010203

United States Department of Energy

Savannah River Site

Record of Decision
Remedial Alternative Selection for the L-Area Hot Shop (Including CML-003 Sandblast Area) Operable Unit (U)

WSRC-RP-2002-4025

Revision 1.1

May 2003

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
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Savannah River Operations Office
Aiken, South Carolina

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DECLARATION FOR THE RECORD OF DECISION

Unit Name and Location

L-Area Hot Shop (Including CML-003 Sandblast Area) Operable Unit

Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS) Identification Number: Operable Unit (OU)- 76

Savannah River Site (SRS)

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

Aiken, South Carolina

United States Department of Energy

The L-Area Hot Shop (including CML-003 Sandblast Area) (LAHS) 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 SRS. The FFA is a legally binding agreement between the regulatory agencies (United States Environmental Protection Agency (USEPA) and South Carolina Department of Health and Environmental Control (SCDHEC)) and the regulated entity (SRS) which establishes responsibilities and schedules for the comprehensive remediation of SRS. The LAHS OU consists of soils (hot shop and sand blast area), a concrete pad, inactive drain lines, manholes, and, drainage ditch. The groundwater associated with the unit is not a part of the LAHS OU. The groundwater is considered a separate unit and is being addressed as part of the L-Area Southern Groundwater OU (LASGW OU).

Statement of Basis and Purpose

This decision document presents the selected remedy for the LAHS OU at SRS in Barnwell County near 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 Contingency Plan (NCP). This decision is based on the Administrative Record File for this site.

Assessment of the Site

Historical equipment repairs and decontamination procedures at the site have resulted in a release or a substantial threat of 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 LAHS OU is one of several OUs located in the Steel Creek Watershed. As part of its overall site management strategy, SRS will evaluate all OUs within a watershed to determine whether the unit is impacting surface and subsurface water features within the watershed. SRS will remediate all units serving as a source of contamination within the watershed. Upon completion of the remediation activities, SRS will issue a final comprehensive ROD for the Steel Creek Integrator Operable Unit (IOU).

The LAHS OU is not a source of contamination to groundwater and surface water units within the watershed. It is, however, a source of radionuclide contamination that presents an unacceptable risk to human health and the environment based on industrial usage. The remedial objective for the LAHS OU is twofold: 1) prevent the transfer of radionuclide contamination present in the concrete slab and drainlines by removal and disposal of these sources; and 2) protect future industrial workers against unacceptable exposures by implementing institutional controls.

The selected remedy for the LAHS OU is Alternative 5, Decontamination, Removal (All of the Process Drainlines), Disposal (P-Reactor Seepage Basin #3) and Institutional Controls.

The selected alternative entails the following:

- Decontaminate the concrete slab (former buildings 707-G, 712-G, 717-G, and 080-1G) by removal of the slab.
- Remove the 6-inch grouted inactive drainline (approximately 30 ft coming out of the slab and an unknown length underneath the slab).
- Remove the 2-inch grouted inactive drainline (approximately 30 ft coming out of the slab and an unknown length beneath the slab.
- Cut both drainlines into smaller pieces suitable for transportation and disposal.
- Transport the contaminated concrete debris resulting from removal and the pieces of both drainlines to P-Reactor Seepage Basin #3 for disposal.
- Implement institutional controls via access controls, deed notification, and field walkdown/maintenance to maintain the site for industrial activities and prevent unauthorized access to the unit.

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

The RCRA permit will be revised to reflect selection of the final remedy using the procedures under 40 CFR, Part 270, and SCDHEC equivalent.

Statutory Determinations

The radiological contamination associated with the inactive process drainlines and the concrete slab poses an unacceptable risk to human health and the environment based on an industrial land use scenario. Therefore, a response action is required. The selected remedy for the LAHS OU is Alternative 5 – Decontamination, Removal, Disposal (PRSB #3), and Institutional Controls.

The selected remedy is protective of human health and the environment under the industrial land use scenario, complies with federal and state requirements that are legally applicable or relevant and appropriate to the remedial actions, is cost-effective and utilizes permanent solutions and alternative removal technologies to the maximum extent practicable. The selected remedy also satisfies the statutory preference for treatment as a principal element of the remedy.

Because this remedy may result in hazardous substances, pollutants, or contaminants remaining on-site above levels that allow for unrestricted 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. Section 300.430(f)(ii) of the NCP requires that a five-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.

Data Certification Checklist

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

- Constituents of concern (COCs) and their respective concentrations (see Section V in the Decision Summary)
- Baseline risk represented by the COCs and the basis for the levels (see Section VII in the Decision Summary)
- Cleanup levels established for the COCs (see Section VIII in the Decision Summary)
- Current and future land and groundwater use assumptions used in the Baseline Risk Assessment (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)

- How source materials constituting principal threats are addressed (see Section XI in the Decision Summary).

8/4/03	[signature]
Date	Jeffrey M. Allison Manager U.S. Department of Energy Savannah River Operations Office
9-2-03	[signature]
Date	Winston A. Smith Director Waste Management Division U.S. Environmental Protection Agency - Region IV
Date	R. Lewis Shaw Deputy Commissioner Environmental Quality Control South Carolina Department of Health and Environmental Control

8/4/03	Jeffrey M. Allison
Date	Jeffrey M. Allison Manager U.S. Department of Energy Savannah River Operations Office
Date	Winston A. Smith Director Waste Management Division U.S. Environmental Protection Agency - Region IV
10-21-03	R Lewis Shaw
Date	R. Lewis Shaw Deputy Commissioner Environmental Quality Control South Carolina Department of Health and Environmental Control

DECISION SUMMARY
REMEDIAL ALTERNATIVE SELECTION (U)

L-Area Hot Shop (Including CML-003 Sandblast Area) Operable Unit

WSRC-RP-2002-4025
Rev. 1.1

May 2003

Savannah River Site
Aiken, South Carolina

Prepared By:

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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
CAB	Citizens Advisory Board
CDI	chronic daily intake
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CERCLIS	Comprehensive Environmental Response, Compensation, and Liability Information System
cm^2	square centimeter
CMCOC	contaminant migration constituent of concern
CMCOPC	contaminant migration constituent of potential concern
CMIR	Corrective Measures Implementation Report
CMI/RAIP	Corrective Measures Implementation/Remedial Action Implementation Plan
COC	constituent of concern
COPC	constituent of potential concern
CSM	conceptual site model
D&D	decontamination and decommissioning
dpm	disintegrations per minute
Eco COC	ecological constituent of concern
EDE	effective dose equivalent
FFA	Federal Facility Agreement
FRR	Final Remediation Report
ft	feet or foot
ft^2	square feet
ft^3	cubic feet
HBL	health based limit
HEPA	high-efficiency particulate air (filter)
HHCOC	human health constituent of concern
HI	hazard index
HQ	hazard quotient
HSWA	Hazardous and Solid Waste Amendments
km	kilometer
km^2	square kilometer
LAHS	L-Area Hot Shop
LAOCB	L-Area Oil/Chemical Basin
LASGW	L-Area Southern Groundwater
LS	lump sum
LUCAP	Land Use Controls Assurance Plan
LUCIP	Land Use Controls Implementation Plan

LIST OF ACRONYMS AND ABBREVIATIONS (Continued)

m	meter
m^2	square meter
mi	mile
mi^2	square mile
MCL	maximum contaminant level
mrem	millirem
NCP	National Oil and Hazardous Substances Contingency Plan
NEPA	National Environmental Policy Act
NPL	National Priorities List
NORM	Naturally occurring radioactive material
O&M	operation and maintenance
OU	operable unit
PCE	tetrachloroethene
PCR	Post-Construction Report
PTSM	principal threat source material
QA/QC	Quality Assurance/Quality Control
RAO	remedial action objective
RCO	Radiological Control Operation
RCRA	Resource Conservation and Recovery Act
RD/RA	Remedial Design/Remedial Action
RfD	reference dose
RFI	RCRA Facility Investigation
RFI/RI	RCRA Facility Investigation/Remedial Investigation
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
TBC	to-be-considered
USDOE	United States Department of Energy
USEPA	United States Environmental Protection Agency
WPA	Work Plan Addendum
WSRC	Westinghouse Savannah River Company
yd^2	square yard
yd^3	cubic yard

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

Unit Name, Location, and Brief Description

L-Area Hot Shop (Including CML-003 Sandblast Area) Operable Unit

Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS) Identification Number: Operable Unit (OU)- 76

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 owns SRS, which historically produced tritium, plutonium, and other special nuclear materials for national defense and the space program. Chemical and radioactive wastes are byproducts 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 L-Area Hot Shop (including CML-003 Sandblast Area) (LAHS) OU as a Resource Conservation Recovery Act (RCRA)/CERCLA unit requiring further evaluation. The LAHS OU was evaluated through an investigation process that integrates and combines the RCRA corrective action process with the CERCLA remedial process to determine the actual or potential impact of releases of hazardous substances to human health and the environment.

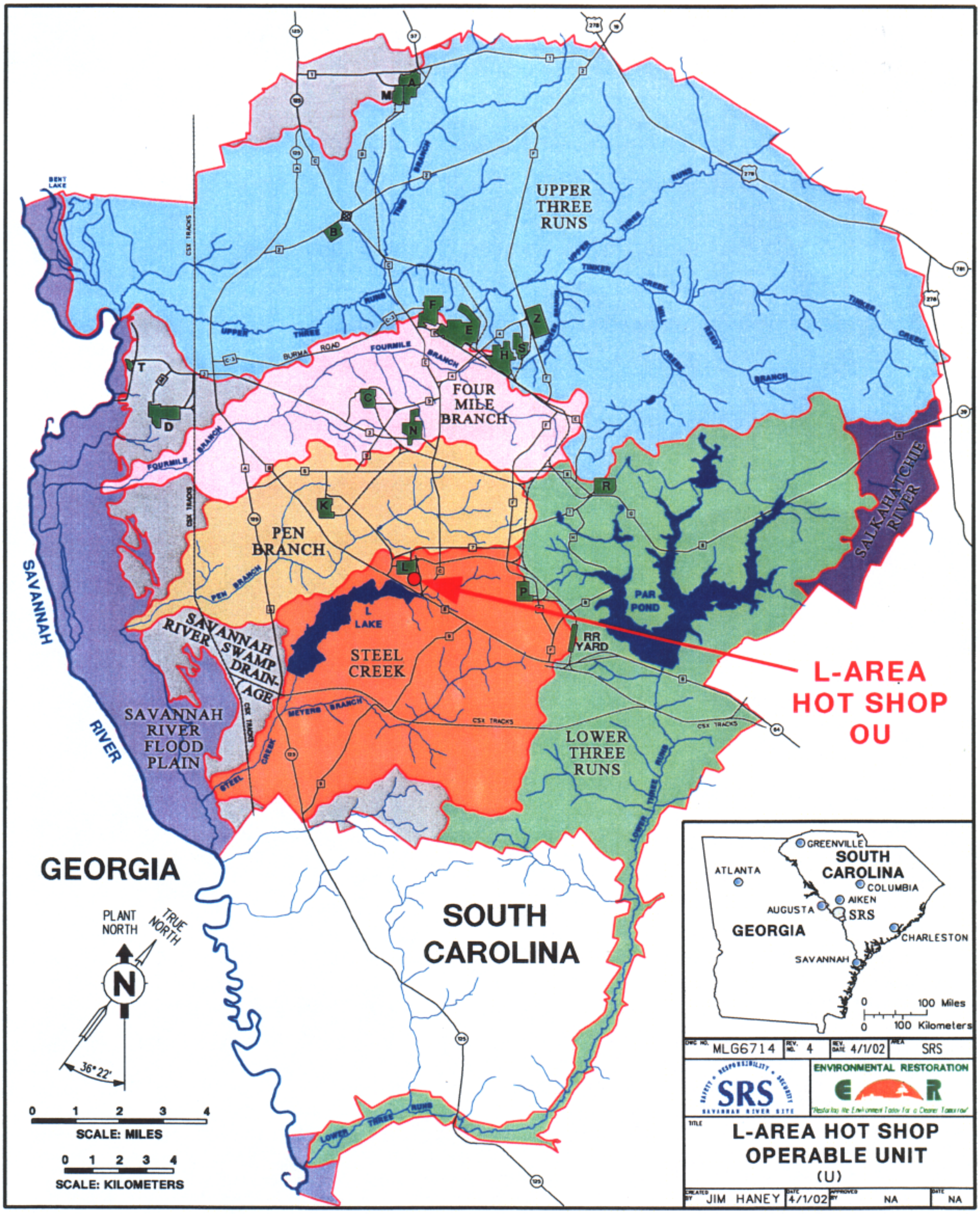


Figure 1. Location of the L-Area Hot Shop Operable Unit at SRS

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 byproducts 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 U.S.C. Section 9620, USDOE has negotiated an FFA (FFA 1993) with United States Environmental Protection Agency (USEPA) and SCDHEC to coordinate remedial activities at SRS as one comprehensive strategy to fulfill 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

L-Area is located in the south-central portion of SRS at the intersection of SRS Roads C and B (Figure 1). L-Area lies north of L-Lake and is separated from it by SRS Road B. The LAHS OU is located at the southeast corner of the L-Reactor Area. The LAHS originally consisted of temporary buildings constructed in the 1950s. During the 1960s, the temporary buildings were removed to make way for three permanent buildings (Buildings 712-G, 717-G, 707-G) and two storage areas (Buildings 080-1G and 080-2G). Building 712-G was used to decontaminate equipment; Building 717-G was used for the repair of equipment. Building 080-1G housed a tool room. Building 080-2G was used for temporary drum storage. Building 707-G was an administration building with a lunchroom, a change room, and a lavatory.

Building 712-G consisted of a concrete pad with two concrete walls and large steel doors at either end. Equipment was brought to the outside door of the pad and suspended from a monorail; it was then moved along the pad via the monorail to a wash area where it was hosed down and decontaminated. The equipment was then carried along the monorail and passed through the second set of doors into Building 717-G, where it was repaired. Repair equipment included welding tables, a lathe, a mill, a radial drill, a drill press, a grinder, a hacksaw, and a sink. The buildings were last used in 1983 and were removed in 1993. Currently, the LAHS consists of the following. (shown in Figure 2):

- a concrete slab with associated drainlines on which three interconnected buildings (Buildings 712-G, 717-G, and 707-G) and a former storage area (Building 080-1G) were constructed.

- a concrete slab (Building 080-2G) outside the eastern perimeter fence used as a temporary drum storage area.

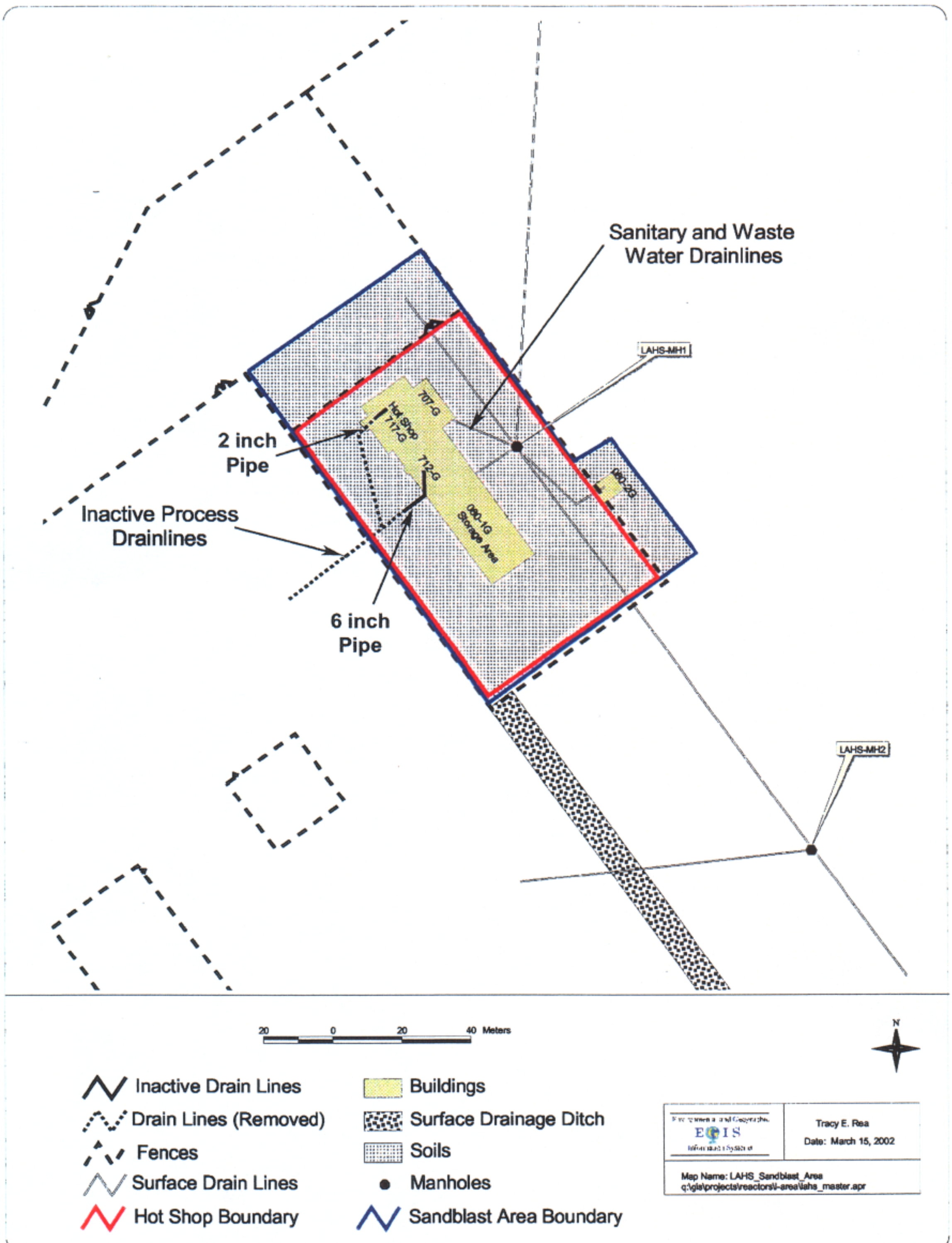


Figure 2. L-Area Hot Shop Operable Unit

- the CML-003 Sandblast Area, reportedly used during operation of L Reactor for sandblasting non-radioactive equipment and metals. LAHS concrete slabs are contained within the footprint of the CML-003 Sandblast Area.

The location is currently vacant except for the concrete pad, which was painted to fix remnant radioactive contamination. The concrete pad is approximately 898 m^2 (9,670 ft^2). Grassy fields surround the concrete pad. A fence controls access to the area containing the concrete slab. The area inside the fence is approximately 5,825 m^2 (62,700 ft^2).

LAHS also includes manholes and piping, as follows:

- Two manholes with associated underground pipelines, one located inside and one outside of the LAHS perimeter fence, (For locations of manholes, see Figure 2) were used for transporting sanitary wastewater.

- Two additional inactive process drainlines, one 6-inch pipe located in the concrete slab/decontamination area (the former Building 712-G) and one 2-inch pipe located in the concrete slab/hot shop (the former Building 717-G) were connected to the L-Area Oil and Chemical Basin (LAOCB).

In 1998, as a part of the LAOCB remedial action and decontamination and decommissioning (D&D), the LAHS process drainlines were grouted and removed up to a cut-off point approximately 3 m (10 ft) from the slab. The 2-inch drainline was removed except for 9.1 m (30 ft) extending out from the slab, as shown in Figure 2 (dotted line). The 6-inch drainline was also completely removed except for 9.1 m (30 ft) of this drainline extending past the edge of the slab. Those portions of the 6-inch drainline and the 2-inch drainline remaining in or beneath the slab are included in the LAHS OU.

Site Characteristics

The LAHS OU is within the Steel Creek watershed (see Figure 1) and is located on the Aiken Plateau at a ground surface elevation of approximately 62.5 m (205 ft) above mean sea level. The ground surface slopes moderately from the LAHS OU at a rate of approximately 4 to 5% towards L-Lake, which is approximately 244 m (800 ft) southwest of the LAHS OU.

Based on 1999 data, the depth to groundwater is approximately 8.5 m (28 ft) below land surface (bls) at the LAHS OU. The groundwater elevations indicate that groundwater flow is to the southwest. The natural water table groundwater discharge is toward L-Lake to the south.

The nearby area south of the LAHS OU is frequently mowed. An ephemeral drainage ditch extends from the south side of the LAHS OU and eventually discharges into L-Lake. The area further south of the LAHS OU is a forest stand of predominantly slash pine with a component of loblolly pine *(Pinus taeda)*. Other understory species include black cherry, southern wax myrtle, water oak *(Quercus nigra)*, yellow jessamine *(Gelsemium sempervirens)*, sweetgum *(Liquidambar styraciflua)*, Japanese honeysuckle *(Lonicera japonica)*, and spotted wintergreen *(Chimaphila maculata)*. Isolated stands of water oaks were noted along the drainage ditch and in moist depressions.

Based on observations made during the unit reconnaissance in March 1999, the nearest wetlands are those associated with L-Lake. It is possible that small segments of the ephemeral drainage ditch exhibit wetland characteristics. However, surface flow along the majority of the drainage ditch is sufficient to minimize the development of these characteristics. The ditch from the LAHS OU channels surface water to L-Lake and is potentially a direct avenue for site-related contamination to reach L-Lake during heavy storm events. During the unit reconnaissance, no evidence was revealed of a recent occurrence of contaminant transport.

Small depressions known as "Carolina bays" are numerous in the SRS area and the surrounding Aiken Plateau. They are found in areas where strata weather to hard, reddish-brown, mottled clayey sand, typical of middle to upper Eocene deposits, where perched water tables are commonly present. Carolina bays may contain water and, therefore, may include wetlands. One hundred ninety-four confirmed or suspected Carolina bays have been identified at SRS. The nearest Carolina bay is Bay 116 located approximately 1,524 m (5,000 ft) northeast of the LAHS OU. It is upgradient from the unit and would not be affected by it.

Numerous species of wildlife have been documented at SRS. Based on observations made during the unit reconnaissance, it is likely that the site provides habitat for birds, small mammals, reptiles, and amphibians. However, there are no aquatic receptors due to incomplete pathways. Evidence of white-tailed deer *(Odocoileus virginiana)*, squirrel *(Sciurus carolinensis)*, dog *(Canis familiaris)*, red fox *(Vulpes vulpes)*, old field mouse *(Peromyscus polionotus)*, eastern harvest mouse (*Reithrodontomys humulis)*, hispid cotton rat *(Sigmodon hispidus)*, cottontail rabbit *(Sylvilagus floridanus)*, short-tailed shrew *(Blarina carolinensis)*, southeastern shrew *(Sorex longirostris)*, Carolina wren *(Thryothorus ludovicianus)*, and American crow *(Corvus brachyrhynchos)* was observed in the vicinity of the LAHS OU during the unit reconnaissance. Many of the plants growing within the unit enclosure produce fruit and seed, which are food sources for birds and mammals.

Amphibians likely to occur near the LAHS OU are Carolina gopher frogs *(Rana areolata capito)*. Reptiles that typically inhabit open fields are likely to occur in the study area as well, including snakes such as the southern back racer *(Coluber constrictor priapus)* and lizards such as the six-lined racerunner *(Cnemidophorus sexlineatus)*.

Federal and/or state-listed endangered animal and plant species at SRS include the red-cockaded woodpecker *(Picoides borealis)*, bald eagle *(haliaeetus leucocephalus)*, golden eagle *(Aquila chrysaetos)*, peregrine falcon *(Falco peregrinus)*, wood stork *(Mycteria* *americana)*, Kirkland's warbler *(Dendroica kirtlandii)*, short-nosed sturgeon *(Acipenser brevirostrum)*, brother spike mussel *(Elliptio fraterna)*, and smooth purple coneflower *(Echinacea laevigata)*; threatened species include American osprey *(pandion haliaetus)* and American alligator *(Alligator mississippiensis)*. According to information obtained from the Savannah River Forest Station (SRFS), a designated bald eagle nesting area is located approximately 1.6 km (1 mile) west of L-Area along Pen Branch and north of Highway 125. This area has been set aside as an area for restricted use and disturbance. Information from the South Carolina Non-Game Heritage Trust classifies the bald eagle as endangered. In May 1993, the SRFS of the United States Forest Service conducted a threatened, endangered, and sensitive (TES) species survey (Jarvis and Irwin 1993). Based on existing information, no other threatened or endangered species are known to exist in the vicinity of the LAHS OU.

There are no wetlands on or near the OU. There are no unusual geographic or topological features associated with the OU that would influence selection of the remedy.

With the exception of the aforementioned drainline removal and grouting associated with the LAOCB remedial action, no removal action or remedial action has been conducted at LAHS 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 LAHS OU. 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 (NEPA), 1969. 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 L-Area Hot Shop (Including CML-003 Sandblast Area) Operable Unit (U)* (WSRC 2002b), a part of the Administrative Record File, highlights key aspects of the investigation and identifies the preferred action for addressing the LAHS 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) (WSRC 2002b) 45-day public comment period began on December 5, 2002, and ended on January 18, 2003. A Responsiveness Summary, prepared to address any comments received during the public comment period, is provided in Appendix A of this Record of Decision (ROD). It will also be available in the final RCRA permit.

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

RCRA/CERCLA Programs at SRS

The FFA integrates the corrective action requirements of RCRA with CERCLA.

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 3 is a flow chart presenting the process logic and documentation.

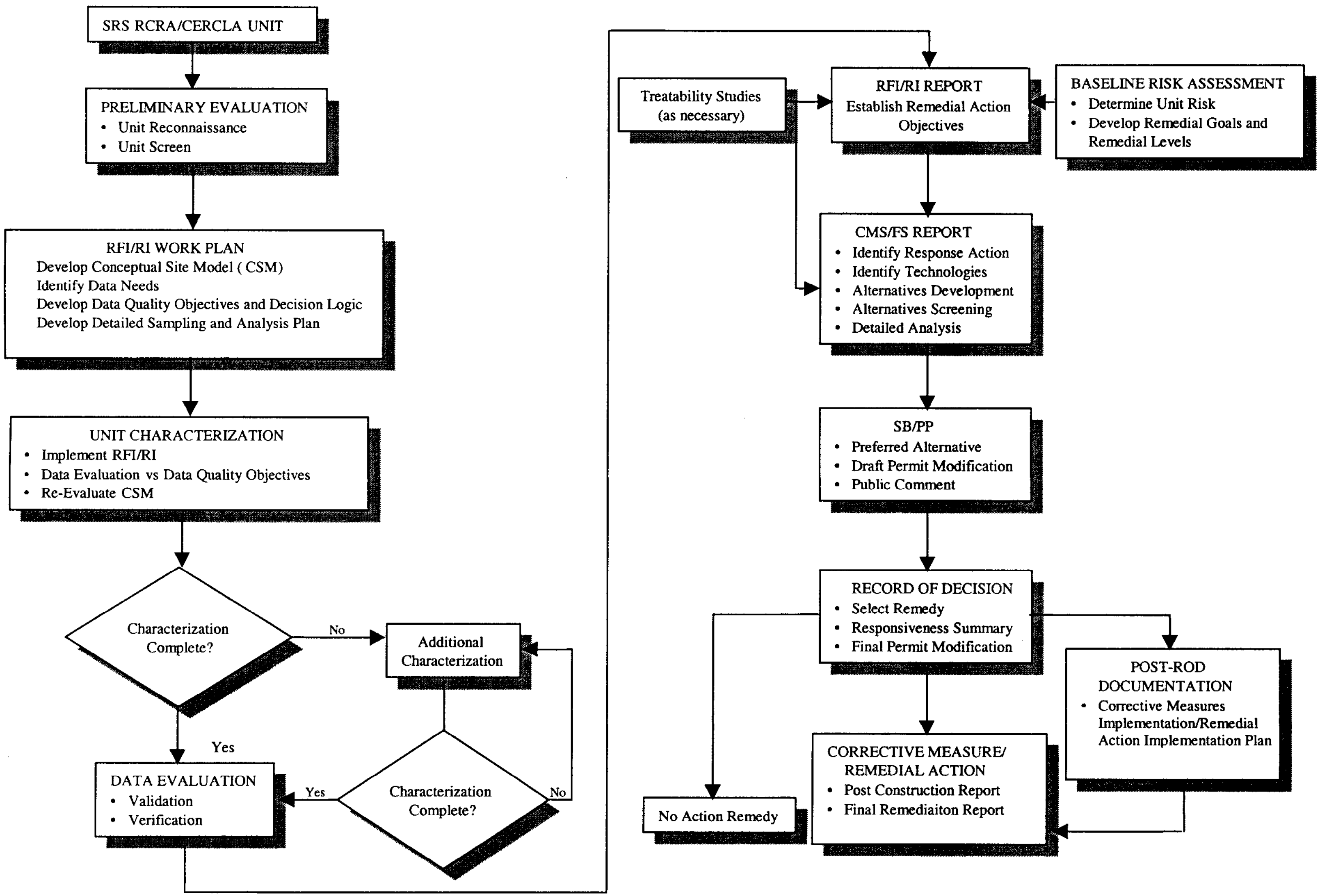


Figure 3. RCRA/CERCLA Logic and Documentation

Operable Unit Remedial Strategy

The overall strategy for addressing the LAHS OU was to (1) characterize the waste unit, delineating the nature and extent of contamination and identifying the media of concern (included in the Work Plan Addendum (WPA) (WSRC 2002a); (2) perform a risk assessment to evaluate media of concern, constituents of concern (COCs), and exposure pathways and to characterize potential risks identified in the WPA; and (3) evaluate and perform a final action to remediate, as needed, the identified media of concern.

The LAHS OU groundwater associated with the LAHS OU is not part of this OU and has been included in the L-Area Southern Groundwater (LASGW) OU.

Radiological contamination is the only type of contamination warranting remedial action at the OU. Radiological contamination is limited to the concrete pad and the piping emerging from the concrete pad. Historical activities at the LAHS OU have not contaminated soils so no remedy is required for unrestricted usage; soils will not act as a source for future contamination of surface water features or groundwater. The soil around the inactive process drainlines may be contaminated from possible leaks and will be addressed by this remedial action. The radiological contamination associated with the inactive process drainlines and the concrete slab is being addressed in this ROD. Therefore, the LAHS OU will have no impact on the response actions of other OUs at SRS.

V. OPERABLE UNIT CHARACTERISTICS

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

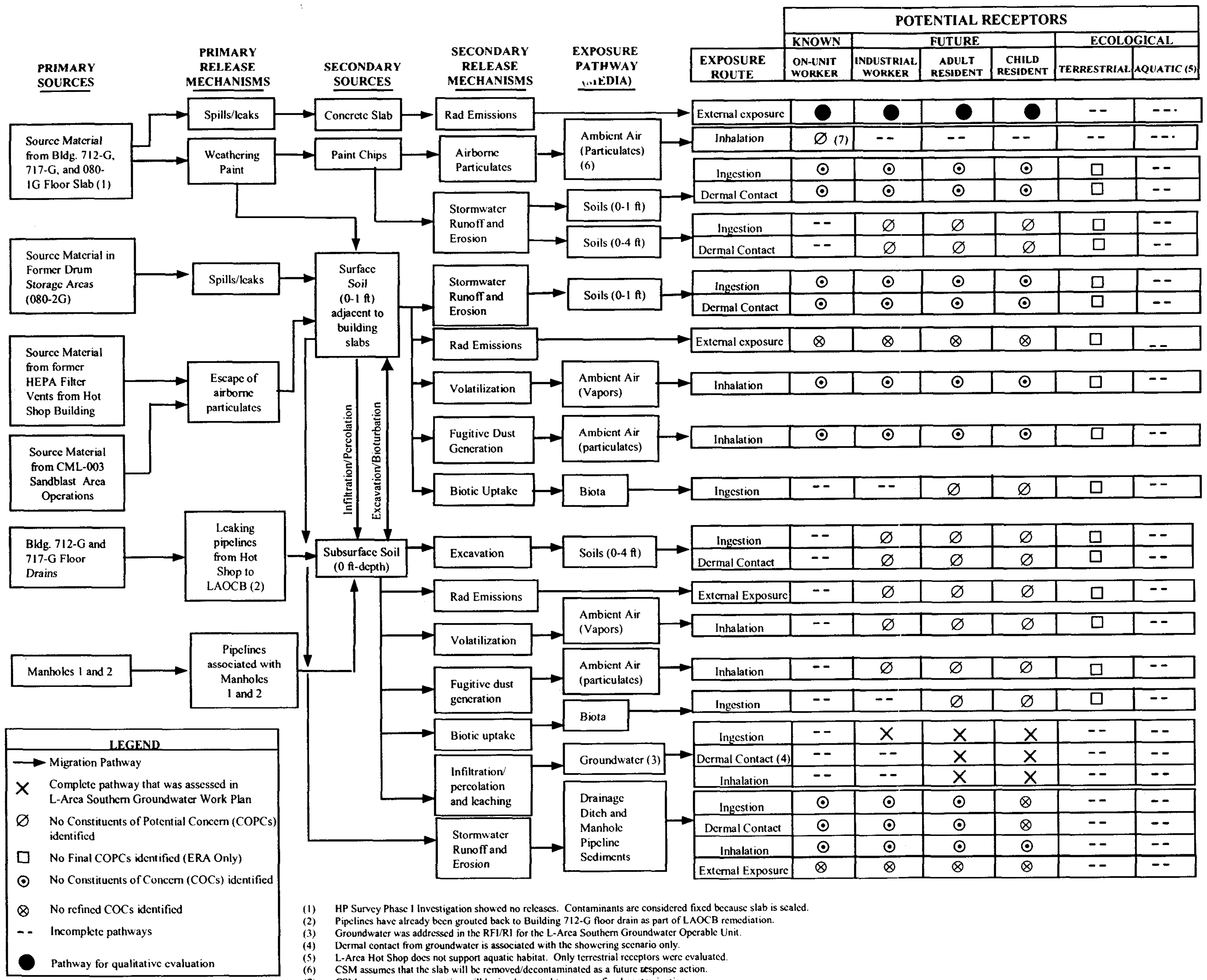
Conceptual Site Model for the LAHS OU

The CSM for the LAHS OU is presented in Figure 4. The exposure routes and the known and potential human and ecological receptors presented in the CSM are discussed in the summary of OU risks in Section VII.

Groundwater associated with the LAHS OU is not a part of the unit so groundwater was not included in the analysis.

Primary Sources of Contamination

The L-Area Hot Shop was primarily used for repairing the equipment brought into the interconnected buildings from the reactor areas. The exact composition of the waste material (primarily radionuclides) is not known; however, radionuclides deposited on the concrete floors of the LAHS buildings and the associated storage facilities and in the drainlines appear to be the primary source material. The field investigations conducted at LAHS OU reveal that the primary sources of potential contamination depicted in Figure 4 include the floor slab in former Buildings 712-G, 717-G, and 080-1G; former Drum Storage Area (080-2G); residue from the former high-efficiency particulate air (HEPA) filter vents from the hot shop buildings, sandblast area (CML-003) operations; the process drainlines connected to former Buildings 712-G and 717-G; and Manholes 1 and 2 (including sanitary drainlines from 707-G) associated with LAHS OU.



(1) HP Survey Phase I Investigation showed no releases. Contaminants are considered fixed because slab is sealed.
(2) Pipelines have already been grouted back to Building 712-G floor drain as part of LAOCB remediation.
(3) Groundwater was addressed in the RFI/RI for the L-Area Southern Groundwater Operable Unit.
(4) Dermal contact from groundwater is associated with the showering scenario only.
(5) L-Area Hot Shop does not support aquatic habitat. Only terrestrial receptors were evaluated.
(6) CSM assumes that the slab will be removed/decontaminated as a future response action.
(7) CSM assumes response action will be implemented to remove fixed contamination.

Figure 4. Revised Conceptual Site Model for the LAHS OU

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Primary Release Mechanisms

The primary contaminant release mechanisms at the LAHS OU include the following:

- spills/leaks
- escape of airborne particulates
- leaking process drainlines from the LAHS OU to the LAOCB OU
- leaking sanitary drainlines associated with Manholes 1 and 2
- weathering of paint used to fix remnant radiological contamination

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 LAHS OU potentially include concrete slab, weathered paint chips, surface soil (0 to 0.3 m [0 to 1 ft]), and subsurface soil (0.3 m [1 ft] to water table).

Secondary Release Mechanisms

The secondary sources may release contaminants to other media through a variety of secondary release mechanisms. At LAHS OU, secondary release mechanisms include the following:

- radiation emissions
- deposition from surface water in the ponded area and intermittent stream to sediment

- airborne particulates
- stormwater runoff and erosion
- 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 subsurface soils to groundwater

The most significant secondary release mechanism affecting the LAHS OU is expected to be radioactive emissions and 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 area surrounding the LAHS OU generally is a grassy area that is frequently mowed.

Exposure Media

Contact with contaminated environmental media creates an exposure pathway for both human and ecological receptors. At LAHS OU, the following exposure media were evaluated:

- concrete slab
- ambient air (particulates)

- ambient air (vapors)
- surface soils (0 to 0.3 m [0 to 1 ft])
- subsurface soils (0.3 m[1ft] to water table)
- biota
- water table groundwater
- drainage ditch and manhole pipeline sediments

Media Assessment

The *RFI/RI Work Plan Addendum-Investigation Results and Risk Assessment for the L-Area Hot Shop (Including the CML-003 Sandblast Area) Operable Unit (U)* (WSRC 2002a) contains the detailed information and analytical data for all the investigations conducted and samples taken in the media assessment of the LAHS OU. This document is available in the Administrative Record File (see Section III of this document).

For the purpose of RI and risk assessment, the LAHS OU components were grouped into five subunits. The subunits are as follows:

- LAHS Soils
- LAHS Inactive Process Drainlines
- LAHS Manholes and Associated Sanitary Drainlines
- LAHS Surface Drainage Ditch

- LAHS Concrete Slab (former location of Buildings 712-G, 717-G, 707-G) and 080-1G

The investigations conducted to characterize LAHS OU subunits are described in the following sections.

Soil Investigation

Detailed results of historical soil sampling performed at the LAHS OU are presented in the LAHS OU Work Plan (WSRC 2001). Soil sampling was conducted in accordance with the LAHS OU Work Plan. During investigations to characterize LAHS OU, 84 soil samples were collected from 26 locations at the LAHS OU. Sample locations were selected based on the tetrachloroethene (PCE) detects from the soil vapor survey. Sample locations are shown in Figure 5.

From June 27 through October 29, 1996, 20 boreholes (LAHSS-1 through -20) were drilled and sampled with hand augers at the LAHS (see Figures 5 and 6). Three boreholes (LAHSS-16, -17, and -18) were drilled to 0.2 m (0.5 ft). Four boreholes (LAHSS-7, -10, -14, and -15) were drilled to 1.2 m (4 ft). One borehole (LAHSS-5) was drilled to 1.8 m (6 ft). Two boreholes (LAHSS-19 and -20) were drilled to 2.1 m (7 ft). Three boreholes (LAHSS-11, -12, and -13) were drilled to 3.0 m (10 ft). Three boreholes (LAHSS-1, and -2, and -3) were drilled to 3.7 m (12 ft) and four boreholes (LAHSS-4, -6, -8, and -9) were drilled to 6.1 m (20 ft).

From June through December 2000, soil samples LHS-SB01 through LHS-SB08, LHS-SB11, LHS-SB12, and LHS-SB23 through 29 were collected around the LAHS concrete slab and former storage areas (see Figure 5). Finally, surface sediment samples were collected from two locations in manholes associated with the LAHS OU (see Figure 6). Both of these sediment-sampling events represent the 0 to 0.3 m (0 to 1 ft) bls interval; however, there was just enough sediment present in each manhole and its associated

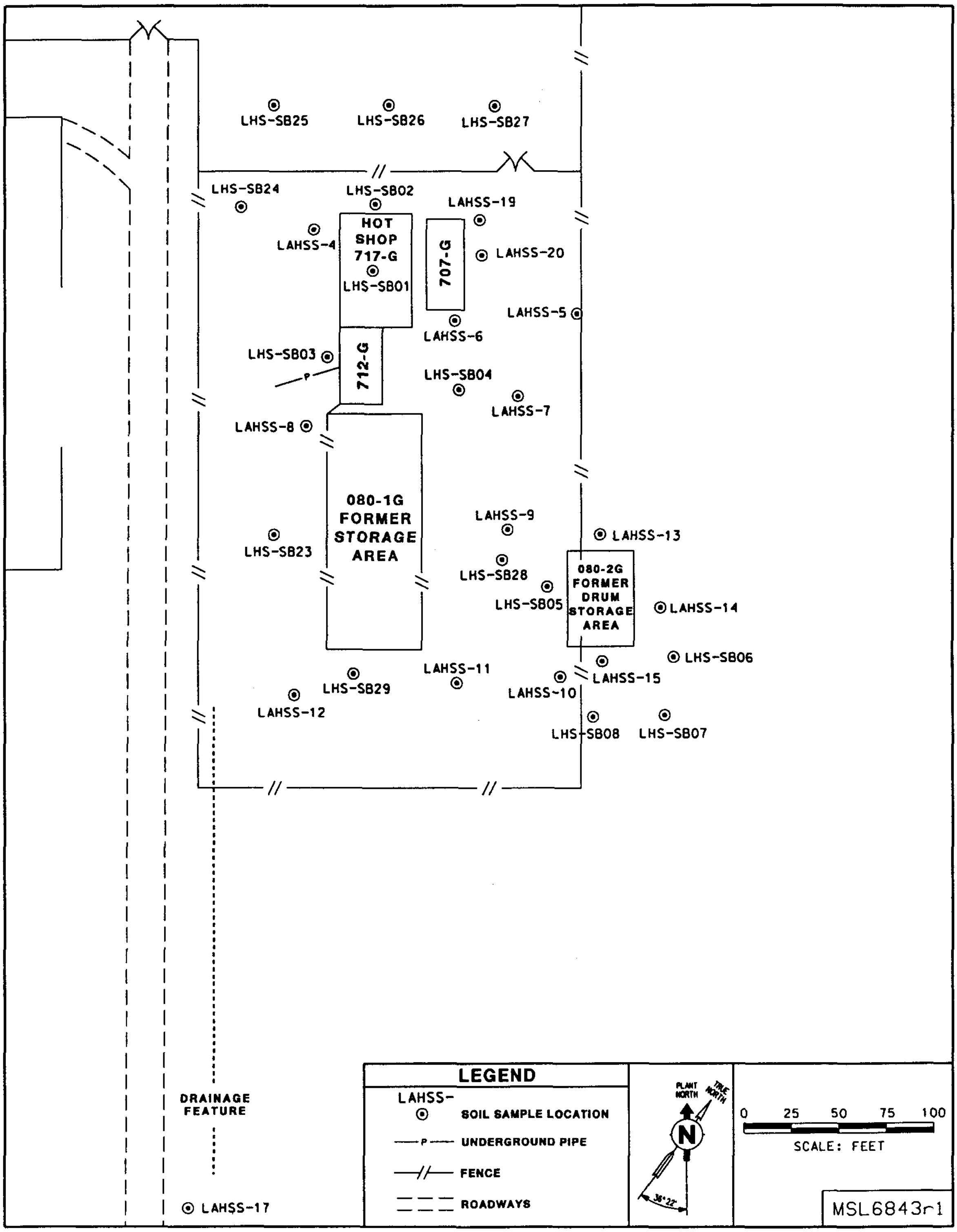


Figure 5. Soil Sampling Locations for the LAHS OU

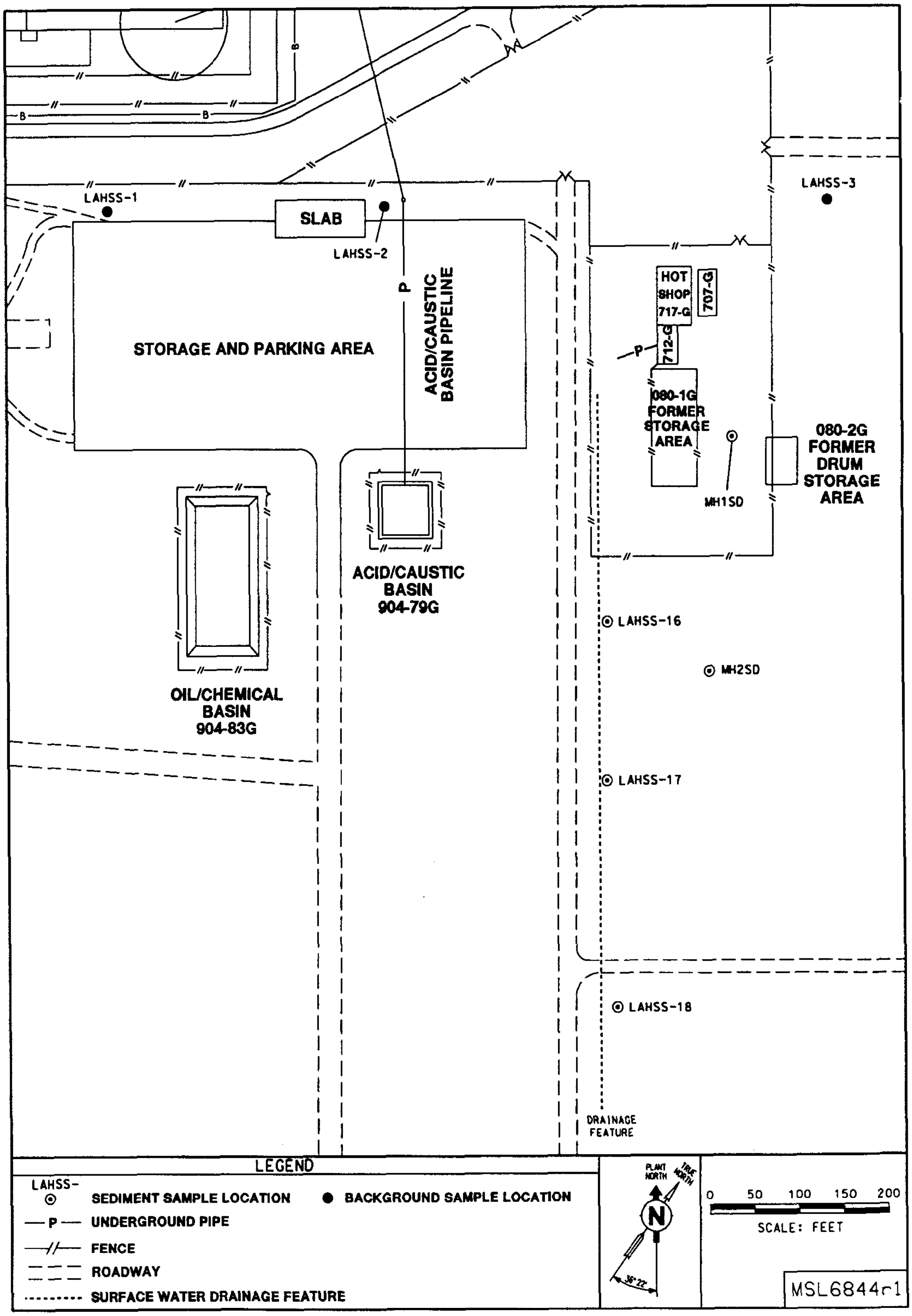


Figure 6. Sediment Sampling Locations for the LAHS OU

drainlines to constitute a sample. All samples (soil and sediment) were analyzed for target analyte list (TAL) inorganics, pesticides/polychlorinated biphenyls (PCBs), radionuclides, target compound list (TCL) semivolatiles, and TCL volatiles.

Additionally, drainage ditch sediment samples were collected from three locations (LAHSS-16, -17, and -18) in the drainage ditch in the LAHS OU (see Figure 6). These additional samples were also analyzed for TAL inorganics, pesticides/PCBs, radionuclides, TCL semivolatiles and TCL volatiles.

Concrete Slab and Drainlines Investigation

The concrete slab is the foundation on which the Hot Shop buildings were constructed and on which the former drum storage area 080-1G was located. Several radiological surveys have been conducted on the slab to identify fixed surface activity. The latest survey, conducted in May 2001, identified fixed beta-gamma surface contamination on the general area at 25,000 disintegrations per minute (dpm)/100 cm^2 with several hot spots containing up to 2.5 million dpm/100 cm^2. No alpha contamination was detected by the surveys. The detection limits for the survey equipment are 20 dpm/100 cm^2 alpha and 200 dpm/100 cm^2 beta-gamma. The measured activity indicates the concrete slab has come into contact with radioactive particles during operations at the LAHS. This contamination was fixed in-place by sealing the concrete slab with paint. The concrete slab was repainted after the first coat of paint began to peel. Because this concrete slab is open to the environment, the weathering of the paint will be a continuing issue.

Groundwater Investigation

Groundwater beneath the LAHS OU was not included in this investigation. The groundwater is being addressed as a part of the LASGW OU.

Media Assessment Results

Soils

The COCs associated with the LAHS OU soils were determined using standard SRS risk assessment protocols for the surface, subsurface, and deep soil exposure groups. Contaminant migration COCs (CMCOCs) were identified through contaminant fate and transport analyses using a CSM to assess the potential for adverse health effects to humans and the environment. The CSM was subsequently revised when additional data became available. The revised CSM is depicted in Figure 4. The CSM for groundwater was not used since groundwater associated with LAHS OU is not a part of the unit. The results of the characterization and assessment have been summarized in the WPA (WSRC 2002a).

Table 1 provides a summary of the process employed in determining the refined COCs to be retained for further remedial evaluation of the LAHS OU. The refined COCs are those constituents for which remediation may be warranted pending a detailed evaluation of the remedial action alternatives.

Based on the results of the WPA (WSRC 2002a), shown in Table 1, no refined COCs are associated with any of the subunits of the LAHS OU. Sampling results reveal that the radiological contamination is limited to the process drainlines and concrete slab surface associated with LAHS OU. Additional key findings are discussed below.

LAHS Soils Subunit

No refined human health constituents of concern (HHCOCs) or final ecological COCs (Eco COCs) are present at the LAHS Soils subunit.

Table 1. Summary of COCs at the LAHS OU

Analyte			CM COC	Human Health COC	Final Ecological COPC	Refined COC
Aluminum				D		
Iron				D		
Vanadium				D		
Bismuth-212				S		
Bismuth-214				S, M		
Cesium-137				S, M		
Cobalt-60				S, M		
Europium-154				S		
Lead-214				S, M		
Potassium-40				S, M		
Radium-226				S, M		
Radium-228				S		
Thallium-208				S, M		
Thorium-228				S, M		

S = soil
D = drainage ditch sediments
M = manhole sediments

Concrete Slab and Drainlines

LAHS Inactive Process Drainlines Subunit

- Elevated levels of radioactivity (300,000 dpm/100 cm^2) exist in the 6-inch grouted drainline, which could corrode with time. The 2-inch grouted drainline is also suspected of containing elevated levels of radioactivity.
- The soil around the inactive process drainlines may be contaminated from possible leaks.

LAHS Manholes and Associated Drainlines Subunit

- HHCOCs were detected but eliminated in the COC refinement process.

LAHS Surface Drainage Ditch Subunit

- HHCOCs were detected but eliminated in the COC refinement process.

LAHS Concrete Slab Subunit

- Radiological survey reports have identified fixed beta/gamma on the surface of the concrete slab. Radioactivity levels of up to 25,000 dpm/100 cm^2, with several hot spots containing radioactivity up to 2.5 million dpm/100 cm^2, have been detected. No alpha contamination was detected during the survey. This radioactivity indicates that the concrete slab came into contact with radioactive particles during operations at the LAHS. These particles may have entered the pores of the concrete matrix and become fixed. The concrete slab has been painted and repainted but weathering of paint re-exposes the contaminants on the surface, thus posing a risk to human health and the environment

Groundwater

L-Area groundwater is considered a separate unit and is not a part of LAHS OU.

Site-Specific Factors

There are no site-specific factors at the OU that require special consideration that might affect the remedial action for the LAHS OU.

Contaminant Transport Analysis

Based on the modeling results, no CMCOCs are associated with the LAHS OU. Therefore, the LAHS OU soils do not pose a migration threat to surface water or 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

The LAHS OU is located in an industrial use area. However, there are currently no ongoing industrial activities.

The potentially exposed receptor evaluated for the current land use scenario is the known on-unit worker who visits 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 LAHS 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 LAHS OU is not used 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 LAHS 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 1996b) designates the LAHS OU as being within an industrial use area with buffer. The report's future-use recommendation is for future industrial, which is essentially unchanged from the current land use. Under 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), which states that residential development cannot be entirely ruled out. However, future use of the land is not likely to change from current use.

VII. SUMMARY OF OPERABLE UNIT RISKS

Baseline Risk Assessment

As a component of the CERCLA process a baseline risk assessment, which included both human health and ecological risk assessments, was performed to evaluate risks associated with the LAHS OU.

Exposure Routes and Receptors

The exposure routes and receptors are discussed in the sections that follow.

Exposure Routes

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

- ingestion of contaminated surface soil or sediment
- inhalation of particulates and vapors
- dermal contact with contaminated surface or sediment
- external radiation from surface soil, sediment, or concrete slab

Human Receptors

Human receptors may include the following:

- known on-unit industrial worker
- hypothetical on-unit industrial worker
- hypothetical on-unit resident (adult and child)

Since the LAHS 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.

The hypothetical on-unit resident exposure scenario evaluates the long-term risks to individuals expected to have unrestricted use of the unit. It assumes that residents live on-unit and are chronically exposed (both indoors and outdoors) to unit-related constituents. The hypothetical on-unit resident includes an adult and a child who are exposed to all the contaminated media. The residential scenario assumes the possible exposure to soil from a depth of 0 to 0.3 m (0 to 1 ft). For all noncarcinogenic exposures to residents, a child and an adult are the receptors that are evaluated. For all carcinogenic exposures to residents, a weighted average child/adult is evaluated. This assumes that a portion of the overall lifetime exposure to carcinogens occurs at a higher level of intensity during the first six years of a child's life.

Ecological Receptors

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 Human Health Risk Assessment

Cancer risks are generally expressed as the incremental probability of an individual developing cancer over a lifetime as a result of exposure to a carcinogen. Excess lifetime cancer risk is calculated from the following equation:

Risk = CDI x SF

where: risk = a unitless probability (e.g., 2×10^{-5}) of an individual developing cancer

CDI = chronic daily intake averaged over 70 years (mg/kg-day)

SF = slope factor, expressed as (mg/kg-day)-1.

These risks are probabilities that usually are expressed in scientific notation (e.g., 1×10^{-6}). An excess lifetime cancer risk of 1×10^{-6} indicates that an individual experiencing the reasonable maximum exposure estimate has a 1 in 1,000,000 chance of developing cancer as a result of site-related exposure. This is referred to as an "excess lifetime cancer risk" because it is in addition to the cancer risks posed to individuals by causes such as smoking or exposure to too much sun. The chance of an individual developing cancer from all other causes has been estimated to be as high as one in three. USEPA's generally acceptable risk range for site-related exposures is 10^{-4} to 10^{-6}.

The potential for noncarcinogenic effects is evaluated by comparing an exposure level over a specified time period (e.g., lifetime) with a reference dose (RfD) derived for a similar exposure period. An RfD represents a level that an individual may be exposed to that is not expected to cause any deleterious effect. The ratio of exposure to toxicity is called a hazard quotient (HQ). An HQ<1 indicates that a receptor's dose of a single contaminant is less than the RfD and that toxic noncarcinogenic effects from that chemical are unlikely. The Hazard Index (HI) is generated by adding the HQs for all COCs that affect the same target organ (e.g., liver) or that act through the same mechanism of action within a medium or across all media to which a given individual may reasonably be exposed. An HI<1 indicates that, toxic noncarcinogenic effects from all contaminants are unlikely based on the sum of all HQs from different contaminants and exposure routes. An HI> 1 indicates that site-related exposures may present a risk to human health.

The HQ is calculated as follows:

Non-cancer HQ = CDI/RfD

where: CDI = Chronic daily intake`

RfD = reference dose

CDI and RfD are expressed in the same units and represent the same exposure period (i.e., chronic, subchronic, or short-term).

Identification of Refined COCs

Based on the results of the risk assessments included in the WPA (WSRC 2002a), no refined COCs have been identified associated with the soil at any of the subunits of the LAHS OU. Groundwater associated with LAHS OU is not a part of LAHS OU since it is being addressed as a part of the LASGW OU. However, radiological surveys conducted in 1993 and 2001, after the three buildings (Buildings 712-G, 717-G, and 707-G) were demolished and removed, identified elevated activities of fixed beta/gamma on the surface of the concrete slab. Therefore, 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 LAHS OU.

Risk Characterization

The results of the risk assessment indicated that the concentrations of all the constituents analyzed were below the USEPA target risk range of 1×10^{-4} to 1×10^{-6} (or HQs less than 0.1 for non-cancer constituents) to the future resident. However, the survey data from the concrete slab has indicated that the slab poses an excess lifetime cancer risk of 2.3×10^{-3} to the future industrial worker, which is outside of USEPA's acceptable risk range. This excess lifetime cancer risk of 2.3×10^{-3} is from a calculated dose of approximately 157 millirem (mrem)/year. Weathering of the concrete may cause leaching of the radiological contamination from the slab to the soil beneath the slab of former Buildings 712-G and 717-G.

Summary of Ecological Risk Assessment

The purpose of the ecological component of the baseline risk assessment is to evaluate the likelihood that adverse ecological effects may occur or are occurring as a result of exposure to unit-related constituents based on a weight-of-evidence approach. The ecological risk assessment has revealed that there are no refined COCs associated with the LAHS OU that pose ecological risk to the ecological environment. Concrete slab and drainlines are not ecological habitats; hence LAHS OU does not pose an unacceptable risk to the ecological receptors.

Summary of Contaminant Fate and Transport Analysis

The CSM used for the analysis of contaminant fate and transport is presented in Figure 4. The analysis was based on the data collected during soil and sediment sampling investigations conducted in 1996 and 2000. The CSM identified no refined CMCOCs for the LAHS OU. Constituents detected in the LAHS OU soils are of such low concentrations that they do not pose a source of groundwater contamination via leaching or other transport mechanism.

Summary of Principal Threat Source Material Evaluation

The purpose of the Principal Threat Source Material (PTSM) evaluation was to determine whether the LAHS OU contains source materials that could pose a significant threat to human health and/or the environment due to highly toxic or mobile properties. A BRA was not performed on the concrete slab. However, the concrete slab and inactive process lines are considered PTSM based on radiological surveys that exceed 157 mrem/year, which equates to an estimated excess lifetime cancer risk of 2.3×10^{-3}. Cs-137 was chosen as the primary COC because of high beta/gamma survey data from the concrete slab and the knowledge that Cs-137 is the most prevalent radionuclide associated with SRS processes.

Conclusion

Based on the results of the RFI/RI WPA (WSRC 2002a), no refined COCs are identified associated with three subunits of the LAHS OU (LAHS Soils, LAHS Manholes and Associated Drainlines, and LAHS Surface Drainage Ditch). Unrestricted land use was assumed for risk calculations and the calculated risk levels were below the USEPA target risk range upper limit of 1×10^{-6}. However, radiological contamination associated with two subunits (LAHS Inactive Process Drainlines and LAHS Concrete Slab) has been identified. A response action is warranted because the estimated cumulative excess carcinogenic risk to an industrial worker is 2.3×10^{-3}, which exceeds the acceptable risk range for current and future land use. Groundwater associated with LAHS OU is not a part of LAHS OU since it is being addressed as a part of the LASGW OU. However, the LAHS Inactive Process Drainlines and LAHS Concrete Slab are considered PTSM. The RFI/RI WPA (WSRC 2002a) has concluded that the sampling conducted at the LAHS OU to date does not allow any determination of the vertical and horizontal contamination within the concrete slab. There may be transferable radiological contamination present on the surface of the concrete slab. Radiological surveys conducted in 1993 and 2001, after the three buildings (Buildings 712-G, 717-G, and 707-G) were demolished, identified fixed beta-gamma contamination above SRS background levels on the concrete slab. The radioactive particles may have entered the pores of the concrete matrix and become fixed. The contamination on the slab surface was fixed in place by sealing the slab with paint. The concrete slab was also repainted after the previous coat of paint began to peel. Since the concrete slab is open to the environment, the weathering of paint may result in the movement of the fixed contamination and hence the weathering of the paint will be a continuing issue.

VIII. REMEDIAL ACTION OBJECTIVES AND REMEDIAL GOALS

The WPA (WSRC 2002a) has concluded that there are no applicable or relevant and appropriate requirements (ARARs) for the LAHS OU. However, a to-be considered (TBC) requirement has been identified based upon the USEPA guidance for establishing protective cleanup levels for radioactive contamination at CERCLA sites (USEPA 1997).

The LAHS Inactive Process Drainlines and the LAHS Concrete Slab potentially contain transferable radiological contamination that poses an unacceptable risk to human health and the environment based on an industrial usage scenario. The estimated human health risk from the radiological contamination for both drainlines remaining in the ground under the slab and the slab itself is an excess lifetime cancer risk of approximately 2.3×10^{-3} based on an industrial usage scenario.

The remedial objective for the LAHS OU is twofold: 1) protect future industrial workers against unacceptable exposures by implementing institutional controls; and 2) prevent the transfer of radionuclide contamination present in the concrete slab and drainlines by removal and disposal of these sources.

IX. DESCRIPTION OF ALTERNATIVES

The following five alternatives evaluated are briefly described in the following paragraphs:

- No Action
- Institutional Controls
- Decontamination, Offsite Disposal of scabbled/removed concrete pad (Non-SRS Disposal), and Institutional Controls
- Decontamination, Removal (Portion of the Process Drainlines), Offsite Disposal of scabbled/removed concrete pad and drainlines (Non-SRS Disposal), and Institutional Controls

- Decontamination, Removal (All of the Process Drainlines), Disposal of concrete pad and drainlines at PRSB #3, and Institutional Controls.

Alternative 1, No Action

Remedy and time for design, for construction, and to achieve remedial goals

This alternative entails leaving the concrete slab and drainlines associated with the LAHS OU in the current condition with no additional controls.

Evaluation of the No Action alternative is required by the (NCP) to serve as a baseline for comparison with other remediation alternatives.

- Time for Design: N/A
- Time for Construction: N/A
- Time to achieve remedial goals: Remedial goals are not achieved.

Cost (Capital and O&M)

- Capital Cost: $0
- O&M Cost: $62,000 (including 5-year remedy review costs)
- Total present worth cost: $62,000 (Present worth cost based on a 3.9% discount rate over 200 years.)

ARARs

- No ARARs are associated with the contamination at the LAHS OU or this particular remedy; however, a TBC requirement has been identified based on USEPA guidance (USEPA 1997). This alternative will not comply with the TBC requirement because it does not address the source of the contamination that poses an unacceptable industrial worker risk.

Whether waste will be removed and disposed of offsite

- No waste removal or disposal.

Expected land use/groundwater use upon achieving remedial goals

- Remedial goals will not be met. Groundwater is not used for any purpose.

Alternative 2, Institutional Controls

Remedy and time for design, for construction, and to achieve remedial goals

Institutional controls will be implemented through administrative and engineering controls to minimize the potential for human exposure by limiting public access to the site and warning the site workers. Administrative controls will consist of access controls (site use/site clearance), signage, deed notification, and field walkdown/maintenance to maintain the site for industrial activities and prevent unauthorized access to the unit. Engineering controls consists of a fence at the SRS boundary to prevent public access to the site.

- Time for Design: N/A

- Time for Construction: 3 months

- Time to achieve remedial goals: 3 months to achieve remedial action objective (RAO) #1

Cost (Capital and O&M)

- Capital Cost: $28,000
- O&M Cost: $133,500 (including 5-year remedy review costs)
- Total present worth cost: $161,500 (Present worth cost based on a 3.9% discount rate over 200 years.)

ARARs

- No ARARs are associated with the contamination at the LAHS OU or this particular remedy; however, a TBC requirement has been identified based on USEPA guidance (USEPA 1997). This alternative will not comply with the TBC requirement because it does not address the source of the contamination that poses an unacceptable industrial worker risk.

Whether waste will be removed and disposed of offsite

- No waste removal or disposal.

Expected land use/groundwater use upon achieving remedial goals

- Expected land use will be industrial after achieving remedial goals. Groundwater is not used for any purpose.

Alternative 3, Decontamination, Offsite Disposal (Non-SRS Disposal), and Institutional Controls

Remedy and time for design, for construction, and to achieve remedial goals

This alternative will entail decontamination of the slab by removal or scabbling the contaminated surface and transporting the contaminated concrete debris resulting from removal or scabbling operations (approximately 2,000 ft^3) to an offsite USEPA-approved disposal facility (Envirocare, Utah).

Institutional controls will be implemented through administrative and engineering controls to minimize the potential for human exposure by limiting public access to the site and warning the site workers. Administrative controls will consist of access controls (site use/site clearance), signage, deed notification, and field walkdown/maintenance to maintain the site for industrial activities and prevent unauthorized access to the unit. Engineering controls consists of a fence at the SRS boundary to prevent public access to the site.

This alternative will achieve the first RAO (RAO #1) through land use controls. However, this alternative will only partially achieve the second RAO (RAO #2) since it will only prevent spread of transferable radionuclide contamination present in the concrete slab. The radionuclide contamination present in both of the inactive process drainlines (6-inch and 2-inch drainlines) will remain at the OU.

- Time for Design: 6 months
- Time for Construction: 4 months
- Time to achieve remedial goals: 4 months to achieve RAO#1

Cost (Capital and O&M)

- Capital Cost: $1,168,000

- O&M Cost: $134,000 (including 5-year remedy review costs)

- Total present worth cost: $1,302,000 (Present worth cost based on a 3.9% discount rate over 200 years.)

ARARs

- No ARARs are associated with the contamination at the LAHS OU or this particular remedy; however, a TBC requirement has been identified based on USEPA guidance (USEPA 1997). This alternative will not comply with the TBC requirement because it does not address the source of the contamination that poses an unacceptable industrial worker risk.

Whether waste will be removed and disposed of offsite

- Concrete debris resulting from the removal or scabbling of the slab and secondary waste will be removed and disposed of offsite.

Expected land use/groundwater use upon achieving remedial goals

- Expected land use will be industrial after achieving remedial goals. Groundwater is not used for any purpose.

Alternative 4, Decontamination, Removal (Portion of the Process Drainlines), Offsite Disposal (Non-SRS Disposal), and Institutional Controls

Remedy and time for design, for construction, and to achieve remedial goals

This alternative will involve decontamination of the slab as described in Alternative 3. However, in this alternative, the 6-inch grouted inactive drainline will be removed in sections. The contaminated concrete debris resulting from removal or scabbling the slab and drainline pieces will be transported to an offsite USEPA-approved disposal facility.

Institutional controls will be implemented through administrative and engineering controls to minimize the potential for human exposure by limiting public access to the site and warning the site workers. Administrative controls will consist of access controls (site use/site clearance), signage, deed notification, and field walkdown/maintenance to maintain the site for industrial activities and prevent unauthorized access to the unit. Engineering controls consists of a fence at the SRS boundary to prevent public access to the site.

This alternative will achieve RAO #1 through land use controls. However, like Alternative 3, this alternative will partially (comparatively more than Alternative 3) achieve RAO #2 since it will prevent spread of transferable radionuclide contamination present in the LAHS OU concrete slab and 6-inch drainline. However, the radionuclide contamination in the 2-inch drainline will still be present at this OU.

- Time for Design: 6 months
- Time for Construction: 6 months
- Time to achieve remedial goals: 6 months to achieve RAO#1 and RAO#2 (partially achieves RAO#2 because a portion of the pipeline will remain in place)

<u>**Cost (Capital and O&M)**</u>

- Capital Cost: $1,248,000
- O&M Cost: $134,000 (including 5-year remedy review costs)
- Total present worth cost: $1,382,000 (Present worth cost based on a 3.9% discount rate over 200 years.)

ARARs

- No ARARs are associated with the contamination at the LAHS OU or this particular remedy; however, a TBC requirement has been identified based on USEPA guidance (USEPA 1997). This alternative will not comply with the TBC requirement because it does not address the source of the contamination that poses an unacceptable industrial worker risk.

Whether waste will be removed and disposed of offsite

- Concrete debris resulting from the removal or scabbling of the slab, excavated drainlines, and secondary waste will be removed and disposed of offsite.

Expected land use/groundwater use upon achieving remedial goals

- Expected land use will be industrial after achieving remedial goals. Groundwater is not used for any purpose.

Alternative 5, Decontamination, Removal (All of the Inactive Process Drainlines), Disposal (P-Reactor Seepage Basin #3), and Institutional Controls

Remedy and time for design, for construction, and to achieve remedial goals

This alternative will involve decontamination of the slab by removal and removal of the 6-inch drainline as described in Alternatives 3 and 4. In this alternative, the 2-inch drainline suspected to be beneath the slab in former Building 717-G will be probed, removed, and cut into small pieces for disposal. The concrete debris resulting from the removal and pieces of both drainlines will be transported to PRSB #3.

Institutional controls will be implemented through administrative and engineering controls to minimize the potential for human exposure by limiting public access to the site and warning the site workers. Administrative controls will consist of access controls (site use/site clearance), signage, deed notification, and field walkdown/maintenance to maintain the site for industrial activities and prevent unauthorized access to the unit. Engineering controls consists of a fence at the SRS boundary to prevent public access to the site.

Once the contaminated portion of the slab and both inactive process drainlines associated with LAHS OU have been removed, both RAOs will be met.

- Time for Design: 6 months
- Time for Construction: 6 months
- Time to achieve remedial goals: 6 months

Cost (Capital and O&M)

- Capital Cost: $971,873
- O&M Cost: $42,970 (including 5-year remedy review costs)
- Total present worth cost: $1,014,843 (Present worth cost based on a 3.9% discount rate over 200 years.)

ARARs

- No ARARs are associated with the contamination at the LAHS OU or this particular remedy; however, a TBC requirement has been identified based on USEPA guidance (USEPA 1997). This alternative satisfies the TBC requirement.

Whether waste will be removed and disposed of offsite

- Concrete debris resulting from the removal or scabbling of the slab, both drainlines, and secondary waste will be removed and disposed of in PRSB #3.

Expected land use/groundwater use upon achieving remedial goals

- Expected land use will be industrial after achieving remedial goals. Groundwater is not used for any purpose.

X. COMPARATIVE ANALYSIS OF ALTERNATIVES

All of the five alternatives have been evaluated against the nine CERCLA evaluation criteria that provide the basis for evaluating the alternatives and selecting a remedy. The nine criteria are categorized into three groups: threshold criteria, primary balancing criteria, and modifying criteria.

The nine criteria are listed below:

- Threshold criteria
  - Overall protection of human health and the environment
  - Compliance with ARARs
- Balancing criteria
  - Long-term effectiveness and permanence
  - Reduction of toxicity, mobility, or volume through treatment
  - Short-term effectiveness
  - Implementability
  - Cost

- Modifying criteria
  - State acceptance
  - Community acceptance

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. (See Table 2 for more detailed description of evaluation criteria.)

Threshold Criteria

Overall Protection of Human Health and the Environment

All alternatives are protective of human health and the environment under the industrial land use scenario except Alternative 1, No Action. Alternative 5 provides complete protection to human health and the environment by removing all of the inactive process drainlines as well as the contaminated portion of the concrete slab. Alternative 4 provides slightly less protection because it removes a portion of the contaminated drainlines. Alternative 3 leaves all of the drainlines in place. Alternative 2 provides institutional controls to help protect human health and the environment; however, it leaves both the contaminated concrete slab and drainlines in place.

Alternative 1 does not provide any protection to human health and the environment. In Alternative 1, no remedial action is taken at the unit and the unit is left in its current condition. This can result in the exposure of future industrial workers to the radioactivity present on the slab surfaces.

Table 2. 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/Feasibility Study (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.

Compliance with ARARs

There are no ARARs associated with the contamination or any of the proposed alternatives for the LAHS OU; however, a TBC requirement has been identified based upon the USEPA guidance (USEPA 1997) Alternative 5 completely achieves the TBC requirement by removing the concrete slab and all of the inactive process drainlines associated with LAHS OU. Alternatives 3 and 4 partially achieve the cleanup level by removing the contaminated concrete slab and a part of the drainlines associated with LAHS OU. Alternatives 1 and 2 do not achieve the cleanup level.

Primary Balancing Criteria

Long-Term Effectiveness and Permanence

In Alternative 5, the concrete slab and the inactive process drainlines are completely removed; therefore, this alternative offers the greatest long-term effectiveness with land use controls and is a permanent solution. In Alternatives 2, 3, and 4, some or all of the contamination is left at the unit; therefore, these are effective only with land use controls. Alternative 1, No Action, is the least effective.

Reduction of Toxicity, Mobility, or Volume through Treatment

In Alternatives 3, 4, and 5, some or all of the contamination is removed from the unit for disposal, thereby indirectly reducing toxicity, mobility, and volume at the unit. In Alternatives 1 and 2, no contamination is removed and the potential for migration exists; therefore, these alternatives do not affect toxicity, mobility, or volume.

Short-Term Effectiveness

Alternatives 1 and 2 do not include any remedial activity in the field; therefore, they provide the highest level of short-term effectiveness in that the remedial workers are not exposed to any additional risk. Alternatives 3, 4, and 5 provide increasing levels of removal that increase the potential for contamination and injury to the remedial workers. However, use of personal protection equipment and strict adherence to SRS procedures will minimize the risk to the remedial workers.

Implementability

Alternative 1 does not involve any action; therefore, implementability is not applicable. Alternative 2 involves only institutional controls; therefore, it is readily implementable. Alternatives 3 and 4 entail transportation and therefore are difficult to implement; however, the volumes of waste are comparatively less than that of Alternative 5. Alternative 5 is the most difficult to implement since it entails transportation of the largest volume of waste.

Cost

The No Action alternative is the least expensive of all the alternatives, followed by Alternative 2. The costs for Alternatives 3, 4, and 5 are higher and are almost equal. Table 3 summarizes the Total Capital, Total O&M, and Total Present Worth Costs for each alternative:

Table 3. Cost Evaluation Criteria for Superfund Remedial Alternatives

	Alternative 1 No Action	Alternative 2 Institutional Controls	Alternative 3 Decon. Slab, Offsite Disposal and IC	Alternative 4 Decon. Slab, Partial Drainline Removal and IC	Alternative 5 Decon. Slab, Drainline Removal and IC
Total Capital Costs	$0	$28,000	$1,168,000	$1,248,000	$971,873
Total O&M Costs	$62,000	$134,000	$134,000	$134,000	$42,970
Total Present Worth Costs*	$62,000	$162,000	$1,302,000	$1,382,000	$1,014,843

***Present worth cost based on a 3.9% discount rate over 200-years**

Modifying Criteria

State Acceptance

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

Community Acceptance

The SB/PP (WSRC 2002b) public comment period began on December 5, 2002, and ended on January 18, 2003. No public comments were received; therefore, community acceptance of the proposed action has been granted (Appendix A).

XI. THE SELECTED REMEDY

Detailed Description of the Selected Remedy

Based upon the RAOs and the detailed evaluation of the alternatives, the selected alternative for the LAHS OU is Alternative 5, Decontamination, Removal and Institutional Controls. This alternative will entail removing both of the contaminated drainlines at former Buildings 712-G and 717-G and the LAHS slab and transporting the contaminated slab waste and drainlines to PRSB #3. The removal of the slab will address RAO #1 (i.e., protect future industrial workers from exposure to radionuclides). Removal of inactive process drainlines from former Buildings 712-G and 717-G will address RAO #2 (i.e., prevent spread of transferable radionuclide contamination present in the drainlines).

Confirmatory sampling will be conducted on the soils surrounding the inactive process drainlines and beneath the concrete pad to validate that soil has not been contaminated. If found, contaminated soil will be removed as part of the remediation.

Institutional controls will be implemented through the first five-year remedy review to confirm that the remedy is protective of human health and the environment. Institutional controls will consist of access controls and site maintenance. Administrative controls (land use restrictions) will be implemented to restrict human exposure to contaminants remaining at the unit. Access controls will include security measures such as installation and maintenance of warning signs to prevent unknowing entry and to ensure that unrestricted use of the waste unit does not occur while under ownership of the government. The signs will be posted on each side of the waste unit in sufficient numbers to be seen from any approach. The signs will be legible from a distance of at least 25 ft. The signs will read:

> "Danger – Unauthorized Personnel Keep Out. This waste unit was used to manage waste materials/hazardous substances (radioactively contaminated construction material). Do not dig or excavate. Do not enter without contacting the waste site custodian."
>
> Custodian: Manager, Post-Closure

Site maintenance will consist of inspections of the OU to verify warning signs are installed and legible. Site maintenance may also include mowing (when applicable). Site maintenance will ensure that site conditions for which the remedial action has been implemented do not change; site maintenance will be performed on a frequency to be determined in the Land Use Controls Implementation Plan (LUCIP).

As negotiated with USEPA, and in accordance with USEPA Region IV, Policy *(Assuring Land Use Controls at Federal Facilities, April 21, 1998),* SRS has developed a LUCAP to ensure that land use restrictions are maintained and periodically verified. The unit-specific LUCIP referenced in this ROD will provide detail and specific measures required for the land use controls selected as part of this remedy. USDOE is responsible for implementing, maintaining, monitoring, reporting upon, and enforcing the land use controls. The LUCIP developed as part of this action will be submitted concurrently with post-ROD documentation, as required in the FFA, for review and approval 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 land use control implementation and maintenance requirements enforceable under CERCLA. The approved LUCIP will establish implementation, monitoring, maintenance, reporting, and enforcement requirements for the unit. 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 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 LAHS OU will be prepared, certified by a professional land surveyor, and recorded with the appropriate county recording agency.

Alternative 5 is selected because it permanently reduces the unacceptable risk associated with the concrete slab and the drainlines under industrial land use, is readily implementable, and provides only a slight short term risk to the remedial workers, which can easily be reduced to acceptable levels through the use of personal protection equipment and strict aunerence to SRS procedures. Alternative 5 is selected over Alternative 4 because it provides additional long-term effectiveness. Based on the characterization data and risk assessment, the uncertainty associated with the extent of the contamination associated with LAHS OU is minimal.

Based on information currently available, the lead agency believes Alternative 5 provides the best balance of tradeoffs among the other alternatives with respect to the evaluation criteria. USDOE expects the Preferred Alternative to satisfy the statutory requirement 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 removal technologies or resource recovery technologies to the maximum extent practicable, and 5) satisfy the preference for treatment as a principal element.

Primary Waste

- Waste generated as a result of removal of the concrete pad will be managed as low-level radioactive waste under CERCLA and disposed of in PRSB, an off-unit but on-site location.

- Waste generated during removal of the grouted pipeline and any associated contaminated soil will be managed as low-level radioactive waste under CERCLA and disposed of in PRSB, an off-unit but on-site location.

The pipeline, to be removed, previously transferred liquid waste from the LAHS to the LAOCB. The pipeline and any associated wastes generated will be managed as low-level radioactive waste under CERCLA.

Secondary Waste

- Since primary waste will be disposed of as non-listed CERCLA low-level waste, all secondary waste generated (metal/wooden shack, PPE, job control waste, silt fencing, etc.) will be managed as CERCLA low-level waste or CERCLA sanitary waste. Low-level secondary waste will be disposed of with the primary waste at the P-Area Reactor Seepage Basin.Potential secondary waste may include PPE used during decontamination, sample returns, etc. CERCLA sanitary waste will be disposed of as appropriate.

Cost Estimate for the Selected Remedy

Estimated costs associated with the selected remedy based on 3.9% discount rate over a 200-year period are summarized below:

- Total Capital Costs: $971,873
- Total O&M Costs: $42,970
- Total Present Worth Cost: $1,014,843

For a detailed cost estimate, refer to Appendix B of this document.

Estimated Outcomes of the Selected Remedy

The selected remedy will permanently remove contamination from the unit. Additionally, the selected remedy includes institutional controls.

XII. STATUTORY DETERMINATIONS

The selected remedy is protective of human health and the environment under the industrial land use scenario, complies with federal and state requirements that are applicable or relevant and appropriate to the remedial actions, and is cost-effective. The

selected remedy also satisfies the statutory preference for treatment as a principal element. The remedy utilizes permanent solutions to the maximum extent practicable.

Section 300.430(f)(ii) of the NCP requires that a 5-year remedy review 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 for the LAHS 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 under the industrial land use scenario, complies with federal and state requirements that are applicable or relevant and appropriate to the remedial actions, and is cost-effective. The selected remedy also satisfies the statutory preference for treatment as a principal element.

XIII. EXPLANATION OF SIGNIFICANT CHANGES

No significant changes were made to the ROD based on the comments received during the public comment period for the SB/PP. Cost estimates were revised from the proposed plan to reflect a 3.9% discount rate in the percent worth calculations. Scabbling was eliminated as a technology for decontamination. P-Reactor Seepage Basin #3 was identified as the waste disposal site. 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 provided in Appendix A of this document.

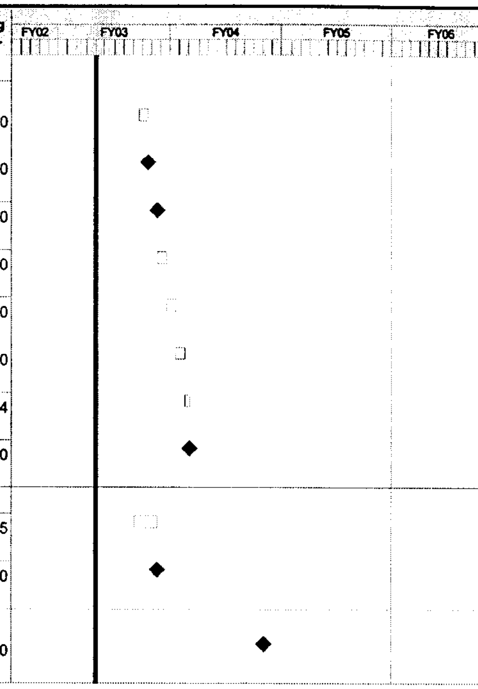
XV. POST-ROD DOCUMENT SCHEDULE AND DESCRIPTION

A detailed schedule for the ROD and post-ROD activities is shown in Figure 7.

The forecast schedule for the post-ROD documentation is provided below.

- CMI/RAIP Rev. 0 for the LAHS OU will be developed and submitted for USEPA/SCDHEC review after receipt of Revision 0 ROD comments.
- USEPA/SCDHEC review of Rev. 0 CMI/RAIP - 30 days
- SRS revision of the CMI/RAIP will be completed 30 calendar days after receipt of all regulatory comments
- USEPA/SCDHEC final review and approval of CMI/RAIP - 30 days
- Proposed Remedial Action start date 4Q 04 (15 months after ROD approval)
- Combined Post-Construction Report/Corrective Measures Implementation Report/Final Remediation Report (PCR/CMIR/FRR) Rev. 0, will be submitted to USEPA/SCDHEC after completion of the remedial action in accordance with the implementation schedule in the approved LAHS RAIP.

Activity Description	Early Start	Early Finish	Orig Dur
CA 5002 L AREA HOT SHOP 717G			
LCS 14 - STATEMENT OF BASIS/PROPOSED PLAN & ROD			
SRS INCORPS EPA/SCDHEC COMMENTS, REV. 1.2 ROD	22JUN03	21JUL03	30
SRS SUBMITTAL OF REV. 1.2 ROD		21JUL03	0
RECEIPT OF ROD APPROVAL		20AUG03	0
DOE OBTAIN SIGNATURE ON ROD	21AUG03	19SEP03	30
EPA OBTAIN SIGNATURE ON ROD	20SEP03	19OCT03	30
SCDHEC OBTAIN SIGNATURE ON ROD	20OCT03	18NOV03	30
PREPARE FOR PUBLIC NOTICE ROD	19NOV03	02DEC03	14
ISSUE ROD		02DEC03	0
LCS 15 - DETAILED ENG & PRECONST ACTIVITIES			
EPA/SCDHEC final review and approval of RAIP	07JUN03	20AUG03	75
Submit signed RAIP to EPA/SCDHEC		20AUG03	0
LCS 16 - REMEDIAL ACTION IMPLEMENTATION			
REMEDIAL ACTION (RA) START DATE	05AUG04		0



Start Date 01OCT92	Early Bar	IMPL - FHPC	Sheet 1 of 1	Date / Revision / Checked / Approved
Finish Date 25SEP05	Progress Bar	Environmental Restoration		
Data Date 03FEB03	Critical Activity	CA 5002 L- AREA HOT SHOP 717-G		
Run Date 16SEP03 14:17		CRA/CERCLA Implementation Schedul		
© Primavera Systems, Inc.				

Figure 7. LAHS OU Implementation Schedule

XVI. REFERENCES

Federal Facility Agreement, 1993. *Federal Facility Agreement for the Savannah River Site,* Administrative Docket No. 89-05-FF (Effective Date: August 16, 1993)

Jarvis, W. L., and J. G. Irwin, 1993. *Threatened, Endangered, and Sensitive Species Listing L-Area Oil and Chemical and Acid/Caustic Basin, Savannah River Site,* May, U. S. Department of Agriculture, Savannah River Forest Station, Savannah River Site, Aiken, SC

USDOE, 1994. *Public Involvement, A Plan for the Savannah River Site* (U.S. Department of Energy), Savannah River Operations Office, Aiken, SC

USDOE, 1996. *Savannah River Site Future Use Project Report: Stockholder Recommendations for SRS Land and Facilities,* Savannah River Operation Office, Aiken, SC

USEPA, 1995. *Supplement 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

USEPA, 1997. *Establishment of Cleanup Levels for CERCLA Sites with Radioactive Contamination*, a memorandum from Stephen D. Luftig, Director, Office of Emergency and Remedial Response and Larry Weinstock, Acting Director, Office of Remediation and Indoor Air, OSWER No. 9200.4-18 dated August 22, 1997, United States Environmental Protection Agency, Washington, DC

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

WSRC, 2001. *RFI/RI Work Plan for the L-Area Hot Shop (including CML-003 Sandblast Area) Operable Unit (U),* WSRC-RP-99-4061, Rev. 1.2, February, Westinghouse Savannah River Company, Savannah River Site, Aiken, SC

WSRC, 2002a. *RFI/RI Work Plan Addendum – Investigation Results and Risk Assessment for the L-Area Hot Shop (Including the CML-003 Sandblast Area) Operable Unit (U),* WSRC-RP-2001-4172, Rev. 1.1, June, Westinghouse Savannah River Company, Savannah River Site, Aiken, SC

WSRC, 2002b. *Statement of Basis/Proposed Plan for the L-Area Hot Shop (Including CML-003 Sandblast Area) Operable Unit (U),* WSRC-RP-2001-4173, Revision 1.2, August, Westinghouse Savannah River Company, Savannah River Site, Aiken, SC

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APPENDIX A. RESPONSIVENESS SUMMARY

Responsiveness Summary

The 45-day public comment period for the *Statement of Basis/Proposed Plan for the L-Area Hot Shop (Including CML-003 Sandblast Area) (LAHS) Operable Unit* began on December 5, 2002, and ended on January 18, 2003.

Public Comment

No comments were received from the public.

APPENDIX B. COST ESTIMATE FOR THE SELECTED REMEDY

Cost Estimate for Alternative 5 - Decontamination, Removal, Disposal (PRSB #3), and Institutional Controls

DESCRIPTION		QUANTITY	UNITS	UNIT COST	TOTAL COST
Direct Capital Costs					
Site Work					
Deed Restrictions/Notifications		1	ls	$2,000	$2,000
Prepare Work Plans		1	ls	$25,000	$25,000
Soil Erosion & Sediment Control Plan		1	ls	$15,000	$15,000
Erosion control (silt fence and hay bales)		400	lf	$4	$1,600
Mobilization/Demobilization		1	ls	$30,000	$30,000
Remedial Action (Concrete Slab)					
Site Survey and construct temporary facilities for decontamination,		1	ls	$30,000	$30,000
Erect warning signs		10	ea	$1,000	$10,000
Demolition and Removal of Concrete Slab		9,670	cf	$30	$290,100
Assume 9670 ft^3					
Remove potentially contaminated soil under concrete slab		4,835	cf	$10	$48,350
Assume 6" lift = 4835 ft^3					
Survey after removal for verification sampling		1	ac	$1,400	$1,400
Verification Sampling		20	ea	$540	$10,800
TAL on 20' centers					
Remedial Action (Removal of Drainlines)					
Excavation		40	cy	$12	$480
Pipe removal and cutting in small pieces		100	lf	$100	$10,000
Containerization in B-12 box including purchasing and RCO support		1	ls	$4,000	$4,000
Backfiling, compacting, and grading		44	cy	$100	$4,400
Backfill					
Excavate, load, haul to unit, place backfill		185	cy	$19	$3,515
Assume 10000 ft^2 x 6 in = 5000 ft3 = 185 cy					
Vegetative layer, topsoil purchase		185	cy	$56	$10,360
Assume 10000 ft^2 x 6 in = 5000 ft3 = 185 cy					
Grading and seeding		1	ac	$10,000	$10,000
Transportation (Concrete Slab)					
Loading, unloading and transporting concrete to PRSB		358	cy	$45	$16,110
Assume 9670 ft^3 = 358 cy					
Transportation (Drainlines)					
Loading, unloading and transporting drainlines to PRSB		35	cy	$45	$1,575
Assume 100lf = 35 cy					
Post Remedial Action and Other Miscellaneous					
Provide dust supression during operations		1	ls	$12,000	$12,000
Equipment decontamination and wastewater disposal		1	ls	$35,000	$35,000
Total Direct Capital Costs					$571,690
Indirect Capital Costs					
Engineering and Design (15% of total direct capital cost)					$85,754
Project/construction management (25% of total direct capital cost)					$142,923
Health and safety (20% of total direct capital cost)					$114,338
Contingency (10% of total direct capital cost)					$57,169
Total Indirect Capital Costs					$400,183
TOTAL CAPITAL COSTS					$971,873
O&M Costs					
Annual inspection and maintenance		5	ea	$5,000	$22,322
Assume 8 hours per year					
Present Worth Factor	4.4644				
Remedy Reviews		1	ea	$25,000	$20,648
Present Worth Factor	0.8259				
TOTAL ESTIMATED O&M COSTS					$42,970
TOTAL ESTIMATED COST					$1,014,843
Interest Rate (i)	3.90%				