 5-year CERCLA ROD reviews.

Because this remedy will result in hazardous substances, pollutants, or contaminants remaining onsite above levels that allow for unlimited use and unrestricted exposure, a review will be conducted within five years after initiation of remedial action to ensure that the remedy continues to provide adequate protection of human health and the environment.

Cost, Construction Time, and Time to Achieve Remedial Action Objectives

- Total estimated cost: $33,000 (the estimated cost is the present worth cost; the present worth cost was calculated by using a 7% discount rate and projecting the operating and maintenance (O&M) costs for 30 years for cost comparison purposes only)
- Construction time to complete: N/A
- Time to achieve RAO: N/A

Treatment Components and Engineering Controls

- This alternative (No Action) does not include treatment components.

- This alternative does not include engineering controls.

Other Salient Features

Protection of Human Health and Reduction of Risk:

- The No Action alternative would not be protective of human health and the environment.
- There is no reduction of risk except due to natural attenuation and this alternative would not eliminate future routes of exposure.

Administrative and Monitoring Controls:

- Institutional controls are not included in this alternative; however, this alternative includes 5-year CERCLA ROD reviews.
- There are no O&M activities involved in this alternative.

ARARs:

- No chemical-specific ARARs are associated with CSBRP OU. This alternative will comply with action- and location-specific ARARs. For ARARs, refer to Table B-1 (Appendix B).

Long-Term Reliability/Effectiveness:

- The No Action alternative is not effective in the long term.

Reduction of Toxicity, Mobility, or Volume of Waste:

- This alternative does not result in reduction of toxicity, mobility or volume of waste.

Alternative 2, Institutional Controls (in conjunction with improved stormwater management)

Description of Alternative

This alternative will include the following:

- Institutional controls in accordance with the Land Use Control Assurance Plan (LUCAP) for the SRS will be implemented. Controls will include erecting warning signs to mitigate the impact of the ongoing operations at the Active Burning Area (631-2G), periodic field inspections, monitoring perched/trapped water levels at Pits 631-3G/3GA, and 5-year CERCLA ROD reviews.

- Improved stormwater management including:

  - Implementing surface water runoff controls such as reconfiguration of the pit surface areas and the surrounding areas

  - Routing the surface water flow away from the pits to minimize infiltration into Pit 631-1G and Pits 631-3G/3GA

  - Covering the pit surface area with vegetative cover

- Monitoring the effectiveness of the above improvements during periodic site inspections included under institutional controls. Pit 631-1G does not require monitoring since the perched water is temporal and discharges out of the pit to the adjacent wetland at the lower end of the pit as shown in Figure 9. Several pressure measuring transducers will be embedded in Pits 631-3G/3GA and pore pressure will be monitored periodically for changes in the water pressure that will indicate the presence or absence of trapped water. The monitoring will be performed until the trapped water is significantly reduced or eliminated.

- Developing a LUC Implementation Plan (LUCIP). The selected remedy leaves buried waste in place that may come in contact with perched water. Therefore, the Core Team determined that it was appropriate to maintain engineered controls such that perched water would not be in contact with the buried waste. The Core Team also agreed that engineered controls will be necessary to remove the uncertainty for future contaminant migration. Hence, to prevent engineered conditions and ensure restricted (industrial) land use a LUCIP for the CSBRP OU will be developed. The LUCIP will provide details and specific measures required for LUCs selected as a part of this remedy. The USDOE is responsible for implementing, maintaining, monitoring, reporting upon, and enforcing the LUCs selected under this ROD. The LUCIP developed as a part of this action will be submitted concurrently with the Corrective Measures Implementation/Remedial Action Implementation Plan (CMI/RAIP), as required in the FFA for review and approval by USEPA and SCDHEC. Upon final approval, the LUCIP will be appended to the LUCAP and is considered incorporated by reference into the ROD establishing LUC implementation and maintenance requirements enforceable under CERCLA. The LUCIP will remain in effect until modified as needed to be protective of human health and the environment. LUCIP modification will only occur through another CERCLA document.

In the long term, if the property is ever transferred to nonfederal ownership, the U.S. Government will take those actions necessary pursuant to Section 120(h) of CERCLA. Those actions will include a deed notification disclosing former waste management and disposal activities as well as remedial actions taken on the site. The deed notification shall, in perpetuity, notify any potential purchaser that the property has been used for the management and disposal of waste. These requirements are also consistent with the intent of the RCRA deed notification requirements at final closure of a RCRA facility if contamination will remain at the unit.

The deed shall also include deed restrictions precluding residential use of the property. However, the need for these deed restrictions may be reevaluated at the time of transfer in

the event that exposure assumptions differ and/or the residual contamination no longer poses an unacceptable risk under residential use. Any reevaluation of the need for the deed restrictions will be done through an amended ROD with USEPA and SCDHEC review and approval.

In addition, if the site is ever transferred to nonfederal ownership, a survey plat of the CSBRP OU will be prepared, certified by a professional land surveyor, and recorded with the appropriate county recording agency.

Additionally, 5-year CERCLA ROD reviews are included in the remedial action.

The remedial action that is being proposed will meet the previously mentioned RAO.

Since there are no ARARS, the proposed remedial action will help achieve the final anticipated future restricted (industrial) land use.

Cost, Construction Time, and Time to Achieve Remedial Action Objectives

- Total estimated cost: $670,000 (the estimated cost is the present worth cost); for cost estimate refer to Appendix C.
- Construction time to complete: 3 months
- Time to achieve RAO: 3 months

Treatment Components and Engineering Controls

- This alternative (Institutional Controls) does not include treatment components.
- This alternative does not include engineering controls.

Common Elements of this Alternative as Compared to Alternative 1

ARARS:

- No chemical-specific ARARs are associated with CSBRP OU. Like the No Action alternative, this alternative will comply with action- and location-specific ARARS. For ARARs, refer to Table B-1 (Appendix B).

Five-year ROD reviews:

- This alternative also includes 5-year CERCLA ROD reviews.

Reduction of Toxicity, Mobility, or Volume of Waste:

- Like the No Action alternative, this alternative does not result in the reduction of toxicity, mobility, or volume of waste.

Distinguishing Features of this Alternative as Compared to Alternative 1

Protection of Human Health and Reduction of Risk:

- This alternative (Institutional Controls) will be protective of human health and the environment.
- This alternative will reduce risk and will eliminate future routes for human exposure through implementation of institutional controls.

Administrative and Monitoring Controls:

- This alternative includes institutional controls.
- This alternative includes periodic inspections and monitoring.

Long-Term Reliability/Effectiveness:

- This alternative is effective in the long term with land-use restrictions.

The Expected Outcome of Each Alternative

Alternative 1, No Action

- This alternative (No Action) will not be protective of human health and the environment. Under the No Action alternative, no further action will be taken at the unit and the unit will be left in its current condition. This could expose the future industrial workers to the refined COCs present in the subsurface soil and deep soil in the event the soil is excavated.

- The groundwater at the CSBRP OU does not require any remedial action.

Alternative 2, Institutional Controls (in conjunction with improved stormwater management)

- This alternative (Institutional Controls) will eliminate the risk to human health and the environment and will also eliminate the uncertainty associated with future contamination migration.

- The groundwater at the CSBRP OU does not require any remedial action.

X. COMPARATIVE ANALYSIS OF ALTERNATIVES

The proposed action (Alternative 2, Institutional Controls) has been evaluated against the nine USEPA evaluation criteria (see insert box) and compared with the No Action alternative. The nine criteria are categorized into three groups: threshold criteria, primary balancing criteria, and modifying criteria. The threshold criteria must be satisfied in order for an alternative to be eligible for selection. The primary balancing criteria are used to weigh major tradeoffs among the alternatives. Generally, the modifying criteria are taken into account after public comment is received on the SB/PP.

EVALUATION CRITERIA FOR SUPERFUND REMEDIAL ALTERNATIVES
THRESHOLD CRITERIA
Overall Protection of Human Health and the Environment determines whether an alternative eliminates, reduces, or controls threats to public health and the environment through institutional controls, engineering controls, or treatment.
Compliance with ARARs evaluates whether the alternative meets Federal and State environmental statutes, regulations, and other requirements that pertain to the site, or whether a waiver is justified.
BALANCING CRITERIA
Long-Term Effectiveness and Permanence considers the ability of an alternative to maintain protection of human health and the environment over time.
Reduction of Toxicity, Mobility, or Volume of Contaminants through Treatment evaluates an alternative's use of treatment to reduce the harmful effects of principal contaminants, their ability to move in the environment, and the amount of contamination present.
Short-Term Effectiveness considers the length of time needed to implement an alternative and the risks the alternative poses to workers, residents, and the environment during implementation.
Implementability considers the technical and administrative feasibility of implementing the alternative, including factors such as the relative availability of goods and services.
Cost includes estimated capital and annual operations and maintenance costs, as well as present worth cost. Present worth cost is the total cost of an alternative over time in terms of today's dollar value. Cost estimates are expected to be accurate within a range of +50 to –30 percent.
MODIFYING CRITERIA
State/Support Agency Acceptance considers whether the State agrees with the analyses and recommendations, as described in the RI/FS and Proposed Plan.
Community Acceptance considers whether the local community agrees with the analyses and preferred alternative. Comments received on the Proposed Plan are an important indicator of community acceptance.

Threshold Criteria

Overall Protection of Human Health and the Environment

The proposed action (Institutional Controls) protects human health and the environment by reducing the exposure of potentially contaminated soils through institutional controls. The No Action alternative is not protective of human health and the environment. Under the No Action alternative, no further action will be taken at the unit and the unit will be

left in its current condition. This could expose the future industrial workers to the refined COCs present in the subsurface soil and deep soil in the event the soil is excavated.

Compliance with ARARs

No ARARs are associated with this proposed action. The proposed action and No Action alternative meet these criteria equally.

Primary Balancing Criteria

Long-Term Effectiveness and Permanence

The proposed action provides long-term effectiveness since the institutional controls will be implemented for at least 30 years. No Action does not provide any long-term effectiveness or permanence.

Reduction of Toxicity, Mobility, or Volume through Treatment

The proposed action does not provide treatment. The buried wastes at the CSBRP OU do not require treatment. Treatment is not necessary because, based on the conclusions of the RFI/RI/BRA investigation, the levels of the COCs identified in Pit 631-1G and Pits 631-3G/3GA do not pose a threat to groundwater. The threat to human exposure (future industrial workers) can be adequately addressed through land use controls. No action also does not involve treatment. Since no treatment is involved in either alternative, neither alternative reduces toxicity, mobility, or volume.

Short-Term Effectiveness

No action will not expose remedial workers to hazard, as there is no remedial activity being performed.

The proposed action will not present a significant risk to the remedial workers. The remedial workers would perform all work including erecting warning signs and reshaping

the pit surface areas and the surrounding areas in accordance with a health and safety plan that minimizes all risks associated with implementation of the proposed action. Additionally, the threat to human exposure (remedial workers) can be adequately addressed through land use controls.

Implementability

No action is fully implementable as it requires no remedial activity. The proposed action is easily implementable since it involves only institutional controls, including erecting warning signs and compliance with Section 3.8 of the LUCAP.

Cost

The cost for the No Action alternative is $33,000. The present value cost for the proposed action (Institutional Controls in conjunction with improved stormwater management) is $670,000. Details of the cost estimate for the proposed action are included in Appendix C. This cost assumes all initial construction activities will be completed within the first year. Maintenance of the vegetative cover and field inspection of the unit and the surrounding areas were assumed to be required for 30 years (for cost comparison purposes only). Five-year CERCLA ROD reviews for 30 years are also included. The interest rate used for projecting the maintenance and inspection costs to the present value was 7%.

Modifying Criteria

State Acceptance

The approval of the proposed action by SCDHEC constitutes acceptance of the proposed action by the state regulatory agency.

Community Acceptance

The SB/PP public comment period began on February 7, 2002, and ended on March 23, 2002. No public comments were received; therefore, community acceptance of the proposed action has been granted.

XI. THE SELECTED REMEDY

Detailed Description of the Selected Remedy

Based upon the characterization data and risk evaluation contained in the RFI/RI/BRA report (WSRC 2001a), RAOs, and the detailed evaluation of the alternatives, the selected remedy for the CSBRP OU is Alternative 2. Alternative 2 was selected because it is the only alternative that is protective of human health and the environment, mitigates potential migration of any contaminants by routing surface water away from the pits, meets all ARARs, and is cost effective. Removal actions were not considered because there is no discernible source of contamination and the risk posed is relatively low (no PTSM).

The selected remedy consists of institutional controls (in conjunction with improved stormwater management) as discussed in Section IX of this ROD.

The objectives of the institutional controls associated with CSBRP OU are:

- preclude residential use of the area; and
- prevent contact, removal, and excavation of the buried waste in the pits.

These objectives will be achieved by implementing controlled access to the CSBRP OU through SRS site use/site clearance program, installing warning signs, periodic inspection and maintenance; and evaluation of the need for deed notification/restrictions if the property is ever transferred to non-federal ownership.

The selected remedy entails:

- Implement institutional controls in accordance with the LUCAP for SRS. The controls will include erecting warning signs, periodic field inspections, and monitoring perched/trapped water levels at Pits 631-3G/3GA.

- Install improved stormwater management system including:

  - Implementing surface water runoff controls through reconfiguration of the pit surface areas and the surrounding areas.

  - Routing the surface water flow away from the pits to minimize infiltration into Pit 631-1G and Pits 631-3G/3GA.

  - Covering the pit surface areas with vegetative covers.

- Monitor the effectiveness of the above improvements (through embedded water pressure measuring transducers) during periodic site inspections included under institutional controls for Pits 631-3G/3GA.

- Five-year CERCLA ROD reviews.

There is no additional proposed alternative (other than the No Action alternative) for this OU so a comparison was only made between the Institutional Controls alternative and the No Action alternative. The proposed action was selected because it offers the most cost-effective method of managing the low risks associated with the CSBRP OU.

Evaluation using the nine USEPA criteria shows that the proposed action fully meets most of the criteria. The major exception is that it does not provide treatment. However, relative to buried wastes, the CSBRP OU does not need any treatment. Treatment is not necessary because there is no discernible source of contamination and based on the conclusions of the RFI/RI/BRA investigation, the levels of the COCs identified in Pit 631-1G and Pits 631-3G/3GA do not pose a threat to groundwater. The threat to human

exposure (future industrial workers) can be adequately addressed through land use controls.

The USEPA and SCDHEC have concurred with the proposed action.

As negotiated with the USEPA and in accordance with – Region IV Policy (*Assuring Land Use Controls of Federal Facilities*, April 21, 1998), SRS has developed a LUCAP (WSRC 1999) to ensure that land use restrictions are maintained and verified periodically. The unit-specific LUCIP referenced in the ROD will provide details and specific measures required for LUCs selected as a part of this remedy. The USDOE is responsible for implementing, maintaining, monitoring, reporting upon, and enforcing the LUCs selected under this ROD. The LUCIP developed as a part of this action will be submitted concurrently with the Corrective Measures Implementation/Remedial Action Implementation Plan (CMI/RAIP), as required in the FFA for review and approval by USEPA and SCDHEC. Upon final approval, the LUCIP will be appended to the LUCAP and is considered incorporated by reference into the ROD establishing implementation and maintenance requirements enforceable under CERCLA. The LUCIP will remain in effect until modified as needed to be protective of human health and the environment. LUCIP modification will only occur through another CERCLA document.

In the long term, if the property is ever transferred to nonfederal ownership, the U.S. Government will take those actions necessary pursuant to Section 120(h) of CERCLA. Those actions will include a deed notification disclosing former waste management and disposal activities as well as remedial actions taken on the site. The deed notification shall, in perpetuity, notify any potential purchaser that the property has been used for the management and disposal of waste. These requirements are also consistent with the intent of the RCRA deed notification requirements at final closure of a RCRA facility if contamination will remain at the unit.

The deed shall also include deed restrictions precluding residential use of the property. However, the need for these deed restrictions may be reevaluated at the time of transfer in

the event that exposure assumptions differ and/or the residual contamination no longer poses an unacceptable risk under residential use. Any reevaluation of the need for the deed restrictions will be done through an amended ROD with USEPA and SCDHEC review and approval.

In addition, if the site is ever transferred to nonfederal ownership, a survey plat of the OU will be prepared, certified by a professional land surveyor, and recorded with the appropriate county recording agency. The CSBRP OU is located in Barnwell County.

Cost Estimate for the Selected Remedy

The cost estimate for the selected remedy (Alternative 2, Institutional Controls) is provided in Appendix C. The major costs associated with the selected remedial action include construction of temporary facilities, reconfiguration of the surface areas in and around the pits, construction of stormwater drainage channel and installation of monitoring devices (pore pressure measuring transducers), vegetative cover, and warning signs. The major O&M costs are associated with annual inspections and 5-year CERCLA ROD reviews.

The estimated costs are summarized below:

- Total Capital Costs: $575,000
- Total O&M Costs: $ 95,000
- Total Present Worth Cost: $670,000

The total present worth costs are calculated using a 7% discount rate over a 30-year timeframe. The 30-year timeframe was selected for cost comparison purposes only. There is no time limit on the requirement to provide 5-year ROD reviews.

Expected Outcome of the Selected Remedy

The results of the BRA summarized in the RFI/RI/BRA report (WSRC 2001a) indicate that the risk associated with the CSBRP OU is within an acceptable range of 1×10^{-4} to 1×10^{-6} for the risk. . However, the perched/trapped water associated with the existing drainage conditions at the CSBRP OU requires mitigation to reduce the uncertainties of future contaminant migration to the adjacent wetland and the groundwater. The selected remedy (institutional controls in conjunction with improved stormwater management) will eliminate risk to human health and the environment and will also eliminate the uncertainty associated with future contaminant migration.

The groundwater at CSBRP OU is not contaminated; its use is not restricted.

XII. STATUTORY DETERMINATIONS

Based on the unit RFI/RI/BRA report for the CSBRP OU (WSRC 2001a), the CSBRP OU poses risks to human health and the environment within acceptable range. However, the selected remedy, institutional controls in conjunction with improved stormwater management, is required to maintain restricted (industrial) land use and to prevent any future potential impact on the adjacent wetland and the groundwater due to perched/trapped water associated with the CSBRP OU. Therefore, remedial actions, as discussed in Section IX of this ROD, have been identified as the selected remedy for the CSBRP OU.

Section 300.430(f)(ii) of the NCP requires that a 5-year remedy review of the ROD be performed if hazardous substances, pollutants, or contaminants above levels that allow for unlimited use and unrestricted exposure remain in the OU. The three parties, SCDHEC, USEPA, and USDOE, have determined that a 5-year review of the ROD for the CSBRP OU will be performed to ensure that the remedy continues to provide adequate protection of human health and the environment.

Based on information currently available, the proposed action provides the best balance of tradeoffs between the no action and the proposed action with respect to the evaluation criteria. The proposed action satisfies the statutory requirements in CERCLA Section 121(b) to (1) be protective of human health and the environment, (2) comply with ARARs, (3) be cost effective, (4) utilize permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable, and (5) satisfy the preference for treatment as a principal element.

The selected remedy is protective of human health and the environment, complies with federal and state requirements that are applicable or relevant and appropriate to the remedial actions and is cost effective. This remedy, however, does not satisfy the statutory preference for treatment as a principal element of the remedy (i.e., reduce toxicity, mobility, or volume of materials comprising principal threat through treatment) because relative to the buried wastes, no remedial action (beyond the institutional controls to maintain restricted (industrial) land use) is necessary to ensure protection of human health and the environment.

XIII. EXPLANATION OF SIGNIFICANT CHANGES

There were no significant changes made to the ROD based on the comments received during the public comment period for the SB/PP. Comments that were received during the public comment period are addressed in the Responsiveness Summary included in Appendix A of this document.

XIV. RESPONSIVENESS SUMMARY

The Responsiveness Summary is included as Appendix A of this document.

XV. POST-ROD DOCUMENT SCHEDULE AND DESCRIPTION

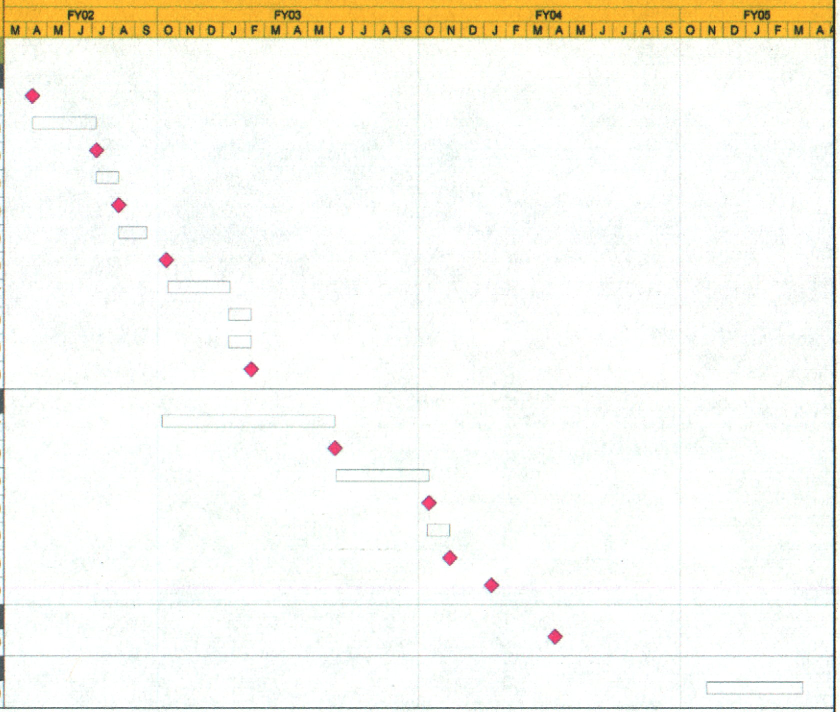
A schedule for the Post-ROD cleanup activities is shown in Figure 10. The schedule for the additional documentation leading to final ROD, post-ROD documentation and the remedial action start date is as follows:

- Submit Rev. 0 ROD, 04/09/02
- Submit Rev. 1 ROD, 08/07/02
- USEPA/SCDHEC approval, 1/10/03
- Submit final signed ROD, 2/9/03
- Corrective Measures Implementation/Remedial Action Implementation Plan (CMI/RAIP) Rev. 0 for the CSBRP OU will be developed and submitted for USEPA/SCDHEC review – 6/6/03
- USEPA/SCDHEC review of Rev. 0 CMI/RAIP – 90 days
- SRS revision of the CMI/RAIP will be completed 30 calendar days after receipt of all regulatory comments. SRS submittal Rev.1 CMI/RAIP – 11/12/03
- USEPA/SCDHEC final review and approval of CMI/RAIP – 12/10/03
- Start implementing the proposed action, 4/10/04.
- Post-Construction Report (PCR), Rev. 0 will be submitted to USEPA/SCDHEC 90 days after completion of the remedial action and a joint walkdown by the regulators.

For more details, refer to Figure 10.

Figure 10. CSBRP OU Implementation Schedule

Activity Description	Early Start	Early Finish	Orig Dur
CA 1210 CENTRAL SHOPS B/R/P (631-1,3)			
LCS 14 - REGULATORY REQUIREMENTS			
SUBMIT REV. 0 ROD		09APR02*	0
EPA/SCDHEC REVIEW OF REV. 0 ROD	10APR02	08JUL02	90
EPA/SCDHEC RETURN REV. 0 ROD COMMENTS		08JUL02*	0
SRS INCORPORATE EPA/SCDHEC COMMENTS - ROD	09JUL02	07AUG02	30
SRS SUBMITTAL OF REV.1 ROD		07AUG02	0
EPA/SCDHEC FINAL REVIEW/APPROVAL REV. 1 ROD	08AUG02	16SEP02	40
REV. 1.1 REDLINE ROD TO REGULATORS	15OCT02*		0
CORE TEAM APPROVE REV REV. 1.1 ROD	16OCT02	10JAN03	87
SRS PREPARE FINAL SIGNED ROD	10JAN03*	08FEB03	30
CLEAN COPY REV. 1.1 ROD	10JAN03	08FEB03	30
SUBMIT FINAL SIGNED ROD		09FEB03	0
LCS 15 - DETAILED ENG & PRECONST ACTIVITIES			
Develop Rev. 0 CMI/RAIP (Post-Rod Document)	07OCT02*	06JUN03	167
SRS Submittal of Rev. 0 CMI/RAIP		06JUN03	0
EPA/SCHDHEC Review of Rev. 0 CMI/RAIP	09JUN03	14OCT03	90
EPA/SCDHEC returns Rev. 0 comments for CMI/RAIP		14OCT03	0
SRS incorporates EPA/SCDHEC comments CMI/RAIP	14OCT03	12NOV03	30
SRS submittal of Rev.1 CMI/RAIP		12NOV03	0
Submit signed CMI/RAIP to EPA/SCDHEC		11JAN04	0
LCS 16 - CONSTRUCTION			
REMEDIAL ACTION (RA) START DATE	10APR04		0
LCS 17 - POST CONSTRUCTION ACTIVITIES			
DEVELOP POST CONSTRUCTION REPORT	08NOV04	21MAR05	90



Start Date	01OCT92	Early Bar	
Finish Date	13JUN27	Progress Bar	
Data Date	05NOV00	Critical Activity	
Run Date	03FEB03 09:06		

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Soil and Groundwater Closure Projects
CA 1210 CENTRAL SHOPS B/R/P (631-1,)
RCRA/CERCLA Implementation Schedule

Date	Revision	Checked	Approved
28JAN03		RNH	SJB

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XVI. REFERENCES

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SCS (Soil Conservation Service) 1990. *Soil Survey of Savannah River Plant Area, Parts of Aiken, Barnwell, and Allendale Counties, South Carolina, U.S. Department of Regulations.*

USDOE, 1994. *Public Involvement, A Plan for the Savannah River Site,* Savannah River Operations Office, Aiken SC

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USEPA, 1995. *Supplemental Guidance to RAGS Region IV Bulletins (Human Health Risk Assessment), Interim Draft,* Office of the Technical Services, United States Environmental Protection Agency, Region IV, Atlanta, GA

WSRC, 1996. *Savannah River Site Federal Facility Agreement Implementation Plan,* WSRC-RP-94-1200, Rev. 0, Westinghouse Savannah River Company, Savannah River Site, Aiken, SC

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WSRC, 1998. *Technical Oversight to Execute RFI/RI Work Plan Phase II for the Central Shops Burning/Rubble Pits, 631-1G, 631-3G, and 631-5G (U),* WSRC-RP-4064, Rev. 0, Westinghouse Savannah River Company, Savannah River Site, Aiken, SC

WSRC, 1999. *Land Use Control Assurance Plan for the Savannah River Site,* WSRC-RP-98-4125, Rev. 1.1, August, Westinghouse Savannah River Company, Savannah River Site, Aiken, SC

WSRC, 2001a. *RCRA Facility Investigation/ Remedial Investigation with Baseline Risk Assessment for the Central Shops Burning/Rubble Pits (631-1G and 631-3G) (U),* WSRC-RP-98-4043, Rev. 1.2, June, Westinghouse Savannah River Company, Savannah River Site, Aiken, SC

WSRC, 2001b. *Statement of Basis/Proposed Plan for the Central Shops Burning/Rubble Pits (CSBRP) operable Unit (631-1G and 631-3G) (U),* WSRC-RP-2001-4097, Rev. 1.1, December, Westinghouse Savannah River Company, Savannah River Site, Aiken, SC

APPENDIX A -
RESPONSIVENESS SUMMARY

Responsiveness Summary

The 45-day public comment period for the *Statement of Basis/Proposed Plan for Central Shops Burning/Rubble Pits (CSBRP) (631-1G and 631-3G) Operable Unit* began on February 7, 2002, and ended on March 23, 2002.

Public Comment

No comments were received from the public.

APPENDIX B -
APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS
(ARARs)

Table B-1. Chemical-, Action-, Location-Specific ARARs – CSBRP OU

Citation(s)	Status	Requirement Summary	Reason for Inclusion	Alternative
Chemical	NONE			
Action				
40 CFR 50.6	Applicable	The concentration of particulate matter (PM_{10}) in ambient air shall not exceed 50 $\mu g/m^3$ (annual arithmetic mean) or 150 $\mu g/m^3$ (24-hour average concentration	Earth-moving activities will generate airborne dust with the potential to exceed the levels specified. Dust suppression will likely be required to minimize dust emissions.	2
SC R.61-9 NPDES Permits	Applicable	Requires notification of intent to discharge storm water from construction associated with industrial activity that will result in a land disturbance of 5 acres or more and/or industrial activities and sets the requirements for the control of storm water discharges.	Potentially applicable if stormwater is discharged during construction activities.	2
SC R.72-300 Standards for Stormwater Management and Sediment Reduction disturbing activities.	Applicable	Stormwater management and sediment control plan for land disturbances	Excavation activities will require an erosion control plan.	2
29 CFR 1910 Occupational Worker Safety (OSHA)	Applicable	Identifies health and safety requirements for remediation workers.	Worker activities involving hazardous materials must be conducted according to a project-specific health and safety plan.	2
SC Pollution/Control Act to Action Specific	Applicable	The act requires protection for the environment during cleanup action.	Excavation activities will require protection of the environment	2
Location				
16 USC 1531	Applicable	The remedial action must be conducted in a manner to conserve endangered or threatened species.	There are threatened and endangered species at the SRS; however, this action will not affect these species.	2
16 USC 661	Applicable	The remedial action must be conducted in a manner to protect fish or wildlife.	This remedial action has no potential to affect wildlife in the vicinity of the CSBRP OU. The action will not affect fish located at the SRS or in nearby bodies of water.	2
16 USC 703	Applicable	The remedial action must be conducted in a manner that minimizes impacts to migratory birds and their habitats.	Migratory bird populations may be present in the vicinity of the SRS. However, this action will not impact the migratory birds and their habitats.	2
Executive Order 11990	Applicable	The remedial action must minimize the destruction, loss, or degradation of wetlands.	Wetlands are located in the vicinity of the SRS; however, they will be unaffected by this action.	2

APPENDIX C -
COST ESTIMATE FOR THE SELECTED REMEDY

Table C-1. Alternative 2 – Institutional Controls

Item	Comments	Quantity	Unit(s)	Unit Cost ($)	Total Cost ($)
Capital Costs					
Direct Capital Costs					
A. Site Work					
• Mobilization/Demobilization		1		LS	30,000
• Prepare Work Plans		1		LS	20,000
• Site surveys		4	Acre	6,000	24,000
• Construct temporary facilities		1		LS	10,000
• Erosion Controls		1,000	LF	8.6	8,600
				Subtotal	92,600
B. Remedial Action					
• Deed restriction/notification		1	LS		2,000
• Surface reconfiguration		4	Acre	6,500	26,000
• Construct stormwater drainage channel		2,000	LF	70	140,000
• Install vegetative cover		3,230	Cy	40	129,200
• Install monitoring devices		6	Each	2,000	12,000
• Equipment decontamination		1	LS		20,000
				Subtotal	329,200
C. Post Remedial Action and Other Miscellaneous					
• Install warning signs		7	Each	200	1,400
• Provide dust suppression during remedial action		1	LS		5,000
• Site restoration		1	LS		5,000
• Post construction survey, safety inspection, etc. and reporting		1	LS		20,000
• Equipment decon and wastewater treatment disposal		1	LS		20,000
				Subtotal	51,400
				TOTAL DIRECT CAPITAL COSTS	**473,200**

Table C-1. Institutional Controls (Continued)

Item	Comments	Quantity	Unit(s)	Unit Cost ($)	Total Cost ($)
Indirect Capital Costs					
• Engineering (includes LUCIP)	30% of construction costs (remedial costs) including 10% contingencies ($329,200)				98,760
			Total Indirect Capital Costs		98,760
			TOTAL CAPITAL COSTS		**571,960**
O&M Costs					
Direct O&M Costs					
• Annual inspection, maintenance and monitoring	Assuming 7% discount rate, factor = 12.41	30 years	Each year	5,000	62,050
• 5-year CERCLA ROD reviews	Assuming 7% discount rate, factor = 2.1578	30 years	Every 5 years	15,000	32,370
			Total Direct O&M Costs		94,420
Indirect O&M Costs					0
			Total Indirect O&M Costs		0
			TOTAL O&M COSTS		**94,420**
Present Worth Costs					
• Total Capital Costs					571,960
• Total O&M Costs					94,420
			TOTAL PRESENT WORTH COST		**666,380**
			Approximately $670,000		

LF – linear feet
LS – lump sum