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Land Use Control Assurance Plan for the Savannah River Site

WSRC-RP-98-4125

Revision 1.1

August 1999

Updated February 2023

SAVANNAH RIVER SITE • AIKEN, SOUTH CAROLINA

DISCLAIMER

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and
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Aiken, South Carolina
—
Program Management & Integration
Environmental Compliance & Area Completion Projects

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LIST OF ACRONYMS AND ABBREVIATIONS

ACP	Area Completion Projects
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
ECODS	Early Construction and Operational Disposal Site
FFA	Federal Facility Agreement for the Savannah River Site
IOU	Integrator Operable Unit
LUC	Land Use Control
LUCAP	Land Use Control Assurance Plan
LUCIP	Land Use Control Implementation Plan
MOA	Memorandum of Agreement
NBN	No Building Number
RCRA	Resource Conservation and Recovery Act
ROD	Record of Decision
RUNK	R-Area Unknown
SCDHEC	South Carolina Department of Health and Environmental Control
SROO	Savannah River Operations Office
SRNS	Savannah River Nuclear Solutions, LLC
SRS	Savannah River Site
USDOE	United States Department of Energy
USEPA	United States Environmental Protection Agency
WADB	Wetland Area at Dunbarton Bay
WSRC	Washington Savannah River Company

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1.0 INTRODUCTION

On April 21, 1998, the United States Environmental Protection Agency (USEPA) Region 4 Federal Facilities Branch issued a memorandum entitled *Assuring Land Use Controls at Federal Facilities* (Johnston 1998). By implementing this policy, USEPA Region 4 sought development of Land Use Control Assurance Plans (LUCAPs) by federal facilities that utilize land use controls (LUCs) as components of Resource Conservation and Recovery Act (RCRA)/Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) remedies. The United States Department of Energy (USDOE)-Savannah River Operations Office (SROO) recognizes the memorandum as setting forth policy guidance that does not carry the force of law as is established through rulemaking. Thus, as a matter of comity and cooperation and, most importantly, for the purpose of advancing the goal of protecting human health and the environment at the Savannah River Site (SRS), this LUCAP has been developed as a means to facilitate accomplishment of this shared objective.

The USDOE-SROO, the USEPA, and the South Carolina Department of Health and Environmental Control (SCDHEC) are herein after referred to as "the Parties".

Definitions for terms used in this document are provided in Appendix A.

2.0 SITE DESCRIPTION

2.1 Savannah River Site Description

The SRS covers 310 square miles, encompasses parts of Aiken, Barnwell, and Allendale counties in western South Carolina, and borders the Savannah River. The SROO manages SRS as a controlled area with limited public access. Open fields and pine and hardwood forests comprise 73 percent of the SRS; wetlands, streams, and two large reservoirs cover approximately 22 percent; and production and support areas, roads, and utility corridors account for the remaining 5 percent. Land adjacent to the SRS is used mainly for forest and agricultural purposes.

2.2 SRS Land Use Planning Process

SRS utilizes a comprehensive planning process. This entails a systematic method for ensuring a site-wide approach to moving the site from the present into the future based on SRS strategic planning. A comprehensive plan is developed that addresses such things as land use, facilities, infrastructure, cultural resources, and natural resources. A site procedure (SRS Manual 1D, *Site Infrastructure and Services*, Procedure 3.02, *Site Real Property Configuration Control*) is in place to ensure that proposed land and facility activities are considered for consistency with the comprehensive plan. This process, along with the Site Use Permit system, ensures that sites selected for an activity are the most appropriate and that any potential conflicts or problems are identified and solved prior to approval.

2.3 Environmental Restoration Program Description

The goal of the SRS Area Completion Projects (ACP) Program is to investigate, and if needed, remediate releases of hazardous substances to minimize or eliminate potential risks to human health and the environment. SRS personnel began inventorying waste units in 1981 and have identified 515 inactive waste and groundwater units to date. The waste units range in size from a few square feet to tens of acres and include basins, pits, piles, burial grounds, landfills, tanks, and groundwater contamination. Soil, groundwater, and surface water have been contaminated with radionuclides and hazardous chemicals as a result of 40 years of site operations (WSRC 1998).

Remediation of the waste units is regulated under the RCRA 3004 (u), 3004 (v), 3005, and CERCLA. In 1993, SRS entered into a Federal Facility Agreement (FFA) with the USEPA and the SCDHEC to ensure that the environmental impacts associated with past and present activities at SRS were thoroughly investigated, and that appropriate corrective/remedial action would be taken to protect public health and welfare and the environment. Figure 1 depicts the watersheds within the SRS. The current industrial areas with buffers, heavy industrial (nuclear facility) areas, heavy industrial (non-nuclear facility) areas, and administrative facility areas are also shown on Figure 1. Figures 2 through 7 show the ACP waste units that have been, are currently undergoing, or are planned for investigation and remediation, if needed, within each watershed. Tables 1 through 6 provide a list of the waste units within each watershed that have LUCs/institutional controls as part of the selected remedy. As the three Parties agree upon remedial decisions, the figures and tables will be updated to highlight those waste units that require LUCs as part of the remedial decision. Appendix C provides a more comprehensive listing of the waste units in each watershed.

Because the SRS is currently and will likely remain under Federal ownership, the SROO desires future site remedy decisions that take land use into account. The Parties agree that when LUCs are necessary to assure the reliability of land use assumptions, a plan is needed to ensure that LUCs will be maintained for as long as necessary to keep the selected remedy fully protective of human health and the environment.

LUCs include, but are not limited to, institutional controls, and are defined in Appendix A of this document. Institutional controls are actions that may be used to supplement engineering controls to prevent or limit exposure to contaminants at a site to ensure protection of human health. Institutional controls may be applied to limit or prevent exposures to contaminants and to ensure that selected land uses are maintained. The advantage of these administrative mechanisms is that they can be employed to provide flexibility in the risk decision-making process. Institutional controls also mitigate health risks by physically restricting land use at a waste unit. These controls may include fences, security guards, warning signs, deed restrictions, and land-use restrictions.

3.0 LAND USE CONTROL GOALS, OBJECTIVES, AND STRATEGIES

3.1 Purpose

This LUCAP was developed to assure the effectiveness and reliability of the required LUCs for as long as any LUCs continue to be required in order for the response action to remain protective. The requirements described herein are only applicable to those waste units listed in the FFA (FFA 1993) Appendices C and H, for which LUCs were selected as part of the corrective/remedial action.

For the units in Appendix H, the LUC requirements are discussed and approved as part of the closure/post-closure/permit application process for these waste units.

As the corrective/remedial action that includes LUCs is selected for individual waste units, a unit-specific Land Use Control Implementation Plan (LUCIP) will be developed. Appendix B of this LUCAP contains the unit-specific LUCIPs. As LUCIPs are finalized and appended to this LUCAP, Appendix B will be updated to reflect any additions or deletions of units that require LUCs as part of the selected remedy. Table B-1 provides a list of all LUCIPs that are a part of this LUCAP. Copies of all updates will be distributed to the USEPA and the SCDHEC for inclusion in their copies of the LUCAP.

3.2 Access Controls

3.2.1 On-Site Workers

In accordance with procedures in place and maintained at SRS, use of all lands and waters on the SRS shall be coordinated via the Site Use Program. No use of land (i.e., excavation or any other land use) shall be undertaken without prior approval documented by a Site Use Permit. Also, in accordance with procedures, all work at SRS that adds or modifies features or facilities portrayed on the SRS development maps (i.e., plot plans of facilities/utilities at SRS) is authorized by a Site Clearance Permit before execution. All Site Clearance requests are reviewed to verify that either an approved Site Use Permit has been obtained, or that an existing Site Use Permit has sanctioned the request. Verification of the USDOE approval for intended land use must be obtained before issuance of a Site Clearance Permit. The Site Use and Site Clearance processes are applicable to all activities and personnel on site (including subcontractors). The processes are controlled within the SRS Quality Assurance Program.

The SRS identifies all buildings and facilities on maps used in the Site Use/Site Clearance Program and includes a 200-foot buffer zone around each facility. Each waste unit is identified on these maps.

Any work proposed at the waste units will be strictly controlled and workers will be appropriately trained and briefed about health and safety requirements if work is deemed necessary for maintenance. Any changes in the use or disturbance of the waste units will require advance notification to the USEPA and the SCDHEC before the disturbance occurs. To prevent unknowing entry and to ensure that unrestricted use of the waste units do not occur while under the ownership of the government, identification signs will be posted at the waste unit access points. Figures will be included in the unit-specific LUCIPs that

indicate where the signs will be posted. The signs will be legible from a distance of at least 25 feet. The signs will read:

> Waste Unit Name and Building Number
> "Danger – Unauthorized Personnel Keep Out.
> This waste unit was used to manage hazardous substances.
> Do not dig or excavate. Do not enter without contacting the waste site custodian."
> Custodian: Manager, Post Closure Maintenance
> Phone: (803) 725-PAGE (19192)

3.2.2 Trespassers

Additionally, while under the ownership of the USDOE, access control of the entire SRS will continue to be maintained in accordance with the 2013 RCRA Permit Renewal Application, Volume I, Section F.1. This section describes the security procedures and equipment (R.61-79.264.14; 270.14(b)(4)), 24-hour surveillance system (R.61-79.264.14(b)(1)), artificial or natural barriers (R.61-79.264.14(b)(2)(i)), control entry systems (R.61-79.264.14(b)(2)(ii)), and warning signs (R.61-79.264.14(c)) in place at the SRS boundary to comply with the security requirements for a RCRA-permitted facility.

3.3 Federal Facility Program and Point-of-Contact

The person responsible for ensuring that unit-specific LUCIPs and the LUCAP are monitored, maintained, and enforced is the Manager of the SROO. The SROO Assistant Manager for Infrastructure and Environmental Stewardship is the point-of-contact and can be reached as follows:

US Department of Energy
Assistant Manager for Infrastructure and Environmental Stewardship
P. O. Box A
Aiken, SC 29802

Phone: (803) 952-6371

3.4 Funding

The Parties expect that all obligations of the SROO arising under the LUCAP will be fully funded through congressional appropriations. Consistent with congressional limitations on future funding, the USDOE SROO will use its best efforts to request timely funding to meet its obligations under this plan.

If appropriate funds are not available to fulfill SROO's obligations, USEPA and SCDHEC will be notified as soon as the SROO is aware of the potential shortfall.

3.5 Decision Documents

The Parties agree when unit-specific LUCs are to be implemented, an adequate description of the LUCs, along with conditions for their use, should be included in the appropriate decision documents (i.e., proposed plan, record of decision (ROD), RCRA permit, as appropriate, etc.) that reflects the selected remedy for a unit. Additionally, Appendix D of this document contains a sample of the standard language for inclusion in such decision documents.

During the 5-year remedy reviews or RCRA permit renewals, the need for LUCIPs for decision documents approved prior to April 21, 1998, in which LUCs were selected as part of the remedy, will be decided. A LUCIP will then be developed as agreed to by the three Parties.

3.6 Land Use Control Implementation Plan

As a component of the post-ROD documentation for waste units that require LUCs as part of the corrective measure/remedial action, a unit-specific LUCIP must be developed and approved following remedy selection through the unit-specific ROD and permit modification. The LUCIP should:

a) identify the area that is under restriction via a survey plat that is certified by a professional land surveyor. In the case of LUCs and groundwater, an appropriate survey will be prepared to delineate the groundwater under LUCs;

b) identify each LUC objective for the waste unit (e.g., prohibit residential use, etc.); and

c) specify the specific controls and mechanisms required to achieve each identified objective (e.g., install/maintain a fence, post warning signs, etc.).

For waste units where the corrective measure/remedial action is institutional controls only, a single post-ROD document identifying the LUCs will be developed. For waste units where institutional controls are combined with an active corrective measure/remedial action, the LUCIP will be developed as an appendix to the agreed upon post-ROD document (i.e., the Corrective Measures/Remedial Design Work Plan, the Corrective Measures/Remedial Design Report, the Corrective Measures/Remedial Action Work Plan, Corrective Measures Implementation/Remedial Action Implementation Plan, Remedial Action Completion Report, Post-Construction Report, etc., or any combination of the listed documents). Since March 2004, LUCIPs have been developed as separate documents. Upon approval, each unit-specific LUCIP will be appended to this LUCAP to serve as a single source for documenting all LUCs.

If a 5-year remedy review or RCRA permit renewal analysis determines that a LUCIP should be required for any LUC selected in a decision document approved prior to April 21, 1998, that LUCIP will be developed and included in Appendix B.

3.7 Monitoring and Field Inspections

For waste units that require LUCs, quarterly on-unit monitoring will be performed throughout the remediation period, unless the Parties, in the unit-specific LUCIP, approve another monitoring frequency. Justification for a different monitoring frequency will be provided in the unit-specific LUCIP, where appropriate. In addition, field inspections will be conducted at least annually to assess the conditions of all units subject to LUCs. These inspections are to be conducted to determine whether the current land use remains protective and consistent with all corrective measure/remedial action objectives outlined in the unit-specific decision documents (e.g., engineering controls remain in place, etc.). The mechanisms and methodology for the monitoring and field inspections will be established in the unit-specific LUCIPs.

3.8 Notifications

3.8.1 Major Land Use Changes

In the event that SROO anticipates any "major changes in land use" for the waste units subject to LUCs, the SROO shall determine whether the contemplated changes will or will not necessitate the need for re-evaluation of the selected response action or implementation of specific measures to ensure continued protection of human health and the environment. The SROO shall evaluate such changes that impact RODs pursuant to 40 CFR 300.430(f)(3)(ii) and 40 CFR 300.435(c)(2). The SROO will notify the USEPA and the SCDHEC in writing of such changes at least sixty (60) days prior to the initiation of such changes to obtain USEPA and SCDHEC positions on the proposed changes. Each notification shall include:

a) an evaluation of whether the anticipated land use change will pose unacceptable risks to human health and the environment or negatively impact the effectiveness of the remedy;

b) an evaluation of the need for any additional remedial action(s) resulting from the anticipated land use changes; and

c) a proposal for any necessary changes to the selected remedial action and identification of documentation requirements (e.g., ROD amendments, ROD Explanation of Significant Differences, RCRA permit modification, etc.) for the proposed changes.

Upon notification by the SROO of an anticipated major land use change, the USEPA and the SCDHEC shall evaluate the information provided and shall issue comments within sixty (60) days so as to minimize any potential adverse impacts to the SRS activities or operations. Together with such comments, the USEPA and SCDHEC will each indicate their agreement or disagreement with USDOE's determinations as to whether the anticipated change in use, considering any changes to the selected remedial action(s) and/or implementation of additional measures proposed by USDOE, will ensure continued protection of human health and the environment. In the event USDOE proceeds with a major land use change that USEPA and/or SCDHEC determine will render a selected remedial action no longer protective of human health and the environment, USEPA and/or

SCDHEC may take any action consistent with their respective authorities under applicable laws to ensure continued protection of human health and the environment.

The Parties agree that "major changes in land use" are defined as:

a) a change in land use that is inconsistent with the exposure assumptions in the risk assessment that was the basis for the LUCs (either human health or ecological risk assessment). Examples include: the human health risk assessment assumed that a unit is in "caretaker" status with a worker visiting the waste unit once a week for 2 hours, and the proposed change would have the worker at the waste unit for 8 hours a day, 5 days a week; any change from industrial, commercial, or recreational land use to a more sensitive land use, such as housing, schools, hospitals, and/or daycare centers is a major land use change; any change from industrial or commercial land use to recreational land use; any change in a land use that has been prohibited in order to protect the environment;

b) any action that may disrupt the effectiveness of the remedial action. For example, excavation at a landfill, groundwater pumping that may impact a groundwater pump and treat system, or a construction project that may result in unacceptable exposure to an ecological habitat protected by the remedy; and

c) any other action that might alter or negate the need for the LUC. For example, any plan to actively remediate a waste unit subject to LUCs in order to allow for unrestricted land use.

In addition, the SROO will immediately notify the USEPA and the SCDHEC upon discovery of any activity inconsistent with any LUCIP. This notification will provide all pertinent information as to the nature and extent of the change and describe any measures implemented or to be implemented (to include a timetable for future completion) to reduce or prevent human health or ecological impacts.

3.8.2 Property Transfer

In the event that the SROO determines to enter into any contract for the sale or transfer of any of the SRS, the SROO will comply with the requirements of Section 120(h) of CERCLA, 42 United States Code § 9620(h), in effectuating that sale or transfer, including all notice requirements. In addition, the SROO will include notice of the FFA in any document transferring ownership or operation of the SRS to any subsequent owner and/or operator of any portion of the SRS and will notify USEPA and SCDHEC of any such sale or transfer at least ninety (90) days prior to such sale or transfer while the FFA is in effect. No property transfer of the SRS or any portion thereof or notice pursuant to Section 120(h) of CERCLA, 42 United States Code § 9620(h), will relieve the SROO of its obligation to perform remediation pursuant to the FFA. No property transfer of the SRS or any portion thereof will be consummated by the SROO without provision for continued maintenance of any containment system, treatment system, or other response action(s) installed or implemented pursuant to the FFA. In the event of any property transfer of the SROO or

any portion thereof, USDOE will consider the need for measures to ensure continued maintenance of any LUCs selected as part of a response action associated with the unit subject to transfer. The USDOE will include in the above-referenced notice of transfer a discussion of its conclusions regarding the need for any such measures and any specific measures to be employed attendant to the transfer.

3.9 Certification

The Manager, SROO, will annually certify that SRS is in compliance with all unit-specific LUCIP requirements in the FFA Annual Progress Report. The annual report will also serve to notify the USEPA and the SCDHEC of any change in the designated officials or of land use changes that are not considered major as described in Section 3.8.1 of this document.

3.10 Change in Applicable or Relevant and Appropriate Standards

Nothing included in this LUCAP should be construed to preclude SRS from proposing at any time or from the Parties otherwise agreeing to effect the deletion of any unit from coverage under the terms of this LUCAP on account of either:

a) a post-remedy implementation change to applicable or relevant and appropriate Federal or State cleanup standards; or

b) a change in previously documented contaminant concentration levels allowing for unrestricted use.

3.11 Future Communications

In accordance with FFA Section XXVIII, the FFA Project Managers shall receive all correspondence and communications on behalf of the Parties pertaining to all matters falling under the terms of this LUCAP.

3.12 Site Access

All Parties agree to use the procedures set forth in the FFA, Section XXX. Access/Data/Document Availability, regarding site access and data and document availability with regards to this LUCAP.

3.13 Reservation of Rights

It is agreed and understood that the USEPA and SCDHEC reserve all rights and authorities each agency may currently have or hereafter acquire by law to require SRS to comply with those Federal and State laws and regulations applicable to the investigation, cleanup, and near- and long-term maintenance of those waste units to be covered by this LUCAP. It is also understood that the SROO herein reserves those rights and authorities granted to the SROO by Federal or State law, regulation, or executive order. The SROO further reserves the right to put all property under its domain to those uses deemed necessary for mission accomplishment or otherwise deemed necessary by appropriate authority to meet the needs of the SROO.

3.14 Anti-Deficiency Act

No provision in this document shall be interpreted to require obligation or payment of funds in violation of the Anti-Deficiency Act (31 United States Code §1341).

3.15 Amendments

Any minor modifications to the LUCAP Memorandum of Agreement (MOA) and/or this LUCAP incorporated herein shall be made effective upon written approval of the Parties' FFA Project Managers. Any major modification shall be made effective upon the written approval by each of the signatories to the MOA (or their successors). A modification will be considered major if so determined by any of the three Parties hereto.

3.16 Effective Date

The LUCAP shall become effective on the date that the last of the authorized representatives of the Parties signs the MOA incorporating this LUCAP. The LUCAP requirements shall then apply to LUCs in any corrective measure/remedial action for which the decision document was approved on or after April 21, 1998.

4.0 REFERENCES

Federal Facility Agreement (FFA), 1993. *Federal Facility Agreement for the Savannah River Site*, Administrative Docket Number 89-05-FF, Effective Date: August 16, 1993, WSRC-OS-94-42.

Johnston, J. D. (EPA-Region 4), 1998. *EPA Region IV Policy, Assuring Land Use Controls at Federal Facilities*, Letter to T. Heenan (DOE-SR) (April 21).

WSRC, 1998. *Management Action Plan*, WSRC-MS-95-0054, Revision 5.0, Westinghouse Savannah River Company, Aiken, SC (May).

5.0 APPENDICES

Appendix A - Definitions

Appendix B - Operable Unit-Specific Land Use Control Implementation Plans

Appendix C - Maps and Tables of Waste Units Within Each Watershed

Appendix D - Sample Land Use Control Language for Inclusion in Decision Documents

Appendix E - Memorandum of Understanding

Appendix F - Modification Record

Appendix G - Annual Land Use Certification Required Under Section 3.9

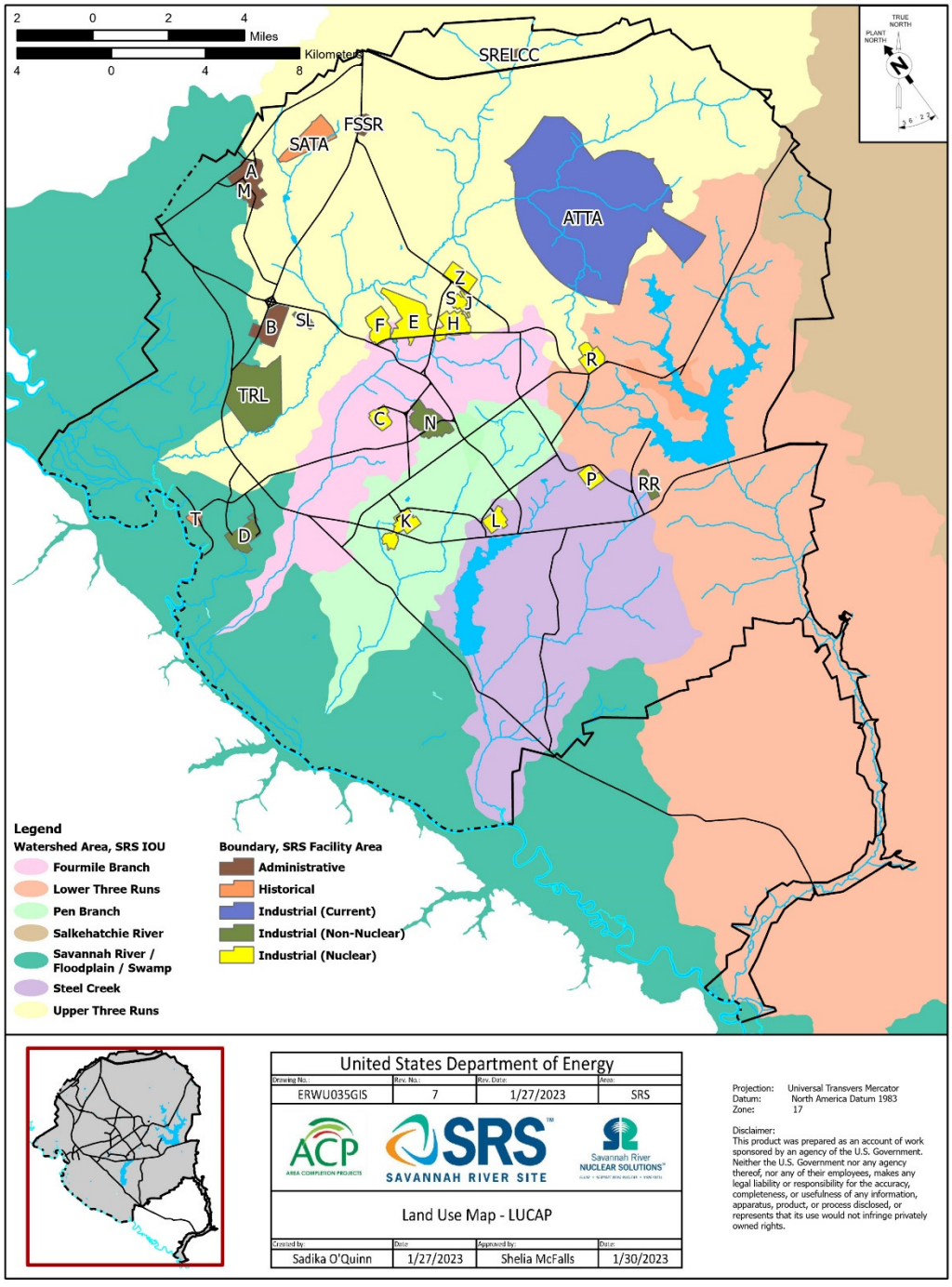


Figure 1. SRS Land Use Map

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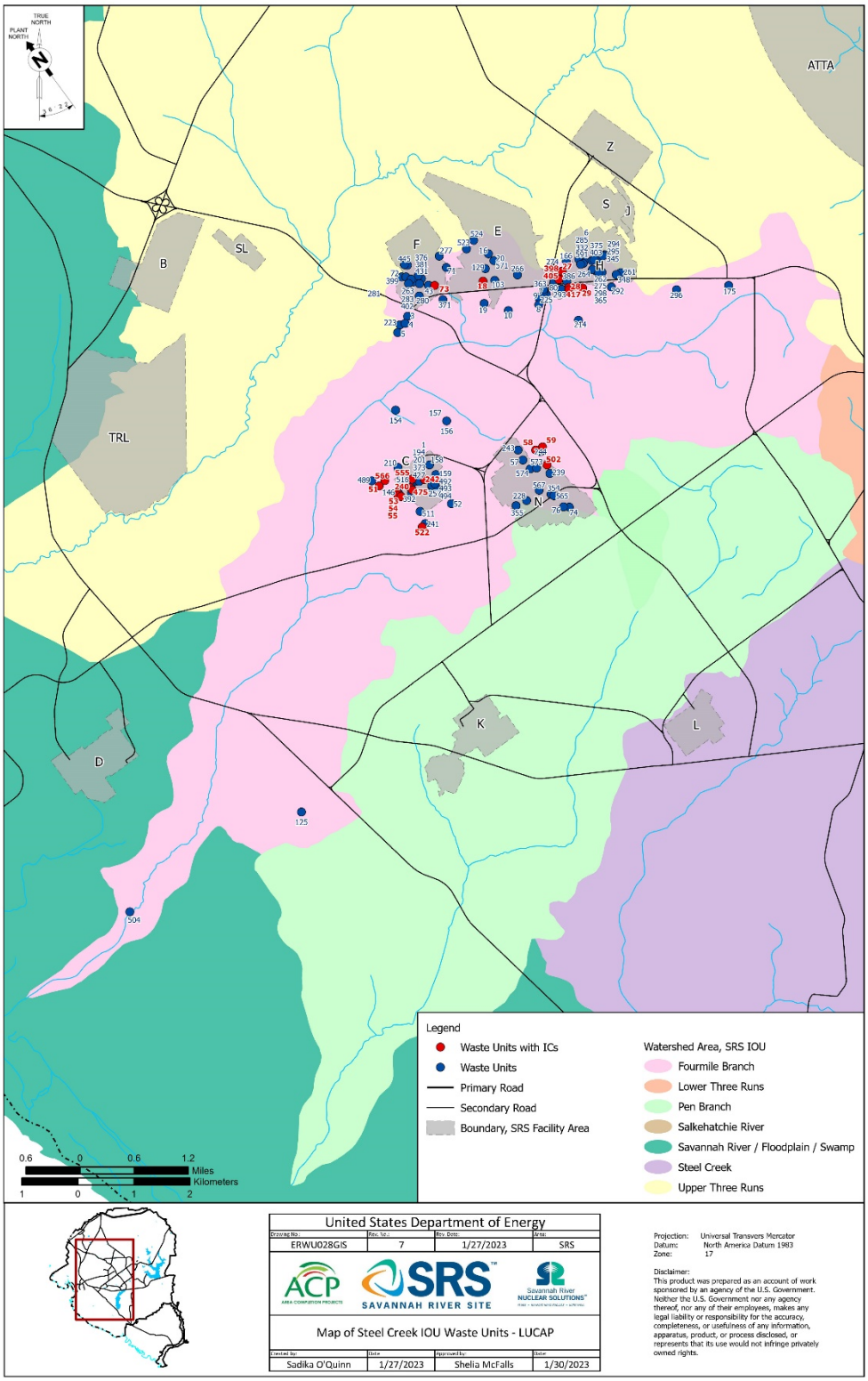


Figure 2. Fourmile Branch Watershed Operable Units that have Land Use Controls/Institutional Controls as a Component of the Selected Remedy

Table 1. Fourmile Branch Watershed Operable Units That Have Land Use Controls / Institutional Controls As A Component of the Selected Remedy

Unit No.	Unit Name
18 29 28 417 27 405 398	General Separations Area Consolidation Unit (consists of Old Radioactive Waste Burial Ground [Including Solvent Tanks], 643-E, HP-52 Ponds, H-Area Retention Basin, 281-3H, Spill on 05/01/1956 of Unknown of Retention Basin Pipe Leak, NBN, Warner's Pond, 685-23G, Spill on 03/08/1978 of Unknown Seepage Basin Pipe Leak in H-Area Seepage Basin, NBN, and Spill on 02/08/1978 of Unknown of H-Area Process Sewer Line Cave-in, NBN)
51	C-Area Burning/Rubble Pit Operable Unit, 131-C
566	Old C-Area Burning/Rubble Pit, NBN
240 242 475 522 555	C-Area Operable Unit Early Action (consists of Potential Release from C-Area Disassembly Basin, Potential Release from C-Area Reactor Cooling Water System, C-Area Cask Car Railroad Tracks as Abandoned, Early Construction and Operational Disposal Site [ECODS] C-1, C-Area Process Sewer Lines as Abandoned)
53	C-Area Reactor Seepage Basin, 904-66G
54	C-Area Reactor Seepage Basin, 904-67G
55	C-Area Reactor Seepage Basin, 904-68G
577	C-Reactor Complex Early Action
58	Central Shops Burning/Rubble Pit, 631-1G
59	Central Shops Burning/Rubble Pit, 631-3G
73	F-Area Retention Basin, 281-3F
502	Heavy Equipment Wash Basin, NBN

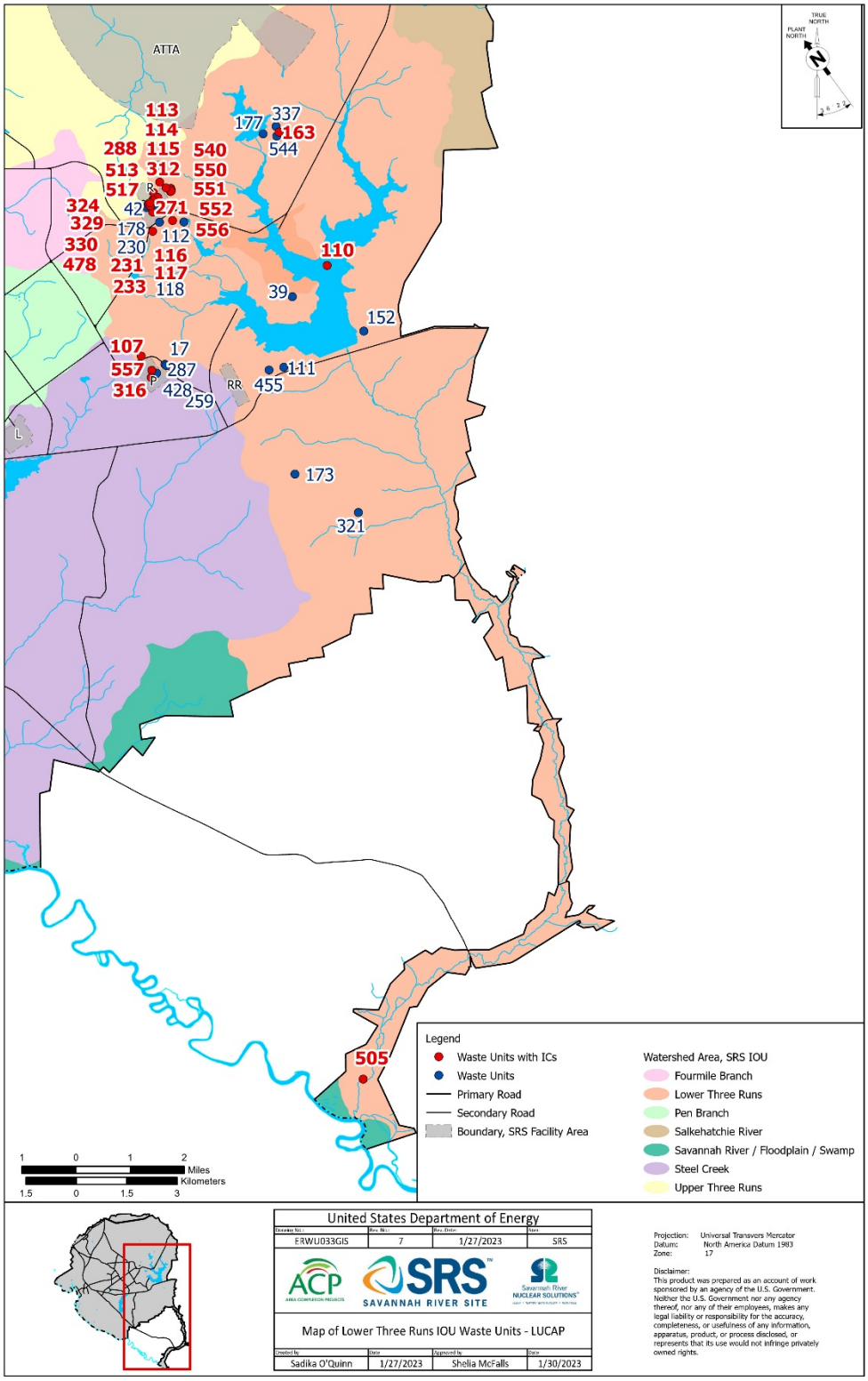


Figure 3. Lower Three Runs Watershed Operable Units that have Land Use Controls/Institutional Controls as a Component of the Selected Remedy

Table 2. Lower Three Runs Watershed Operable Units That Have Land Use Controls / Institutional Controls As A Component of the Selected Remedy

Unit No.	Unit Name
540	ECODS R-1A, -1B, -1C
163 337 544	Gunsite 012 Operable Unit (consists of Gunsite 012 Rubble Pile, NBN, Rubble Pile Across from Gunsite 012, NBN, and ECODS G-3 [Adjacent to Gunsite 012], NBN)[1]
505	Lower Three Runs Integrator Operable Unit (IOU) Tail Portion (Middle and Lower Subunits)
505 110 312	Lower Three Runs IOU (Upper Subunit) (consists of PAR Pond [Including the Pre-Cooler Ponds and Canals], 685-G and Old R-Area Discharge Canal, NBN)
107	P-Area Bingham Pump Outage Pit, 643-4G
113	R-Area Bingham Pump Outage Pits, 643-10G
114	R-Area Bingham Pump Outage Pits, 643-8G
115	R-Area Bingham Pump Outage Pits, 643-9G
116	R-Area Burning/Rubble Pit, 131-1R
117	R-Area Burning/Rubble Pit, 131-R
550	R-Area Unknown Pit #1 (RUNK-1), NBN
551	R- Area Unknown Pit #2 (RUNK-2), NBN
552	R- Area Unknown Pit #3 (RUNK-3), NBN
231 233 271 288 324 329 330 478 513 517 556	R Area Operable Unit (consists of Area on the North Side of Building 105-R, Laydown Area North of 105-R, and Release from the Decontamination of R-Area Reactor Disassembly Basin, NBN, Combined Spills North of Building 105-R, NBN, Cooling Water Effluent Sump, 107-R, Potential Release from R-Area Disassembly Basin, NBN, Potential Release of $NaOH/H_2SO_4$ from 183-2R, NBN, R-Area Ash Basin, 188-0R, R-Area Groundwater, R-Area Process Sewer Lines as Abandoned, NBN, R-Area Reactor Area Cask Car Railroad Tracks as Abandoned, NBN)

[1] A remedy of No Action was selected for Rubble Pile Across from Gunsite 012 and ECODS G-3 (Adjacent to Gunsite 012).

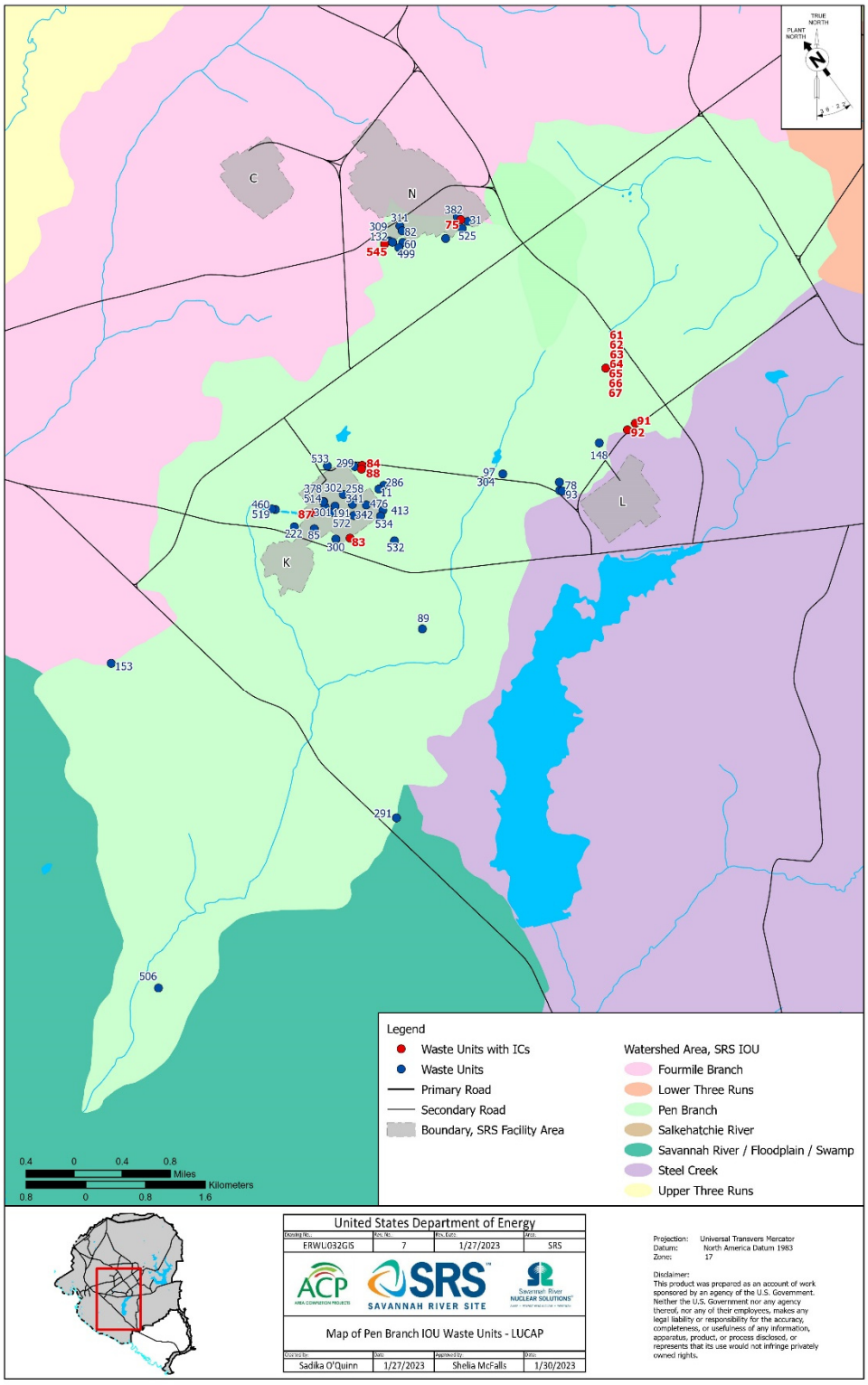


Figure 4. Pen Branch Watershed Operable Units that have Land Use Controls/Institutional Controls as a Component of the Selected Remedy

Table 3. Pen Branch Watershed Operable Units That Have Land Use Controls / Institutional Controls As A Component of the Selected Remedy

Unit No.	Unit Name
545	ECODS N-2
75	Ford Building Seepage Basin, 904-91G
83	K-Area Bingham Pump Outage Pit, 643-1G
84	K-Area Burning/Rubble Pit, 131-K
87	K-Area Reactor Seepage Basin, 904-65G
88	K-Area Rubble Pile, 631-20G
583	K-Reactor Complex Early Action
91	L-Area Bingham Pump Outage Pit, 643-2G
92	L-Area Bingham Pump Outage Pit, 643-3G
61	Chemical, Metals, and Pesticides (CMP) Pits, 080-170G
62	CMP Pits, 080-171G
63	CMP Pits, 080-180G
64	CMP Pits, 080-181G
65	CMP Pits, 080-182G
66	CMP Pits, 080-183G
67	CMP Pits, 080-190G

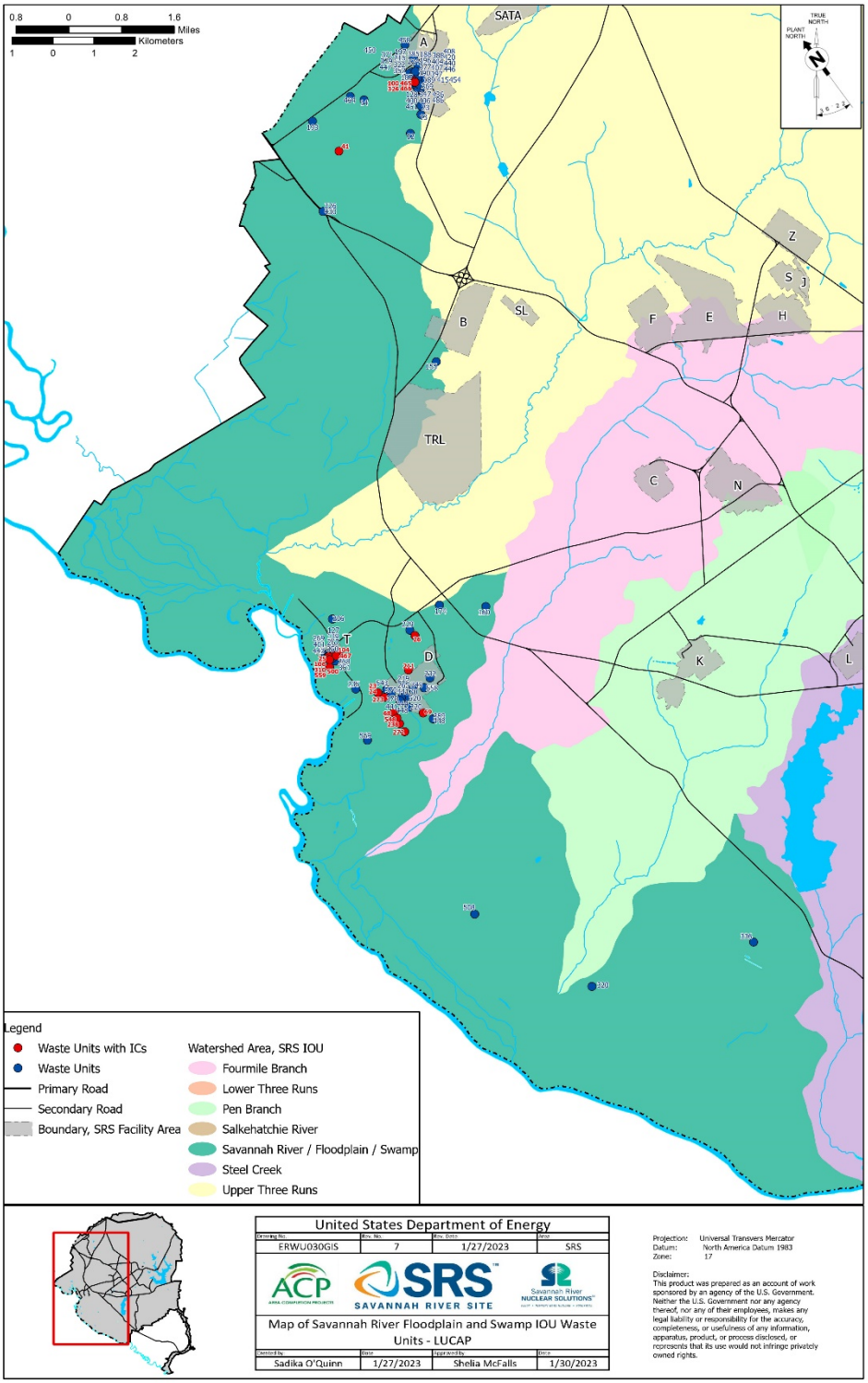


Figure 5. Savannah River and Floodplain Swamp Watershed Operable Units that have Land Use Controls/Institutional Controls as a Component of the Selected Remedy

Table 4. Savannah River and Floodplain Swamp Watershed Operable Units That Have Land Use Controls / Institutional Controls As A Component of the Selected Remedy

Unit No.	Unit Name
25 106 104 139 127	TNX Area Operable Unit (consists of TNX Groundwater , 082-G, Old TNX Seepage Basin, 904-076G, New TNX Seepage Basin, 904-102G, and TNX Burying Ground, 643-5G [Including Spill on 01/12/53 of ½ ton of Uranyl Nitrate, NBN])
26	D-Area Oil Seepage Basin, 631-G
32	D-Area Burning/Rubble Pit, 431-1D
33	D-Area Burning/Rubble Pit, 431-D
41	Silverton Road Waste Site, 731-3A
68 273	D-Area Expanded Operable Unit (consists of D-Area Rubble Pit, 431-2D & D-Area Ash Basin, 488-D)
69 70 211 265 558 570	D Area Operable Unit Early Action (consists of Combined Spills from 483-D and Associated Areas, NBN, D-Area Asbestos Pit, 080-20G, D-Area Coal Pile Runoff Basin, 489-D, D-Area Process Sewer Lines as Abandoned, NBN, D-Area Waste Oil Facility, 484-10D[2], D-006 Petroleum Release Site, NBN)
238 272 548	D-Area Operable Unit Second Early Action (consists of the 488-1D Ash Basin [including Inlet Basins], 488-2D Ash Basin, 488-4D Ash Landfill, and 489-D Coal Pile Runoff Basin [Southern 75%])[3]
100	M-Area Inactive Process Sewer Lines Operable Unit, 081-M (consists of 313-M and 320-M Inactive Clay Process Sewers to Tims Branch, NBN)[4]
310 467 500 559	T Area Operable Unit (consists of Neutralization Sump, 678-T; X-001 Outfall Drainage Ditch, NBN; TNX Outfall Delta, Lower Discharge Gully, and Swamp, NBN; & TNX-Area Process Sewer Lines and Tile Fields as Abandoned, NBN)

[2] This refers to the environmental media associated the 484-10D Facility.
[3] No remedial action is needed for the 489-D Coal Pile Runoff Basin (Southern 75%) or the Inlet Basins portion of 488-1D Ash Basin.
[4] The M-Area Inactive Process Sewer Lines Operable Unit is divided between Savannah River and Floodplain Swamp Watershed and Upper Three Runs Watershed.

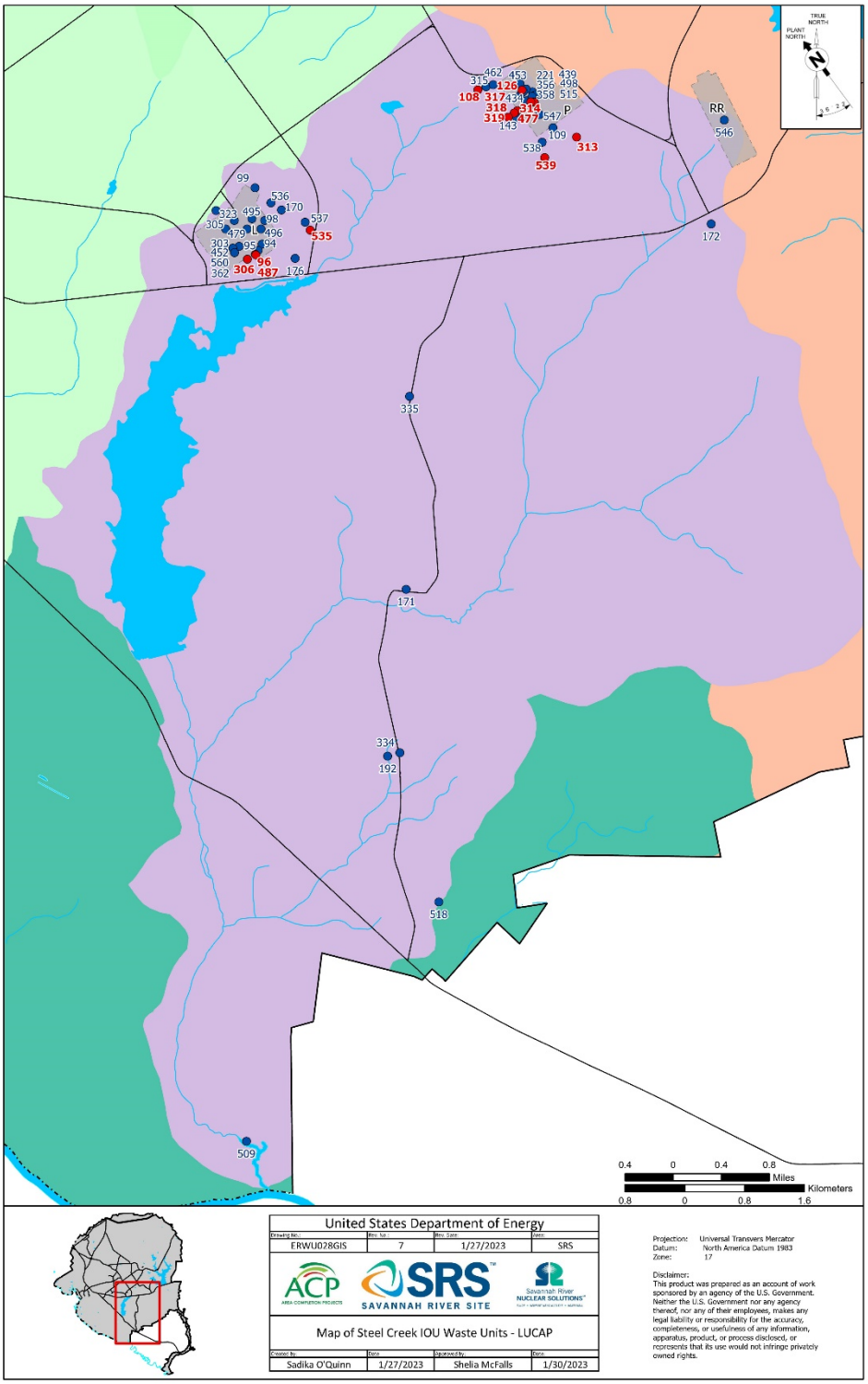


Figure 6 Steel Creek Watershed Operable Units that have Land Use Controls/Institutional Controls as a Component of the Selected Remedy

Table 5. Steel Creek Watershed Operable Units That Have Land Use Controls / Institutional Controls As A Component of the Selected Remedy

Unit No.	Unit Name
96	L-Area Oil/Chemical Basin, 904-83G
584	L-Reactor Complex Early Action
108	P-Area Burning/Rubble Pit, 131-P
306	L-Area Reactor Seepage Basin, 904-064G
126 313 314 316 477 557	P Area Operable Unit (consists of P-Area Ash Basin [Including Outfall P-007], 188-P; P-Area Process Sewer Lines as Abandoned, NBN and Spill on 03/15/79 of 5500 Gallons of Contaminated Water, NBN; P-Area Reactor Area Cask Car Railroad Tracks as Abandoned, NBN; Potential Release from P-Area Disassembly Basin, NBN; Potential Release from P-Area Reactor Cooling Water System, 186/190-P)
317	P-Area Reactor Seepage Basin, 904-61G
318	P-Area Reactor Seepage Basin, 904-62G
319	P-Area Reactor Seepage Basin, 904-63G
535	ECODS L-1
539	ECODS P-2
487	L-Area Southern Groundwater
509[5]	Wetland Area at Dunbarton Bay

[5] This unit number is associated with Steel Creek IOU, which includes the Wetland Area at Dunbarton Bay (WADB). Portions of the WADB have been remediated; Steel Creek IOU has not.

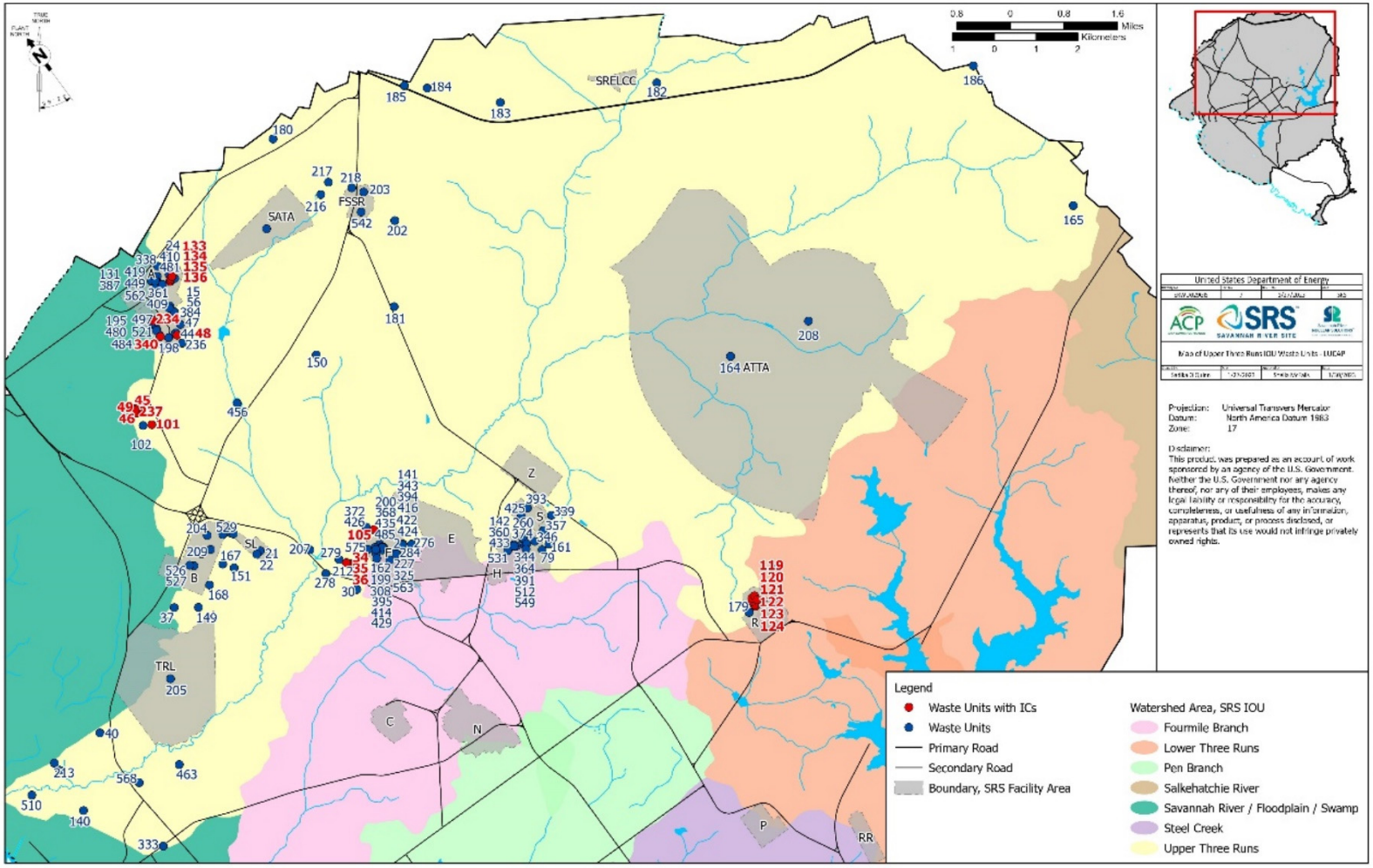


Figure 7 Upper Three Runs Watershed Operable Units that have Land Use Controls/Institutional Controls as a Component of the Selected Remedy

Table 6. Upper Three Runs Watershed Operable Units That Have Land Use Controls / Institutional Controls As A Component of the Selected Remedy

Unit No.	Unit Name
237	A-Area Ash Pile, 788-2A
45	A-Area Burning/Rubble Pit, 731-1A
46	A-Area Burning/Rubble Pit, 731-A
48	A-Area Miscellaneous Rubble Pile, 731-6A
49	A-Area Rubble Pit, 731-2A
593 528 530	B Area Operable Unit (consists of 770-U Test Reactor Building [HWCTR], ECODS B-3 [East of B Area, South of Road C], and ECODS B-5 [Adjacent to ECODS B-3])
34	F-Area Burning/Rubble Pits, 231-1F
35	F-Area Burning/Rubble Pits, 231-2F
36	F-Area Burning/Rubble Pits, 231-F
234	M-Area Inactive Process Sewer Lines Operable Unit, 081-M (consists of 313-M and 320-M Inactive Clay Process Sewers to Tims Branch, NBN)[6]
465 466 340 326[7]	M Area Operable Unit (consists of Underground Sump 321 M #001, Underground Sump 321 M #002, Salvage Yard, 741-A, and Potential Release of TCT, TET TCE, HNO3, U, Heavy Metals from 321-M Abandoned Sewer Line, NBN)
101	Miscellaneous Chemical Basin, 731-4A
105	Old F-Area Seepage Basin, 904-49G
119	R-Area Reactor Seepage Basin, 904-103G
120	R-Area Reactor Seepage Basin, 904-104G
121	R-Area Reactor Seepage Basin, 904-57G
122	R-Area Reactor Seepage Basin, 904-58G
123	R-Area Reactor Seepage Basin, 904-59G
124	R-Area Reactor Seepage Basin, 904-60G
133	SRL Seepage Basin, 904-51G1
134	SRL Seepage Basin, 904-53G2
135	SRL Seepage Basin, 904-54G
136	SRL Seepage Basin, 904-55G

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[6] The M-Area Inactive Process Sewer Lines Operable Unit is divided between Savannah River and Floodplain Swamp Watershed and Upper Three Runs Watershed.
[7] Unit Number 326 is a subunit of M-Area Operable Unit; however, it is located in the Savannah River and Floodplain Swamp Watershed and is shown on Figure 5 and included in Table C-4.

APPENDIX A

DEFINITIONS

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CERCLA, as defined in the National Oil and Hazardous Pollution Contingency Plan, is the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended by the Superfund Amendments and Reauthorization Act of 1986.

Decision Document, as defined in the EPA Region 4 Policy, refers to Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Records of Decision, Resource Conservation and Recovery Act (RCRA) Statement of Basis/Notices of Decision, and RCRA Permit Modifications.

Facility, as defined in the EPA Region 4 Policy, refers to a military base or other entire federal installation.

Land Use Control (LUC), as defined in the EPA Region 4 Policy and in regard to real property on federal facilities, means any restriction or control that limits the use of and/or exposure to any portion of that property, including water resources, arising from the need to protect human health and the environment. The term encompasses "institutional controls", such as those involved in real estate interests, governmental permitting, zoning, public advisories, deed notices, and other "legal" restrictions. The term may also include restrictions on access, whether achieved by means of engineered barriers (e.g., fence or concrete pad) or by human means (e.g., the presence of security guards). Additionally, the term may involve both affirmative measures to achieve the desired restrictions (e.g., night lighting of an area) and prohibitive directives (e.g., no drilling of drinking water wells). Considered altogether, the LUCs for a facility will provide a tool for how its property should be used in order to maintain the level of protectiveness that one or more remedial/corrective actions were designed to achieve.

Land Use Control Assurance Plan (LUCAP), as defined in the EPA Region 4 Policy, is a written facility-wide plan that sets out the procedure to assurance LUCs remain effective over the long-term for all areas at the particular facility where they are required.

Land Use Control Implementation Plan (LUCIP), as defined in the EPA Region 4 Policy, is a written plan, normally developed after a decision document has required one or more LUCs for some particular area (e.g., operable unit, contaminated unit, and/or solid waste management unit), that

(1) identifies each LUC objective for that area (e.g., to restrict public access to the area for recreational use) and
(2) specifies those actions required to achieve each identified objective (e.g., install/maintain a fence, post warning signs, record notice in deed records).

LUCIPs specify what must be done to impose and maintain the required LUCs, and are therefore analogous to design and/or operation and maintenance plans developed for active remedies.

Monitoring, as defined in the EPA Region 4 Policy, is used to indicate a variety of investigative activities, ranging from "drive-by" visual observations to detailed scientific sampling and testing. The nature of the particular LUCs being implemented will determine the type(s) and extent of any "monitoring" activities provided at an operable unit.

Proposed Plan(s), as defined in the FFA, mean the report(s) describing the corrective/remedial action(s) recommended for a waste unit, Section 117(a) of CERCLA, 42 USC § 9617.

RCRA is the Resource Conservation and Recovery Act, 1976, a Federal law that established a regulatory system to track hazardous substances from their generation to disposal. The law requires safe and secure procedures to be used in treating, transporting, storing, and disposing of hazardous substances. RCRA is designed to prevent the creation of new, uncontrolled hazardous waste units.

Record(s) of Decision (RODs), as defined in the FFA, mean the document(s) issued as the final corrective/remedial action plan for a waste unit, Section 117(b) of CERCLA, 42 USC § 9617

Statement(s) of Basis, as defined in the FFA, mean the report(s) describing the corrective measure(s)/remedial action(s) being conducted pursuant to South Carolina Hazardous Waste Management Regulations, as amended.

Waste Unit refers to a particular area (such as an "operable unit") that makes up only a portion of the facility.

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APPENDIX B

OPERABLE UNIT-SPECIFIC LAND USE CONTROL IMPLEMENTATION PLANS

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Table B- 1 Unit-Specific LUCIPs

Unit Name	Document Title	Approval Date[1]	Tab Number[2]	Watershed Figure[3]
A-Area Burning/Rubble Pits, 731-A and -1A and A-Area Rubble Pit, 731-2A[h]	Appendix A of *Post-Construction Report for the A-Area Burning/Rubble Pits, 731-A and –1A and A-Area Rubble Pit, 731-2A* (WSRC-RP-2003-4019, Revision 1, July 2003)	09/12/2003	1	7
A-Area Burning/Rubble Pits (731-A, -1A) and Rubble Pit (731-2A) and the Miscellaneous Chemical Basin/Metals Burning Pit (731-4A and -5A) Operable Unit[i]	*Land Use Control Implementation Plan for the A-Area Burning/Rubble Pits (731-A, -1A) and Rubble Pit (731-2A) & the Miscellaneous Chemical Basin/Metals Burning Pit (731-4A & -5A) Operable Unit* (WSRC-RP-2006-4073, Revision 1, September 2007)	2/7/2008	37	7
A-Area Miscellaneous Rubble Pile, 731-6A	Appendix A of *Corrective Measures Implementation/ Remedial Action Implementation Plan for A-Area Miscellaneous Rubble Pile, 731-6A* (WSRC-RP-2002-4067, Revision 1, July 2003)	08/07/2003	2	7
B Area Operable Unit (consists of 770-U Test Reactor Building (HWCTR), ECODS B-3 (East of B Area, South of Road C), and ECODS B-5 (Adjacent to ECODS B-3)	*Land Use Control Implementation Plan for B Area Operable Unit (U)* (SRNS-RP-2013-00113, Revision 1, January 2014)	01/13/2014	45	7
C-, K-, and L-Reactor Complexes Early Action	*Land Use Control Implementation Plan for the C-, K-, and L-Reactor Complexes Early Action* (SRNS-RP-2009-01470, Revision 1, May 2010)	7/1/2010	38	2 (C) 4 (K) 6 (L)
C-Area Burning/Rubble Pit Operable Unit (131-C) and Old C-Area Burning/Rubble Pit (NBN)	*Land Use Control Implementation Plan for the C-Burning/Rubble Pit Operable Unit (131-C) and Old C-Area Burning/Rubble Pit (NBN)*	06/11/2009	35	2

[h] This LUCIP provides the signage for the A-Area Burning/Rubble Pits, 731-A and -1A and A-Area Rubble Pit, 731-2A; however, this LUCIP was superseded by the LUCIP) for the A-Area Burning/Rubble Pits (731-A, -1A) and Rubble Pit (731-2A) and the Miscellaneous Chemical Basin/Metals Burning Pit (731-4A and -5A) Operable Unit (WSRC-RP-2006-4073, Revision 1, September 2007).

[i] This OU includes the A-Area Ash Pile (788-2A).

Unit Name	Document Title	Approval Date[1]	Tab Number[2]	Watershed Figure[3]
	(WSRC-RP-2008-4050, Revision 1.1, April 2009)			
C-Area Operable Unit Early Action (consists of Potential Release from C-Area Disassembly Basin, Potential Release from C-Area Reactor Cooling Water System, C-Area Cask Car Railroad Tracks as Abandoned, ECODS C-1, C-Area Process Sewer Lines as Abandoned)	*Early Action Land Use Control Implementation Plan for the C-Area Operable Unit (U)* (SRNS-RP-2015-00034, Revision 1, September 2015)	9/30/2015	47	2
C-Area Reactor Seepage Basins, 904-66G, -67G, and –68G	Appendix A of *Post-Construction Report/Final Remediation Report for C-Area Reactor Seepage Basins, 904-66G, -67G, and 68G* (WSRC-RP-2002-4219, Revision 1, January 2003)	03/19/2003	3	2
Central Shops Burning/Rubble Pits, 631-1G and 631-3G	Appendix A of *Corrective Measures Implementation/ Remedial Action Implementation Plan for Central Shops Burning/Rubble Pits, 631-1G and 631-3G* (WSRC-RP-2003-4018, Revision 1, August 2003)	09/12/2003	4	2
CMP Pits, 80-170G, -171G, -180G, -181G, -182G, -183G, and -190G	*Land Use Control Implementation Plan for the Chemical, Metals, and Pesticides Pits Operable Unit, 080-170G, 080-180G, 080-181G, 080-182G, 080-183G, and 080-190G)* (WSRC-RP-2005-4078, Revision 1.2, July 2007)	08/09/2007	29	4
D-Area Burning/Rubble Pits, 431-D and -1D	Section 2.0 of *Final Remediation Report for the D-Area Burning/Rubble Pits (431-D and 431-lD)* (WSRC-RP-97-406, Revision 1.1, March 1998)	04/22/1998	31	5
D-Area Expanded Operable Unit (consists of D-Area Ash Basin, 488-D and D-Area Rubble Pit, 431-2D)	*Land Use Control Implementation Plan for the D-Area Expanded Operable Unit* (WSRC-RP-2004-4065, Revision 1, June 2005)	08/03/2005	27	5

Unit Name	Document Title	Approval Date[1]	Tab Number[2]	Watershed Figure[3]
D-Area Oil Seepage Basin, 631-G	Appendix B of *Corrective Measures Implementation/ Remedial Design/Remedial Design Report/Remedial Action Workplan for the D-Area Oil Seepage Basin, 631-G* (WSRC-RP-99-4006, Revision 1, August 1999)	08/16/1999	5	5
D Area Operable Unit Early Action (consists of Spills from 483-D and Associated Areas (NBN), D-Area Asbestos Pit, 080-20G, D-Area Coal Pile Runoff Basin, 489-D, D-Area Process Sewer Lines as Abandoned, NBN, D-Area Waste Oil Facility, 484-10D, D-006 Petroleum Release Site, NBN)	*Early Action Land Use Control Implementation Plan for the D Area Operable Unit* (SRNS-RP-2011-01166, Revision 0 (corrected), July 2011)	08/25/2011	41	5
D-Area Operable Unit Second Early Action (consists of the 488-1D Ash Basin [including Inlet Basins], 488-2D Ash Basin, 488-4D Ash Landfill, and 489-D Coal Pile Runoff Basin [Southern 75%])[j]	*Second Early Action Land Use Control Implementation Plan for the D-Area Operable Unit (U)* (SRNS-RP-2020-00759, Revision 0, November 2020)	02/26/2021	49	5
Early Construction and Operational Disposal Site (ECODS) L-1, N-2, P-2, and R-1A, -1B, -1C	*Land Use Control Implementation Plan for the Early Construction and Operational Disposal Site (ECODS) L-1, N-2, P-2, & R-1A, -1B, -1C* (SRNS-RP-2009-01373, Revision 1, April 2010)	6/9/2010	39	3 (R-1A, -1B, -1C) 4 (N-2) 6 (L-1, P-2)
F-Area Burning/Rubble Pits, 231-F, -1F, and -2F	Section 2.0 of *Final Remediation Report for the F-Area Burning/Rubble Pits (231-F, 231-lF, and 231-2F)* (WSRC-RP-97-193 Revision 1.1, March 1998)	04/23/1998	33	7
F-Area Industrial Solid Waste Landfill	*Land Use Control Implementation Plan for the F-Area Industrial Solid Waste*	06/01/2000	44	NA

[j] No remedial action is needed for the 489-D Coal Pile Runoff Basin (Southern 75%) or the Inlet Basins portion of the 488-1D Ash Basin.

Unit Name	Document Title	Approval Date[1]	Tab Number[2]	Watershed Figure[3]
	Landfill (WSRC-RP-2000-4086, Revision 0, June 2000)			
F-Area Retention Basin, 281-3F	Appendix A of *Corrective Measures Implementation/Post-Construction Report/Final Remediation Report for the F-Area Retention Basin, 281-3F* (WSRC-RP-2001-4049, Revision 1, September 2001)	10/15/2001	6	2
Ford Building Seepage Basin, 904-91G	Appendix A of *Post-Construction Report/Corrective Measures Implementation Report/Final Remediation Report for the Ford Building Seepage Basin, 904-91G* (WSRC-RP-2003-4038, Revision 1, October 2003)	09/17/2003	7	4
General Separations Area (consists of Old Radioactive Waste Burial Ground (Including Solvent Tanks 650-01E to 22E), 643-E, HP-52 Ponds, H-Area Retention Basin, 281-3H, Spill on 05/01/1956 of Unknown of Retention Basin Pipe Leak, NBN, Warner's Pond, 685-23G, Spill on 03/08/1978 of Unknown Seepage Basin Pipe Leak in H-Area Seepage Basin, NBN, and Spill on 02/08/1978 of Unknown of H-Area Process Sewer Line Cave-in, NBN)	Appendix A of *Corrective Measures Implementation/ Remedial Action Implementation Plan (CMI/RAIP) for the General Separations Area Consolidation Unit* (WSRC-RP-2003-4053, Revision 1.1, November 2003)	12/12/2003	8	2
Gunsite 012 Operable Unit (consists of Gunsite 012 Rubble Pile, NBN, Rubble Pile Across from Gunsite 012, NBN, and ECODS G-3 [Adjacent to Gunsite 012], NBN)[k]	*Land Use Control Implementation Plan for the Gunsite 012 Operable Unit* (SRNS-RP-2011-00293, Revision 1, August 2011)	09/07/2011	42	3

[k] A remedy of No Action was selected for Rubble Pile Across from Gunsite 012 and ECODS G-3 (Adjacent to Gunsite 012).

Unit Name	Document Title	Approval Date[1]	Tab Number[2]	Watershed Figure[3]
Heavy Equipment Wash Basin, NBN	*Land Use Control Implementation Plan for the Heavy Equipment Wash Basin and Central Shops Burning Rubble Pit (631-5G)*[1] (WSRC-RP-2005-4015, Revision 1, July 2005)	09/01/2005	26	2
K-Area Bingham Pump Outage Pit, 643-1G	Section 2 of *Final Remediation Report for the K-Area Bingham Pump Outage Pit, 643-1G*, (WSRC-RP-98-4003, Revision 1, August 1998)	10/05/1998	9	4
K-Area Burning/Rubble Pit, 131-K and K-Area Rubble Pile, 631-20G	Appendix D of *Post-Construction Report for the K-Area Burning/Rubble Pit 131-K and K-Area Rubble Pile 631-20G* (WSRC-RP-2002-4095, Revision 1, October 2002)	11/22/2002	10	4
K-Area Reactor Seepage Basin, 904-65G	Appendix A of *Post-Construction Report for the K-Area Reactor Seepage Basin* (WSRC-RP-2002-4030, Revision 1, July 2002)	09/30/2002	11	4
L- and P-Area Bingham Pump Outage Pits, 643-2G, 643-3G and 643-4G	Section 2.0 of *Final Remediation Report for the L- and P-Area Bingham Pump Outage Pits, 643-2G, 643-3G and 643-4G* (WSRC-RP-2000-4030, Revision 0, March 2000)	06/13/2000	12	4 (643-2G, 643-3G) 3 (643-4G)
L-Area Oil and Chemical Basin, 904-83G	Appendix A of *Post-Construction Report/Final Remediation Report for the L-Area Oil and Chemical Basin, 904-83G* (WSRC-RP-2001-4078, Revision 1, September 2001)	11/05/2001	14	6
L-Area Reactor Seepage Basin, 904-064G	Appendix A of *Post-Construction Report/Final Remediation Report for the L-Area Reactor Seepage Basin* (WSRC-RP-2003-4118, Revision 1, February 2004)	03/19/2004	15	6
L-Area Southern Groundwater Operable Unit	*Land Use Control Implementation Plan for L-Area Southern Groundwater Operable*	05/08/2009	34	6

[1] Central Shops Burning Rubble Pit (631-5G) was designated as a No Action OU and removed from the LUCAP.

Unit Name	Document Title	Approval Date[1]	Tab Number[2]	Watershed Figure[3]
	Unit (WSRC-RP-2007-4049, Revision 1, April 2009)			
Lower Three Runs Integrator Operable Unit (IOU) Tail Portion (Middle and Lower Subunits)	*Early Action Land Use Control Implementation Plan for the Lower Three Runs Integrator Operable Unit Tail Portion (Middle and Lower Subunits)* (SRNS-RP-2013-00046, Revision 1, August 2013)	8/22/2013	46	3
Lower Three Runs IOU) Tail Portion (Upper Subunit) (consists of PAR Pond [Including the Pre-Cooler Ponds and Canals], 685-G and Old R-Area Discharge Canal, NBN)	*Land Use Control Implementation Plan for the Lower Three Runs Integrator Operable Unit (Upper Subunit)* (SRNS-RP-2022-00017, Revision 1, August 2022)	10/04/2022	50	3
M Area Operable Unit (consists of Underground Sump 321 M #001, Underground Sump 321 M #002, Salvage Yard, 741-A, and Potential Release of TCT, TET TCE, HNO3, U, Heavy Metals from 321-M Abandoned Sewer Line, NBN)	*Land Use Control Implementation Plan for the M Area Operable Unit (MAOU)* (WSRC-RP-2008-4067, Revision 1, April 2009)	05/08/2009	36	7
M-Area Inactive Process Sewer Lines Operable Unit, 081-M (consists of 313-M and 320-M Inactive Clay Process Sewers to Tims Branch, NBN)[m]	*Land Use Control Implementation Plan for the M-Area Inactive Sewer Lines Operable Unit* (WSRC-RP-2006-4068, Revision 1, April 2007)	05/17/2007	30	5 (081-M) 7 (313-M, 320-M)
Miscellaneous Chemical Basin/Metals Burning Pit, 731-4A and 731-5A[n]	Appendix A of *Interim Post-Construction Report for the Miscellaneous Chemical Basin/Metals Burning Pit, 731-4A and 731-5A* (WSRC-RP-2002-4038, Revision 1.1, December 2002)	03/13/2003	17	7

[m] The M-Area Inactive Process Sewer Lines Operable Unit is divided between the Savannah River and Floodplain Swamp Watershed and the Upper Three Runs Watershed.

[n] This LUCIP provides the signage for the Miscellaneous Chemical Basin, 731-4A; however, this LUCIP was superseded by the LUCIP for the A-Area Burning/Rubble Pits (731-A, -1A) and Rubble Pit (731-2A) and the Miscellaneous Chemical Basin/Metals Burning Pit (731-4A and -5A) Operable Unit (WSRC-RP-2006-4073, Revision 1, September 2007). The Metals Burning Pit, 731-5A, is located outside the established land use controls boundary and no further problem warranting action exist in the surface soil subunit; therefore, inspections were discontinued in 2022.

Unit Name	Document Title	Approval Date[1]	Tab Number[2]	Watershed Figure[3]
Old F-Area Seepage Basin, 904-49G	Appendix A *of Post-Construction Report for the Old F-Area Seepage Basin, 904-49G* (WSRC-RP-2000-4100, Revision 1, August 2001)	08/01/2001	18	7
P-Area Burning/Rubble Pit, 131-P	Appendix A of *Corrective Measures Implementation/Remedial Action Implementation Plan P-Area Burning/Rubble Pit, 131-P* (WSRC-RP-2002-4216, Revision 1, August 2003)	09/26/2003	19	6
P Area Operable Unit (consists of P-Area Ash Basin (Including Outfall P-007), 188-0P; P-Area Process Sewer Lines as Abandoned, NBN and Spill on 03/15/79 of 5500 Gallons of Contaminated Water, NBN; P-Area Reactor Area Cask Car Railroad Tracks as Abandoned, NBN; Potential Release from P-Area Disassembly Basin, NBN; Potential Release from P-Area Reactor Cooling Water System, 186/190-P)	*Land Use Control Implementation Plan for the P Area Operable Unit* (SRNS-RP-2010-00619, Revision 1, October 2010)	11/29/2010	40	6
P-Area Reactor Seepage Basins, 904-61G, -62G, and -63G	*Land Use Control Implementation Plan for P-Area Reactor Seepage Basins, 904-61G, -62G, and -63G* (WSRC-RP-2003-4139, Revision 1, January 2004)	03/03/2004	20	6
R-Area Bingham Pump Outage Pits, 643-8G, -9G, and -10G and R-Area Unknown Pits #1, #2, and #3, RUNKS-1, -2, and -3	Appendix B of *Final Remediation Report for the R-Area Bingham Pump Outage Pits, 643-8G, -9G, and –10G and R-Area Unknown Pits #1, #2, and #3, RUNKS-1, -2, and –3* (WSRC-RP-2003-4061, Revision 1, July 2003)	08/29/2003	21	3
R-Area Burning/Rubble Pits (131-R and -1R) and R-Area Rubble Pile (631-25G)	*Land Use Control Implementation Plan for R-Area Burning/Rubble Pits (131-R and 131-1R) and R-Area Rubble Pile (631-25G)*	03/16/2005	25	3

Unit Name	Document Title	Approval Date[1]	Tab Number[2]	Watershed Figure[3]
	Operable Unit (WSRC-RP-2004-4119, Revision 0, January 2005)			
R Area Operable Unit (consists of Area on the North Side of Building 105-R, Laydown Area North of 105-R, and Release from the Decontamination of R-Area Reactor Disassembly Basin, NBN, Combined Spills North of Building 105-R, NBN, Cooling Water Effluent Sump, 107-R, Potential Release from R-Area Disassembly Basin, NBN, Potential Release of NaOH/H2SO4 from 183-2R, NBN, R-Area Ash Basin, 188-0R, R-Area Groundwater, R-Area Process Sewer Lines as Abandoned, NBN, R-Area Reactor Area Cask Car Railroad Tracks as Abandoned, NBN)	*Land Use Control Implementation Plan for the R Area Operable Unit* (SRNS-RP-2010-01208, Revision 1, February 2011)	03/07/2011	43	3
R-Area Reactor Seepage Basins, 904-57G, -58G, -59G, -60G, -103G, and -1-4G	*Land Use Control Implementation Plan for R-Area Reactor Seepage Basins, 904-57G, -58G, -59G, -60G, -103G, and -104G* (WSRC-RP-2004-4032, Revision 1, September 2004)	11/16/2004	24	7
Silverton Road Waste Unit, 731-3A	Section 2.0 of *Final Remediation Report for the Silverton Road Waste Unit (731-3A)* (WSRC-RP-97-153 Revision 1.1, March 1998)	04/23/1998	32	5
SRL Seepage Basins, 904-51G1, - 53G2, -54G, and -55G	Appendix A of *Corrective Measures Implementation Report/Post-Construction Report/ Final Remediation Report for the SRL Seepage Basins, 904-51G1, -53G3, -54G, and -55G* (WSRC-RP-2001-4123, Revision 1, February 2002)	04/04/2002	22	7

Unit Name	Document Title	Approval Date[1]	Tab Number[2]	Watershed Figure[3]
T Area Operable Unit (consists of Neutralization Sump, 678-T; X-001 Outfall Drainage Ditch, NBN; TNX Outfall Delta, Lower Discharge Gully, and Swamp, NBN; and TNX-Area Process Sewer Lines and Tile Fields as Abandoned, NBN)	*Land Use Control Implementation Plan for T Area Operable Unit* (WSRC-RP-2005-4029, Revision 1, July 2006)	10/10/2006	28	5
TNX Groundwater (082-G), Old TNX Seepage Basin (904-076G), and New TNX Seepage Basin (904-102G)	*Land Use Control Implementation Plan for TNX Operable Unit* (WSRC-RP-2003-4173, Revision 1, April 2004)	05/04/2004	23	5
Wetland Area at Dunbarton Bay	*Land Use Control Implementation Plan for the Wetland Area at Dunbarton Bay in Support of Steel Creek Integrator Operable Unit (U)* (SRNS-RP-2018-00479, Revision 1, November 2018)	11/28/2018	48	6

[1] Date of the latest regulatory approval received.
[2] This refers to the tab attachment for the unit LUCIP.
[3] This refers to the location of the unit on the watershed figures in the LUCAP.

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LUCIP for the
A-Area Burning/Rubble Pits, 731-A and -1A
and A-Area Rubble Pit, 731-2A

Appendix A *of Post-Construction Report for the A-Area Burning/Rubble Pits, 731-A and –1A and A-Area Rubble Pit, 731-2A*
(WSRC-RP-2003-4019, Revision 1, July 2003)

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Appendix A

Significant Reference Document

Unit-Specific Land Use Control Implementation Plan

for the A-Area Burning/Rubble Pits (731-A/1A) and Rubble Pit (731-2A)

APPENDIX A

LUCIP

A-Area Burning/Rubble Pits and Rubble Pit

Land Use Control Implementation Plan (LUCIP)

The A-Area Burning/Rubble Pits and Rubble Pit (ABRP) LUCIP will be appended to the Savannah River Site (SRS) Land Use Control Assurance Plan (LUCAP) which has been approved by the USDOE, USEPA, and SCDHEC.

Remedy Selection

The ABRP is located in the northwest portion of SRS, approximately 2.4 kilometers (1.5 miles) south of the A/M Area operations and 4.8 kilometers (3 miles) east of the SRS boundary (Figure A-1). The ABRP is located in the Upper Three Runs Creek Watershed and is situated on the west side of Road C-1, a dirt road (Figure A-1). Due to the receipt of waste from A/M Area, the ABRP is being addressed in the SRS Resource Conservation and Recovery Act/Comprehensive Environmental Response, Compensation, and Liability Act (RCRA/CERCLA) program.

Between 1951 and 1973, Pits 731-A and 731-1A were used to burn paper, plastics, wood, rubber, rags, cardboard, oil, degreasers, and solvents. Combustible materials were burned monthly. Pit 731-2A was only used as a rubble pit. After burning was discontinued in 1973, Pits 731-A and 731-1A were also converted to rubble pits and used to dispose of concrete rubble, bricks, tile, asphalt, plastics, metal, wood products, and rubber. When the pits were filled to capacity, they were covered with compacted clay-rich native soils and vegetation was established. The actual closing date is not recorded. However, the

estimated time is 1978. After the last use of Pit 731-2A in 1983, the area was backfilled and seeded.

Ground penetrating radar data show the two Burning/Rubble Pits (731-A/1A) to be approximately 22 feet wide, 9 to 10 feet deep and 250 feet in length. The arial dimensions of the Rubble Pit (731-2A) are believed to be approximately 40 feet (width) by 650 feet (length); the depth is not known, but is suspected to be up to 20 feet. The Pits Area is defined as Pits 731-A, 731-1A, and 731-2A.

Two other areas within the operable unit (OU) were investigated. The first area (designated as the "Potential Pit") has been tentatively identified approximately 500 feet east of the Pits Area (Figure A-1). The Potential Pit was identified based on physical evidence (depression and subsidence) along the ground surface and interviews with SRS personnel. The second area (designated as the "Depressional Area" due to its lower elevation) is located approximately 300 feet east of the Potential Pit (Figure A-1). No specific disposal records or historical use information is available for the Potential Pit or the Depressional Area. The Land Use Controls (LUCs) do not apply to this Potential Pit and Depressional Area.

The IAPP was submitted in accordance with the Federal Facility Agreement (FFA) and the approved implementation schedule, and was approved by the United States Environmental Protection Agency (USEPA) and the South Carolina Department of Health and Environmental Control (SCDHEC) on December 6, 1999. The IROD documented the selected remedial action and was approved by USEPA on May 25, 2000 and SCDHEC on May 24, 2000.. In summary, the ABRP surface soils contaminated with benzo(a)pyrene will be covered with a one-foot soil cover. The groundwater will be treated using AS combined with passive/active soil vapor extraction.

The combination of alternatives for soil cover, groundwater remediation, and institutional controls is intended to be an interim action for the ABRP OU as a whole, to reduce risk to

human health and the environment. However, the selected alternative for the soils represents a final action because it will meet the final remedial action objective (RAO) and final remedial goal (RG) established in the IROD. An interim action for this OU was chosen because of the uncertainty of the groundwater remediation within the overall unit remediation strategy. The uncertainty in the groundwater remediation strategy is based on 1) possible discontinuities within the confining unit that separates the M-Area aquifer zone from the underlying uppermost confined aquifer (Lost Lake), and therefore the potential for contamination of the underlying Lost Lake aquifer; 2) a volatile organic compound (VOC) groundwater plume located upgradient from the ABRP. The groundwater plume is associated with the M-Area Hazardous Waste Management Facility (HWMF) (a facility closed under RCRA and undergoing corrective action for the contaminated groundwater associated with that unit). Since the plume is moving in the general direction of the ABRP, it is not clear whether it may represent a future VOC source relative to the ABRP groundwater. An interim action for the ABRP groundwater subunit will allow an early start for remedial activities while generating additional data on the nature and extent of the groundwater interactions between the ABRP and A&M Area. These data will assist in development of the final groundwater RGs. The rationale for the proposed groundwater interim action is centered on remediating the "hot spot" portion of the groundwater plume.

The vadose zone remediation was added to the interim groundwater remedial strategy due to the discovery of VOC contamination beneath the "trench/pit". Some uncertainty also exists with respect to the vadose zone remediation strategy. The uncertainty in the vadose zone remediation strategy is based on 1) the implementation of the new microblower technology which has limited performance data in this type of application and 2) the extent of contamination in the trench/pit area. Evaluation of a full range of alternatives for vadose zone and groundwater remediation will be included in the final CMS/FS.

According to the *Savannah River Site Future Use Report* (USDOE 1996), the ABRP OU is located in an area designated for future residential use. However, due to the proximity of the ABRP OU to the A-Area Ash Pile, the two Materials Storage Areas (temporarily stored petroleum-contaminated soil), and the A/M and B-Area industrial zones, future industrial land use is the most likely scenario. The ABRP will not meet unrestricted land use criteria for soils following the soil cover detailed in the Interim Corrective Measures Implementation/ Remedial Action Implementation Plan (ICMI/RAIP). Groundwater beneath the unit exceeds the maximum contaminant levels (MCLs). Although institutional controls are included in all of the alternatives, the United States Department of Energy (USDOE) has recommended that residential use of SRS land in the vicinity of ABRP be controlled; therefore, prohibition of future residential use and potential residential water usage and other controls will be taken to ensure long-term protectiveness in this area (USDOE 1996).

A post-construction conceptual site model (CSM) for the ABRP, which illustrates the broken pathways after implementation of the remedy, is included as Figure A-2.

Land Use Controls

Institutional controls are intended to be an alternative that maintains control of the area and that is protective of human health and the environment. Implementation of this alternative will require some near-term actions.

For the ABRP, the land use control (LUC) objective necessary to ensure protectiveness of the preferred alternative is:

- Prevent direct contact with BaP-contaminated surface soils, such that the constituents of concern (COCs) are not a continued significant risk to human health.

- Prevent direct contact with the vadose zone and groundwater during the groundwater interim remedial action.

The institutional controls required to prevent unauthorized exposure to the contaminated media at the ABRP include the following:

- Controlled access to the ABRP through existing SRS security gates and perimeter fences and the site use/site clearance programs

- Signs posted in the area to indicate that waste remains in the vicinity of the ABRP above levels allowing for unrestricted land use and to contact the waste unit custodian prior to entry, and

- Notification of residual hazardous waste to any future landowner through deed notification, as required under CERCLA Section 120(h).

Figure A-1 shows the location of the ABRP OU and the SRS coordinates of the ABRP OU.

In the long term, if the ABRP OU is transferred to non-federal ownership, the need for deed restriction will be evaluated and performed through an amended ROD with USEPA and SCDHEC approval and actions taken pursuant to CERCLA 120(h). The actions will include a deed notification disclosing former waste management and disposal activities, as well as any remedial actions taken at the waste unit. The deed notification will, in perpetuity, notify any potential purchaser that the property has been used for the management and disposal of waste and other materials, including hazardous substances. At this time, RCRA deed notification requirements are not required for this waste unit since this is an interim action. The deed, if necessary, would include restrictions precluding residential use of the property. The need for deed restrictions may be re-evaluated at the time of transfer in the event exposure assumptions differ and/or

contamination no longer poses an unacceptable risk under residential use. Proposed changes in deed restrictions will require USEPA and SCDHEC review and approval. The survey plat will be reviewed and updated, as necessary, at the time the site is transferred and will be recorded with the Aiken County recording agency. This proposal is consistent with USEPA guidance and is an effective use of risk management principles.

The elements of the institutional control corrective action, which consists of land restrictions without any engineering controls, are composed of deed notifications when the parcel is transferred from USDOE ownership, access controls that include posting of identification signs, and field walkdowns for general site conditions. These land use controls will be implemented in perpetuity for this OU.

Each element of the institutional controls corrective action is discussed below.

Deed Notification

A deed notification shall be filed in the appropriate county records in accordance with CERCLA 120(h), which requires the government to create a deed when land on which any hazardous substance was stored, released, or disposed is transferred to non-federal ownership. The transference of the ABRP OU is unlikely. In the event the property is transferred, a deed notification will be filed with Aiken County. Per CERCLA 120(h)(3)(A), the deed shall contain, to the extent practical, such information as is available based on the complete search of agency files, including the following:

- A notice of the type and quantity of such hazardous substances;
- Notice of the time at which such storage, release, or disposal took place; and
- A description of the remedial action taken, if any.

Per CERCLA 120(h)(3)(B), the deed shall also contain a covenant warranting that

- All remedial action necessary to protect human health and the environment with respect to any such substance remaining on the property has been taken before the date of such transfer;

- Any additional remedial action found to be necessary after the date of such transfer shall be conducted by the United States Government, and

- A clause granting the United States Government access to the property in any case in which remedial action or corrective action is found to be necessary after the date of such transfer.

At this time, RCRA permit requirements are not applicable for this waste unit since this is an interim action.

Access Controls

On-Site Workers

In accordance with WSRC 1D, *Site Infrastructure and Services Manual*, Procedure 3.02, *Site Real Property Configuration Control*, use of all lands and waters on the SRS shall be coordinated via the Site Use Program. No use of land (i.e., excavation or any other land use) shall be undertaken without prior approval documented by a Site Use Permit. Also, in accordance with Procedure 3.02, all work at SRS that adds to or modifies features or facilities portrayed on the SRS development maps (i.e., plot plans of facilities/utilities at SRS) is authorized by a Site Clearance Permit before any excavation activities. All Site Clearance requests are reviewed to verify that either an approved Site Use Permit has been obtained or that an existing Site Use Permit has sanctioned the request. Verification of USDOE approval for intended land use must be obtained before issuance of a Site Clearance Permit. The Site Use and Site Clearance processes are applicable to all

activities and personnel on site (including subcontractors). The processes are controlled within the SRS Quality Assurance Program.

The SRS identifies all buildings and facilities on maps used in the Site Use/Site Clearance Program and includes a 200-foot buffer zone around each facility. This waste unit is identified on these maps as a CERCLA facility.

Any work proposed in these areas will be strictly controlled and workers will be appropriately trained and briefed about health and safety requirements if work is deemed necessary for maintenance. Any changes in the use or disturbance of the ABRP will be cleared with the USEPA and SCDHEC before disturbance occurs. To prevent unknowing entry and to ensure that unrestricted use of the waste unit does not occur while under ownership of the government, identification signs will be posted. The signs will be legible from a distance of at least 25 feet. See Figure A-1 for locations of the signs. The signs will read:

A-Area Burning/Rubble Pits (731-A/1A) and Rubble Pit (731-2A)

"Danger – Unauthorized Personnel Keep Out.

This unit contains hazardous substances. Do not dig or excavate.

Do not enter without contacting the waste site custodian."

Custodian: Manager, Post Closure Maintenance
Phone: (803) 952-6882

Site-specific controls (i.e., fences) are not required for ABRP OU since the exposure to the casual worker or trespasser does not warrant this level of protection.

Trespassers

Additionally, while under the ownership of the USDOE, access control of the entire SRS will continue to be maintained in accordance with the 1992 RCRA Part B Permit Renewal Application, Volume I, Section F.1. This section describes the 24-hour surveillance system (R.61-79.264.14(b)(1)), artificial or natural barriers (R.61-79.264.14(b)(2)(i)), control entry systems (R.61-79.264.14(b)(2)(ii)), and warning signs (R.61-79.264.14(c)) in place at the SRS boundary to comply with the security requirements for a RCRA-permitted facility.

Field Walkdowns and Maintenance for Institutional Controls

"Monitoring" will be performed to verify that LUCIP requirements are met. Semi-annual monitoring of the ABRP OU, 731-A/1A and 731-2A, will be conducted for items such as accuracy and legibility of signs, visible subsidence or erosion of the waste unit, proper vegetative growth, mowing, etc. Subsidence or erosion will be corrected by backfilling the affected area with clean soil and seeding the area to prevent further erosion. USEPA and SCDHEC will be notified of the results of any inspection, event, and/or action that could indicate some potential compromise of institutional controls within 30 days of identification and will be documented in the Federal Facility Agreement Annual Progress Report. All other routine maintenance activities (i.e., mowing, etc.) will be documented and maintained in files that are subject to USEPA and SCDHEC review and audit. A copy of the completed inspection form is maintained in the Environmental Restoration Division administrative record files.

Inspections at the ABRP will be performed to ensure that institutional controls remain protective and consistent with all remedial action objectives. Semi-annual inspections will be conducted. The A-Area Burning/Rubble Pits (731-A/1A) and Rubble Pit (731-2A) Inspection Sheet is included in Appendix A (Figure A–3).

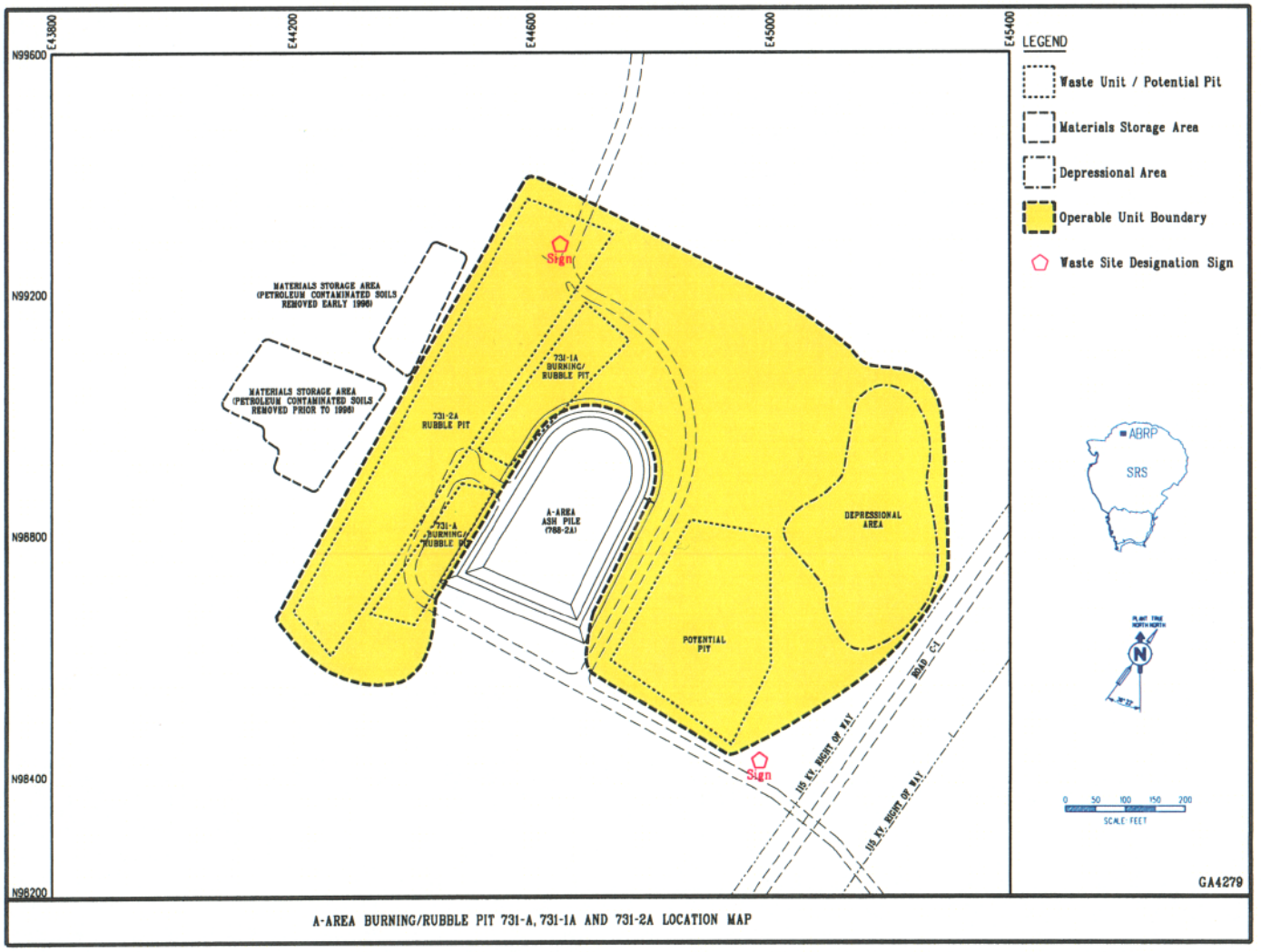


Figure A-1. The A-Area Burning/Rubble Pits (731-A/1A) and Rubble Pit (731-2A) Operable Unit

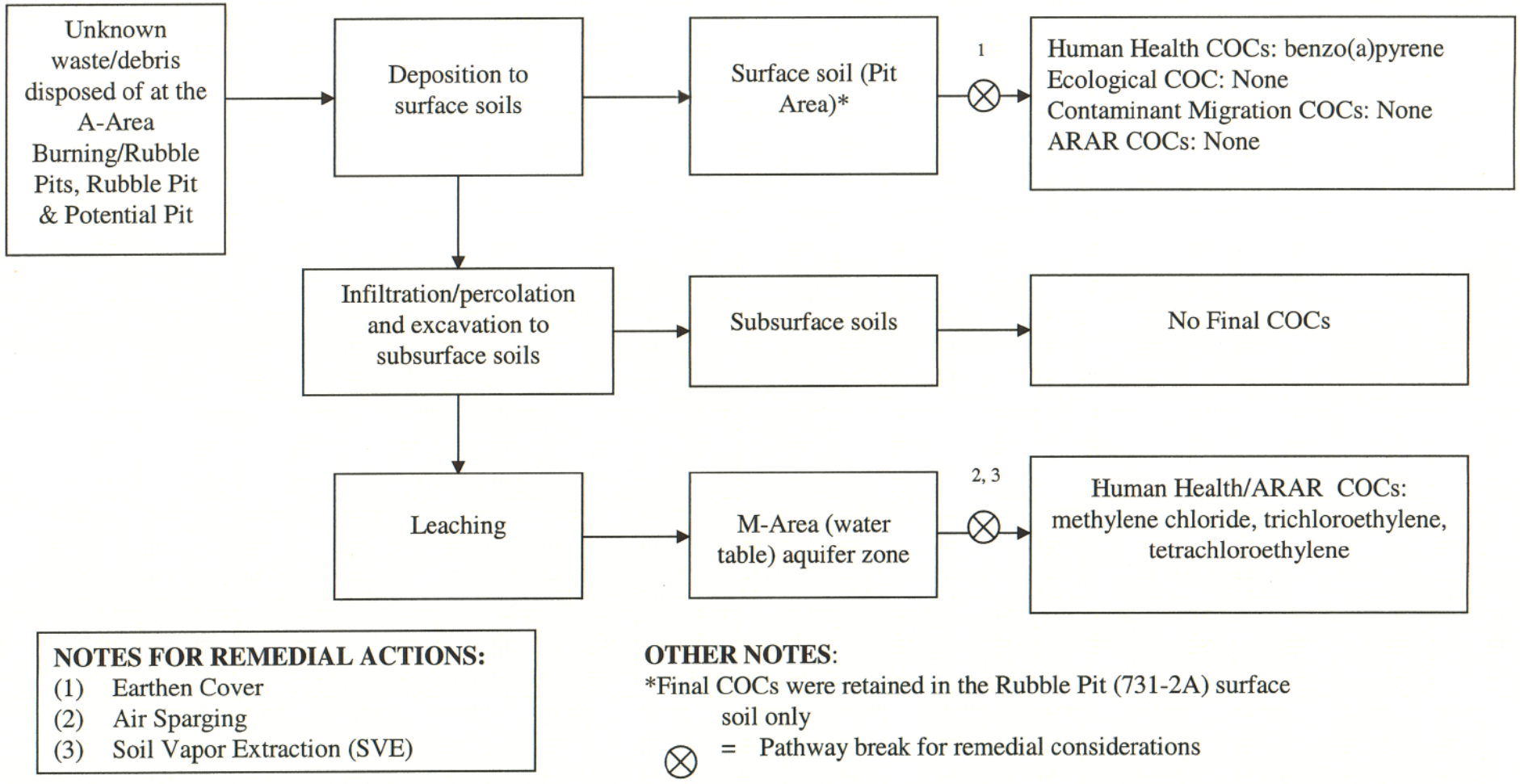


Figure A-2. Simplified Conceptual Site Model (CSM) for the A-Area Burning/Rubble Pits (713-A/1A) and Rubble Pit (731-2A) Operable Unit

ABRP (731-A/1A/2A) INSPECTION SHEET

A = Satisfactory X = Unsatisfactory (Explanation Required)	A or X	Observation or Corrective Action Taken
1. Verify that there is no excavating, digging or construction activity on the soil cover.		
2. Verify that there is no woody vegetation growing on the soil cover. Remove or identify as needed.		
3. Visual check vegetative cover for grass density, with no bare spots no more than 9 square feet in area. The height of the vegetation cover should not impair the visual inspection of the soil cover. This will be determined by the inspector.		
4. Verify the condition of the roads to the well sites and waste unit is adequate.		
5. Does unit show signs of erosion or subsidence?		
6. Are there any signs of burrowing animals (holes)?		
7. Verify condition of drainage ditches and sediment for presence of excessive erosion, sediment buildup, and any debris restricting water flow.		
8. Inspect general condition of site (housekeeping)		
9. Verify that the signs are correct and legible from a distance of at least 25 feet.		
10. Comments/Other		

CAUTION: The inspector shall notify the Post-Closure Manager and Environmental Compliance Authority **IMMEDIATELY** if there has been a breach or compromise of the institutional controls of this Waste Unit. Refer to Procedure SOP-019.

Inspected By:_____/_____Date:_____
(Print Name) (Signature)

Reviewed By:_____/_____Date:_____
Post-Closure Manager (Print Name) (Signature)

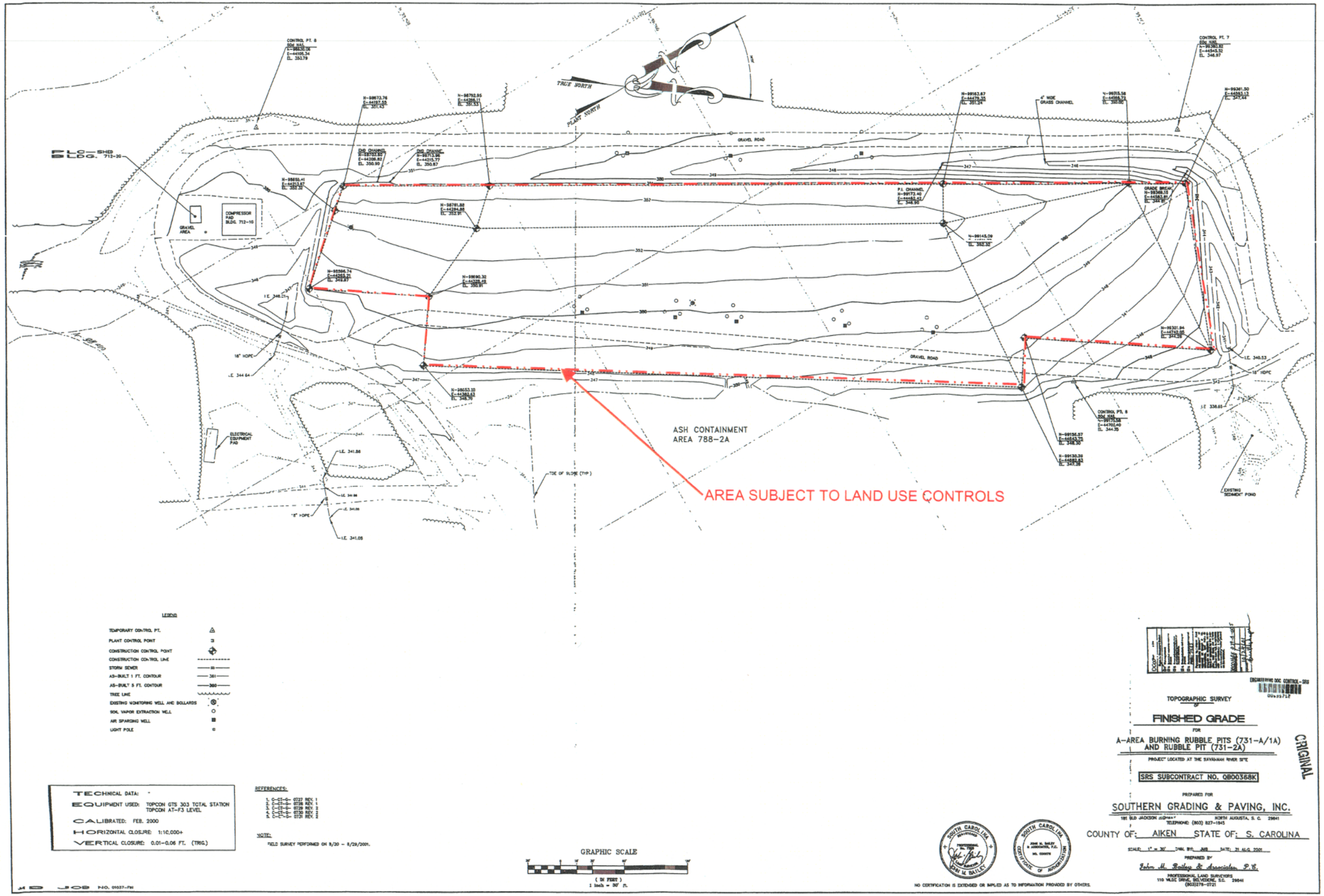
Figure A-3. Inspection Sheet

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Attachment 1

Survey Plat

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TRUE NORTH
PLANT NORTH
GRAVEL ROAD
4' WIDE GRASS CHANNEL
COMPRESSOR PAD BLDG. 712-1G
GRAVEL AREA
ELECTRICAL EQUIPMENT PAD
ASH CONTAINMENT AREA 788-2A
AREA SUBJECT TO LAND USE CONTROLS
TOE OF SLOPE (TYP.)
EXISTING SEDIMENT POND
LEGEND
TEMPORARY CONTRO. PT.
PLANT CONTROL POINT
CONSTRUCTION CONTROL POINT
CONSTRUCTION CONTROL LINE
STORM SEWER
AS-BUILT 1 FT. CONTOUR
AS-BUILT 5 FT. CONTOUR
TREE LINE
EXISTING MONITORING WELL AND BOLLARDS
SOIL VAPOR EXTRACTION WELL
AIR SPARGING WELL
LIGHT POLE
TECHNICAL DATA:
EQUIPMENT USED: TOPCON GTS 303 TOTAL STATION
TOPCON AT-F3 LEVEL
CALIBRATED: FEB. 2000
HORIZONTAL CLOSURE: 1:10,000+
VERTICAL CLOSURE: 0.01-0.06 FT. (TRIG.)
REFERENCES:
NOTE:
FIELD SURVEY PERFORMED ON 8/20 - 8/29/2001.
GRAPHIC SCALE
(IN FEET)
1 inch = 30' ft.
TOPOGRAPHIC SURVEY
OF
FINISHED GRADE
FOR
A-AREA BURNING RUBBLE PITS (731-A/1A)
AND RUBBLE PIT (731-2A)
PROJECT LOCATED AT THE SAVANNAH RIVER SITE
SRS SUBCONTRACT NO. 0800368K
PREPARED FOR
SOUTHERN GRADING & PAVING, INC.
COUNTY OF: AIKEN STATE OF: S. CAROLINA
PREPARED BY
John M. Bailey & Associates, P.A.
PROFESSIONAL LAND SURVEYORS
NO CERTIFICATION IS EXTENDED OR IMPLIED AS TO INFORMATION PROVIDED BY OTHERS.
ORIGINAL

LUCIP for the A-Area Miscellaneous Rubble Pile, 731-6A
Appendix A of *Corrective Measures Implementation/Remedial Action Implementation Plan for A-Area Miscellaneous Rubble Pile, 731-6A*
(WSRC-RP-2002-4067, Revision 1, July 2003)

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APPENDIX A

LAND USE CONTROL IMPLEMENTATION PLAN FOR THE

A-AREA MISCELLANEOUS RUBBLE PILE (731-6A) OPERABLE UNIT

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Land Use Control Implementation Plan for the

A-Area Miscellaneous Rubble Pile (731-6A) Operable Unit

This A-Area Miscellaneous Rubble Pile (731-6A) Operable Unit (ARP OU) Land Use Control Implementation Plan (LUCIP) will be appended to the Savannah River Site (SRS) Land Use Control Assurance Plan (LUCAP).

The selected remedy leaves hazardous substances in place that pose a potential future risk and will require land use restrictions for an indefinite period of time. As negotiated with the United States Environmental Protection Agency (USEPA) and in accordance with USEPA Region IV policy (Johnston 1998), the SRS has developed a LUCAP (WSRC 2002) to ensure that land use restrictions are maintained and periodically verified. This LUCIP provides detailed and specific measures required for the land use controls selected as part of this remedy. The United States Department of Energy (USDOE) is responsible for implementing, maintaining, monitoring, reporting upon, and enforcing the land use controls described herein. Upon final approval, the LUCIP will be appended to the LUCAP and is considered incorporated by reference into the Post-Construction Report/Final Remediation Report (PCR/FRR), establishing land use controls implementation and maintenance requirements enforceable under the Comprehensive Environmental Response, Compensation, and Recovery Act (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.

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1.0 REMEDY SELECTION

1.1 A-Area Miscellaneous Rubble Pile (731-6A) Operable Unit

The ARP OU is a Resource Conservation and Recovery Act/Comprehensive Environmental Response, Compensation, and Liability Act (RCRA/CERCLA) unit. The ARP OU is located in the northwest part of SRS within A Area. It is located approximately 1.1 mi from the nearest site boundary and approximately 0.7 mi south-southeast of the intersection of SRS Road 1-A and SRS Road D. A Area serves as the main administrative and research center for SRS. The ARP OU is situated immediately east of M Area. M Area is an industrial center with support and administration facilities. These two areas are collectively referred to as the A/M Area. Other RCRA/CERCLA units in the vicinity of the ARP OU are the A-Area Coal Pile Runoff Basin and the 716-A Motor Shop Seepage Basin. Within the vicinity of the ARP OU is the 782-3M Soil Vapor Extraction Unit (SVEU).

The ARP OU covers approximately 5.8 acres. The unit is bounded on the southwest and southeast by outfall drainages emanating from former National Pollutant Discharge Elimination System (NPDES) Outfall A-014 and Outfall A-011, respectively. The A-011 Outfall no longer exists and the A-014 Outfall has been relocated approximately 0.6 miles southeast of the ARP OU. A gravel road bounds the ARP OU to the north.

Disposal activities at ARP OU began in the early 1950s but the specific waste disposal at the unit was not documented. Field investigation and characterization of the unit identified construction rubble and an ash material as the primary wastes disposed of at the unit. Based on the results of the Phase II characterization, the ARP OU has been divided into three subunits: the Piles Area, the Ash Area and the Trenches Area.

The Piles Area, located on the eastern side of the unit, contains many small mounds of construction debris 2 to 5 ft high and covers a total area of approximately 2.3 acres. The debris primarily consists of construction materials that were disposed of directly on the ground surface. This material includes shingles and siding, concrete, brick, electrical boxes, roofing and wall

board materials, empty paint cans, empty drums and buckets, building materials, scrap metal, insulation, tar, plastic, glass, timbers, and transite containing non-friable asbestos.

The Ash Area is located in the central portion of the unit and is approximately 1.8 acres. Boreholes drilled in this area encountered buried construction debris (including transite) and an ash layer. The ash layer was primarily in the upper 4 ft and consisted of a dark-gray, low-density ash material that was physically distinct from the orange sandy silts of the native soils.

The Trenches Area is approximately 1.6 acres located in the westernmost portion of the ARP OU. It consists of a wooded area approximately 200 by 100 ft and a grassy area which covers the remainder of the Trenches Area. The wooded area is located in the northwest portion of the Trenches Area. Debris piles consisting of the same types of material found in the Piles Area are scattered throughout this area. The T-shaped trench is approximately 8 to 12 ft deep.

The figure in Attachment A-1 provides a unit map of the ARP OU.

1.2 Nature and Extent of Contamination in the ARP OU

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 ARP OU. The risks associated with each subunit are presented in the following paragraphs.

Piles Area

At the Piles Area, two very small, localized areas of concern were identified:

- the polychlorinated biphenyl/polycyclic aromatic hydrocarbon (PCB/PAH) waste pile, and
- the lead hot spot.

The arsenic and aroclor-1254 (a PCB) associated with these two small hot spots in the Piles Area pose potential carcinogenic risks of 9×10^{-6} and 7×10^{-5} to future industrial workers and residents, respectively. The risks associated with the PAHs in the waste pile were not quantified in the baseline risk assessment because composite samples from the waste pile were not included in the

0- to 0.3-m (0- to 1-ft) exposure data set. The waste pile in question was created during the characterization by physically pushing soil and debris aside to allow for 0- to 1-foot soil samples to be collected adjacent to the debris piles. Based on the physical shape of the pile, it was not appropriate to designate 0- to 1-foot samples. Grab and composite samples were taken from the pile by auguring into the side of the pile at several locations. These data were used to determine if the waste pile is principal threat source material (PTSM). The lead hot spot contains elevated levels of lead (maximum concentration of 9.6 percent) that contribute to unacceptable levels of the potential non-carcinogenic risk. Aroclor-1254, arsenic, lead, and PAHs [human-health constituents of concern (COCs)] are present in the Piles Area at acceptable risk levels (less than $1x10^{-6}$ under a hypothetical future residential scenario) if the two hot spots are removed.

The PCB/PAH waste pile was identified as PTSM due to the high toxicity of benzo(a)pyrene (average concentration of 910 mg/kg exceeds 1 x 10^{-3} risk to an industrial worker) and because it occupies a significant volume. The lead hot spot is not PTSM because it was not considered a discernible source although lead concentrations are high.

Ash Area

In the Ash Area, arsenic was identified as a human-health COC for the future industrial worker and resident exposed to surface soil (ingestion risk $2x10^{-6}$ and $2x10^{-5}$, respectively). Average arsenic concentrations are approximately two times higher than average unit-specific background concentrations.

Trenches Area

In soil at the Trenches Area, human-health COCs include arsenic and the following PAHs: benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, and dibenzo(a,h) anthracene. The total carcinogenic risks associated with exposure to soil for a future industrial worker and resident are 3×10^{-5} and 2×10^{-4}, respectively. The primary contaminants are benzo(a)pyrene (associated with the asphaltic debris source area) and arsenic (throughout the subunit).

There are no unacceptable risks to ecological receptors at any of the three subunits (Piles Area, Ash Area, and Trenches Area) associated with the ARP OU.

Modeling was performed to evaluate the potential for soil contaminants to leach to groundwater. Based on the results of the modeling, no contaminant migration COCs are associated with the following ARP OU subunits: Piles Area and Ash Area. However, the modeling did predict that tetrachloroethylene (PCE) and trichloroethylene (TCE) would exceed their respective maximum contaminant levels of 5 μg/L in about 500 and 200 years, respectively, in the Trenches Area. Soil samples taken from the vadose zone show that PCE and TCE have not migrated from the trench. Therefore, these constituents are identified as refined contaminant migration COCs for the Trenches Area. The PCE and TCE are limited to the western portion of the T-shaped trench.

1.3 Remedial Action Overview

Based on the ARP OU characterization results, the ARP OU has been subdivided into three subunits: the Piles Area, the Ash Area, and the Trenches Area. The ARP OU future land use will be industrial. Unrestricted land use is inappropriate at the Ash and Trenches subunits due to the presence of contaminated soil. After implementation of the Piles subunit remedy, the Piles subunit will be available for unrestricted land use and no land use controls will be required. However, the groundwater beneath the ARP OU has been impacted by SRS operations not associated with the unit. The groundwater contamination is being addressed under the RCRA corrective action program for A/M Area. The selected alternatives for the ARP OU are described in the following paragraphs.

Piles Area

The selected alternative for the Piles Area subunit is Removal and Disposal of Lead Hot Spot and PCB/PAH Waste Pile. The selected remedy for this subunit entails the following:

- Excavate the lead hot spot soil (2 yd^3) and remove the PCB/PAH waste pile (10 yd^3).
- Remove the excavated soil and transport it from SRS to a permitted offsite disposal facility.
- Backfill the excavated spots with clean soil from an SRS borrow pit.
- Grade the clean soil to match the surrounding topography and cover the backfilled spots with vegetative cover to minimize erosion.

Excavation and removal of contaminated soil from the Piles Area will remove the PTSM (benzo(a)pyrene) from the ARP OU and protect future industrial workers or residents from exposure to refined COCs at the Piles Area (arsenic and lead at the lead hot spot; and aroclor-1254, and benzo(a)pyrene, and other PAHs at the PCB/PAH waste pile).

Ash Area

The selected alternative for the Ash Area subunit is Institutional Controls. The selected remedy for this subunit entails the following:

- Implement institutional controls that would prohibit future residential land use and limit activities by future industrial workers. Institutional controls implemented at the Ash Area will protect future industrial workers from exposure to surface soil containing arsenic (ingestion risk = 2×10^{-6}).
- Install access control warning signs to restrict access to the unit and activities at the unit by future industrial workers.

Trenches Area

The selected alternative for the Trenches Area subunit is Active Soil Vapor Extraction (ASVE), Institutional Controls, and 1-foot Soil Cover. The selected remedy for this subunit entails the following:

- Cover the contaminated portion of the Trenches Area with a 1-foot soil cover (minimum) to reduce the exposure of current remedial workers and future workers to surface contamination.

- Install 7 ASVE and 12 monitoring wells, connect the ASVE wells to an existing SVEU (782-3M) that is adjacent to the unit, and operate (estimated remediation time is 5 years) the system until the TCE and PCE are removed from the soil to the levels where they no longer pose a migration threat to the groundwater.

- Install access control warning signs and implement institutional controls to prohibit future residential land use and restrict access to the unit and activities at the unit by future industrial workers.

For the Ash Area and the Trenches Area, the USDOE currently controls access to SRS through fencing, security gates and badging requirements. SRS activities at any specific OU are controlled through the site use/site clearance program. The field conditions at the Ash Area will be evaluated to determine the effectiveness of the selected alternative and to identify whether further or additional remedial action is appropriate for this subunit during the 5-year remedy reviews. These institutional controls would be in place in perpetuity.

The post-remedial action conceptual site model (see Attachment A-4) shows the broken pathways and the remaining residual risk to the future industrial worker.

According to the SRS Future Use Project Report (USDOE 1996a), residential use of SRS land should be prohibited.

2.0 LAND USE CONTROLS

Institutional controls are intended to be an alternative that maintains control of the area and that is protective of human health and the environment. Considering the residual risk mentioned above, the land use control objectives at the ARP OU are to:

- provide controlled access to the ARP OU through existing SRS security gates and perimeter fences and the site use/site clearance programs,
- post signs in the area to indicate that waste remains in the vicinity of the ARP OU above levels allowing for unrestricted land use and to contact the waste unit custodian prior to entry,
- maintain the use of the Ash and Trenches Areas for industrial activities only, and
- prevent unauthorized access to the closed CERCLA unit as long as the waste remains a threat to human health or the environment.

Current access controls and deed notification needed to maintain the LUCs are described in the following sections of this LUCIP.

2.1 Access Controls

2.1.1 On-Site Workers

In accordance with WSRC 1D, *Site Infrastructure and Services Manual*, Procedure 3.02, "Site Real Property Configuration Control," use of all lands and waters on SRS shall be coordinated via the Site Use Program. All employees, contractors, and visitors to the SRS require adherence to the Site Use Program. This program ensures authorization of all work performed on the SRS that adds, modifies, or removes features portrayed on the SRS development maps. No use of land (i.e., excavation or any other land use) shall be undertaken without prior approval documented by a Site Use Permit. This authorization is obtained through the completion of a Site Clearance Request Form. Also, in accordance with Procedure 3.02, all work at SRS that adds to or modifies features or facilities portrayed on SRS development maps (i.e., plot plans of

facilities/utilities at SRS) will be authorized by a Site Clearance Permit before any excavation activities are conducted. All site clearance requests will be reviewed to verify that either an approved Site Use Permit has been obtained or that an existing Site Use Permit has sanctioned the request.

SRS, specifically the Site Development Control Department, is responsible for updating, maintaining, and reviewing site maps, including Federal Facility Agreement (FFA 1993) OU identifications. If a site clearance request is made that may impact an FFA OU, the Site Clearance Request Form is sent to the FFA OU reviewer, who is in the SGCP, for either approval or disapproval. The roles and responsibilities of each individual are detailed in WSRC 1D, Procedure 3.02, Verification of USDOE approval for intended land use must be obtained before issuance of a Site Clearance Permit. The site use and site clearance processes are applicable to all activities and personnel on site (including subcontractors).

The processes are controlled within the SRS Quality Assurance (QA) Program. The SRS QA program is the governing QA program for all SRS activities, including those in SGCP. The activities that are performed in SGCP must comply with SRS QA Program procedures as well as with SGCP-specific procedures.

SRS identifies all buildings and facilities on maps used in the Site Use/Site Clearance Program. This waste unit is identified on these maps as a CERCLA facility.

Any work proposed in these areas will be strictly controlled and workers will be appropriately trained and briefed about health and safety requirements if work is deemed necessary for maintenance. No major change in land use or excavation at the ARP OU shall be undertaken without USEPA and SCDHEC approval. To prevent unknowing entry and to ensure that unrestricted us of the waste unit does not occur while under ownership of the government, identification signs will be posted at the unit. The access control warning signs will be legible from a distance of at least 25 feet and will be located as shown on the ARP OU LUCIP Drawing (Drawing No. SK-C-53137, Attachment A-2 of this LUCIP).

The signs will read as follows:

A-Area Miscellaneous Rubble Pile Operable Unit (731-6A)

"Danger – Unauthorized Personnel Keep Out. This unit contains radiological or mixed hazardous substances. Do not dig or excavate. Do not enter without contacting the waste site custodian."

Custodian: Manager, Post Closure Maintenance

Phone: (803) 952-6882

The Post-Closure Maintenance Group within SGCP will maintain custodial responsibilities for maintenance and inspection of the ARP OU.

2.1.2 Trespassers

While under the ownership of USDOE, access control of the entire SRS will be maintained in accordance with the 1992 RCRA Part B Permit Renewal Application, Volume I, Section F.1. This section describes the 24-hour surveillance system (R.61-79.264.14(b)(1)), artificial or natural barriers (R.61-79.264.14(b)(2)(I)), control entry systems (R.61-79.264.14(b)(2)(ii)), and access control warning signs (R.61-79.264.14(c)) in place at the SRS boundary to comply with the security requirements for a RCRA-permitted facility."

2.2 LUCIP Deed Notification

In the long-term, if the property is ever transferred to non-federal 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 contract for sale and the deed will contain the notification required by CERCLA Section 120(h). The deed notification shall, in perpetuity, notify any potential purchaser that the property has been used for the management and disposal of waste. These requirements are also consistent with the intent of 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, specifically the Ash and Trenches Areas. However, the need for these deed restrictions may be re-evaluated 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 re-evaluation 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 non-federal ownership, a survey plat of the OU will be prepared, certified by a professional land surveyor, and recorded with the appropriate county recording agency.

Per Section 3.6 of the LUCAP, the post-construction revision of this LUCIP will identify the area under land use restriction via a survey plat certified by a professional land surveyor. The line marked "AREA SUBJECT TO LAND USE CONTROL (INSTITUTIONAL CONTROL)" on A-Area Miscellaneous Rubble Pile (ARP) Operable Unit LUCIP Drawing (Attachment A-1, Drawing No. SK-C-53137) defines the area subject to LUCs.

2.3 Field Walkdown and Maintenance for Institutional Controls

"Monitoring" will be performed to verify that LUCIP requirements are met. Semi-annual monitoring of the ARP OU, 731-6A, will be conducted for items such as accuracy and legibility of signs, visible subsidence or erosion of the waste unit, proper vegetative growth, mowing, etc. Subsidence or erosion will be corrected by backfilling the affected area with clean soil and seeding the area to prevent further erosion. The results of any events and or actions that indicate some potential compromise of institutional controls will be documented in the FFA Annual Progress Report. All other routine maintenance activities will be documented and maintained in

files subject to USEPA and SCDHEC review and audit. A copy of the complete inspection form is maintained in the SGCP Administrative Record Files.

Inspections at the ARP OU will be performed to ensure that institutional controls remain protective and consistent with all RAOs. Semi-annual inspections will be conducted. The ARP OU (731-6A) Inspection Checklist is included as Attachment A-3. A copy of the inspection checklist will be provided to USEPA and SCDHEC for the final walkdown.

The waste site inspectors are to be trained and certified in Hazardous Waste Operations and Emergency Response (HAZWOPER), RCRA Well Inspections (SGCP-specific training), SGCP RCRA Waste Unit Inspections, Radiological Workers, etc., as applicable for the specific inspection. They will also be trained based on the individual requirements of the regulatory approved closure documents for each waste unit. In addition, the inspectors are to attend yearly refresher courses. Over the years, no single person will conduct all of the inspections or grass cutting operations. This unit-specific LUCIP, including the checklist (Attachment A-3), will be appended to the SRS LUCAP.

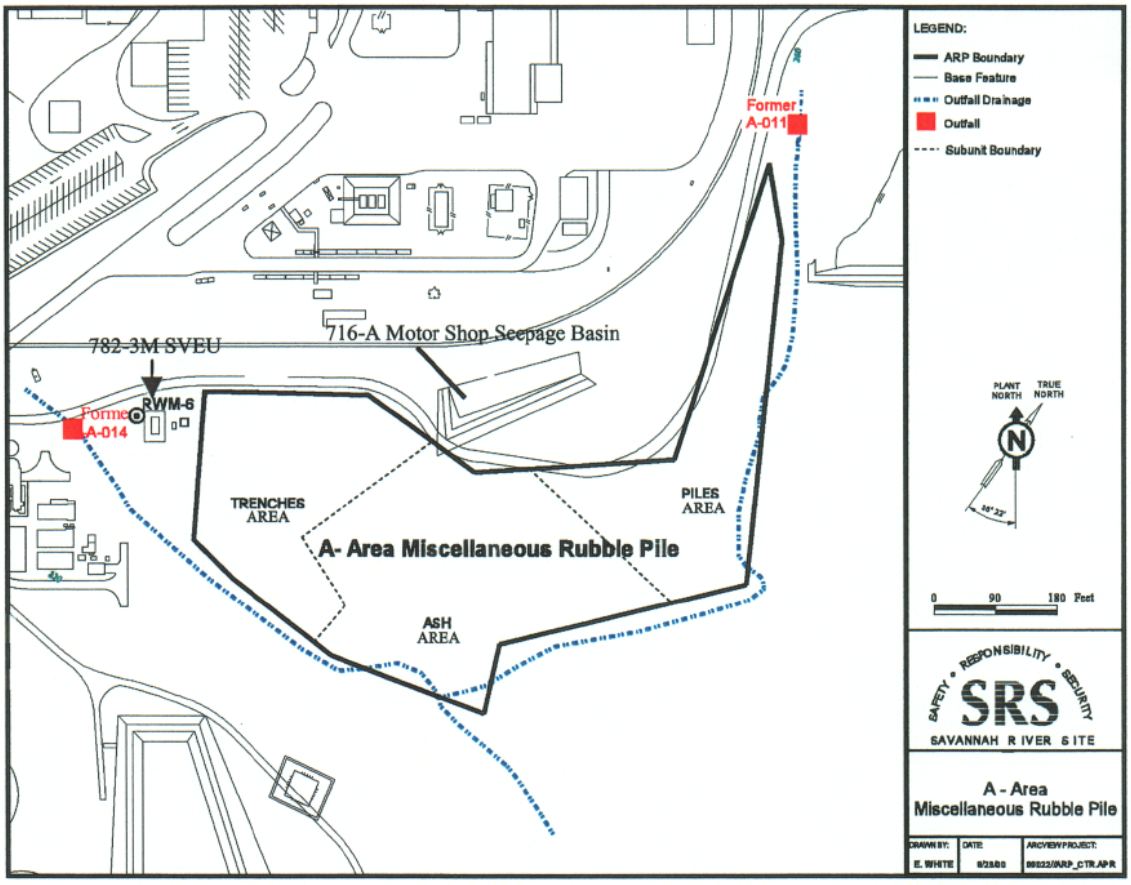
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ATTACHMENT A-1

UNIT MAP OF THE

A-AREA MISCELLANEOUS RUBBLE PILE OPERABLE UNIT (731-6A)

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LEGEND:
ARP Boundary
Base Feature
Outfall Drainage
Outfall
Subunit Boundary
Former A-011
716-A Motor Shop Seepage Basin
782-3M SVEU
RWM-6
Former A-014
TRENCHES AREA
PILES AREA
A- Area Miscellaneous Rubble Pile
ASH AREA
PLANT NORTH
TRUE NORTH
N
0
90
180 Feet
SAFETY • RESPONSIBILITY • SECURITY
SRS
SAVANNAH RIVER SITE
A - Area
Miscellaneous Rubble Pile
DRAWN BY:
E. WHITE
DATE:
8/28/03
ARCVIEW PROJECT:
00022/ARP_CTR.APR

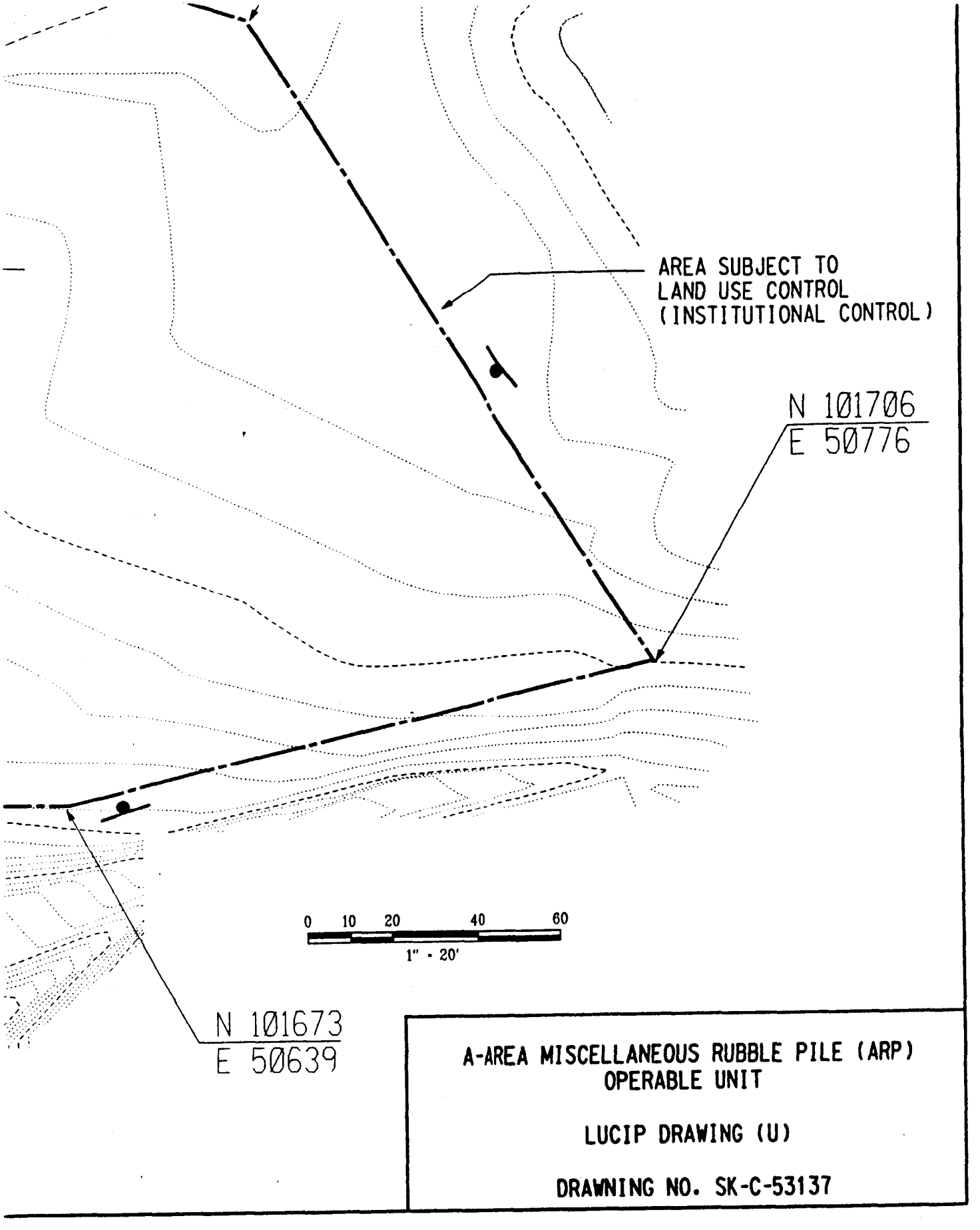
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ATTACHMENT A-2

SK-C-53137, LAND USE CONTROL IMPLEMENTATION PLAN

BOUNDARY DRAWING

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A-AREA MISCELLANEOUS RUBBLE PILE (ARP)
OPERABLE UNIT

LUCIP DRAWING (U)

DRAWNING NO. SK-C-53137

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ATTACHMENT A-3

SGCP FIELD INSPECTION CHECKLIST

FOR

A-AREA MISCELLANEOUS RUBBLE PILE OPERABLE UNIT (731-6A)

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SGCP FIELD INSPECTION CHECKLIST

for

A-AREA MISCELLANEOUS RUBBLE PILE OPERABLE UNIT (731-6A)

A = Satisfactory X = Unsatisfactory (Comments Required)	A or X	Comments or Corrective Action Taken (See Maintenance Register for Corrected Items)
Verify that there is no excavation, digging, or construction activities on the soil cover.		
Verify that no woody vegetation is growing on the soil cover. Remove or identify as needed.		
Visually check vegetative cover for grass density, with no bare spots more than 3 feet in area. The height of the vegetative cover should not impair the visual inspection of the soil cover. This inspector will determine this.		
Verify that the roads are accessible.		
Check the soil cover for signs of erosion or depressions (subsidence). Backfill as needed.		
Check for signs of burrowing animal holes.		

SGCP FIELD INSPECTION CHECKLIST

for

A-AREA MISCELLANEOUS RUBBLE PILE OPERABLE UNIT (731-6A)

(Continued)

A = Satisfactory X = Unsatisfactory (Comments Required)	A or X	Comments or Corrective Action Taken (See Maintenance Register for Corrected Items)
Verify that the access control warning signs [eight (8) total] are in acceptable condition, have correct information, and are legible from 25 feet.		
Check the site for general housekeeping. Remove the debris as needed.		
Other:		

Inspected By:

_____/_____Date/Time:_____/_____

(Print Name) (Signature)

Reviewed By (Post Closure Manager or Designee):

_____/_____Date/Time:_____/_____

(Print Name) (Signature)

Note: USEPA and SCDHEC must be notified within 30 days of identification of any area where any breach or compromise of restrictions placed on this institutional controls operable unit has occurred.

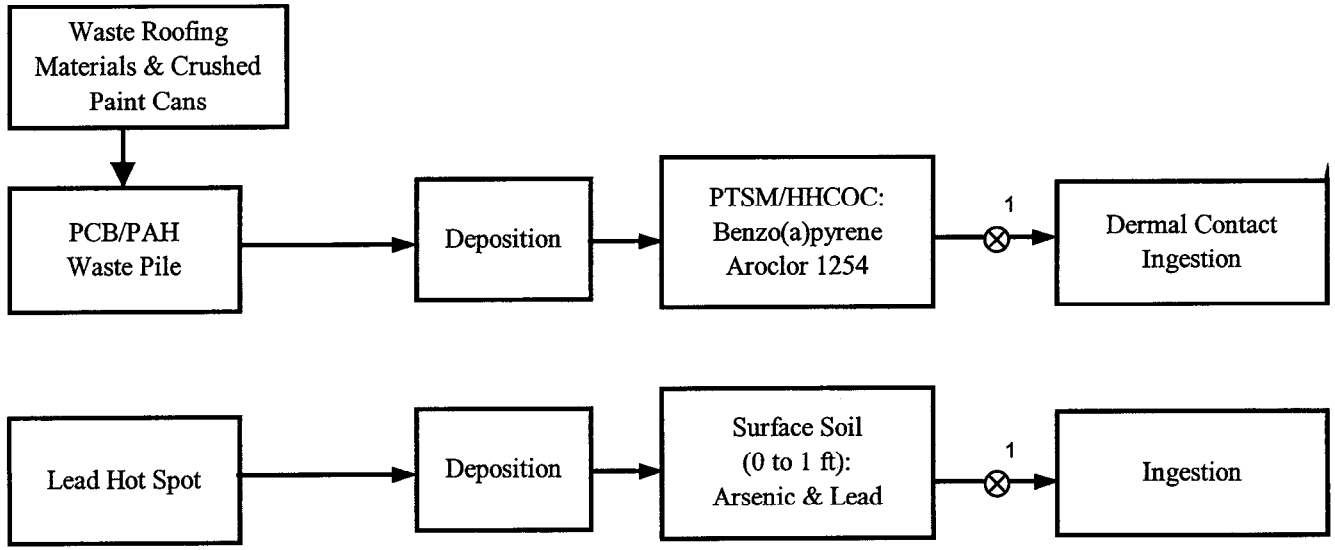
ATTACHMENT A-4

CONCEPTUAL SITE MODEL FOR THE A-AREA MISCELLANEOUS RUBBLE PILE OPERBLE UNIT (731-6A) POST REMEDIAL ACTION

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A-Area Miscellaneous Rubble Pile Problem Statement Conceptual Site Model:

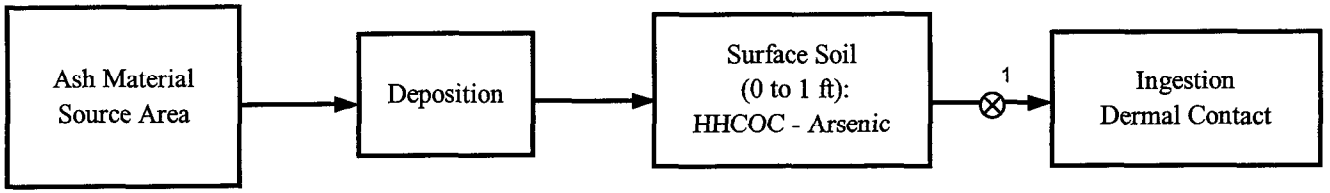
Piles Area Exposure Unit



Legend
HHCOC -Human Health Contaminant of Concern
⊗ Pathway break
Remedial Alternative
(1) Removal and Offsite Disposal

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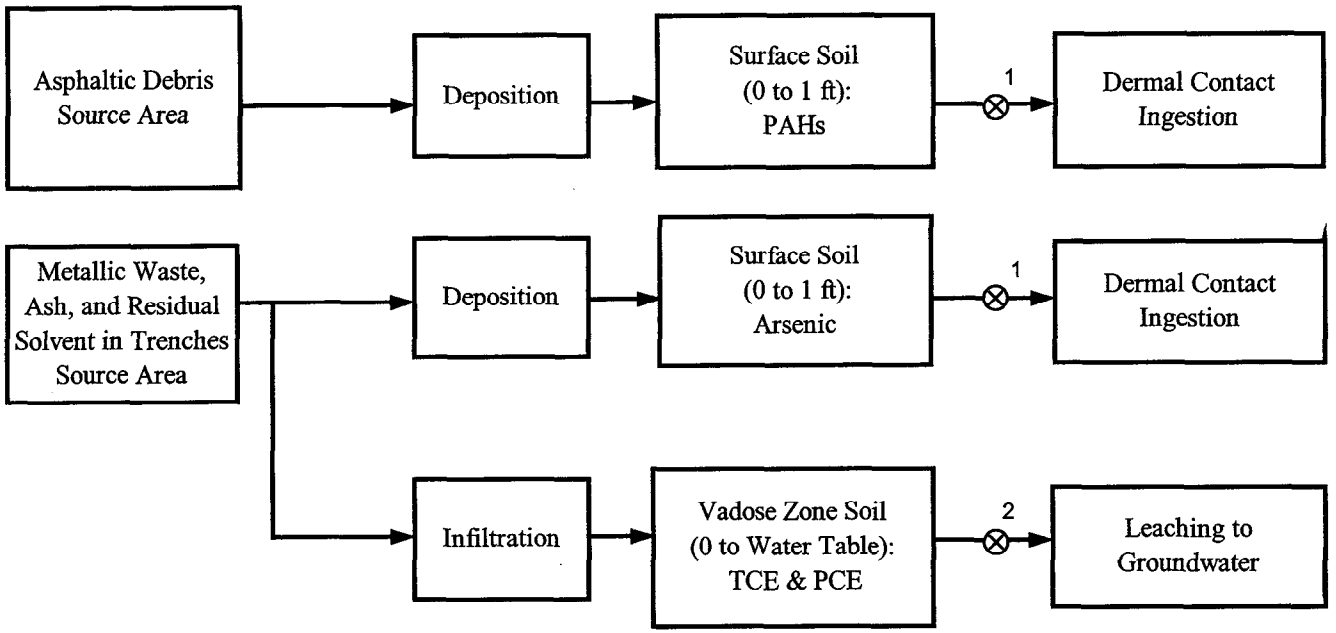
A-Area Miscellaneous Rubble Pile Problem Statement Conceptual Site Model:
Ash Area Exposure Unit



Legend
HHCOC - Human Health Contaminant of Concern
⊗ – Pathway break
Remedial Alternative
(1) Institutional Control

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A-Area Miscellaneous Rubble Pile Problem Statement Conceptual Site Model:
Trenches Area Exposure Unit



Legend
⊗ Pathway break
Remedial Alternatives
(1) Soil Cover and Institutional Control
(2) Soil Vapor Extraction

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LUCIP for the
C-Area Reactor Seepage Basins, 904-66G, -67G, and 68G
Appendix A of *Post-Construction Report/Final Remediation Report for C-Area Reactor Seepage Basins, 904-66G, -67G, and 68G*
(WSRC-RP-2002-4219, Revision 1, January 2003)

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APPENDIX A

LAND USE CONTROL IMPLEMENTATION PLAN

for the

C-AREA REACTOR SEEPAGE BASIN OU

(904-66G, -67G, and –68G)

LAND USE CONTROL IMPLEMENTATION PLAN

This C-Area Reactor Seepage Basin (CRSB) Land Use Control Implementation Plan (LUCIP) will be appended to the Savannah River Site (SRS) Land Use Control Assurance Plan (LUCAP). The United States Department of Energy (USDOE) is responsible for implementing the land use controls (e.g., inspections, maintenance, etc.) outlined in this unit-specific LUCIP.

The selected remedy leaves hazardous substances in place that pose a potential future risk and will require land use restrictions for an indefinite period of time. As negotiated with the United States Environmental Protection Agency (USEPA), and in accordance with USEPA Region IV policy (Johnston 1998), the SRS has developed a LUCAP (WSRC 2002) to ensure that land use restrictions are maintained and periodically verified. This LUCIP provides detailed and specific measures required for the land use controls selected as part of this remedy. The USDOE is responsible for implementing, maintaining, monitoring, reporting upon, and enforcing the land use controls herein. Upon final approval, the LUCIP will be appended to the LUCAP and is considered incorporated by reference into the Post-Construction Report/Final Remediation Report (PCR/FRR), establishing land use controls implementation and maintenance requirements enforceable under the Comprehensive Environmental Response, Compensation, and Recovery Act (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.

1.0 REMEDY SELECTION

1.1 CRSB Operable Unit

Located in C Area in the central portion of the SRS, the CRSB Operable Unit (OU) lies approximately 120 meters (m) (400 feet [ft]) west of C-Area Reactor perimeter fence.

The CRSB OU was constructed in 1957 to receive low-level radioactive wastewater from the C-Reactor (Building 105-C) disassembly basin purges. From 1957 until 1960, and from 1978 until 1986, the CRSB received purge water from the disassembly basin via an underground, polyethylene process sewer line, which measured approximately 245-m (800-ft) in length, with a diameter of 7.6-centimeter (cm) (3-inch [in]).

Three unlined (earthen) basins comprised the CRSBs. Basin 1 (904-66G) was L-shaped and was constructed with approximate outside dimensions of 80 x 10 m (250 x 35 ft) in the north-south direction, 55 x 10 m (180 x 35 ft) in the east-west direction, and with a depth of approximately 2.1 m (7 ft) below land surface (bls). Basin 2 (904-67G) was constructed with approximate outside dimensions of 90 x 20 m (300 x 60 ft), and a depth of 3.6 m (11 ft) bls. Basin 3 (904-68G) was constructed with approximate outside dimensions of 55 x 25 m (180 x 90 ft), and a depth of 3.7 m (12 ft) bls. Prior to remediation, these basins were open and had not been backfilled to grade.

Groundwater contamination above maximum contaminant levels (MCLs) has not been associated with the CRSB OU.

1.2 Nature and Extent of Contamination in CRSB Soils and Pipeline

The CRSB OU consists of a source term. The source term area of concern (AOC) includes the basins and the process sewer line. The following is a brief summary of the principal threat source material (PTSM) as defined in the Plug-in Record of Decision

(ROD) (WSRC 1999) and the Unit-Specific Plug-in ROD Amendment (WSRC 2002a) documents.

- Basin 1 PTSM is composed of cesium-137. The average cesium-137 concentration exceeds the 1 x 10^{-3} risk and treatment threshold value (TTV) from 0 to 1.8 m (0 to 6 ft) below the basin bottom.

- Basin 2 PTSM is composed of cesium-137. TTVs are exceeded from 0 to 1.2 m (0 to 4 ft) below the basin bottom. An analysis of the activities indicates that the cesium-137 levels associated with Basin 2 soils will decline below the TTV by 2002. This has been interpreted as short-term PTSM, and stabilization/solidification (S/S) is not considered a necessary component of the plug-in remedy for this basin, because current site access/site usage controls will prevent access to the basin as long as the soil is considered PTSM.

- No PTSM was detected in Basin 3. Because of this, no S/S was performed in Basin 3.

- There was no contaminant migration constituent of concern (CMCOC) in the basin soils or in the soil surrounding the process sewer line that will leach to groundwater and exceed MCLs within 1,000 years.

- No PTSM was associated with the process sewer line because radionuclides detected during the sampling did not exceed any of the TTVs.

- The PTSM at CRSB OU is not in direct contact with surface water or groundwater.

- Volatile organic compound (VOC) concentrations, metals, and pesticides in basin soils are below regulatory concern and did not invoke RCRA waste management methods for remediation waste streams. For detailed discussion on the results of characterization sampling and analysis for the CRSB OU refer to Section 3.0 of the Unit-Specific TER (WSRC 2000).

1.3 Remedial Action Overview

The selected remedial action (RA) for the CRSB OU was in situ stabilization of Basin 1, installation of a low-permeability soil cover system over the extent of all three basins, and in situ grouting of the process sewer pipeline. This remedy entailed the following actions:

- Pipeline grouting was used to stabilize and immobilize any potential contamination left inside the pipeline, and prevent access by small animals.

- In situ stabilization of Basin 1 through grouting was used to treat PTSM soil that posed a risk in excess of 1×10^{-3} for future industrial workers.

- Contaminated soil outside the basins exceeding PTSM criteria would have been consolidated. No soil consolidation was required for the CRSB OU.

- A low permeability soil cover system was provided over contaminated soil and the in situ stabilized soil to reduce water infiltration and to provide shielding to potential receptors on the surface.

- Implementation of land use controls, including access control warning signs and a fence, to ensure continued protection of human health or the environment.

The post-remedial action conceptual site model (see Attachment A-3) shows the broken pathways and the remaining residual risk to the future industrial worker.

According to the SRS Future Use Project Report (USDOE 1996) residential use of SRS land should be prohibited.

2.0 LAND USE CONTROLS

Considering the residual risk mentioned above, and in order to ensure the protectiveness of the remedy described above, the CRSB OU land use control objectives are to:

- prevent contact, removal, or excavation of buried waste or pipelines in the OU areas designated in the LUCIP;
- maintain the use of the site for industrial activities only; and
- prevent unauthorized access to the closed CERCLA unit as long as the waste remains a threat to human health or the environment.

Current access controls and a deed notification needed to maintain the future land use controls are described in the following sections of this LUCIP.

2.1 Access Controls

2.1.1 On-Site Workers

In accordance with WSRC 1D, *Site Infrastructure and Services Manual* (WSRC 2002g), Procedure 3.02, "Site Real Property Configuration Control," use of all lands and waters on SRS shall be coordinated via the Site Use Program. All employees, contractors, and visitors to the SRS require adherence to the Site Use Program. This program insures that all work performed on the SRS that adds, modifies, or removes features portrayed on the SRS development maps is authorized. No use of land (i.e., excavation or any other land use) shall be undertaken without prior approval documented by a Site Use Permit. This authorization is obtained through the completion of a Site Clearance Request Form. Also, in accordance with Procedure 3.02, all work at SRS that adds to or modifies features or facilities portrayed on SRS development maps (i.e., plot plans of facilities/utilities at SRS) will be authorized by a Site Clearance Permit before any excavation activities are conducted. All site clearance requests will be reviewed to verify

that either an approved Site Use Permit has been obtained or that an existing Site Use Permit has sanctioned the request.

The SRS, specifically the Site Development, Planning, and Mapping Department, is responsible for updating, maintaining, and reviewing site maps, including Federal Facility Agreement (FFA) (FFA 1993) OU identifications. If a site clearance request is made that may impact an FFA OU, the Site Clearance Request Form is sent to the FFA OU reviewer, who is in the Environmental Restoration Division (ERD), for either approval or disapproval. The roles and responsibilities of each individual are detailed in WSRC 1D, Procedure 3.02. Verification of USDOE approval for intended land use must be obtained before issuance of a Site Clearance Permit. The site use and site clearance processes are applicable to all activities and personnel on site (including subcontractors).

The processes are controlled within the SRS Quality Assurance (QA) Program. The SRS QA Program is the governing QA Program for all SRS activities, including those in the ERD. The activities that are performed in the ERD must comply with SRS QA Program procedures as well as ERD-specific procedures.

SRS identifies all buildings and facilities on maps used in the Site Use/Site Clearance Program. This waste unit is identified on these maps as a CERCLA facility.

Any work proposed in these areas will be strictly controlled and workers will be appropriately trained and briefed about health and safety requirements if work is deemed necessary for maintenance. No major change in land use nor excavation at the CRSB OU shall be undertaken without USEPA and South Carolina Department of Health and Environmental Control (SCDHEC) approval. To prevent unknowing entry and to ensure that unrestricted use of the waste unit does not occur while under ownership of the government, identification signs will be posted at the unit.

The access control warning signs for the soil cover will be legible from a distance of at least 25 ft. The soil cover access control warning sign is shown in Figure A-3 (Attachment A-4 to this LUCIP).

The access control warning signs for the underground grouted pipeline will be legible from a distance of at least 25 ft. The underground pipeline access control warning sign is shown in Figure A-4 (Attachment A-4 to this LUCIP).

Custodial responsibilities for maintenance and inspection of the CRSB waste site will be maintained by the Post-Closure Maintenance Group within the ERD.

2.1.2 Trespassers

While under the ownership of USDOE, access control of the entire SRS will continue to be maintained in accordance with the 1992 Resource Conservation and Recovery Act (RCRA) Part B Permit Renewal Application, Volume I, Section F.1. This section describes the 24-hour surveillance system (R.61-79.264.14(b)(1)), artificial or natural barriers (R.61-79.264.14(b)(2)(I)), control entry systems (R.61-79.264.14(b)(2)(ii)), and access control warning signs (R.61-79.264.14(c)) in place at the SRS boundary to comply with the security requirements for a RCRA-permitted facility.

2.2 Deed Notification

In the long term, if the property is ever transferred to non-federal ownership, the US 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 contract for sale and the deed will contain the notification required by CERCLA Section 120(h). The deed notification shall, in perpetuity, notify any potential purchaser that the property has been used for the management and disposal of waste. These requirements are also consistent

with the intent of the RCRA deed notification requirements at final closure of a RCRA facility if contamination will remain at the unit.

The deed shall also include deed restrictions precluding residential use of the property. However, the need for these deed restrictions may be re-evaluated 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 re-evaluation 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 non-federal ownership, a survey plat of the OU will be prepared, certified by a professional land surveyor, and recorded with the appropriate county recording agency.

Per Section 3.6 of the LUCAP, this LUCIP identifies the area under land use restriction via a Survey Plat (see Attachment A-1, Drawing No. SK-C-53122). Note: The line marked "AREA SUBJECT TO LAND USE CONTROLS" on the Survey Plat defines the area subject to land use controls.

2.3 Field Walkdowns and Maintenance for Institutional Controls

After the remediation of the CRSB OU, only maintenance activities will be required per this remedial action. No operations will be required.

The results of any events or actions that indicate some potential compromise of institutional controls will be documented in the FFA Annual Progress Report. All other routine maintenance activities will be documented and maintained in files subject to USEPA and SCDHEC review and audit. A copy of the completed inspection form is maintained in the ERD Administrative Record Files.

The following steps will be implemented to maintain the low permeability soil cover, for as long as it is necessary to prevent contaminant migration above MCL:

- Perform periodic (annual) visual inspections for evidence of damage to the soil cover due to erosion or intrusion by burrowing animals. The inspection will also address upkeep of the vegetative cover and access control barriers (i.e., the fence and access control warning signs). (Attachment A-2 provides a unit-specific inspection checklist for the CRSB waste unit).

- Perform necessary repairs (when required as identified during inspection) to maintain the functional integrity of the soil cover, fence, and access control warning signs.

- Enforce SRS institutional controls through access controls by restricting access to the closed waste unit. Institutional controls will be maintained as long as the waste remains a threat to human health or the environment.

- As required by the National Oil and Hazardous Substance Contingency Plan (NCP), a five-year review of the ROD for the CRSB OU will be performed as long as the waste remains a threat to human health or the environment.

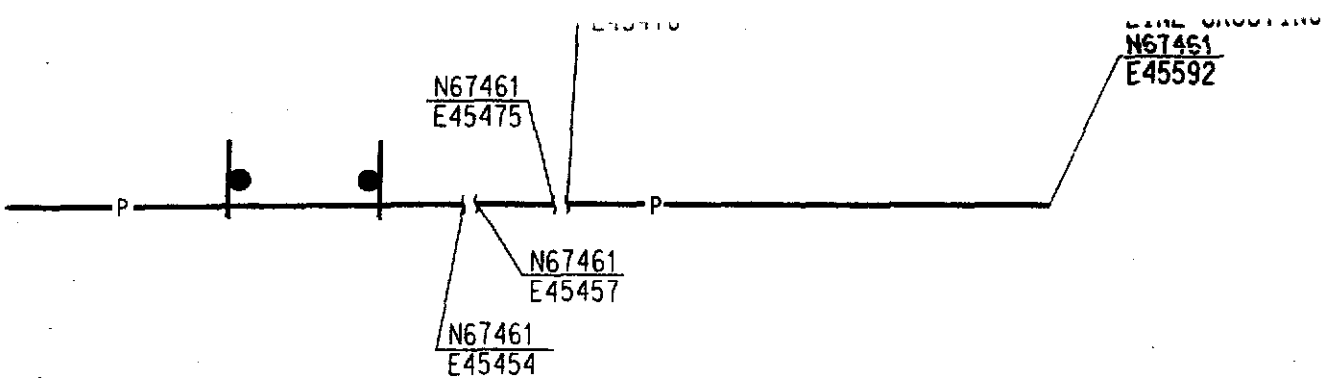
The waste site inspectors are to be trained and certified in Hazardous Waste Operations and Emergency Response (HAZWOPER), RCRA Well Inspections (ERD-specific training), ERD RCRA Waste Unit Inspections, Radiological Worker, etc., as applicable for the specific inspection. They will also be trained based on the individual requirements of the regulatory approved closure documents for each waste unit. In addition, the inspectors are to attend yearly refresher courses. Over the years no single person will conduct all of the inspections or grass cutting operations.

This unit-specific LUCIP, including the checklist (Attachment A-2), will be appended to the SRS LUCAP.

ATTACHMENT A-1

SURVEY PLAT

SK-C-53122, Land Use Control Implementation Plan, Survey Plat (U)



LEGEND:

- ACCESS WARNING SIGN
- BOUNDARY MARKER
- BARBED WIRE FENCE

REMEDIAL ACTION IMPLEMENTATION PLAN FOR THE C - REACTOR SEEPAGE BASIN (904-66G, 67G & 68G) CLOSURE

90

LAND USE CONTROL IMPLEMENTATION PLAN SURVEY PLAT (U)

DRAWING NO. SK-C-53122

4444444455555555556666
2345678901234567890123

PSC= DRAWN BY (ORIG):
PLOT DATE 8/21/02 TIME

LAST CADD REV. BY: T.HIC[illegible]
DATE: 8/20/02

Scale shown on this drawing is only applicable 9)

Land Use Control
Survey Plat (U)
(SK-C-53122)

ATTACHMENT A-2

ERD FIELD INSPECTION CHECKLIST for CRSB WASTE SITE

ATTACHMENT A-2

ERD FIELD INSPECTION CHECKLIST FOR CRSB WASTE SITE

Page 1 of 3

Waste Site: _____ A = Satisfactory X = Unsatisfactory (Comments required)	**A or X**	Comments or Corrective Action Taken (See Maintenance Register for Corrected Items)
1. Verify that there is no excavation, digging, or construction activities on the soil cover.		
2. Verify that no woody vegetation is growing on the soil cover. Remove or identify, as needed.		
3. Visually check vegetative cover for grass density, with no bare spots more than 3-feet in area. The height of the vegetative cover should not impair the visual inspection of the soil cover. This will be determined by the inspector.		
4. Verify that the wells and roads are accessible.		
5. Verify that the five (5) waste unit signs, and the six (6) underground piping signs, are in acceptable condition, have correct information, and are legible from a distance of 25 feet.		
6. Verify that the fence is in good condition and that the gate is locked.		

ATTACHMENT A-2 (Continued)

ERD FIELD INSPECTION CHECKLIST FOR CRSB WASTE SITE
Page 2 of 3

Waste Site: _ A = Satisfactory X = Unsatisfactory (Comments required)	**A or X**	Comments or Corrective Action Taken (See Maintenance Register for Corrected Items)
7. Check the soil cover for signs of erosion or depressions (subsidence).		
8. Check for signs of burrowing animals (holes).		
9. Verify that there is no excavation, digging or construction activities over underground process piping (identified by signs).		
10. Other:		

Inspected By:_____/_____Date:_____Time:_____
(Print Name) (Signature)

Reviewed By:_____/_____Date:_____Time:_____
Post-Closure Manager or Designee (Print Name) (Signature)

Note: USEPA and SCDHEC must be notified within 30 days of identification of any area where any breach or compromise of restrictions placed on this institutional control OU has occurred.

ATTACHMENT A-3

CONCEPTUAL SITE MODEL FOR C-AREA REACTOR SEEPAGE BASIN POST REMEDIAL ACTION

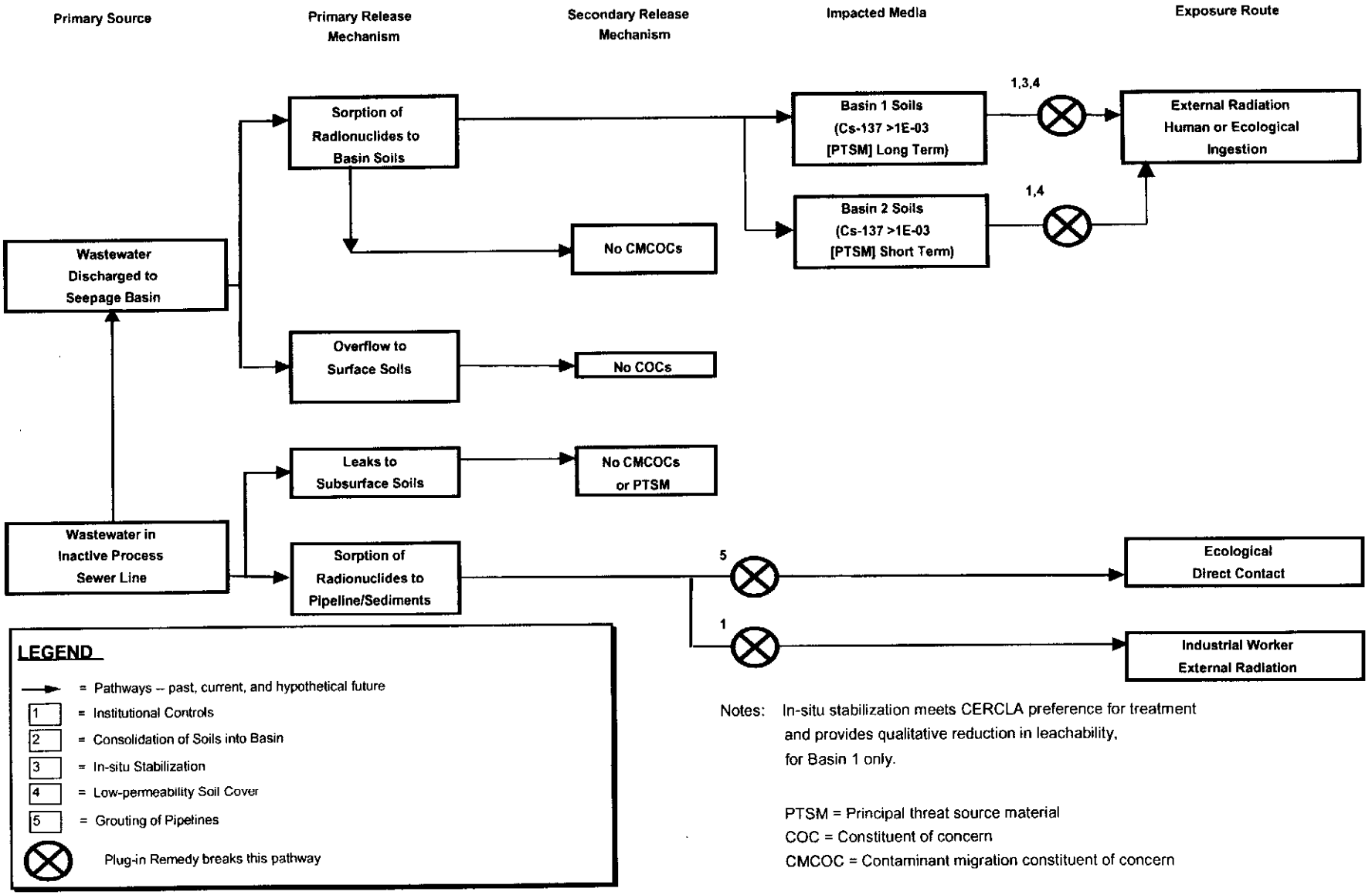


Figure A-1. Conceptual Site Model for C-Area Reactor Seepage Basin Post Remedial Action

ATTACHMENT A-4

ACCESS CONTROL WARNING SIGNS

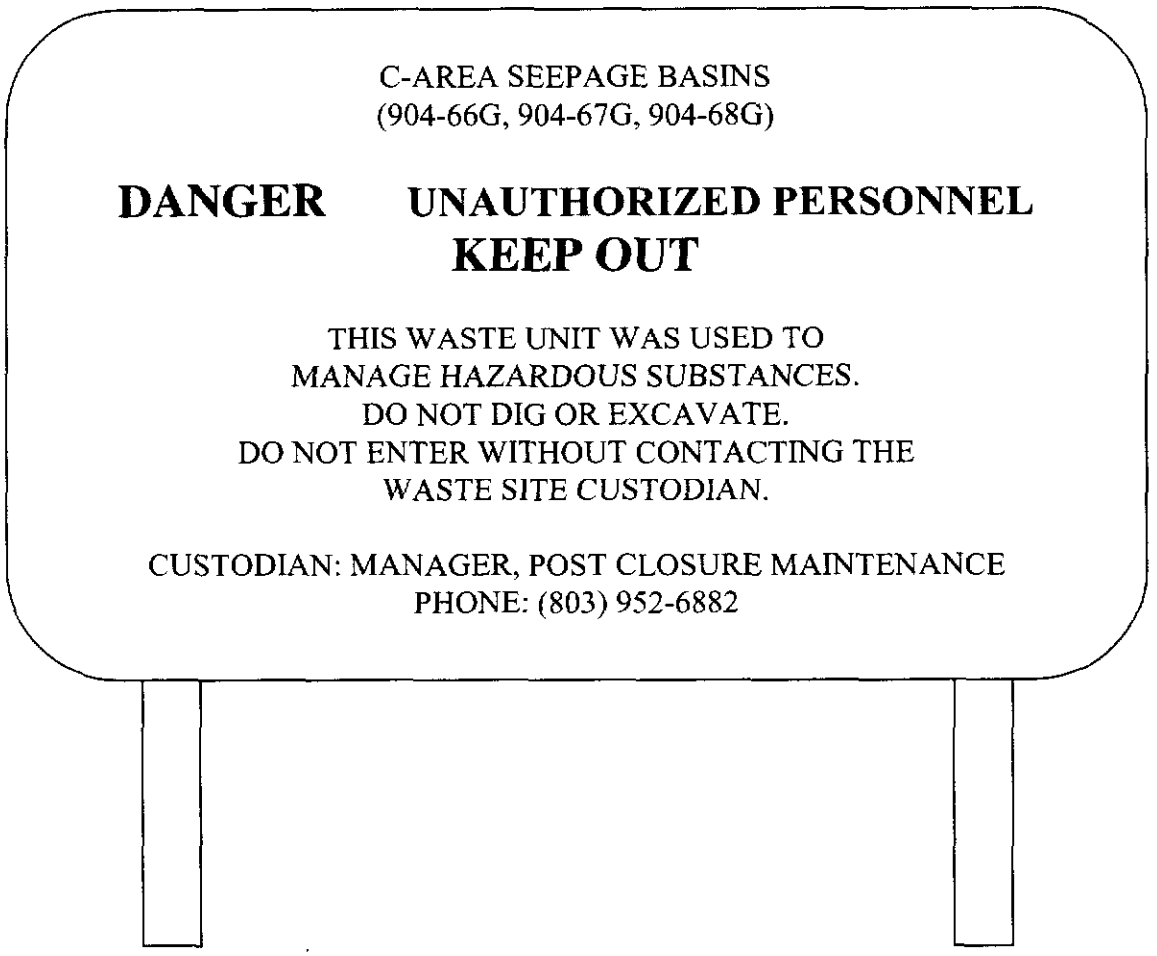


Figure A-2. Soil Cover Access Control Warning Sign

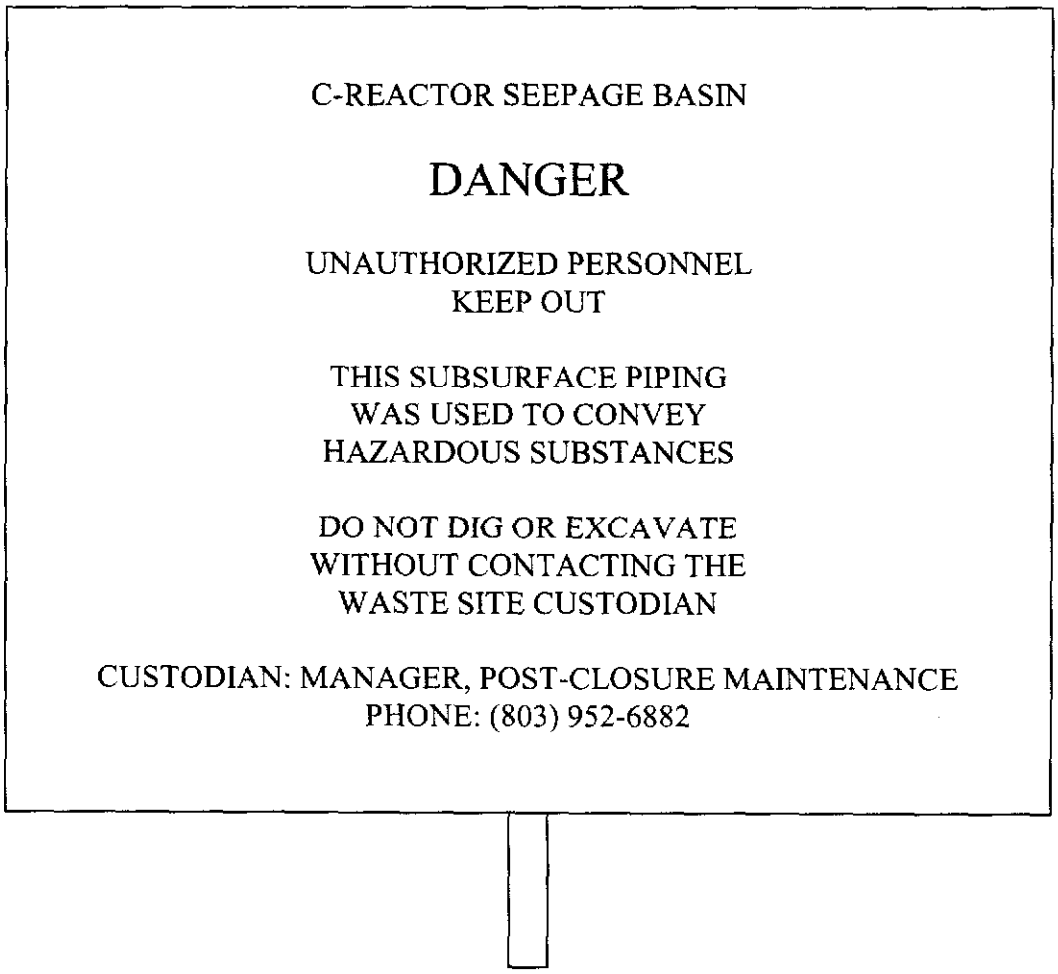


Figure A-3. Underground Piping Access Control Warning Sign

LUCIP for the
Central Shops Burning/Rubble Pits, 631-1G and 631-3G
Appendix A of *Corrective Measures Implementation/Remedial Action Implementation Plan for Central Shops Burning/Rubble Pits, 631-1G and 631-3G*
(WSRC-RP-2003-4018, Revision 1, August 2003)

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APPENDIX F

LAND USE CONTROL IMPLEMENTATION PLAN (LUCIP)
FOR THE
CENTRAL SHOPS BURNING/RUBBLE PITS OPERABLE UNIT

The CSBRP LUCIP that was originally submitted with the CSBRP CMI/RAIP (WSRC 2003a) has been revised to update the format to the current template approved by USEPA and SCDHEC in March 2004.

1.0 INTRODUCTION

This Land Use Control Implementation Plan (LUCIP) has been prepared for the Central Shops Burning/Rubble Pits (CSBRP) Operable Unit (OU) at the Savannah River Site (SRS). The purpose of the LUCIP is to describe how the land use controls (LUCs) selected in the CSBRP OU Record of Decision (ROD) (WSRC 2002) will be implemented and maintained. The following LUCs have been selected for this OU:

- Access Controls
- Deed Notification
- Field Inspections and Maintenance for the Institutional Controls

The selected remedy leaves hazardous substances in place that pose a potential future risk and will require land use restrictions for an indefinite period of time. As agreed on March 30, 2000, among the United States Department of Energy (USDOE), the United States Environmental Protection Agency (USEPA), and the South Carolina Department of Health and Environmental Control (SCDHEC), SRS is implementing a Land Use Control Action Plan (LUCAP) to ensure that the LUCs required by numerous remedial decisions at SRS are properly maintained and periodically verified. The requirements of that LUCAP also apply to the LUCs that were selected as part of the remedial action for CSBRP OU. This additional document, the CSBRP OU LUCIP, contains the detailed and specific measures required to implement and maintain the LUCs selected as part of this particular remedial decision. The LUCs shall be maintained until the OU is suitable for unlimited exposure and unrestricted use. Approval by USEPA and SCDHEC is required for any modification or termination of the institutional controls.

USDOE is responsible for implementing, maintaining, monitoring, reporting, and enforcing the LUCs in accordance with the approved LUCIP. Upon final approval, the

LUCIP will be appended to the LUCAP and should be considered incorporated by reference into the CSBRP OU ROD, establishing implementation and maintenance requirements for the LUCs under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and the SRS Federal Facility Agreement (FFA) (1993). The LUCIP will remain in effect unless and until modifications are approved by USEPA and SCDHEC as necessary for protection of human health and the environment. This LUCIP will be evaluated for accuracy during the five-year remedy review, and any approved LUCIP modification will be appropriately documented for incorporation by reference into the CSBRP OU ROD.

1.1 Format of LUCIP

The format of this LUCIP is consistent with the FFA protocol format approved by USEPA and SCDHEC in March 2004.

2.0 OVERVIEW OF CSBRP OU REMEDIAL ACTION

2.1 Description of CSBRP OU

The CSBRP OU, located in the central portion of the SRS, is approximately 10.5 km (6.5 mi) from the nearest site boundary. It is in the northern part of N Area (also known as Central Shops), approximately 0.9 km (0.6 mi) south of the intersection of SRS Roads 5 and C.

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

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

Pit 631-1G

Waste disposal activities at Pit 631-1G are estimated to have begun in late 1951. Historically, the pit had dimensions of approximately 61.0 by 9.1 by 1.8 m (200 by 30 by 6 ft).

During the Phase II investigation, trenching and ground penetrating radar (GPR) activities conducted at Pit 631-1G indicated a pit approximately 79.2 m (260 ft) long and 9.1 m (30 ft) wide. This pit contained debris from 0.6 to 2.7 m (2 to 9 ft) below land surface (bls), with an average waste thickness of 1.2 m (4 ft). The waste consisted of burned trash, including wood, glass, and stainless steel shavings.

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

Pits 631-3G/3GA

According to the historical records, Pit 631-3G originally had dimensions of 122 by 15.2 by 2.1 m (400 by 50 by 7 ft). The pit began receiving waste some time after 1975. In 1998, boreholes were drilled through Pit 631-3G, revealing a depth of at least 8.2 m (27 ft) bls, with the trash rising to within 2.4 m (8 ft) bls and overlain by clay fill. The pit was used to dispose of dry, inert rubble. It may have received asbestos, empty paint cans, fluorescent light fixtures, paper, cans, lumber, barrels, metal pipes, metal shavings, and electrical switch gear. The Phase II investigation of trenching activities within Pit 631-3G identified stainless steel metal shavings, sheet metal, burned wood, and one

crushed 208-L (55-gal) drum. In 1983, dumping ceased and the pit was covered with 2.1 to 3 m (7 to 10 ft) of soil, creating a mounded profile. Historically, the volume of waste in the pit was unknown. However, estimates from the Phase II characterization activities indicate that the volume of the waste in Pit 631-3G is approximately 10,224 m^3 (361,000 ft^3).

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

2.2 Nature and Extent of Contamination in CSBRP OU

The RFI/RI/BRA investigation found no refined constituents of concern (COCs) in any subunit of the CSBRP OU, including groundwater. Further, there is no potential threat source material (PTSM) at the CSBRP OU; however, it has been determined that perched/trapped water associated with existing drainage conditions requires mitigation to reduce the uncertainty of future contaminant migration. For this reason, an action is required to maintain restricted (industrial) land use at the CSBRP OU, thereby ensuring protection of human health and the environment. The selected remedy has been identified as institutional controls (in conjunction with improved stormwater management).

2.3 Remedial Action Selected

In accordance with the ROD, the selected remedy includes the following:

- Institutional controls in accordance with the LUCAP for SRS. Controls will include erecting warning signs to mitigate the impact of the ongoing operations at the Active Burning Area (631-2G), conducting periodic field inspections, and maintaining the site for restricted (industrial) land use.

- Improved stormwater management, including

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

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

  - Covering the surface area of the pit with vegetative covers

Monitoring the effectiveness of the above improvements during periodic site inspections included under institutional controls.

The water level in Pit 631-3G will be measured quarterly and evaluated by a hydrogeologist to determine if the pit surface area improvements are reducing water level in the pit as designed. The water level measurement will be discontinued only when the trapped water shows a declining trend for three consecutive years.

Additionally, five-year remedy reviews will be performed to ensure that the remedy continues to provide adequate protection to human health and the environment.

The selected remedy is a permanent solution, is protective of both human health and the environment, and is effective in meeting the remedial action objective (RAO). The

selected remedy will comply with applicable or relevant and appropriate requirements (ARARs) and will not pose any short-term risks to remedial workers, the community, or the environment.

3.0 LAND-USE CONTROL OBJECTIVES

To meet the remedial goal, the following LUC objectives have been established:

- minimize the perched water in the Pit 631-3G
- maintain the use of the OU for industrial activities only to prevent residential exposure, and
- prevent unauthorized access to the closed CSBRP OU as long as the waste remains a potential threat to human health or the environment in order to protect the industrial worker
- provide public notices for disclosing former waste management and disposal activities and remedial actions taken on the site in order to protect the future residents, trespassers, and industrial workers.
- maintain vegetation cover to eliminate erosion and prevent disturbance of the soil in the pit.

4.0 IMPLEMENTATION OF LAND-USE CONTROLS

This section describes the LUCs selected in the ROD to achieve the LUC objectives described in Section 3.0. The information provided in this section is summarized in Table F-1.

Table F-1. Land Use Controls for the CSBRP OU

Type of Control	Purpose of Control	Duration	Implementation	Affected Areas[a]
1. Property Record Notices[b]	Provide notice to anyone searching records about the existence and location of contaminated areas	Until the concentrations of hazardous substances associated with the unit have been reduced to levels that allow for unlimited exposure and unrestricted use	Notice recorded by USDOE in accordance with state laws at the County Register of Deeds office if the property or any portion thereof is ever transferred to non-federal ownership	All waste management areas and other areas where hazardous substances are left in place at levels that require land use
2. Property record restrictions[c]: A. Land Use	Restrict use of property by imposing limitations	Until the concentration of hazardous substances associated with the unit have been reduced to levels that allow for unlimited exposure and unrestricted use	Drafted and implemented by USDOE upon transfer of affected areas; recorded by USDOE in accordance with state law at the County Register of Deeds office	All waste management areas and other areas where hazardous substances are left in place at levels that require land use
3. Other Public Notices[d]	Provide notice to county/city about the existence and location of waste disposal and residual contamination areas for zoning/planning purposes	Until the concentration of hazardous substances associated with the unit have been reduced to levels that allow for unlimited exposure and unrestricted use	Notice recorded by USDOE in accordance with state laws at the County Register of Deeds office if the property or any portion thereof is ever transferred to non-federal ownership	All waste management areas and other areas where hazardous substances are left in place at levels that require land use
4. Site Use Program[e]	Provide notice to worker/developer, i.e., permit requestor, on extent of contamination and prohibit or limit excavation/penetration activity	As long as property remains under USDOE control	Implemented by USDOE and site contractors; initiated by permit request	Remediation systems, all waste management areas, and areas where hazardous substances are left in place at levels that require land use

Table F-1. Land Use Controls for the CSBRP OU (Continued)

Type of Control	Purpose of Control	Duration	Implementation	Affected Areas[a]
5. Warning Signs[g]	Provide notice or warning to prevent unauthorized uses	Until the concentration of hazardous substances associated with the unit have been reduced to levels that allow for unlimited exposure and unrestricted use	Signage maintained by USDOE	At select locations throughout SRS
6. Security Surveillance Measures	Control and monitor access by workers/public	Until the concentration of hazardous substances associated with the unit have been reduced to levels that allow for unlimited exposure and unrestricted use	Established and maintained by USDOE; necessity of patrols evaluated upon completion of remedial actions	Patrol of selected area throughout SRS, as necessary

[a]Affected areas – Specific locations identified in the SRS LUCIP or subsequent post-ROD documents.

[b]Property Record Notices – Refers to any non-enforceable, purely informational document recorded along with the original property acquisition records of USDOE and its predecessor agencies that alerts anyone searching property records to important information about residual contamination or waste disposal areas in the property.

[c]Property Record Restrictions – Includes conditions and/or covenants that restrict or prohibit certain uses of real property and are recoded along with original property acquisition records of USDOE and its predecessor agencies.

[d]Other Notices – Includes information on the location of waste disposal areas and residual contamination depicted on a survey plat provided to a zoning authority (i.e., city planning commission) for consideration in appropriate zoning decisions for non-DOE property.

[e]Site Use Program – Refers to the internal USDOE/USDOE contractor administrative program(s) that requires the permit requestor to obtain authorization, usually in the form of a permit, before beginning any excavation/penetration activity (e.g., well drilling) for the purpose of ensuring that the proposed activity will not affect underground utilities/structures or, in the case of contaminated soil or groundwater, will not disturb the affected areas without the appropriate precautions and safeguards.

[f]Physical Access Controls – Physical barriers or restrictions to entry.

[g]Signs – Posted command, warning, or direction.

4.1 Property Record Notices

In the long term, if the property is ever transferred to non-federal 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 contract for sale and the deed will contain the notification required by CERCLA Section 120(h).

The deed notification shall, in perpetuity, notify any potential purchaser that the property has been used to manage and dispose of waste. This requirement is consistent with the intent of the Resource Conservation and Recovery Act (RCRA) deed notification requirements at final closure of a RCRA facility if contamination will remain at the unit.

4.2 Property Record Restrictions

The deed shall also include restrictions precluding residential use of the property and/or any other property record restrictions necessary to achieve the LUC objectives. The deed shall contain provisions to ensure that appropriate LUCs remain with the affected area upon any and all transfers. USDOE shall provide a copy of the executed deeds to the regulatory agencies as soon as practicable after the transfer of fee title, but no later than 30 days. However, the need for these deed restrictions may be re-evaluated 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 re-evaluation of the need for the deed restrictions will be done through an amended ROD. USDOE shall provide six months' notice to USEPA and SCDHEC prior to deed transfer to allow the parties time to ensure appropriate provisions are included in the transfer terms or conveyance documents to maintain effective institutional controls. If it is not possible for the facility to notify USEPA and SCDHEC at least six months prior to any transfer or sale, then the facility will notify USEPA and SCDHEC as soon as possible but no later than 60 days

prior to the transfer or sale of any property subject to institutional controls. In addition to the land transfer notice and discussion provisions above, DOE further agrees to provide USEPA and SCDHEC with similar notice, within the same time frames, as to federal-to-federal transfer of property.

4.3 Other Public Notices

The LUCIP provides the as-built arrangement of the institutional controls and identifies the area under land use restriction via an as-built drawing. **Note:** As-built drawing (Attachment A-2) and the line marked "AREA SUBJECT TO LAND USE CONTROLS."

In addition, if the site is ever transferred to non-federal ownership, a professional land surveyor-certified survey plat of the OU will be prepared at or near the time of conveyance to support the LUCIP-required restrictive covenants on land use and will be recorded with the appropriate county recording agency.

4.4 Site Use Program

Under DOE Order 430.1A, *Life Cycle Management* (USDOE 1998), SRS is required to implement an asset management program for the use, maintenance, and disposal of physical assets, including real estate. SRS complies with this Order through its Site Use Program, which is conducted in accordance with WSRC 1D, *Site Infrastructure and Services Manual*, Procedure 3.02, "Site Real Property Configuration Control" (WSRC 2003a). All employees, contractors, and visitors at SRS are required to adhere to the Site Use Program. This program ensures authorization of any work performed at SRS if the work adds, modifies, or removes features portrayed on the SRS development maps. No land use (e.g., excavation) shall be undertaken without prior approval documented by a Site Use Permit. To obtain this authorization, a Site Clearance Request Form must be completed. In accordance with WSRC 1D, Procedure 3.02, all work at SRS that adds to or modifies features or facilities portrayed on SRS development maps (i.e., plot plans of

facilities/utilities at SRS) will be authorized by a Site Clearance Permit before any activities are conducted. All Site Clearance Requests will be reviewed to verify that either an approved Site Use Permit has been obtained or that the request is sanctioned by an existing Site Use Permit. All land use requirements applicable for the OU will be provided to the Site Use Program for use in determining issuance of Site Clearance permits. In addition, the Site Use permit must be amended when the geographic configuration or buffer zone used to establish the permit boundary changes or there is a change to the permitted land use.

SRS is responsible for updating, maintaining, and reviewing site maps, including Federal Facility Agreement (FFA) (1993) OU identifications. If a Site Clearance Request potentially impacts an FFA OU, the Site Clearance Request form is sent to the appropriate FFA OU reviewer for approval. The roles and responsibilities of each individual are detailed in WSRC 1D, Procedure 3.02. Before a Site Clearance Permit is issued, verification of USDOE approval for intended land use must be obtained. The site use and site clearance processes are applicable to all activities and personnel on site (including subcontractors). USEPA and SCDHEC will be notified within 30 days of any changes to the Site Use Program that impacts actual land use requirements by USDOE via a revision to the LUCAP. The processes are controlled within the SRS Quality Assurance (QA) Program in accordance with WSRC 1Q Manual, *Quality Assurance* (WSRC 2003b). The SRS QA program governs all SRS activities.

SRS identifies all buildings and facilities on maps used in the Site Use Program. This waste unit is identified on these maps as a CERCLA facility.

Any work proposed in these areas will be strictly controlled, and workers will be appropriately trained and briefed about health and safety requirements if work is deemed necessary for maintenance. No change in land use or excavation at the CSBRP OU shall be undertaken without USEPA and SCDHEC approval. USDOE shall seek prior

concurrence of USEPA and SCDHEC before any anticipated action that may disrupt the effectiveness of the LUCs or any action that may alter or negate the need for LUCs.

4.5 Warning Signs

To prevent unknowing entry and to ensure that unrestricted use of the waste unit does not occur while the unit is under ownership of the government, access control warning signs will be posted at the unit. The signs will be legible for a distance of at least 25 feet. Figure A-1 depicts a typical access control warning sign.

Custodial responsibilities for maintenance and inspection of the CSBRP OU will be maintained by the Post-Closure Maintenance Group.

4.6 Other Access Controls and Security/Surveillance Measures

While under the ownership of USDOE, access control of the entire SRS will be maintained in accordance with the 1992 RCRA Part B Permit Renewal Application, Volume I, Section F.1. This section describes the 24-hour surveillance system (R.61-79.264.14(b)(1)), artificial or natural barriers (R.61-79.264.14(b)(2)(I)), control entry systems (R.61-79.264.14(b)(2)(ii)), and access control warning signs (R.61-79.264.14(c)) in place at the SRS boundary to comply with the security requirements for a RCRA-permitted facility.

4.7 Field Inspection and Maintenance for Institutional Controls

After remediation of the CSBRP OU, only maintenance activities will be required by this remedial action. No operations will be required.

The CSBRP OU will be inspected semi-annually using the Field Inspection Checklist provided as an attachment (Attachment A-1). USEPA and SCDHEC will be notified by USDOE of any events and/or actions that indicate potential compromise of the institutional controls and the proposed action to address the potential compromise within

30 days of identification. The FFA Annual Progress Report, submitted to the regulatory agencies by USDOE, will provide the status of the institutional controls and describe how any institutional control deficiencies or inconsistent uses have been addressed. In the event of property transfer or lease, the Annual Report will cite findings on the following: whether the use of the property is affected by the deed or lease restrictions and controls; whether property use conforms with the deed or lease restrictions and controls; and whether the owners and state/local agencies have been notified regarding the deed or lease restrictions and controls.

All other routine maintenance activities will be documented and maintained in files subject to USEPA and SCDHEC review and audit. A copy of the completed inspection form is maintained in the SGCP Document Control Center. The waste unit inspectors are to be trained in Hazardous Waste Operations and Emergency Response (HAZWOPER), RCRA Well Inspections (SGCP-specific training), SGCP RCRA Waste Unit Inspections, Radiological Worker Training, etc., as applicable for the specific inspection. They will also be trained based on the individual requirements of the regulatory approved closure documents for each waste unit. In addition, the inspectors are to attend yearly refresher courses. Over the years, different personnel may conduct the inspections and grass cutting operations.

This unit-specific LUCIP, including the checklist (Attachment A-1), will be appended to the SRS LUCAP upon final regulatory approval.

5.0 REFERENCES

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

USDOE, 1998. DOE Order 430.1A, *Life Cycle Management* (Approved October 14, 1998)

WSRC, 2001. *RCRA Facility Investigation/Remedial Investigation (RFI-RI) with BRA for the Central Shops Burning/Rubble Pits Operable Unit (U),* WSRC-RP-98-4043, Rev 1.2, June, Westinghouse Savannah River Company, Savannah River Site, Aiken, SC

WSRC, 2002. *Record of Decision Remedial Alternative Selection for the Central Shops Burning/Rubble Pits, 631-1G, and 631-3G/3GA (U), Operable Unit (OU),* WSRC-RP-2001-4265, Rev. 1.1, October, Westinghouse Savannah River Company, Savannah River Site, Aiken, SC

WSRC, 2003a. WSRC Procedure Manual 1D, *Site Infrastructure and Services Manual (U)*, Procedure 3.02, "Site Real Property Configuration Control," Westinghouse Savannah River Company, Savannah River Site, Aiken, SC

WSRC, 2003b. WSRC Procedure Manual 1Q, *Quality Assurance (U)*, Westinghouse Savannah River Company, Savannah River Site, Aiken, SC

ATTACHMENT A-1

FIELD INSPECTION CHECKLIST FOR THE CENTRAL SHOPS BURNING/RUBBLE PITS

❑ SCHEDULED ❑ UNSCHEDULED

A= Satisfactory X= Unsatisfactory (Explanation required)	A or X	Observation of Corrective Action Taken
1. Verify that the roads are accessible.		
2. Verify that the waste unit signs (#13) are in acceptable condition, have the correct information, and are legible from a distance of 25 feet.		
3. Verify that the water measuring devices (piezometers) are accessible and not damaged.		
4. Verify that there are no excavation, digging, or construction activities on the soil cover.		
5. Verify that the integrity of the drainage ditches, and required land grading for proper drainage is being maintained and that they are free of excessive erosion, sediment buildup, and any debris restricting water flow.		
6. Verify that no woody vegetation is growing on the soil cover. Remove or identify as needed.		
7. Verify that the grass density of the vegetative cover has no bare spots more than 3 by 3 feet in area. The height of the vegetative cover should not impair the visual inspection of the soil cover. This verification will be determined by the inspector.		
8. Verify that the soil cover has no signs of unacceptable erosion or depression (subsidence.)		

ATTACHMENT A-1

FIELD INSPECTION CHECKLIST FOR THE CENTRAL SHOPS BURNING/RUBBLE PITS (Continued)

☐ **SCHEDULED** ☐ **UNSCHEDULED**

A= Satisfactory X= Unsatisfactory (Explanation required)	A or X	Observation of Corrective Action Taken
9. Verify that signs of burrowing or mounding animals are not present.		
10. Other		

Inspected by:

_____ / _____ Date:_____

(Print Name) (Signature)

Post-Closure Manager:

_____ / _____ Date:_____

(Print Name) (Signature)

CAUTION: The inspector shall notify the Post-Closure Manager (PCM) and Environmental Compliance Authority (ECA) **IMMEDIATELY** if there has been a breach or compromise of the institutional controls at this waste unit. The notification shall be in accordance with SRS post-closure inspection procedures.

NOTE: Monitoring wells associated with this waste unit are maintained in accordance with SGCP Monitoring Well Procedures.

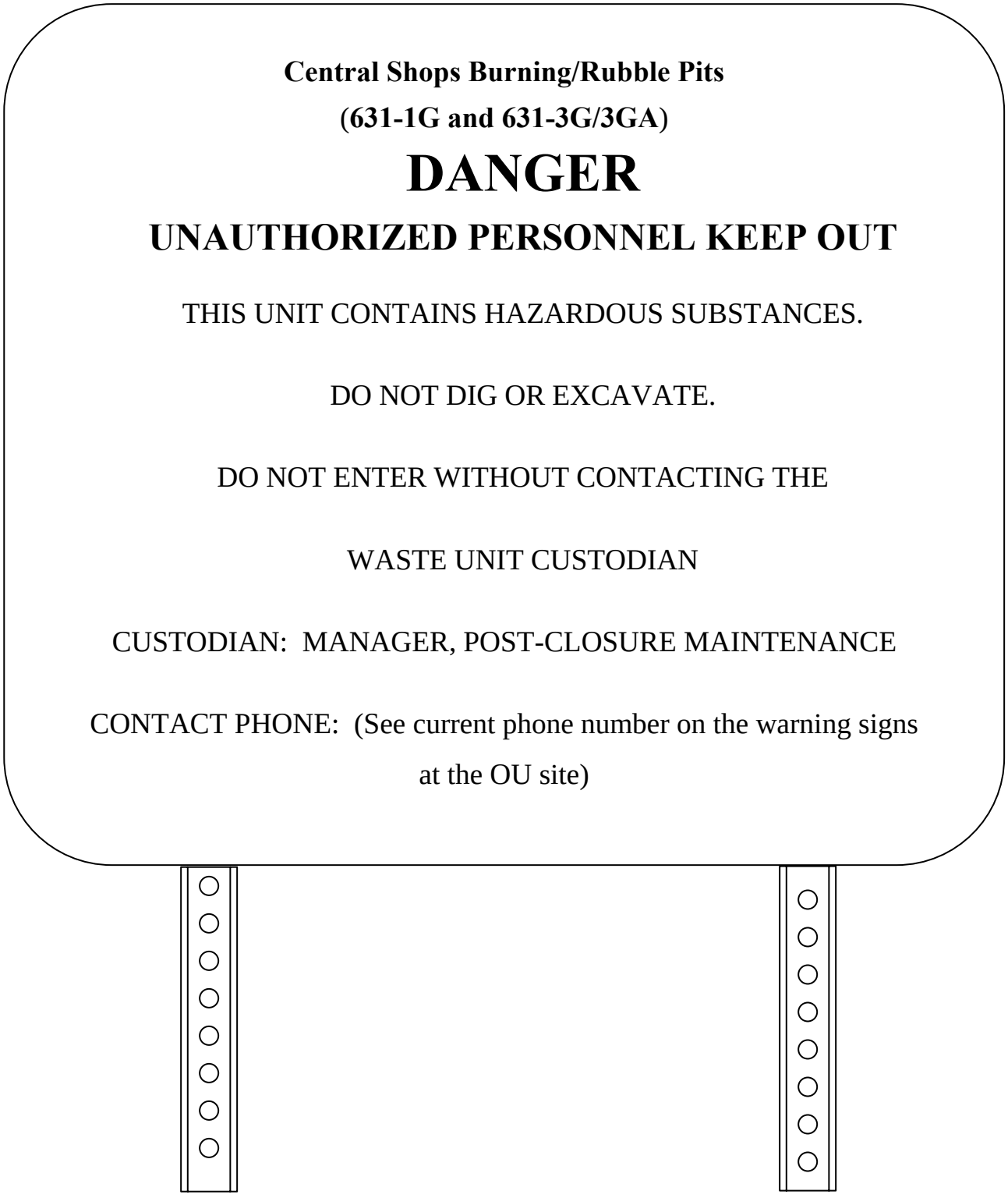


Figure A-1. Access Control Warning Sign

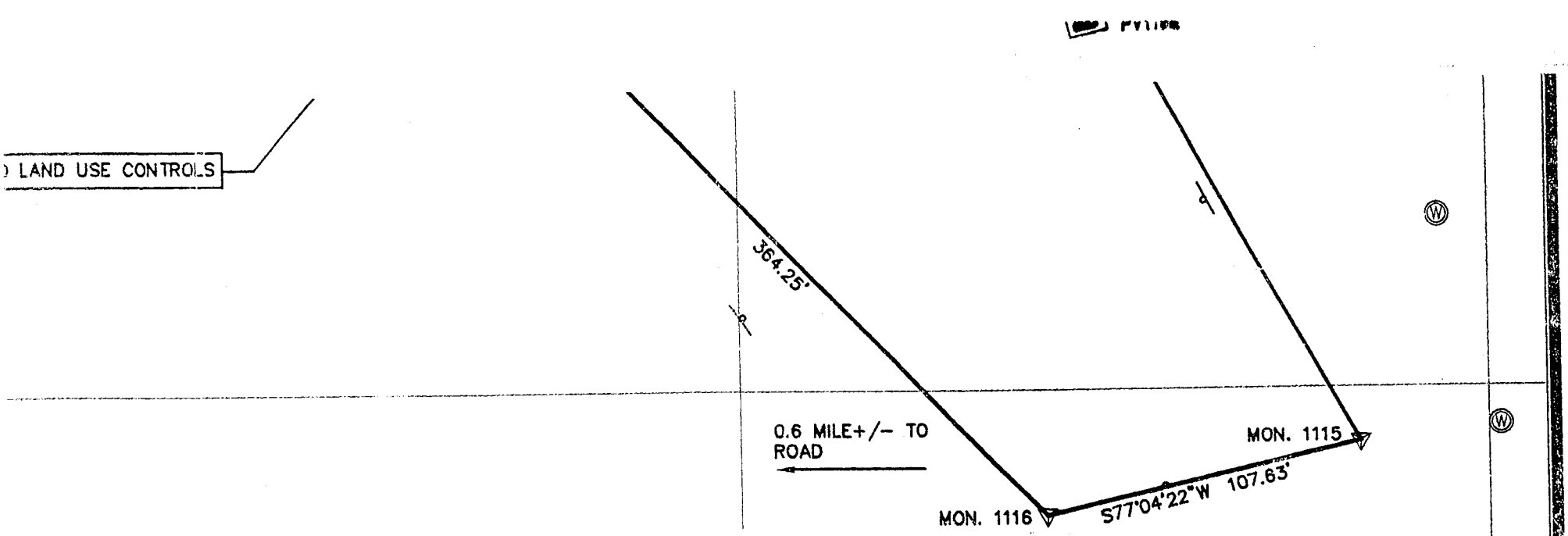
ATTACHMENT A-2

LUCIP SURVEY PLAN

FOR

CENTRAL SHOPS BURNING/RUBBLE PIT CLOSURE

Land use control implementation plan survey for Central Shops Burning/Rubble Pits 631-1G/3G/3GA (certified by the professional land surveyor), job 03140-Bound, dated April 22, 2004.



LAND USE CONTROL IMPLEMENTATION PLAN SURVEY PLAT

OF

CENTRAL SHOPS BURNING RUBBLE PITS 631-1G/3G/3GA

PROPERTY LOCATED AT SAVANNAH RIVER SITE

PREPARED FOR

U. S. DEPARTMENT OF ENERGY

SAVANNAH RIVER SITE
AIKEN, SOUTH CAROLINA 29802

COUNTY OF: AIKEN STATE OF: S. CAROLINA

SCALE: 1" = 50' DWN. BY: JMB DATE: 22 APRIL 2004

SOUTH CAROLINA
JOHN M. BAILEY & ASSOCIATES, P.C.
NO. C00078
CERTIFICATE OF AUTHORIZATION

PREPARED BY

John M. Bailey & Associates, P.C.

PROFESSIONAL LAND SURVEYORS
101 LeCOMPTE AVENUE, NORTH AUGUSTA, S.C. 29841
(803)278-0721

LUCIP for the
D-Area Oil Seepage Basin, 631-G

Appendix B of *Corrective Measures Implementation/Remedial Design/Remedial Design Report/Remedial Action Workplan for the D-Area Oil Seepage Basin, 631-G*
(WSRC-RP-99-4006, Revision 1, August 1999)

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APPENDIX B LAND USE CONTROL IMPLEMENTATION PLAN (LUCIP)

LAND USE CONTROL IMPLEMENTATION PLAN (LUCIP)

The D-Area Oil Seepage Basin (D-Area OSB) LUCIP will be appended to the Savannah River Site (SRS) Land Use Control Assurance Plan (LUCAP).

Remedy Selection

The D-Area OSB was constructed in 1952 as a series of unlined trenches for disposal of waste oil products, from D Area and other areas at SRS, which were unacceptable for incineration in the 400-D powerhouse boilers. As the trenches filled, the waste oils along with general office and cafeteria waste, were occasionally ignited. The practice of open burning was a common practice at SRS until 1973 when it was stopped site-wide. In 1975 the basin was removed from service and was backfilled with soil.

The basin remained inactive and covered with natural vegetation, including bushes and grasses, until 1996, when an interim remedial action (IRA) was implemented. During the IRA, the trench area was excavated and drums and debris were removed along with any obviously contaminated soils. The surface soils were carefully removed and stockpiled so that these clean soils could be replaced on the surface at the end of the remedial action. Soil removed from the trenches that were not obviously contaminated was returned to the excavation, with the soil removed from the bottom of the trenches replaced first, and the remaining soils replaced as close to their original location as possible.

At the close of the IRA, the contractor installed two horizontally oriented, perforated pipes along the length of the former waste unit for technology testing (bioventing) purposes. These pipes were used to force fresh air, nutrients, and tracers into the soils at a depth of about 2.4 m (8 ft) in order to volatilize the constituents in the soil, enhance

the aerobic degradation of the constituents in the soil, and monitor the effectiveness of the treatment program (WSRC 1997b, c, d, e).

The selected remedy for shallow soil, surface water, and sediment is no action because no constituents of concern (COCs) in those media were identified in the RCRA Facility Investigation/Remedial Investigation (RFI/RI) Report and Baseline Risk Assessment. The selected remedy for the D-Area OSB deep soils is no further action since Remedial Action Objectives (RAOs) have been achieved by the IRA and biovent testing.

The selected remedy for D-Area OSB groundwater is Natural Attenuation/Groundwater Mixing Zone (GWMZ) with Institutional Controls. Under this alternative, natural attenuation mechanisms such as biodegradation, flushing, volatilization, adsorption, and hydrolysis would continue to reduce contaminant concentrations in the groundwater to acceptable levels. Results from the bioventing study, conducted as part of the IRA, indicate that the source of contaminated soils at the D-Area OSB has been removed and the soil will no longer contribute to any additional groundwater contamination. Evidence indicating that natural attenuation processes are occurring in the D-Area OSB groundwater was presented in the RFI/RI Report and Baseline Risk Assessment and included: (1) decreased dissolved oxygen levels in the groundwater, which indicates that microorganisms are utilizing a combination of the contaminants as carbon source and oxygen within the groundwater as an oxygen source to produce energy, (2) elevated chemical oxygen demand, chloride, and sulfate levels downgradient, (3) depressed pH levels in contaminated areas, and (4) presence of breakdown products.

The D-Area OSB is in an industrial use zone, as identified in Figure 3.3 of the SRS Federal Facility Agreement (FFA) Implementation Plan (WSRC 1996a), for both current and anticipated future land use. The D-Area OSB currently meets unrestricted land use criteria for soils, sediment, and surface water. Groundwater beneath the unit

exceeds the maximum contaminant levels (MCLs). Although institutional controls are included in all of the alternatives (except no-action alternative), the Department of Energy (US DOE) has recommended that residential use of SRS land in the vicinity of D Area be prohibited (US DOE 1996); therefore, future residential use and potential residential water usage in this area is unlikely. Modeling of groundwater transport processes as part of the evaluation of the remedial alternatives indicates that MCLs for the contaminants of concern will be achieved in all areas of the D-Area OSB groundwater after approximately 10 years. Once remediation is complete, institutional controls will no longer be needed.

Land Use Controls

Implementation of this alternative will require near-term institutional control measures. For D-Area OSB, the land use control (LUC) objective necessary to ensure protectiveness of the preferred alternative is to prevent unauthorized access to the D-Area OSB contaminated groundwater plume.

The institutional controls required to prevent unauthorized exposure to the contaminated groundwater at the D-Area OSB include the following:

- Controlled access to the D-Area OSB through existing SRS security gates and SRS perimeter fences and the site use/site clearance programs

- Site control of installation of groundwater wells through existing site procedures

This action is expected to remediate groundwater to below MCLs within 10 years. SRS does not expect any land transfer at this location prior to achievement of the RGOs. Consistent with the No Action and No Further Action decisions for the source unit, a certified survey plat of the source unit and deed restriction will not be required because the source unit meets unrestricted land use requirements, and there is no waste

left in place. A certified survey plat of the groundwater mixing zone boundary has been prepared by a registered land surveyor and is included in this document as Attachment B

If the D-Area OSB is transferred to non-federal ownership prior to remediation of the groundwater to the MCLs for the COCs, reevaluation of the need for deed restriction would be performed through an amended Record of Decision (ROD) with the U. S. Environmental Protection Agency (US EPA) and the South Carolina Department of Health and Environmental Control (SCDHEC) approval. These actions will also be evaluated to ensure compliance with CERCLA 120(h).

In the event that the D-Area OSB is transferred to non-Federal ownership after remediation of the groundwater to meet the MCLs for the COCs, deed notification requirements pursuant to CERCLA 120(h) will be completed. These actions will include a deed notification disclosing former waste management and disposal activities, as well as any remedial actions taken at the waste unit.

Deed Notification

A deed notification shall be filed in the appropriate county records in accordance with CERCLA 120(h), which requires the government to create a deed when land on which any hazardous substance was stored, released, or disposed is transferred to non-federal ownership. The transference of the D-Area OSB prior to the achievement of MCLs is unlikely. In the event the property is transferred prior to completion of the remedial action, a deed notification will be filed with Aiken County. Per CERCLA 120(h)(3)(A), the deed shall contain, to the extent practical, such information as is available based on the complete search of agency files, including the following:

- A notice of the type and quantity of such hazardous substances;

- Notice of the time at which such storage, release, or disposal took place;

- A description of the remedial action taken, if any.

Per CERCLA 120(h)(3)(B), the deed shall also contain a covenant warranting that:

- All remedial action necessary to protect human health and the environment with respect to any such substance remaining on the property has been taken before the date of such transfer;

- Any additional remedial action found to be necessary after the date of such transfer shall be conducted by the United States Government;

- A clause granting the United States Government access to the property in any case in which remedial action or corrective action is found to be necessary after the date of such transfer.

Access Controls

On-Site Workers

In accordance with WSRC 1D, *Site Infrastructure and Services Manual*, Procedure 3.02, *Site Real Property Configuration Control* (WSRC 1996b), use of all lands and waters on the SRS shall be coordinated via the Site Use Program. No use of land (i.e., excavation or any other land use) shall be undertaken without prior approval documented by a Site Use Permit. Also, in accordance with Procedure 3.02, all work at SRS that adds to or modifies features or facilities portrayed on the SRS development maps (i.e., plot plans of facilities/utilities at SRS) is authorized by a Site Clearance Permit before any excavation activities. All Site Clearance requests are reviewed to verify that either an approved Site Use Permit has been obtained or that an existing Site

Use Permit has sanctioned the request. Verification of US DOE approval for intended land use must be obtained before issuance of a Site Clearance Permit. The Site Use and Site Clearance processes are applicable to all activities and personnel on site (including subcontractors). The processes are controlled within the SRS Quality Assurance Program.

Trespassers

Additionally, while under the ownership of the US DOE, access control of the entire SRS will continue to be maintained in accordance with the 1992 RCRA Part B Permit Renewal Application, Volume I, Section F.1. This section describes the 24-hour surveillance system (R.61-79.264.14(b)(1)), artificial or natural barriers (R.61-79.264.14(b)(2)(i)), control entry systems (R.61-79.264.14(b)(2)(ii)), and warning signs (R.61-79.264.14(c)) in place at the SRS boundary to comply with the security requirements for a RCRA-permitted facility.

LUCIP for the
F-Area Retention Basin, 281-3F

Appendix A of *Corrective Measures Implementation/Post-Construction Report/Final Remediation Report for the F-Area Retention Basin, 281-3F*
(WSRC-RP-2001-4049, Revision 1, September 2001)

On February 6, 2014, the DOE submitted a letter (ACP-14-125, ARF #019315) to the EPA and SCDHEC to perform the inspections for this operable unit on an annual basis. The EPA and SCDHEC approved the request in letters dated March 20, 2014 (ARF #019385) and March 7, 2014 (ARF #019360), respectively.

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APPENDIX A

Unit Specific LUCIP for

F-Area Retention Basin (Bldg. 281-3F) (U)

APPENDIX A

LUCIP
F-Area Retention Basin (Bldg. 281-3F) (U)

LAND USE CONTROL IMPLEMENTATION PLAN (LUCIP)

The F-Area Retention Basin (Bldg. 281-3F) Land Use Control Implementation Plan (LUCIP) will be appended to the Savannah River Site (SRS) Land Use Control Assurance Plan (LUCAP), which has been approved by the USDOE, USEPA, and SCDHEC. SRS is responsible for implementing the land use controls (LUCs) (e.g., inspections, maintenance, etc.) outlined in this unit specific LUCIP.

1.0 REMEDY SELECTION

The F-Area Retention Basin (FRB) is a Resource Conservation Recovery Act (RCRA)/Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) unit located within SRS. The FRB is designated as Building 281-3F and is located outside and south of the F-Area perimeter fence, approximately 1,035 m (3,397 ft) north of Fourmile Branch.

The FRB became operational in 1955, remained active until 1972, and was closed in December 1978. At the time of closure, soil sampling was performed at the basin, and approximately 0.6 m (2 ft) of soil was excavated from the bottom of the basin. A total of 970 m^3 (34,209 ft^3) of contaminated soil was removed from the basin and transported to Building 643-G for disposal. The basin was backfilled with clean soil and the area was seeded with grass.

The FRB covers an area of approximately 2,400 m^3 (0.6 acre). The basin is approximately 61 m (200 ft) long, 36.6 m (129 ft) wide, and 2.1 m (6.9 ft) deep. Prior to implementation of this remedial action, the FRB was an inactive basin,

filled with clean soil and covered with grass, lying at an elevation of approximately 275 ft above mean sea level. Surface water drains from the southeast to Fourmile Branch via an unnamed drainage ditch (tributary) and overland flow. The basin was designed and operated as an unlined, temporary container for potentially contaminated cooling water from the F-Area Canyon Facility and stormwater drainage from the F-Area Tank Farm.

Water was conveyed to the basin by a process sewer line [approximately 168 M (550 ft) of 61-cm (24-inch) diameter and approximately 212 m (700 ft) of 91-cm (36-inch) diameter] that discharged into the north side of the basin. The depth to the top of the process sewer line ranges from less than 1 m (3 ft) to 4.6 m (15 ft).

The FRB RCRA Facility Investigation/Remedial Investigation/Baseline Risk Assessment (RFI/RI/BRA) (WSRC1997a) reports that the primary constituents of concern (COCs) are located at depth in FRB soils and consist of elevated levels of cesium-137 (Cs-137), strontium-90 (Sr-90), and radium-226 (Ra-226).

On March 2, 1999, the combined Corrective Measures Implementation (CMI)/Remedial Design Report (RDR)/Remedial Action Work Plan (RAWP) for the FRB (281-3F) (WSRC 1999c), which provides the design details of the remedial action for the FRB, was approved by USEPA and SCDHEC. The selected remedy specified in the Record of Decision (ROD) is source control. The key elements of the selected remedial action and associated design, as identified in the CMI/RDR/RAWP, for the FRB soils and process sewer line sediment are as follows:

- Placement of all contaminated soils inside the basin (contaminated soil from the basin side walls and from hot spots surrounding the process sewer line)

- In situ stabilization/solidification (S/S) of contaminated soil at the bottom of the basin and contaminated soils placed in the basin from the basin side walls and process sewer line

- In situ grouting of contaminated sediments contained within the process sewer line

- Construction and placement of an engineered low-permeability soil cover (hydraulic conductivity of 1 x 10^{-5} or less) over the S/S soil mass

- Implementation of institutional controls to limit access to the site and associated pipelines and to restrict future use of this site to industrial applications

The CMI/RDR/RAWP provides the design details for the remedial action at the FRB per the remedy specified in the ROD. The FRB remedial action was performed in accordance with the applicable and relevant federal, state, and local environmental laws and statutes. The technology of choice for this remediation was soil S/S using grouting materials and admixtures in conjunction with a low-permeability soil cover.

1.1 Groundwater Monitoring and Reporting

The selected remedial action includes groundwater monitoring to confirm that the source remediation has achieved the required stabilization of contaminants; to relieve any uncertainty in the analytical data; and to verify that there exists no upgradient source contributing any contamination to the FRB OU groundwater. The existing monitoring wells (FRB-01, -02, -03, and –04) will continue to be used to collect samples semi-annually.

These FRB monitoring wells were used in the remedial investigation process to determine impact from the basin to the groundwater and should be sufficient for the above-stated purposes. Sketches showing the location relative to the basin can be found in the Remedial Design Work Plan (Figure 1) or the ROD (Figure 18).

The analytes being monitored include Cs-137, Sr-90, Ra-226, trichloroethylene (TCE), gross alpha, and non-volatile beta as well as normal field measurements. Cs-137, Sr-90, and Ra-226 will be monitored to confirm the stabilization. Minor detection results (below maximum contaminant levels (MCLs)) of TCE were found during the remedial investigation. Since this constituent is not associated with the basin, the possibility of an upgradient source exists. Should the levels increase, TCE will be monitored for trigger action. If monitoring detects contamination above MCLs (or risk-based concentration (RBCs) without MCLs) for those constituents attributable to the FRB OU or an unknown upgradient source, for two consecutive monitoring periods, the regulators will be informed within 30 days. A plan for evaluating the data and developing further action will be submitted within 90 days for regulatory approval. The results of the monitoring activities will be reported annually.

2.0 LAND USE CONTROL

For the FRB, the following land use control (LUC) objective is necessary to ensure protectiveness of the remedy:

- Controlled access to the FRB unit in accordance with the current site use/site clearance programs, including access controls to the sewer line by grouting the sewer pipeline, manholes, and associated structures and posting signs in the area to indicate that the sewer line and soil beneath the unit has been contaminated with radionuclides.

The elements of the institutional control corrective action, which consists of land restrictions without any engineering controls, are composed of deed notifications when the parcel is transferred from federal ownership (Section 2.1) and access controls including posting identification signs (Section 2.2) and field walkdowns for general site conditions (Section 2.3). These LUCs will be implemented for perpetuity.

Each element of the institutional controls corrective action is discussed below.

2.1 Deed Notification

A deed notification shall be filed in the appropriate county records in accordance with CERCLA 120(h), which requires the government to create a deed when land on which any hazardous substance was stored, released, or disposed of is transferred to non-federal ownership. In the event the property is transferred, a deed notification will be filed with Aiken County. Per CERCLA 120(h)(3)(A), the deed shall contain, to the extent practical, such information as is available based on the complete search of agency files, including the following:

- A notice of the type and quantity of such hazardous substances
- Notice of the time at which such storage, release, or disposal took place
- A description of the remedial action taken, if any

Per CERCLA 120(h)(3)(B), the deed shall also contain a covenant warranting that

- all remedial action necessary to protect human health and the environment with respect to any such substance remaining on the property has been taken before the date of such transfer; and

- any additional remedial action found to be necessary after the date of such transfer would be conducted by the United States Government.

2.2 Access Controls

2.2.1 On-Site Workers

In accordance with WSRC ID, *Site Infrastructure and Services Manual,* Procedure 3.02, "Site Real Property Configuration Control," use of all lands and waters at SRS shall be coordinated via the Site Use Program. No use of land (i.e., excavation or any other land use) shall be undertaken without prior approval documented by a Site Use Permit. Also, in accordance with Procedure 3.02, all work at SRS that adds to or modifies features or facilities portrayed on SRS development maps (i.e., plot plans of facilities/utilities at SRS) will be authorized by a Site Clearance Permit before excavation activities take place. All Site Clearance Requests are reviewed to verify that either an approved Site Use Permit has been obtained or that an existing Site Use Permit has sanctioned the request. Verification of USDOE approval for intended land use must be obtained before a Site Clearance Permit is issued. The site use and site clearance processes are applicable to all activities and personnel on site (including subcontractors). The processes are controlled within the SRS Quality Assurance Program.

SRS identifies all buildings and facilities on maps used in the Site Use/Site Clearance Program and requires a 200-foot buffer zone around each facility. This waste unit is identified on these maps as a CERCLA facility.

Any work proposed in these areas will be strictly controlled, and workers will be appropriately trained and briefed about health and safety requirements if work is deemed necessary for maintenance. Any changes in the use or disturbance of the FRB will be cleared with USEPA and SCDHEC before any disturbance occurs.

To prevent unknowing entry and to ensure that unrestricted use of the waste unit does not occur while under government ownership, identification signs have been posted at the unit. The signs are legible from a distance of 25 feet and located approximately every 100 feet along the process sewer line, at each manhole, and at each side of the basin as shown in Figure 7, sheet 1 and 2. The signs read as follows:

F-Area Retention Basin

"DANGER"
UNAUTHORIZED PERSONNEL
KEEP OUT.
THIS UNIT WAS USED TO MANAGE HAZARDOUS SUBSTANCES. DO NOT DIG OR EXCAVATE. DO NOT ENTER WITHOUT CONTACTING THE WASTE SITE CUSTODIAN.

CUSTODIAN: MANAGER, POST-CLOSURE MAINTENANCE
PHONE: (803) 952-6882

F-Area Process Piping

"DANGER"
UNAUTHORIZED PERSONNEL
KEEP OUT.
THIS SUBSURFACE PIPING SYSTEM WAS USED TO CONVEY HAZARDOUS SUBSTANCES. DO NOT DIG OR EXCAVATE WITHOUT CONTACTING THE WASTE SITE CUSTODIAN.

CUSTODIAN: MANAGER POST-CLOSURE MAINTENANCE
PHONE: (803) 952-6882

Additionally, while under the ownership of USDOE, access control of the entire SRS will continue to be maintained in accordance with the 1992 RCRA Part B Permit Renewal Application, Volume I, Section F.1. To comply with the security requirements for a RCRA-permitted facility, this section describes the 24-hour surveillance system (R.61-79.264.14(b)(1)), artificial or natural barriers (R.61-79.264.14(b)(2)(i)), control entry systems (R.61-79.264.14(b)(2)(ii)), and warning signs (R.61-79.264.14(c)) in place at the SRS boundary.

2.3 Field Walkdowns and Maintenance for Institutional Controls

Monitoring will be performed to verify that LUCIP requirements have been met. Semi-annual monitoring of the FRB OU, 281-3F, will be conducted for accuracy and legibility of signs, visible subsidence or erosion of the waste unit, proper

vegetative growth, burrowing animals, proper access to the facility, mowing, etc. Subsidence or erosion will be corrected by backfilling the affected area with clean soil and seeding the area to prevent further erosion. USEPA and SCDHEC will be notified of the results of any inspection, event, and/or action that indicates a potential compromise of institutional controls within 30 days of identification. The notification and the reason for the notification will be documented in the Federal Facility Agreement Annual Progress Report. All other routine maintenance activities (i.e., mowing, etc.) will be documented, and the documentation will be maintained in files that are subject to USEPA and SCDHEC review and audit. A copy of the completed inspection form will be maintained in Environmental Restoration Division administrative record files.

Inspections at the FRB will be performed to ensure that institutional controls remain protective and consistent with all remedial action objectives. Monthly inspections will be performed for the first 2 years and until permanent vegetation is established. After that time, inspections will be performed semi-annually per the inspection checklist.

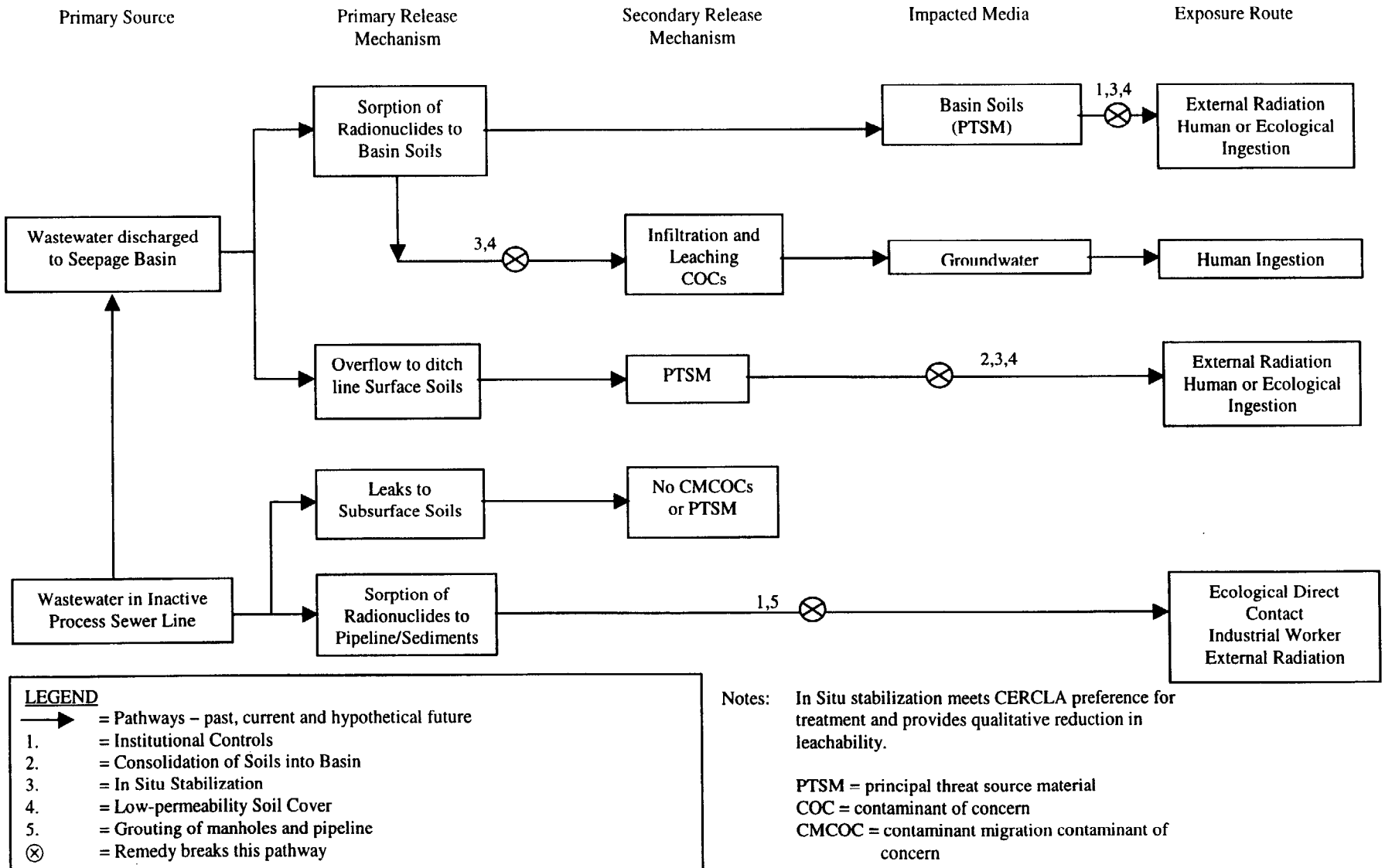


Figure A-1. Conceptual Site Model (CSM) for the F-Area Retention Basin Post Remedial Action

APPENDIX B ER INSPECTION CHECKLIST FOR F-AREA RETENTION BASIN

Waste Site: _____ **A = Satisfactory** **X = Unsatisfactory (Comments required)**	**A or X**	**Comments or Corrective Action Taken (See Maintenance Register for Corrected Items)**
Check to see if the site needs mowing.		
Verify that the basin and roads are accessible.		
Check for potential encroachments. (Ensure that there is no building on the site.)		
Verify all signs are intact, in good condition, and legible from a distance of at least 25 feet.		
Visually check vegetative cover for grass density. There should be no woody vegetation or shrubs growing on the cover. The height of the vegetative growth should not impair the visual inspection of the site.		
Check the integrity of drainage ditches (if any) for presence of excessive erosion, sediment buildup, and any debris restricting water flow.		
Visually inspect the concrete markers at four corners of the basin to ensure their integrity. The concrete should be visible and free of damage.		
Visually check the basin cover for signs of erosion subsidence and/or depressions.		
Verify that conditions of the roads to the well sites are adequate.		
Inspect the grounds surrounding well sites for vegetation overgrowth, debris, and existence and/or development of erosion features.		

APPENDIX B ER INSPECTION CHECKLIST FOR F-AREA RETENTION BASIN (Cont'd.)

Waste Site: _____ **A = Satisfactory** **X = Unsatisfactory (Comments required)**	**A or X**	**Comments or Corrective Action Taken (See Maintenance Register for Corrected Items)**
Verify that the well posts and protective covers are in place.		
Verify the well is properly identified per R.61-71.6H (South Carolina well standards and regulations).		
Verify the wells' casings are properly locked per R.61-71.11.C.6 (South Carolina well standards and regulations).		
Verify that the previous "Quarterly Monitoring Well Inspection Summary Report" has been sent to ERD Records Interim Storage. This report can be obtained from ERD Waste Treatment.		
Other		
Comments:		

Inspected By:_____ / _____ Date:_____ Time:_____
(Print Name) (Signature)

Reviewed By:_____ / _____ Date:_____ Time:_____
PM or Designee (Print Name) (Signature)

Note: USEPA and SCDHEC must be notified within 30 days of identification of any area where any breach or compromise of restrictions placed on this institutional control operable unit has occurred.

LUCIP for the
Ford Building Seepage Basin, 904-91G
Appendix A of *Post-Construction Report/Corrective Measures Implementation Report/Final Remediation Report for the Ford Building Seepage Basin, 904-91G*
(WSRC-RP-2003-4038, Revision 1, October 2003)

On August 20, 2014, the DOE submitted a letter (IACD-14-186, ARF #019770) to the EPA and SCDHEC to perform the inspections for this operable unit on an annual basis. The EPA and SCDHEC approved the request in letters dated October 2, 2014 (ARF #019837) and September 17, 2014 (ARF #019816), respectively.

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APPENDIX A

LAND USE CONTROL IMPLEMENTATION PLAN (LUCIP)

FOR THE

FORD BUILDING SEEPAGE BASIN OPERABLE UNIT

APPENDIX A

LAND USE CONTROL IMPLEMENTATION PLAN (LUCIP)

FOR THE

FORD BUILDING SEEPAGE BASIN OPERABLE UNIT

LAND USE CONTROL IMPLEMENTATION PLAN

The selected remedy leaves hazardous substances in place that pose a potential future risk and will require land use restrictions for an indefinite period of time. As negotiated with the United States Environmental Protection Agency (USEPA) and in accordance with USEPA Region IV policy (Johnston 1998), the Savannah River Site (SRS) has developed a Land Use Control Assurance Plan (LUCAP) (WSRC 2002) to ensure that land use restrictions are maintained and periodically verified. The Land Use Control Implementation Plan (LUCIP) provides detailed and specific measures required for the land use controls selected as part of this remedy. The United States Department of Energy (USDOE) is responsible for implementing, maintaining, monitoring, reporting upon, and enforcing the land use controls described herein. Upon final approval, the LUCIP will be appended to the LUCAP and is considered incorporated by reference into the Post-Construction Report/Final Remediation Report (PCR/FRR), establishing land use controls implementation and maintenance requirements enforceable under the Comprehensive Environmental Response, Compensation, and Recovery Act (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.

This LUCIP for the Ford Building Seepage Basin will be appended to the SRS LUCAP.

Remedy Selection

Located in N Area in the central portion of the Savannah River Site (SRS), the Ford Building Seepage Basin (FBSB) Operable Unit (OU) lies approximately 610 m (2,000 ft) northwest of the intersection of Roads C and 6 (see Figure 1 in the main text). The FBSB and its associated components were constructed in 1964 to receive wastewater from the Ford Building. At the Ford Building, wastewater was generated during the reconfiguration, repair, and scrapping of reactor heat exchangers and the process equipment. The seepage basin operated until 1984. The retention tank, pumping station, and process piping line were removed in 1998. As a result of the removal action of 1998, approximately 2.1 m^3 (2.8 yd^3) of radiologically contaminated soil was containerized in two B-12 boxes and one 55-gal drum. The containerized soil is included in the remedial action for the FBSB OU.

The FBSB OU (as shown in Figures 3 and 4 included in the main text) included the following eight components:

- a 5-cm (2 in) diameter, 18.3-m (60-ft) long, steel underground pipeline (Ford Building process sewer line) that carried wastewater from the Ford Building to the underground retention tank (removed in 1998)

- a 22,710 L (6,000 gal), underground, steel retention tank containing sludge and wastewater (removed in 1998)

- a 5-cm (2 in) diameter, 32.9-m (108 ft) long, steel underground pipeline (Ford Building process sewer line removed in 1998) that carried wastewater from the underground retention tank to the seepage basin

- a pumping station (removed in 1998) to remove fluids from the retention tank

- an unlined, 568,000-L (150,000 gal) seepage basin (approximately 37 by 24 m [120 by 80 ft] at ground level and approximately 18 by 7.8 [60 by 25 ft] at the floor level and approximately 3 m [10 ft] deep)

- a delisted National Pollutant Discharge Elimination System (NPDES) outfall CS-008 and associated riprap-lined earthen drainage ditch

- an underground 20-cm (8 in) diameter, abandoned fire hydrant line that was cut during construction of the seepage basin

- groundwater associated with the unit (the groundwater flow direction is indicated in Figure 4)

There is no record that the basin ever overflowed.

The RFI/RI/BRA report (WSRC 2000) (see Section 6.0 in the main test for references) contains the detailed information and analytical data for all the investigations conducted and samples taken during the media assessment of the FBSB OU. For the purpose of remedial investigation and risk assessment, the eight FBSB OU components were grouped into the following five subunits:

- FBSB and its surrounding area (Seepage Basin Area)

- Tank/Process Sewer Line Area

- Fire Hydrant Line

- NPDES Ditch

- Groundwater

Based on the results of the RFI/RI/BRA report, only soils associated with two of the five subunits needed remedial action namely, Seepage Basin Area (surface soil 0 to 0.3 m [0 to 1 ft] below land surface (bls) and subsurface soils (0.3 to 2.1 m [1 to 7 ft bls]; and Tank/Process Sewer Line Area (soil limited to 1.3-m [4-ft] depth).

Five refined COCs were identified for the Seepage Basin Area subunit. The refined COCs included arsenic, aroclor-1254, cesium-137, cobalt-60, and europium-154. Out of five refined COCs, four were human health COCs (arsenic, cesium-137, cobalt-60, and europium-154) and were identified for the future industrial workers exposed to surface and subsurface soils. One refined COC (aroclor-1254) was identified as an ecological COC for the Seepage Basin Area surface soil.

Only two human health refined COCs (cesium-137 and cobalt-60) were identified for the Tank/Process Sewer Line Area soil limited to 1.3-m (4-ft) depth.

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

The selected remedy for the FBSB OU was excavation, dispositioning, backfilling, vegetative cover, and institutional controls. This selected remedial action entailed excavating the contaminated soil at the Tank/Process Sewer Line Area and dispositioning the excavated soil into the basin along with the vegetation existing in the basin; removing the containerized soil and dispositioning the soil into the seepage basin; backfilling the remaining volume of the seepage basin and the excavated area of the Tank/Process Sewer Area with clean soil from an SRS borrow pit; and covering the backfilled area with vegetative covers. Additionally, implementing the institutional controls and five-year remedy reviews are included.

Time to complete construction was estimated to be six months.

The selected remedy is protective of both human health and the environment, is effective in meeting remedial action objectives (RAOs), and is a permanent solution. The selected remedy will comply with applicable or relevant and appropriate requirements (ARARs)

and will not pose short-term risks to remedial workers, the community, or the environment.

A post-remedial action conceptual site model (CSM) (Figure B-1) illustrates how implementation of the remedial action breaks the exposure pathways.

According to the Savannah River Site Future Use Project Report (USDOE 1996); (see Section 6.0 in the main text for reference), residential use of SRS land should be prohibited.

Land Use Controls

Considering the residual risks mentioned above, the land-use control objectives are to:

- maintain the use of the OU for industrial activities only,
- prevent unauthorized access to the closed FBSB OU as long as the waste remains a threat to human health and environment, and
- preserve the cover and prevent disturbance of the dispositioned soil.

Current access controls and a deed notification needed to maintain the future land use controls are described in the following sections of this LUCIP. The area subject to land use control is identified in Drawing SK-C-53107 in Appendix F.

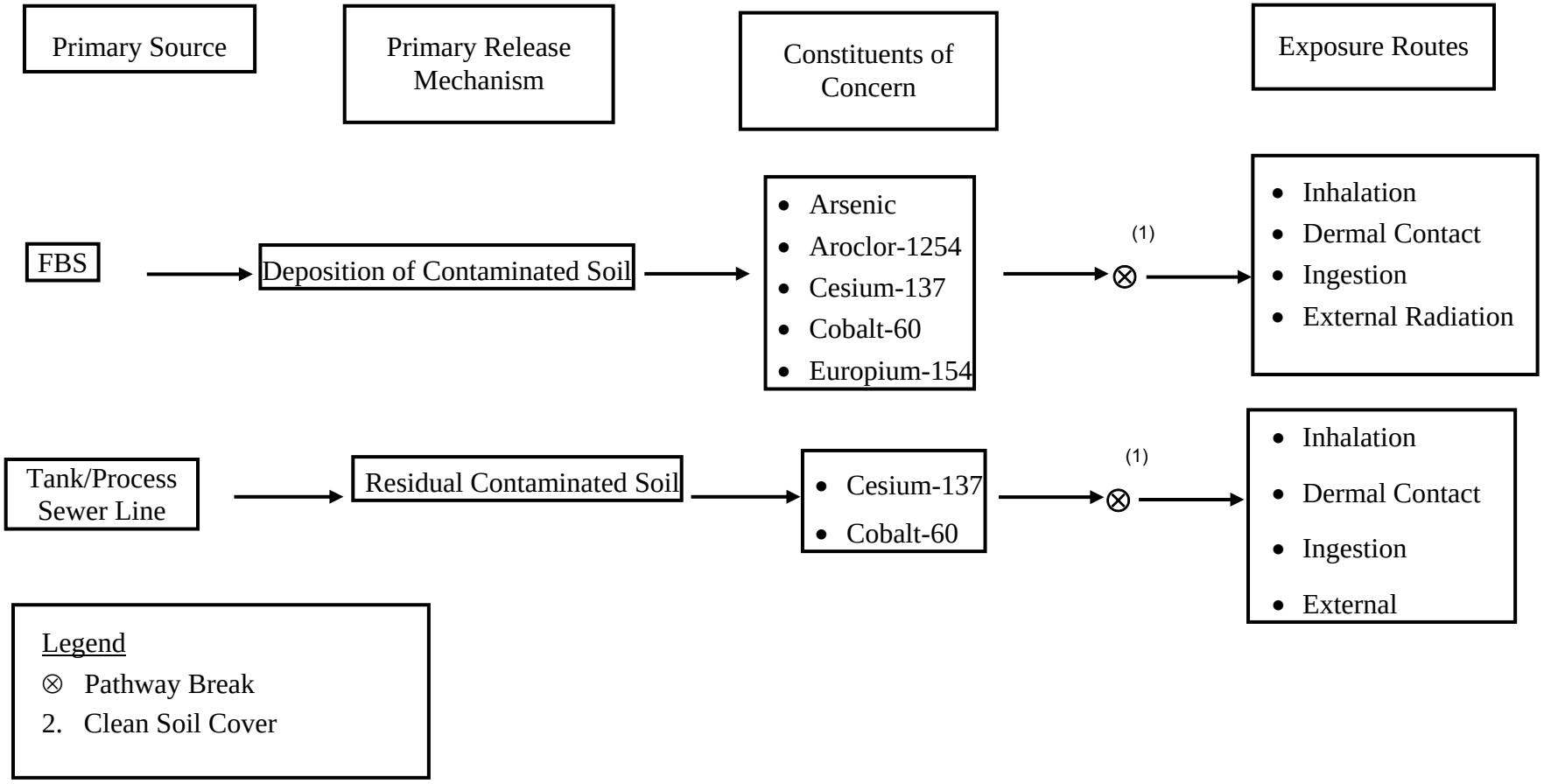


Figure A-1 Conceptual Site Model for FBSB OU with Selected Remedy Applied

Deed Notification

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

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

In addition, if the OU is ever transferred to non-federal ownership, a survey plat of the area will be prepared by a certified professional land surveyor and recorded with the county recording agency. The FBSB OU is located in Barnwell County.

Note: Survey Plat included in Appendix F and the line marked, Area Subject to Land Use Controls in Sketch SK-C-53107, define the area subject to Land Use Controls.

Access Controls

<u>On-Site Workers</u>

In accordance with procedures in place and maintained at SRS (WSRC 1D, *Site Infrastructure and Services Manual*, Procedure 3.02, Site Real Property Configuration

Control) use of all lands and waters on SRS shall be coordinated via the Site Use Program. No major change in use of land (i.e., excavation or disturbance) shall be undertaken without prior approval from USEPA and SCDHEC.

To prevent unknowing entry and to ensure that unrestricted use of the waste unit does not occur while under ownership of the government, identification signs are posted at the unit. The signs are legible from a distance of at least 25 feet. The signs read as follows:

Ford Building Seepage Basin (904-91G)

"Danger – Unauthorized Personnel Keep Out. This unit contains hazardous substances. Do not dig or excavate. Do not enter without contacting the waste unit custodian."

Custodian: Manager, Post-Closure Maintenance

Contact Phone: (See current phone number on the warning signs at the OU Site)

Trespassers

While under the ownership of US DOE, access control of the entire SRS will continue to be maintained in accordance with the 1992 RCRA Part B Permit Renewal Application, Volume I, Section F.1. This section describes the 24-hour surveillance system (R.61-79.264.14(b)(1)), artificial or natural barriers (R.61-79.264.14(b)(2)(i)), control entry systems (R.61-79.264.14(b)(2)(ii)), and warning signs (R.61-79.264.14(c)) in place at the SRS boundary to comply with the security requirements for a RCRA-permitted facility.

Field Walkdowns and Maintenance for Institutional Controls

After the remediation of the FBSB, only maintenance activities will be required per this remedial action. No operations will be required.

The results of any events and or actions that indicate some potential compromise of institutional controls will be documented in the FFA Annual Progress Report. All other routine maintenance activities will be documented and maintained in files subject to

USEPA and SCDHEC review and audit. A copy of the completed inspection form is maintained in the Soil and Groundwater Closure Projects (SGCP) Administrative Record Files. The land-use controls will be implemented as long as the waste remains a threat to human health or the environment.

The following steps will be implemented to maintain the soil covers for as long as it is necessary to prevent unacceptable exposure to future industrial workers:

- Perform periodic (semi-annual) visual inspections for evidence of damage to the soil cover due to subsidence, erosion or intrusion by burrowing animals. The inspection will also address upkeep of the vegetative cover and access control barriers (e.g., the warning signs). The field inspection checklist for FBSB OU is provided as an attachment (Attachment A-1).

- Perform necessary repairs (when required as identified during inspection) to maintain the functional integrity of the soil cover and the warning signs.

- Enforce SRS institutional controls through access controls by restricting access to the closed waste unit. Institutional controls will be maintained as long as the waste remains a threat to human health or the environment.

- As required by the National Oil and Hazardous Substance Contingency Plan (NCP), a five-year review of the ROD for the FBSB OU unit will be performed as long as the waste remains a threat to human health or the environment.

The waste site inspectors are to be trained in Hazardous Waste Operations and Emergency Response (i.e., HAZWOPER), RCRA Well Inspections (ERD-specific training), ERD RCRA Waste Unit Inspections, Radiological Workers, etc., as applicable for the specific inspection. They will also be trained based on the individual requirements of the regulatory approved closure documents for each waste unit. In

addition, the inspectors are to attend yearly refresher courses. Over the years, different personnel will conduct the inspections and grass cutting operations.

The unit-specific LUCIP, including the inspection data sheet, will be revised as needed (e.g., after completion and construction activities and in response to the result of five-year reviews of the remedy) and appended to the SRS LUCAP.

Per Section 3.6 of the LUCAP, the post-construction revision of the LUCIP identifies the area under land-use restriction via a survey plat certified by a professional land surveyor. A copy of the Boundary Survey of the Ford Building Seepage Basin is included in Appendix F.

ATTACHMENT A-1

FIELD INSPECTION CHECKLIST FOR THE FORD BUILDING SEEPAGE BASIN OPERABLE UNIT

A = Satisfactory **X = Unsatisfactory (Explanation required)**	**A or X**	**Observation or Corrective Action Taken**
1. Verify that there is no excavation, digging, or construction activities on the soil cover		
2. Verify that no woody vegetation is growing on the soil cover. Remove or identify, as needed.		
3. Visually check vegetative cover for grass density, with no bare spots more than 3 feet by 3 feet in area. The height of the vegetative cover should not impair the visual inspection of the soil cover. This will be determined by the inspector.		
4. Verify that the roads are accessible.		
5. Verify that the waste unit signs, (4) are in acceptable condition, have correct information, and are legible from a distance of 25 feet.		
6. Check the soil cover for signs of erosion or depressions (subsidence).		
7. Check for signs of burrowing animals (holes)		
8. Other:		

CAUTION: The Inspector shall notify the Post-Closure Manager (PCM) and Environmental Compliance Authority (ECA) **IMMEDIATELY** if there has been a breach or compromise of the institutional controls of this waste unit. Refer to the post-closure inspection procedure SOP-019.
NOTE: All monitoring wells associated with this waste unit are inspected using SGCP Monitoring Well Inspection Procedure in compliance with South Carolina Hazardous Waste Management Regulation R.61-79, Subpart F, Groundwater Monitoring.

Inspected By:_____/_____Date: _____
(Print Name) (Signature)

Post-Closure Manager:_____/_____Date:_____
(Print Name) (Signature)

LUCIP for the
General Separations Area Consolidated Unit
(consists of Old Radioactive Waste Burial Ground (including Solvent Tanks 650-01E to -22E), 643-E, HP-52 Ponds, H-Area Retention Basin, 281-3H, Spill on 05/01/1956 of Unknown of Retention Basin Pipe Leak, NBN, Warner's Pond, 685-23G, Spill on 03/08/1978 of Unknown Seepage Basin Pipe Leak in H-Area Seepage Basin, NBN, and Spill on 02/08/1978 of Unknown of H-Area Process Sewer Line Cave-in, NBN)

Appendix A of *Corrective Measures Implementation/Remedial Action Implementation Plan (CMI/RAIP) for the General Separations Area Consolidation Unit*
(WSRC-RP-2003-4053, Revision 1.1, November 2003)

On February 6, 2014, the DOE submitted a letter (ACP-14-125, ARF #019315) to the EPA and SCDHEC to perform the inspections for this operable unit on an annual basis. The EPA and SCDHEC approved the request in letters dated March 20, 2014 (ARF #019385) and March 7, 2014 (ARF #019360), respectively.

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APPENDIX A

LAND USE CONTROL IMPLEMENTATION PLAN FOR THE GENERAL SEPARATIONS AREA CONSOLIDATION UNIT

LAND USE CONTROL IMPLEMENTATION PLAN

The General Separations Area Consolidation Unit (GSACU) Land Use Control Implementation Plan (LUCIP) will be appended to the Savannah River Site (SRS) Land Use Control Assurance Plan (LUCAP).

The selected remedy leaves hazardous substances in place that pose a potential future risk and will require land use restrictions for an indefinite period of time. As negotiated with the United States Environmental Protection Agency (USEPA) and in accordance with USEPA Region IV policy (Johnston 1998), the Savannah River Site (SRS) has developed a LUCAP (WSRC 2002b) to ensure that land use restrictions are maintained and periodically verified. This LUCIP provides detailed and specific measures required for the land use controls selected as part of this remedy. The United States Department of Energy (USDOE) is responsible for implementing, maintaining, monitoring, reporting upon, and enforcing the land use controls described herein. Upon final approval, the LUCIP will be appended to the LUCAP and is considered incorporated by reference into the Post-Construction Report/Corrective Measures Implementation Report (PCR/CMIR), establishing land use controls implementation and maintenance requirements enforceable under the Comprehensive Environmental Response, Compensation, and Recovery Act (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.

1.0 REMEDY SELECTION

1.1 General Separations Area Consolidation Unit

The SRS occupies approximately 310 square miles of land adjacent to the Savannah River, principally in Aiken and Barnwell counties of South Carolina. The GSACU is located near the center of SRS adjacent to E Road and south of H-Area, and includes the following waste units:

- H-Area Retention Basin (HRB) (281-3H).
- Warner's Pond (685-23G), including a portion of the H-Area Inactive Process Sewer Line (HIPSL).
- HP-52 Ponds.
- Old Radioactive Waste Burial Ground (ORWBG) (643-E), including 22 underground solvent tanks known as OSTs.

Collectively, these waste units are identified as a single operable unit (OU) because of their proximity to each other and similar health and environmental threats.

The Federal Facility Agreement (FFA 1993) for SRS lists the GSACU as a Resource Conservation and Recovery Act (RCRA) Solid Waste Management Unit/Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) unit requiring further evaluation. The GSACU required further evaluation through an investigation process that integrates and combines the RCRA Facility Investigation (RFI) process with the CERCLA Remedial Investigation (RI) process to determine the actual or potential impact to human

health and the environment of releases of hazardous substances, pollutants or contaminants to the environment.

1.1.1 H-Area Retention Basin

HRB (281-3H) is a single open inactive retention basin surrounded by a berm. HRB is approximately 60 m (200 ft) long by 37 m (120 ft) wide by 2 m (7 ft) deep. From 1955 to 1972, it received non-hazardous, radioactively-contaminated wastewater from chemical separations facilities and from the H-Area Tank Farm. Wastewater flowed through an underground process sewer line to a diversion box that directed the waste stream to either HRB or a former retention basin (281-7H) that was located to the west side of HRB. The process sewer line from the diversion box to HRB is no longer in service and is part of the HRB unit. This segment is a 1-m (3-ft) diameter concrete pipe approximately 23 m (75 ft) long. Drainage from HRB was via a 1-m (3-ft) diameter concrete pipe approximately 30 m (100 ft) long on the south side of the basin. The pipe discharged to a concrete spillway along an existing active effluent stream that flows from H-Area to Fourmile Branch.

In May 1956, an undetermined volume of material leaked from the discharge gate on the south side of HRB. SRS constructed a temporary holding pond (approximately 15 x 15 m [45 x 45 ft]) to contain the material. This area was identified as a site evaluation area (SEA) called "Spill on 05/01/1956 of Unknown Amount of Retention Basin Pipe Leak" and subsequently has been included in the HRB unit.

There is a soil pile on the western side of the basin. The soil pile is approximately 50 m (160 ft) long by 18 m (60 ft) wide by 5 m (15 ft) high. The soil is the excavated remains of a former basin (281-7H) which was adjacent to HRB site.

Trees and other vegetation were removed from HRB in 1996. HRB is now primarily covered with grasses and scattered small shrubs. Standing rainwater is normally present in HRB. The amount varies seasonally, depending on the amount of rainfall and the evaporation rate.

1.1.2 Warner's Pond

Warner's Pond (685-23G) is approximately 4-acre in size centered on an area that was formerly occupied by a pond approximately 1-acre in size. The pond was constructed in 1956 as an emergency holding pond to receive contaminated cooling water from the 221-H (H Canyon) building that flowed into an effluent stream. Contaminated cooling water was discharged to Warner's Pond on three occasions: 1956 (cooling coil leak), 1960 (source not determined), and 1965 (cooling coil leak which released approximately 300 curies [Ci] of activity). Contaminated water from all three events entered the pond via the effluent stream leading from H Area and was diverted or pumped to HRB or to the H-Area Seepage Basins. In 1966, Warner's Pond was drained, backfilled with clean soil, and paved with asphalt.

There are several inactive pipelines that run through the Warner's Pond area and are part of the unit. One is a RCRA regulated pipeline known as the H-Area Inactive Process Sewer Line (HIPSL). The RCRA-HIPSL is an 46-centimeter (cm) (18-inch) diameter vitrified clay pipe through which liquid waste was transported from the H-Area Separations Facilities to the H-Area Seepage Basins. Facility records indicate the sewer line operated from 1955 to 1982. This effluent was characterized as hazardous due to mercury and chromium concentrations and low pH. No listed wastes were managed at the RCRA-HIPSL. There are approximately 380 m (1,250 ft) of RCRA-HIPSL, several manholes, and a diversion box inside the Warner's Pond OU boundary.

The other two inactive process sewer lines (IPSLs) in the Warner's Pond waste unit are within the berms and are subject to CERCLA remedial action in accordance with the SRS Federal Facilities Agreement (FFA 1993), as opposed to corrective action under the SRS RCRA Permit. One section of the CERCLA-IPSL is approximately 105 m (350 ft) of reinforced concrete pipe, and the other section is approximately 70 m (230 ft) of polyethylene pipe. These pipelines adjoin the RCRA-HIPSL from a network of sewer lines (now inactive) that carried effluent to several non-RCRA regulated units.

In 1978, two spills (overflows) from a diversion box along the then-active vitrified clay HIPSL contaminated soils in the vicinity of the diversion box over an area at least 8 x 75m (25 by 250 ft). This area was identified as a SEA called "Spill on 03/08/1978 of Unknown Seepage Basin Pipe Leak in H-Area Seepage Basin (NBN)" and subsequently has been included in the Warner's Pond unit.

There are also reports that 12 m (40 ft) of the HIPSL collapsed in 1978 just north of the railroad line at the northern part Warner's Pond. A parallel bypass line was installed adjacent to the broken section, which was abandoned in place. This area was identified as a SEA called "Spill on 02/08/1978 of H-Area Process Sewer Line Cave-In (NBN)" and subsequently has been included in the Warner's Pond unit.

In 1978, radiological survey data and sampling data identified elevated beta-gamma activity at Warner's Pond that warranted corrective measures. Soils exceeding 2,000 counts per minute (approximately 765 m^3 [1,000 yd^3]) were removed from the former pond area and sent to the Burial Ground Complex for disposal. The area was then treated with herbicide, graded with fresh soil, topped with a clay overburden, and re-paved with asphalt. The effluent stream that fed the former pond has been re-directed around the contaminated area.

Trees and other vegetation were removed from the fenced Warner's Pond in 1996. Warner's Pond is primarily covered with asphalt that is in generally good condition with few cracks. The area between the south side of the Warner's Pond fence and E Road, which contains woody vegetation and soils with surficial contamination, has been included in this remediation project.

1.1.3 HP-52 Ponds

The HP-52 Ponds waste unit (no building number) is a site approximately 1.1 acre in size centered on an area that was formerly occupied by two small holding ponds. In 1967, during a transfer of high level waste at the H-Area Tank Farm, some spilled material flowed into a nearby storm sewer and reached the HP-52 outfall. Two small holding ponds referred to as the "HP-52 Cesium Ponds" or "HP-52 Ponds" were constructed to contain the contaminated water. Contaminated soil from the spill containing approximately 1,200 Ci of radioactivity was removed and shipped to the ORWBG. The stream banks below the HP-52 outfall were paved with asphalt to minimize contaminant migration from the soil to the stream.

A smaller spill occurred in 1969 when an H-Area Tank Farm waste transfer line ruptured and released high level waste to the storm sewer and outfall. Following this event, the pond areas were filled with contaminated soil excavated from the stream banks, and covered with clean backfill. Stream flow was diverted from the original effluent ditch and re-directed around the former ponds area.

There is no historical evidence to document the exact locations of the former ponds at HP-52 Ponds. The former ponds area was inferred from the field locations of, and information associated with, two concrete waste site markers. Several soil piles are present at HP-52 Ponds. The piles are the result of

movement of soil at the unit to fill the pond areas, to backfill ditches, and to redirect the active regulated effluent ditch.

Trees and other vegetation were removed from HP-52 Ponds in 1996. The HP-52 Ponds unit is now primarily covered with grasses and scattered small shrubs.

1.1.4 Old Radioactive Waste Burial Ground

The ORWBG (643-E) is located in E-Area directly south of the Low-Level Radioactive Waste Disposal Facility (LLRWDF) (643-7E) and the Mixed Waste Management Facility (MWMF) (643-28E). The ORWBG is bordered by SRS E Road on the south and F-Area on the west. The ORWBG is part of the central disposal area for solid radioactive waste at SRS known as the Burial Ground Complex (BGC). Waste was disposed of at the ORWBG from 1952 until 1974, when the site was essentially filled and the majority of waste disposal operations shifted to other facilities in the BGC.

The ORWBG is a 76-acre disposal area for solid radioactive waste produced at SRS, as well as for shipments from other USDOE and Department of Defense facilities. During its operational history, approximately 200,000 m^3 (7,125,000 ft^3) of radioactive wastes, including radioactively contaminated hazardous substances, were buried at depth within the ORWBG. Most wastes disposed of in the ORWBG were placed in drums, cans, cardboard boxes, plastic bags, and metal containers and then buried in earthen trenches approximately 6 m (20 ft) deep. Most waste was disposed of at the ORWBG from 1952 until 1972. In addition, small quantities of radioactive waste (contaminated primarily with transuranic isotopes) were disposed of in 1973 and 1974. At the time of burial, approximately 5.1 million Ci of radioactivity was placed in the ORWBG. Much of the short-lived radioactivity has decayed, but a large inventory of radioactive and hazardous substances remain buried at depth in the ORWBG.

In 1996, USDOE issued an Interim Record of Decision (IROD) (WSRC 1996) to place a soil cover on the ORWBG. The interim action installed a minimum 0.6 m (2 ft) thick compacted low permeability native soil layer underlying a 15 cm (6 inch) vegetative layer with proper slopes and associated drainage network to minimize infiltration and leaching of the buried waste. This interim action was completed in May 1998.

A second interim action was started in 2001 (WSRC 2000) to stabilize residual contamination remaining in the old solvent tanks (OSTs) within the ORWBG. The 22 OSTs, including the residual materials in the tanks, have been grouted in place. The physical work for this interim action was completed in March 2003.

1.2 Nature and Extent of Contamination at GSACU Waste Units

The constituents of concern (COCs) pertinent to the GSACU, as presented in the ROD (WSRC 2002), include the source units (e.g., contamination in soil) for the waste units. Groundwater in the aquifer under HRB, Warner's Pond, and HP-52 Ponds is not included in the scope of this CMI/RAIP because it is being addressed separately under the GSA Eastern Groundwater OU. The ORWBG is being addressed by the corrective action program in the SRS RCRA Part B permit for the Mixed Waste Management Facility (MWMF) (WSRC 1995) in accordance with Settlement Agreement 87-52-SW.

Principle threat source material (PTSM) is a COC that has been determined to present a risk of 1 x 10^{-3}, or greater, to human health. Contaminant migration constituents of concern (CMCOCs) are COCs that have been determined to present a risk of leaching to the groundwater at concentrations above the maximum contaminant level (MCL) within 1,000 years.

1.2.1 HRB

The unit investigation determined that soils in the basin bottom/sidewalls, in the basin berm, in the soil pile, and in the sewer line and discharge area are contaminated with radionuclides and arsenic. PTSM is present, primarily as cesium-137. CMCOCs are also present, primarily as strontium-90. Along the process sewer line, the contamination is at and below the pipe elevation. The discharge area has the deepest detected contamination. At the soil pile, the contamination is limited to the soil pile itself and does not extend below the asphalt layer beneath the soil pile. Available data suggest that the hardpan provides a natural limit to the downward migration of contaminants at HRB, although this is not a certainty.

1.2.2 Warner's Pond

The investigations determined that soils in the former pond area, in the berms, and along the HIPSL are contaminated with radionuclides. PTSM is present as cesium-137. Radionuclide CMCOC contaminants were primarily strontium-90. An additional CMCOC, mercury, was present in some soils in the former pond area. The extent of contamination, including any remnant left after excavation, and depth of the hardpan layer, was refined during post-ROD field activities.

1.2.3 HP-52 Ponds

The investigations determined that soils and sediments in the former ponds area, the old effluent ditch, the soil piles, and the historic drainage channel near the former beaver pond are contaminated with radionuclides. PTSM is present as cesium-137. There are no CMCOCs at HP-52 Ponds. The extent of contamination, including any remnant left after excavation, and depth of the hardpan, was refined during post-ROD field activities.

1.2.4 ORWBG

Traditional characterization (i.e., intrusive sampling) was not performed at the ORWBG to avoid disturbing material under the interim soil cover. Characterization was accomplished through a detailed literature review; evaluation of aerial photographs, construction drawings, health physics burial maps, and the computerized burial record analysis database, evaluation of past studies, review of process history, interviews with SRS staff, and non-intrusive investigations. This investigation is documented in *Source Term for the Old Radioactive Waste Burial Ground (ORWBG), Savannah River Site* (WSRC 1997a). The data provided sufficient information to understand the hazards associated with the ORWBG and to select a remedial alternative.

1.3 Remedial Action Overview

The selected remedial action established in the ROD is based on an evaluation of potential alternatives performed in accordance with the National Oil and Hazardous Substance Contingency Plan (NCP) and the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) (as amended). As stated in the ROD (WSRC 2002), the selected RA for the GSACU includes the following elements:

1. Excavate materials constituting industrial PTSM and soil containing CMCOCs above RGs at HRB, Warner's Pond, and HP-52 Ponds to the extent practicable. The excavation will not breach the integrity of the hardpan. Soil RGs for CMCOCs are established to prevent leaching of constituents to groundwater at concentrations above the maximum concentration level (MCL) within 1,000 years.

2. Manage standing surface water (in HRB, Warner's Pond, and HP-52 Ponds) and water which accumulates during excavation by solidification and consolidation with the excavated soil and/or by another means.

3. Consolidate the excavated soil and material by transferring it to the areas of the ORWBG that have not yet been covered by the native soil cover (e.g., over the OSTs).

4. When inactive pipelines are encountered during removal of soil, excavate those sections of the pipelines with the soil. At Warner's Pond, this will include the inactive CERCLA pipelines within the berms, the diversion box, and the RCRA-regulated HIPSL. Characterization data show that soil around the HIPSL is non-hazardous. Sections of the HIPSL and any contents will be sampled and analyzed during the characterization of Warner's Pond to determine if they are hazardous in accordance with South Carolina Hazardous Waste Management Regulation R.61-79.261. If the HIPSL pipeline or its contents are hazardous, these materials will not be consolidated into the ORWBG. A RCRA Closure Plan will be developed to document the disposition of the RCRA pipeline.

   For remaining intact portions of inactive pipelines, including portions that are not in contact with PTSM or cannot be readily removed (such as the section of the HIPSL under the railroad track), plug the ends of the pipelines and grout in place. If a pipeline is not intact, cannot be reliably grouted in place, and is non-hazardous, remove it and consolidate it with the soil transferred to the ORWBG. Risks posed by remnant contamination in soil after excavation will be determined prior to backfilling.

5. Consolidate any vegetation in contact with PTSM by removing it and transferring it to the ORWBG. Vegetation will be shredded, chipped, or

spatially distributed and incorporated into the excavated soil. Placement of this material at ORWBG will be engineered in a manner that minimizes subsidence.

6. Evaluate the risk of remnant material after excavation at HRB, Warner's Pond, and HP-52 Ponds. Contaminant migration risk from the potential source to the groundwater beneath each unit will be evaluated.

7. Mitigate residual risk at HRB, Warner's Pond, and HP-52 Ponds by backfilling and placing clean soil over open excavations that may contain residual contamination exceeding RGs. A soil cover will be used to minimize infiltration so that (1) no unit-related contaminants will cause MCL exceedances in the groundwater beneath each unit, and (2) the accumulation of perched water atop the hardpan is minimized.

   Note: at HRB and Warner's Pond, a low permeability geosynthetic cover will be installed, as stated in the CMI/RAIP, Section 1.5.2, RAIP Scoping Meeting, Item No. 5.

8. Restore surface water drainage at Warner's Pond to a natural state by removing the berms that cause ponding of water.

9. Prepare a post-construction report for HRB, Warner's Pond, and HP-52 Ponds to summarize the remediation activities and summarize how residual risks are addressed.

10. Implement institutional controls at HRB, Warner's Pond, and HP-52 Ponds. Institutional controls will consist of site maintenance (site inspections, mowing, general housekeeping, repair of erosion damage, and other routine maintenance as needed) and access controls (warning signs and land use

restrictions). Institutional controls will include continued use of SRS's Site Use and Site Clearance.

11. Construct a low-permeability geosynthetic cover system (with a soil hydraulic conductivity of $\leq 1 \times 10^{-7}$ cm/sec) over the ORWBG; including the areas where consolidated materials from HRB, Warner's Pond, and HP-52 Ponds shall be placed. A hydraulic conductivity of $\leq 1 \times 10^{-7}$ cm/sec is selected because it provides infiltration control that sufficiently manages uncertainties related to residual contamination without further investigation, and it is consistent with low permeability caps placed over similar facilities at SRS.

12. Implement institutional controls at the ORWBG. Institutional controls will consist of site maintenance (site inspections, mowing, general housekeeping, repair of erosion damage, other routine maintenance as needed, and periodic maintenance of the infiltration control system) and access controls (security fences, warning signs, and land use restrictions). Institutional controls will include continued use of SRS's Site Use and Site Clearance.

13. Before institutional controls are terminated at the ORWBG, install intruder barriers over the long-lived persistent radioactive hot spots to deter inadvertent human intrusion. The likely configuration of the intruder barrier is heavy rip-rap. The barrier will be installed above the low permeability cap but beneath a soil cover. Covering the rip rap will minimize development of an undesirable habitat (e.g., a habitat among rip-rap favorable for deep-rooting plants and burrowing animals that could degrade the low permeability cap). Placement of the barrier will not interfere with the long-term integrity of the cap. A reasonable estimated timeframe for installing the intruder barrier is 100 years. The barrier will be installed before institutional controls are terminated; the USDOE expects to maintain institutional controls at the

Burial Ground Complex for at least 100 years. Installation of these intruder barriers are not part of this remedial action.

Note: The final intruder barriers over the long-lived persistent radioactive hot spots at the ORWBG will not be required until the USDOE relinquishes institutional control of the BGC. The estimated time frame of 100 years for installing these barriers is based on the assumed time frame for continued USDOE ownership.

The post-remedial action conceptual site model (see Attachment A-3 to this LUCIP) shows the broken pathways and the remaining residual risk to the future industrial worker.

According to the Savannah River Site future Use Project Report (USDOE 1996), residential use of SRS land should be prohibited.

2.0 LAND-USE CONTROLS

Considering the residual risk mentioned above, and in order to insure the protectiveness of the remedy described above, the GSACU land use control objectives are to:

- prevent contact, removal, or excavation of buried waste or pipelines in the OU areas designated in this LUCIP;
- maintain the use of the site for industrial activities only;
- prevent unauthorized access to the closed CERCLA unit as long as the waste remains a threat to human health or the environment; and
- prevent unauthorized residential or agricultural access to groundwater.

Current access controls and deed notification needed to maintain the future land use are described in the following sections of this LUCIP.

2.1 Access Controls

2.1.1 On-Site Workers

In accordance with WSRC 1D, *Site Infrastructure and Services Manual*, Procedure 3.02, "Site Real Property Configuration Control," use of all lands and waters on SRS shall be coordinated via the Site Use Program. All employees, contractors, and visitors to the SRS require adherence to the Site Use Program. This program ensures that all work performed on the SRS that adds, modifies, or removes features portrayed on the SRS development maps is authorized. No use of land (i.e., excavation or any other land use) shall be undertaken without prior approval documented by a Site Use Permit. This authorization is obtained through the completion of a Site Clearance Request Form. Also, in accordance with Procedure 3.02, all work at SRS that adds to or modifies features or facilities portrayed on SRS development maps (i.e., plot plans of facilities/utilities at SRS) will be authorized by a Site Clearance Permit before any excavation activities are conducted. All site clearance requests will be reviewed to verify that either an approved Site Use Permit has been obtained or that an existing Site Use Permit has sanctioned the request.

SRS, specifically the Site Development, Planning, and Mapping Department, is responsible for updating, maintaining, and reviewing site maps, including Federal Facility Agreement (FFA) (FFA 1993) operable unit (OU) identifications. If a site clearance request is made that may impact an FFA OU, the Site Clearance Request Form is sent to the FFA OU reviewer, who is in the Soil and Groundwater Closure Projects (SGCP), for either approval or disapproval. The roles and responsibilities of each individual are detailed in WSRC 1D, Procedure

3.02. Verification of USDOE approval for intended land use must be obtained before issuance of a Site Clearance Permit. The Site Use and Site Clearance processes are applicable to all activities and personnel on site (including subcontractors).

The processes are controlled within the SRS Quality Assurance (QA) Program. The SRS QA program is the governing QA program for all SRS activities, including those in SGCP. The activities that are performed in SGCP must comply with SRS QA Program procedures as well as with SGCP-specific procedures.

SRS identifies all buildings and facilities on maps used in the Site Use/Site Clearance Program. This waste unit is identified on these maps as a CERCLA facility.

Any work proposed in these areas will be strictly controlled and workers will be appropriately trained and briefed about health and safety requirements if work is deemed necessary for maintenance. No major change in land use nor excavation at the GSACU OU shall be undertaken without USEPA and South Carolina Department of Health and Environmental Control (SCDHEC) approval. To prevent unknowing entry and to ensure that unrestricted use of the waste unit does not occur while under ownership of the government, identification signs will be posted at the unit.

The access control warning signs for the soil covers will be legible for a distance of at least 25 feet. The soil cover access control warning sign is shown in Figure A-5 (Attachment A-4 to this LUCIP).

The access control warning signs for the underground grouted pipeline (Warner's Pond only) will be legible from a distance of at least 25 ft. The underground pipeline access control warning sign is shown in Figure A-6 (Attachment A-4 to this LUCIP).

Custodial responsibilities for maintenance and inspection of the GSACU waste units will be maintained by the Post-Closure Maintenance Group within SGCP.

2.1.2 Trespassers

While under the ownership of USDOE, access control of the entire SRS will be maintained in accordance with the 1992 RCRA Part B Permit Renewal Application, Volume I, Section F.1. This section describes the 24-hour surveillance system (R.61-79.264.14(b)(1)), artificial or natural barriers (R.61-79.264.14(b)(2)(I)), control entry systems (R.61-79.264.14(b)(2)(ii)), and access control warning signs (R.61-79.264.14(c)) in place at the SRS boundary to comply with the security requirements for a RCRA-permitted facility.

2.2 LUCIP Deed Notification

In the long term, if the property is ever transferred to non-federal ownership, the US 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 contract for sale and the deed will contain the notification required by CERCLA Section 120(h).

The deed notification shall, in perpetuity, notify any potential purchaser that the property has been used for the management and disposal of waste. These requirements are also consistent with the intent of 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 re-evaluated 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 re-evaluation of the need for the deed restrictions will be done though an amended ROD with USEPA and SCDHEC review and approval.

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

Per Section 3.6 of the LUCAP, the post-construction revision of this LUCIP will identify the area under land use restriction via a survey plat certified by a professional land surveyor.

2.3 Field Walkdown and Maintenance for Institutional Controls

After the remediation of the GSACU, only maintenance activities will be required per this remedial action. No operations other than groundwater monitoring (at the monitoring wells) and effluent stream monitoring (at the monitoring stations) will be required.

The results of any events and or actions that indicate some potential compromise of institutional controls will be documented in the FFA Annual Progress Report. All other routine maintenance activities will be documented and maintained in files subject to US EPA and SCDHEC review and audit. A copy of the complete inspection form is maintained in the Soil and Groundwater Closure Projects Administrative Record Files. The land-use controls will be implemented as long as the waste remains a threat to human health or the environment.

The following steps will be implemented to maintain the geosynthetic soil covers for as long as is necessary to prevent contaminant migration above MCL:

- Perform periodic (quarterly at the ORWBG, and annually at HRB, Warner's Pond, and HP-52 Ponds) visual inspections for evidence of damage to the soil cover due to erosion or intrusion by burrowing animals. The inspection will also address upkeep of the vegetative cover and access control barriers (e.g., the access control warning signs). (Attachment A-2 provides a unit-specific inspection checklist for the GSACU waste units).

- Perform necessary repairs (when required as identified during inspection) to maintain the functional integrity of the soil cover, fence (ORWBG only), and access control warning signs.

- Enforce SRS institutional controls through access controls by restricting access to the closed waste unit. Institutional controls will be maintained as long as the waste remains a threat to human health or the environment.

- As required by the National Oil and Hazardous Substance Contingency Plan (NCP), a five-year review of the ROD for the GSACU will be performed as long as the waste remains a threat to human health or the environment.

The waste unit inspectors are to be trained in Hazardous Waste Operations and Emergency Response (HAZWOPER), RCRA Well Inspections (SGCP-specific training), SGCP RCRA Waste Unit Inspections, Radiological Workers, etc., as applicable for the specific inspection. They will also be trained based on the individual requirements of the regulatory approved closure documents for each waste unit. In addition, the inspectors are to attend yearly refresher courses. Over the years, different personnel will conduct the inspections and grass cutting operations.

This unit-specific LUCIP, including the checklist (Attachment A-2), will be appended to the SRS LUCAP.

ATTACHMENT A-1

SURVEY PLAT (Later)

The applicable Survey Plats for the GSACU waste units will be provided in the PCR/CMIR documentation with as-built information for the waste unit closures. (See Section 2.2 of the LUCIP.)

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ATTACHMENT A-2

SGCP FIELD INSPECTION CHECKLIST
for the
GENERAL SEPARATIONS AREA CONSOLIDATION UNIT

SGCP FIELD INSPECTION CHECKLIST
for the
GENERAL SEPARATIONS AREA CONSOLIDATION UNIT

This includes H-Area Retention Basin (HRB), Warner's Pond, HP-52 Ponds, and the Old Radioactive Waste Burial Ground (ORWBG) waste units

GSACU Waste unit Inspected: _____

A= Satisfactory X= Unsatisfactory (Explanation required)	**A or X**	**Observation or Corrective Action Taken**
1. Verify that the roads are accessible. (HRB, Warner's Pond, HP-52)		
2. Verify that the waste unit warning signs are in acceptable condition, have the correct information, and are legible from a distance of 25 feet. (All sites)		
3. Verify that the fence is in good condition and that the gates are locked. (ORWBG only)		
4. Verify that there are no excavation, digging, or construction activities on the soil cover. (All sites)		
5. Check the integrity of drainage ditches for the presence of excessive erosion, sediment buildup, and any debris restricting water flow. (HRB, Warner's Pond, HP-52)		
6. Verify that no woody vegetation is growing on the soil cover. Remove or identify as needed. (All sites)		

7. Visually check the vegetative cover for grass density, with no bare spots more than 3-feet by 3-feet in area. The height of the vegetative cover should not impair the visual inspection of the soil cover. This will be determined by the inspector. (All sites)		
8. Check the soil cover for signs of erosion or depressions (subsidence). (All sites)		
9. Check for signs of burrowing animals. (HRB, Warner's Pond, ORWBG)		
10. Other		

Inspected By:_____/_____Date:_____
(Print Name) (Signature)

Reviewed By:_____/_____Date:_____
Post-Closure Manager or Designee (Print Name) (Signature)

CAUTION: The inspector shall notify the Post-Closure Manager (PCM) and Environmental Compliance Authority (ECA) IMMEDIATELY if there has been a breach or compromise of the institutional controls of this waste unit. Refer to procedure SOP-019.

NOTE: All monitoring wells associated with this waste unit are inspected using the SGCP Monitoring Well Inspection Procedure in compliance with South Carolina Hazardous Waste Regulation R.61-79, Subpart F, Groundwater Monitoring.

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ATTACHMENT A-3

CONCEPTUAL SITE MODEL
for the
GENERAL SEPARATIONS AREA CONSOLIDATION UNIT
POST-REMEDIAL ACTION

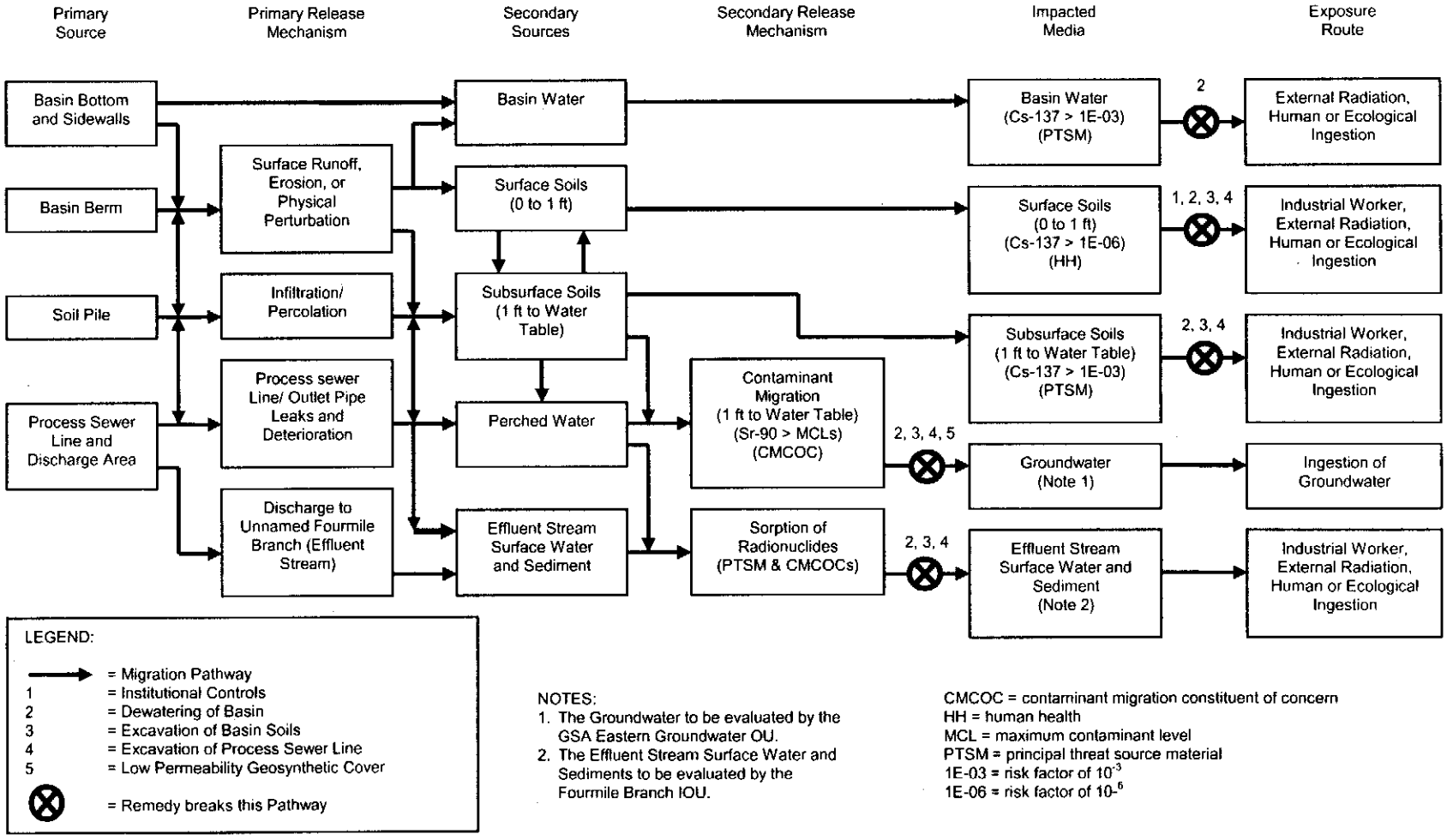


Figure A-1. Conceptual Site Model for HRB Post-Remedial Action

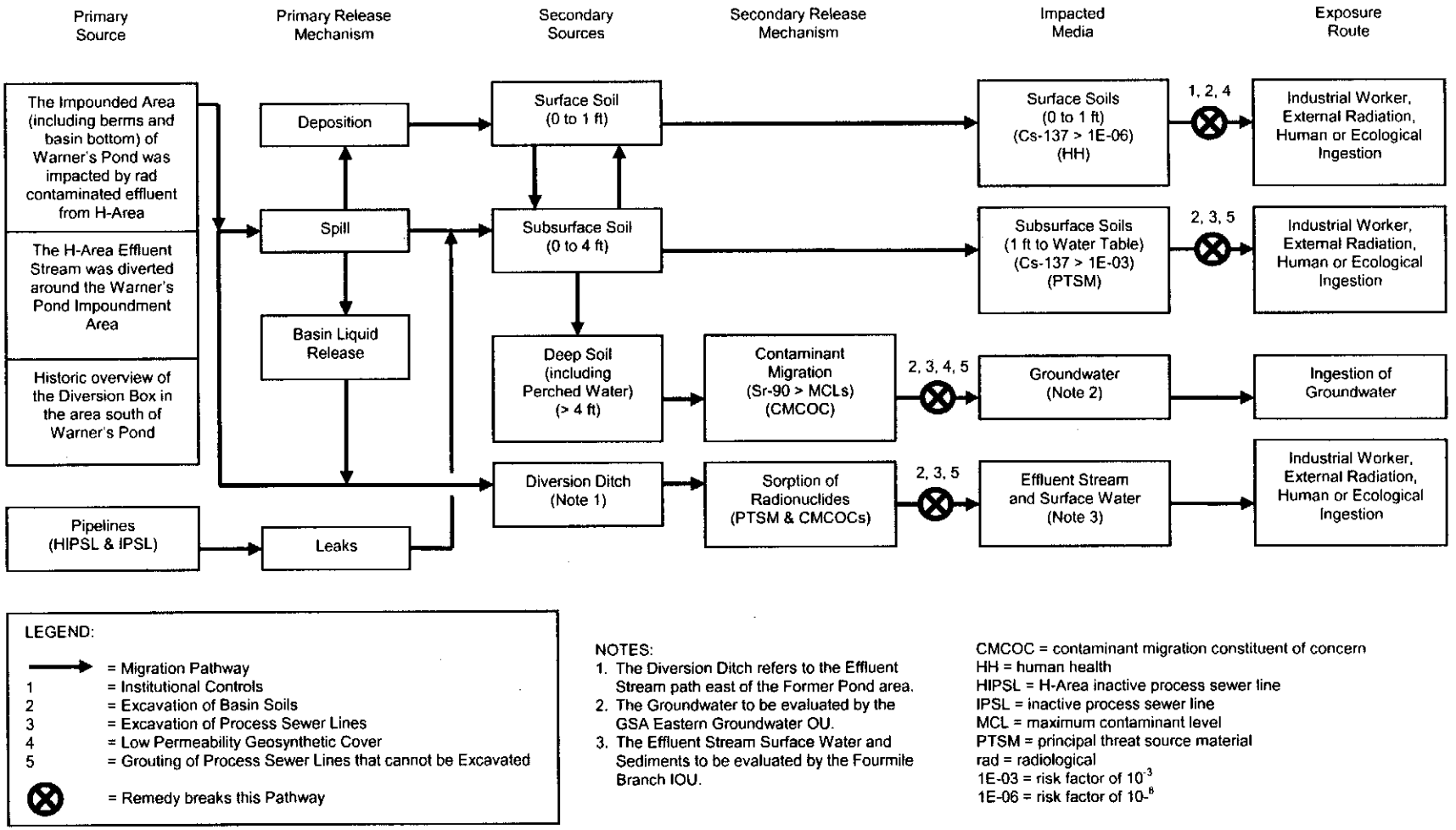


Figure A-2. Conceptual Site Model for Warner's Pond Post-Remedial Action

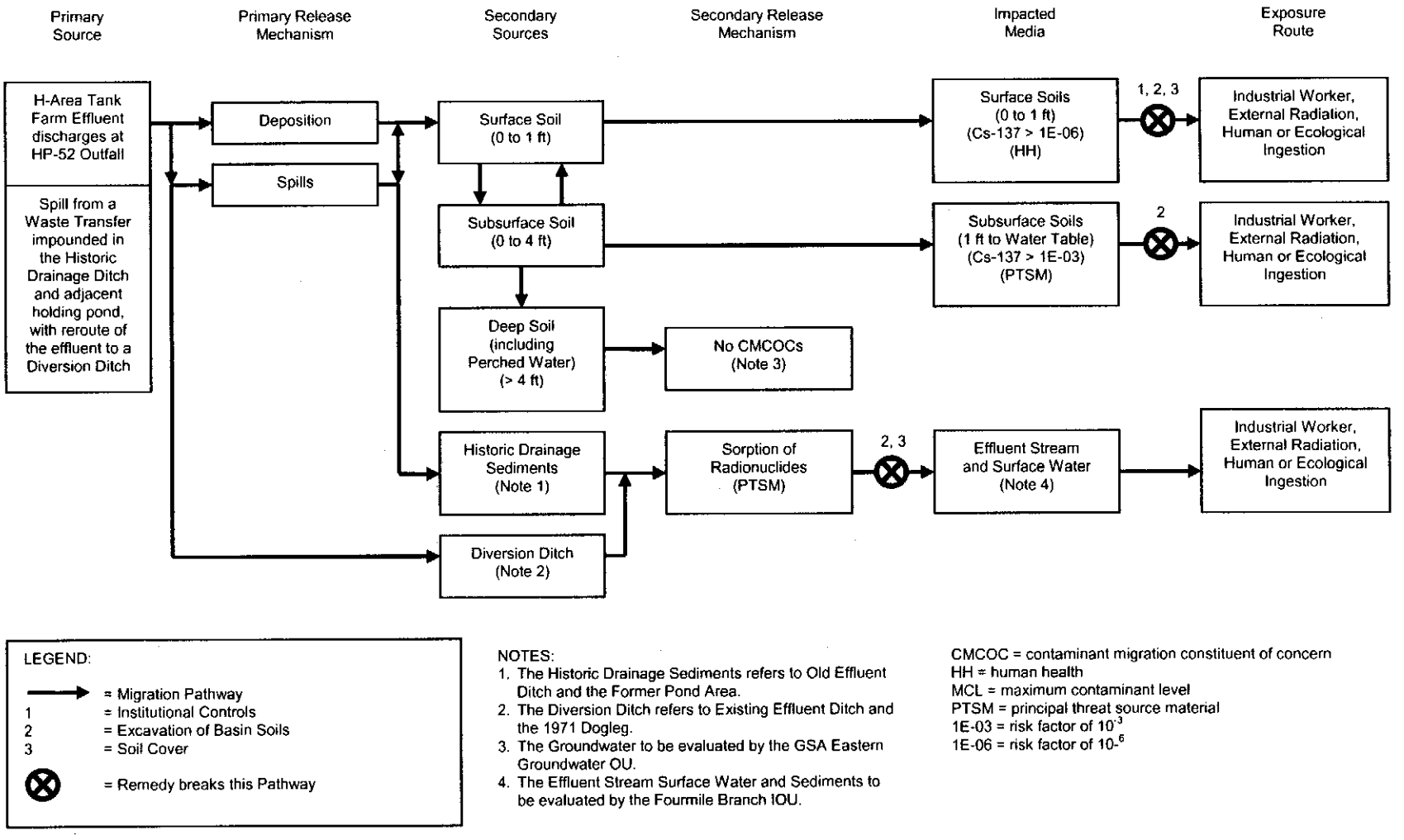


Figure A-3. Conceptual Site Model for HP-52 Ponds Post-Remedial Action

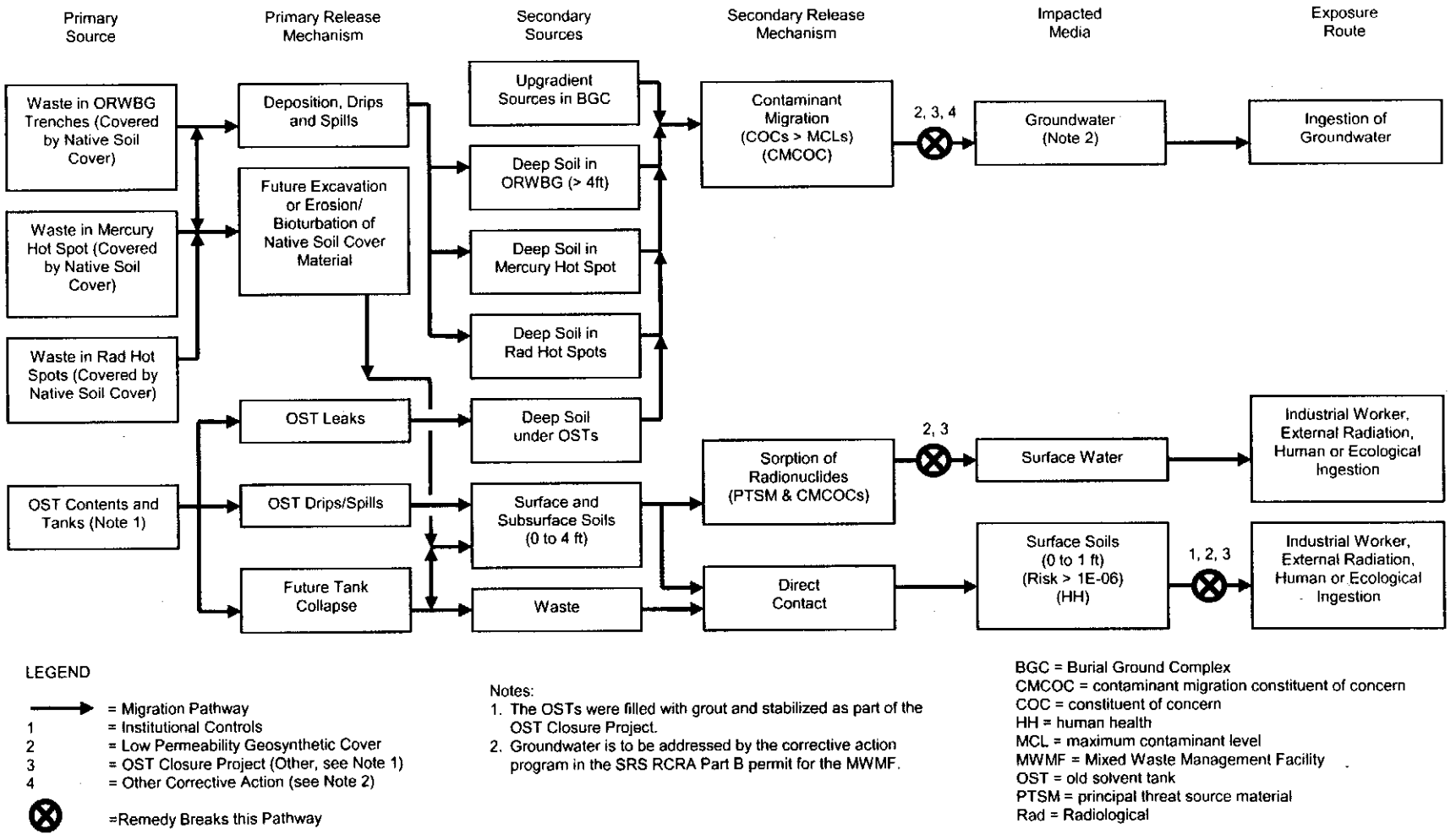
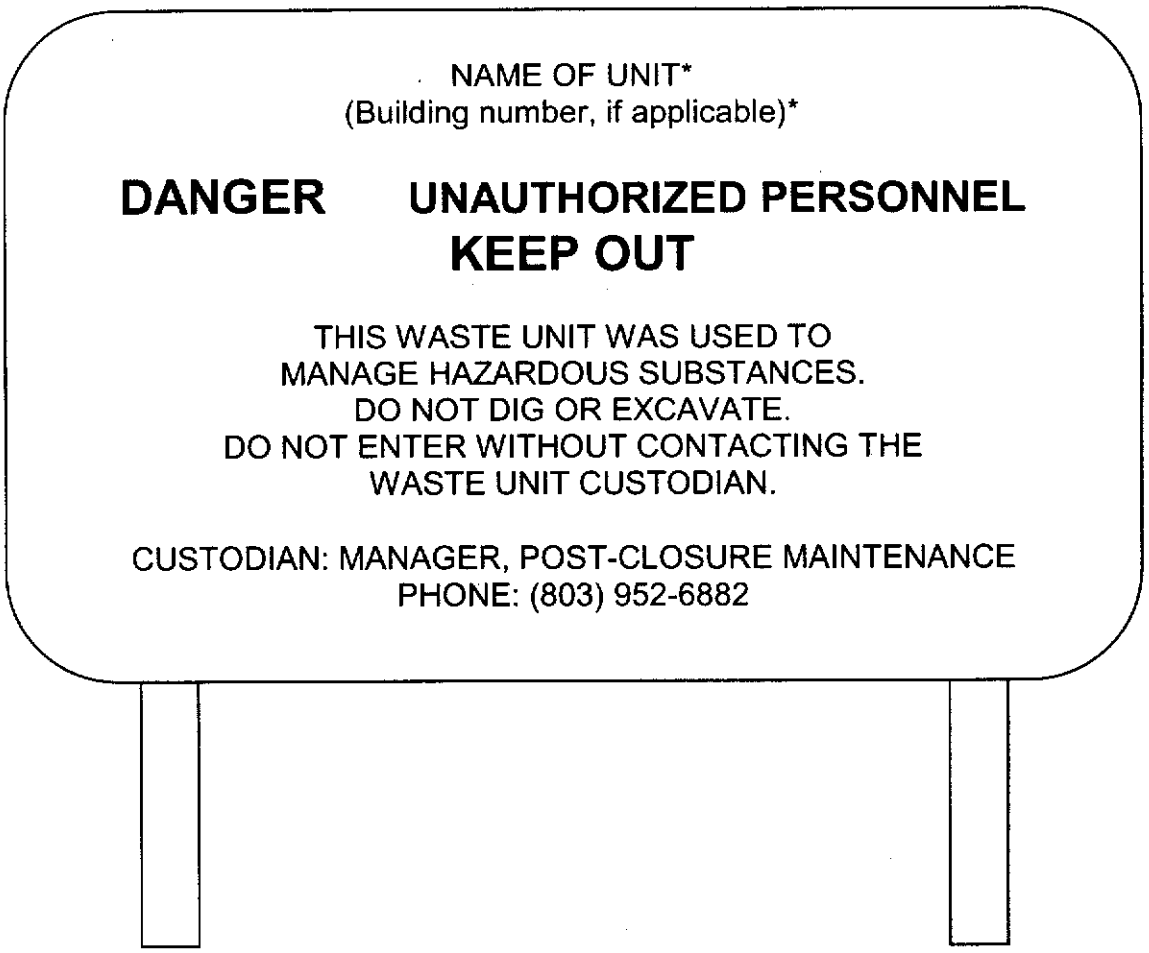


Figure A-4. Conceptual Site Model for the ORWBG Post-Remedial Action

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ATTACHMENT A-4

ACCESS CONTROL WARNING SIGNS



* Name of waste unit and building identification will inserted as applicable.

Figure A-5. Soil Cover Access Control Warning Sign

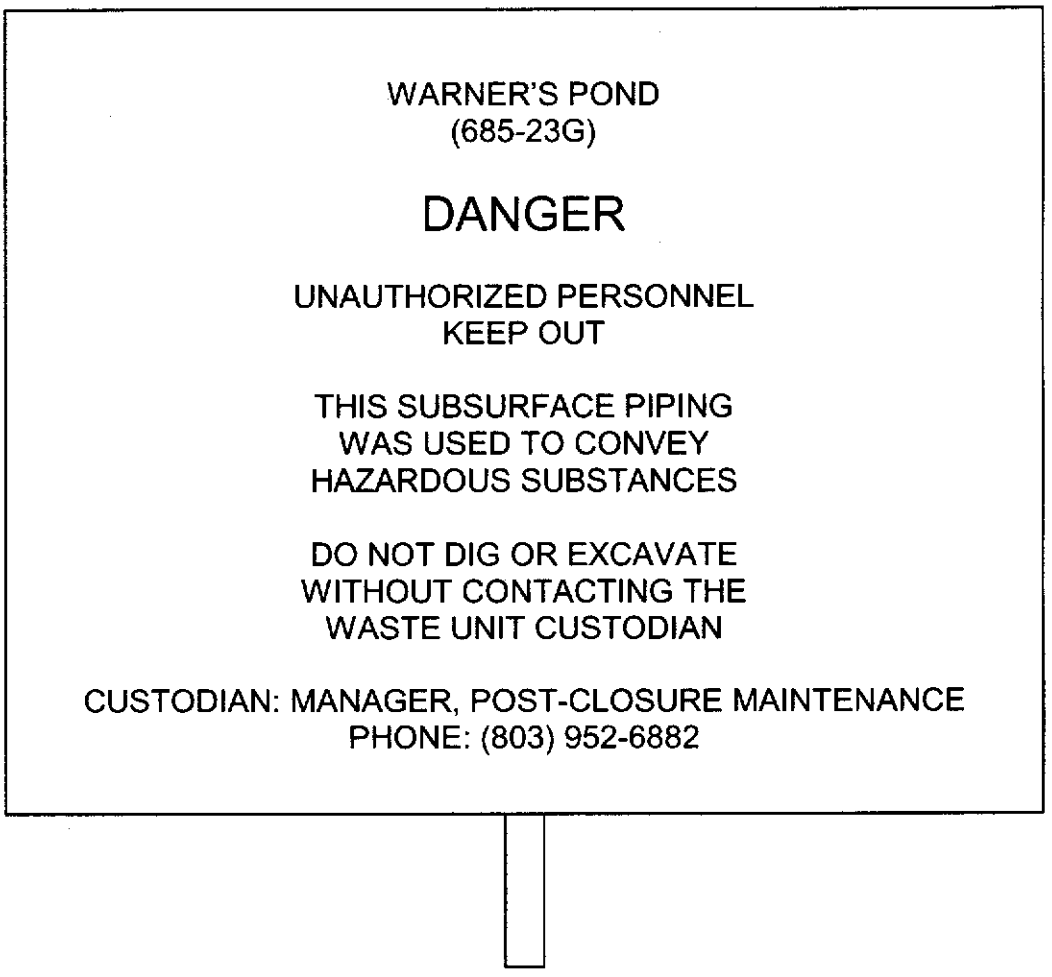


Figure A-6. Underground Piping Access Control Warning Sign

LUCIP for the
K-Area Bingham Pump Outage Pit, 643-1G
Section 2 of *Final Remediation Report for the K-Area Bingham Pump Outage Pit, 643-1G*
(WSRC-RP-98-4003, Revision 1, August 1998)

On February 6, 2014, the DOE submitted a letter (ACP-14-125, ARF #019315) to the EPA and SCDHEC to perform the inspections for this operable unit on an annual basis. The EPA and SCDHEC approved the request in letters dated March 20, 2014 (ARF #019385) and March 7, 2014 (ARF #019360), respectively.

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United States Department of Energy

Savannah River Site

Final Remediation Report for the K-Area Bingham Pump Outage Pit (643-1G) (U)

WSRC-RP-98-4003
Revision 1
August 1998

Westinghouse Savannah River Company
Savannah River Site
Aiken. SC 29808

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

DISCLAIMER

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

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LIST OF ACRONYMS

BRA	Baseline Risk Assessment
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
EPA	U.S. Environmental Protection Agency
LUC	Land Use Control
LUCAP	Land Use Control Assurance Plan
K BPOP	K-Area Bingham Pump Outage Pit
RCRA	Resource Conservation and Recovery Act
RI	Remedial Investigation
ROD	Record of Decision
SCDHEC	South Carolina Department of Environmental Control
SRS	Savannah River Site
WSRC	Westinghouse Savannah River Company

1.0 GENERAL DESCRIPTION OF THE K-AREA BINGHAM PUMP OUTAGE PIT

The K-Area Bingham Pump Outage Pit (K BPOP), Building Number 643-1G, is situated immediately south and outside the K-Reactor fence line (Figure 1) and is approximately 400 feet in length and 60 feet in width (Figure 2). The K-Reactor (Figure 3) is located in the west-central portion of the Savannah River Site (SRS), approximately 4 miles east of the nearest SRS boundary. The K BPOP waste unit is listed as a Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) waste unit in the SRS Federal Facility Agreement and is not subject to Resource Conservation and Recovery Act (RCRA) permit modification per the SRS Federal Facility Agreement, Appendix C.

Surface water drainage ditches surround the K BPOP to the north, west, and south. These ditches collect and redirect runoff water to reduce erosion. As depicted in Figure 1, the K BPOP is located on the west side of a small topographical high. Consequently, surface water drainage from other areas has little or no effect on the surface of the K BPOP. Generally, no surface water is found in the drainage ditches.

The K BPOP is situated in the Tobacco Road formation that extends from ground surface to a depth of 95 feet below ground surface. The Tobacco Road formation is composed of dark red to tan, very fine to fine sandy clay and clayey sands with laminated tan and purple, silty, clayey very fine to medium sands. The groundwater flow direction is to the southwest across the K BPOP and the groundwater flow rate for the Water Table Aquifer beneath the K BPOP is estimated at approximately 91.25 ft/year.

Between 1957 and 1958, miscellaneous construction debris generated by major modifications and repairs to the primary and secondary reactor cooling water systems was buried in the K BPOP. There were no pumps buried and no liquid waste was disposed of in the K BPOP. The depth of excavation at the K BPOP ranged from 9 to 14 feet, which indicates a sloping pit base (this is consistent with the use of the pit for disposal purposes). The radioactive contamination was less than 25 mR/hr with no detected alpha activity.

The K BPOP was backfilled with approximately four feet of fill material in 1958 and is now an open grassy area marked by orange ball markers and concrete monuments.

The contact person (title, address, and phone number) for the K BPOP is as follows:

Westinghouse Savannah River Company
Manager, Post Closure Maintenance
Building 730-2B
Aiken, SC 29808
(803) 952-6882

Figure 1. Location of the K-Area Bingham Pump Outage Pit

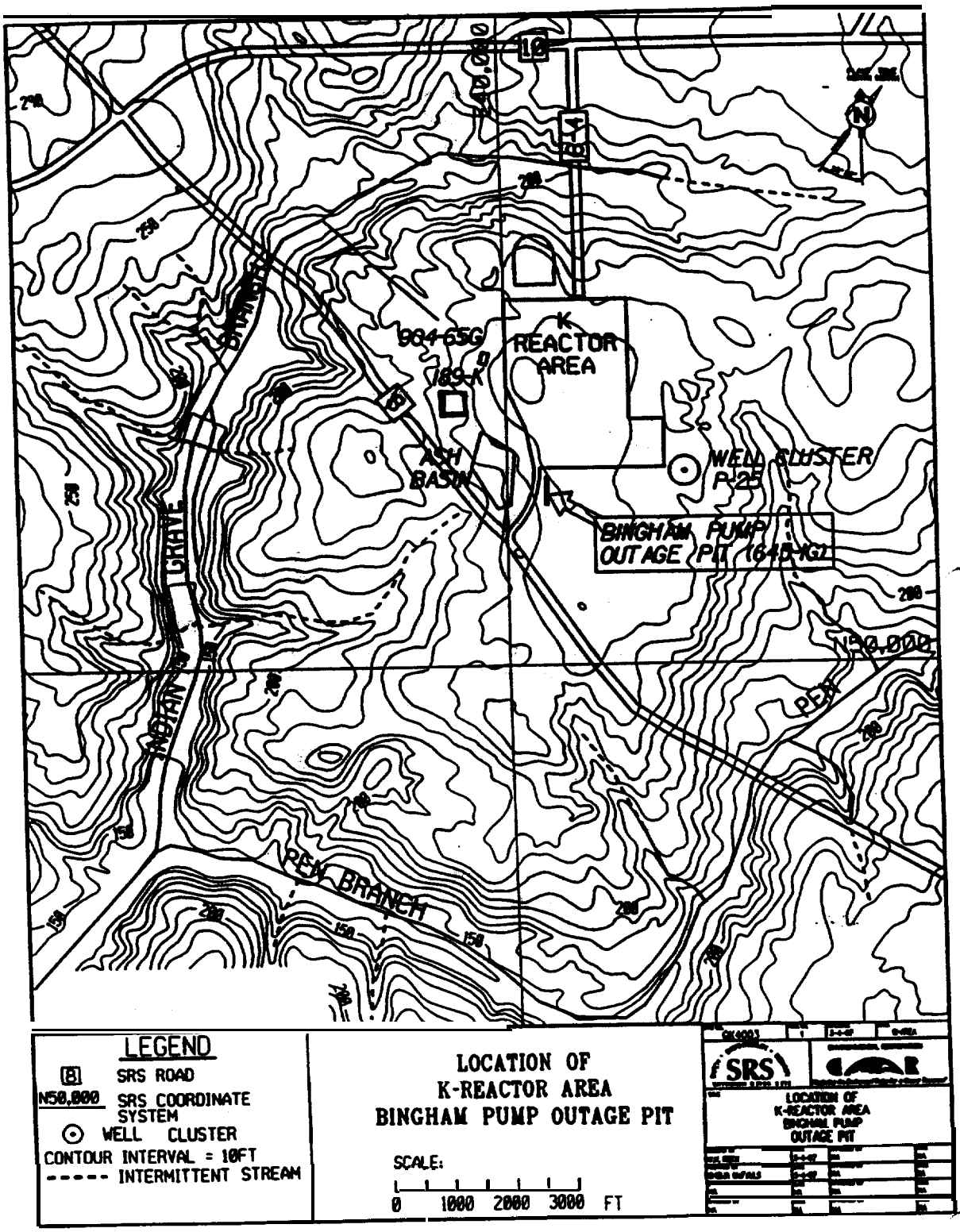


Figure 2. K-Area Bingham Pump Outage Pit Dimensions

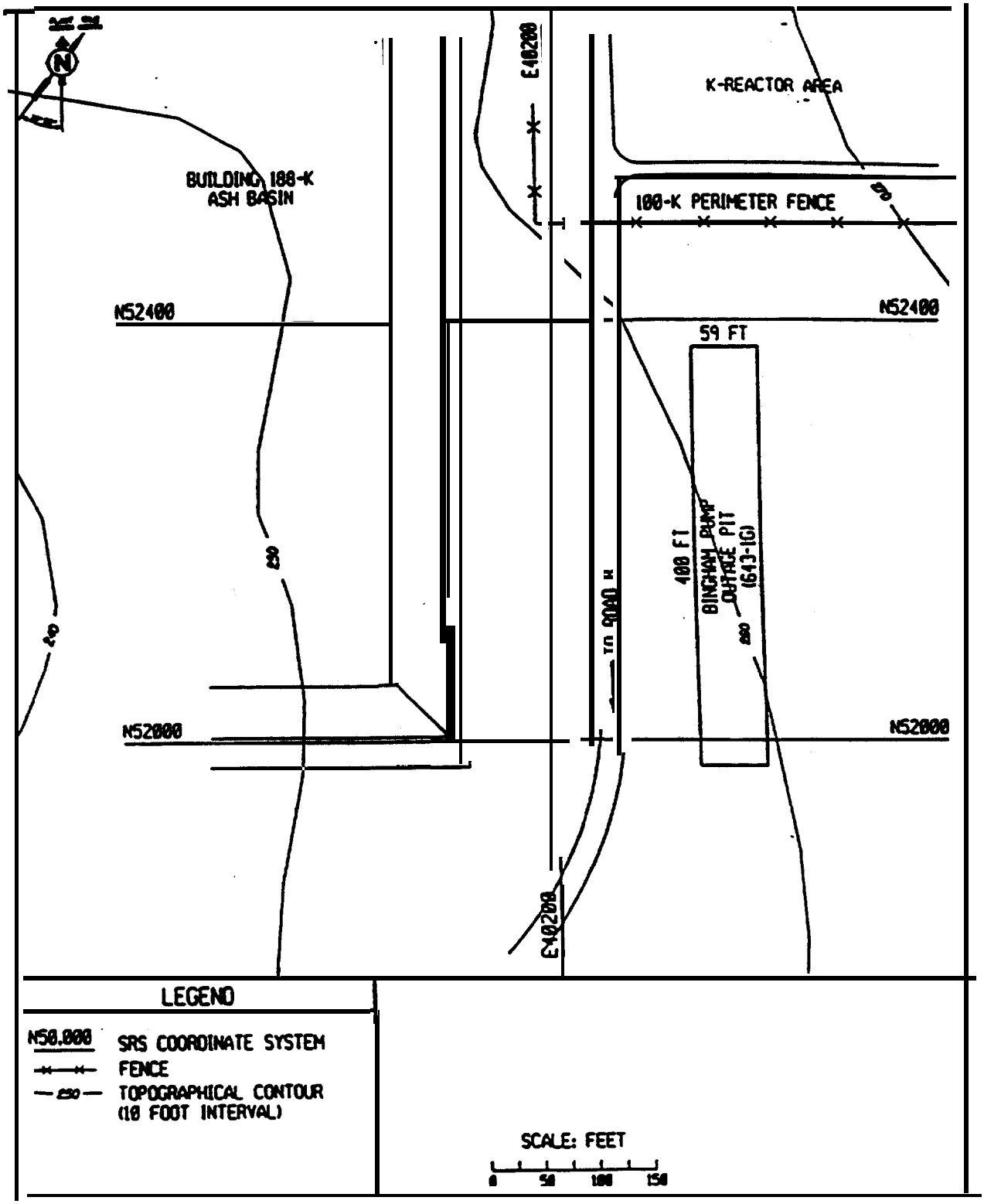
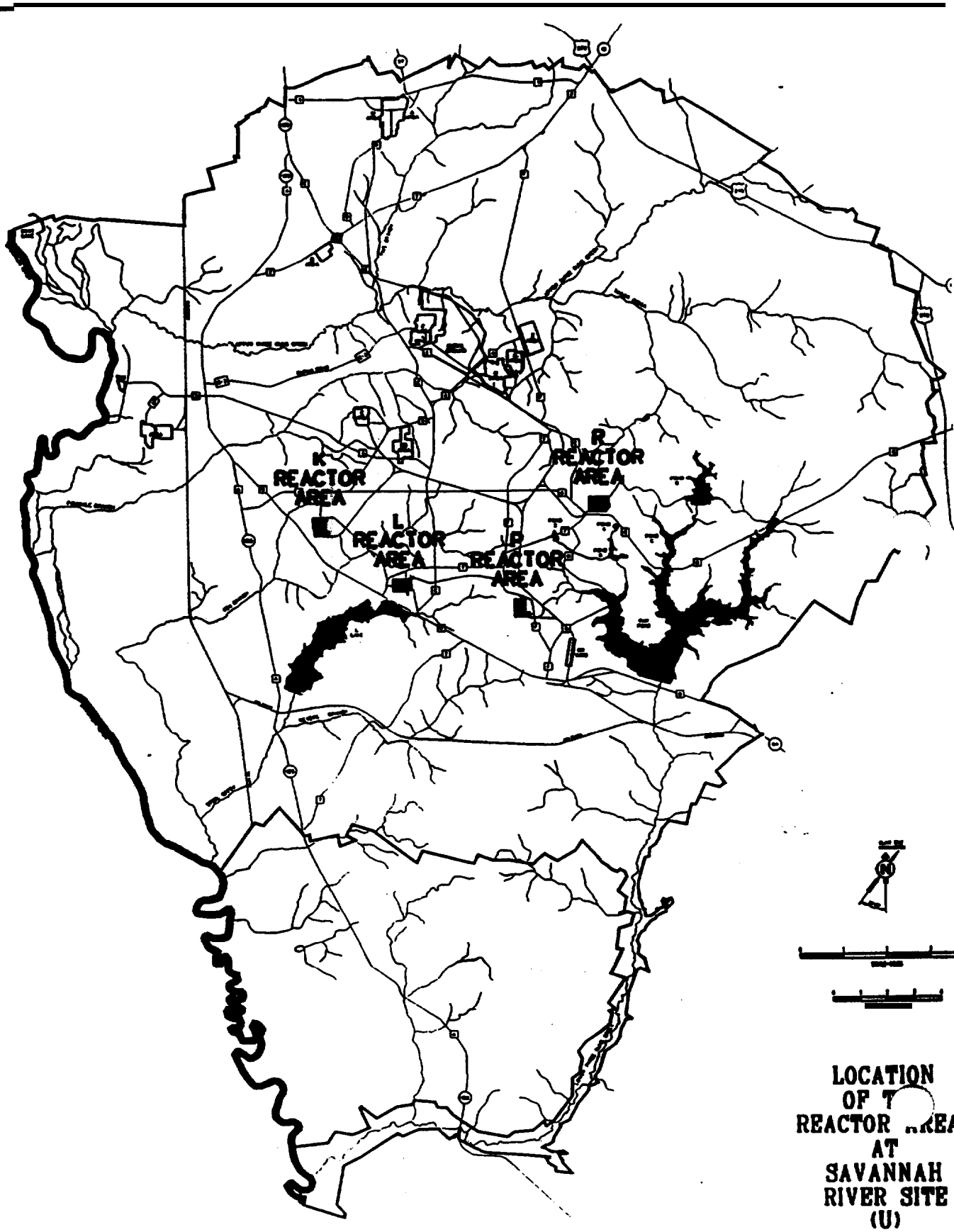


Figure 3. Location of the Reactor Areas at the Savannah River Site



2.0 LAND USE CONTROL IMPLEMENTATION PLAN

The K BPOP Land Use Control Implementation Plan will be appended to the SRS Land Use Control Assurance Plan (LUCAP) once the SRS LUCAP is approved.

Remedy Selection

The miscellaneous construction debris (i.e., pipes, cables, ladders, etc.) with fixed contamination (primary source) has been buried in the K BPOP since 1958. The presence of the debris plays a primary role in the remedy selection. There was no indication from the characterization data that the contamination present on the debris has moved and the level of radioactivity has diminished over the years. The degree of exposure toxicity to the waste is considered minimal and the potential for exposure is also considered to be minimal.

The K BPOP is located in an industrial zone as recommended by the Citizens Advisory Board and delineated on the SRS Future Land Use Map in the Federal Facility Agreement Implementation Plan. Under the current land use scenario, the possible receptor includes the known on-unit worker. Possible receptors under the future land use scenario include the on-unit industrial worker and on-unit resident (adult and child). Based on the risks identified for the K BPOP in the Remedial Investigation Report with Baseline Risk Assessment (RI/BRA) (WSRC, 1997b), the K BPOP poses minimal risk to human health. However, to manage any risk uncertainty and to ensure that the potential for exposure remains minimal, institutional controls are appropriate for the K BPOP operable unit. The No Action alternative would provide adequate protection of human health and the environment only for the near future. However, long-term protection for the duration of U.S. Government control of the SRS will be assured through institutional controls; and if the land is transferred to non-federal ownership via deed restrictions, in perpetuity, if deed restrictions are determined to be necessary.

For the K BPOP operable unit, institutional controls meet the remedial action objectives of risk reduction to human health and achievement of remedial goals for soil by precluding future on-site residential use of the area, buried waste contact, removal, or excavation. In addition, there is no need for remediation of the K BPOP from an ecological standpoint. Further, K BPOP is not impacting groundwater. Constituents are not observed to have migrated horizontally and clayey zones underneath the base of the pit will limit vertical migration potential.

Land Use Controls

Institutional controls are intended to be permanent and effective in the near- and long-term. It is considered to be the least cost option, which is still protective of human health and the environment. Implementation of this alternative will require both near- and long-term actions. For the near term, signs will be posted at the waste unit to indicate that this area was used to manage hazardous materials. In addition, existing SRS access controls will be used to maintain this site for nonresidential use.

Based on the conclusions of the K BPOP RI/BRA Report, groundwater does not pose a threat to human health and restrictions are not required. Therefore, groundwater land use control (LUC) objectives have not been established. However, to prevent the disturbance of soil in the LUC area the following LUC objectives for soil at K BPOP have been established.

For the K BPOP operable unit, the LUCobjectives are to:

- Prevent contact, removal or excavation of buried waste in the area and
- Preclude residential use of the area

The general means to achieve the objectives include:

- Continuation of the SRS access controls (i.e., security guards, security systems, badging, etc.) to preclude access to the SRS and the K BPOP by the general public,
- Continuation of the SRS Site Use/Site Clearance program to preclude work in the waste unit
- Installation of warning signs at the most probable access points that instruct personnel to contact the waste unit custodian prior to entry,
- Maintenance of the waste unit signs and visible markers to identify the waste unit to site workers,
- General maintenance of the waste unit (i.e. mowing, ensuring road accessibility, erosion and subsidence control, etc.), and
- Evaluation of the need for deed notifications/restrictions if the property is ever transferred to non-federal ownership, as required per CERCLA Section 120(h)

A survey plat, completed by professional land surveyors delineates the land subject to land use controls. (Figure 4).

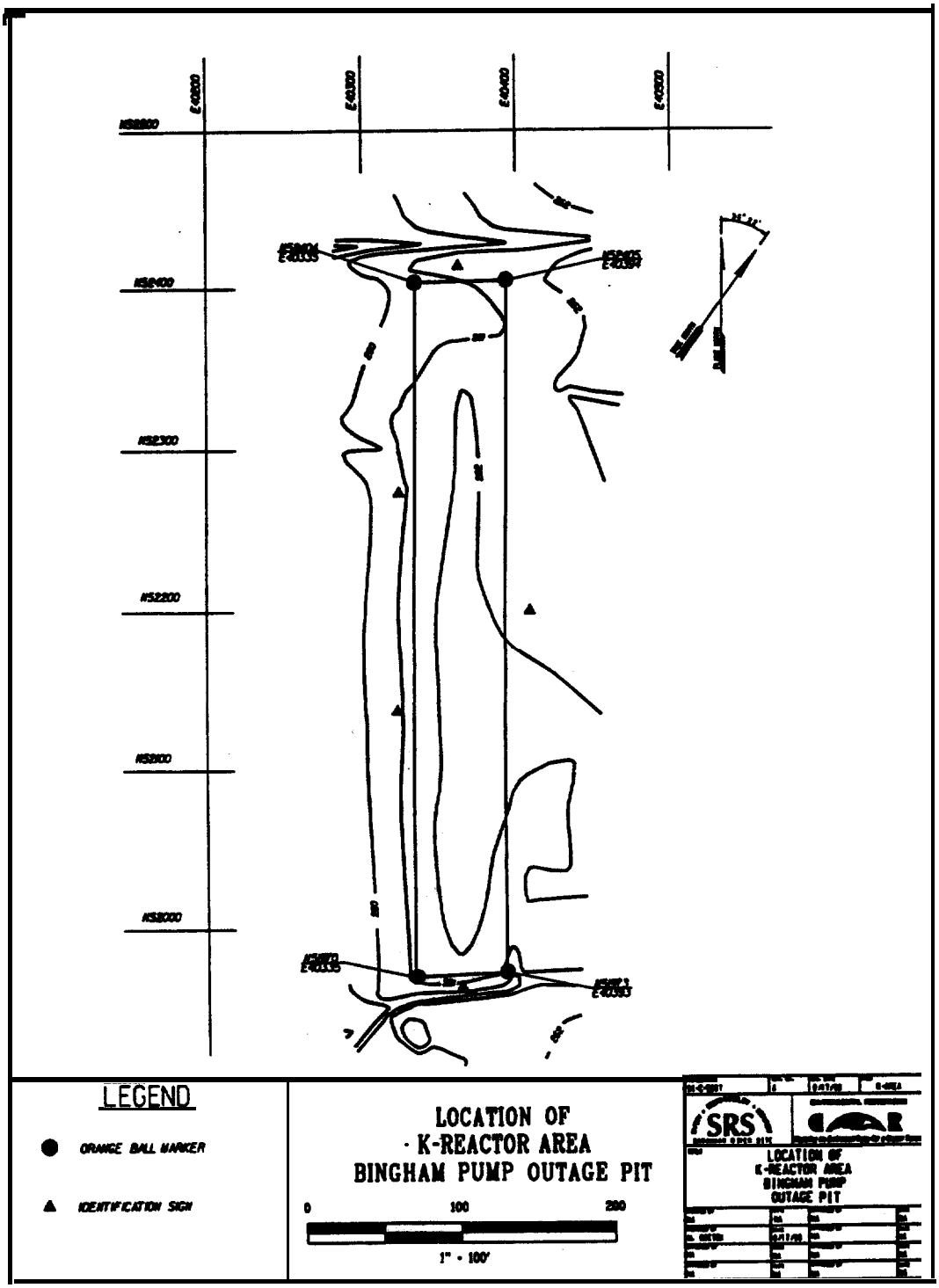
In the long term, if the property is ever transferred to non-federal ownership, the U.S. Government will take those actions necessary pursuant to CERCLA 120(h). These actions will include a deed notification disclosing former waste management and disposal activities, as well as any remedial actions taken at the waste unit. The deed notification will, in perpetuity, notify any potential purchaser that the property has been used for the management and disposal of construction debris and other materials, including hazardous substances. RCRA deed notification requirements are not required for this waste unit since it is not listed as a RCRA facility in the SRS Federal Facility Agreement, Appendix C. The deed will also include restrictions precluding residential use of the property. However, the need for modifications to the LUCs shall be reevaluated at the time of transfer in the event that exposure assumptions differ and/or contamination no longer poses an unacceptable risk under residential use. The Environmental Protection Agency (EPA) and the South Carolina Department of Health and Environmental Control (SCDHEC) will be given advanced notification of plans for property transfer in order to ensure adoption of such additional measures as may be needed to assure continued compliance with LUCs on the transferred property. In addition, if the property is ever transferred to non-federal ownership, a survey plat of the area will be prepared, certified by a professional land surveyor, and recorded with the appropriate county recording agency.

This proposal is consistent with EPA guidance and is an effective use of risk management principles.

The elements of the institutional controls corrective action, which consists of land restriction without any engineering controls, are comprised of deed notifications, access controls that include posting of identification signs, and field walkdowns for general site conditions.

Each element of the institutional controls corrective action is discussed below.

Figure 4. Locations of the K-Area Bingham Pump Outage Pit Identification Signs



2.1 Deed Notification

A deed notification shall be filed in the appropriate county records in accordance with CERCLA 120(h), which requires the government to create a deed when land on which any hazardous substance was stored, released, or disposed is transferred to non-federal ownership. Per CERCLA 120(h)(3)(A), the deed shall contain, to the extent practical, such information as is available based on the complete search of agency files, to include

- a notice of the type and quantity of such hazardous substances;
- notice of the time at which such storage, release, or disposal took place;
- a description of the remedial action taken, if any.

Per CERCLA 120(h)(3)(B), the deed shall also contain a covenant warranting that

- all remedial action necessary to protect human health and the environment with respect to any such substance remaining on the property has been taken before the date of such transfer;
- any additional remedial action found to be necessary after the date of such transfer shall be conducted by the United States Government;
- a clause granting the United States Government access to the property in any case in which remedial action or corrective action is found to be necessary after the date of such transfer.

RCRA permit requirements are not applicable for this waste unit per the SRS Federal Facility Agreement, Appendix C.

2.2 Access Controls

2.2.1 On-Site Workers

In accordance with WSRC 1D, *Site Infrastructure and Services Manual*, Procedure 3.02, *Site Real Property Configuration Control* (WSRC, 1996), use of all lands and waters on the SRS shall be coordinated via the Site Use Program. No use of land (i.e., excavation or any other land use) shall be undertaken without prior approval documented by a Site Use Permit. Also, in accordance with Procedure 3.02, all work at SRS that adds to or modifies features or facilities portrayed on the SRS development maps (i.e., plot plans of facilities/utilities at SRS) is authorized by a Site Clearance Permit before execution. All Site Clearance requests are reviewed to verify that either an approved Site Use Permit has been obtained, or that an existing Site Use Permit has sanctioned the request. Verification of the Department of Energy approval for intended land use must be obtained before issuance of a Site Clearance Permit. The Site Use and Site Clearance processes are applicable to all activities and personnel on site (including subcontractors). The processes are controlled within the SRS Quality Assurance Program.

The SRS identifies all buildings and facilities on maps used in the Site Use/Site Clearance Program and includes a 200-foot buffer zone around each facility. This waste unit is identified on these maps as a CERCLA facility.

Any work proposed in these areas will be strictly controlled and workers will be appropriately trained and briefed about health and safety requirements if work is deemed necessary for maintenance. Any changes in the use or disturbance of the K BPOP will be cleared with the EPA and SCDHEC before the disturbance occurs. To prevent unknowing entry and to ensure that unrestricted use of the waste unit does not occur while under ownership of the government, identification signs will be posted at the waste unit access points (Figure 4). The signs will be legible from a distance of at least 25 feet. The signs will read:

K-Area Bingham Pump Outage Pit, 643-1G
"Danger - Unauthorized Personnel Keep Out.
This waste unit was used to manage hazardous substances.
Do not dig or excavate. Do not enter without contacting the
waste site custodian."
Custodian: Manager, Post Closure Maintenance
Phone: (803) 952-6882

Site-specific access controls (i. e., fences) are not required for the K BPOP since exposure to the casual worker or trespasser as calculated in the Baseline Risk Assessment does not warrant this level of protection.

2.2.2 *Trespassers*

Additionally, while under the ownership of the Department of Energy, access control of the entire SRS will continue to be maintained in accordance with the 1992 RCRA Part B Permit Renewal Application, Volume I, Section F.1. This section describes the 24-hour surveillance system (R.61-79.264.14(b)(1)), artificial or natural barriers (R.61-79.264.14(b)(2)(i)), control entry systems (R.61-79.264.1 4(b)(2)(ii)), and warning signs (R.61-79.264.14(c)) in place at the SRS boundary to comply with the security requirements for a RCRA-permitted facility.

2.3 Field Walkdowns and Maintenance

"Monitoring" will be performed to verify that LUC Implementation Plan requirements as specified in Section 2.0 of this documen t are met. Semi-annual monitoring of the K BPOP, 643-1G, will be conducted for items such as accuracy and legibility of identification signs, visible subsidence or erosion of the waste unit, proper vegetation growth, mowing, etc. Subsidence or erosion will be corrected by backfilling the affected area with clean soil and seeding the area to prevent direct exposure of the waste or creation of an exposure pathway. The results of any events and/or actions that could indicate some potential compromise of institutional controls will be documented in the Federal Facility Agreement Annual Progress Report. All other routine maintenance activities (i.e., mowing, etc.) will be documented and maintained in files that are subject to EPA and SCDHEC review and audit. Currently, K BPOP is located outside of the K-Area reactor security fence in an area of no planned future activity and existing SRS access controls and Site Use/Site Clearance programs support the LUC objectives. Also, no erosion or subsidence has been detected during current semi-annual inspections in recent years, and vegetation will not cover signs in a six-month period. Therefore, semi-annual, rather than quarterly, monitoring of the K BPOP will be required to ensure that LUC objectives are met. The typical field inspection checklist to be used to perform monitoring activities at K BPOP is included in this document as Attachment A.

"Inspections" at K BPOP will be performed to ensure that Institutional Controls remains protective and consistent with all remedial action objectives. Annual inspections of the K BPOP will be conducted. The results of the inspections will be reported in the annual certification.

2.4 Certification Mechanism

The U.S. Department of Energy Site Manager shall certify on an annual basis that the K BPOP is currently being restricted per the institutional controls corrective action described in the approved *Record of Decision Remedial Alternative Selection for the K-Area Bingham Pump Outage Pit (643-1G) (U)*, WRSC-RP-97-178, Revision 1, October 1997 (WSRC, 1997a). This certification shall be included in the Federal Facility Agreement Annual Progress Report.

2.5 Groundwater Monitoring and Reporting

Based on the conclusions of the RI/BRA, the K BPOP is not impacting groundwater. Constituents are not observed to have migrated horizontally and clayey zones underneath the base of the pit will limit vertical migration potential. No groundwater land use control objectives have been established. Therefore, groundwater monitoring and reporting is not required for the K BPOP.

3.0 SCHEDULE

The remedial actions to be implemented at the K BPOP include the installation of five identification signs. The installation of the identification signs, as described in Section 2.2.1, will occur during 1 QFY99. Semi-annual site monitoring activities will also begin with 1QFY99. The monitoring activities will included those items necessary to annually certify that the K BPOP is being restricted per the approved corrective action. Installation of the signs and site monitoring activities will commence within two months of regulatory approval of this FRR.

4.0 REFERENCES

WSRC, 1996. "Procedure 3.02, Site Real Property Configuration Control" located in WSRC 1D, *Site Infrastructure and Services Manual*, Westinghouse Savannah River Company, Aiken, SC (latest revision).

WSRC, 1997a. *Record of Decision Remedial Alternative Selection for the K-Area Bingham Pump Outage Pit (643-1G) (U)*, WSRC-RP-97-178, Rev. 1, Westinghouse Savannah River Company, Aiken, SC (October).

WSRC, 1997b. *Remedial Investigation Report with Baseline Risk Assessment for the K-Area Bingham Pump Outage Pit (U)*, WSRC-RP-95-1555, Rev. 1.2, Westinghouse Savannah River Company, Aiken, SC (March).

ATTACHMENT A

FIELD INSPECTION CHECKLIST

TYPICAL

ER INSPECTION DATA SHEET FOR WASTE SITES

Page 1 of 3

Waste Site: _____ **A = Satisfactory** **X = Unsatisfactory (Comments required)**	**A or X**	**Comments or Corrective Action Taken (See Maintenance Register for Corrected Items)**
Check for potential encroachments (Ensure that there is no building on the site).		
Does the site have brush or woody vegetation that needs cutting and disposal?		
Does the site need grass cut?		
Verify that the wells and roads are accessible.		
Are the wells properly locked per R.61-71.11.C.6?		

TYPICAL

ER INSPECTION DATA SHEET FOR WASTE SITES

Page 2 of 3

Waste Site: _____ **A = Satisfactory** **X = Unsatisfactory (Comments required)**	**A or X**	**Comments or Corrective Action Taken (Se Maintenance Register for Corrected Items**
Is the concrete pad cracked or broken? Is the pad undercut or silted over?		
Is the well properly identified per R.61-71.6.H?		
Verify that the wells' posts and protective covers are in place.		
Verify that the waste units' signs have the correct and legible information.		
Does the site show signs of erosion or subsidence? Are there any signs of burrowing animals (holes)?		
Verify that the orange ball markers are in place.		

- TYPICAL

ER INSPECTION DATA SHEET FOR WASTE SITES

Page 3 of 3

Waste Site: _____ A = Satisfactory X = Unsatisfactory (Comments required)	A or X	Comments or Corrective Action Taken (See Maintenance Register for Corrected Items)
Verify that the fence is locked and in good condition (if applicable).		
Check the integrity of drainage ditches (if any) for presence of excessive erosion, sediment buildup, and any debris restricting water flow.		
Does the site need general clean up (housekeeping)?		
Comments:		

Inspected By: _____ / _____ Date: _____ Time: _____
(Print Name) (Signature)

Reviewed By: _____ / _____ Date: _____ Time: _____
Post Closure Manager or Designee (Print Name) (Signature)

Note: EPA and SCDHEC most be notified within 30 days of identification of any area where any breach or compromise or compromise of restrictions placed on this institutional control operable unit has occurred.

LUCIP for the
K-Area Burning/Rubble Pit, 131-K and K-Area Rubble Pile, 631-20G
Appendix D of *Post-Construction Report for the K-Area Burning/Rubble Pit, 131-K and K-Area Rubble Pile, 631-20G*
(WSRC-RP-2002-4095, Revision 1, October 2002)

Due to a discrepancy that was identified between the PCR (WSRC-RP-2002-4095, Revision 1, October 2002) and the LUCIP that is appended to the PCR in the inspection frequency (i.e., PCR states semi-annual and the LUCIP states annual), DOE submitted a letter to the EPA and SCDHEC requesting approval to perform the inspections on an annual basis in accordance with the LUCIP (see ACP-10-279 dated October 1, 2010, ARF #01764). The EPA and SCDHEC approved the request in letters dated October 25, 2010 (ARF #017202) and October 25, 2010 (ARF #017205), respectively.

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APPENDIX D

LAND USE CONTROL IMPLEMENTATION PLAN

K-AREA BURNING/RUBBLE PIT (131-K)

AND

K- AREA RUBBLE PILE (631-20G) OPERABLE UNIT (KBRP/KRP)

LAND USE CONTROL IMPLEMENTATION PLAN

This KBRP/KRP Land Use Control Implementation Plan (LUCIP) will be appended to the Savannah River Site (SRS) Land Use Control Assurance Plan (LUCAP). The United States Department of Energy (USDOE) is responsible for implementing the land use controls (LUCs) (e.g., inspections, maintenance, etc.) outlined in this unit-specific LUCIP.

The selected remedy leaves hazardous substances in place that pose a potential future risk and will require land use restrictions for an indefinite period of time. As negotiated with the United States Environmental Protection Agency (USEPA), and in accordance with USEPA Region IV policy (Johnston 1998), the SRS has developed a LUCAP (WSRC 2002b) to ensure that land use restrictions are maintained and periodically verified. This LUCIP provides detailed and specific measures required for the land use controls selected as part of this remedy. The USDOE is responsible for implementing, maintaining, monitoring, reporting upon, and enforcing the land use controls herein. Upon final approval, the LUCIP will be appended to the LUCAP and is considered incorporated by reference into the Post Construction Report (PCR), establishing land use controls implementation and maintenance requirements enforceable under the Comprehensive Environmental Response, Compensation, and Recovery Act (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.

1.0 REMEDY SELECTION

1.1 KBRP/RP Operable Unit

Located in K Area in the south-central portion of SRS, the KBRP/KRP operable unit (OU) lies approximately 4.5 km (5.9 miles) east of the nearest site boundary and 0.65 km (0.4 miles) east of K-Reactor Area (Figure 1 in the PCR).

Historical photographs of K-Area indicate that the K-Area Burning/Rubble Pit (KBRP) was constructed between 1955 and 1956. Used for waste burning and burial, the pit was a shallow, unlined excavation measuring approximately 9 m (30 ft) wide, 73 m (240 ft) long, and approximately 2.4 m (8 ft) deep. Based on its dimensions, the total pit volume is approximately 1,640 m^3 (2,140 yd^3) and encompasses an area of approximately 0.07 ha (0.17 acres).

During operation, organic liquids of unknown use and origin, waste oils, paper, plastics, and rubber were disposed of in the pit and burned periodically (WSRC 1998a). Disposal records, including composition, origin, and use of materials disposed, were not kept for this unit during its operation. The use of the KBRP for disposal of combustible wastes was discontinued in 1973. When the pit became full, it was backfilled with soil to grade level.

Historical photographs of K Area indicate that the K-Area Rubble Pile (KRP) was constructed sometime between 1956 and 1961. The KRP consists of a general disposal area, semicircular in shape, measuring approximately 91 m (300 ft) long and 16 to 41 m (50 to 135 ft) wide, with an area of approximately 0.6 ha (1.5 acres). Individual rubble piles within the area are 1.2 to 1.8 m (4 to 6 ft) high. The total estimated waste volume is 2,140 m^3 (2,800 yd^3). The KRP is composed primarily of soil matter, with some broken asphalt, broken concrete pieces, and gravel-sized coal. The coal and asphalt materials exist in a wide range of particle sizes and are dispersed in a highly heterogeneous manner throughout the piles. As with the KBRP, disposal records were not kept for this unit

during its period of operation. The Resource Conservation and Recovery Act (RCRA) Facility Investigation/Remedial Investigation (RFI/RI) included collecting soil samples from individual rubble piles as part of the pit and pile area evaluation (WSRC 1998a).

According to the Savannah River Site Future Use Project Report (USDOE 1996), residential use of SRS land should be prohibited.

1.2 Nature and Extent of Contamination

The KBRP/KRP OU consists of a source term and groundwater. The following is a brief summary of final constituents of concern (COCs) as defined in the Record of Decision (ROD) document. There is no principal threat source material (PTSM).

Under the future industrial worker scenario, the Baseline Risk Assessment (BRA) identified final COCs for the KBRP (polycyclic aromatic hydrocarbon (PAHs)), for the KRP (PAHs and arsenic) and for the groundwater (tetrachloroethylene (PCE) and trichloroethylene (TCE)). The following COCs and associated risks were identified for the KBRP based on the future industrial worker: benzo(a)anthracene (3.70×10^{-5}), benzo(a)pyrene (3.70×10^{-4}), benzo(b)fluoranthene (5.00×10^{-5}), benzo(k)fluoranthene (2.50×10^{-6}), dibenzo(a,h)anthracite (5.40×10^{-5}), and indeno (1,2,3-c,d)pyrene (2.14×10^{-5}). The following COCs and associated risks were identified for the KRP based on the future industrial worker: benzo(a)anthracene (1.81×10^{-5}), benzo(a)pyre (1.45×10^{-4}), benzo(b)fluoranthene (2.30×10^{-5}), indeno(1,2,3-c,d)pyrene (8.70×10^{-6}), and arsenic (3.35×10^{-5}). The following COCs and associated risks were identified for KBRP and KRP groundwater based on the future industrial worker: PCE (1.6×10^{-6}) and TCE (1.10×10^{-7}).

1.3 Remedial Action Overview

The remedy selected and installed for the OU is:

KBRP/KRP	Soil cover with Institutional Controls
K-Area Groundwater	Monitored Natural Attenuation (MNA)

This remedy included the following actions:

- Installation of a soil cover system,
- Installation of monitoring wells, and
- Implementation of land-use controls, including warning signs, to ensure continued protection of human health or the environment.

Per the ROD, MNA would be implemented pursuant to the groundwater mixing zone application (GMZA) (WSRC 1999b). The ROD deferred to the GMZA for details establishing the long-term groundwater monitoring program to ensure maximum mixing zone concentration limits (MZCL) are not exceeded. Therefore hereafter MNA is referred to as GMZA.

The post-remedial action conceptual site model, Attachment A, shows the broken pathways and the remaining residual risk to the future industrial worker.

2.0 LAND USE CONTROLS

In order to ensure the protectiveness of the remedy described above, the KBRP/KRP OU land use control objective is to:

- Prevent contact, removal, or excavation of buried waste in the OU areas designated in the LUCIP and preclude future residential or agricultural use of the area, and

- Prevent unauthorized access to groundwater.

Current access controls and a deed notification needed to maintain the LUCs are described in the following sections of this LUCIP.

2.1 Access Controls

2.1.1 On-Site Workers

In accordance with WSRC 1D, *Site Infrastructure and Services Manual*, Procedure 3.02, "Site Real Property Configuration Control," use of all lands and waters on SRS shall be coordinated via the Site Use Program. All employees, contractors, and visitors to the SRS require adherence to the Site Use Program. This program ensures that all work performed on the SRS that adds, modifies, or removes features portrayed on the SRS development maps is authorized. No use of land (i.e., excavation or any other land use) shall be undertaken without prior approval documented by a Site Use Permit. This authorization is obtained through the completion of a Site Clearance Request Form. Also, in accordance with Procedure 3.02, all work at SRS that adds to or modifies features or facilities portrayed on SRS development maps (i.e., plot plans of facilities/utilities at SRS) will be authorized by a Site Clearance Permit before any excavation activities are conducted. All site clearance requests will be reviewed to verify that either an approved Site Use Permit has been obtained or that an existing Site Use Permit has sanctioned the request.

The SRS, specifically the Site Development, Planning, and Mapping Department, is responsible for updating, maintaining, and reviewing site maps, including Federal Facility Agreement (FFA) OU identifications. If a site clearance request is made that may impact

a FFA OU, the Site Clearance Request Form is sent to the FFA OU reviewer, who is in the Environmental Restoration Division (ERD), for either approval or disapproval. The roles and responsibilities of each individual are detailed in WSRC 1D, Procedure 3.02. Verification of USDOE approval for intended land use must be obtained before issuance of a Site Clearance Permit. The site use and site clearance processes are applicable to all activities and personnel on site (including subcontractors).

The processes are controlled within the SRS Quality Assurance (QA) Program. The SRS QA Program is the governing QA Program for all SRS activities, including those in the ERD. The activities that are performed in the ERD must comply with SRS QA Program procedures as well as ERD-specific procedures.

SRS identifies all buildings and facilities on maps used in the Site Use/Site Clearance Program. This waste unit is identified on these maps as a CERCLA facility.

Any work proposed in these areas will be strictly controlled and workers will be appropriately trained and briefed about health and safety requirements if work is deemed necessary for maintenance. No major change in land use nor excavation at the KBRP/KRP OU shall be undertaken without United States Environmental Protection Agency (USEPA) and South Carolina Department of Health and Environmental Control (SCDHEC) approval. To prevent unknowing entry and to ensure that unrestricted use of the waste unit does not occur while under ownership of the government, identification signs will be posted at the unit.

Custodial responsibilities for maintenance and inspection of the KBRP/KRP waste site will be maintained by the Post-Closure Maintenance group within the ERD.

The warning signs for the soil cover will be legible from a distance of at least 25 feet. The soil cover signs will read as follows:

K-Area Burning/Rubble Pit (131-K) and Rubble Pile (631-20G)

"Danger – Unauthorized Personnel Keep Out. This unit contains hazardous substances. Do not dig or excavate. Do not enter without contacting the waste site custodian."

Custodian: Manager, Post-Closure Monitoring and Maintenance

Phone: (803) 952-6882

2.1.2 Trespassers

While under the ownership of USDOE, access control of the entire SRS will continue to be maintained in accordance with the 1992 Resource Conservation and Recovery Act (RCRA) Part B Permit Renewal Application, Volume I, Section F.1. This section describes the 24-hour surveillance system (R.61-79.264.14(b)(1)), artificial or natural barriers (R.61-79.264.14(b)(2)(i)), control entry systems (R.61-79.264.14(b)(2)(ii)), and warning signs (R.61-79.264.14(c)) in place at the SRS boundary to comply with the security requirements for a RCRA-permitted facility.

2.2 LUCIP Deed Notification

In the long term, if the property is ever transferred to non-federal ownership, the US 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 contract for sale and the deed will contain the notification required by CERCLA Section 120(h). The deed notification shall, in perpetuity, notify any potential purchaser that the property has been used for the management and disposal of waste. These requirements are also consistent with the intent of the RCRA deed notification requirements at final closure of a RCRA facility if contamination will remain at the unit.

The deed shall also include deed restrictions precluding residential use of the property. However, the need for these deed restrictions may be re-evaluated 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 re-evaluation 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 non-federal ownership, a survey plat of the OU will be prepared, certified by a professional land surveyor, and recorded with the appropriate county recording agency.

Note: Survey Plat (Attachment B, SK-C-5373), and the line marked "AREA SUBJECT TO LAND USE CONTROLS" define the area subject to Land Use Controls.

2.3 Field Walkdown and Maintenance for Institutional Controls

After the remediation of the KBRP/KRP OU, only maintenance activities will be required per this remedial action. No operations other than GMZA monitoring (WSRC 1999b) will be required.

The results of any events or actions that indicate some potential compromise of institutional controls will be documented in the FFA Annual Progress Report. All other routine maintenance activities will be documented and maintained in files subject to USEPA and SCDHEC review and audit. A copy of the completed inspection form is maintained in the ERD Administrative Record Files.

The following steps will be implemented to maintain the soil cover for as long as the waste remains a threat to human health or the environment:

- Perform periodic (annual) visual inspections for evidence of damage to the soil cover due to erosion or intrusion by burrowing animals. The inspection will also

address upkeep of the vegetative cover and access control barriers (i.e., the warning signs). (Attachment C provides a unit-specific inspection data sheet for the KBRP/KRP waste unit).

- Perform necessary repairs (when required as identified during inspection) to maintain the functional integrity of the soil cover and the warning signs.

- Enforce SRS institutional controls through access controls by restricting access to the closed waste unit. Institutional controls will be maintained as long as the waste remains a threat to human health or the environment.

- As required by the National Oil and Hazardous Substance Contingency Plan (NCP), a five-year review of the ROD for the KBRP/KRP unit will be performed as long as the waste remains a threat to human health or the environment.

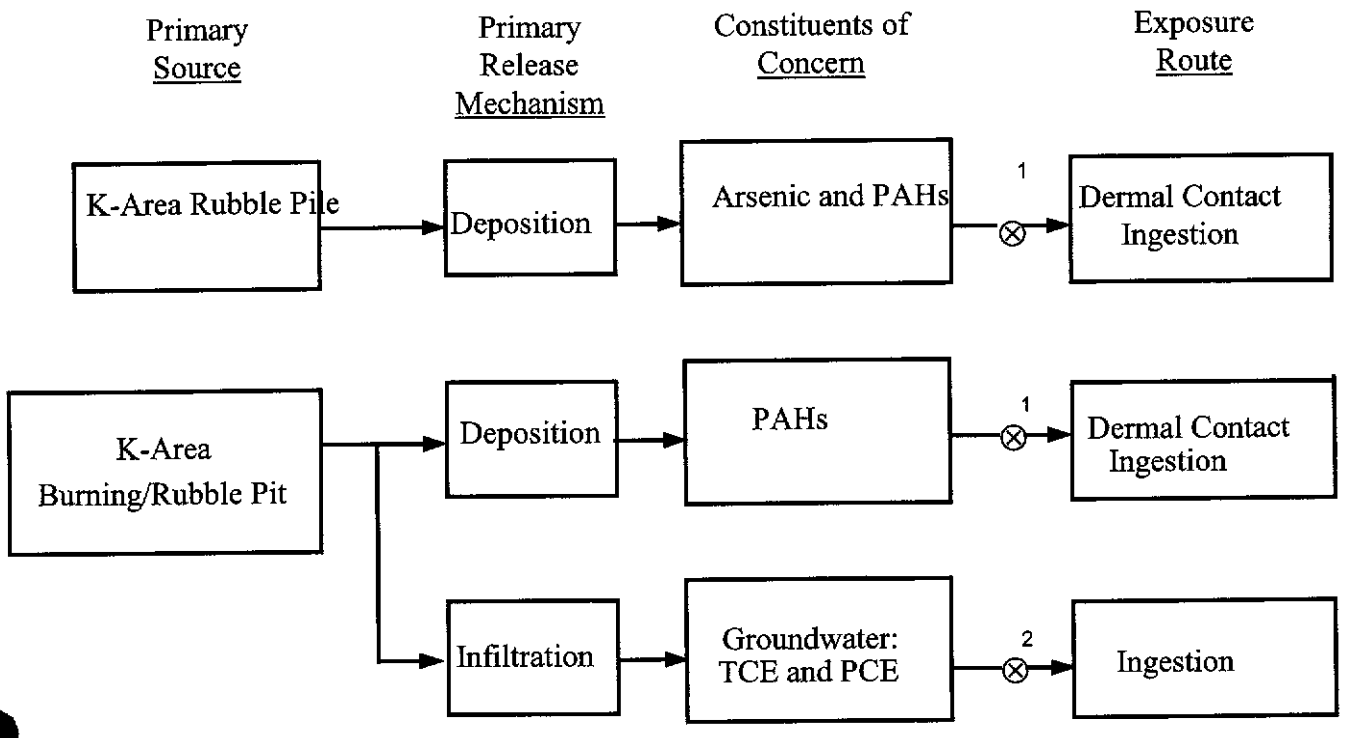
The waste site inspectors are to be trained and certified as Hazardous Waste Operations and Emergency Response (HAZWOPER), RCRA Well Inspectors (ERD specific training), ERD RCRA Waste Unit Inspectors, Radiological Workers, etc., as applicable for the specific inspection. They will also be trained based on the individual requirements of the regulatory approved closure documents for each waste unit. In addition, the inspectors are to attend yearly refresher courses. Over the years no single person will conduct all of the inspections or grass cutting operations.

This unit-specific LUCIP, including the checklist, will be appended to the SRS LUCAP.

Per Section 3.6 of the LUCAP, this LUCIP identifies the area under land-use restriction via a survey plat (see Attachment B). If the OU is ever transferred to non-federal ownership, a survey plat of the area, prepared by a certified professional land surveyor, will be recorded with the county recording agency.

ATTACHMENT A

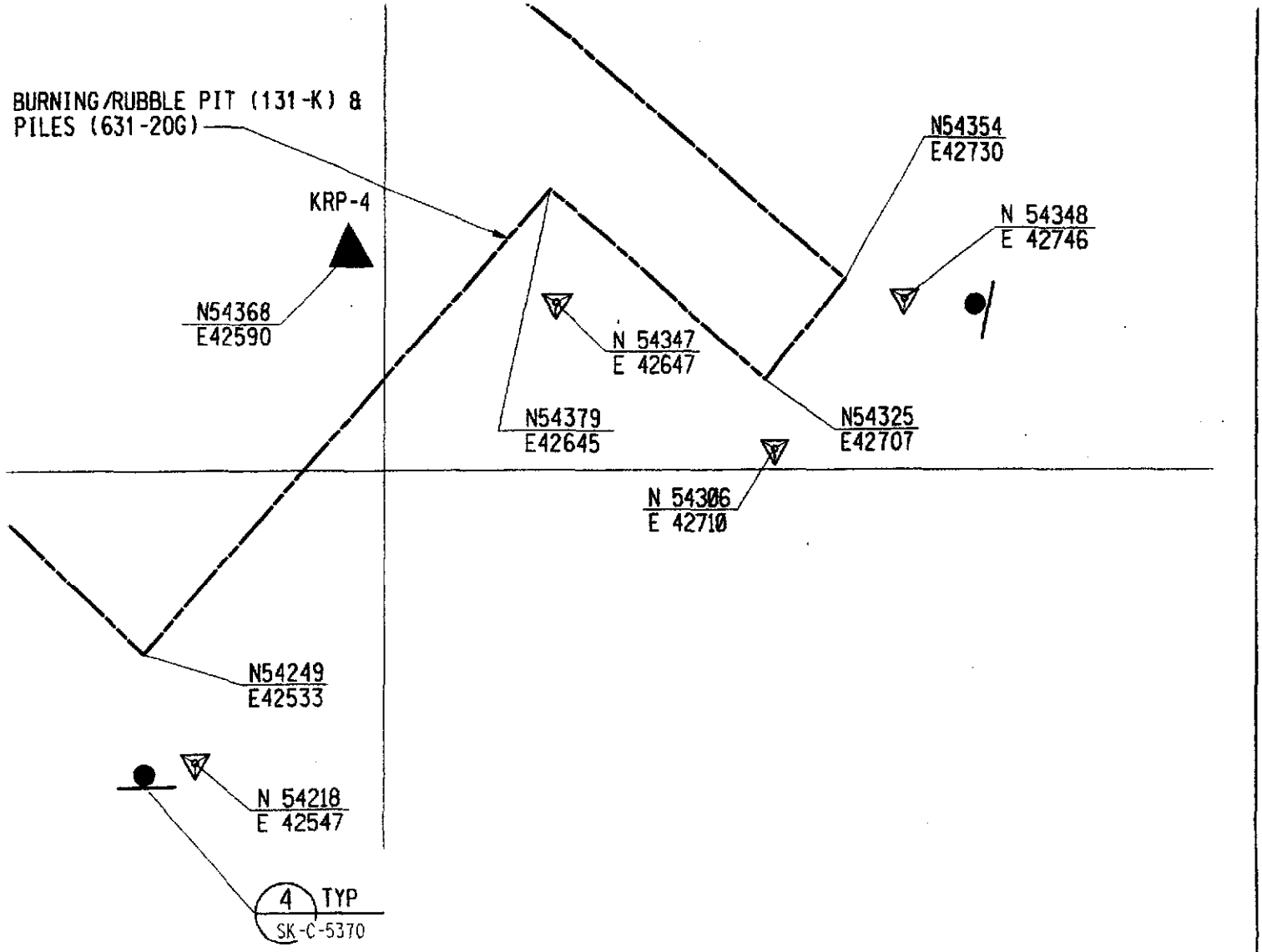
K-AREA BURNING RUBBLE PIT AND RUBBLE PILE POST-REMEDIAL ACTION CONCEPTUAL SITE MODEL



Legend
⊗ Pathway break
Remedial Alternatives:
(1) Soil Cover
(2) GMZA

ATTACHMENT B

LAND USE CONTROL IMPLEMENTATION PLAN SURVEY PLAT (SK-C-5373)



90

UNITED STATES DEPARTMENT OF ENERGY

SAVANNAH RIVER SITE

AS-BUILT OF K-AREA BURNING/RUBBLE PIT (131-k) AND RUBBLE PILES (631-20G)

LAND USE CONTROL IMPLEMENTATION PLAN SURVEY PLAT (U)

SCALE	SRS DRAWING NO.	SHEET NO.	LATEST REVISION
AS NOTED	SK-C-5373	1 OF 1	0

ATTACHMENT C

ER INSPECTION DATA SHEET FOR KBRP/KRP OU

ER INSPECTION DATA SHEET

Page 1 of 2

A = Satisfactory X = Unsatisfactory (Comments required)	A or X	Comments or Corrective Action Taken (See Maintenance Register for Corrected Items)
Verify that there is no excavation, digging, or construction activities on the soil cover.		
Verify that no woody vegetation is growing on the soil cover. Remove or identify as needed.		
Visually check vegetative cover for grass density, with no bare spots more than 3 feet in area. The height of the vegetative cover should not impair the visual inspection of the soil cover. The inspector will determine this.		
Verify that roads are accessible.		
Verify that the four (4) warning signs are in acceptable condition, have correct information, and are legible from of 25 feet.		

ER INSPECTION DATA SHEET
(Continued)

A = Satisfactory X = Unsatisfactory (Comments required)	A or X	Comments or Corrective Action Taken (See Maintenance Register for Corrected Items)
Check the soil cover for signs of erosion or depressions (subsidence).		
Check for signs of burrowing animal holes.		
Inspect the groundwater mixing zone application monitoring wells KRP-4, 5, 6, 8, 10C, 10D, 11C, 11D, 12C, 12D, 13D, 14C, and 14D in accordance with ER-SOP-011 and submit results to the well maintenance coordinator.		
Other:		

Inspected By: _____/_____ Date: _____Time: _____
(Print Name) (Signature)

Reviewed By: _____/_____ Date: _____Time: _____
(Print Name) (Signature)

(Reviewed by: Post-Closure Manager or Designee)

Note: USEPA and SCDHEC must be notified within 30 days of identification of any area where any breach or compromise of restrictions placed on this institutional control OU has occurred.

LUCIP for the
K-Area Reactor Seepage Basin, 904-65G
Appendix A of *Post-Construction Report/Final Remediation Report for the K-Area Reactor Seepage Basin, 904-65G*
(WSRC-RP-2002-4030, Revision 1, July 2002)

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APPENDIX A

LUCIP

for

K-AREA REACTOR SEEPAGE BASIN

LAND USE CONTROL IMPLEMENTATION PLAN

This K-Area Reactor Seepage Basin (KRSB) Land Use Control Implementation Plan (LUCIP) will be appended to the Savannah River Site (SRS) Land Use Control Assurance Plan (LUCAP). SRS is responsible for implementing the land use controls (LUCs) (e.g., inspections, maintenance, etc.) outlined in this unit-specific LUCIP.

The selected remedy leaves hazardous substances in place that pose a potential future risk and will require land use restrictions for an indefinite period of time. As negotiated with the United States Environmental Protection Agency (USEPA), and in accordance with USEPA Region IV policy (Johnston 1998), the Savannah River Site (SRS) has developed a LUCAP (WSRC 2002b) to ensure that land use restrictions are maintained and periodically verified. This LUCIP provides detailed and specific measures required for the land use controls selected as part of this remedy. The United States Department of Energy (USDOE) is responsible for implementing, maintaining, monitoring, reporting upon, and enforcing the land use controls herein. Upon final approval, the LUCIP will be appended to the LUCAP and is considered incorporated by reference into the PCR/FRR, establishing land use controls implementation and maintenance requirements enforceable under the Comprehensive Environmental Response, Compensation, and Recovery Act (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.

1.0 REMEDY SELECTION

1.1 KRSB Operable Unit

Located in K Area in the south-central portion of SRS, the KRSB Operable Unit (OU) lies approximately 100 feet west of K Reactor (Building 105-K).

The KRSB was constructed in 1957 to receive low-level radioactive wastewater from disassembly basin purges from K Reactor (Building 105-K). The basin dimensions are approximately 40 x 20 meters (135 x 70 feet), with an average depth of 2.1 meters (7 feet) below land surface (bls). From 1957 until 1960, the KRSB received low-level radioactive purge water from the K-Area Disassembly Basin via a 183-meter (600-feet) long, 7.6-centimeter (3-inch) diameter polyethylene pipe buried approximately 0.6 to 1.2 meter (2 to 4 feet) bls.

Groundwater contamination above maximum contaminant levels (MCLs) has not been associated with the KRSB Operable Unit.

According to the Savannah River Site Future Use Project Report (USDOE 1996), residential use of SRS land should be prohibited.

1.2 Nature and Extent of Contamination in KRSB Soils and Pipeline

The KRSB OU consists of a source term. The source term area of contamination (AOC) includes a 40 m long x 20 m wide x 2.1 m deep (131 ft long x 66 ft wide x 7 ft deep) basin and a 183 m (600 ft) long polyethylene process sewer line. The following is a brief summary of radionuclides including the principal threat source material (PTSM) as defined in the Plug-in Record of Decision (ROD) document.

- KRSB is radiologically contaminated. Five radionuclides have been identified as human health constituents of concern (COCs) in the seepage basin soils: cesium-137, strontium-90, plutonium-239/240, americium-241, and cobalt-60. Radionuclides in

soils around the perimeter of the seepage basin were determined not to be a human health risk. Carbon-14 and strontium-90 were retained as final contaminant migration constituents of concern (CMCOCs) in basin soil only. Only radionuclides were identified as COCs.

- KRSB contains principal threat source material (PTSM). For the plug-in remedy, PTSM has been defined as highly contaminated basin soils and any other unit-related soils that pose a radiological risk equal to or greater than $1x10^{-3}$ to the future industrial worker. The KRSB OU characterization data indicate that a maximum cumulative risk of 1.3×10^{-2} may result from exposure of a future industrial worker to basin soils that exceed the PTSM threshold. Cesium-137 is the predominant risk driver under this scenario.

1.3 Remedial Action Overview

The selected remedial action (RA) for the KRSB OU was in situ stabilization of the basin with a low-permeability soil cover system, and in situ grouting of the process pipeline. This remedy entails the following actions:

- Pipeline grouting was used to stabilize any potential contamination left inside the pipeline and prevent access by small animals.

- In situ stabilization through grouting was used to treat PTSM soil in the basin which poses a risk in excess of 1×10^{-3} for future industrial workers.

- Consolidation of contaminated soil outside the basin exceeding PTSM criteria. Consolidated PTSM soil was stabilized with the rest of the soil in the basin.

- A low permeability soil cover system was provided over the in situ stabilized soil to reduce water infiltration and to provide shielding to potential receptors on the surface.

- Implementation of LUCs, including warning signs, to ensure continued protection of human health or the environment.

The post-remedial action conceptual site model, Figure A-1, shows the broken pathways and the remaining residual risk to the future industrial worker.

2.0 LAND USE CONTROLS

In order to ensure the protectiveness of the remedy described above, the KRSB OU land use control objective is to:

- Prevent contact, removal, or excavation of buried waste or pipelines in the OU areas designated in the LUCIP and preclude future residential or agricultural use of the area.

Current access controls and a deed notification needed to maintain the LUCs are described in the following sections of this LUCIP.

2.1 Access Controls

2.1.1 On-Site Workers

In accordance with WSRC 1D, *Site Infrastructure and Services Manual*, Procedure 3.02, "Site Real Property Configuration Control," use of all lands and waters on SRS shall be coordinated via the Site Use Program. All employees, contractors, and visitors to the SRS require adherence to the Site Use Program. This Program ensures that all work performed on the SRS that adds, modifies, or removes features portrayed on the SRS development maps is authorized. No use of land (i.e., excavation or any other land use) shall be undertaken without prior approval documented by a Site Use Permit. This authorization is obtained through the completion of a Site Clearance Request Form. Also, in accordance with Procedure 3.02, all work at SRS that adds to or modifies features or facilities portrayed on SRS development maps (i.e., plot plans of facilities/utilities at SRS) will be authorized by a Site Clearance Permit before any excavation activities are conducted. All site clearance requests will be reviewed to verify that either an approved

Site Use Permit has been obtained or that an existing Site Use Permit has sanctioned the request.

The SRS, specifically the Site Development, Planning, and Mapping Department, is responsible for updating, maintaining, and reviewing site maps, including Federal Facility Agreement (FFA) OU identifications. If a site clearance request is made that may impact a FFA OU, the Site Clearance Request Form is sent to the FFA OU reviewer, who is in the ERD, for either approval or disapproval. The roles and responsibilities of each individual are detailed in WSRC 1D, Procedure 3.02. Verification of USDOE approval for intended land use must be obtained before issuance of a Site Clearance Permit. The site use and site clearance processes are applicable to all activities and personnel on site (including subcontractors).

The processes are controlled within the SRS Quality Assurance (QA) Program. The SRS QA Program is the governing QA Program for all SRS activities, including those in the ERD. The activities that are performed in the ERD must comply with SRS QA Program procedures as well as ERD-specific procedures.

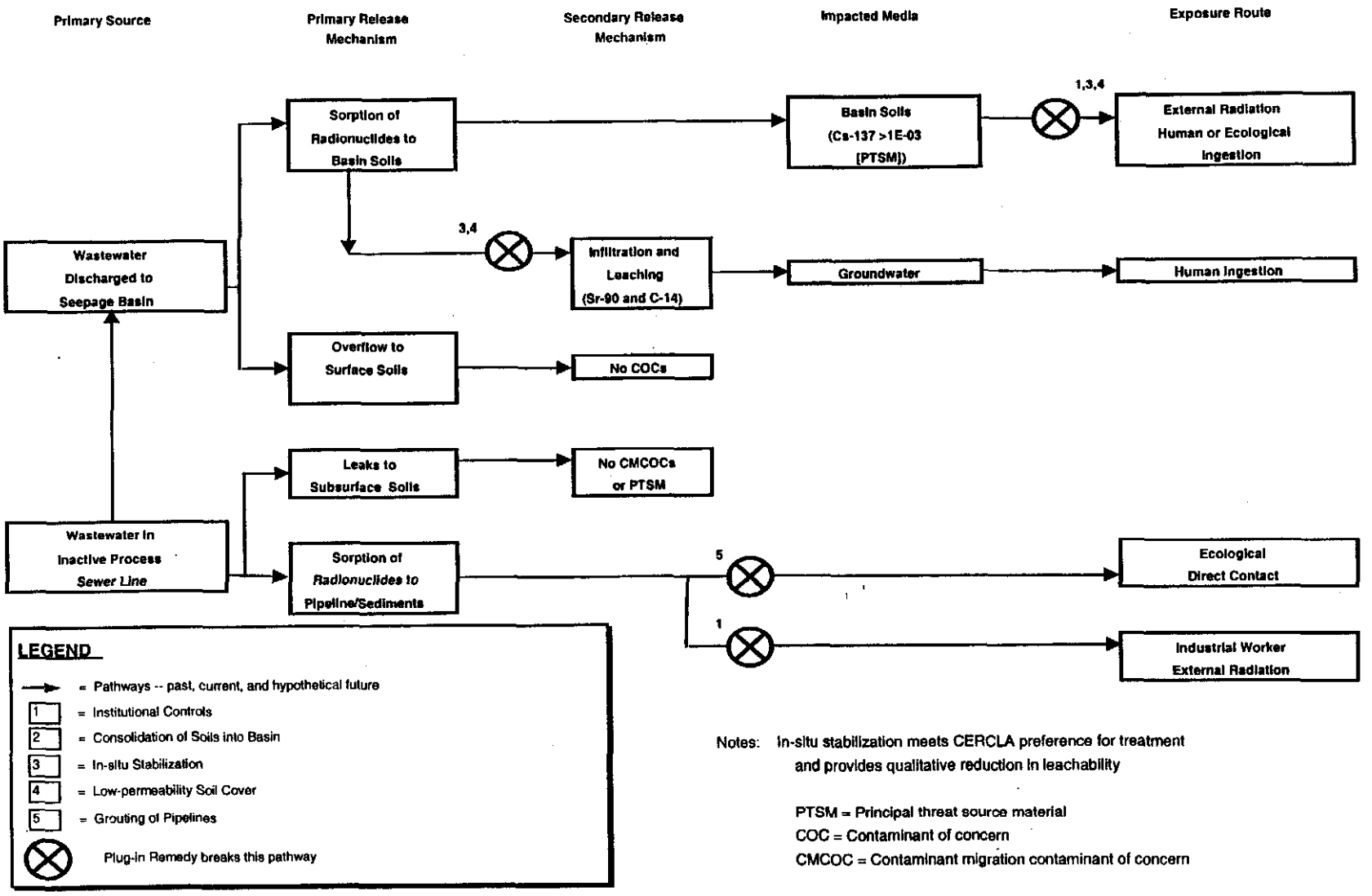


Figure A-1. Conceptual Site Model for K-Area Reactor Seepage Basin Post Remedial Action

SRS identifies all buildings and facilities on maps used in the Site Use/Site Clearance Program. This waste unit is identified on these maps as a Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) facility.

Any work proposed in these areas will be strictly controlled and workers will be appropriately trained and briefed about health and safety requirements if work is deemed necessary for maintenance. No major change in land use nor excavation at the KRSB OU shall be undertaken without United States Environmental Protection Agency (USEPA) and South Carolina Department of Health and Environmental Control (SCDHEC) approval. To prevent unknowing entry and to ensure that unrestricted use of the waste unit does not occur while under ownership of the government, identification signs will be posted at the unit.

Custodial responsibilities for maintenance and inspection of the KRSB waste site will be maintained by the Post-Closure Maintenance group within the ERD.

The warning signs for the soil cover will be legible from a distance of at least 25 feet. The soil cover signs will read as follows:

K-REACTOR SEEPAGE BASIN
(904-65G)

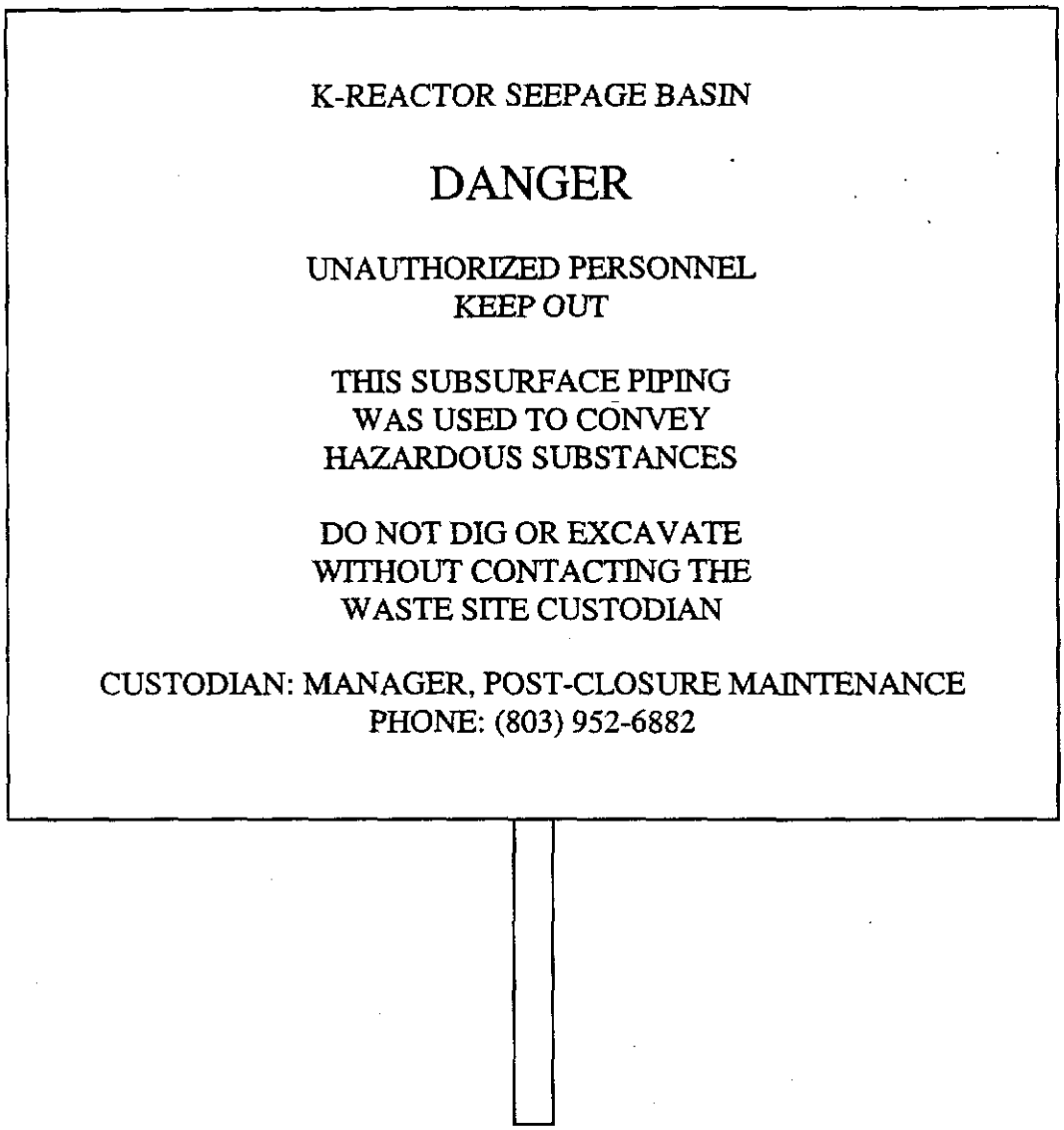
DANGER UNAUTHORIZED PERSONNEL

KEEP OUT

THIS WASTE UNIT WAS USED TO
MANAGE HAZARDOUS SUBSTANCES.
DO NOT DIG OR EXCAVATE.
DO NOT ENTER WITHOUT CONTACTING THE
WASTE SITE CUSTODIAN.

CUSTODIAN: MANAGER, POST CLOSURE MAINTENANCE
PHONE: (803) 952-6882

The warning signs for the underground grouted pipeline will be legible from a distance of at least 25 feet. The underground pipeline signs will read as follows:



2.1.2 Trespassers

While under the ownership of USDOE, access control of the entire SRS will continue to be maintained in accordance with the 1992 Resource Conservation and Recovery Act (RCRA) Part B Permit Renewal Application, Volume I, Section F.1. This section

describes the 24-hour surveillance system (R.61-79.264.14(b)(1)), artificial or natural barriers (R.61-79.264.14(b)(2)(i)), control entry systems (R.61-79.264.14(b)(2)(ii)), and warning signs (R.61-79.264.14(c)) in place at the SRS boundary to comply with the security requirements for a RCRA-permitted facility.

2.2 Deed Notification

In the long term, a deed notification will be filed in the appropriate county records in accordance with CERCLA 120(h), which requires the government to create a deed when land on which any hazardous substance was stored, released, or disposed of is transferred to non-federal ownership. In the event the property is transferred, a deed notification will be filed with Aiken County. Per CERCLA 120(h)(3)(A), the deed shall contain, to the extent practical, such information as is available based on the complete search of agency files, including the following:

- A notice of the type and quantity of such hazardous substances
- Notice of the time at which such storage, release, or disposal took place
- A description of the remedial action taken

Although the above information is known and documented, for federal land, a deed is not applicable. If or when this parcel of land is sold to a private entity, a deed will be filed with the appropriate county and the conditions of CERCLA 120(h)(3)(A) will be satisfied.

Per CERCLA 120(h)(3)(B), the deed shall also contain a covenant warranting that

- All remedial action necessary to protect human health and the environment with respect to any such substance remaining on the property has been taken before the date of such transfer.

- Any additional remedial action found to be necessary after the date of such transfer should be conducted by the United States Government.

- A clause granting the United States Government access to the property in any case in which remedial action or corrective action is found to be necessary after the date of such transfer.

The deed notification shall, in perpetuity, notify any potential purchaser that the property has been used for management and disposal of radioactive oil and chemical wastewater. The deed shall also include restrictions precluding residential use of property. However, the need for these deed restrictions may be re-evaluated at the time of transfer in the event that contamination no longer poses an unacceptable risk under residential use. In addition, if the site is ever transferred to non-federal ownership, a survey plat of the area will be prepared by a certified professional land surveyor and recorded with the county recording agency.

2.3 Field Walkdowns and Maintenance for Institutional Controls

After the remediation of the KRSB, only maintenance activities will be required per this remedial action. No operations will be required.

The results of any events or actions that indicate some potential compromise of institutional controls will be documented in the Federal Facility Agreement (FFA) Annual Progress Report. All other routine maintenance activities will be documented and maintained in files subject to USEPA and SCDHEC review and audit. A copy of the completed inspection form is maintained in the Environmental Restoration Division Administrative Record Files.

The following steps will be implemented to maintain the low permeability soil cover, for as long as it is necessary to prevent contaminant migration above MCL:

- Perform periodic (annual) visual inspections for evidence of damage to the soil cover due to erosion or intrusion by burrowing animals. The inspection will also address upkeep of the vegetative cover and access control barriers (i.e., the warning signs). (Attachment 2 provides a unit-specific inspection data sheet for the KRSB waste unit).

- Perform necessary repairs (when required as identified during inspection) to maintain the functional integrity of the soil cover and the warning signs.

- Enforce SRS institutional controls through access controls by restricting access to the closed waste unit. Institutional controls will be maintained as long as the waste remains a threat to human health or the environment.

- As required by the National Oil and Hazardous Substance Contingency Plan (NCP), a five-year review of the ROD for the KRSB unit will be performed as long as the waste remains a threat to human health or the environment.

The waste site inspectors are to be trained and certified as Hazardous Waste Operators (HAZWOPER), RCRA Well Inspectors (Environmental Restoration Division [ERD] specific training), ERD RCRA Waste Unit Inspectors, Radiological Workers, etc., as applicable for the specific inspection. They will also be trained based on the individual requirements of the regulatory approved closure documents for each waste unit. In addition, the inspectors are to attend yearly refresher courses. Over the years no single person will conduct all of the inspections or grass cutting operations.

This unit-specific LUCIP, including the checklist, will be appended to the SRS LUCAP.

Per Section 3.6 of the LUCAP, this LUCIP identifies the area under land-use restriction via a survey plat (see Attachment 1). If the OU is ever transferred to non-federal ownership, a survey plat of the area, prepared by a certified professional land surveyor, will be recorded with the county recording agency.

ATTACHMENT 1

SURVEY PLAT

SK-C-53105, Rev. 2, Land Use Control Implementation Plan, Survey Plat (U)

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REFERENCE: PCR/FRR # WSRC-RP-2002-4030

K - REACTOR SEEPAGE BASIN (904-65G) CLOSURE
LAND USE CONTROL IMPLEMENTATION PLAN
SURVEY PLAT (U)

DRAWING NO. SK-C-53105, REV. 2

3344444444445555555555666689012345678901234567890123 PSC= PLOT DATE DRAWN BY (ORIG): TIME LAST CADD REV. BY: T.HICKMAN DATE:

ATTACHMENT 2

ER INSPECTION DATA SHEET FOR KRSB WASTE SITE
Page 1 of 2

Waste Site: _____ A = Satisfactory X = Unsatisfactory (Comments required)	**A or X**	Comments or Corrective Action Taken (See Maintenance Register for Corrected Items)
1. Verify that there is no excavation, digging, or construction activities on the soil cover.		
2. Verify that no woody vegetation is growing on the soil cover. Remove or identify, as needed.		
3. Visually check vegetative cover for grass density, with no bare spots more than 3-feet in area. The height of the vegetative cover should not impair the visual inspection of the soil cover. This will be determined by the inspector.		
4. Verify that the roads are accessible.		
5. Verify that the four (4) waste unit signs, and the four (4) underground piping signs, are in acceptable condition, have correct information, and are legible from a distance of 25 feet.		
6. Check the soil cover for signs of erosion or depressions (subsidence).		

ATTACHMENT 2 (Cont.)

ER INSPECTION DATA SHEET FOR KRSB WASTE SITE
Page 2 of 2

Waste Site: _____ A = Satisfactory X = Unsatisfactory (Comments required)	**A or X**	Comments or Corrective Action Taken (See Maintenance Register for Corrected Items)
7. Check for signs of burrowing animals (holes).		
8. Verify that there is no excavation, digging or construction activities over underground process piping (identified by signs).		
9. Other:		

Inspected By:_____/_____Date:_____Time:_____
(Print Name) (Signature)

Reviewed By:_____/_____Date:_____Time:_____
Post-Closure Manager or Designee (Print Name) (Signature)

Note: USEPA and SCDHEC must be notified within 30 days of identification of any area where any breach or compromise of restrictions placed on this institutional control OU has occurred.

LUCIP for the
L- and P-Area Bingham Pump Outage Pits, 643-2G, 643-3G and 643-4G
Section 2.0 of *Final Remediation Report for the L- and P-Area Bingham Pump Outage Pits,643-2G 643-3G and 643-4G*
(WSRC-RP-2000-4030, Revision 0, March 2000)

On February 6, 2014, the DOE submitted a letter (ACP-14-125, ARF #019315) to the EPA and SCDHEC to perform the inspections for this operable unit on an annual basis. The EPA and SCDHEC approved the request in letters dated March 20, 2014 (ARF #019385) and March 7, 2014 (ARF #019360), respectively.

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United States Department of Energy

Savannah River Site

Final Remediation Report (FRR) for the L- and P-Area Bingham Pump Outage Pits (643-2G, 643-3G, and 643-4G) (U)

WSRC-RP-2000-4030

Revision 0

March 2000

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

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

SAFETY • RESPONSIBILITY • SECURITY
SRS
SAVANNAH RIVER SITE

DISCLAIMER

This report was prepared by Westinghouse Savannah River Company LLC (WSRC) for the United States Department of Energy under Contract No. DE-AC09-96-SR18500 and is an account of work performed under that contract. References herein to any specific commercial product, process, or services by trademark, name, manufacturer, or otherwise does not necessarily constitute or imply endorsement, recommendation, or favoring of same by WSRC or by the United States Government or any agency thereof.

Printed in the United States of America

Prepared for

U. S. Department of Energy

And

Westinghouse Savannah River Company LLC

Aiken, South Carolina

006957

CERTIFICATION

L and P-Area Bingham Pump Outage Pits (643-2G, 643-3G, and 643-4G)
Final Remediataion Report, WSRC-RP-2000-4030 Revision. 0

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

Date: 27 JUN 2000 Signature:

Richard R. Harbert
Vice President and General Manager
Environmental Restoration Division
Westinghouse Savannah River Company
Co-operator for the U.S. Department of Energy
Savannah River Operations Office

Date: 13 July 2000 Signature:

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

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LIST OF ACRONYMS AND ABBREVIATIONS

bls	below land surface
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CM COC	contaminant migration constituents of concern
COC	constituents of concern
CSM	conceptual site model
FFA	Federal Facility Agreement
FRR	Final Remediation Report
ft	feet
LUC	Land Use Control
LUCAP	Land Use Control Assurance Plan
LUCIP	Land Use Control Implementation Plan
L- and P-BPOPs	L- and P-Area Bingham Pump Outage Pits
m	meter
miR/hr	milliRoentgen per hour
PAH	polyaromatic hydrocarbons
PCB	polychlorinated biphenyls
OU	Operable Unit
RAO	Remedial Action Objectives
RCRA	Resource Conservation and Recovery Act
RG	Remedial Goal
RI/BRA	Remedial Investigation/Baseline Risk Assessment
ROD	Record of Decision
SCDHEC	South Carolina Department of Health and Environmental Control
SRS	Savannah River Site
US DOE	United States Department of Energy
US EPA	United States Environmental Protection Agency
UTRA	Upper Three Runs Aquifer
WSRC	Westinghouse Savannah River Company

1.0 GENERAL DESCRIPTION OF THE L- AND P--AREA BINGHAM PUMP OUTAGE PITS

The L- and P-Reactors (Figure 1) are located in the central portion of the Savannah River Site (SRS), approximately 1 mile from the nearest SRS boundary. The L- and P-Area Bingham Pump Outage Pits (L and P BPOPs), Building Numbers 643-2G, 643-3G, and 643-4G, are situated north and outside the L- and P-Reactor fence lines (Figures 2 and 3). The L BPOPs consist of two pits (643-2G and 643-3G) aligned end-to-end with approximately 38 m (125 ft) between them; one pit is 83.8 x 6.7 m (275 x 22 ft) and the other is 114.9 x 6.1 m (377 x 20 ft). The P BPOP consists of one pit (643-4G) having dimensions of 143.9 x 7.9 m (472 x 26 ft). The mean depth of each pit is approximately 4.0 m (13 ft). The L and P BPOP waste units are listed as Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) waste units in the SRS Federal Facility Agreement (FFA) and are not subject to Resource Conservation and Recovery Act (RCRA) permit modification per the SRS FFA, Appendix C.

There are no surface water drainage ditches or surface water associated with the L and P BPOPs. The local topography is generally level but occasionally gently sloping. The units are grass covered and surrounded by trees. Consequently, surface water drainage from other areas has little or no effect on the surface of the L and P BPOPs.

At the L BPOPs, the vadose zone is approximately 11.9 m (39 ft) thick and is composed primarily of Upland Unit clay and silt with lesser sand. The water table aquifer represents the "upper" aquifer zone of the Upper Three Runs Aquifer (UTRA) and is composed of silt and clay. The aquifer is approximately 23.5 m

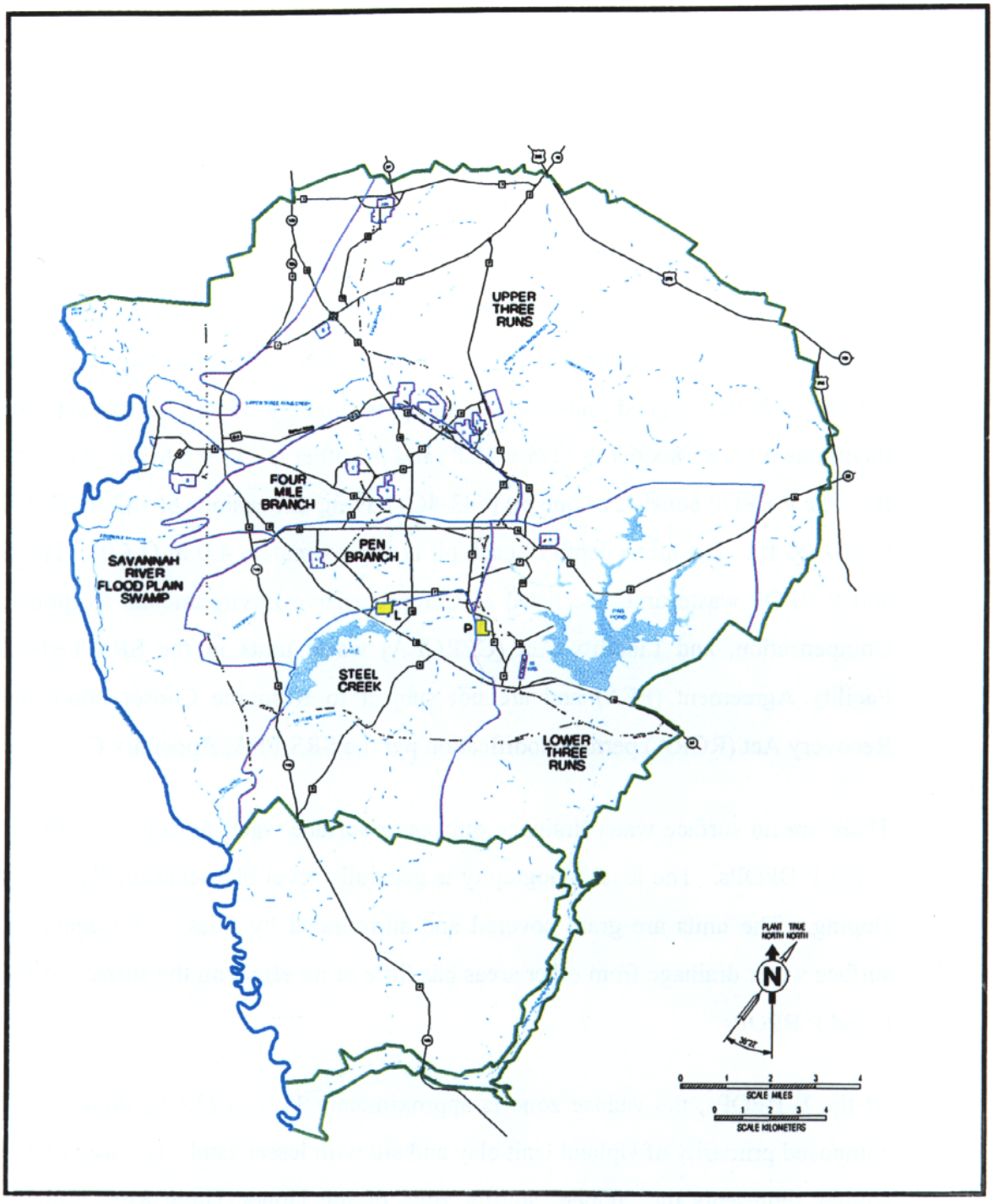


Figure 1. Location of the L and P Reactor Areas and SRS Watersheds

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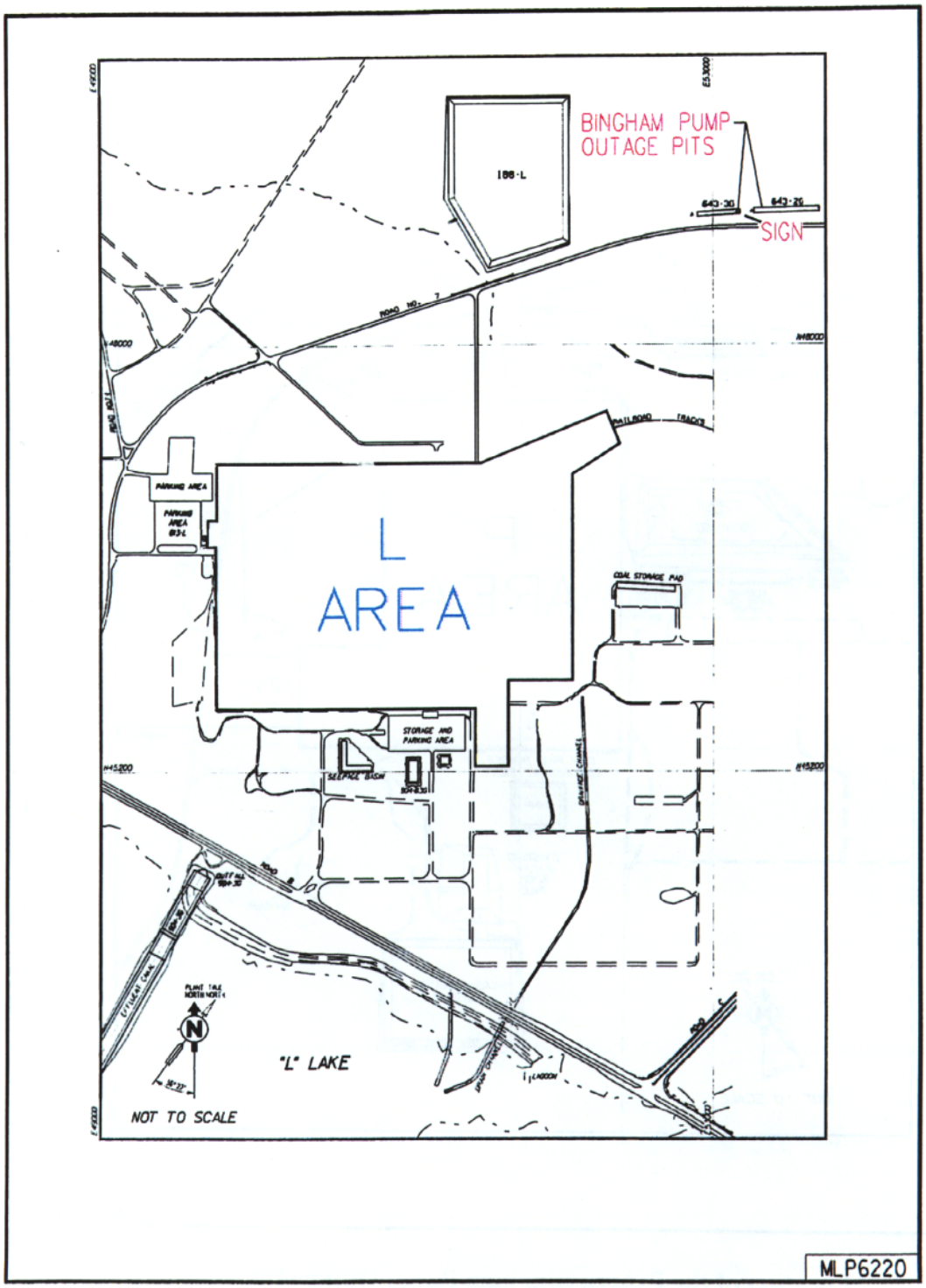


Figure 2. Location of the L-Area Bingham Pump Outage Pits

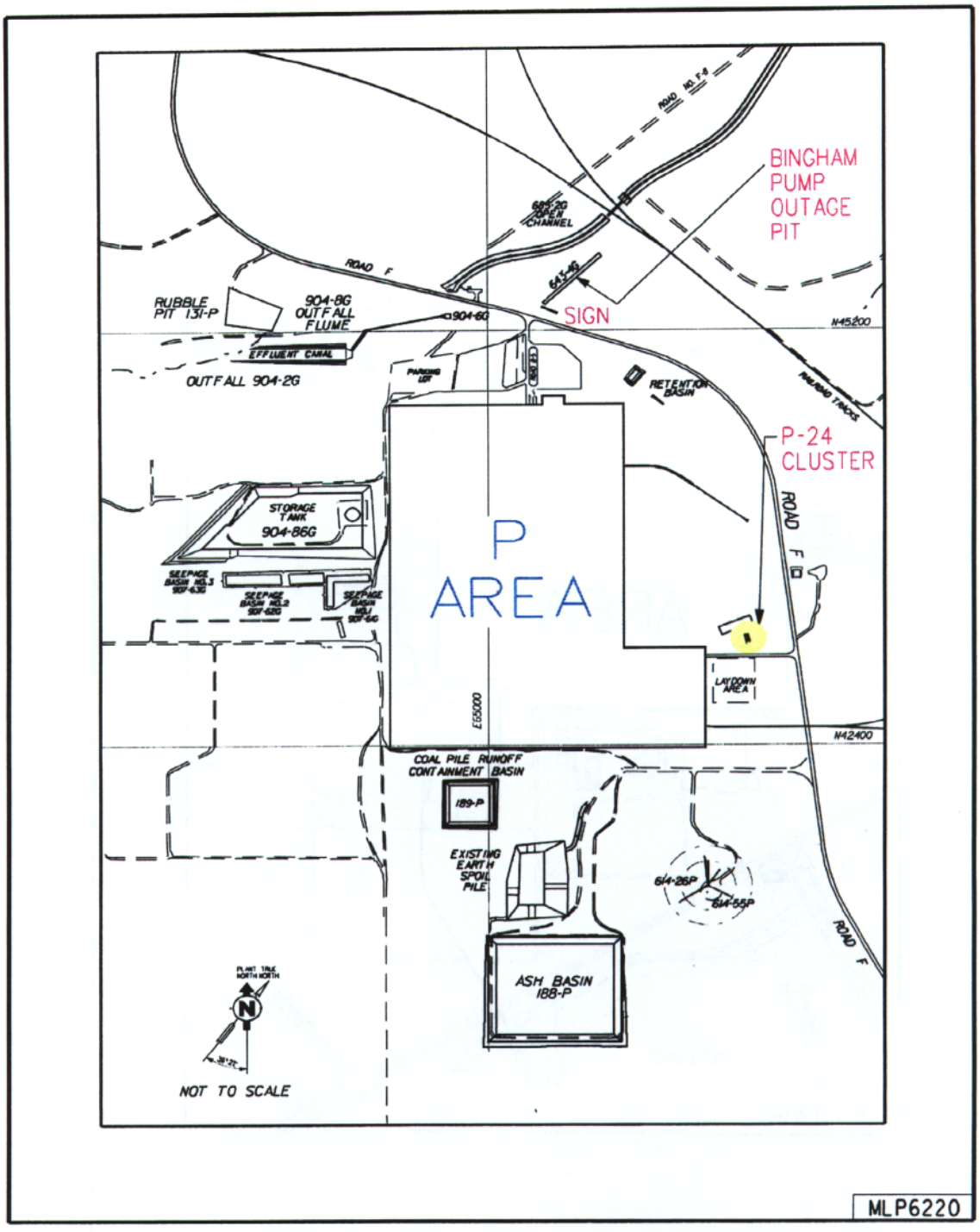


Figure 3. Location of the P-Area Bingham Pump Outage Pit

(77 ft) thick; it extends from the water table to a locally continuous clay layer at a depth of approximately 35.4 m (116 ft) below land surface (bls). Groundwater flow direction at the L BPOPs is to the northwest. No groundwater constituents of concern (COC) were identified for the L BPOPs.

At the P BPOP, the vadose zone is approximately 10.7 m (35 ft) thick and is composed of clay interbedded with lesser sand and silt of the Upland Unit and Tobacco Road sand. The water table aquifer represents the "upper" aquifer zone of the UTRA and is composed of discontinuous layers of clay, silt, and sand. The aquifer is approximately 20.1 m (66 ft) thick; it extends from the water table to the local confining unit at a depth approximately 30.8 m (101 ft) bls. The groundwater flow direction at the P BPOP is generally to the west. No groundwater constituents of concern were identified for P BPOP.

The L and P BPOPs are burial pits containing waste debris generated by major modifications to primary and secondary reactor cooling systems including the primary system Bingham Pumps in 1957 and 1958. The units were formed by excavating trenches to an average depth of 4.0 m (13 ft), disposing of 2.7 m (9 ft) of debris, and then returning the unit to grade by covering the debris with 1.2 m (4 ft) of backfill. The waste consists of miscellaneous construction materials such as pipes, cables, ladders, and concrete. No known pumps or liquid wastes were buried in the L and P BPOPs. The radioactive contamination was less than 25 milliRoentgen per hour (mR/hr) with no detected alpha activity. The buried waste is categorized as Low Level Threat Waste (US EPA, 1991) because of the absence of free liquids or mobile or highly toxic material. The L and P BPOPs were backfilled with approximately four feet of fill material in 1958 and are now an open grassy area marked by orange ball markers.

The contact person (title, address, and phone number) for the L and P BPOPs is as follows:

Westinghouse Savannah River Company
Manager, Post-Closure Maintenance
Building 730-2B
Aiken, SC 29808
(803) 952-6882

2.0 LAND USE CONTROL IMPLEMENTATION PLAN (LUCIP)

The L and P BPOPs Land Use Control Implementation Plan (LUCIP) will be appended to the SRS Land Use Control Assurance Plan (LUCAP) once it is approved.

Remedy Selection

The miscellaneous construction debris (i.e., pipes, cables, ladders, etc.) with fixed contamination (primary source) has been buried in the L and P BPOPs since 1958. The presence of the debris plays a primary role in the remedy selection. There was no indication from the characterization data that the contamination present on the debris has moved, and the level of radioactivity has diminished over the years. The degree of exposure toxicity to the waste is considered minimal and the potential for exposure is also considered to be minimal.

The L and P BPOPs are located in a potential residential zone, close to but outside of the industrial zone boundaries as identified on the Proposed SRS Future Land Use Map of the SRS FFA Implementation Plan. The location of the L and P BPOPs adjacent to the heavy industrial (nuclear) zones, and the presence of buried debris, make the units unsuitable for residential use (US DOE 1996). Although the units are located outside of the defined industrial zones, it is anticipated that the units will be limited use areas with restrictions similar to an industrial-use zone.

Based on the *Approved Standardized Corrective Action Design (ASCAD™) Combined Document for the L- and P-Area Bingham Pump Outage Pits* (U) (WSRC 1999a), no human health or ecological final COCs were identified for any land use/receptor scenario at the L BPOPs, indicating that surface soil and subsurface soil and groundwater do not pose unacceptable risks to human or environmental receptors under current or future conditions. Furthermore, no final Contaminant Migration Constituents of Concern (CM COC) were identified; therefore, leaching does not pose a threat to groundwater. Land Use Controls (LUCs) will provide adequate protection against exposure to waste left in place by prohibiting unauthorized excavation through access controls and deed restrictions.

Based on the *Approved Standardized Corrective Action Design (ASCAD™) Combined Document for the L- and P-Area Bingham Pump Outage Pits* (U) (WSRC 1999a), no ecological final COCs or final CM COCs were identified at the P BPOP; therefore, the unit does not pose unacceptable risks to ecological receptors and does not pose a future threat to groundwater. For the hypothetical on-unit resident and the future industrial worker scenarios, human health final COCs in the subsurface soil included polyaromatic hydrocarbons (PAHs) and polychlorinated biphenyls (PCBs). No human health final COCs were identified for the current land use scenario. LUCs will provide adequate protection against exposure to waste left in place by prohibiting unauthorized excavation through access controls and deed restrictions.

The selected remedy for L and P BPOPs groundwater is No Action as neither unit poses a future threat to groundwater. The L and P BPOPs soils pose minimal risk to human health. To manage any risk uncertainty and to ensure that the potential for exposure remains minimal, Institutional Control as the selected remedy for soils is appropriate for the L and P BPOPs operable unit (OU). LUCs will restrict the L and P BPOPs to future industrial use and will prohibit residential use of the

areas. Unauthorized excavation will also be prohibited and the waste units will remain undisturbed. LUCs will be maintained until such time as they are deemed unnecessary.

The proposed actions for both the L and P BPOPs Operable Unit (OU) are final actions because they each meet the final remedial action objectives (RAOs) and final remedial goals (RGs) established in the Record of Decision (ROD) (WSRC 1999b).

A post-construction conceptual site model (CSM) for the L and P BPOPs, which illustrates the broken pathways after implementation of the remedy, are included as Figure 4.

Land Use Controls

Based on the conclusions of the L and P BPOPs remedial investigation/baseline risk assessment (RI/BRA), groundwater does not pose a threat to human health and restrictions are not required. Therefore, groundwater LUC objectives have not been established. Soils do pose a threat to human health and restrictions are required. Soil LUC objectives are detailed below.

Institutional controls is the remedial alternative selected for this site and is intended to be permanent and effective in the near-and long-term. Implementation of this alternative will require both near- and long-term actions.

The LUC objectives necessary to ensure the protectiveness of the preferred alternative are:

- Prevent contact, removal, or excavation of buried waste in the area
- Preclude residential use of the area

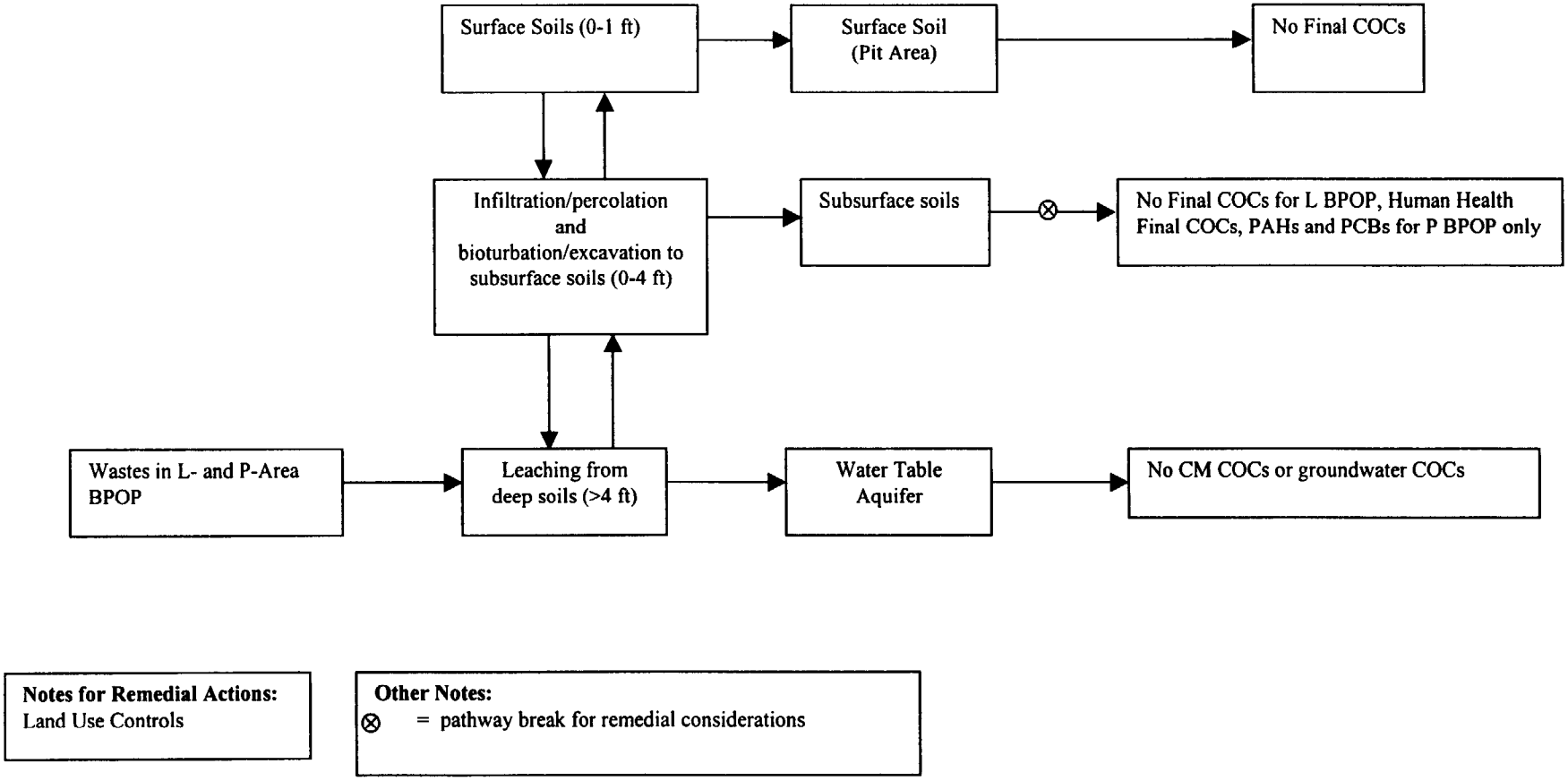


Figure 4. Simplified Conceptual Site Model for the L and P BPOPs

The LUCs required to prevent unauthorized exposure to the contaminated media at the L and P BPOPs include the following:

- Survey plats have been completed by professional land surveyors delineating the land subject to LUCs (Figures 5 and 6). Figures 5 and 6 are reductions of full size survey plats.

- installation of warning signs at the most probable access points to indicate that the areas were used for the disposal of waste materials/hazardous substances (radioactively contaminated construction materials) and to advise that the waste unit custodian must be contacted prior to entry

- use of existing SRS access controls (including security gates, guards, and the site use/site clearance program) to maintain the use of each site consistent with its intended land use

- periodic inspections and general maintenance (primarily mowing and subsidence repairs, and minor drainage modifications as needed to prevent ponding and to promote surface water runoff)

- evaluation of the need for deed notifications/restrictions if the property were ever transferred to non-federal ownership, as required under CERCLA Section 120(h)

In the long term, if the L and P BPOPs are transferred to non-federal ownership, the need for deed restriction will be evaluated and performed through an amended ROD with the United States Environmental Protection Agency (US EPA) and South Carolina Department of Health and Environmental Control (SCDHEC)

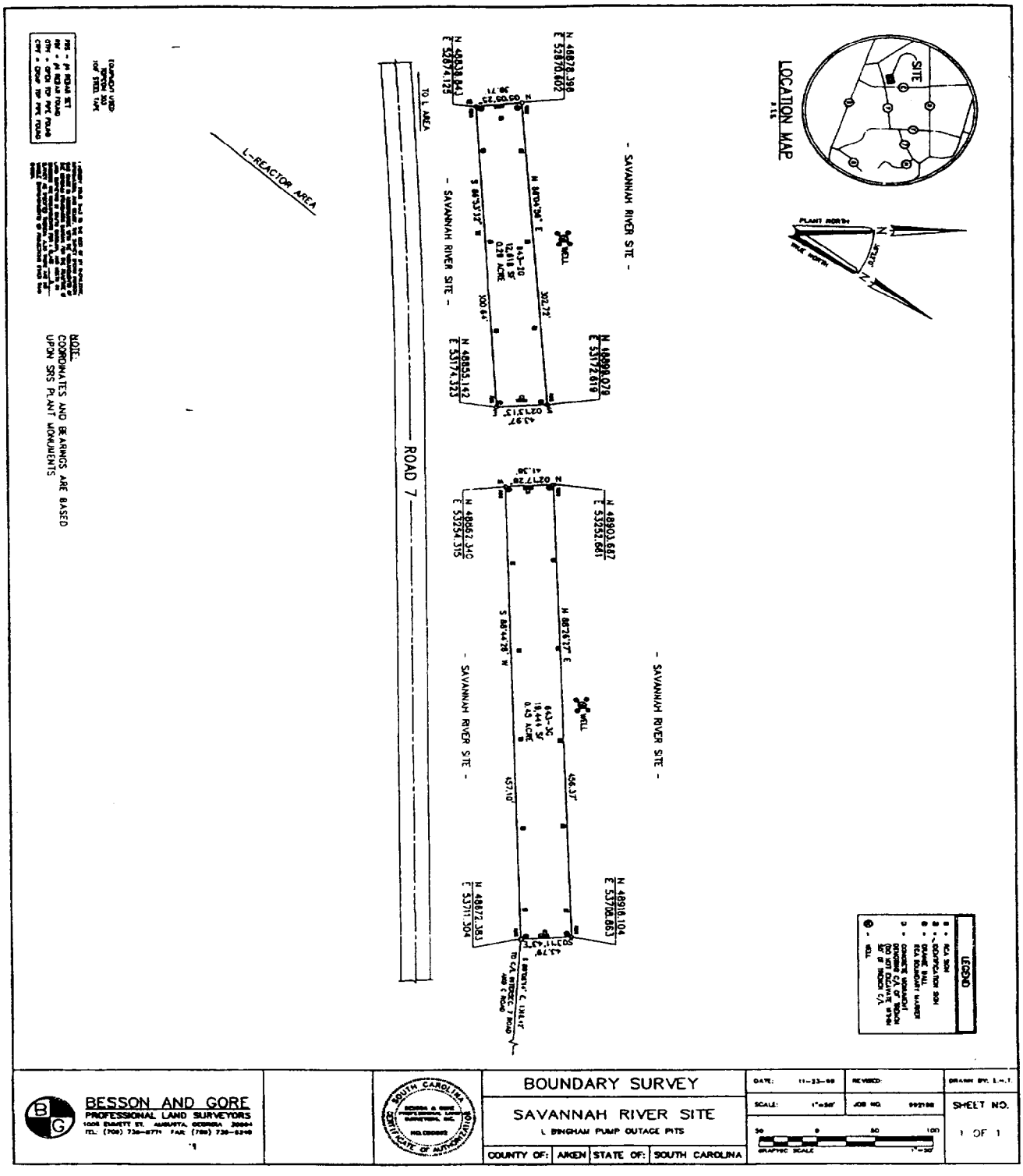


Figure 5. L Bingham Pump Outage Pits Survey Plat

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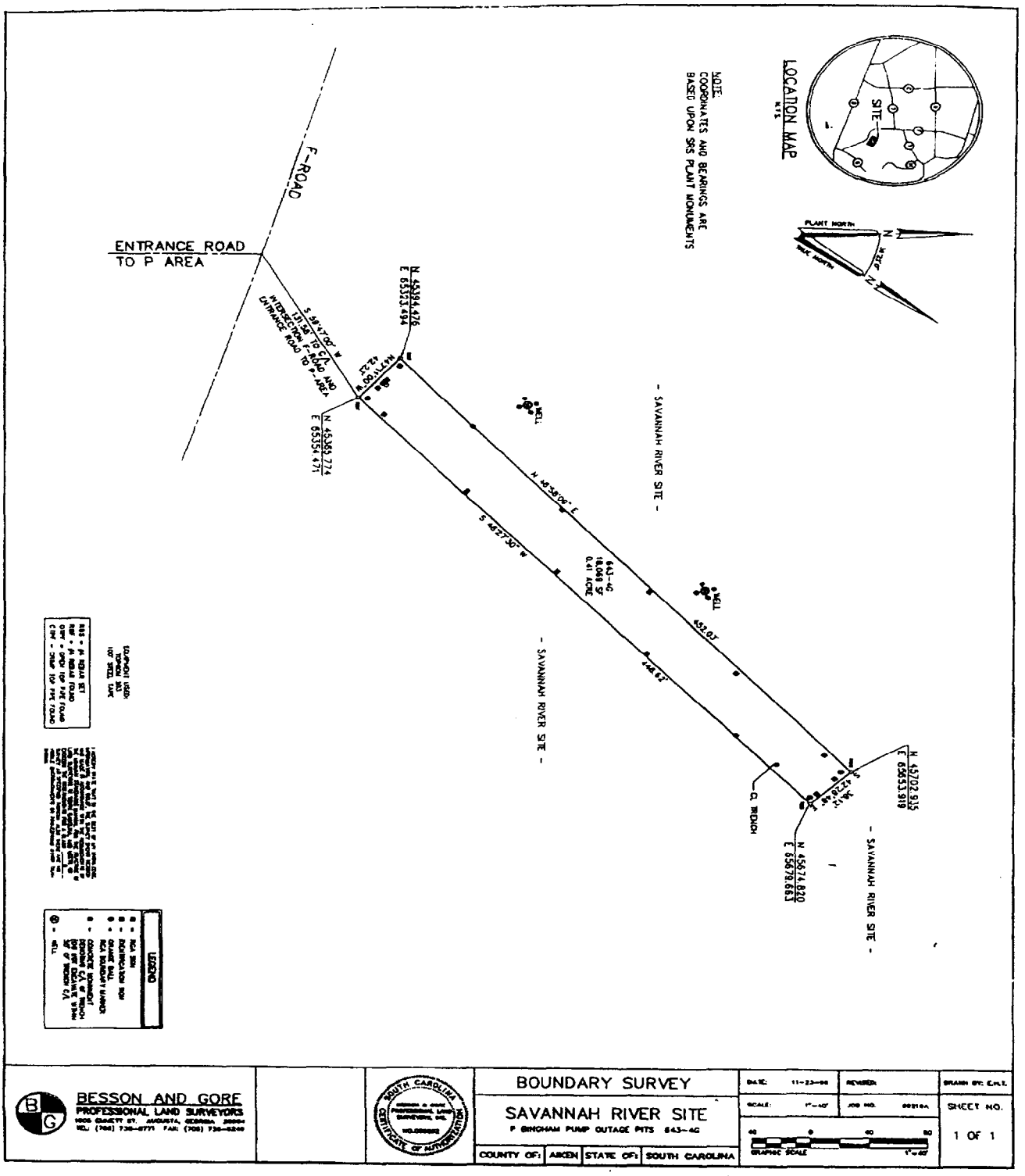


Figure 6. P Bingham Pump Outage Pit Survey Plat

approval and actions taken pursuant to CERCLA Section 120(h). The actions will include a deed notification disclosing former waste management and disposal activities, as well as any remedial actions taken at the waste unit. The deed notification will, in perpetuity, notify any potential purchaser that the property has been used for the management and disposal of construction debris, waste and other materials, including hazardous substances. RCRA deed notification requirements are not required for this waste unit since it is not listed as a RCRA facility in the SRS FFA, Appendix C. The deed would include restrictions precluding residential use of the property. The need for deed restrictions and/or LUCs will require US EPA and SCDHEC review and approval. The survey plat will be reviewed and updated, as necessary, at the time the site is transferred and will be recorded with the Barnwell County recording agency. This proposal is consistent with US EPA guidance and is an effective use of risk management principles.

The elements of the institutional control corrective action, which consists of land restrictions without any engineering controls, are composed of deed notifications when the parcel is transferred from United States Department of Energy (US DOE) ownership, access controls that include posting of identification signs, and field walkdowns for general site conditions. These LUCs will be implemented in perpetuity for this OU. Each element of the institutional controls corrective action is discussed below.

2.1 Deed Notification

A deed notification shall be filed with the Barnwell County recording agency in accordance with CERCLA Section 120(h), which requires the government to create a deed when land on which any hazardous substance was stored, released, or disposed is transferred to non-federal ownership. The transference of the L and

P BPOPs OU is unlikely. Per CERCLA Section 120(h)(3)(A), the deed shall contain, to the extent practical, such information as is available based on the complete search of agency files, including the following:

- a notice of the type and quantity of such hazardous substances
- notice of the time at which such storage, release, or disposal took place
- a description of the remedial action taken, if any

Per CERCLA Section 120(h)(3)(B), the deed shall also contain a covenant warranting that

- all remedial action necessary to protect human health and the environment with respect to any such substance remaining on the property has been taken before the date of such transfer
- any additional remedial action found to be necessary after the date of such transfer shall be conducted by the United States Government
- a clause granting the United States Government access to the property in any case in which remedial action or corrective action is found to be necessary after the date of such transfer

RCRA permit requirements are not applicable for this waste unit per the SRS FFA, Appendix C.

2.2 Access Controls

2.2.1 On-Site Workers

In accordance with WSRC 1D, *Site Infrastructure and Services Manual,* Procedure 3.02, *Site Real Property Configuration Control* (WSRC, 1996), use of all lands and waters on the SRS shall be coordinated via the Site Use Program. No use of land (i.e., excavation or any other land use) shall be undertaken without prior approval documented by a Site Use Permit. Also, in accordance with Procedure 3.02, all work at SRS that adds to or modifies features or facilities portrayed on the SRS development maps (i.e., plot plans of facilities/utilities at SRS) is authorized by a Site Clearance Permit before execution. All Site Clearance requests are reviewed to verify that either an approved Site Use Permit has been obtained, or that an existing Site Use Permit has sanctioned the request. Verification of the US DOE approval for intended land use must be obtained before issuance of a Site Clearance Permit. The Site Use and Site Clearance processes are applicable to all activities and personnel on site (including subcontractors). The processes are controlled within the SRS Quality Assurance Program.

SRS identifies all buildings and facilities on maps used in the Site Use/Site Clearance Program and includes a 200-ft buffer zone around each facility. This waste unit is identified on these maps as a CERCLA facility.

Any work proposed in these areas will be strictly controlled and workers will be appropriately trained and briefed about health and safety requirements if work is deemed necessary for maintenance. Any changes in the use or disturbance of the L and P BPOPs will be cleared with the US EPA and SCDHEC before the disturbance occurs. To prevent unknowing entry and to ensure that unrestricted use of the waste unit does not occur while under ownership of the government,

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identification signs will be posted at the waste unit roadway access points (Figures 2 and 3). The signs will be legible from a distance of at least 25 ft. The signs will read:

> L-Area Bingham Pump Outage Pits, 643-2G and 643-3G
> "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 Maintenance
> Phone: (803) 952-6882
>
> P-Area Bingham Pump Outage Pit, 643-4G
> "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 Maintenance
> Phone: (803) 952-6882

Site-specific access controls (i.e., fences) are not required for the L and P BPOPs since exposure to the casual worker or trespasser as calculated in the Baseline Risk Assessment does not warrant this level of protection.

2.2.2 Trespassers

Additionally, while under the ownership of the US DOE, access control of the entire SRS will continue to be maintained in accordance with the 1992 RCRA Part B Permit Renewal Application, Volume I, Section F.1. This section describes the 24-hour surveillance system (R.61-79.264.14(b)(1)), artificial or natural barriers (R.61-79.264.14(b)(2)(i)), control entry systems (R.61-79.264.14(b)(2)(ii)), and warning signs (R.61-79.264.14(c)) in place at the SRS boundary to comply with the security requirements for a RCRA-permitted facility.

2.3 Field Walkdowns and Maintenance

Monitoring will be performed to verify that LUCIP requirements are met. Semi-annual monitoring of the L and P BPOPs, 643-2G, 3G, and 4G will be conducted for items such as accuracy and legibility of identification signs, visible subsidence or erosion of the waste unit, proper vegetation growth, mowing, etc. Subsidence or erosion will be corrected by backfilling the affected area with clean soil and seeding the area to prevent further erosion. The results of any events and/or actions that could indicate some potential compromise of institutional controls will be documented in the FFA Annual Progress Report. All other routine maintenance activities (i.e., mowing, etc.) will be documented and maintained in files that are subject to US EPA and SCDHEC review and audit. The typical field inspection checklist to be used to perform monitoring activities at the L and P BPOPs are included in this document as Attachment A-1. A copy of the completed inspection form is maintained in the Environmental Restoration Division Administrative Record Files.

Inspections at the L and P BPOPs will be performed to ensure that institutional controls remain protective and consistent with all remedial action objectives. Semi-annual inspections of the L and P BPOPs will be conducted. The results of the inspections will be reported in the annual certification.

2.4 Certification Mechanism

The US DOE Site Manager shall certify on an annual basis that the L and P BPOPs are currently being restricted per the institutional controls corrective action described in the approved *Record of Decision Remedial Alternative Selection for the L- and P-Area Bingham Pump Outage Pits (643-2G, 3G and 4G) (U)*, WRSC-RP-98-4105, Revision 1, September 1999 (WSRC 1999b). This certification shall be included in the FFA Annual Progress Report.

2.5 Groundwater Monitoring and Reporting (as necessary)

Based on the conclusions of the RI/BRA, the L and P BPOPs are not impacting groundwater. Constituents are not observed to have migrated horizontally and clayey zones underneath the base of the pit will limit vertical migration potential. No groundwater land use control objectives have been established. Therefore, groundwater monitoring and reporting is not required for the L and P BPOPs.

3.0 SCHEDULE

The remedial actions to be implemented at the L and P BPOPs include the installation of two identification signs. The installation of the identification signs, as described in Section 2.2.1, will occur during 4Q00. Semi-annual site monitoring activities will also begin with 4Q00. The monitoring activities will include those items necessary to annually certify that the L and P BPOPs are being restricted per the approved corrective action. Installation of the signs and site monitoring activities will commence within two months of regulatory approval of this FRR.

4.0 REFERENCES

US DOE 1996. *Savannah River Site: Future Use Project Report,* Stakeholder Recommendations for SRS Land and Facilities. January 1996. Cover letter: Fiori, Mario P., "SRS Future Use Project Report (Reference: Transmittal of Final Draft "Forging the Missing Link: A Resource Document for Identifying Future Use Options," Grumbly/Pearlman letter, 1-12-94)", US DOE Letter EB-96-015, Savannah River Site, Aiken, South Carolina, January 29, 1996.

US EPA 1991. *A Guide to Principal Threat and Low Level Threat Wastes,* Superfund Publication 9380.3-06FS, United States Environmental protection Agency, Office of Solid Waste and Emergency Response, November 1991.

WSRC, 1996. Procedure 3.02, "Site Real Property Configuration Control", WSRC 1D, *Site Infrastructure and Services Manual,* Westinghouse Savannah River Company, Aiken, SC (latest revision).

WSRC 1999a. *Approved Standardized Corrective Action Design (ASCAD™) Combined Document for the L- and P-Area Bingham Pump Outage Pits* (U) WSRC-RP-97-443, Rev. 1, Westinghouse Savannah River Company, Aiken, SC (April)

WSRC 1999b. *Record of Decision Remedial Alternative Selection for the L- and P-Area Bingham Pump Outage Pits (643-2G, 643-3G and 643-4G) (U)*, WSRC-RP-98-4105, Rev. 1, Westinghouse Savannah River Company, Aiken, SC (September).

5.0 ATTACHMENTS

5.1 Attachment A-1– Field Inspection Checklist for L- and P-Area BPOPs (643-2G, 643-3G and 643-4G)

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Attachment A-1. Field Inspection Checklist for L- and P-Area BPOPs (643-2G, 643-3G and 643-4G)

Waste Site: _____ **A = Satisfactory** **X = Unsatisfactory (Comments required)**	**A or X**	Comments or Corrective Action Taken (See Maintenance Register for Corrected Items)
Check for potential encroachments (Ensure that there is no building on the site).		
Does the site have brush or woody vegetation that needs cutting and disposal?		
Does the site need grass cut?		
Verify that roads are accessible.		
Does the site show signs of erosion or subsidence? Are there any signs of burrowing animals (holes)?		
Does the site have adequate vegetative cover?		
Verify that the waste unit signs (2) are correct and legible.		
Does the site need general cleanup (housekeeping)?		
Verify that the orange balls are in place.		

Inspected By: _____ / _____ Date/Time: _____ / _____
(Print Name) (Signature)

Accompanied By: _____ / _____ Date/Time: _____ / _____
(Print Name) (Signature)

Post Closure Manager: _____ / _____ Date/Time: _____ / _____
(Print Name) (Signature)

Note: US EPA and SCDHEC must be notified within 30 days of identification of any area where any breach or compromise of restrictions placed on this institutional control operable unit has occurred.

THIS TAB IS NO LONGER USED

The L-Area Hot Shop (717-G) OU was designated as a No Action OU in FY2014 and was removed from the LUCAP.

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LUCIP for the
L-Area Oil and Chemical Basin, 904-83G
Appendix A *Post-Construction Report/Final Remediation Report for the L-Area Oil and Chemical Basin, 904-83G*
(WSRC-RP-2001-4078, Revision 1, September 2001)

On February 6, 2014, the DOE submitted a letter (ACP-14-125, ARF #019315) to the EPA and SCDHEC to perform the inspections for this operable unit on an annual basis. The EPA and SCDHEC approved the request in letters dated March 20, 2014 (ARF #019385) and March 7, 2014 (ARF #019360), respectively.

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APPENDIX A

LUCIP
for L-Area Oil and Chemical Basin (Bldg. 904-83G) (U)

LAND USE CONTROL IMPLEMENTATION PLAN (LUCIP)

The L-Area Oil and Chemical Basin (LAOCB) LUCIP will be appended to the Savannah River Site (SRS) Land Use Control Assurance Plan (LUCAP), which has been approved by the United States Department of Energy (USDOE), United States Environmental Protection Agency (USEPA), and South Carolina Department of Health and Environmental Control (SCDHEC). SRS will be responsible for the implementation of the LUCIP.

1.0 REMEDY SELECTION

1.1 LAOCB Operable Unit

The LAOCB and L-Area Acid/Caustic Basin (LAACB) source operable unit (OU) is listed as a Resource Conservation and Recovery Act (RCRA) 3004(u) Solid Waste Management Unit/Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) unit in Appendix C of the Federal Facility Agreement (FFA).

The selected remedial alternative was developed in accordance with CERCLA, as amended, RCRA, and to the extent practicable, the National Oil and Hazardous Substances Pollution Contingency Plan (NCP). The decision in the Record of Decision (ROD) document is based on the Administrative Record File for this specific RCRA/CERCLA unit.

Based on the LAOCB/LAACB RCRA Facility Investigation/Remedial Investigation (RFI/RI) Report and the Baseline Risk Assessment (BRA), the LAOCB source OU posed significant risk to human health and the environment.

Therefore, a determination has been made that the combination of in situ solidification/stabilization (S/S) of the pipeline, excavation and placement of the pipeline in the LAOCB, and in situ S/S and capping of the LAOCB is protective of human health and the environment for the contamination remaining in the LAOCB pipeline and soil.

Based on the LAOCB/LAACB RFI/RI Report and the BRA, the LAACB source OU poses no significant risk to human health and the environment. Therefore, a determination has been made that a No Action alternative is appropriate for the LAACB. The No Action alternative will be protective of human health and the environment.

As stated in the ROD, the groundwater has been identified as a separate OU and is therefore considered outside the scope of LAOCB remedial action.

1.2 General Description of LAOCB

The LAOCB is located within the SRS, approximately 300 feet south of the L-Area perimeter fence and 1,250 feet north of L Lake. The area lies at an elevation of approximately 235 feet above mean sea level and 45 feet above the elevation of L Lake. Surface water runoff in L Area drains southward to L Lake via overland flow and small intermittent stream channels and drainage ditches. The water table is approximately 25 feet below ground surface in the area of the LAOCB.

The LAOCB measured approximately 182 feet long by 108 feet wide at the berm, with an average depth of 12 feet. The berm diverted overland flow away from the basin. The LAOCB previously contained water from direct precipitation and low-lying vegetation indigenous to the area. It was surrounded by a chain link fence and was posted as a radiological soil contamination area (SCA).

The LAOCB was constructed in 1961 as an unlined seepage basin. Prior to its construction, approximately 750 feet of 6-inch diameter steel pipeline was originally installed from the maintenance hot shop (Building 717-G) to the L-Area Seepage Basin. After the LAOCB was constructed, wastewater was diverted to the LAOCB through a portion of the 6-inch pipeline between the hot shop and the LAOCB; the remainder of the pipeline was plugged off and taken out of use. A second 2-inch diameter steel pipeline, approximately 450 feet long and located just south of the 6-inch pipeline, was also used between the hot shop and the LAOCB. Wastewater from other areas of SRS was transported in drums and tanker trucks and was disposed in the basin via a bermed concrete drainage pad, located outside and upgradient at the north side of the basin. The basin was put in operation in 1961 and remained active until 1979.

The LAOCB is no longer a radiological facility. The pipelines were buried in areas designated as underground radiological material areas (URMA).

1.3 Nature and Extent of Contamination in LAOCB Soils and Pipelines

LAOCB soils presented the greatest risk at the unit. Significant carcinogenic risks to the potential future worker or resident were driven by potential exposure from direct radiation, ingestion of soil, and ingestion of produce grown in the LAOCB soils, which were contaminated with radionuclides (primarily cobalt-60 and cesium-137) to a depth of less than two feet. Noncarcinogenic risks were driven primarily by ingestion of basin soils contaminated with chromium and lead. The vegetation within the LAOCB security fence was contaminated with radionuclides from the basin. The concrete drainage pad and associated piping within the staging area at the north end of the LAOCB were contaminated with fixed and/or transferable radioactive contamination. Four existing monitoring wells (LCOs 1, 2, 3, 4) potentially provided a conduit for the migration of unit constituents of concern (COCs) to the water table aquifer in the vicinity of the basin.

No manmade radionuclide contamination of soils existed outside and adjacent to the LAOCB security fence; the detected radionuclides outside the LAOCB fence were strictly naturally occurring.

Results of investigation on the LAOCB pipelines indicated that soils surrounding the pipelines had not been significantly impacted by unit operation. Carcinogenic and noncarcinogenic risks posed by the pipeline soils were due to naturally occurring metals and radionuclides that are typical of SRS soils. However, relatively high levels of radioactive contamination were detected on the internal surface of the LAOCB pipelines. Future deterioration of the pipeline's steel walls could have created an unacceptable risk to the environment.

Table 3 of the ROD summarizes the on-unit risks posed by LAOCB.

1.4 Remedial Action Overview

1.4.1 The LAOCB Remedial Action

The remedial action was applicable to the LAOCB soils and pipelines (associated pipelines between the hot shop and the western limit of the proposed LAOCB cover).

The selected remedial action for the LAOCB soils and pipelines included the following key elements (WSRC 1997b):

- in situ stabilization of the LAOCB pipelines' interior and excavation of the stabilized pipelines, including the surrounding contaminated soils (if any), and their placement in the LAOCB for stabilization and solidification;

- in situ S/S of LAOCB soils and pipelines, followed by capping of the LAOCB with a low permeability (hydraulic conductivity of 1 x 10^{-5} cm/sec or less) engineered soil cover, and

- maintenance and institutional control of the capped LAOCB as long as the waste remains a threat to human health and the environment.

The objectives of the LAOCB remedial action were to eliminate risks posed by direct external exposure to radiation, ingestion, and inhalation of radionuclides and to prevent or mitigate the leaching and migration of COCs to the groundwater (WSRC 1997b, WSRC 1997c). The post-remedial action Conceptual Site Model in Figure A-1 of this LUCIP illustrates how the selected remedy achieves the remedial action objectives.

2.0 LAND USE CONTROL

For the LAOCB, the following land use control (LUC) objective is necessary to ensure protectiveness of the remedy:

- Control access to the LAOCB unit in accordance with the current site use/site clearance programs, including access control signs in the area to indicate that the stabilized soil beneath the unit is contaminated with radionuclides.

- Prevent unauthorized access to the groundwater.

The elements of the institutional control corrective action, which consists of land restrictions without any engineering controls, are composed of deed notifications when the parcel is transferred from federal ownership (Section 2.1), access controls such as posting identification signs (Section 2.2), and field walkdowns to inspect general site conditions and maintenance (Section 2.3). These land use controls will remain in place as long as the waste remains a threat to human health and the environment.

2.1 Deed Notification

A deed notification shall be filed in the appropriate county records in accordance with CERCLA 120(h), which requires the government to create a deed when land on which a hazardous substance was stored, released, or disposed of is transferred to non-federal ownership. In the event the property is transferred, a deed notification will be filed with Aiken County. Per CERCLA 120(h)(3)(A), the deed shall contain, to the extent practical, such information as is available based on the complete search of agency files, including the following:

- A notice of the type and quantity of such hazardous substances
- Notice of the time at which such storage, release, or disposal took place
- A description of the remedial action taken, if any

Per CERCLA 120(h)(3)(B), the deed shall also contain a covenant warranting that

- All remedial action necessary to protect human health and the environment with respect to any such substance remaining on the property has been taken before the date of such transfer.
- Any additional remedial action found to be necessary after the date of such transfer would be conducted by the United States Government.

2.2 Access Controls

2.2.1 On-Site Workers

In accordance with WSRC ID, *Site Infrastructure and Services Manual,* Procedure 3.02, "Site Real Property Configuration Control," use of all lands and waters at SRS shall be coordinated via the Site Use Program. No use of land (i.e.,

excavation or any other land use) shall be undertaken without prior approval documented by a Site Use Permit. Also, in accordance with Procedure 3.02, all work at SRS that adds to or modifies features or facilities portrayed on SRS development maps (i.e., plot plans of facilities/utilities at SRS) will be authorized by a Site Clearance Permit before excavation activities take place. All Site Clearance Requests are reviewed to verify that either an approved Site Use Permit has been obtained or that an existing Site Use Permit has sanctioned the request, Verification of USDOE approval for intended land use must be obtained before a Site Clearance Permit is issued. The site use and site clearance processes are applicable to all activities and personnel on site (including subcontractors). The processes are controlled under the SRS Quality Assurance Program.

SRS identifies all buildings and facilities on maps used in the Site Use/Site Clearance Program and requires a 200-foot buffer zone around each facility. This waste unit is identified on these maps as a CERCLA facility.

All work in these areas will be strictly controlled, and workers will be appropriately trained and briefed about health and safety requirements if work is deemed necessary for maintenance. Any changes in the use or disturbance of the LAOCB will be cleared with the USEPA and SCDHEC before disturbance occurs. To prevent unknowing entry and to ensure that unrestricted use of the waste unit does not occur while under ownership of the government, identification signs have been posted at the unit. The signs are legible from a distance of 25 feet. The sign reads as follows:

L-Area Oil and Chemical Basin

"DANGER"
UNAUTHORIZED PERSONNEL KEEP OUT.
THIS UNIT WAS USED TO MANAGE HAZARDOUS SUBSTANCES. DO NOT DIG OR EXCAVATE. DO NOT ENTER WITHOUT CONTACTING THE WASTE SITE CUSTODIAN.
CUSTODIAN: MANAGER, POST CLOSURE MAINTENANCE
PHONE: (Contact Phone Number)

2.2.2 Trespassers

Additionally, while under the ownership of USDOE, access control of the entire SRS will continue to be maintained in accordance with the 1992 RCRA Part B Permit Renewal Application, Volume I, Section F.1. To comply with the security requirements for a RCRA-permitted facility, this section describes the 24-hour surveillance system (R.61-79.264.14(b)(1)), artificial or natural barriers (R.61-79.264.14(b)(2)(i), control entry systems (R.61-79.264.14(b)(2)(ii), and warning signs (R.61-79.264.14(c)) in place at the SRS boundary.

2.3 Field Walkdowns and Maintenance for Institutional Controls

Monitoring will be performed to verify that LUCIP requirements have been met. Semi-annual monitoring of the LAOCB OU, 904-83G, will be conducted for accuracy and legibility of signs, visible subsidence or erosion of the waste unit, proper vegetative growth, burrowing animals, proper access to the facility, mowing, etc. Subsidence or erosion will be corrected by backfilling the affected area with clean soil and seeding the area to prevent further erosion. USEPA and SCDHEC will be notified of the results of any inspection, event, and/or action that indicates a potential compromise of institutional controls within 30 days of identification. The notification and the reason for the notification will be documented in the Federal Facility Agreement Annual Progress Report. All other routine maintenance activities (i.e., mowing, etc.) will be documented, and the documentation will be maintained in files that are subject to USEPA and SCDHEC review and audit. A copy of the completed inspection form will be maintained in Environmental Restoration Division Administrative Record Files.

Inspections at the LAOCB will be performed to ensure that institutional controls remain protective and consistent with all remedial action objectives. Monthly inspections will be performed for the first 2 years and until permanent vegetation is established. After that time, inspections will be performed semi-annually per the attached inspection checklist

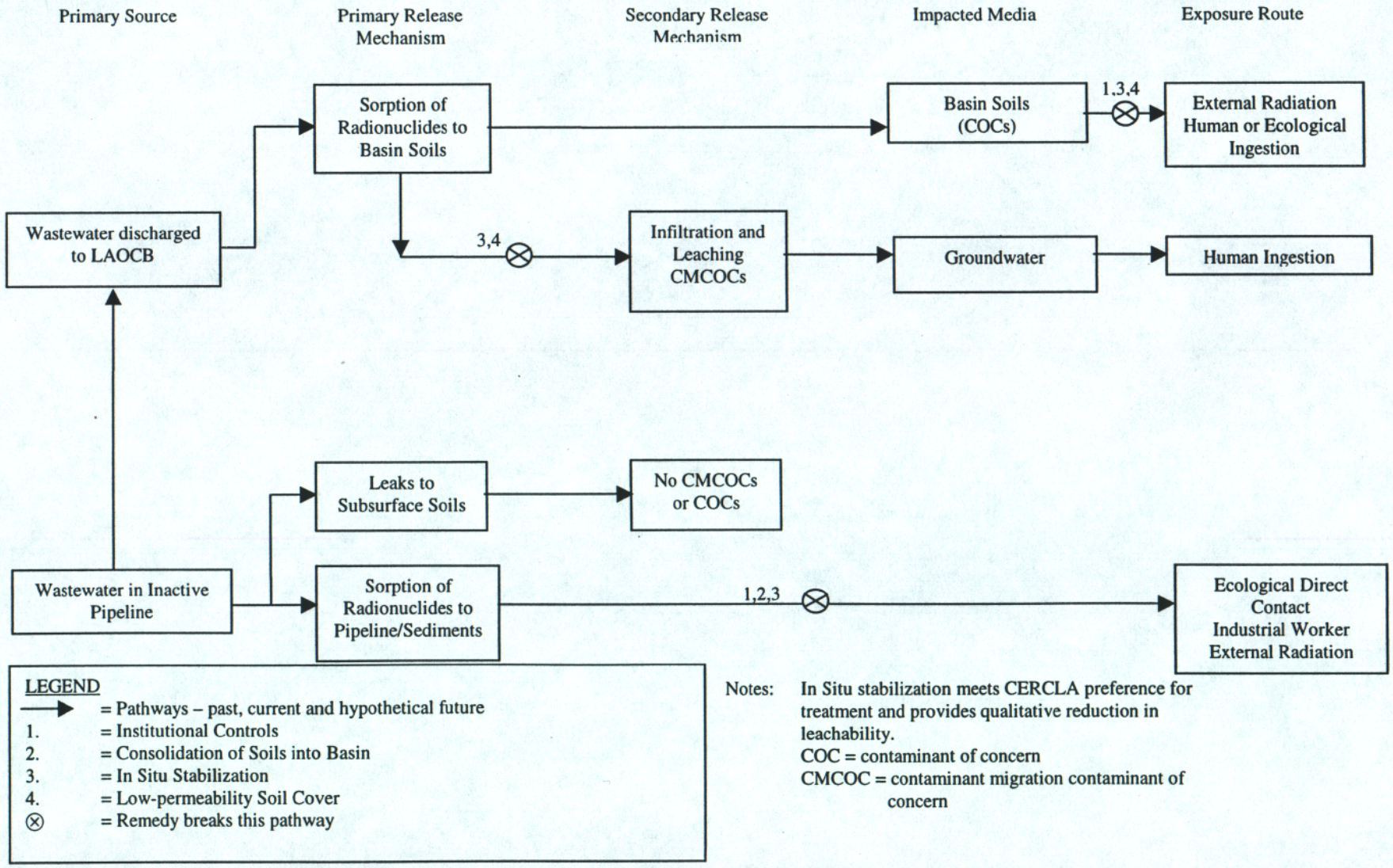


Figure A-1. Conceptual Site Model for the L-Area Oil and Chemical Basin Post Remedial Action

ATTACHMENT TO LUCIP

ER INSPECTION CHECKLIST FOR L-AREA OIL AND CHEMICAL BASIN

Waste Site: _____ **A = Satisfactory** **X = Unsatisfactory (Comments required)**	**A or X**	**Comments or Corrective Action Taken (See Maintenance Register for Corrected Items)**
Check to see if the site needs mowing.		
Verify that the basin and roads are accessible.		
Check for potential encroachments. (Ensure that there is no building on the site.)		
Verify all signs are intact, in good condition, and legible from a distance of at least 25 feet.		
Visually check vegetative cover for grass density. There should be no woody vegetation or shrubs growing on the cover. The height of the vegetative growth should not impair the visual inspection of the site.		
Check the integrity of drainage ditches (if any) for presence of excessive erosion, sediment buildup, and any debris restricting water flow.		
Visually inspect the concrete markers at four corners of the basin to ensure their integrity. The concrete should be visible and free of damage.		
Visually check the basin cover for signs of erosion subsidence and/or depressions.		
Verify that conditions of the roads to the well sites are adequate.		
Inspect the grounds surrounding well sites for vegetation overgrowth, debris, and existence and/or development of erosion features.		

ATTACHMENT TO LUCIP

ER INSPECTION CHECKLIST FOR L-AREA OIL AND CHEMICAL BASIN (Cont'd.)

Waste Site: _____ **A = Satisfactory** **X = Unsatisfactory (Comments required)**	**A or X**	**Comments or Corrective Action Taken (See Maintenance Register for Corrected Items)**
Verify that the well posts and protective covers are in place.		
Verify the well is properly identified per R.61-71.6H (South Carolina well standards and regulations).		
Verify the wells' casings are properly locked per R.61-71.11.C.6 (South Carolina well standards and regulations).		
Verify that the previous "Quarterly Monitoring Well Inspection Summary Report" has been sent to ERD Records Interim Storage. This report can be obtained from ERD Waste Treatment.		
Other		
Comments:		

Inspected By:_____/_____Date:_____Time:_____
(Print Name) (Signature)

Reviewed By:_____/_____Date:_____Time:_____
PM or Designee (Print Name) (Signature)

Note: USEPA and SCDHEC must be notified within 30 days of identification of any area where any breach or compromise of restrictions placed on this institutional control operable unit has occurred.

LUCIP for the
L-Area Reactor Seepage Basin, 904-064G
Appendix A of *Post-Construction Report/Final Remediation Report for the L-Area Reactor Seepage Basin*
(WSRC-RP-2003-4118, Revision 1, February 2004)

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Appendix A

Land Use Control Implementation Plan (LUCIP)

For

L-Area Reactor Seepage Basin

This L-Area Reactor Seepage Basin (LRSB) Land Use Control Implementation Plan (LUCIP) will be appended to the Savannah River Site (SRS) Land Use Control Assurance Plan (LUCAP). SRS is responsible for implementing the land use controls (LUCs) (e.g., inspections and maintenance) outlined in this unit-specific LUCIP.

The selected remedy leaves hazardous substances in place that pose a potential future risk and will require land use restrictions for an indefinite period of time. As negotiated with the United States Environmental Protection Agency (USEPA), and in accordance with USEPA Region IV policy, SRS has developed a LUCAP to ensure that land use restrictions are maintained and periodically verified. This LUCIP provides detailed and specific measures required for the LUCs selected as part of this remedy. The United States Department of Energy (USDOE) is responsible for implementing, maintaining, monitoring, reporting upon, and enforcing the LUCs herein. Upon final approval, the LUCIP will be appended to the LUCAP. It is considered incorporated by reference into the Post-Construction Report/Final Remediation Report (PCR/FRR), establishing land use controls implementation and maintenance requirements enforceable under the Comprehensive Environmental Response, Compensation, and Recovery Act (CERCLA). The approved LUCIP will establish implementation, monitoring, maintenance, reporting, and enforcement requirements for the unit. The plan 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.

SRS will maintain institutional controls in accordance with the LUCAP (WSRC-2003). The LUCAP states that the land use for the LRSB operable unit (OU) will be maintained

for industrial land use only. Institutional controls will be in place as long as the risk is greater than 1 x 10^{-6} and the threat to the environment extends beyond 2006.

The additional institution control, fencing, will be required through the year 2006, at which point the risk from potential threat source material (PTSM) (1 x 10^{-3}) will no longer be present due to radioactive decay.

1.0 REMEDY SELECTION

1.1 LRSB Operable Unit

The LRSB OU is located in the central portion of SRS, southeast of the L-Reactor facility. The basin was in an open area with sparse vegetative cover. It was posted as a Soil Contamination Area (SCA) and is currently posted as an underground radioactive material area. The ground slopes to the south toward L-Lake, which is approximately 1,220 ft away. The LRSB is located in an industrial zone identified in the proposed SRS future land use map. The basin was adjacent to a nuclear facility and has been selected to remain an industrial use area. According to the *Savannah River Site Future Use Project Report* (USDOE 1996), residential use of SRS land near nuclear facilities should be prohibited.

1.2 Nature and Extent of Contamination in LRSB

The LRSB was an L-shaped unlined (earthen) basin with dimensions of 200 ft in length for each leg of the L-shape, 36 ft in width, and 7 ft in depth. The basin has been filled, covered, vegetated and is currently closed. The basin area was 0.29 acres. The area inside the LRSB OU fence is 1.34 acres.

In 1958, the process sewer line began conveying low-level radioactive purge water from the L-Area Reactor disassembly basin to the seepage basin. The LRSB received purge water from 1958 to 1968 and from 1985 to 1988. From 1985 to 1988, mixed-bed

deionizers and sand filters intercepted the purge water before it was discharged to the LRSB. In 1988, L-Reactor was placed on warm standby; in 1993, it was shut down. It has not been restarted.

The process sewer line is a 3-inch diameter high density polyethylene (HDPE) pipe that is approximately 450 ft long and extended from the disassembly basin within the L-Reactor facility to the discharge point at the north end of the basin. In addition to the process sewer line, a concrete pad (18 x 18 ft) with metal handles sat adjacent to the basin. This pad was most likely used as an off-loading area. Liquid waste was transferred from tanker trucks at the off-loading pad into the basin via a flexible pipe. The pipe extends from the pad to the north end of the basin.

The LRSB contains PTSM composed of cobalt-60 and is limited to 1 ft below the bottom of the basin. No PTSM is associated with the process sewer lines or the concrete pad.

Strontium-90 was predicted to leach to the groundwater from the seepage basins and buffer area in less than 1,000 years at concentrations above the MCL.

A portion of the L-Area Oil and Chemical Basin (LAOCB) 6-inch pipeline (steel) used to extend between the west end of the LAOCB cap and the east end of the LRSB. Although many radionuclides were discharged to LRSB, most of the radioactivity was attributable to tritium. Other radionuclides include strontium-90, cesium-137, cobalt-60, and promethium-147.

1.3 Remedial Action Overview

The remedy selected for the LRSB OU is a low-permeability soil cover system with institutional controls. According to the *Savannah River Site Future Use Project Report Stakeholder Recommendations for SRS Land and Facilities* (USDOE 1996) residential use of SRS land should be prohibited. This remedy entails the following actions:

- The 6-inch carbon steel pipe was grouted in place, excavated and disposed of in the basin. The 3-inch HDPE pipe was grouted and left in place. The portion of the 1.5-inch abandoned domestic water line inside the LRSB fence line was excavated and dispose of in the basin, and the end of the pipe was capped. Any contaminated soil (i.e., exceeding 20 pCi/g of gross alpha or 50 pCi/g non-volatile beta) surrounding the pipelines was disposed of in the basin.

- The concrete pad, associated piping, and handrails was removed and disposed of in the basin. A minimum 1 ft of soil from beneath the previous concrete pad location was excavated and disposed of in the basin. Any contaminated soil (i.e., exceeding 20 pCi/g gross alpha or 50 pCi/g nonvolatile beta) surrounding the concrete pad was disposed in the basin.

- A low-permeability soil cover system with a perimeter fence was installed to reduce water infiltration, and to protect human health and the environment.

- Institutional controls were implemented to ensure continued protection of human health or the environment.

The post-remedial action (RA) conceptual site model shows the broken pathways and the remaining residual risk to the future industrial worker (Attachment C).

2.0 LAND USE CONTROLS

The following LUC objectives have been developed for the LRSB OU to ensure the protectiveness of the RA:

- Prevent contact, removal, or excavation of buried waste or pipelines in the OU areas designated in the LUCIP and preclude future residential or agricultural use of the area.

- Maintain the use of the site for industrial activities only.

Current access controls and a deed notification needed to maintain the future LUCs are described in the following sections of this LUCIP.

2.1 Access Controls

2.1.1 On-Site Workers

In accordance with WSRC 1D, *Site Infrastructure and Services Manual*, Procedure 3.02, "Site Real Property Configuration Control," use of all lands and waters on SRS shall be coordinated via the Site Use Program. No use of land (i.e., excavation or any other land use) shall be undertaken without prior approval documented by a Site Use Permit. In accordance with Procedure 3.02, all work at SRS that adds to or modifies features or facilities portrayed on SRS development maps (i.e., plot plans of facilities/utilities at SRS) will be authorized by a Site Clearance Permit before excavation activities are conducted. All Site Clearance Requests will be reviewed to verify that either an approved Site Use Permit has been obtained or that an existing Site Use Permit has sanctioned the request.

The Site Development, Planning, and Mapping Department at SRS is responsible for updating, maintaining, and reviewing site maps, including Federal Facility Agreement (FFA) OU identifications. If a Site Clearance Request is made that may impact an FFA OU, the Site Clearance Request form is sent to the FFA OU reviewer, who is in the Soil and Groundwater Closure Projects (SGCP), for either approval or disapproval. The roles and responsibilities of each individual are detailed in WSRC 1D, Procedure 3.02. Verification of USDOE approval for intended land use must be obtained before issuance of a Site Clearance Permit. The Site Use and Site Clearance processes are applicable to all activities and personnel on site (including subcontractors).

The processes are controlled within the SRS Quality Assurance (QA) Program. The SRS QA Program is the governing QA Program for all SRS activities, including those in the

SGCP. The activities that are performed in the SGCP must comply with SRS QA Program procedures as well as SGCP-specific procedures.

SRS identifies all buildings and facilities on maps used in the Site Use/Site Clearance Program. This waste unit is identified on these maps as a CERCLA facility.

Any work proposed in these areas will be strictly controlled, and workers will be appropriately trained and briefed about health and safety requirements if work is deemed necessary for maintenance. No major change in land use or excavation at the LRSB OU shall be undertaken without USEPA and South Carolina Department of Health and Environmental Control (SCDHEC) approval. To prevent unknowing entry and to ensure that unrestricted use of the waste unit does not occur while it is under ownership of the government, identification signs will be posted at the unit.

Custodial responsibilities for maintenance and inspection of the LRSB OU will be maintained by the Post-Closure Maintenance group within the SGCP.

The warning signs for the soil cover will be legible from a distance of at least 25 ft. The soil cover signs will read as shown in the photograph below:



The warning signs for the underground grouted pipeline will be legible from a distance of at least 25 ft. The underground pipeline signs will read as shown in the photograph below:



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2.1.2 Trespassers

While under the ownership of USDOE, access control of the entire SRS will continue to be maintained in accordance with the 1992 Resource Conservation Recovery Act (RCRA) Part B Permit Renewal Application, Volume I, Section F.1. This section describes the 24-hour surveillance system (R.61-79.264.14(b)(1)), artificial or natural barriers (R.61-79.264.14(b)(2)(i)), control entry systems (R.61-79.264.14(b)(2)(ii)), and warning signs (R.61-79.264.14(c)) in place at the SRS boundary to comply with the security requirements for a RCRA-permitted facility.

2.2 Deed Notification

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

The deed shall also include deed restrictions that preclude residential use of the property. However, the need for these deed restrictions may be re-evaluated 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 re-evaluation of the need for the deed restrictions will be done through an amended ROD with USEPA and SCDHEC review and approval.

Pursuant to the approved ROD Amendment (WSRC 2002a) and RAIP (WSRC 2002b), if the site is ever transferred to non-federal ownership, a survey plat of the OU will be prepared, certified by a professional land surveyor, and recorded with the appropriate county recording agency.

Note: The "AREA SUBJECT TO LAND USE CONTROLS" are shown on SK-C-53110, Rev. 1.

2.3 Field Walk downs and Maintenance for Institutional Controls

After the remediation of the LRSB, only maintenance activities will be required per this RA. No operations activities will be required.

The results of any events and or actions that indicate some potential compromise of institutional controls will be documented in the FFA Annual Progress Report. All other routine maintenance activities will be documented and maintained in files subject to USEPA and SCDHEC review and audit. A copy of the completed inspection form is maintained in the SGCP Administrative Record Files.

The following steps will be implemented to maintain the low-permeability soil cover:

- Perform periodic (at a minimum annual) visual inspections for evidence of damage to the soil cover due to erosion or intrusion by burrowing animals. The inspection will also address upkeep of the vegetative cover and access control barriers (e.g., the fences and warning signs). (Attachment B provides a unit-specific field inspection checklist for the LRSB OU).

- Perform necessary repairs (when required as identified during inspection) to maintain the functional integrity of the soil cover and the warning signs.

- Enforce SRS institutional controls by restricting access to the closed waste unit. Institutional controls will be maintained as long as the waste remains a threat to human health or the environment.

- As required by the National Oil and Hazardous Substance Contingency Plan (NCP), a five-year review of the Record of Decision (ROD) for the LRSB unit will be performed as long as the waste remains a threat to human health or the environment.

The waste site inspectors are to be trained and certified in Hazardous Waste Operations (HAZWOPER), RCRA well inspectors (SGCP-specific training), SGCP RCRA waste unit inspectors, radiological workers, etc., as applicable for the specific inspection. They will also be trained based on the individual requirements of the regulatory approved closure documents for each waste unit. In addition, the inspectors are to attend yearly refresher courses. Over the years no single person will conduct all of the inspections or grass cutting operations.

This unit-specific LUCIP, including the checklist, will be appended to the SRS LUCAP.

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Appendix A

Attachment A

SK-C-53110, Rev. 1, L-Area Reactor Seepage Basin (904-64G) Closure (U) Land Use Control Implementation Plan As-Built

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010742

PCR# WSRC-RP-2003-4118

L - AREA REACTOR SEEPAGE BASIN (904-64G) CLOSURE (U) AS-BUILT LAND USE CONTROL IMPLEMENTATION PLAN

DRAWING NO. SK-C-53110 , REV. 1

90

333444444444455555555556666
78901234567890123456789012 3

PSC=
PLOT DATE

DRAWN BY (ORIG):
TIME

LAST CADD REV. BY:
DATE:

Scale shown on this drawing is only applicable when plotted at 30"x42" (actual drawing size)

Appendix A

Attachment B

SGCP Inspection Checklist For L-Area Reactor Seepage Basin

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	232.14
	232.32
	232.83
	233.01
	233.82

PCR# WSRC-RP-2003-4118

L - AREA REACTOR SEEPAGE BASIN

(904-64G) CLOSURE (U)

AS-BUILT

SAMPLE LOCATIONS

DRAWING NO. SK-C-53111 , REV. 1

60 90

333344444444445555555556666
678901234567890123456789012 3

PSC=
PLOT DATE

DRAWN BY (ORIG): T.HICKMAN
TIME

LAST CADD REV. BY:
DATE:

Scale shown on this drawing is only applicable when plotted at 30"x42" (actual drawing size)

N 45300

FENCE

N 45200

40 60

LEGEND

- AREA SUBJECT TO LAND USE CONTROLS
- EXISTING MINOR CONTOUR
- EXISTING MAJOR CONTOUR
- ABANDONED PIPELINE
- BASIN PERIMETER FENCE
- ACCESS WARNING SIGN
- ABANDONED PIPELINE WARNING SIGN
- BOUNDARY MARKER

PCR # WSRC-RP-2003-4118

L - AREA REACTOR SEEPAGE BASIN (904-64G) CLOSURE (U)

AS-BUILT GRADING PLAN

DRAWING NO. SK-C-53112 , REV. 1

333444444444455555555556666
'8901234567890123456789012 3

PSC=
PLOT DATE

DRAWN BY (ORIG): T.HICKMAN
TIME

LAST CADD REV. BY:
DATE:

Scale shown on this drawing is only applicable when plotted at 30"x42" (actual drawing size)

010742

PCR # WSRC-RP-2003-4118

L - AREA REACTOR SEEPAGE BASIN (904-64G) CLOSURE (U)

SECTIONS

DRAWING NO. SK-C-53113 , REV. 1

333444444444455555555556666
7890123456789012345678901 23
PSC=
PLOT DATE
DRAWN BY (ORIG): T.HICKMAN
TIME
LAST CADD REV. BY:
DATE:
Scale shown on this drawing is only applicable when plotted at 30"x42" (actual drawing size)

FIELD INSPECTION CHECKLIST

L-AREA REACTOR SEEPAGE BASIN

❑ SCHEDULED ❑ UNSCHEDULED

A= Satisfactory X= Unsatisfactory (Explanation Required)	A or X	Observations/Corrective Action Taken
1. Verify that the roads are accessible.		
2. Verify that the waste unit signs are in acceptable condition, have the correct information, and are legible from a distance of 25 ft.		
3. Verify that there are no excavation, digging, or construction activities on the soil cover or the underground process piping (identified by signs).		
4. Check the integrity of vegetative covers and drainage ditches for presence of excessive erosion, sediment buildup, and any debris restricting flow.		
5. Verify that no woody vegetation is growing on the soil cover. Remove or identify, as needed.		
6. Visually check vegetative cover for grass density, with no bare spots more that 3 ft by 3 ft in area. The height of the vegetative cover should not impair the visual inspection of the soil cover. This will be determined by the inspector.		
7. Check the soil cover for signs of erosion or depressions (subsidence).		
8. Check for signs of burrowing animals (holes).		
9. Verify that the fence is in good condition and that the gate is locked.		

Inspected by:

_____ / _____ Date:_____

(Print Name) (Signature)

Post-Closure Manager:

_____ / _____ Date:_____

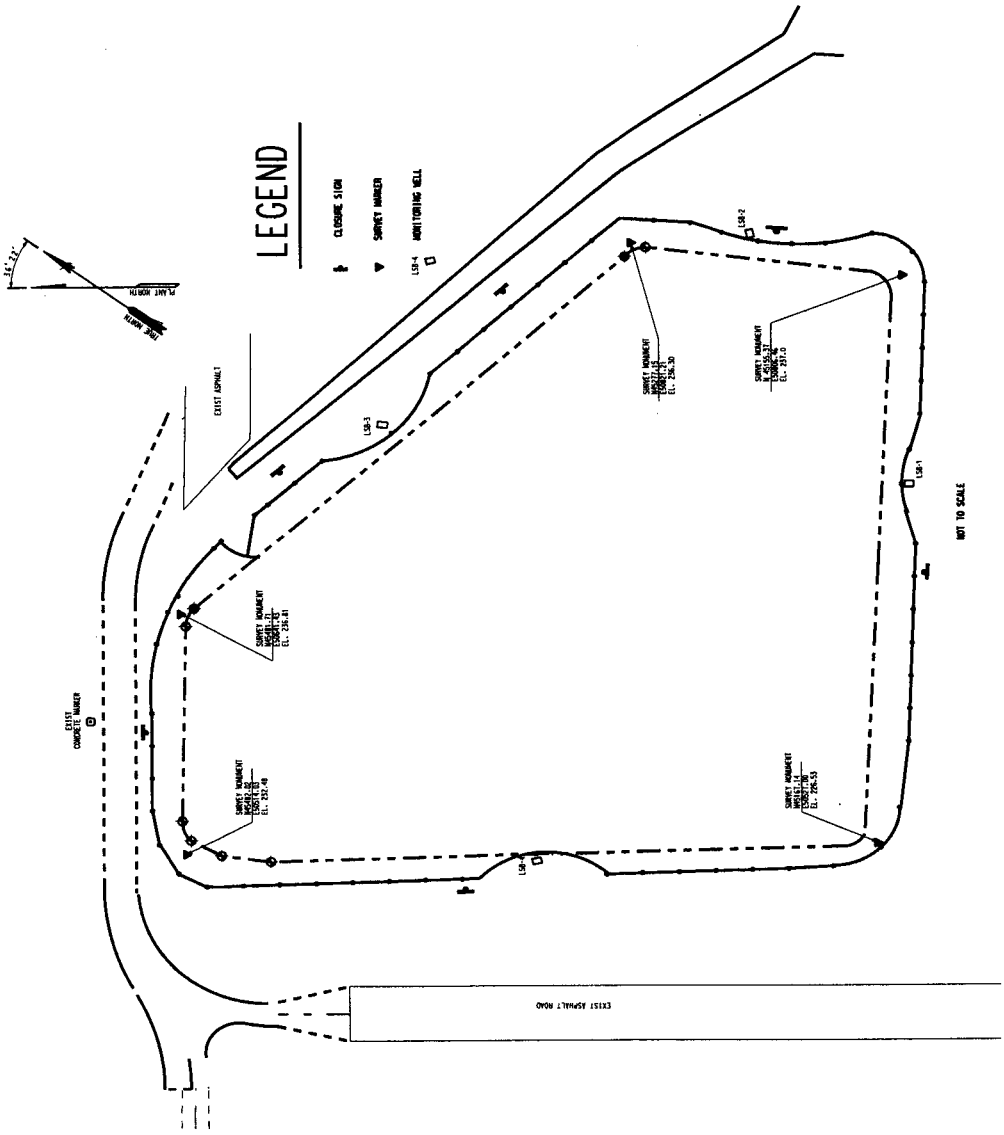
(Print Name) (Signature)

CAUTION:

The Inspector shall notify the Post Closure Manager (PCM) and the Environmental Compliance Authority (ECA) IMMEDIATELY if there has been a breach or compromise of this waste unit. Refer to Post Closure Procedures.

NOTE: Monitoring wells associated with this waste unit are maintained in accordance with SGCP Monitoring Well Procedures. See attached map of the LRSB OU.

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Map L-Area Reactor Seepage Basin (904 – 64G)

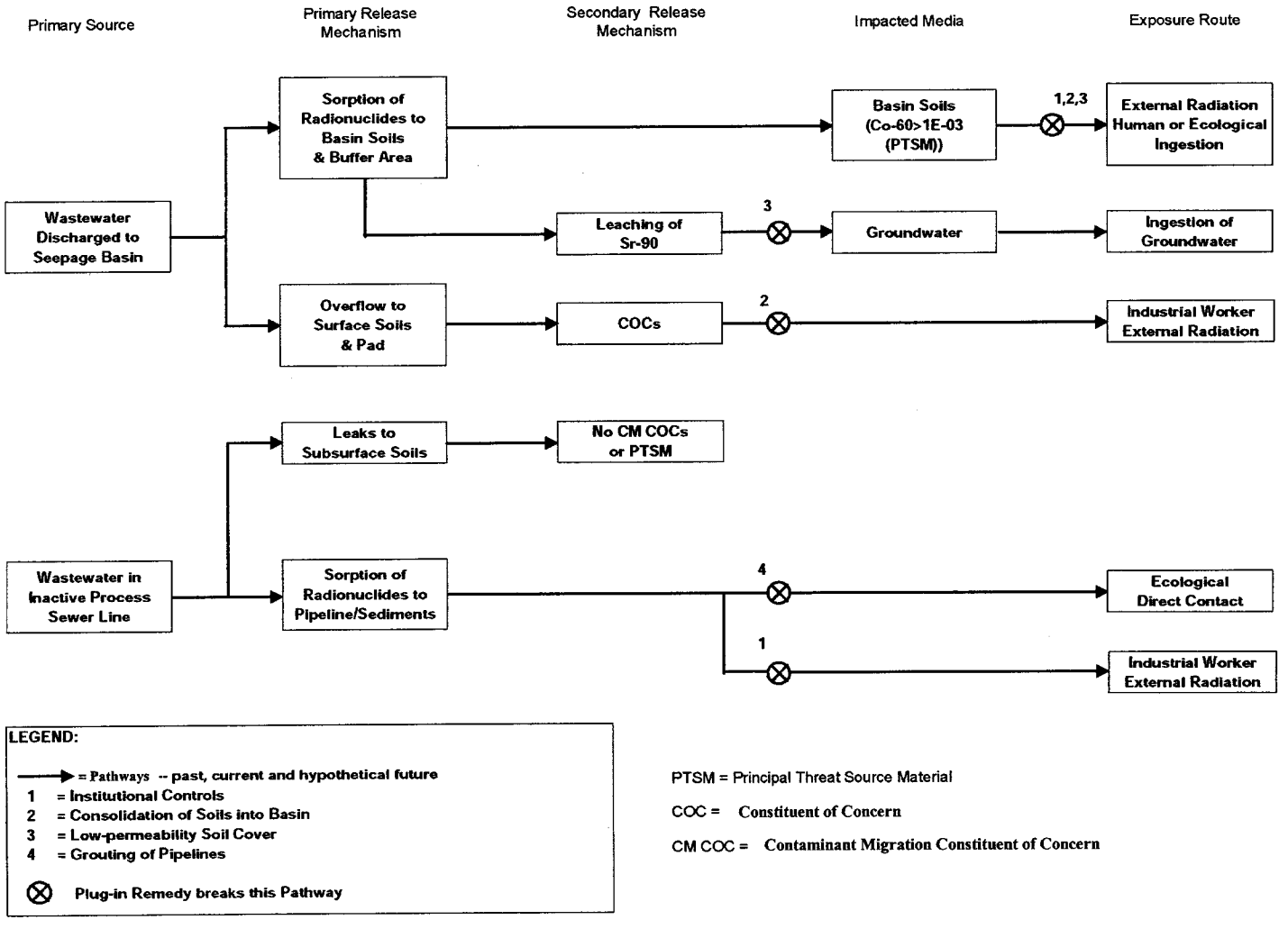
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Appendix A

Attachment C

Post-Remedial Action Conceptual Site Model For L-Area Reactor Seepage Basin With Plug-In Remedy Applied

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Post-Remedial Action Conceptual Site Model For L-Area Reactor Seepage Basin With Plug-In Rod

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The L-Area Rubble Pile (131-3L) Groundwater Plume OU was designated as a No Action OU in FY2018 and was removed from the LUCAP.

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LUCIP for the
Miscellaneous Chemical Basin/Metals Burning Pit, 731-4A and 731-5A
Appendix A of *Interim Post-Construction Report for the Miscellaneous Chemical Basin/Metals Burning Pit, 731-4A and 731-5A*
(WSRC-RP-2002-4038, Revision 1.1, December 2002)

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Appendix A

Unit-Specific Land Use Control Implementation Plan

for the Miscellaneous Chemical Basin/Metals Burning Pit (731-4A/5A)

UNIT-SPECIFIC LAND USE CONTROL IMPLEMENTATION PLAN FOR THE MISCELLANEOUS CHEMICAL BASIN/METALS BURNING PIT

The Miscellaneous Chemical Basin/Metals Burning Pit (MCB/MBP) Land Use Control Implementation Plan (LUCIP) will be appended to the Savannah River Site (SRS) Land Use Control Assurance Plan (LUCAP). SRS is responsible for implementing the land use controls (LUCs) (e.g., inspections, maintenance, etc.) outlined in this unit-specific LUCIP.

1.0 REMEDY SELECTION

The MCB received liquid chemical wastes and is located in an old borrow pit. It was approximately 6 m (20 ft) wide by 6 m (20 ft) long and approximately 0.3 m (1 ft) deep, although exact basin boundaries have not been determined. No construction records exist for the borrow pit. No records of specific materials disposed were kept although its presumed use was for the disposal of waste solvent and used oil.

The MBP is irregular in shape with approximate dimensions of 122 by 122 m (400 by 400 ft). Waste materials were piled 0.9 to 2.7 m (3 to 6 ft) high within the MBP. A review of file material does not indicate the existence of an excavation as the word "pit" implies. The MBP is actually a cleared area that was used for burning lithium-aluminum alloys, scrap, and cuttings from A&M Area operations. Unit photographs show what is thought to be typical disposal of metal shavings, pieces of aluminum, plastic pipe, metal drums, and other miscellaneous scrap. Wastes were primarily contained in two discrete areas, one large pile and a series of small piles oriented in a semi-circular arc. The pit was reportedly placed in service in 1960 and taken out of service in 1974. At that time, the waste piles were regraded and the area was allowed to revegetate. Weeds, grasses, and pine trees currently grow at the unit. The western half of the unit has a slope of approximately 6 percent, and the eastern half of the unit has a slope of approximately 2.5 percent.

The Interim Action Proposed Plan (IAPP) was submitted in accordance with the Federal Facility Agreement (FFA) and the approved implementation schedule and was approved by the United States Environmental Protection Agency (USEPA) on January 14, 1999, and the South Carolina Department of Health and Environmental Control (SCDHEC) on January 18, 1999. The IROD documented the selected remedial action and was approved by USEPA on January 6, 2000, and SCDHEC on November 18, 1999.

In summary, the MBP surface and subsurface soils contaminated with aluminum and the MCB surface soils contaminated with polychlorinated biphenyls (PCBs) will be excavated and disposed of in an appropriate Offsite Rule compliant facility. Soil vapor extraction (SVE) will be performed in the MCB vadose zone, while the groundwater at that unit will be treated by in situ air stripping. The combination of alternatives for soil removal, vadose zone remediation via active/passive SVE, groundwater remediation, and institutional controls is intended to be an interim action for the MCB/MBP operable unit (OU) as a whole to reduce risk to human health and the environment. However, the selected alternatives for the soils and vadose zone represent final actions because they will meet the final remedial action objectives (RAOs) and final remedial goals (RGs) established in the IROD. An interim action for this OU was chosen because of the uncertainty of the groundwater remediation within the overall unit remediation strategy. The uncertainty in the groundwater remediation strategy is based on two volatile organic compounds (VOCs) groundwater plumes located upgradient from the MCB/MBP. The groundwater plumes are associated with the M-Area Hazardous Waste Management Facility (a facility closed under RCRA and undergoing corrective action for the contaminated groundwater associated with that unit) and the A-Area Burning/Rubble Pits and Rubble Pit (ABRP) (a Resource Conservation and Recovery Act (RCRA)/ Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) unit). Since these plumes are moving in the general direction of the MCB/MBP, it is not clear whether these plumes may represent a future VOC source relative to the MCB/MBP groundwater. An interim action at the MCB/MBP OU will allow an early start for remedial activities and will generate additional data on the nature and extent of the

groundwater interactions between the MCB/MBP, the ABRP, and A&M Area. These data will allow development of the final groundwater RGs. The rationale for the proposed groundwater interim action is centered on 1) controlling the source of groundwater contamination, i.e. vadose zone contamination; and 2) remediating the "hot spot" portions of the groundwater plume.

The MCB/MBP OU is in an area that has been recommended for multiple land uses, with the specific exclusion of residential land use. Although the remediation decisions for this unit were based on the industrial use scenario, the groundwater remedy is anticipated to achieve the more protective residential use scenario based on modeling results. The MBP will meet unrestricted land use criteria for soils, sediment, and surface water following the excavation detailed in the Interim Corrective Measures Implementation/Remedial Action Implementation Plan (ICMI/RAIP). The MCB will not meet unrestricted land use criteria for soils. Groundwater beneath both units exceeds the maximum contaminant levels (MCLs). Although institutional controls are included in all of the alternatives, the United States Department of Energy (USDOE) has recommended that residential use of SRS land in the vicinity of MCB/MBP be controlled; therefore, prohibition of future residential use and potential residential water usage and other controls will be taken to ensure long-term protectiveness in this area.

A post-construction conceptual site model (CSM) for the MCB, which illustrates the broken pathways after implementation of the remedy, is included as Figure A-1. A post-construction CSM for the MBP is included as Figure A-2.

2.0 LAND USE CONTROLS

Institutional controls are intended to be an alternative that maintains control of the area and that is protective of human health and the environment. Implementation of this alternative will require some near-term actions.

For the MCB, the following LUC objectives are necessary to ensure protectiveness of the preferred alternative:

- Prevent direct contact with PCB- and octachlorodibenzo-p-dioxin (OCDD)-contaminated surface/subsurface soils such that the constituents of concern (COCs) are not a continued significant risk to human health. Contaminated soils remain at the MCB to an estimated depth of 4 ft.

- Prevent direct contact with the vadose zone and groundwater during the groundwater interim remedial action.

For the MBP, the following LUC objective is necessary to ensure protectiveness of the preferred alternative:

- Prevent direct contact with the vadose zone and groundwater during the groundwater interim remedial action. Note that no contaminated soils remain at the MBP that are a continued significant risk to human health or the environment.

The following institutional controls are required to prevent unauthorized exposure to the contaminated media at the MCB/MBP:

- Controlled access to the MCB/MBP through existing SRS security gates and perimeter fences and the site use/site clearance programs.

- Signs posted in the area to indicate that waste remains in the vicinity of the MCB above levels allowing for unrestricted land use and to contact the waste unit custodian prior to entry.

- Notification of residual hazardous waste to any future landowner through deed notification, as required under CERCLA Section 120(h).

Figure A-3 shows the location of the MCB/MBP OU and the SRS coordinates of the MCB/MBP OU.

In the long term, if the MCB/MBP OU is transferred to non-federal ownership, the need for deed restriction will be evaluated and performed through an amended ROD with USEPA and SCDHEC approval and actions taken pursuant to CERCLA 120(h). The actions will include a deed notification disclosing former waste management and disposal activities, as well as any remedial actions taken at the waste unit. The deed notification will, in perpetuity, notify any potential purchaser that the property has been used for the management and disposal of waste and other materials, including hazardous substances. At this time, RCRA deed notification requirements are not required for this waste unit since this is an interim action. The deed, if necessary, would include restrictions precluding residential use of the property. The need for deed restrictions may be re-evaluated at the time of transfer in the event exposure assumptions differ and/or contamination no longer poses an unacceptable risk under residential use. Proposed changes in deed restrictions will require USEPA and SCDHEC review and approval. The survey plat will be reviewed and updated, as necessary, at the time the site is transferred and will be recorded with the Aiken County recording agency. This proposal is consistent with USEPA guidance and is an effective use of risk management principles.

The elements of the institutional control corrective action, which consists of land restrictions without any engineering controls, are composed of deed notifications when the parcel is transferred from USDOE ownership, access controls that include posting of identification signs, and field walkdowns for general site conditions. These land use controls will be implemented in perpetuity for this OU.

Each element of the institutional controls corrective action is discussed below.

2.1 Deed Notification

A deed notification shall be filed in the appropriate county records in accordance with CERCLA 120(h), which requires the government to create a deed when land on which any hazardous substance was stored, released, or disposed of is transferred to non-federal ownership. The transference of the MCB/MBP OU is unlikely. In the event the property is transferred, a deed notification will be filed with Aiken County. Per CERCLA 120(h)(3)(A), the deed shall contain, to the extent practical, such information as is available based on the complete search of agency files, including the following:

- A notice of the type and quantity of such hazardous substances;
- Notice of the time at which such storage, release, or disposal took place; and
- A description of the remedial action taken, if any.

Per CERCLA 120(h)(3)(B), the deed shall also contain a covenant warranting that

- All remedial action necessary to protect human health and the environment with respect to any such substance remaining on the property has been taken before the date of such transfer;
- Any additional remedial action found to be necessary after the date of such transfer shall be conducted by the United States Government; and

- A clause granting the United States Government access to the property in any case in which remedial action or corrective action is found to be necessary after the date of such transfer.

At this time, RCRA permit requirements are not applicable for this waste unit since this is an interim action.

2.2 Access Controls

2.2.1 On-Site Workers

In accordance with WSRC 1D, *Site Infrastructure and Services Manual*, Procedure 3.02, *Site Real Property Configuration Control*, use of all lands and waters on the SRS shall be coordinated via the Site Use Program. No use of land (i.e., excavation or any other land use) shall be undertaken without prior approval documented by a Site Use Permit. Also, in accordance with Procedure 3.02, all work at SRS that adds to or modifies features or facilities portrayed on the SRS development maps (i.e. plot plans of facilities/utilities at SRS) is authorized by a Site Clearance Permit before any excavation activities. All Site Clearance requests are reviewed to verify that either an approved Site Use Permit has been obtained or that an existing Site Use Permit has sanctioned the request. Verification of USDOE approval for intended land use must be obtained before issuance of a Site Clearance Permit. The Site Use and Site Clearance processes are applicable to all activities and personnel on site (including subcontractors). The processes are controlled within the SRS Quality Assurance Program.

The SRS identifies all buildings and facilities on maps used in the Site Use/Site Clearance Program and includes a 200-foot buffer zone around each facility. This waste unit is identified on these maps as a CERCLA facility.

Any work proposed in these areas will be strictly controlled and workers will be appropriately trained and briefed about health and safety requirements if work is deemed necessary for maintenance. Any changes in the use or disturbance of the MCB/MBP will be cleared with the USEPA and SCDHEC before disturbance occurs. To prevent unknowing entry and to ensure that unrestricted use of the waste unit does not occur while under ownership of the government, identification signs will be posted. The signs will be legible from a distance of at least 25 feet and are located at the MCB/MBP as shown on the Miscellaneous Chemical Basin and Metals Burning Pit Soil and Groundwater Remediation Soil Removal and Replacement Plan and Detail (U) (C-CT-A-0027, Attachment 2 of this LUCIP).

The signs at the MCB read:

> Miscellaneous Chemical Basin (731-4A)
> "Danger – Unauthorized Personnel Keep Out. This unit contains hazardous substances. Do not dig or excavate. Do not enter without contacting the waste site custodian."
> Custodian: Manager, Post-Closure Maintenance
> Phone: (803) 952-6882

The signs at the MBP read:

> Metals Burning Pit (731-5A)
> "Danger – Unauthorized Personnel Keep Out. This unit contains hazardous substances. Do not dig or excavate. Do not enter without contacting the waste site custodian."
> Custodian: Manager, Post-Closure Maintenance
> Phone: (803) 952-6882

Site-specific controls (i.e., fences) are not required for MCB/MBP OU since the exposure to the casual worker or trespasser does not warrant this level of protection.

2.2.2 Trespassers

Additionally, while under the ownership of the USDOE, access control of the entire SRS will continue to be maintained in accordance with the 1992 RCRA Part B Permit Renewal Application, Volume I, Section F.1. This section describes the 24-hour surveillance system (R.61-79.264.14(b)(1)), artificial or natural barriers (R.61-79.264.14(b)(2)(i)), control entry systems (R.61-79.264.14(b)(2)(ii)), and warning signs (R.61-79.264.14(c)) in place at the SRS boundary to comply with the security requirements for a RCRA-permitted facility.

2.3 Field Walkdowns and Maintenance for Institutional Controls

"Monitoring" will be performed to verify that LUCIP requirements are met. Semi-annual monitoring of the MCB/MBP OU, 731-4A/5A, will be conducted for items such as accuracy and legibility of signs, visible subsidence or erosion of the waste unit, proper vegetative growth, condition of fence, mowing, etc. Subsidence or erosion will be corrected by backfilling the affected area with clean soil and seeding the area to prevent further erosion. The results of any events and/or action that could indicate some potential compromise of institutional controls will be documented in the Federal Facility Agreement Annual Progress Report. All other routine maintenance activities (i.e., mowing, etc.) will be documented and maintained in files that are subject to USEPA and SCDHEC review and audit. A copy of the completed inspection form is maintained in the Environmental Restoration Division administrative record files.

Inspections at the MCB/MBP will be performed to ensure that institutional controls remain protective and consistent with all RAOs. Semi-annual inspections will be conducted. The MCB/MBP (731-4A/5A) Inspection Sheet is included as Attachment 1 of this LUCIP.

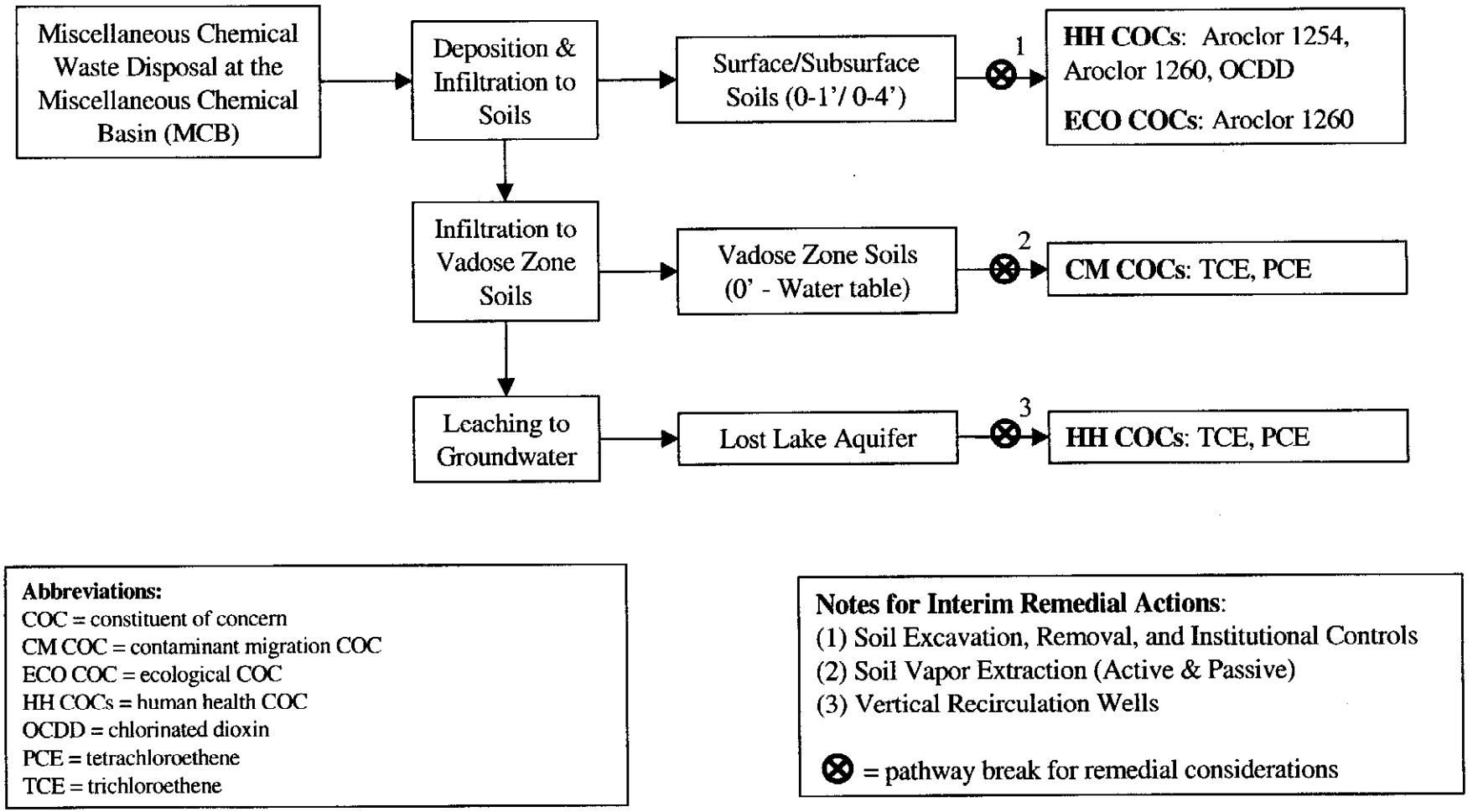
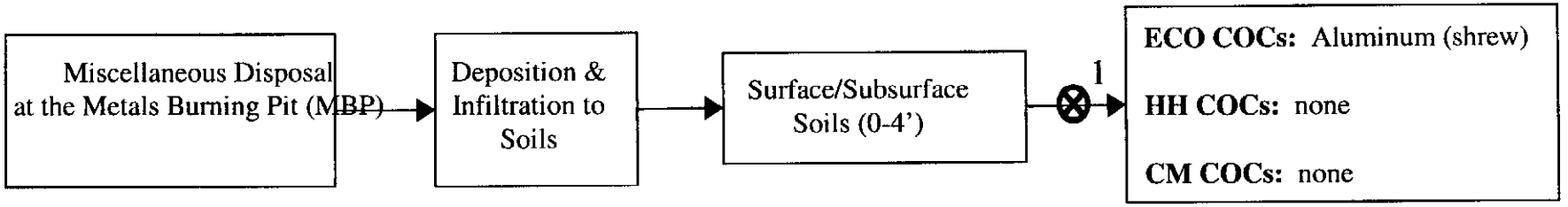


Figure A-1. Conceptual Site Model for MCB

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Abbreviations:
COC = constituent of concern
CM COC = contaminant migration COC
ECO COC = ecological COC
HH COC = human health COC

Notes for Interim Remedial Actions:
(1) Soil Excavation & Offsite Disposal

⊗ = pathway break for remedial considerations

Figure A-2. Conceptual Site Model for MBP

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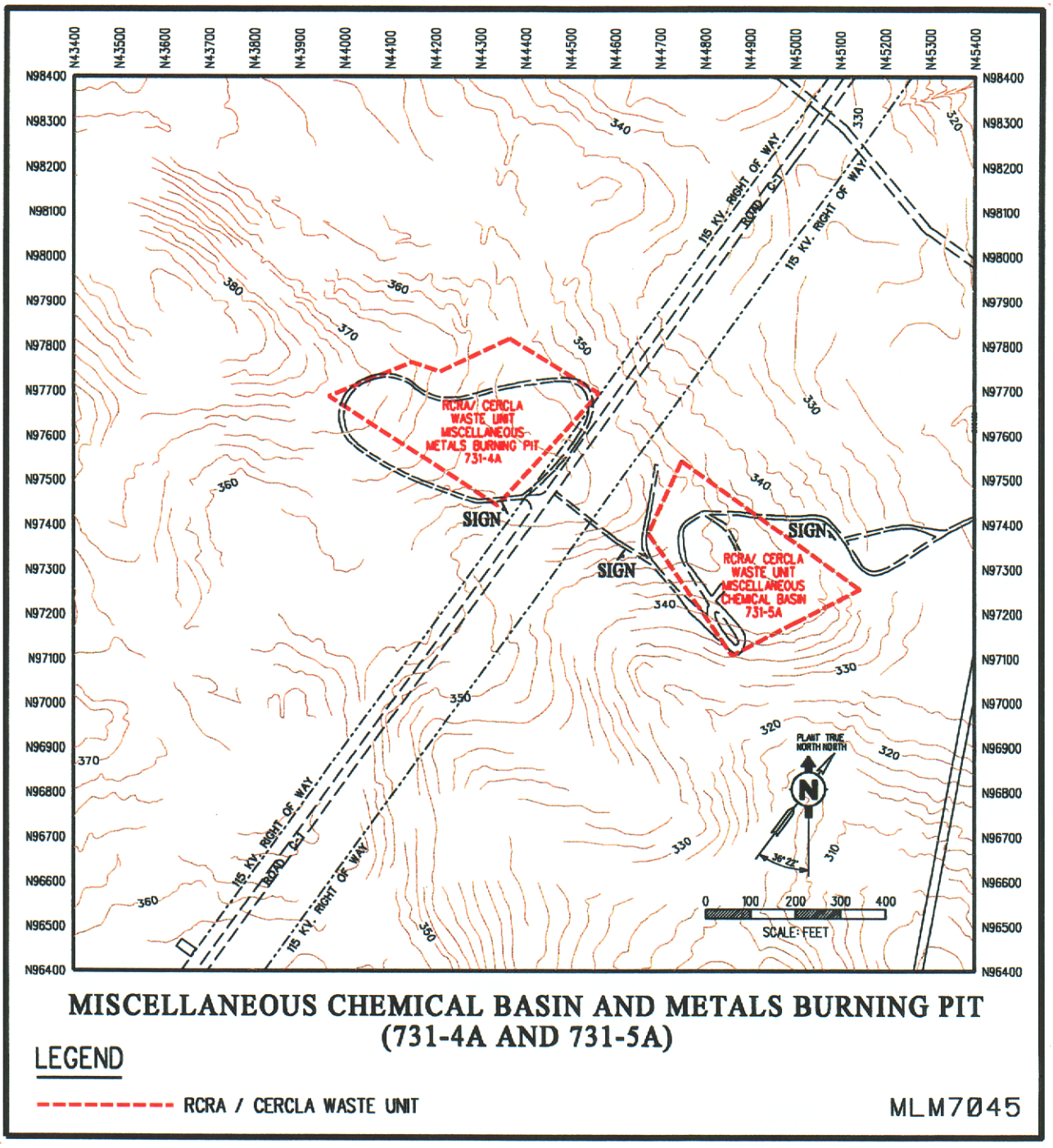


Figure A-3. Miscellaneous Chemical Basin/Metals Burning Pit Operable Unit

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ATTACHMENT 1

MCB/MBP (731-4A/5A) INSPECTION SHEET

A = Satisfactory X = Unsatisfactory (Comments Required)	A or X	Comments or Corrective Action Taken (See Maintenance Register for Corrected Items)
Check for potential encroachments (Ensure that there is no building on the site)		
Does the site have brush or woody vegetation that needs cutting and disposal?		
Does the site need to have the grass cut?		
Verify that the roads are accessible.		
Does the site show signs of erosion or subsidence? Are there any signs of burrowing animals (holes)?		
Does the site have adequate vegetative cover?		
Verify that the signs (three total) are correct and legible.		
Does the site need general cleanup (housekeeping)?		

Inspected By:_____/_____**Date/Time:**_____/_____
(Print Name) **(Signature)**

Accompanied By:_____/_____**Date/Time:**_____/_____
(Print Name) **(Signature)**

Post Closure Manager:_____/_____**Date/Time:**_____/_____
(Print Name) **(Signature)**

Note: USEPA and SCDHEC must be notified within 30 days of identification of any area where any breach or compromise of restrictions placed on this institutional control operable unit has occurred.

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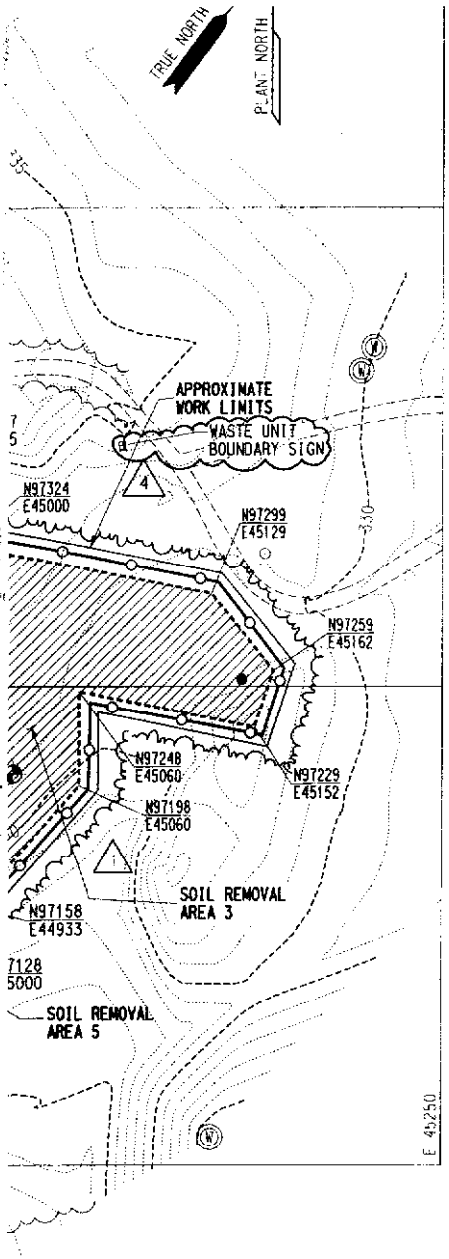
ATTACHMENT 2

MISCELLANEOUS CHEMICAL BASIN/METALS BURNING PIT SOIL AND GROUNDWATER REMEDIATION

SOIL REMOVAL AND REPLACEMENT PLAN AND DETAIL (U)

(DRAWING NUMBER C-CT-A-0027)

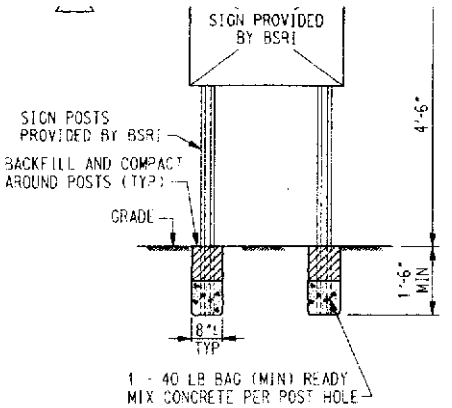
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SOIL REMOVAL AND REPLACEMENT PLAN

0 50 100 150

1" = 50'



DETAIL 1 — NOT TO SCALE

WASTE UNIT BOUNDARY SIGN

DAMAGE TO THESE WELLS SHALL BE REPAIRED OR REPLACED BY THE CONTRACTOR TO THE CRITERIA PROVIDED BY BSRI.

8. HAND EXCAVATION IS REQUIRED AROUND THE GROUNDING CABLE, FIBER OPTIC CABLE AND SCADA CABLES IN SOIL REMOVAL AREA 2.

9. SEE DRAWING NUMBER C-CT-G-0716 FOR THE LOCATION PLAN, GENERAL NOTES, AND ADDITIONAL LEGEND.

10. SEE NOTES ON DRAWING NUMBER C-CT-A-0023 FOR ADDITIONAL EROSION REDUCTION MEASURES REQUIREMENTS.

11. THE LOCATION OF THE SILT FENCING SHOWN ON THIS DRAWING IS APPROXIMATE. THE ACTUAL INSTALLATION SHALL BE PLACED PARALLEL TO THE SITE CONTOURS WHERE POSSIBLE. THE ENDS OF THE SILT FENCE SHALL BE TURNED UPSLOPE APPROXIMATELY 2 FEET IN ELEVATION TO PREVENT RUNOFF FROM FLOWING AROUND THE ENDS OF THE SILT FENCE. WHERE IT IS NOT POSSIBLE TO INSTALL THE SILT FENCE PARALLEL TO THE CONTOUR, IT SHALL BE INSTALLED IN A SERIES OF "J" SHAPES DOWN THE SLOPE, WITH THE BOTTOM LOOPS OF THE "J" TURNING UPSLOPE APPROXIMATELY 2 FEET IN ELEVATION.

12. THE WORK LIMITS SHOWN FOR THE SOIL REMOVAL AREAS ARE 10 FEET BEYOND THE LIMITS OF THE SOIL REMOVAL AREAS. THIS TERM REFERS TO THE LIMIT OF THE AREA AVAILABLE FOR CONSTRUCTION EQUIPMENT ACCESS. ANY ADDITIONAL LAND DISTURBANCE AREA WILL REQUIRE REVISION TO THE SMSRP/PPP.

△3 13. AFTER THE SOIL AND GRAVEL REMOVAL IS COMPLETED IN THE SOIL REMOVAL AREA NUMBER 3, REPLACE THE REMOVED GRAVEL ROAD WITH A NEW 12' WIDE BY 6" DEEP GRAVEL ROAD TO THE LIMITS SHOWN ON DRAWING C-CT-A-0019.

14. INSTALL A WASTE UNIT BOUNDARY SIGN AS PROVIDED BY BSRI AT THE APPROXIMATE CENTER OF EACH SIDE OF THE INDIVIDUAL WASTE UNITS PER DETAIL 1, THIS SHEET..

△2

INFORMATION ONLY

LEGEND

LIMITS OF SOIL REMOVAL AND REPLACEMENT

C CCT A 0027 — LATEST REVISION 4

ENGINEERING DOC. CONTROL-SRS

0057896

N	PREP'D	LEAD ENG	CHK'D	APRV'D	APRV'D	APRV'D
		SIGNATURES ON MICROFILM				
5 PER DCF # C-DCF-A-00094		SIGNATURES ON MICROFILM				
RY SIGN DETAIL		SIGNATURES ON MICROFILM				
REVISED SOIL REMOVAL AREAS						
		SIGNATURES ON MICROFILM				
BCD/ER)						

THIS DRAWING HAS BEEN FURNISHED BY THE SAVANNAH RIVER SITE. THE INFORMATION AND KNOW HOW THEREON MAY NOT BE USED NOR THE DRAWING REPRODUCED WITHOUT WRITTEN PERMISSION OF THE PRIME CONTRACTOR. ALL REPRODUCTIONS IN WHOLE OR IN PART, INCLUDING VENDOR'S SHOP DRAWINGS, SHALL BEAR OR REFER TO THIS STAMP.

REFERENCE DRAWINGS

C-CT-A-0019	ENLARGED SITE PLAN
C-CT-A-0023	SEDIMENT/EC NOTES AND DETAILS
C-CT-G-0716	LOCATION, DOC INDEX, GEN NOTES
C-CT-G-0717	SITE UTILITIES PLAN SHT 1

REFERENCE STANDARDS

SCALE

LEVELS 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 | PSC= | DRAWN BY (ORIG): M. FINLEY | PLOT DATE 03/12/07 TIME

UNITED STATES DEPARTMENT OF ENERGY

SAVANNAH RIVER SITE

BLDG. NO.	SITE CLEARANCE NO.	DESIGN AREA NO.	DESIGN GROUP
N/A	SC 4554.1	N/A	PE&CD/ER

TITLE

MISCELLANEOUS CHEMICAL BASIN AND METALS BURNING PIT SOIL AND GROUNDWATER REMEDIATION

SOIL REMOVAL AND REPLACEMENT PLAN AND DETAIL (U)

Soil Removal and Placement Plan and Detail (U) (C-CT-A-0027)

LUCIP for the
Old F-Area Seepage Basin, 904-49G
Appendix A of *Post-Construction Report for the Old F-Area Seepage Basin, 904-49G*
(WSRC-RP-2000-4100, Revision 1, August 2001)

On February 6, 2014, the DOE submitted a letter (ACP-14-125, ARF #019315) to the EPA and SCDHEC to perform the inspections for this operable unit on an annual basis. The EPA and SCDHEC approved the request in letters dated March 20, 2014 (ARF #019385) and March 7, 2014 (ARF #019360), respectively.

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APPENDIX A

Unit-Specific LUCIP for Old F-Area Seepage Basin (Bldg. 904-40G) (U)

LAND USE CONTROL IMPLEMENTATION PLAN (LUCIP)

The Old F-Area Seepage Basin (OFASB) (Bldg. 904-49G) LUCIP will be appended to the Savannah River Site (SRS) Land Use Control Assurance Plan (LUCAP), which has been approved by the United States Department of Energy (USDOE), United States Environmental Protection Agency (USEPA), and South Carolina Department of Health and Environmental Control (SCDHEC).

1.0 REMEDY SELECTION

The OFASB is a Resource Conservation Recovery Act (RCRA)/Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) unit located within the SRS, approximately 600 feet north of F Area and 1 mile east of Road C. The Upper Three Runs Creek is located to the north of the basin. The water table is approximately 75 feet below ground surface in the area of the OFASB. Surface drainage is to the north toward Upper Three Runs Creek, which is 155 feet below the basin elevation.

The OFASB covers a total of 1.3 acres and is approximately 200 by 300 feet in dimension. An earthen berm in the interior divides the basin into two compartments. This unit also includes one effluent ditch line, which is located to the northwest corner of the basin leading toward Upper Three Runs Creek, and one process sewer line, which fed the basin at the southwest corner. The sewer line has an average depth of 9 to 10 feet below the land surface and is approximately 800 feet in length.

Between 1954 and mid-May 1955, approximately 9 to 14 million gallons of wastewater was discharged to the basin. The basin served as an unlined seepage basin for the purpose of reducing radioactive substance concentrations. Since 1955, the OFASB has received occasional discharges of cooling water and rainfall runoff. During a three-month period in 1969, spent nitric acid solution used to etch depleted uranium (from Building 303-M Operations) was discharged to the basin. Wastewater disposal was discontinued after the 1969 discharge.

The operable unit includes a source unit and a groundwater unit. The source unit comprises the basin and associated soil and vegetation, an adjacent ditch line and the sewer line.

The OFASB characterization revealed that surface and subsurface soils within the unit contained the highest concentrations of contaminants as well as contaminants with the highest potential risk. The remedial action selected in the OFASB Record of Decision (ROD) consisted of removal of contaminated vegetation; removal of the top 2 feet of soil from the effluent ditch line and placement into the basin; in situ grouting of the top 2 feet of the basin bottom, and placement of the soils in the basin. The OFASB was then backfilled and compacted. A low permeability engineered soil cover was then constructed over the basin area to eliminate radiation exposure and minimize potential future impacts to the groundwater beneath the OFASB.

Institutional controls will be used as the selected remedy for the waste process sewer line and the surrounding soils. These controls will restrict future use of this land to industrial applications and limit access to the soils. The selected remedy for groundwater is to maintain existing institutional controls and monitor the extent of the groundwater contaminant plume. The RAOs for this remedy are to achieve mixing zone contaminant limits (MZCLs) throughout the groundwater aquifer and not to exceed maximum contaminant levels (MCLs) at the compliance

point as described in the approved groundwater mixing zone application. To implement the groundwater mixing zone demonstration, four compliance boundary wells, three intermediate wells, and the three existing MZCL wells have been utilized.

2.0 LAND USE CONTROL

For the OFASB, the following land use control (LUC) objective is necessary to ensure protectiveness of the remedy:

- Controlled access to the OFASB unit in accordance with the current site use/site clearance programs, including access controls to the sewer line by grouting the manholes and posting signs in the area to indicate that the sewer line and soil beneath the unit has been contaminated with radionuclides.

The elements of the institutional control corrective action, which consists of land restrictions without any engineering controls, are composed of deed notifications when the parcel is transferred from federal ownership (Section 2.1) and access controls comprising posting identification signs (Section 2.2) and field walkdowns and maintenance for general site conditions (Section 2.3). These LUCs will be implemented in perpetuity for this operable unit.

Each element of the institutional controls corrective action is discussed below.

2.1 Deed Notification

A deed notification shall be filed in the appropriate county records in accordance with CERCLA 120(h), which requires the government to create a deed when land on which any hazardous substance was stored, released, or disposed of is transferred to non-federal ownership. In the event the property is transferred, a deed notification will be filed with Aiken County. Per CERCLA 120(h)(3)(A),

the deed shall contain, to the extent practical, such information as is available based on the complete search of agency files, including the following:

- A notice of the type and quantity of such hazardous substances
- Notice of the time at which such storage, release, or disposal took place
- A description of the remedial action taken, if any

Per CERCLA 120(h)(3)(B), the deed shall also contain a covenant warranting that

- All remedial action necessary to protect human health and the environment with respect to any such substance remaining on the property has been taken before the date of such transfer.
- Any additional remedial action found to be necessary after the date of such transfer would be conducted by the United States Government.

2.2 Access Controls

2.2.1 On-Site Workers

In accordance with WSRC ID, *Site Infrastructure and Services Manual,* Procedure 3.02, "Site Real Property Configuration Control," use of all lands and waters at SRS shall be coordinated via the Site Use Program. No use of land (i.e., excavation or any other land use) shall be undertaken without prior approval documented by a Site Use Permit. Also, in accordance with Procedure 3.02, all work at SRS that adds to or modifies features or facilities portrayed on SRS development maps (i.e., plot plans of facilities/utilities at SRS) will be authorized by a Site Clearance Permit before excavation activities take place. All Site Clearance Requests are reviewed to verify that either an approved Site Use Permit has been obtained or that an existing Site Use Permit has sanctioned the request.

Verification of US DOE approval for intended land use must be obtained before a Site Clearance Permit is issued. The site use and site clearance processes are applicable to all activities and personnel on site (including subcontractors). The processes are controlled within the SRS Quality Assurance Program.

SRS identifies all buildings and facilities on maps used in the Site Use/Site Clearance Program and requires a 200-foot buffer zone around each facility. This waste unit is identified on these maps as a CERCLA facility.

All work in these areas will be strictly controlled, and workers will be appropriately trained and briefed about health and safety requirements if work is deemed necessary for maintenance. Any changes in the use or disturbance of the OFASB will be cleared with the USEPA and SCDHEC before disturbance occurs. To prevent unknowing entry and to ensure that unrestricted use of the waste unit does not occur while under ownership of the government, identification signs have been posted at the unit. The signs are legible from a distance of 25 feet and located approximately every 100 feet along the process sewer line and at each manhole and each side of the basin in the area as shown in Figure 7, sheet 1 and 2. The signs read as follows:

Old F-Area Seepage Basin

"DANGER"
UNAUTHORIZED PERSONNEL KEEP OUT.
THIS UNIT WAS USED TO MANAGE HAZARDOUS SUBSTANCES. DO NOT DIG OR EXCAVATE. DO NOT ENTER WITHOUT CONTACTING THE WASTE SITE CUSTODIAN.
CUSTODIAN: MANAGER, POST-CLOSURE MAINTENANCE
PHONE: (803) 952-6882

Old F-Area Seepage Basin Process Piping

"DANGER"
UNAUTHORIZED PERSONNEL KEEP OUT.
THIS SUBSURFACE PIPING SYSTEM WAS USED TO CONVEY HAZARDOUS SUBSTANCES. DO NOT DIG OR EXCAVATE WITHOUT CONTACTING THE WASTE SITE CUSTODIAN.

CUSTODIAN: MANAGER POST-CLOSURE MAINTENANCE
PHONE: (803) 952-6882

2.2.2 Trespassers

Additionally, while under the ownership of USDOE, access control of the entire SRS will continue to be maintained in accordance with the 1992 RCRA Part B Permit Renewal Application, Volume I, Section F.1. To comply with the security requirements for a RCRA-permitted facility, this section describes the 24-hour surveillance system (R.61-79.264.14(b)(1)), artificial or natural barriers (R.61-79.264.14(b)(2)(i)), control entry systems (R.61-79.264.14(b)(2)(ii)), and warning signs (R.61-79.264.14(c)) in place at the SRS boundary.

2.3 Field Walkdowns and Maintenance for Institutional Controls

Monitoring will be performed to verify that LUCIP requirements have been met. Semi-annual monitoring of the OFASB OU, 904-49G, will be conducted for accuracy and legibility of signs, visible subsidence or erosion of the waste unit, proper vegetative growth, burrowing animals, proper access to the facility, mowing, etc. Subsidence or erosion will be corrected by backfilling the affected area with clean soil and seeding the area to prevent further erosion. USEPA and SCDHEC will be notified of the results of any inspection, event, and/or action that indicates a potential compromise of institutional controls within 30 days of identification. The notification and the reason for the notification will be documented in the Federal Facility Agreement Annual Progress Report. All other routine maintenance activities (i.e., mowing, etc.) will be documented, and the documentation will be maintained in files that are subject to USEPA and SCDHEC review and audit. A copy of the completed inspection form will be maintained in Environmental Restoration Division administrative record files.

Inspections at the OFASB will be performed to ensure that institutional controls remain protective and consistent with all RAOs. Monthly inspections will be performed for the first 2 years and until permanent vegetation is established. After that time, inspections will be performed semi-annually per the inspection checklist.

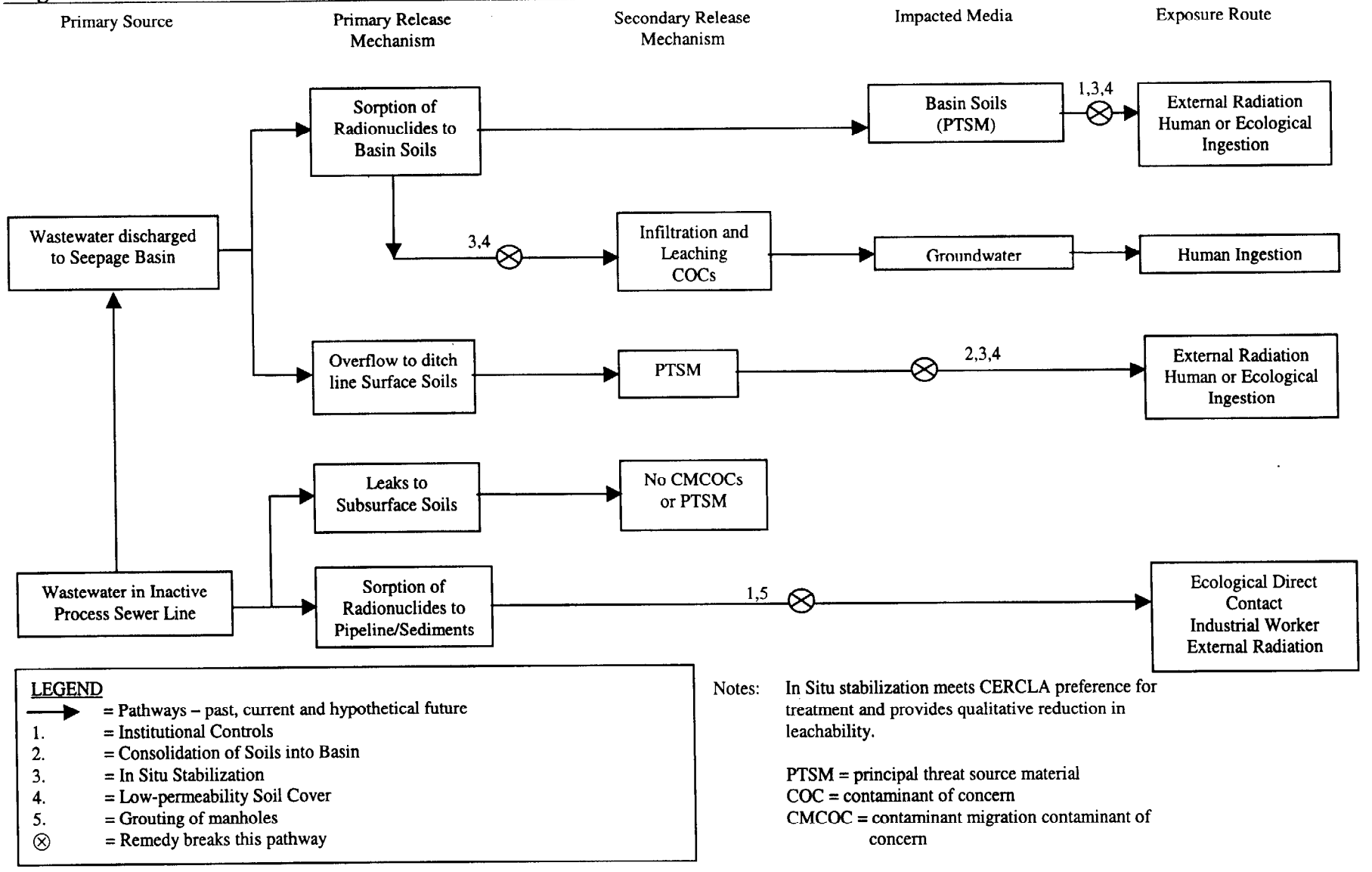


Figure A-1. Conceptual Site Model (CSM) for the Old F-Area Seepage Basin Post Remedial Action

APPENDIX A

ER INSPECTION CHECKLIST FOR OLD F-AREA SEEPAGE BASIN

Waste Site: _____ A = Satisfactory X = Unsatisfactory (Comments required)	A or X	Comments or Corrective Action Taken (See Maintenance Register for Corrected Items)
Check to see if the site needs mowing.		
Verify that the basin and roads are accessible.		
Check for potential encroachments. (Ensure that there is no building on the site.)		
Verify all signs are intact, in good condition, and legible from a distance of at least 25 feet.		
Visually check vegetative cover for grass density. There should be no woody vegetation or shrubs growing on the cover. The height of the vegetative growth should not impair the visual inspection of the site.		
Check the integrity of drainage ditches (if any) for presence of excessive erosion, sediment buildup, and any debris restricting water flow.		
Visually inspect the concrete markers at four corners of the basin to ensure their integrity. The concrete should be visible and free of damage.		
Visually check the basin cover for signs of erosion subsidence and/or depressions.		
Verify that conditions of the roads to the well sites are adequate.		
Inspect the grounds surrounding well sites for vegetation overgrowth, debris, and existence and/or development of erosion features.		

APPENDIX A

ER INSPECTION CHECKLIST FOR OLD F-AREA SEEPAGE BASIN (Cont'd.)

Waste Site: _____ **A = Satisfactory** **X = Unsatisfactory (Comments required)**	**A or X**	**Comments or Corrective Action Taken (See Maintenance Register for Corrected Items)**
Verify that the well posts and protective covers are in place.		
Verify the well is properly identified per R.61-71.6H (South Carolina well standards and regulations).		
Verify the wells' casings are properly locked per R.61-71.11.C.6 (South Carolina well standards and regulations).		
Verify that the previous "Quarterly Monitoring Well Inspection Summary Report" has been sent to ERD Records Interim Storage. This report can be obtained from ERD Waste Treatment.		
Other		
Comments:		

Inspected By:_____/_____Date:_____Time:_____
(Print Name) (Signature)

Reviewed By:_____/_____Date:_____Time:_____
PM or Designee (Print Name) (Signature)

Note: USEPA and SCDHEC must be notified within 30 days of identification of any area where any breach or compromise of restrictions placed on this institutional control operable unit has occurred.

LUCIP for the
P-Area Burning/Rubble Pit, 131-P
Appendix A of *Corrective Measures Implementation/Remedial Action Implementation Plan P-Area Burning/Rubble Pit, 131-P*
(WSRC-RP-2002-4216, Revision 1, August 2003)

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APPENDIX B

LAND USE CONTROL IMPLEMENTATION PLAN

for the

P-AREA BURNING RUBBLE PIT (PBRP)

LAND USE CONTROL IMPLEMENTATION PLAN

for the

P-AREA BURNING RUBBLE PIT (PBRP)

This P-Area Burning Rubble Pit (PBRP) Land Use Control Implementation Plan (LUCIP) will be appended to the Savannah River Site (SRS) Land Use Control Assurance Plan (LUCAP). The United States Department of Energy (USDOE) is responsible for implementing the land use controls (LUCs) (e.g., inspections, maintenance, etc.) outlined in this unit-specific LUCIP.

The selected remedy leaves hazardous substances in place that pose a potential future risk and will require land use restrictions for an indefinite period of time. As negotiated with the United States Environmental Protection Agency (USEPA), and in accordance with USEPA Region IV policy (Johnston 1998), SRS has developed a LUCAP (WSRC 2002c) to ensure that land use restrictions are maintained and periodically verified. This LUCIP provides detailed and specific measures required for the LUCs selected as part of this remedy. USDOE is responsible for implementing, maintaining, monitoring, reporting upon, and enforcing the LUCs herein. Upon final approval, the LUCIP will be appended to the LUCAP and is considered incorporated by reference into the Post-Construction Report/Final Remediation Report (PCR/FRR), establishing LUC implementation and maintenance requirements enforceable under the Comprehensive Environmental Response, Compensation, and Recovery Act (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.

SRS will maintain institutional controls in accordance with the LUCAP (WSRC 2002c). The LUCAP states that the land use for the PBRP OU will be maintained for industrial land use only. Institutional controls will remain in place as long as the risk is greater than 1×10^{-6} and there is a threat to the environment.

1.0 REMEDY SELECTION

1.1 PBRP Operable Unit

The PBRP operable unit (OU) is located in the central portion of SRS, west of the P-Reactor facility. The PBRP is in an open area with sparse vegetative cover. The land surface at PBRP slopes gently to the south. Approximately 45.7 m (150 ft) to the south of the unit is a steep embankment of Steel Creek. The embankment drops 7.6 m (25 ft) in elevation over a lateral distance of 30.5 m (100 ft). The embankment is punctuated by a terrace located 3.0 m (10 ft) above the elevation of Steel Creek. The terrace is 7.6 m (25 ft) wide and contains a seep line. Steel Creek is at the base of the embankment. As outlined in the *Savannah River Site Future Use Project Report* (USDOE 1996b), USDOE has taken steps to prohibit residential use of SRS, including land in the vicinity of the P-Reactor Area, through its plan for current and future use of SRS. Therefore, future residential use of the area is not anticipated.

The RFI/RI/BRA determined that there is no problem (there are no refined constituents of concern [RCOCs]) warranting additional or separate action for the small drainage ditch near PBRP, the seepline located along an embankment of Steel Creek, or the segment of Steel Creek located adjacent to the PBRP OU; therefore, no subunit-specific action(s) were warranted under the ROD for these three areas. The ditch and seepline subunits do not appear to have been contaminated. Although Steel Creek as a whole is contaminated, no subunit-specific action was warranted under the ROD for the portion of this surface water within the PBRP OU. This contamination did not originate from PBRP and

contamination in Steel Creek is being addressed separately under the integrator operable unit program. Action was found to be warranted only for the PBRP and the groundwater.

The USDOE, USEPA, and South Carolina Department of Health and Environmental Control (SCDHEC) agree that industrial land use restrictions are appropriate for the PBRP OU. Industrial land use restrictions will include LUCs to ensure protection against unrestricted (residential) uses. The future land use of the PBRP OU is anticipated to be the same as the current land use (industrial use and control by the federal government).

A Remedial Action Fact Sheet summarizing project background, environment concerns, and environmental actions and plans is included as Appendix A of the PBRP Corrective Measures Implementation/Remedial Action Implementation Plan (CMI/RAIP).

1.2 Nature and Extent of Contamination in PBRP

Soil

The PBRP unit investigation confirmed that miscellaneous inert debris remains buried in the pit. Soil contaminants within the pit include inorganics, semi-volatile organic constituents (SVOCs), volatile organic compounds (VOCs), and polychlorinated biphenyls (PCBs). Soils around the perimeter of the pit are generally uncontaminated. However, there are a few places around the perimeter of the pit where low levels of unit-related contamination are present. "The Human Health RCOCs were limited to polycyclic aromatic hydrocarbons (PAHs) (See note on Table 1 for a specific list of PAHs). No Ecological RCOCs were identified within the PBRP investigation.". There are no RCRA-listed or characteristic wastes at the unit. The volume of contaminated soil is 3,500 cubic yards.

The contaminant fate and transport modeling indicates that nine constituents at PBRP present a contaminant migration (leachability) threat to groundwater. The contaminant migration RCOCs include antimony, chromium, copper, nickel, zinc, dibenzofuran,

tetrachloroethene, trichloroethene, and PCB-1242. These constituents are predicted to exceed MCLs or RBCs within 1,000 years.

"Table 1 lists the final Contaminant Migration and Human Health RCOCs and risks at the OU (WSRC 2002a)." There is no principal threat source material (PTSM) (highly mobile or highly toxic source materials that require a bias toward treatment alternatives) at PBRP. The contamination is largely isolated by backfill with its exposure limited by land use restrictions; the waste is categorized as a low-level threat.

Groundwater

There is no discernable contaminant plume in the groundwater, and detections above maximum contaminant levels (MCLs) are sporadic and limited to the water table aquifer (i.e., shallow unconfined aquifer). The groundwater RCOCs were 1,1-dichloroethene (DCE) and trichloroethene (TCE). DCE was detected above its MCL of 7 micrograms per liter (μg/L) in well PRP-6 in one of four sampling events (9.29 μg/L in January 2001) and in well PRP-7 in one of four sampling events (7.13 μg/L in November 1999). TCE was detected above its MCL of 5 μg/L in well PRP-7 in one of four sampling events (15.9 μg/L in November 1999). SK-C-53135 shows the locations of wells at PBRP and the analytical results for DCE and TCE. The volume of contaminated groundwater cannot be defined; there is no discernable contaminant plume. "Table 1 reports the risks associated with the groundwater RCOCs (i.e., DCE and TCE) (WSRC 2002a). There is no PTSM in groundwater. There is no free product (non-aqueous phase liquids)."

1.3 Remedial Action Overview

Based upon the characterization data and risk assessments in the RCRA Facility Investigation/Remedial Investigation/Baseline Risk Assessment (RFI/RI/BRA) (WSRC 2001a), the RAOs, and the evaluation of alternatives, the ROD (WSRC 2002a) selected remedy for PBRP is Alternative PBRP2 (Engineered Cover System with BaroBalls™, Natural Biodegradation, and Institutional Controls). The ROD selected remedy for

groundwater is Alternative GW2 (Continued Monitoring and Reporting) (i.e., wells PRP 5, 6 and 7). The conceptual site model (CSM) from the ROD has been revised and is included to illustrate the broken pathways with the OU after implementation of the remedy (Figure 1).

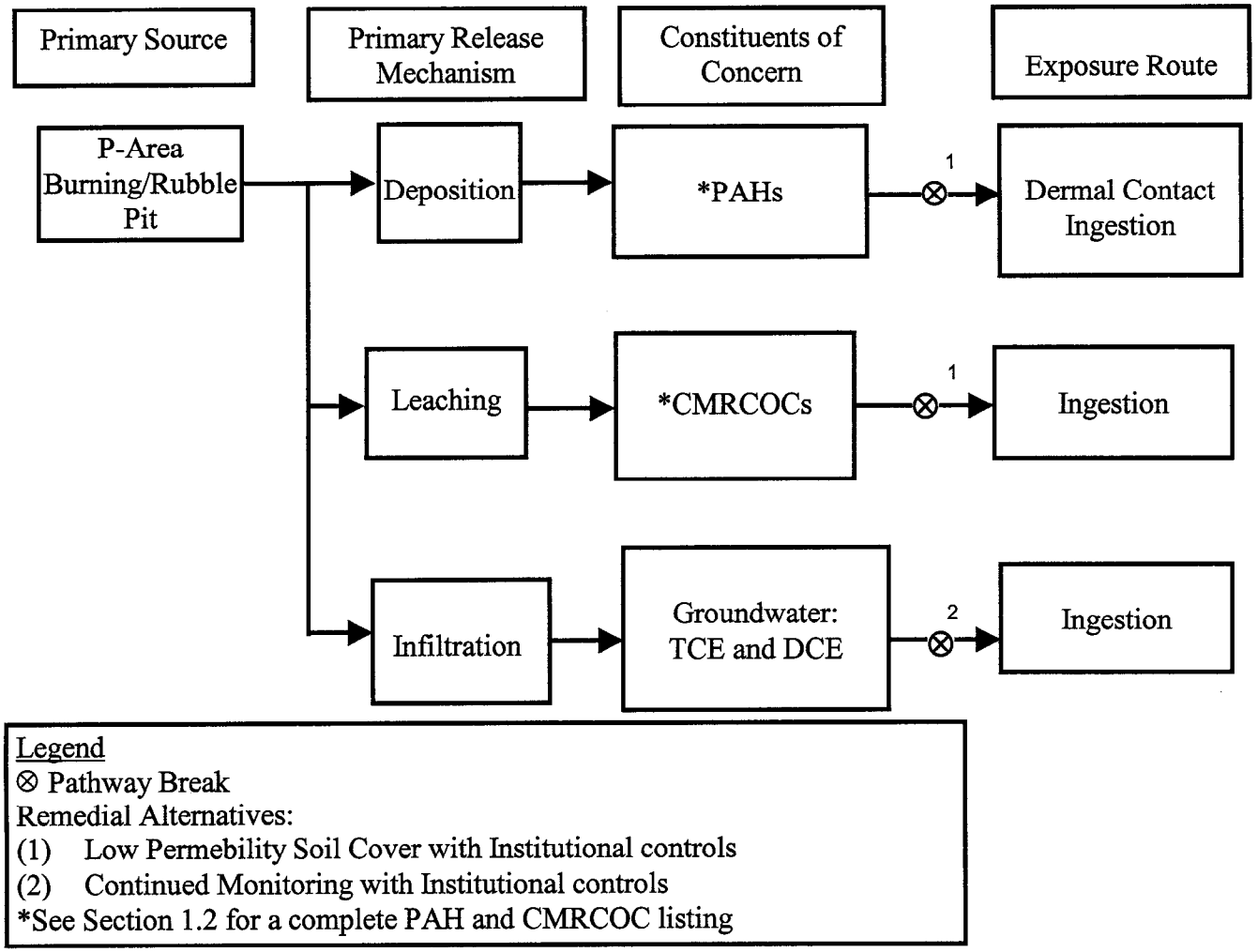


Figure 1. Conceptual Site Model for the PBRP with Remedy Applied

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Table 1. Summary of Risks and Hazards

RCOC	Type of RCOC	Location of Maximum	Depth of Maximum (ft bls)	Summary of Risks
PBRP Soil				
Antimony (Sb)	CM	PBRP-04	6-9	Predicted to exceed MCL in 612 years. Max groundwater concentration (10X MCL) in 800 years
Chromium (Cr)	CM	PBRP-05	6-9	Predicted to exceed MCL in 422 years. Max groundwater concentration (30X MCL) in 830 years
Copper (Cu)	CM	PRBP 05	9-12	Predicted to exceed MCL in 489 years. Max groundwater concentration (5X MCL) in 860 years
Nickel (Ni)	CM	PBRP-01	6-9	Predicted to exceed MCL in 232 years. Max groundwater concentration (3X MCL) in 430 years
Zinc (Zn)	CM	PBRP-01	6-9	Predicted to exceed RBC in 232 years. Max groundwater concentration (4X RBC) in 450 years
Benzo(a)anthracene *	$HH_{ind, res}$	PBRP-01	0-1	Future Industrial Worker Risk = up to 5×10^{-5} Hypothetical Resident Risk = up to 2×10^{-4}
Benzo(a)pyrene *	$HH_{cur, ind, res}$	PBRP-01	0-1	Current Worker Risk = up to 1×10^{-6} Future Industrial Worker Risk = up to 5×10^{-4} Hypothetical Resident Risk = up to 2×10^{-3}
Benzo(b)fluoranthene *	$HH_{ind, res}$	PBRP-01	0-1	Future Industrial Worker Risk = up to 5×10^{-5} Hypothetical Resident Risk = up to 2×10^{-4}
Benzo(k)fluoranthene *	$HH_{ind, res}$	PBRP-01	0-1	Future Industrial Worker Risk = up to 4×10^{-6} Hypothetical Resident Risk = up to 2×10^{-5}
Chrysene *	HH_{res}	PBRP-01	0-1	Hypothetical Resident Risk = up to 2×10^{-6}
Dibenzo(a,h)anthracene *	$HH_{ind, res}$	PBRP-01	0-1	Future Industrial Worker Risk = up to 7×10^{-5} Hypothetical Resident Risk = up to 3×10^{-4}
Dibenzofuran	CM	PBRP-01	0-1	Predicted to exceed RBC in 94 years. Max groundwater concentration (19X RBC) in 170 years
Fluoranthene *	HH_{res}	PBRP-01	0-1	Hypothetical Resident Hazard = up to 0.14
Indeno(1,2,3-c,d)pyrene *	$HH_{ind, res}$	PBRP-01	0-1	Future Industrial Worker Risk = up to 2×10^{-5} Hypothetical Resident Risk = up to 1×10^{-4}
Phenanthrene *	HH_{res}	PBRP-01	0-1	Hypothetical Resident Hazard = up to 0.16
Pyrene *	HH_{res}	PBRP-01	0-1	Hypothetical Resident Hazard = up to 0.16
Tetrachloroethene (PCE)	CM	PBRP-04	15-18	Predicted to exceed MCL in 5 years. Max groundwater concentration (15X MCL) in 6 years
Trichloroethene (TCE)	CM	PBRP-04	15-18	Predicted to exceed MCL in 4 years. Max groundwater concentration (10X MCL) in 4 years
PCB-1242	CM	PBRP-04	12-15	Predicted to exceed MCL in 428 years. Max groundwater concentration (9X MCL) in 500 years
Groundwater				
1,1-Dichloroethene (DCE)	ARAR, $HH_{res, ind}$	PRP-6	N/A	Exceeds MCL by 1.3X
Trichloroethene (TCE)	ARAR, HH_{res}	PRP-7	N/A	Exceeds MCL by 3X

ARAR = applicable or relevant and appropriate requirement (ARAR) RCOC
CM = Contaminant Migration RCOC
HH_{cur} = Human health RCOC for the current on-unit worker
HH_{ind} = Human health RCOC for the future industrial worker
HH_{res} = Human health RCOC for the future on-unit resident
RBC = Risk Based Concentration
MCL = maximum contaminant level
bls = below land surface

Ecological:
No RCOCs.

PTSM: No PTSM.

* Note: All HH RCOCs listed above are hereafter referred to as polycyclic aromatic hydrocarbons (PAHS)

Site maintenance will consist of repair of erosion damage, maintenance of drainage features, maintenance of wells PRP 5, 6 and 7 and maintenance of the soil cover integrity to maintain the effectiveness of the cover at mitigating infiltration and leaching. Site maintenance will also include maintenance of signs around the unit.

2.0 LAND USE CONTROLS

To ensure the protectiveness of the remedy described above, the PBRP OU land-use control objective is to:

- prevent contact, removal, or excavation of buried waste in the OU areas designated in the LUCIP and preclude future residential or agricultural use of the area.

- maintain the use of the site for industrial activities only.

Current access controls and a deed notification needed to maintain the future LUCs are described in the following sections of this LUCIP.

2.1 Access Controls

2.1.1 On-Site Workers

In accordance with WSRC 1D, *Site Infrastructure and Services Manual*, Procedure 3.02, "Site Real Property Configuration Control," use of all lands and waters on SRS shall be coordinated via the Site Use Program. All employees, contractors, and visitors to SRS require adherence to the Site Use Program. This program ensures that all work performed on the SRS that adds, modifies, or removes features portrayed on the SRS development maps is authorized. No use of land (i.e., excavation or any other land use) shall be undertaken without prior approval documented by a Site Use Permit. This authorization is obtained through the completion of a Site Clearance Request Form. Also, in accordance with WSRC 1D, Procedure 3.02, all work at SRS that adds to or modifies

features or facilities portrayed on SRS development maps (i.e., plot plans of facilities/utilities at SRS) will be authorized by a Site Clearance Permit before any excavation activities are conducted. All Site Clearance requests will be reviewed to verify that either an approved Site Use Permit has been obtained or that an existing Site Use Permit has sanctioned the request.

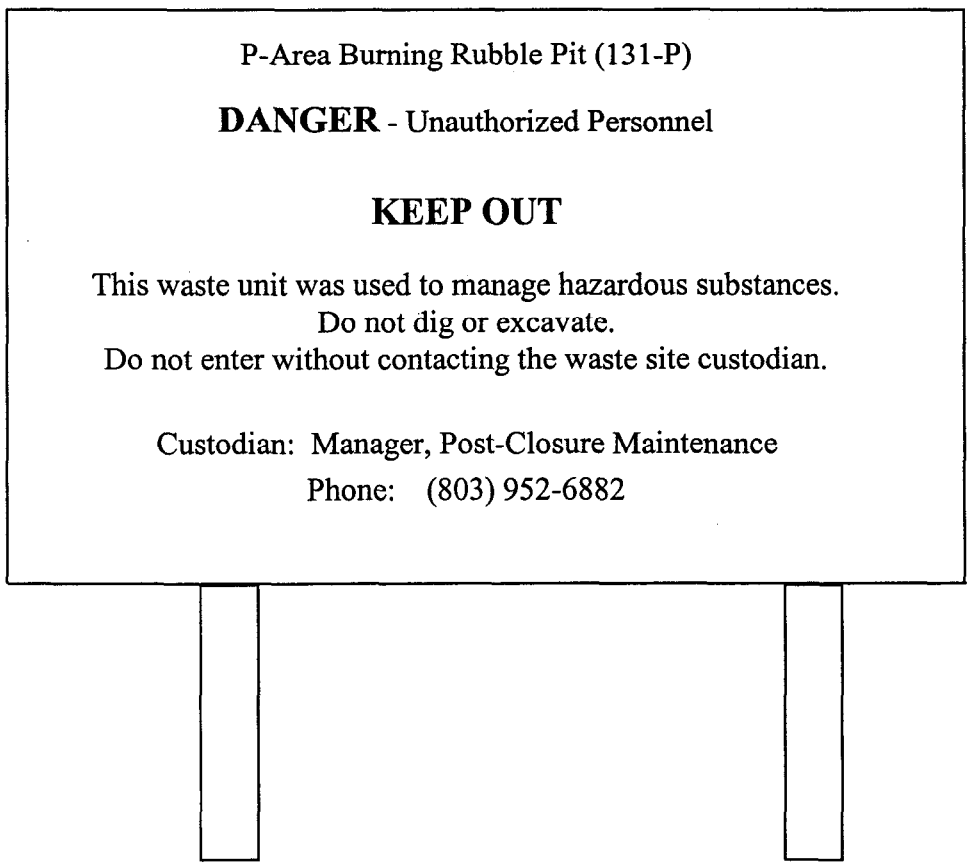
The SRS, specifically the Site Development, Planning, and Mapping Department, is responsible for updating, maintaining, and reviewing site maps, including FFA OU identifications. If a site clearance request is made that may impact an FFA OU, the Site Clearance Request Form is sent to an FFA OU reviewer, who is in the Soil and Groundwater Closure Projects (SGCP), for either approval or disapproval. The roles and responsibilities of each individual are detailed in WSRC 1D, Procedure 3.02. Verification of USDOE approval for intended land use must be obtained before issuance of a Site Clearance Permit. The Site Use and Site Clearance processes are applicable to all activities and personnel on site (including subcontractors).

The processes are controlled within the SRS Quality Assurance (QA) Program. The SRS QA Program is the governing QA Program for all SRS activities, including those in the SGCP. The activities that are performed in the SGCP must comply with SRS QA Program procedures as well as SGCP-specific procedures.

SRS identifies all buildings and facilities on maps used in the Site Use/Site Clearance Program. This waste unit is identified on these maps as a CERCLA facility.

Any work proposed in these areas will be strictly controlled, and workers will be appropriately trained and briefed about health and safety requirements if work is deemed necessary for maintenance. No major change in land use or excavation at the PBRP OU shall be undertaken without USEPA and SCDHEC approval. To prevent unknowing entry and to ensure that unrestricted use of the waste unit does not occur while it is under ownership of the government, access control warning signs will be posted at the unit.

They will be posted at each entrance to the restricted portion of the unit and at other appropriate locations in sufficient numbers to be seen from any approach. Custodial responsibilities for maintenance and inspection of the PBRP OU will be maintained by the Post-Closure Maintenance group within the SGCP. The access control warning signs for the soil cover will be legible from a distance of at least 25 feet. The soil cover signs will read as follows:



2.1.2 Trespassers

While under the ownership of USDOE, access control of the entire SRS will continue to be maintained in accordance with the 1992 Resource Conservation Recovery Act (RCRA) Part B Permit Renewal Application, Volume I, Section F.1. This section

describes the 24-hour surveillance system (R.61-79.264.14(b)(1)), artificial or natural barriers (R.61-79.264.14(b)(2)(i)), control entry systems (R.61-79.264.14(b)(2)(ii)), and warning signs (R.61-79.264.14(c)) in place at the SRS boundary to comply with the security requirements for a RCRA-permitted facility.

2.1.3 Groundwater Institutional Controls

Groundwater institutional controls will be implemented as long as concentrations exceed MCLs. Institutional controls will be implemented by:

- Performing environmental monitoring of wells PRP-5, 6 and 7.
- Providing access controls for on-site workers via the Site Use/Site Clearance Program, work control, worker training, worker briefing of health and safety requirements, and identification.
- The posting of signs at the waste unit access points to provide a visible indication of the presence of hazardous materials.
- Preventing unauthorized groundwater usage via the Site Use/Site Clearance Program land use restrictions.
- Notifying the USEPA and SCDHEC of any changes in use or disturbance of waste observed during site inspections.
- Providing access controls against trespassers per Section 2.1.2.

2.2 Deed Notification

In the long-term, if the property is ever transferred to non-federal 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 contract for sale and the deed will contain the notification required by CERCLA Section 120(h). The deed

notification shall, in perpetuity, notify any potential purchaser that the property has been used for the management and disposal of waste. These requirements are also consistent with the intent of the RCRA deed notification requirements at final closure of a RCRA facility if contamination will remain at the unit.

The deed shall also include deed restrictions precluding residential use of the property. However, the need for these deed restrictions may be re-evaluated 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 re-evaluation 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 non-federal ownership, a survey plat of the OU will be prepared, certified by a professional land surveyor, and recorded with the appropriate county recording agency.

2.3 Field Walkdowns and Maintenance for Institutional Controls

After the remediation of the PBRP, only well monitoring and maintenance activities, outlined in the PBRP ROD (WSRC 2002a), will be required per this remedial action. No operations other than well monitoring will be required.

The results of any events and or actions that indicate some potential compromise of institutional controls will be documented in the FFA Annual Progress Report. All other routine maintenance activities will be documented and maintained in files subject to USEPA and SCDHEC review and audit. A copy of the completed inspection form is maintained in the SGCP Administrative Record Files.

The following steps will be implemented to maintain the low permeability soil cover:

- Perform periodic (annual) visual inspections for evidence of damage to the soil cover due to erosion or intrusion by burrowing animals. The inspection will also address upkeep of the vegetative cover and access control barriers (e.g., the warning signs). (Attachment A provides a unit-specific inspection data sheet for the PBRP OU).

- Perform necessary repairs (when required as identified during inspection) to maintain the functional integrity of the soil cover, selected wells, and the warning signs.

- Enforce SRS institutional controls by restricting access to the closed waste unit. Institutional controls will be maintained as long as the waste remains a threat to human health or the environment.

- As required by the National Oil and Hazardous Substance Contingency Plan (NCP), a five-year review of the remedy for the PBRP unit will be performed as long as the waste remains a threat to human health or the environment.

The waste site inspectors are to be trained in Hazardous Waste Operations and Emergency Response (i.e., HAZWOPER), RCRA Well Inspections, RCRA Waste Unit Inspections, Radiological Workers, etc., as applicable for the specific inspection. They will also be trained based on the individual requirements of the regulatory approved closure documents for each waste unit. In addition, the inspectors are to attend yearly refresher courses. No single person will conduct all of the inspections or grass cutting operations over the years.

This unit-specific LUCIP, including the checklist, will be appended to the SRS LUCAP.

Per Section 3.6 of the LUCAP, this LUCIP identifies the area under land-use restriction via a survey plat. Note: Drawing # SK-C-53135 (Attachment B), includes a line marked "AREA SUBJECT TO LAND USE CONTROLS" to define the area subject to LUCs.

If the OU is ever transferred to non-federal ownership, a survey plat of the area, prepared by a certified professional land surveyor, will be recorded with the county recording agency.

APPENDIX B

ATTACHMENT A

SGCP INSPECTION DATA SHEET FOR P-AREA BURNING RUBBLE PIT

SGCP ANNUAL INSPECTION DATA SHEET

FOR P-AREA BURNING RUBBLE PIT

A = Satisfactory **X = Unsatisfactory (Explanation required)**	**A or X**	Comments or Corrective Action Taken (See Maintenance Register for Corrected Items)
Verify there is no unauthorized digging, excavation, or construction activities on the soil cover.		
Remove or verify there is no woody vegetation growing on the soil cover.		
Check the vegetative cover for density. Verify there are no bare spots greater than 9 ft^2 in area. The height of the vegetative cover should not impair the visual inspection of the soil cover. This will be determined by the inspector.		
Verify that the wells and roads are accessible.		
Inspect monitoring wells PRP-5, 6 and 7.		

Note: All monitoring wells associated with this waste unit are inspected using Monitoring Well Inspection Procedure SOP-011 in compliance with South Carolina Hazardous Waste Management Regulations R.61-79: Subpart F, Groundwater Monitoring.

SGCP ANNUAL INSPECTION DATA SHEET

FOR P-AREA BURNING RUBBLE PIT (Continued)

A = Satisfactory **X = Unsatisfactory (Explanation required)**	**A or X**	Comments or Corrective Action Taken (See Maintenance Register for Corrected Items)
Verify that the waste unit signs have the correct information and they are legible from at least 25 feet and remove vegetation blocking the sign.		
Check the unit for evidence of erosion or subsidence (depressions).		
Check for evidence of burrowing animals (holes).		
Check OU boundary for presence of excessive erosion, carrying material outside the monument marker boundaries.		
Comments:		

Inspected by:_____/_____Date:_____Time:_____
(Print Name) (Signature)

Reviewed by:_____/_____Date:_____Time:_____
Post-Closure Manager or Designee

Note: USEPA and SCDHEC must be notified within 30 days of identification of any area where any breach or compromise of restrictions placed on this institutional control OU has occurred.

APPENDIX B

ATTACHMENT B

LUCIP DRAWING

SK-C-53135, Rev. 0, Land Use Control Implementation Plan (U)

2Q.	98.	ND, ND
2Q.	98.	ND, ND
4Q.	98.	ND, ND
1Q.	01.	ND, ND

0 10 20 40 60

1" = 20'

P-AREA BURNING RUBBLE PIT (PBRP) OPERABLE UNIT CLOSURE (131-P)

LAND USE CONTROL IMPLEMENTATION PLAN DRAWING (U)

SK-C-53135, REV. 0

3333334444444444555555555566664567890123456789012345678901234567890123

PSC= 20 DRAWN BY (ORIG): T.HICKMAN LAST CADD REV. BY: T.HICKMAN
PLOT DATE 01/10/03 TIME DATE: 01/10/03

...\rev_0\SKC53135.DGN 02/13/2003 03:25:21 PM

ATTACHMENT A

DRAWINGS

SK-C-53133 - PBRP (131-P) Grading Plan (U)

and

SK-C-53134 - PBRP (131-P) Sections and Details (U)

[redacted] MARKERS SHALL BE 36 INCHES LONG WITH THE LOCATION COORDINATES AND ELEVATION ENGRAVED ON A 2-INCH DIAMETER BRASS PLATE. THE TOP OF THE INSTALLED BOUNDARY MARKER SHALL NOT BE MORE THAN 2 INCHES ABOVE THE SURROUNDING GRADE.

10. WELL SHOWN AS ◈ ARE NOT SUBJECT TO ONGOING MAINTENANCE, MONITORING, OR SAMPLING.

11. INSTALL CLOSED OPERABLE UNIT SIGN AT APPROXIMATE LOCATIONS SHOWN ON THE DRAWING.

P-AREA BURNING RUBBLE PIT (PBRP) OPERABLE UNIT CLOSURE (131-P)

GRADING PLAN (U)

SK-C-53133, REV. 0

0 10 20 40 60

1" = 20'

333344444444445555555555666667890123456789012345678901234567890123

PSC= 20 DRAWN BY (ORIG): T.HICKMAN LAST CADD REV. BY: T.HICKMAN

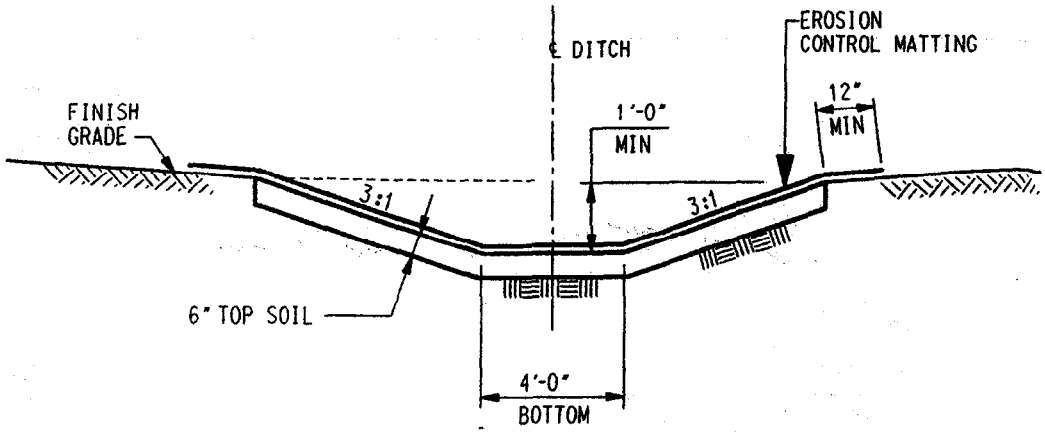
PLOT DATE 01/13/03 TIME DATE: 01/13/03

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CONNECT AND BAND
AS REQUIRED

IL 2
LE
CHANNEL)

DETAIL 3
NOT TO SCALE SK-C-53133



GRASS LINED CHANNEL

DETAIL 5
NOT TO SCALE SK-C-53134
(EAST-WEST CHANNEL)

P-AREA BURNING RUBBLE PIT
(PBRP) OPERABLE UNIT CLOSURE (131-P)

SECTION AND DETAILS (U)

SK-C-53134, RIV. 0

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456789012345678901234567890123
PSC= 20 DRAWN BY (ORIG):
PLOT DATE 01/08/03 TIME
LAST CADD REV. BY: T.HICKMAN
DATE: 01/08/03

...\rev_0\skc53134.dgn 02/13/2003 03:19:10 PM

ATTACHMENT B

STORMWATER MANAGEMENT AND SEDIMENT REDUCTION PLAN / POLLUTION PREVENTION PLAN (SMSRP/PPP)

(For Reference Only)

SRS
savannah river site
TM

WESTINGHOUSE SAVANNAH RIVER COMPANY
INTEROFFICE MEMORANDUM

November 27, 2002 ESH-ECS-2002-00516

TO: J. K. PRICE, 730-2B

FROM: J. A. LINTERN, 742-A

APPROVED GRADING PERMIT # 02-19-P-1.25 FOR LAND DISTURBING ACTIVITIES ASSOCIATED WITH THE P-AREA BURNING RUBBLE PIT (PBRP) OPERABLE UNIT (131-P) CLOSURE

Grading Permit #02-19-P-1.25 has been issued for land disturbing activities associated with the PBRP closure project, which includes tree removal, the installation of soil cover layers, and the placement of off-site topsoil over the unit totaling (1.25 acres). Enclosed is one (1) copy of the approved Stormwater Management & Sediment Reduction Plan (SMSRP), and one (1) copy of the Grading Permit. This information is to be maintained on the construction site.

Controls and sequences, as dictated in the approved SMSRP, are required to be maintained and inspected at intervals noted in the plan. Any changes to this plan must be reviewed and approved by EPD prior to implementation.

Upon completion of project and establishment of a perennial vegetative cover, close out of this Grading Permit is required. If this project is delayed or suspended after land disturbing actives have commenced, the area should be properly stabilized per plan requirements and notification made to EPD.

Please call me at 5-9003, if you have any questions.

jal/aeo
Att.*
c: L. Anderson, 730-2B
T. R. Bland, 730-2B
H. L Davis, 703-A
D. E. Haley, 730-2B
N. J. Lowry, 742-A
B. D. McGee, 772-1G*
S. M. Mead, 730-2B
M. K. Patel, 730-2B
S. L. Stinson, 742-A
EPD Files, 742-A
Records Processing, 773-52A*

FILE INFO.
Stormwater; PBRP
10040;
DOE 1-8.a(1);
Permanent

GRADING PERMIT APPLICATION FOR LAND DISTURBING ACTIVITIES AT THE SAVANNAH RIVER SITE

SECTION 1

DATE: 11/6/2002 FILE NUMBER: 02-19-P-1.25 A (To be assigned by EPD)

1. FACILITY NAME OR PROJECT NAME: P-Area Burning Rubble Pit (PBRP) Operable Unit Closure (131-P)

   SIZE, TOTAL (ACRES): 1.25 SURFACE AREA OF LAND DISTURBANCE (ACRES): 1.25

   SRS AREA: P-Area COUNTY: Barnwell START DATE: 11/03 COMPLETION DATE: 5/04

   LOCATION: PBRP is located northwest of the intersection of the P-Area Reactor and south of the intersection of Road F and Road 7.

   CATEGORY B

2. FOR LAND DISTURBANCES GREATER THAN OR EQUAL TO 5 ACRES:

   SIC CODE: _____ LATITUDE: _____ LONGITUDE: _____

   USGS QUADNAME: _____

   Westinghouse Savannah River Company
   Environmental Protection Department
   File# 02-19-P-1.25
   Date Issued 11/26/02
   By: _____

3. NEAREST RECEIVING WATER BODY: Steel Creek

   DISTANCE TO NEAREST RECEIVING WATER BODY: 1000 feet

   ULTIMATE RECEIVING WATER BODY: "Atlantic Ocean"

4. LIST NPDES OUTFALLS DOWNSTREAM OF THIS ACTIVITY: None

5. ARE FRESHWATER WETLANDS LOCATED ON PROPERTY? ○ YES ◉ NO

   If Yes, Have The Wetlands Been Delineated? ○ YES ◉ NO

SECTION 2

Provide Applicable Information as Requested Below: (List name, address, and phone/pager #)

6. RESPONSIBLE ORG.: Environmental Restoration

   PROJECT MANAGER: Terry R. Bland, 730-2B-2124, 2-6387, Pager 17911

   ENVIR. COMPLIANCE AUTHORITY: Price, Joe K., 730-2B-2127, (2-6708, B-17718)

7. DESIGN AGENCY: PE&CD/ER

   RESPONSIBLE ENGINEER: Stephen M. Mead, 730-2B-2037, 2-6768

8. CONSTRUCTION ENGR.: N/A

   SUBCONTRACT TEC. REP. (STR) : Larry Anderson, 730-2B-2096, 2-6700/14471

9. CONTRACTOR: Subcontractor

   RESPONSIBLE SUPT.:

   SUBCONTRACTOR/CO-PERMITTEES:

SIC CODES:

15 General Building Contractors__ 1541-Industrial buildings and Warehouses
16 Heavy Const. __ 1611-Hwy and str. const.,1622-Bridge, tunnel, & elev. hwy.1623-Water sewer, and utility lines,1629 Heavy const., nec.
17 Special Trade Contractors __ 1794-Excavation work, 1795-Wrecking and demolition work

GRADING PERMIT APPLICATION FOR LAND DISTURBING ACTIVITIES AT THE SAVANNAH RIVER SITE

SECTION 3

10.a 11-21-02
Environmental Coordinator Signature / Date

10.b Stephen M Mead 11-18-2002
Design Agency Rep. Signature / Date

11. I HEREBY CERTIFY THAT ALL LAND DISTURBING CONSTRUCTION AND ASSOCIATED ACTIVITY PERTAINING TO THIS SITE SHALL BE ACCOMPLISHED PURSUANT TO AND IN KEEPING WITH THE TERMS AND CONDITIONS OF THE APPROVED PLANS. I ALSO CERTIFY THAT A RESPONSIBLE PERSON WILL BE ASSIGNED TO THE PROJECT FOR DAY-TO-DAY CONTROL. I ALSO GRANT AUTHORIZATION TO THE DEPARTMENT OF HEALTH AND ENVIRONMENTAL CONTROL AND/OR THE IMPLEMENTING AGENCY THE RIGHT OF ACCESS TO THE SITE AT ALL TIMES FOR THE PURPOSE OF ON SITE INSPECTIONS DURING THE COURSE OF CONSTRUCTION AND TO PERFORM MAINTENANCE INSPECTIONS FOLLOWING THE COMPLETION OF THE LAND DISTURBING ACTIVITY.

T. R. BLAND
Printed Name

11/21/02
Signature / Date

12. I HEREBY CERTIFY THAT ALL LAND DISTURBING CONSTRUCTION AND ASSOCIATED ACTIVITY PERTAINING TO THIS SITE SHALL BE ACCOMPLISHED PURSUANT TO AND IN KEEPING WITH THE TERMS AND CONDITIONS OF THE APPROVED PLANS. I ALSO CERTIFY THAT A RESPONSIBLE PERSON WILL BE ASSIGNED TO THE PROJECT FOR DAY-TO-DAY CONTROL. I CERTIFY UNDER PENALTY OF LAW THAT THIS DOCUMENT AND ALL ATTACHMENTS WERE PREPARED UNDER MY DIRECTION OR SUPERVISION IN ACCORDANCE WITH A SYSTEM DESIGNED TO ASSURE THAT QUALIFIED PERSONNEL PROPERLY GATHERED AND EVALUATED THE INFORMATION SUBMITTED. BASED ON MY INQUIRY OF THE PERSON OR PERSONS WHO MANAGE THE SYSTEM, OR THOSE PERSONS DIRECTLY RESPONSIBLE FOR GATHERING THE INFORMATION, THE INFORMATION SUBMITTED IS, TO THE BEST OF MY KNOWLEDGE AND BELIEF, TRUE, ACCURATE, AND COMPLETE. I AM AWARE THAT THERE ARE SIGNIFICANT PENALTIES FOR SUBMITTING FALSE INFORMATION, INCLUDING THE POSSIBILITY OF FINE AND IMPRISONMENT FOR KNOWING VIOLATIONS. I ALSO GRANT AUTHORIZATION TO THE DEPARTMENT OF HEALTH AND ENVIRONMENTAL CONTROL AND/OR THE IMPLEMENTING AGENCY THE RIGHT OF ACCESS TO THE SITE AT ALL TIMES FOR THE PURPOSE OF ON SITE INSPECTIONS DURING THE COURSE OF CONSTRUCTION AND TO PERFORM MAINTENANCE INSPECTIONS FOLLOWING THE COMPLETION OF THE LAND DISTURBING ACTIVITY.

Printed Name*

Signature / Date

*Owner / Person Financially Responsible or Authorized Representative of DOE (corporate officer or their delegate)

13. DESIGNER CERTIFICATION: FOUR COPIES OF THE PLANS, ALL SPECIFICATIONS AND SUPPORTING CALCULATIONS, FORMS, AND REPORTS ARE HEREWITH SUBMITTED AND MADE A PART OF THIS APPLICATION. I HAVE PLACED MY SIGNATURE AND SEAL ON THE DESIGN DOCUMENT SUBMITTED SIGNIFYING THAT I ACCEPT RESPONSIBILITY FOR THE DESIGN OF THE SYSTEM. FURTHER, I CERTIFY TO THE BEST OF MY KNOWLEDGE AND BELIEF THAT THE DESIGN IS CONSISTENT WITH THE REQUIREMENTS OF TITLE 48, CHAPTER 14 OF THE CODE OF LAWS OF SC, 1976 AS AMENDED, AND PURSUANT REGULATION 72-300.

S.C. Registration Number

ENGINEER ☐
TIER B, LAND SURVEYOR ☐
LANDSCAPE ARCHITECT ☐

Signature / Date

LAND DISTURBANCE	REQUIRED SIGNATURE (S)
/2 ACRES	ENVIRONMENTAL COORDINATOR (EC)
≤ 2 ACRES	EC, DESIGN AGENCY, & Owner or person financially responsible (Block 11)
> 2 ACRES	EC, OWNER/PERSON FINANCIALLY RESPONSIBLE (BLOCK 12)
	DESIGNER CERTIFICATION (BLOCK 13)

GRADING PERMIT APPLICATION FOR LAND DISTURBING ACTIVITIES AT THE SAVANNAH RIVER SITE

SECTION 4

FOR INTERNAL USE ONLY:

1. I HEREBY CERTIFY THAT I HAVE THOROUGHLY REVIEWED THE APPLICATION, PLANS AND SUPPORTING DOCUMENTS AND FOUND THEM TO BE IN COMPLIANCE WITH THE LETTER AND THE INTENT OF THE LAW. THIS STAMP OF APPROVAL ON THE PLANS IS SOLELY AN ACKNOWLEDGEMENT OF SATISFACTORY COMPLIANCE WITH THE REQUIREMENTS OF THESE REGULATIONS. THE APPROVAL STAMP DOES NOT CONSTITUTE A REPRESENTATION OF WARRANTY TO THE APPLICANT OR ANY OTHER PERSON CONCERNING THE SAFETY, APPROPRIATENESS OF EFFECTIVENESS OF ANY PROVISIONS, OR OMISSION FROM THE STORMWATER AND SEDIMENT PLAN. I HAVE STAMPED 6 SETS OF APPROVED PLANS.

   I HAVE FILED ONE SET AND DISTRIBUTED

   ☐ Grading Permit Application only to SCDHEC - Aiken, SC

   Intern 11/26/02
   PLAN REVIEWER

2A. WILL SITE MONITORING/INSPECTION BY A SOUTH CAROLINA REGISTERED PROFESSIONAL ENGINEER RESPONSIBLE FOR CONSTRUCTION BE REQUIRED? (TO BE SPECIFIED BY REVIEWER) ☐ YES ☒ NO

   IF YES, LIST REASON: CATEGORY A PROJECT _____

   OTHER _____

   CAN APPROVED SITE INSPECTOR (ASI) OPTION BE UTILIZED IN LIEU OF SOUTH CAROLINA REGISTERED PROFESSIONAL ENGINEER?

   ☒ YES ☐ NO IF NO, GIVE REASON _____

   _____
   SIGNATURE / DATE

2B. WILL AS BUILT CERTIFICATION BY A REGISTERED PROFESSIONAL RESPONSIBLE FOR CONSTRUCTION BE REQUIRED FOR THIS PROJECT FOR FINAL APPROVAL? (TO BE SPECIFIED BY REVIEWER) ☐ YES ☒ NO

   IF YES

   PRIOR TO FINAL APPROVAL, I WILL SUBMIT A STATEMENT CERTIFYING THAT CONSTRUCTION IS COMPLETE AND IN ACCORDANCE WITH APPROVED PLANS AND SPECIFICATIONS. THIS WILL BE BASED UPON PERIODIC OBSERVATIONS OF CONSTRUCTION AND FINAL INSPECTION FOR DESIGN COMPLIANCE BY ME OR A REPRESENTATIVE OF MY OFFICE WHO IS UNDER MY SUPERVISION.
   (To be signed by a registered professional responsible for construction)

   _____
   SIGNATURE / DATE

3. Records: Please ensure that this document is included with the official Project Files and is handled per SCD4 requirements. EPD will maintain "Information Only" copies of this document.

4. CATEGORY B PROJECT OPTION FOR ASI:

   I, _____ (NAME AND TITLE)
   REQUEST THAT THIS PROJECT BE INSPECTED BY AN APPROVED SITE INSPECTOR.

STORMWATER MANAGEMENT & SEDIMENT REDUCTION PLAN / POLLUTION PREVENTION PLAN (SMSRP/PPP)

P-AREA BURNING RUBBLE PIT (I31-P) CLOSURE (U)

Document No. ERD-SMP-2002-00008

REVISION 0

CA-1221

Westinghouse Savannah River Company
Environmental Protection Department

File# 02-19-P-1,25
Date Issued 11/26/02
By: Jeff Kintern

Originator Stephen M. Mead — Date: 11-15-2002
Stephen M. Mead

Verifier/ Checker — Date: 11/18/02
M. K. Patel

Approval Damon E. Haley Jr. — Date: 11/18/02
D. E. Haley

SUMMARY OF REVISIONS

Revision	Revision Date	Affected Sections and Paragraphs	Description of Change
0		All	Issued for use

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1.0 INTRODUCTION

This Stormwater Management & Sediment Reduction Plan/Pollution Prevention Plan (SMSRP/PPP) is prepared for closure of the P-Area Burning Rubble Pit (PBRP) Operable Unit (131-P).

The PBRP Operable Unit will be closed using a low permeability soil cover. Prior to work under this plan, the PBRP Operable Unit will be cleared of marketable timber by Forest Services. The project scope and key activities include the following:

- Installation and maintenance of temporary erosion and sediment reduction measures.
- Site work including surveys, earthwork, and clearing and grubbing.
- Clearing all trees and vegetation from within the PBRP operable unit limits and disposal to an off unit area.
- Grinding all stumps to a minimum of 6" below existing grade and disposal of grindings beneath the low permeability soil layer. Chipping of uprooted stumps and roots, and placement under the low permeability soil layer.
- Removal of perimeter fence posts, signs and orange ball and disposal into an inert landfill.
- Removal and distribution of soil from high areas including rough grading of the PBRP operable unit area per the project drawings and specification.
- Installation of soil cover layers atop the PBRP operable unit area per the project drawings and specification.
- Installation and maintenance of drainage channels and stormwater management structures per the project drawings and specification.
- Placement of topsoil from an off-site source.
- Installation of gravel access ramp for the PBRP cover.
- Seeding and fertilization of soil cover area including all disturbed areas.
- Installation of markers (signs) along the perimeter of soil cover area.
- Installation of waste unit boundary monuments.
- Installation of monitoring wells.

1.1 LOCATION & ORIENTATION

The PBRP operable unit is located northwest of the P-Reactor and south of the intersection of Road F and Road 7. (See attached drawing C-CV-G-0098). The PRBP operable unit closure area is approximately 265 ft long by 95 ft wide and encompasses a single inactive burial pit approximately 200 ft long by 30 ft. wide. At present, the project area gently slopes southward and is well vegetated. There is a fair growth of pine trees within the operable unit limits.

At the west side of the site, there is a steep embankment with a drainage swale at the embankment's toe. There is a compacted gravel/soil perimeter road located at the north and east sides of the unit. The land surface at PBRP slopes gently to the south towards the embankment of Steel Creek. The drainage from the operable unit closure area is intercepted by a drainage swale south of the unit, which intercepts and conveys the stormwater westward towards a 18-inch diameter corrugated plastic pipe (CPP) culvert.

At present, site stormwater runoff primarily sheet flows and becomes shallow concentrated flow as it flows into the swale located to the south of the unit. The PBRP is relatively flat and contributes very little runoff. The surrounding areas outside of the PBRP operable unit are the major contributors of runoff to the south and west side swales. Stormwater runoff from areas outside the operable unit closure area does not sheet flow over the unit, but flows around the unit in swales.

1.2 OBJECTIVES OF SMSRP/PPP

This SMSRP/PPP specifies the stormwater management and sediment reduction measures that will be utilized during the project construction activities to prevent off-site sediment migration beyond the limits of disturbance. The SMSRP/PPP complies with:

- South Carolina Department of Health and Environmental Control (SCDHEC) Stormwater Management and Sedimentation Control Handbook for Land Disturbance Activities.

The SMSRP/PPP incorporates the following criteria as a means of satisfying the regulations referenced above:

- The smallest practical area will be cleared and grubbed.
- Where feasible, natural vegetation will be retained and protected from damage.
- Temporary plant cover and mulching to control runoff will be used to protect areas that are exposed to erosion during periods of development.
- Wire-backed silt fence check dams will be utilized to remove sediment from runoff prior to release of the stormwater from the disturbed area.
- The long-term re-vegetation activities will begin no later than 14 days after construction completion.
- An 18-inch CPP elbow riser will be utilized at the existing 18-inch CPP culvert to detain water and settle out sediment.

2.0 SOIL EROSION CHARACTERISTICS & RUNOFF DETERMINATION

To assist in the existing site evaluation, a topographic survey (see attached drawing C-CV-G-0098) was used to accurately establish land slopes and to predict stormwater runoff rates. Also, a walk down of the project site and adjacent surrounding areas was conducted during August 2002. The purpose of the walk down was to determine and evaluate drainage patterns at the project site, surrounding area drainage patterns, and the extent and condition of existing ground cover.

Approximately 0.90 acres will be covered with a low permeability soil cover and an 18-inch thick vegetative layer placed atop the low perm layer. Construction activities will disturb 1.25 acres. The proposed finished cover grades are from 3 to 5 percent with 4:1 side slopes. The proposed ground cover is a well-established dense grass that will receive regular maintenance. Therefore, the site hydrology between the pre and post conditions for a 10-year 24-hour storm will not change significantly. Based on these facts and that the site is very small, a formal calculation for the runoff determination and sediment volume predictions was not prepared. Given the site topography and size, proposed disturbance area, and construction duration, temporary sediment and erosion control measures were selected.

3.0 STORMWATER MANAGEMENT & SEDIMENT REDUCTION PLAN/POLLUTION PREVENTION PLAN

Materials used for erosion and sediment reduction will conform to the project specification sections listed in the references of this SMSRP/PPP plan. Inspection of erosion and sediment reduction measures will be performed per Section 5.0 of this SMSRP/PPP. Any damages shall be repaired immediately.

3.1 STORMWATER MANAGEMENT MEASURES

On-site stormwater runoff will sheet flow southward from the construction site. There is no off-site stormwater run-on to the disturbed area. The existing site grading will be maintained until construction of the low-permeability soil cover system begins. The final grading of the site will sheet flow towards the east, west and south into the same drainage swales that existed prior to construction. The existing west and south side swales will be regraded and improved to increase hydraulic performance. A riprap apron will be installed at the inlet of the 18-inch diameter CPP to minimize erosion.

The temporary erosion and sediment control measures will remain in place until it has been determined that there is a 70 percent vegetation coverage. Once 70 percent vegetation coverage is confirmed, the ERD Post Closure Maintenance organization will assume all responsibility for ensuring that a 70% long-term cover is established. Also, this same group shall dismantle and remove all temporary sediment control measures such as silt fences, riser, etc.

3.2 EROSION AND SEDIMENT REDUCTION MEASURES

3.2.1 Wire-backed temporary silt fence will be located along the south and east sides of the construction site and will be relocated as required to facilitate grading activities during the construction phases. Wire backed silt fence check dams will be installed in the regraded channels upstream of the riprap apron to capture transported sediments from the disturbed areas. Also, a temporary riser will be installed at the inlet end of existing 18 inch diameter corrugated plastic pipe (CPP) culvert to detain the stormwater during construction activities. These temporary measures will be located as indicated on drawing C-CV-G-0099 and -0100 and installed to conform to the requirements of drawing C-CV-G-0102.

3.2.2 Attempts to vegetate disturbed areas will begin immediately whenever each phase has temporarily or permanently ceased.

If it is determined that construction activity will be temporarily delayed for more than 21 days, temporary vegetative cover or extensive mulching shall be provided within 14 days of the construction termination.

4.0 CONSTRUCTION SCHEDULE AND SEQUENCING

Listed below is a forecast of the construction schedule for the PRBP Closure Project. The proposed construction duration is subject to change based on funding and regulatory constraints.

Construction Task	Approximate Duration
Install erosion and sediment reduction measures	½ month
Vegetation removal and rough grading	1 month
Install low-permeability soil cover	5 months
Vegetate final grade and disturbed areas	½ month
Remove temporary stormwater management and sediment reduction measures	Upon acceptance of long term vegetation

5.0 INSPECTION AND MAINTENANCE

Inspections shall be performed on all stormwater management and sediment reduction measures. The inspection frequency shall be once every seven days and/or after any storm event of greater than 0.5 inches of precipitation during any 24-hour period. These inspections will be performed and documented as required by the project specification document. This SMSRP/PPP will be retained at the construction site with the inspection log containing completed Inspection Reports until construction is completed and until site ownership is transferred to the permanent site custodian.

6.0 POST CONSTRUCTION SITE CONDITION

The receiving waters from stormwater runoff of this site will remain unchanged after construction. Site stormwater presently is intercepted by Steel Creek and conveyed to L Lake. L Lake impounds Steel Creek but eventually discharges water downgradient to Steel Creek once again. Steel Creek flows southward and joins Pen Branch. The Pen Branch waters are received by the Savannah River.

Post construction ground surfaces will be well vegetated with established long-term vegetation. All temporary stormwater management and sediment reduction measures will be inspected and maintained until stabilization of the disturbed areas is confirmed.

7.0 PLAN AMENDMENT

This SMSRP/PPP will be revised and amended as required to properly reflect any proposed changes. The revised SMSRP/PPP shall receive EPD approval prior to implementation of any proposed changes.

8.0 SUMMARY AND CONCLUSION

This sediment reduction plan is prepared in compliance with the provisions of SCDHEC Stormwater Management and Sediment Control Handbook for Land Disturbance Activities. The plan recognizes the importance of sediment migration. The high degree of abatement is accomplished through the use of the following:

- Minimizing the size of the disturbed areas;
- Filtering the runoff from the disturbed areas; and,
- Stabilizing all disturbed areas as soon as possible

It is imperative that stormwater management and erosion reduction structures be maintained during construction activities and for the entire project duration. The structures are specifically designed to minimize the amount of soil that may migrate from the site. It is concluded that the plan, as developed, will be an effective means of controlling erosion.

9.0 ATTACHMENTS

C-CV-G-0098	Existing Topographic Map and Drawing Index (U)
C-CV-G-0099	Top of Low Permeability Soil Layer Grading Plan (U)
C-CV-G-0100	Top of Vegetative Layer Grading Plan (U)
C-CV-G-0101	Sections and Details (U)
C-CV-G-0102	Erosion and Sediment Reduction Notes and Details (U)

10.0 REFERENCES

- South Carolina Regulation 72-300 Standards for Stormwater Management and Sediment Reduction, 1998
- South Carolina Stormwater Management and Sedimentation Control Handbook for Land Disturbance Activities, SCDHEC.
- Manual No. WSRC-IM-91-69, SRS Environmental Permitting, "HOW" Manual, Sections 1.9 and 1.13.
- DOE/SR-5000-29, Handbook for Erosion and Sediment Control on the Savannah River Site.
- Permit No. SCR100000 - SCDHEC NPDES General Permit for Stormwater Discharge from Construction Activities that are Classified as "Associated with Industrial Activity" by EPA Regulation, Issue Date: January 15,1998, Expiration Date: January 31, 2003.
- Specification C-SPP-P-00001, Section 02230 Clearing and Grubbing
- Specification C-SPP-P-00001, Section 02300 Earthwork
- Specification C-SPP-P-00001, Section 02374 Erosion Control
- Specification C-SPP-P-00001, Section 02924 Seeding, Fertilizing and Mulching

TAGE CONSTRUCTION OF SOIL COVER
DF EXPOSED AREAS AND THE LENGTH OF
POSED. TOPSOIL SHALL BE PLACED
AL SUBGRADES ARE ESTABLISHED AND
TION AS SPECIFIED IN THE
-00008.

AVAILABLE BOUNDARY MARKERS AT THE
INDICATED ON THE PROJECT DRAWINGS.
BE 36 INCHES LONG WITH THE
AND ELEVATION ENGRAVED ON A 2-INCH
THE TOP OF THE INSTALLED BOUNDARY
ORE THAN 2 INCHES ABOVE THE

CONSTRUCTION ACTIVITIES EXISTING
E ABANDONED IN PLACE BY BSRI.

CONSTRUCTION ACTIVITIES. EXISTING
E REMOVED BY BSRI.

ONG THE PERIMETER OF THE PBRP
ON THE DRAWING FOR CLARITY.

INFORMATION ONLY

AVERY™ PV119E

N O P Q R S T U V W X Y

RAWING INDEX

GRAPHIC MAP AND DRAWING INDEX
RMEABILITY SOIL LAYER GRADING PLAN
TIVE LAYER GRADING PLAN
DETAILS
EDIMENT REDUCTION NOTES AND DETAILS

C	V	G	0	0	9	8	LATEST 0 REVISION

ARTMENT OF ENERGY

RIVER SITE

DESIGN AREA NO.	DESIGN GROUP
P-AREA	PE&CD/ER

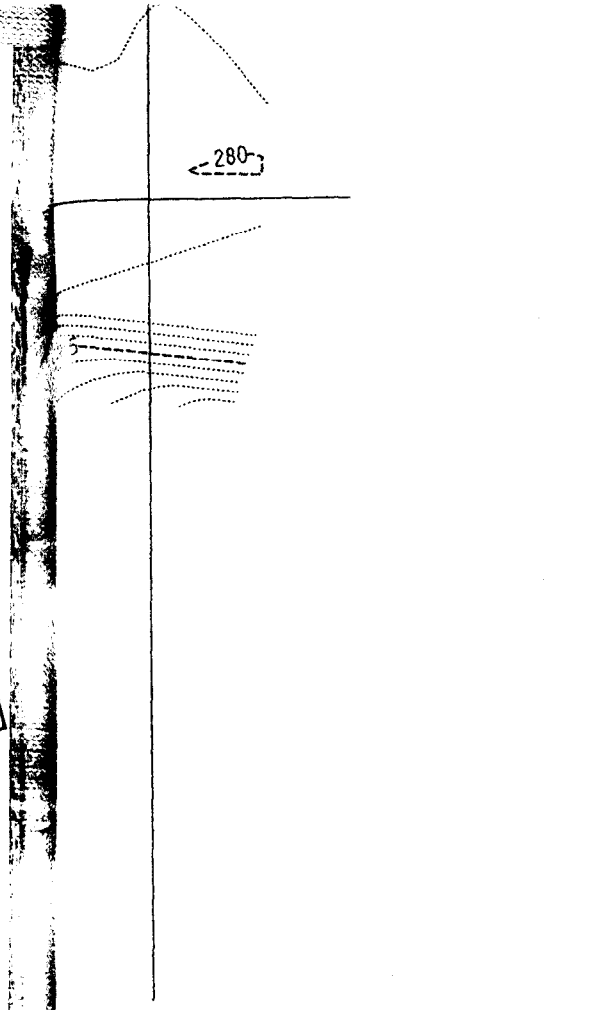
NG RUBBLE PIT
E UNIT CLOSURE

POGRAPHIC MAP
NG INDEX (U)

SHEET NO.	LATEST REVISION
1 OF 1	0

le shown on this drawing is only applicable
n plotted at 30"x42" (actual drawing size)

C-CV-G-0098, Rev.0
Existing Topographic Map
And Drawing Index (U)



0 10 20 40 60

1" = 20'

THIS DRAWING HAS BEEN FURNISHED BY THE SAVANNAH RIVER SITE. THE INFORMATION AND KNOW HOW THEREON MAY NOT BE USED NOR THE DRAWING REPRODUCED WITHOUT WRITTEN PERMISSION OF THE PRIME CONTRACTOR. ALL REPRODUCTIONS IN WHOLE OR IN PART, INCLUDING VENDOR'S SHOP DRAWINGS, SHALL BEAR OR REFER TO THIS STAMP.

PRP'D	LEAD ENG	CHK'D	APRV'D	APRV'D	APRV'D
2/wh	SMM	RP	RP	JBH	N/A

REFERENCE DRAWINGS

C-CV-G-0098	EXISTING TOPOGRAPHIC MAP AND
----------	DRAWING INDEX
C-CV-G-0100	TOP OF VEGETATIVE SOIL LAYER
C-CV-G-0101	SECTIONS AND DETAILS
C-CV-G-0102	EROSION AND SEDIMENT REDUCTION
----------	NOTES AND DETAILS

REFERENCE STANDARDS

LEVELS 1111111111222222222233333333334444444444555555555566666 1234567890123456789012345678901234567890123456789012345678901234567890123

PSC= 20 DRAWN BY (C

PLOT DATE 11/12/02 TIME

UNITED STATES

SAVANN

BLDG. NO.	SITE CLEARANCE NO.
131-P	LATER

TITLE

P-AREA BU
(PBRP) OPEF

TOP OF LOW PEF
GRAD

SCALE	SRP DRAWING NO.
1" = 20'	N/A

C-CV-G-0099, Rev.0
Top of Low Permeability
Soil Layer Grading Plan (U)

PV110E

INFORMATION ONLY

G DOC. CONTROL-SRS
0659267

N O P Q R S T U V W X Y

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PARTMENT OF ENERGY

RIVER SITE

DESIGN AREA NO.	DESIGN GROUP
P-AREA	PE&CD/ER

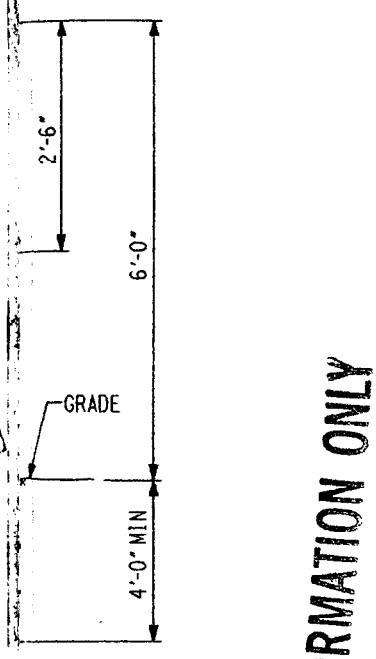
ING RUBBLE PIT
LE UNIT CLOSURE

TIVE SOIL LAYER
PLAN (U)

SHEET NO.	LATEST REVISION
1 OF 1	0

ile shown on this drawing is only applicable
n plotted at 30"x42" (actual drawing size)

C-CV-G-0100 Rev.0
TOP OF VEGETABLE SO
LAYER GRADING PLAN (



INFORMATION ONLY

SIGN

R LOCATION.

-0100

							LATEST
C	V	G	0	1	0	1	0 REVISION

PARTMENT OF ENERGY

RIVER SITE

DESIGN AREA NO.	DESIGN GROUP
P-AREA	PE&CD/ER

ING RUBBLE PIT
LE UNIT CLOSURE

D DETAILS (U)

	SHEET NO.	LATEST REVISION
	1 OF 1	0

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C-CV-G-0101 Rev. 0
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FOR LOCATION PLAN, GENERAL NOTES,
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INFORMATION ONLY

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EROSION AND SEDIMENT REDUCTION NOTES AND DETAILS (U)

LUCIP for the
P-Area Reactor Seepage Basins, 904-61G, -62G, and -63G
Land Use Control Implementation Plan for P-Area Reactor Seepage Basins, 904-61G, -62G, and -63G
(WSRC-RP-2003-4139, Revision 1, January 2004)

On February 6, 2014, the DOE submitted a letter (ACP-14-125, ARF #019315) to the EPA and SCDHEC to perform the inspections for this operable unit on an annual basis. The EPA and SCDHEC approved the request in letters dated March 20, 2014 (ARF #019385) and March 7, 2014 (ARF #019360), respectively.

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010702

United States Department of Energy

Savannah River Site

Land Use Control Implementation Plan (LUCIP) for P-Reactor Seepage Basins (904-61G, 904-62G, and 904-63G) OU (U)

CERCLIS NUMBER: 66

WSRC-RP-2003-4139

Revision 1

January 2004

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

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

DISCLAIMER

This report was prepared by Westinghouse Savannah River Company LLC (WSRC) for the United States Department of Energy under Contract No. DE-AC09-96SR18500 and is an account of work performed under that contract. Reference herein to any specific commercial product, process, or services by trademark, name, manufacturer or otherwise does not necessarily constitute or imply endorsement, recommendation, or favoring of same by WSRC or the United States Government or any agency thereof.

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

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FIGURE 1. CONCEPTUAL SITE DETAIL OF P-AREA REACTOR SEEPAGE BASINS 3

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LIST OF ACRONYMS AND ABBREVIATIONS

b/g	beta-gamma
bls	below land surface
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
Ci	curie
COC	constituent of concern
cm/s	centimeter per second
CSM	conceptual site model
ECA	Environmental Compliance Authority
FFA	Federal Facility Agreement
ft	feet
ft^2	square feet
GCL	geosynthetic clay liner
GDL	geocomposite drainage layer
HAZWOPER	Hazardous Waste Operations and Emergency Response
HDPE	high-density polyethylene liner
IPSL	inactive process sewer pipelines
LUC	Land Use Control
LUCAP	Land Use Control Assurance Plan
LUCIP	Land Use Control Implementation Plan
MCL	maximum contaminant levels
NCP	National Oil and Hazardous Substance Contingency Plan
OU	Operable Unit
pCi/g	picocuries per gram
PCM	Post-Closure Manager
PRSB	P-Area Reactor Seepage Basins
PTSM	principal threat source materials
PVC	polyvinyl chloride
QA	Quality Assurance

LIST OF ACRONYMS AND ABBREVIATIONS (Continued)

RA	remedial action
RAIP	remedial action implementation plan
RAO	remedial action objective
RBC	risk-based concentrations
RCRA	Resource Conservation and Recovery Act
RG	remedial goal
ROD	Record of Decision
S/S	stabilization/solidification
SCA	soil contamination area
SCDHEC	South Carolina Department of Health and Environmental Control
SGCP	Soil and Groundwater Closure Projects
SRS	Savannah River Site
TER	Technical Evaluation Report
TTV	treatment threshold value
URMA	underground radioactive management area
USDOE	United States Department of Energy
USEPA	United States Environmental Protection Agency
WSRC	Westinghouse Savannah River Company, LLC

1.0 INTRODUCTION

This Land Use Control Implementation Plan (LUCIP) has been prepared for P-Reactor Seepage Basin (PRSB) (904-61G, 904-62G, and 904-63G) Operable Unit (OU) (Figure 1) at the Savannah River Site (SRS). The purpose of the LUCIP is to describe how the land use controls (LUCs) selected in the PRSB OU Record of Decision (ROD) will be implemented and maintained. The following LUCs have been selected for this OU:

- Property Record Notices
- Property Record Restrictions
- Other Public Notices
- Site Use Program
- Warning Signs
- Access Controls and Security/Surveillance Measures
- Field Inspection and Maintenance for Institutional Controls

Section 4.0 of this LUCIP describes the LUCs that will be implemented at the PRSBs.

The selected remedy leaves hazardous substances in place that pose a potential future risk and will require land use restrictions for an indefinite period of time. As agreed on March 30, 2000, among the United States Department of Energy (USDOE), the United States Environmental Protection Agency (USEPA), and the South Carolina Department of Health and Environmental Control (SCDHEC), SRS is implementing a Land Use Control Action Plan (LUCAP) to ensure that the LUCs required by numerous remedial decisions at SRS are properly maintained and periodically verified. The requirements of that LUCAP also apply to the LUCs that were selected as part of the remedial action (RA) for the PRSB OU. This additional document, the

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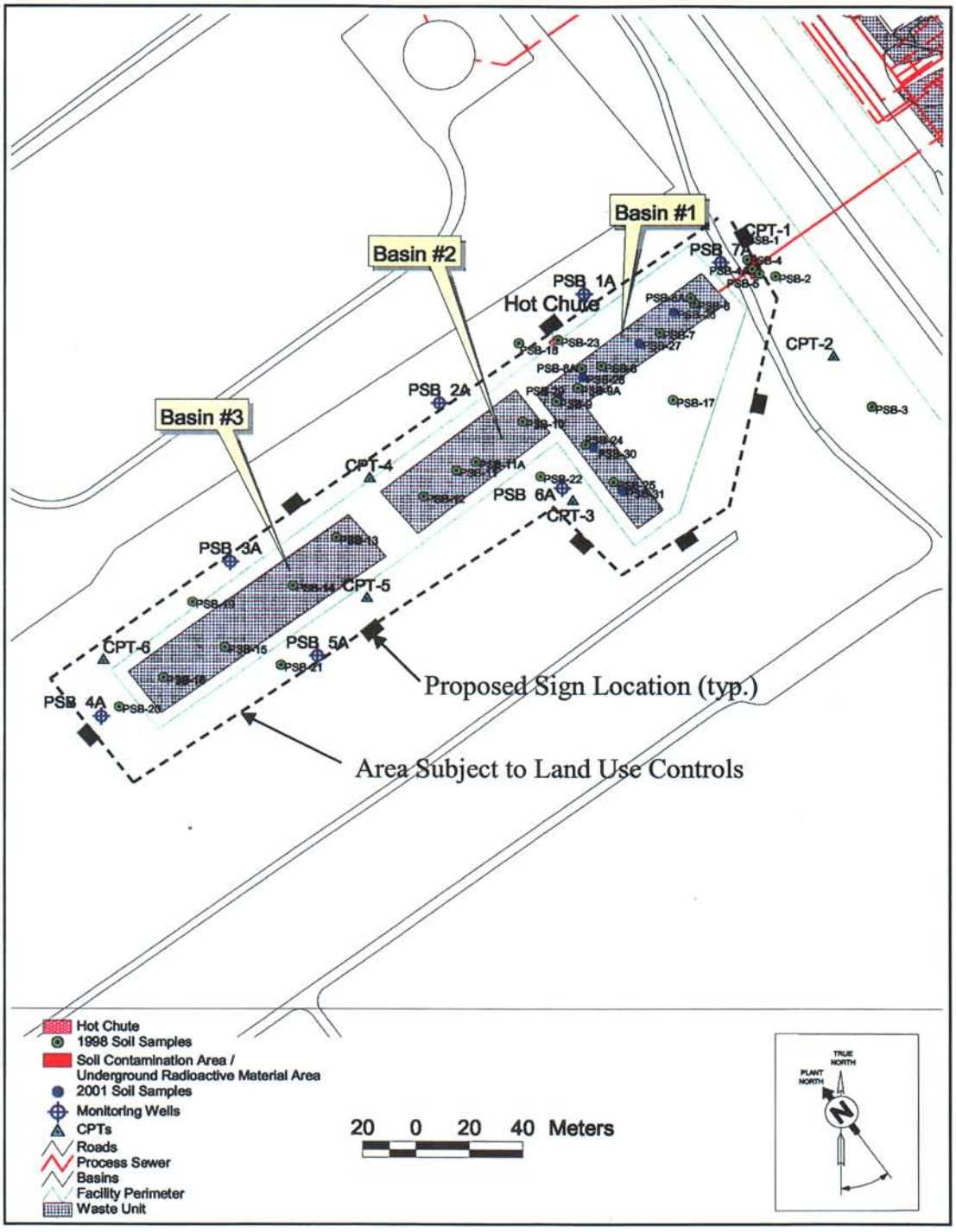


Figure 1. Conceptual Site Detail of P-Area Reactor Seepage Basins

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PRSB (904-61G, 904-62G, and 904-63G) OU LUCIP, contains the detailed and specific measures required to implement and maintain the LUCs selected as part of this particular remedial decision.

2.0 OVERVIEW OF P-REACTOR SEEPAGE BASINS REMEDIAL ACTION

2.1 Description of the P-Reactor Seepage Basins (904-61G, 904-62G, and 904-63G) Operable Unit

The PRSB (904-61G, 904-62G and 904-63G) 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) (1993) for SRS. The media associated with this OU include soils, inactive process pipelines (IPSLs), a hot chute, cascade overflow pipes, and woody vegetation.

The PRSB OU is located in the central portion of SRS west of P Area. The basins are in an open area with vegetative cover. The ground slopes southwestward toward Steel Creek, approximately 2,500 ft to SRS west. The PRSBs are located in an industrial zone identified in the proposed SRS future land use map of the SRS FFA Implementation Plan. The basins are adjacent to a nuclear facility and have been selected to remain an industrial use area.

Constructed in 1957, the PRSB OU comprises three unlined (earthen) basins. Basin 1 is L-shaped and was constructed with approximate outside dimensions of 211 x 50 ft in the north-south direction and 254 x 50 ft in the east-west direction, at a depth of 13 to 17 ft below land surface (bls). Basin 2 was constructed with approximate outside dimensions of 211 x 70 ft at a depth of 8 ft bls. Basin 3 was constructed with approximate outside dimensions of 340 x 70 ft at a depth of 9 ft bls. None of the three basins has been backfilled to grade, and all are currently open.

Two IPSLs extend from the disassembly basin within P Reactor to the eastern end of Basin 1. One IPSL is made of 3-inch diameter carbon steel and the other is made of 4-inch diameter high

density polyethylene (HDPE). The IPSLs are approximately 660 ft in length. From 1957 until 1970 and from 1978 until 1991, the process sewer lines conveyed low-level radioactive purge water from the P-Area Reactor Disassembly Basin to the seepage basins. Historical records indicate that the original IPSL leaked in an area east of Basin 1, contaminating the soils in a 15 by 30 ft (450 ft^2) area. A second line was installed as a replacement, but contaminated soils were not removed during this installation. This area is posted as a Soil Contamination Area (SCA) and an Underground Radioactive Management Area (URMA).

Cascade overflow pipes connect Basin 1 to Basin 2 and Basin 2 to Basin 3. The cascade overflow pipes are 12-inches in diameter and are made of corrugated steel. Flow between the basins was via the cascade overflow pipes positioned near the top of the basin walls.

In addition to the cascade overflow pipe in Basin 1, a "hot chute" was placed at the north wall of the basin during operation. The chute consists of several 10-ft sections of polyvinyl chloride (PVC) pipes and several coils of fire hose located outside of the basin perimeter fence. There is no documentation indicating when the "hot chute" was used and if it was used for waste disposal. Previous radiological surveys of the "hot chute" are consistent with background radiation levels.

The seepage basins were used from 1957 to 1970 to dispose of low-level radioactive process purge water from the reactor disassembly basin. Beginning in 1963, disassembly basin wastewater was deionized and filtered prior to discharge, which reduced radioactivity and removed solids and sludges. The seepage basins were not used from 1971 to 1977. Purge water was mixed with large volumes of heat exchanger cooling water and discharged to area streams. After improvements for processing disassembly basin water had been made, purge water discharges to the seepage basins resumed in 1978. The seepage basins have not received wastewater since P-Reactor was shut down for repairs in 1991.

Waste disposal records indicate that the main basin (Basin 1) received aqueous radioactive waste. Radionuclides in the wastewater from the disassembly basin, sumps, tanks, and drums included tritium, strontium-90, chromium-51, cobalt-60, cesium-134, cesium-137, and other

beta-gamma (b/g) fission products. The records show most of the radioactivity in reactor seepage basin discharge water was due to tritium, cesium-137, cobalt-60, and strontium-90. During the entire operation of the PRSBs, it is estimated that 70,000 curies (Ci) of tritium, 4.74 Ci of strontium-90, 19.5 Ci of cesium-137, and 0.835 Ci of other b/g emitters were released to the PRSBs.

2.2 Nature and Extent of Contamination in P-Reactor Seepage Basins (904-61G, 904-62G, and 904-63G) OU

The PRSB soils have been characterized in the unit-specific Plug-in Technical Evaluation Report (TER). (WSRC 2003c). The radionuclides that are designated as principal threat source material (PTSM) in the TER are briefly addressed in the following paragraphs. Tritium was a major contributor to the production waste stream and may still be present in the soil and pipelines.

For the plug-in remedy, PTSM has been defined as highly contaminated basin soils and any other unit-related soils that pose a radiological risk to the future industrial worker equal to or greater than 1×10^{-3} risk (using baseline risk assessment exposure assumptions). Based on the presumptive approach used in the Plug-in ROD, a bias for treatment of PTSM that consists of soil stabilization/solidification (S/S) (by grouting) has been used.

The TER (WSRC 2003c) provides a comparison of the average radionuclide concentration detected in the three basins and SCA/URMA to the PTSM treatment threshold value (TTV). The TTV relates to a risk of 1×10^{-3} for an industrial worker. The average cesium-137 concentration exceeds the TTV in Basin 1, Basin 2, and the SCA/URMA; therefore, this plug-in criteria is met because this unit contains PTSM. No PTSM was detected in Basin 3 or below 19 ft in Basin 1 or 2 or the SCA/URMA. Data in the TER illustrate that PTSM is present in Basin 1, Basin 2, and the SCA/URMA. Basin 1 PTSM is composed of cesium-137 and cobalt-60. The average cesium-137 concentration exceeds the 1×10^{-3} risk and TTV. The TER (WSRC 2003c) indicates the maximum depth of S/S of PTSM for Basin 1, which is 10 ft.

Basin 2 PTSM is composed of cesium-137. TTVs are exceeded in Basin 2 in all four boreholes to a depth of 4 ft. The depth designated for S/S, which extends 4 ft below the basin bottom, is shaded in gray on Table 10 of the TER (WSRC 2003c).

Very little contamination was ever released to Basin 3 and, as result, no PTSM is present. See Table 11 of TER (WSRC 2003c). PTSM located in the SCA/URMA and associated with the original process sewer line is composed of cesium-137. The average concentration of cesium-137 exceeds the TTV between a depth of 1 to 4 ft bls (Table 12 of the TER).

The "hot chute" does not contain any PTSM but will be removed, placed in Basin 1 or Basin 2 and encapsulated within the grouted mass. The cascade overflow pipes connecting the three basins will be crushed and encapsulated within the grout mass.

2.3 Remedial Action Selected

The selected RA established in the ROD is based on an evaluation of potential alternatives performed in accordance with the National Oil and Hazardous Substance Contingency Plan (NCP) and CERCLA, as amended.

The RA addressed in the Remedial Action Implementation Plan (RAIP) for PRSB is applicable to the in situ grouting of the two IPSLs, in situ S/S of the PRSB PTSM soils, excavation and encapsulation of the IPSLs within the grouted mass, and capping of the PRSB with a low permeability geosynthetic closure cover system.

The PRSB conceptual site model (CSM) (Appendix C) illustrates how implementation of the RA breaks the contaminant exposure pathways.

The following are key elements of the selected RA for the PRSB soils and IPSLs (WSRC 2003c):

- Based on the analysis and conclusions of the TER, the S/S treatment depth for Basin 1 will be graduated as follows:

- For the east-west section of Basin 1, the treatment depth will be 10 ft below basin bottom (approximately 15 ft bls) at the eastern end (source location of IPSL discharge) and will be graduated to 6 ft (approximately 11 ft bls) at the basin corner.

- For the north-south section of Basin 1, the S/S treatment depth will be graduated from 6 ft (approximately 11 ft bls) at the corner to 2 ft (approximately 7 ft bls) at the south end.

- Basin 2 soils will be stabilized in place to a depth of 4 ft below the basin bottom with a cement-based grout mixture to achieve the CERCLA preference for treatment of PTSM. This treatment will convert the waste to a solid form, which is less likely to result in human exposure to radionuclides. Since there is no PTSM soil in Basin 3, it does not need S/S treatment.

- A low permeability geosynthetic closure cover system will be installed over the PRSB to meet the remedial action objectives (RAOs) as stated in Section 1.6 of this RAIP. This closure cover system will be placed over basins 1, 2, and 3 and will extend beyond the edges of the seepage basins. The soil cover will encompass all of the stabilized PTSM and contaminated soils located at the basins. Because arsenic and strontium-90 were estimated to migrate to the groundwater at concentrations above the MCL within a period of 1,000 years, a closure cover system with a maximum hydraulic conductivity of 1×10^{-5} cm/s or lower will be provided to reduce infiltration. The closure cover system consists of a structural fill layer, geosynthetic clay liner (GCL), geocomposite drainage layer (GDL), grading fill layer, and a vegetative layer. The closure cover system is designed to reduce water infiltration and to prevent exposure to highly contaminated soils in the PRSBs in accordance with the approved Plug-in ROD (WSRC 1999a) and the approved Unit-Specific Plug-in TER (WSRC 2003c). The installed cover system will be maintained to provide long-term protection.

- Institutional controls will consist of near- and long-term actions. These actions will be consistent with industrial land use and the SRS LUCAP. For the near term, signs and existing SRS access controls will be used to prevent disturbance of the soil cover system. 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, which will likely include deed restrictions precluding residential use or excavation within the boundaries of the unit. Residential use of SRS land will be prohibited as stated in the *SRS Future Use Project Report, Stakeholder Recommendations for SRS Land and Facilities* (USDOE 1996).

- The IPSLs will be grouted, removed, and placed in Basin 1 or 2 and incorporated in the S/S mix to prevent or limit contact of plants and animals to contamination, thereby protecting the ecological receptors indigenous to the area. Historical records, supported by more recent characterization data, indicate that the original IPSL leaked in an area east of Basin 1, contaminating the soils in a 15 by 30 ft (450 ft^2) area. A second line was installed as a replacement; however, the contaminated soils were not removed during this installation. This area is posted as an SCA/URMA. Because the soil adjacent to the IPSLs in the SCA/URMA is considered PTSM, the contaminated soil does meet the Plug-in ROD requirement for treatment or consolidation. The contaminated soil in the SCA/URMA area will be excavated and placed in Basin 1 or 2 (consolidation) for inclusion in the S/S treatment. Soils exceeding 20 pCi/g gross alpha or 50 pCi/g nonvolatile beta screening/sampling criteria will be excavated and consolidated within the S/S mass in Basin 1 or Basin 2.

The remedy selected in the Plug-in ROD is designed to meet the following RAOs for the PRSB and any contaminated soils encountered during removal of the IPSLs:

1) Prevent human exposure to highly contaminated basin soils (PTSM) through stabilization treatment to the extent practicable and backfill of the basins with clean soil. Reduce risks to the future worker from surface soils (0 to 1 ft) outside the basin by establishing

remedial goals (RGs) for constituents of concern (COCs) at concentrations equivalent to 1×10^{-6} for carcinogens and a hazard quotient of 1 for noncarcinogens or background (where background levels of COCs exceed 1×10^{-6}).

2) Prevent the release of COCs in the soil to groundwater beneath the unit above maximum contaminant levels (MCLs) or risk-based concentrations (RBCs) if there are no MCLs. The soil RGs are back-calculated based on MCLs or RBCs.

3) Protect the ecological receptors indigenous to the area by preventing or limiting contact with contaminated basin soil/pipelines and preventing plants and animals from bringing contaminants up towards the surface.

3.0 LAND-USE CONTROL OBJECTIVES

Considering the residual risk mentioned above, the following LUCs have been established for the PRSB OU:

- Maintain the use of the site for industrial activities only.
- Prevent unauthorized access to the unit as long as the waste remains a threat to human health or the environment.
- Prevent unauthorized residential or agricultural access to soil. (Note: P-Area Reactor groundwater is a separate OU).

Current access controls and deed notification needed to maintain the future land use are described in the following sections of this LUCIP.

4.0 LAND-USE CONTROL DESCRIPTIONS

4.1 Property Record Notices

In the long term, if the property is ever transferred to non-federal 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 the RA taken on the site. The contract for sale and the deed will contain the notification required by CERCLA Section 120(h).

The deed notification shall, in perpetuity, notify any potential purchaser that the property has been used for management and disposal of waste. These requirements are also consistent with the intent of RCRA deed notification requirements at final closure of a RCRA facility if contamination will remain at the unit.

4.2 Property Record Restrictions

The deed shall also include deed restrictions precluding residential use of the property. However, the need for these deed restrictions may be re-evaluated 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 re-evaluation of the need for the deed restrictions will be done though an amended ROD.

4.3 Other Public Notices

The LUCIP identifies the area under land use restriction via a survey plat certified by a professional land surveyor. The survey plat will be incorporated in this LUCIP upon completion of the construction phase. A conceptual site detail is provided in Figure 1.

4.4 Site Use Program

SRS is required under DOE Order 430.1A, *Life Cycle Management* (USDOE 1998), to implement an asset management program for the use, maintenance, and disposal of physical assets, including real estate. SRS has complied with this order by establishing its Site Use Program in accordance with WSRC 1D, *Site Infrastructure and Services Manual*, Procedure 3.02, "Site Real Property Configuration Control" (WSRC 2003a). In accordance with this procedure, use of all lands and waters on SRS shall be coordinated via the Site Use Program, and all employees, contractors, and visitors at SRS must comply with it. This program ensures that any work performed at SRS that adds, modifies, or removes features portrayed on the SRS development maps is authorized. No use of land (i.e., excavation or any other land use) shall be undertaken without prior approval documented by a Site Use Permit. This authorization is obtained through the completion of a Site Clearance Request Form. Also, in accordance with WSRC 1D, Procedure 3.02, all work at SRS that adds to or modifies features or facilities portrayed on SRS development maps (i.e., plot plans of facilities/utilities at SRS) will be authorized by a Site Clearance Permit before any excavation activities are conducted. All site clearance requests will be reviewed to verify that either an approved Site Use Permit has been obtained or that an existing Site Use Permit has sanctioned the request.

SRS is responsible for updating, maintaining, and reviewing site maps, including FFA OU identifications (FFA 1993). If a site clearance request that may impact an FFA OU is made, the Site Clearance Request Form is sent to the appropriate FFA OU reviewer for either approval or disapproval. The roles and responsibilities of each individual are detailed in WSRC 1D, Procedure 3.02. Verification of USDOE approval for intended land use must be obtained before a Site Clearance Permit is issued. The site use and site clearance processes are applicable to all activities and personnel on site (including subcontractors).

The processes are controlled in accordance with the WSRC 1Q, SRS Quality Assurance (QA) Program (WSRC 2003b). The SRS QA program is the governing QA program for all SRS activities.

SRS identifies all buildings and facilities on maps used in the Site Use/Site Clearance Program. This waste unit is identified on these maps as a CERCLA facility.

Any work proposed in these areas will be strictly controlled, and workers will be appropriately trained and briefed about health and safety requirements if work is deemed necessary for maintenance. No major change in land use or excavation at the PRSB OU shall be undertaken without USEPA and SCDHEC approval.

4.5 Warning Signs

To prevent unknowing entry and to ensure that unrestricted use of the waste unit does not occur while it is under ownership of the government, identification signs will be posted at the unit (Figure 1). The signs will be legible for a distance of at least 25 ft. The signs will read as follows:

P-REACTOR SEEPAGE BASINS (904-61G, 904-62G AND 904-63G)
OPERABLE UNIT

DANGER UNAUTHORIZED PERSONNEL

KEEP OUT

THIS UNIT CONTAINS RADIOLOGICAL OR MIXED HAZARDOUS SUBSTANCES.

DO NOT DIG OR EXCAVATE.

DO NOT ENTER WITHOUT CONTACTING THE WASTE SITE CUSTODIAN.

CUSTODIAN: MANAGER, POST-CLOSURE MAINTENANCE

PHONE: (803) 952-6882

Custodial responsibilities for maintenance and inspection of the PRSB OU will be maintained by the Post-Closure Maintenance Group within Soil and Groundwater Closure Projects (SGCP).

4.6 Other Access Controls and Security/Surveillance Measures

While under the ownership of USDOE, access control of the entire SRS will be maintained in accordance with the 1992 RCRA Part B Permit Renewal Application, Volume I, Section F.1. This section describes the 24-hour surveillance system (R.61-79.264.14(b)(1)), artificial or natural barriers (R.61-79.264.14(b)(2)(I)), control entry systems (R.61-79.264.14(b)(2)(ii)), and access control warning signs (R.61-79.264.14(c)) in place at the SRS boundary to comply with the security requirements for a RCRA-permitted facility.

4.7 Field Inspection and Maintenance for Institutional Controls

"Monitoring" will be performed to verify that the LUCIP requirements are met. Semi-annual monitoring of the PRSB OU will be conducted for items such as accuracy and legibility of signs, visible subsidence or erosion of the waste unit, proper vegetative growth, and mowing. Subsidence or erosion will be corrected by backfilling the affected area with clean soil and seeding the area to prevent further erosion. After remediation of the PRSB OU, only maintenance activities will be required per this RA. USEPA and SCDHEC will be notified of the results of any event and/or action that could indicate some potential compromise of institutional controls within 30 days of identification. These events or actions will be documented in the FFA Annual Progress Report. All other routine maintenance activities will be documented and maintained in files subject to USEPA and SCDHEC review and audit. A copy of the complete inspection form is maintained in the SGCP Document Control Center. The LUCs will be implemented as long as the waste remains a threat to human health or the environment.

A unit-specific field inspection checklist is provided in Appendix B of this LUCIP. The waste site inspectors are to be trained in Hazardous Waste Operations and Emergency Response (HAZWOPER), RCRA Well Inspections (SGCP-specific training), SGCP RCRA Waste Unit

Inspections, Radiological Workers, etc., as applicable for the specific inspection. They will also be trained based on the individual requirements of the regulatory approved closure documents for each waste unit. In addition, the inspectors are to attend yearly refresher courses. Over the years, different personnel may conduct the inspections and grass cutting operations.

5.0 REFERENCES

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

USDOE, 1996. *SRS Future Use Project Report, Stakeholder Recommendations for SRS Land and Facilities*, U.S. Department of Energy Savannah River Operations Department, January

USDOE, 1998. DOE Order 430.1A, *Life Cycle Management* (Approved 10/14/98)

WSRC, 2003a. WSRC Procedure Manual 1D, *Site Infrastructure and Services Manual (U)*, Procedure 3.02, "Site Real Property Configuration Control," Westinghouse Savannah River Company, Savannah River Site, Aiken, SC

WSRC, 2003b. WSRC Procedure Manual 1Q, *Quality Assurance (U)*, Westinghouse Savannah River Company, Savannah River Site, Aiken, SC

WSRC, 2003c. *Unit-Specific Plug-In Technical Evaluation Report for the P-Area Reactor Seepage Basins 904-61G, 904-62G, and 904-63G) Operable Unit (U)*, WSRC RP-2002-4082, February, Rev. 1.1, Westinghouse Savannah River Company, Savannah River Site, Aiken, SC

6.0 APPENDICES

Appendix A Survey Plat

Appendix B Field Inspection Checklist

Appendix C Post-Remedial Action Conceptual Site Model

APPENDIX A

SURVEY PLAT

LAND USE CONTROL IMPLEMENTATION PLAN SURVEY PLAT

(The survey plat will be incorporated in this LUCIP upon completion of the construction phase).

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APPENDIX B

FIELD INSPECTION CHECKLIST

FOR LUCIP FOR P-REACTOR SEEPAGE BASINS

APPENDIX B

SGCP FIELD INSPECTION CHECKLIST - TYPICAL

Note: This unit-specific LUCIP, including the checklist, will be appended to the SRS LUCAP. The Appendix A survey plat will be provided upon completion of the construction phase.

☐ **SCHEDULED** ☐ **UNSCHEDULED**

A= Satisfactory X= Unsatisfactory (Explanation required)	A or X	Observation of Corrective Action Taken
1. Verify that the roads are accessible.		
2. Verify that the waste unit signs (specify the number) are in acceptable condition, have the correct information, and are legible from a distance of 25 feet.		
3. Verify that there are no excavation, digging, or construction activities on the soil cover.		
4. Check the integrity of drainage ditches (if any) for the presence of excessive erosion, sediment buildup, and any debris restricting water flow.		
5. Verify that no woody vegetation is growing on the soil cover. Remove or identify as needed.		
6. Visually check the vegetative cover for grass density, with no bare spots more than 3 by 3 feet in area. The height of the vegetative cover should not impair the visual inspection of the soil cover. This will be determined by the inspector.		
7. Check the closure cover system for signs of erosion or depressions (subsidence).		
8. Check for signs of burrowing animals.		

Inspected by: _____ / _____ Date _____

(Print Name) (Signature)

Post-Closure Manager: _____ / _____ Date _____

(Print Name) (Signature)

CAUTION: The inspector shall notify the Post-closure manager (PCM) and Environmental Compliance Authority (ECA) **IMMEDIATELY** if there has been a breach or compromise of the institutional controls at this waste unit. Refer to post-closure inspection procedures.

APPENDIX C

POST-REMEDIAL ACTION CONCEPTUAL SITE MODEL

FOR THE LUCIP FOR P-REACTOR SEEPAGE BASINS

APPENDIX C

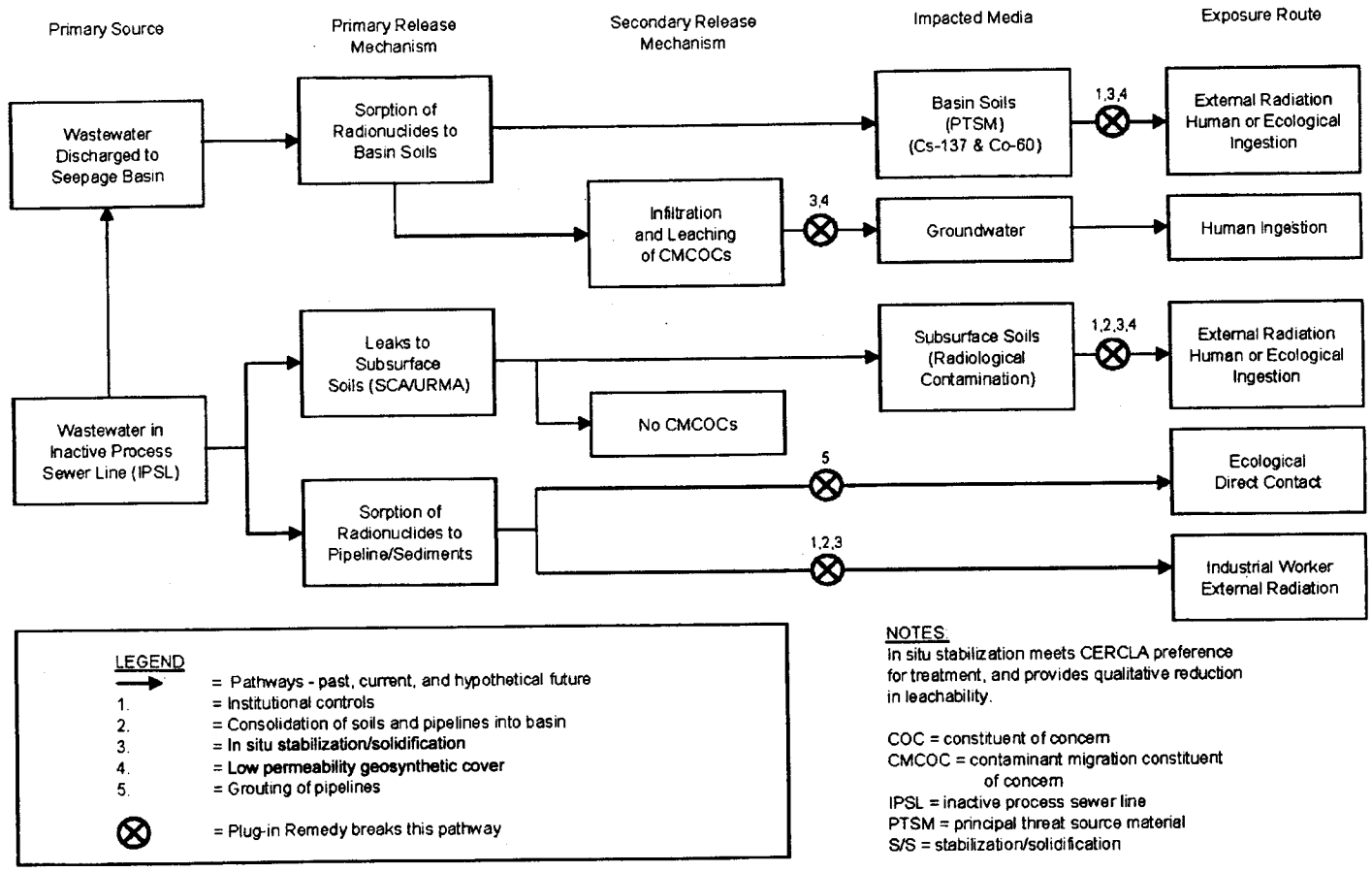


Figure C1. Post-Remedial Action Conceptual Site Model for the LUCIP For P-Reactor Seepage Basins

LUCIP for the
R-Area Bingham Pump Outage Pits, 643-8G, -9G, and –10G and R-Area Unknown Pits #1, #2, and #3, RUNKS-1, -2, and -3

Appendix B of *Final Remediation Report for the R-Area Bingham Pump Outage Pits, 643-8G, -9G, and –10G and R-Area Unknown Pits #1, #2, and #3, RUNKS-1, -2, and -3*
(WSRC-RP-2003-4061, Revision 1, July 2003)

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Appendix B

LAND USE CONTROL IMPLEMENTATION PLAN (LUCIP)

for the

R-AREA BINGHAM PUMP OUTAGE PITS (643-8G, 643-9G, AND 643-10G)

and

R-AREA UNKNOWN PITS #1, #2, and #3 (RUNKS -1, -2 and -3)

LAND USE CONTROL IMPLEMENTATION PLAN

This R-Area Bingham Pump Outage Pits (643-8G, 643-9G, and 643-10G) and R-Area Unknown Pits #1, #2, and #3 (R BPOPs and RUNKs) OU Land Use Control Implementation Plan (LUCIP) will be appended to the Savannah River Site (SRS) Land Use Control Assurance Plan (LUCAP) (WSRC 1999b).]

The selected remedy leaves hazardous substances in place that pose a potential future risk and will require land use restrictions for an indefinite period of time. As negotiated with the United States Environmental Protection Agency (USEPA) and in accordance with USEPA Region IV policy (Johnston 1998), the SRS has developed a LUCAP (WSRC 1999b) to ensure that land use restrictions are maintained and periodically verified. This LUCIP provides detailed and specific measures required for the land use controls selected as part of this remedy. The United States Department of Energy (USDOE) is responsible for implementing, maintaining, monitoring, reporting upon, and enforcing the land use controls described herein. Upon final approval, the LUCIP will be appended to the LUCAP and is considered incorporated by reference into the FRR, establishing land use controls implementation and maintenance requirements enforceable under the Comprehensive Environmental Response, Compensation, and Recovery Act (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.

1.0 REMEDY SELECTION

1.1 R-Area Bingham Pump Outage Pits (643-8G, 643-9G, and 643-10G and RUNKs 1, 2 and 3)

R Area is located in the central portion of SRS, approximately 5 miles from the nearest SRS boundary. The R BPOPs and RUNKs OU is situated northeast and outside the R-Area fence line. The R BPOPs and RUNKs OU consists of six pits including three known pits called R BPOPs (643-8G, 643-9G, and 643-10G) and three pits with unknown or incomplete histories called RUNKs (RUNK-1, RUNK-2, and RUNK-3). Pits 643-8G and 643-9G are approximately 250 ft long, 16 ft and 20 ft wide, respectively, and up to 13 ft deep. Pit 643-10G is approximately 522 ft long, 19 ft wide, and 14 ft deep. RUNK-1 and RUNK-3 are approximately 105 ft and 135 ft long, respectively, 25 ft wide, and up to 8 ft deep. RUNK-2 is approximately 445 ft long, 30 ft wide, and up to 12 ft deep. The sum of the areas for each pit is 0.9 acres; the area of a polygon around all the pits, which includes the areas between the pits, is 1.75 acres.

The land surface at R BPOPs and RUNKs OU is gently sloping and covered by grassy vegetation. Dense vegetation and trees are located around the unit. The habitats at the OU generally do not meet the needs of most threatened, endangered, or sensitive species. No unique or sensitive ecosystems have been identified.

RUNK-2 predates the R BPOPs and was in existence as early as 1953. Construction debris has been verified in RUNK-2 based upon a magnetic survey, ground penetrating radar (GPR) surveys, and soil sampling in the pit. Liquid wastes were also introduced into the pit, but no containerized liquids were discovered during characterization. RUNK-2 was closed in 1956.

The R BPOPs were constructed during 1957 and 1958 when major modifications were made to primary and secondary SRS reactor cooling water systems. The outages of the cooling water systems that occurred as a result of these modifications became known as Bingham Pump Outages. Wastes generated during these outages were segregated based

on levels of radioactivity. Higher activity waste was sent to the SRS Burial Ground Complex in E Area while lower activity waste was buried in the R BPOPs. Waste disposed of in the R BPOPs consisted of miscellaneous construction materials such as pipes, cables, ladders, concrete, and miscellaneous hardware. The R BPOPs were closed in the late 1950s by backfilling with approximately 4 ft of cover soil.

RUNK-1 and RUNK-3 were discovered in 1993 during a GPR survey of the area. The survey indicated that these areas had been previously disturbed, but their history is unknown. Magnetic surveys of these RUNKs indicated they do not contain metallic debris; furthermore, no metallic or non-metallic debris was encountered during soil sampling. Due to the lack of any identified debris, it is possible that no debris was ever placed in these two RUNKs.

The R-Area BPOPs and RUNKs waste units are listed as CERCLA waste units in the SRS Federal Facility Agreement (FFA) but are not subject to Resource Conservation and Recovery Act (RCRA) permit modification in accordance with Appendix C of the SRS FFA (FFA 1993).

The OU has been assessed through characterization and a series of documents written by USDOE and approved by the regulatory agencies (South Carolina Department of Health and Environmental Control [SCDHEC] and USEPA). These documents include a Work Plan (WSRC 1999a), a Remedial Investigation (RI) Report with Baseline Risk Assessment (BRA) (WSRC 2000), and a Proposed Plan (PP) (WSRC 2001b). A Feasibility Study (FS) was not prepared because USDOE, SCDHEC, and USEPA agreed that the problem warranting action and the scope of the problem was well-defined and that the list of likely response actions was short enough to proceed directly from the RI/BRA to the PP. The types of assessments typically done in an FS were included in Appendix A of the PP. A PP 30-day public comment period began on April 18, 2002, and ended on May 17, 2002. No comments were received during the public comment period. These documents culminated in a Record of Decision (ROD) (WSRC 2002) for

the OU. The scope of the problem addressed by this final ROD action was contamination in soil and on buried debris at R BPOPs and RUNKs OU. USDOE, USEPA, and SCDHEC have agreed in the R BPOPs and RUNKs OU ROD that groundwater at the OU will be evaluated separately in association with the R Area Groundwater OU.

1.2 Nature and Extent of Contamination in R BPOPs and RUNKs OU

The sampling data were evaluated in the RI/BRA to identify refined constituents of concern (RCOCs), which are constituents warranting remedial action. RCOCs were identified using the SRS protocols for data processing, human health and ecological risk assessment, and contaminant migration modeling. Table 1 lists the RCOCs and risks at the unit from the RI/BRA. Modeling indicated that there are no contaminant migration (CM) refined constituents of concern (RCOCs).

Table 1. Summary of Risks and Hazards: Surface Soil at R BPOPs and RUNKs

Known On-Unit Worker
No RCOCs

Future On-Unit Industrial Worker				
RCOC	**Ingestion**	**Inhalation**	**Dermal/External**	**Total of All Exposure Routes**
Benzo(a)pyrene	2.54×10^{-6}	----	5.24×10^{-6}	7.78×10^{-6}
Dibenzo(a,h)anthracene	----	----	1.54×10^{-6}	1.54×10^{-6}
Cesium-137	----	----	1.94×10^{-6}	1.94×10^{-6}
Cobalt-60	----	----	2.17×10^{-6}	2.17×10^{-6}
			Total Cumulative Risk	1.34×10^{-5}

---- = not a RCOC for this pathway.
There are no ecological RCOCs or CM RCOCs for the R BPOPs and RUNKs OU.
A risk of 1×10^{-6} means there is a risk of one additional incident of cancer per one million people.

There are no RCRA-listed or characteristic wastes at the unit. There is no principal threat source material (PTSM) (highly-mobile or highly-toxic source materials that require a bias toward treatment alternatives) at the R BPOPs and RUNKs OU. The contamination is largely isolated by backfill and exposure to RCOCs is limited by land use restrictions. Therefore, the waste is categorized as a low-level threat.

1.3 Remedial Action Overview

As documented in the ROD (WSRC 2002), based upon the characterization data and risk assessments in the RI/BRA (WSRC 2000), the RAOs, and the evaluation of alternatives, the selected remedy for the R BPOPs and RUNKs OU is Alternative 2: Institutional Controls.

The post-remedial action (RA) conceptual site model (see Attachment B-1) shows the broken pathways and the remaining residual risk to the future industrial worker.

According to the SRS Future Use Project Report (USDOE 1996), residential use of SRS land should be prohibited.

2.0 LAND USE CONTROLS

Considering the residual risk mentioned above, the land use control objectives are to

- maintain the use of the site for industrial activities only and
- prevent unauthorized access, contact, removal and excavation of buried RCOCs exceeding remedial goals at the closed CERCLA unit as long as the waste remains a threat to human health or the environment.

Current access controls and deed notification needed to maintain the future land use are described in the following sections of this LUCIP.

2.1 Access Controls

2.1.1 On-Site Workers

In accordance with WSRC 1D, *Site Infrastructure and Services Manual*, Procedure 3.02, "Site Real Property Configuration Control," use of all lands and waters on SRS shall be

coordinated via the Site Use Program. All employees, contractors, and visitors to the SRS must adhere with the requirements of the Site Use Program. This program ensures that all work performed on the SRS that adds, modifies, or removes features portrayed on the SRS development maps is authorized. No use of land (i.e., excavation or any other land use) shall be undertaken without prior approval documented by a Site Use Permit. This authorization is obtained through the completion of a Site Clearance Request Form. Also, in accordance with Procedure 3.02, all work at SRS that adds to or modifies features or facilities portrayed on SRS development maps (i.e., plot plans of facilities/utilities at SRS) will be authorized by a Site Clearance Permit before any excavation activities are conducted. All site clearance requests will be reviewed to verify that either an approved Site Use Permit has been obtained or that an existing Site Use Permit has sanctioned the request.

SRS, specifically the Site Development, Planning, and Mapping Department, is responsible for updating, maintaining, and reviewing site maps, including FFA (1993) operable unit (OU) identifications. If a site clearance request is made that may impact an FFA OU, the Site Clearance Request Form is sent to the FFA OU reviewer, who is in the Soil and Groundwater Closure Projects (SGCP), for either approval or disapproval. The roles and responsibilities of each individual are detailed in WSRC 1D, Procedure 3.02. Verification of USDOE approval for intended land use must be obtained before issuance of a Site Clearance Permit. The site use and site clearance processes are applicable to all activities and personnel on site (including subcontractors).

The processes are controlled within the SRS Quality Assurance (QA) Program. The SRS QA program is the governing QA program for all SRS activities, including those in SGCP. The activities that are performed in SGCP must comply with SRS QA Program procedures as well as with SGCP -specific procedures.

SRS identifies all buildings and facilities on maps used in the Site Use/Site Clearance Program. This waste unit is identified on these maps as a CERCLA facility.

Any work proposed in these areas will be strictly controlled and workers will be appropriately trained and briefed about health and safety requirements if work is deemed necessary for maintenance. No major change in land use or excavation at the R BPOPs and RUNKs OU shall be undertaken without USEPA and SCDHEC approval. To prevent unknowing entry and to ensure that unrestricted use of the waste unit does not occur while under ownership of the government, access control warning signs will be posted at the unit. The warning signs will be legible from a distance of at least 25 feet and will read as shown in Attachment B-2, which depicts a drawing of a typical access control warning sign. Custodial responsibilities for maintenance and inspection of the R BPOPs and RUNKs OU will be maintained by the Post-Closure Maintenance Group within SGCP.

2.1.2 Trespassers

While under the ownership of USDOE, access control of the entire SRS will be maintained in accordance with the 1992 RCRA Part B Permit Renewal Application, Volume I, Section F.1. This section describes the 24-hour surveillance system (R.61-79.264.14(b)(1)), artificial or natural barriers (R.61-79.264.14(b)(2)(I)), control entry systems (R.61-79.264.14(b)(2)(ii)), and warning signs (R.61-79.264.14(c)) in place at the SRS boundary to comply with the security requirements for a RCRA-permitted facility.

2.2 LUCIP Deed Notification

In the long-term, if the property is ever transferred to non-federal ownership, the US 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 RAs taken on the site. The contract for sale and the deed will contain the notification required by CERCLA Section 120(h).

The deed shall also include deed restrictions precluding residential use of the property. However, the need for these deed restrictions may be re-evaluated 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 re-evaluation 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 non-federal ownership, a survey plat of the OU will be certified by a professional land surveyor and recorded with the appropriate county recording agency.

Note: Survey Plat (Attachment B-3), and the line marked "AREA SUBJECT TO LAND USE CONTROLS" define the area subject to Land Use Controls. The OU boundary is delineated by survey markers.

2.3 Field Walkdown and Maintenance for Institutional Controls

After the remediation of the R BPOPs and RUNKs OU, only maintenance activities will be required per this RA.

The USEPA and SCDHEC will be notified of the results of any events and/or actions that indicate some potential compromise of institutional controls within 30 days of identification. The events/actions will be documented in the FFA Annual Progress Report. All other routine maintenance activities will be documented and maintained in files subject to USEPA and SCDHEC review and audit. A copy of the complete inspection form is maintained in the SGCP Administrative Record Files. The land use controls will be implemented as long as the waste remains a threat to human health or the environment.

Site maintenance will consist of inspections of the OU and maintenance of existing drainage features to minimize the formation of large gullies. Minor earthwork will be

performed as needed to repair any erosion damage that may occur. No grading or construction of new drainage features is anticipated to be needed. Site maintenance will also include mowing of the existing cleared areas of OU. Trees will be removed as necessary to facilitate mowing. Site maintenance will ensure that site conditions for which the remedial action has been implemented do not change. Site maintenance and inspections will be performed annually.

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 posting 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, warning signs will be posted at each entrance to the restricted portion of the unit. Signs will be legible from a distance of at least 25 ft.

As required by the National Oil and Hazardous Substance Contingency Plan (NCP), statutory 5-year reviews of the RA for the R BPOP and RUNKs OU will be performed as long as the waste remains a threat to human health or the environment.

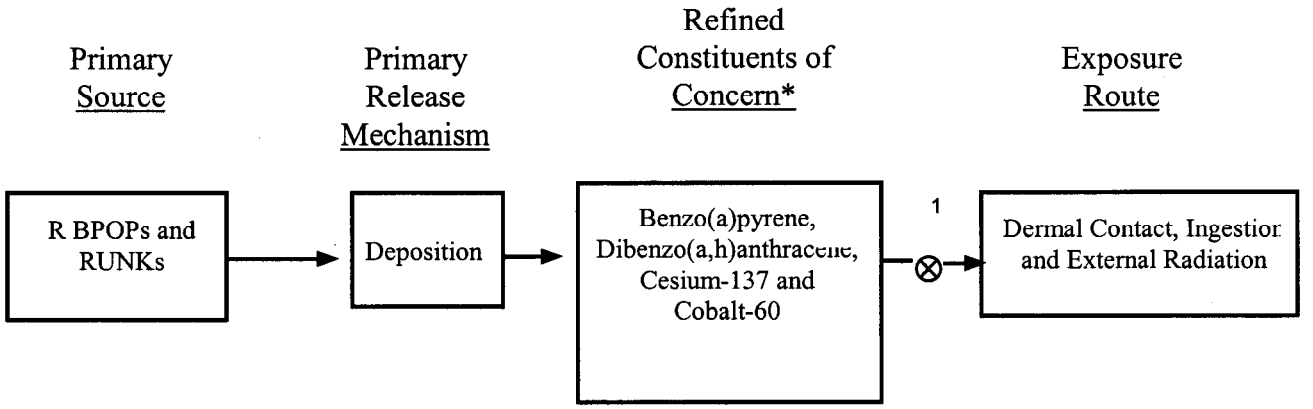
The waste site inspectors are to be trained in Hazardous Waste Operations and Emergency Response (i.e. HAZWOPER), RCRA Well Inspections (SGCP-specific training), SGCP RCRA Waste Unit Inspections, Radiological Workers, etc., as applicable for the specific inspection. They will also be trained based on the individual requirements of the regulatory approved closure documents for each waste unit. In addition, the inspectors are to attend yearly refresher courses. Over the years, different personnel will conduct the inspections and grass cutting operations.

This unit-specific LUCIP, including the inspection checklist (Attachment B-4), will be appended to the SRS LUCAP. If the OU is ever transferred to non-federal ownership, a survey plat of the area, prepared by a certified professional land surveyor, will be recorded with the county recording agency.

ATTACHMENT B-1

CONCEPTUAL SITE MODEL FOR THE R-AREA BPOPS AND RUNKs

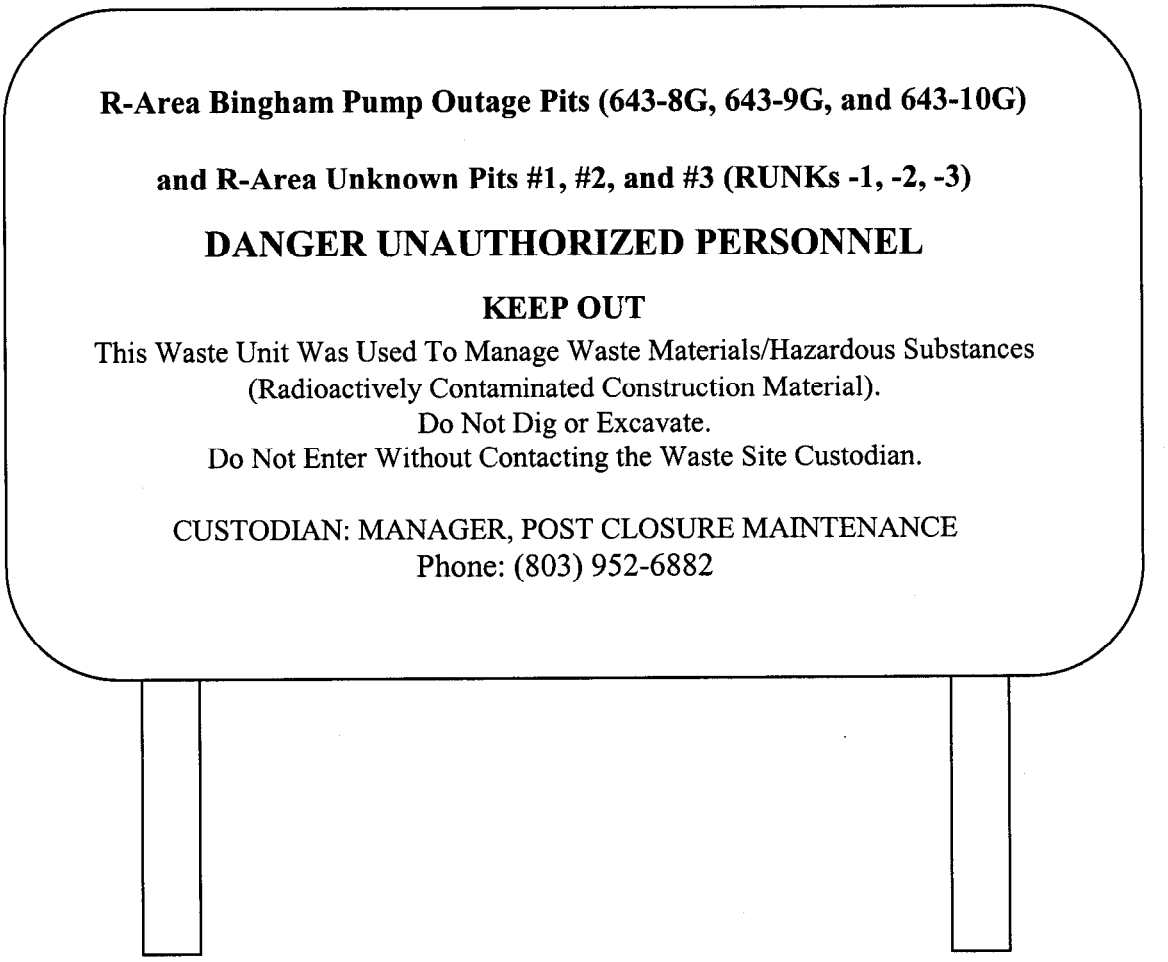
POST-REMEDIAL ACTION



Legend
⊗ Pathway break
Remedial Alternative:
(1) Institutional Controls
*Based on industrial worker scenario (found in soil at depths of 0 to 1 ft)

ATTACHMENT B-2

ACCESS CONTROL WARNING SIGNS

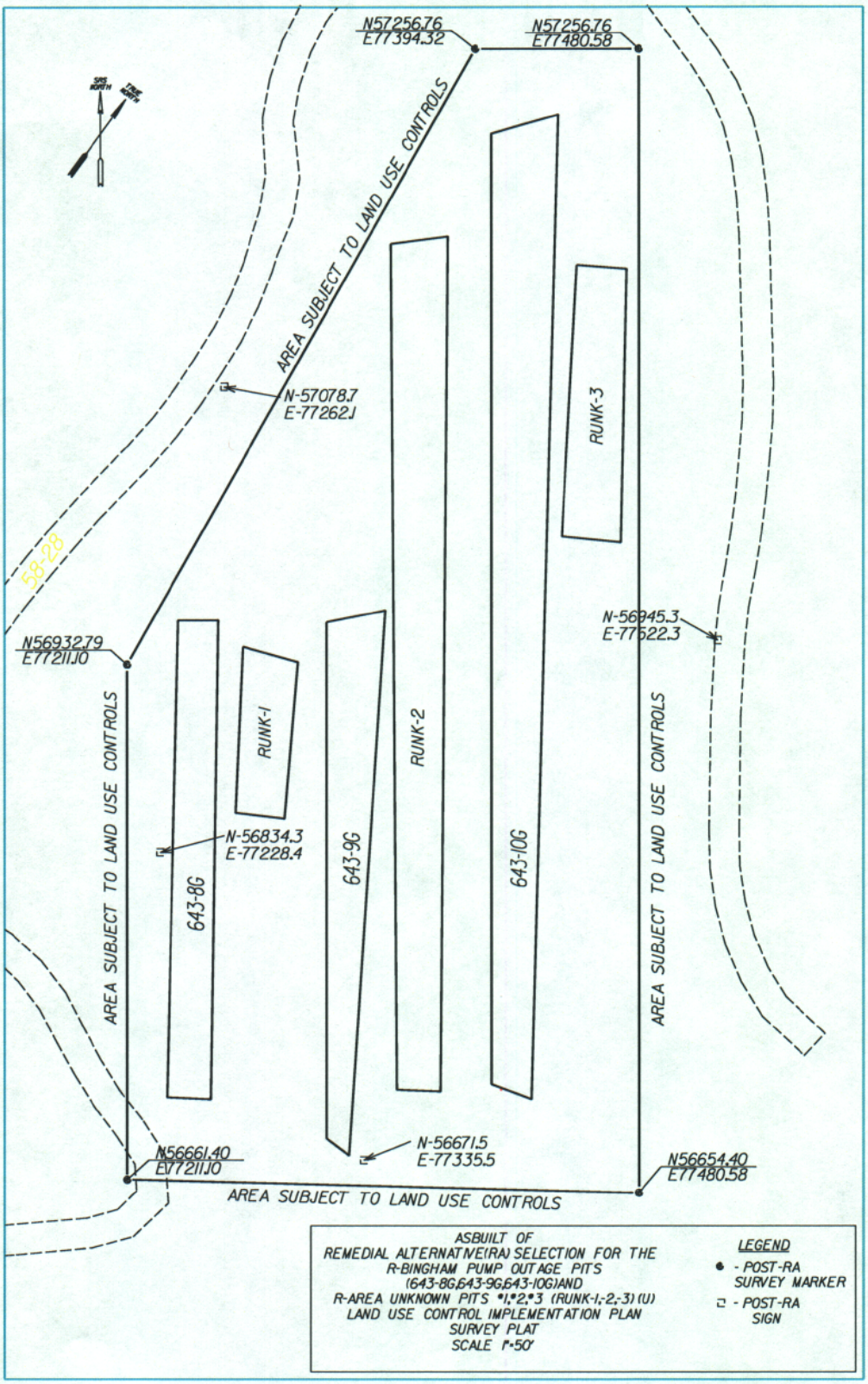


ATTACHMENT B-3

SURVEY PLAT

LAND USE CONTROL

IMPLEMENTATION PLAN SURVEY PLAT


N57256.76
E77394.32
N57256.76
E77480.58
SRS NORTH
TRUE NORTH
AREA SUBJECT TO LAND USE CONTROLS
N-57078.7
E-77262.1
RUNK-3
58-28
N56932.79
E772111.0
N-56945.3
E-77522.3
RUNK-1
RUNK-2
643-96
643-106
643-86
N-56834.3
E-77228.4
AREA SUBJECT TO LAND USE CONTROLS
AREA SUBJECT TO LAND USE CONTROLS
N56661.40
E772111.0
N-56671.5
E-77335.5
N56654.40
E77480.58
AREA SUBJECT TO LAND USE CONTROLS
ASBUILT OF
REMEDIAL ALTERNATIVE(RA) SELECTION FOR THE
R-BINGHAM PUMP OUTAGE PITS
(643-8G,643-9G,643-10G)AND
R-AREA UNKNOWN PITS #1,#2,#3 (RUNK-1,-2,-3) (U)
LAND USE CONTROL IMPLEMENTATION PLAN
SURVEY PLAT
SCALE 1"=50'
LEGEND
- POST-RA SURVEY MARKER
- POST-RA SIGN

ATTACHMENT B-4

SGCP FIELD INSPECTION CHECKLIST

for the

R-AREA BINGHAM PUMP OUTAGE PITS (643-8G, 643-9G, and 643-10G)

and

R-Area Unknown Pits #1, #2, and #3 (RUNKs 1, 2, and 3)

SGCP ANNUAL INSPECTION DATA SHEET
for R-AREA BPOPs and RUNKs OU

A = Satisfactory X = Unsatisfactory (Explanation Required)	A or X	Comments or Corrective Action Taken (See Maintenance Register for Corrected Items)
Verify there is no unauthorized digging; excavation, or construction activities within the OU.		
Verify that roads are accessible.		
Verify that the waste unit signs are in acceptable condition, have the correct information, and they are legible from at least 25 feet.		
Mow vegetation (and remove trees to facilitate mowing) within the existing cleared area.		
Maintain existing drainage features to minimize the formation of large gullies (i.e. 3 ft. wide and 1 ft. deep). Minor earthwork will be performed as needed to repair any erosion damage that may occur. No grading or construction of new drainage features is needed.		
Comments:		

Inspected By:_____/_____Date/Time:_____/_____
(Print Name) (Signature)

Reviewed By
Post-Closure Manager:_____/_____Date/Time:_____/_____
(or designee) (Print Name) (Signature)

CAUTION: The inspector shall notify the PCM and ECA **IMMEDIATELY** if there has been a breach or compromise of the institutional controls of this waste unit. Refer to post-closure inspection procedures.

LUCIP for the
SRL Seepage Basins, 904-51G1, -53G3, -54G, and -55G
Appendix A of *Corrective Measures Implementation Report/Post-Construction Report/ Final Remediation Report for the SRL Seepage Basins, 904-51G1, -53G3, -54G, & -55G*
(WSRC-RP-2001-4123, Revision 1, February 2002)

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APPENDIX A
UNIT-SPECIFIC LAND USE CONTROL IMPLEMENTATION PLAN FOR SRL SEEPAGE BASINS INCLUDING SRLSB SURVEY PLAT

The SRL Seepage Basin (SRLSB) Land Use Control Implementation Plan (LUCIP) will be appended to the Savannah River Site (SRS) Land Use Control Assurance Plan (LUCAP). SRS is responsible for implementing the land use controls (LUCs) (e.g., inspections, maintenance, etc.) outlined in this unit-specific LUCIP.

1.0 REMEDY SELECTION

The SRLSB unit consists of four unlined basins that received low-level radioactive wastewater from SRL until 1982. Basins 1 and 2 were placed in operation in 1954, and Basins 3 and 4 were added in 1958 and 1960, respectively. The basins were used from 1954 to 1982 to dispose of low-level radioactive liquid waste generated in the laboratories located in Buildings 735-A and 773-A. Waste was transferred from the laboratories to the basins via a 900-foot long, 10-inch diameter, clay, process sewer line pipe.

Characterization of the SRLSB revealed that the highest concentrations of contaminants and the contaminants with the highest potential risk were primarily restricted to surface and subsurface soils within the unit. It was determined that the SRLSB does not represent a source of contamination to groundwater.

The remedy for the SRLSB was excavation and off-SRS disposal of all principal threat source material, soil above the 1×10^{-3} industrial worker health risk level. The remedy entailed the following actions:

a) Excavation of approximately 4 feet of soil from the bottom and 1 foot of soil from the berms of Basin 1

b) Excavation of approximately 5 feet of soil from the bottom and approximately 1 foot from the berms of Basin 2

c) Excavation of approximately 1 foot from the bottom and berms of Basin 3

d) No soil was removed from Basin 4

e) Removal of the process sewer pipeline and associated soils from Basin 1 to the first manhole

f) Backfill of all four basins and the process sewer trench with clean soil. The soil cover was then vegetated to prevent erosion. The depth of the clean soil is nominally between 9 to 19 feet

g) Transportation and disposal of all excavated soil and the pipeline to Envirocare of Utah, Inc., an approved, licensed, off-SRS low-level waste disposal facility

According to the *Savannah River Site Future Use Project Report* (USDOE 1996), "residential uses of SRS land should be prohibited". The Conceptual Site Model (CSM), Figure A-1, was revised to reflect the implementation of the remedy. Since it shows some remaining residual risk that would preclude unrestricted land use, LUCs are needed to maintain the future land use (industrial) and to ensure continued protection of human health and the environment. The LUCs were developed based on there being some residual risk remaining and that the residual risk is located 10 to 14 feet below the final grade.

2.0 LAND USE CONTROLS

For SRLSB, the LUC objective necessary to ensure protectiveness of the remedy is:

> Controlled access to the SRLSB unit in accordance with the current site use/site clearance programs, including signs posted in the area to indicate that soil beneath the unit has been contaminated with radionuclides

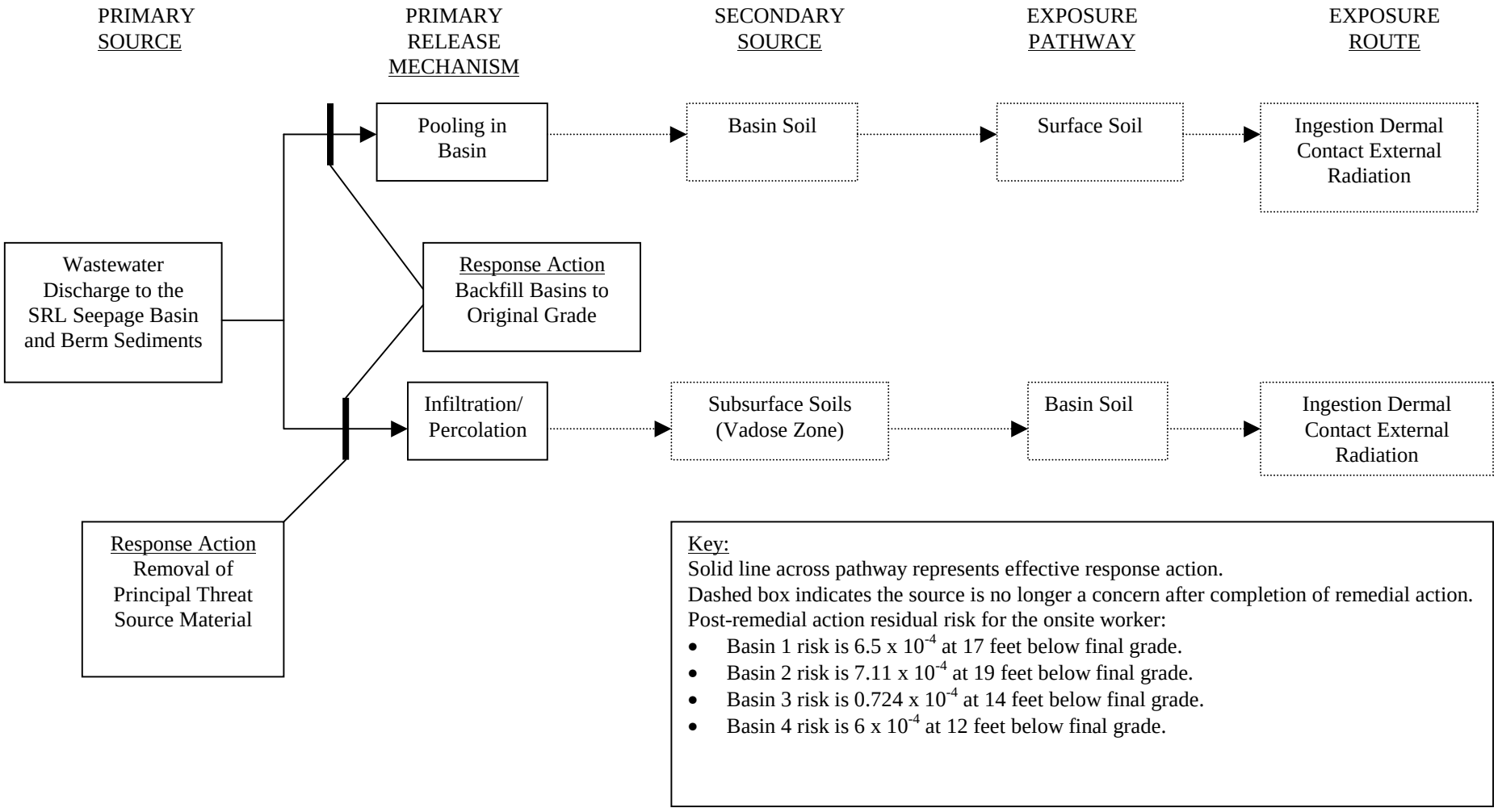


Figure A-1. Conceptual Site Model for the SRL Seepage Basin

The elements of the institutional control corrective action, which consists of land restrictions without any engineering controls, are composed of deed notifications when the parcel is transferred from federal ownership (Section 2.1), access controls that include posting of identification signs (Section 2.2), and field walkdowns for general site conditions (Section 2.3). These LUCs will be implemented in perpetuity for this operable unit.

Each element of the institutional controls corrective action is discussed below.

2.1 Deed Notification

A deed notification shall be filed in the appropriate county records in accordance with CERCLA 120(h), which requires the government to create a deed when land on which any hazardous substance was stored, released, or disposed is transferred to non-federal ownership. In the event the property is transferred, a deed notification will be filed with Aiken County. Per CERCLA 120(h)(3)(A), the deed shall contain, to the extent practical, such information as is available based on the complete search of agency files, including the following:

- A notice of the type and quantity of such hazardous substances;
- Notice of the time at which such storage, release, or disposal took place;
- A description of the remedial action taken, if any.

Per CERCLA 120(h)(3)(B), the deed shall also contain a covenant warranting that

- All remedial action necessary to protect human health and the environment with respect to any such substance remaining on the property has been taken before the date of such transfer.
- Any additional remedial action found to be necessary after the date of such transfer shall be conducted by the United States Government.

- A clause granting the United States Government access to the property in any case in which remedial action or corrective action is found to be necessary after the date of such transfer.

RCRA permit requirements are applicable for this waste unit per the SRS Federal Facility Agreement, Appendix C.

2.2 Access Controls

2.2.1 On-Site Workers

In accordance with WSRC 1D, *Site Infrastructure and Services Manual*, Procedure 3.02, *Site Real Property Configuration Control*, use of all lands and waters on the SRS shall be coordinated via the Site Use Program. No use of land (i.e., excavation or any other land use) shall be undertaken without prior approval documented by a Site Use Permit. Also, in accordance with Procedure 3.02, all work at SRS that adds to or modifies features or facilities portrayed on the SRS development maps (i.e., plot plans of facilities/utilities at SRS) is authorized by a Site Clearance Permit before any excavation activities. All Site Clearance requests are reviewed to verify that either an approved Site Use Permit has been obtained or that an existing Site Use Permit has sanctioned the request. Verification of USDOE approval for intended land use must be obtained before issuance of a Site Clearance Permit. The Site Use and Site Clearance processes are applicable to all activities and personnel on site (including subcontractors). The processes are controlled within the SRS Quality Assurance Program.

The SRS identifies all buildings and facilities on maps used in the Site Use/Site Clearance Program and includes a 200-foot buffer zone around each facility. This waste unit is identified on these maps as a CERCLA facility.

Any work proposed in these areas will be strictly controlled and workers will be appropriately trained and briefed about health and safety requirements if work is deemed necessary for maintenance. Any changes in the use or disturbance of the SRLSB will be cleared with the USEPA and SCDHEC before disturbance occurs.

To prevent unknowing entry and to ensure that unrestricted use of the waste unit does not occur while under ownership of the government, identification signs will be posted at the unit. The signs will be legible from a distance of at least 25 feet and located around the basin as shown on the SRLSB Remediation Grading Plan As-Built (U) (SK-C-5388, Attachment 2 of this LUCIP). Also provided in this LUCIP is the SRLSB Survey Plat (Attachment 3) which shows only the boundary signs.

The signs will read:

> SRL Seepage Basins (904-53G (1&2), -54G, and -55G)
> "Danger – Unauthorized Personnel Keep Out. This unit was used to manage hazardous substances. Do not dig or excavate. Do not enter without contacting the waste site custodian."
> Custodian: Manager, Post Closure Maintenance
> Phone: (803) 952-6882

2.2.2 Trespassers

Additionally, while under the ownership of the USDOE, access control of the entire SRS will continue to be maintained in accordance with the 1992 RCRA Part B Permit Renewal Application, Volume I, Section F.1. This section describes the 24-hour surveillance system (R.61-79.264.14(b)(1)), artificial or natural barriers (R.61-79.264.14(b)(2)(i)), control entry systems (R.61-79.264.14(b)(2)(ii)), and warning signs (R.61-79.264.14(c)) in place at the SRS boundary to comply with the security requirements for a RCRA-permitted facility.

2.3 Field Walkdowns and Maintenance for Institutional Controls

Monitoring will be performed to verify that LUCIP requirements are being met. Based on the amount of fill placed (9 to 19 feet), that the basins (holes) have been backfilled with clean soils, and the surrounding area being virgin, wooded and well established, once vegetation is established on the backfilled basins, erosion to depths that would expose the residual is not expected. Based on this, annual monitoring of the SRLSB OU will be conducted. These inspections will look for items such as accuracy and legibility of signs, visible subsidence or erosion of the

waste unit, proper vegetative growth, etc. Subsidence or erosion will be corrected by backfilling the affected area with clean soil and seeding the area to prevent further erosion. The results of any events and/or action that could indicate some potential compromise of institutional controls will be documented in the Federal Facility Agreement Annual Progress Report. All other routine maintenance activities will be documented and maintained in files that are subject to USEPA and SCDHEC review and audit. A copy of the completed inspection form is maintained in the Environmental Restoration Division administrative record files.

Inspections at the SRLSB will be performed to ensure that institutional controls remain protective and consistent with all remedial action objectives. Annual inspections will be conducted. The SRL Seepage Basins (904-53G (1 & 2), -54G, and -55G) Inspection Sheet is included in Attachment 1 of this LUCIP.

ATTACHMENT 1
SRL SEEPAGE BASINS INSPECTION SHEET
SRL SEEPAGE BASINS (904-53G (1 & 2), -54G, and -55G) INSPECTION SHEET

A = Satisfactory **X = Unsatisfactory (Comments required)**	**A or X**	**Comments of Corrective Action Taken (See Maintenance Register for Corrected Items)**
Check for potential encroachments (Ensure that there is no building on the site).		
Does the site have brush or woody vegetation that needs cutting and disposal?		
Does the site need to have the grass cut?		
Verify that the roads are accessible.		
Verify that the waste unit's signs are correct and legible.		
Does the site show signs of erosion or subsidence? Are there any signs of burrowing animals (holes)?		
Does the site have adequate vegetative cover?		
Check the integrity of drainage ditches (around the area) for the presence of excessive erosion, sediment buildup, and any debris restricting water flow.		
Does the site need general cleanup (housekeeping)?		

Inspected By:_____/_____Date/Time:_____/____
(Print Name) (Signature)

Post Closure Manager:_____/_____Date/Time:_____/____
(Print Name) (Signature)

Note: USEPA and SCDHEC must be notified within 30 days of identification of any area where any breach or compromise of restrictions place on this institutional control operable unit has occurred

ATTACHMENT 2



SIGN NUMBER	NORTH	EAST
1	105606	52592
2	105672	52659
3	105735	52725
4	105801	52793
5	105859	52867
6	105911	52941
7	105962	53016
8	105876	53079
9	105799	53138
10	105718	53200
11	105671	53138
12	105620	53078
13	105718	52989
14	105628	52876
15	105655	52848
16	105569	52761
17	105504	52688
18	105553	52639

ON (TYP @ BOTH ENDS)

P Q R S T U V W X Y

THIS DRAWING PLOTTED AT 2/3 SCALE.

SK C 5388 — LATEST REVISION: A

THIS DRAWING HAS BEEN FURNISHED BY THE SAVANNAH RIVER SITE. THE INFORMATION AND KNOW HOW THEREON MAY NOT BE USED NOR THE DRAWING REPRODUCED WITHOUT WRITTEN PERMISSION OF THE PRIME CONTRACTOR. ALL REPRODUCTIONS IN WHOLE OR IN PART, INCLUDING VENDOR'S SHOP DRAWINGS, SHALL BEAR OR REFER TO THIS STAMP.

REFERENCE DRAWINGS

SK-C-5387	PLAN VIEW
SK-C-5389	SECTIONS AND DETAILS

REFERENCE STANDARDS

UNITED STATES DEPARTMENT OF ENERGY

SAVANNAH RIVER SITE

BLDG. NO.	SITE CLEARANCE NO.	DESIGN AREA NO.	DESIGN GROUP
904-53,54 & 55G			PE&CD/ER

TITLE

SRL SEEPAGE BASINS REMEDIATION

GRADING PLAN AS-BUILT (U)

SCALE	SHP DRAWING NO.	SHEET NO.	LATEST REVISION
1" = 30'	SK-C-5388	1 OF 1	A

555555556666
234567890123

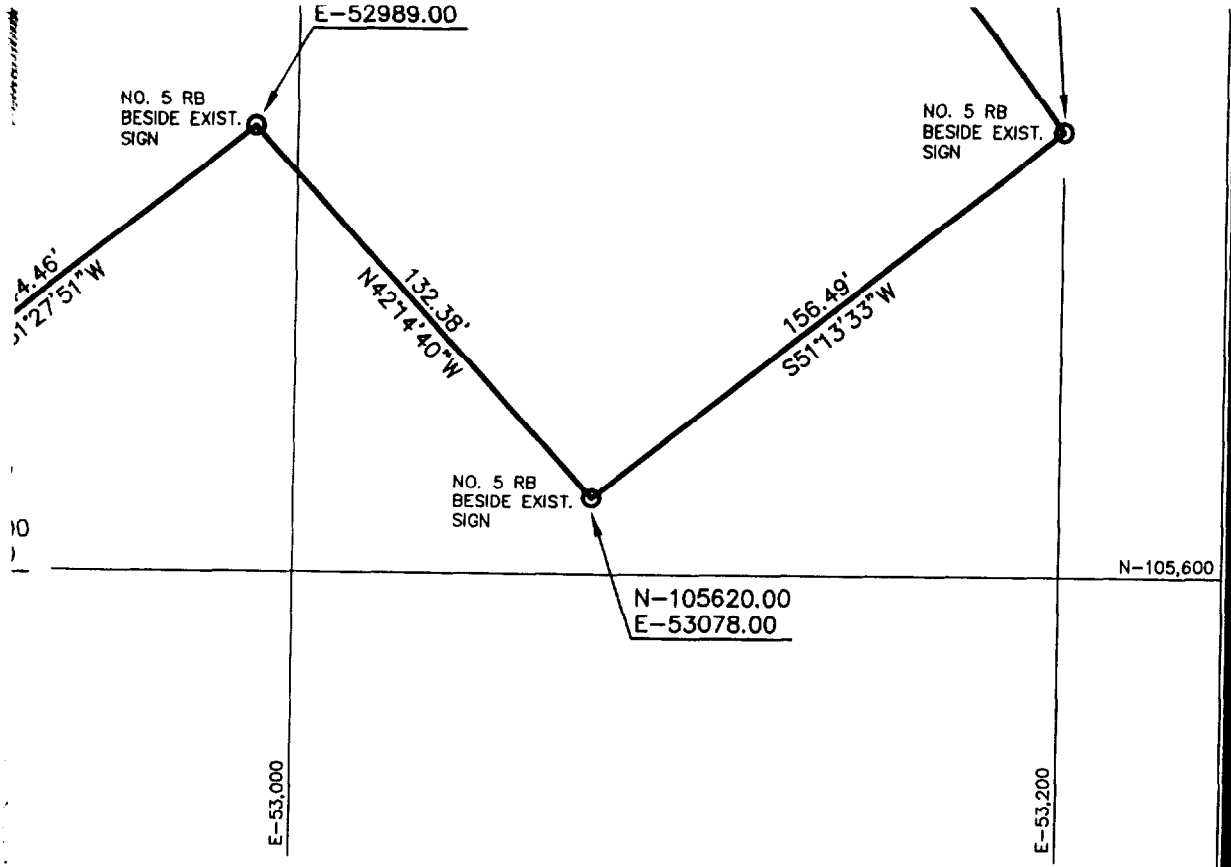
PSC= DRAWN BY (ORIG):
PLOT DATE 08/08/01 TIME

LAST CADD REV. BY: R.WILLIAMS
DATE: 08/08/01

Scale shown on this drawing is only applicable when plotted at 30"x42" (actual drawing size)

Attachment 2
SRLSB Remediation Grading Plan As-Built (U) (SK-C-5388)

ATTACHMENT 3



BOUNDARY SURVEY

OF

SRL SEEPAGE BASIN AREA

PROPERTY LOCATED AT SAVANNAH RIVER SITE

PREPARED FOR

ESTINGHOUSE SAVANNAH RIVER COMPANY

BUILDING 730-2B RM. 3007 AIKEN, S. C. 29808
C/O MARK CRIST (803)952-6021

OF: AIKEN STATE OF: S. CAROLINA

SCALE: 1" = 50' DWN. BY: JMB DATE: 25 JULY 2001

PREPARED BY

John M. Bailey & Associates, P.C.

PROFESSIONAL LAND SURVEYORS
110 WILDE DRIVE, BELVEDERE, S.C. 29841
(803)278-0721

Attachment 3
SRLSB Survey Plat

LUCIP for the
TNX Groundwater (082-G), Old TNX Seepage Basin (904-076G), and
New TNX Seepage Basin (904-102G)
Land Use Control Implementation Plan for TNX Operable Unit
(WSRC-RP-2003-4173, Revision 1, April 2004)

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011109

United States Department of Energy

Savannah River Site

Land Use Control Implementation Plan (LUCIP) for TNX Area Operable Unit (U)

CERCLIS NUMBER: 21, 29

WSRC–RP–2003-4173

Revision 1

April 2004

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

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

DISCLAIMER

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Prepared for

U.S. Department of Energy

and

Westinghouse Savannah River Company LLC

Aiken, South Carolina

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LIST OF ACRONYMS AND ABBREVIATIONS

CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
COC	Constituent of Concern
CSM	conceptual site model
DG	Discharge Gully
ECA	Environmental Compliance Authority
FFA	Federal Facility Agreement
GMZA	Groundwater Mixing Zone Application
IPSL	Inactive Process Sewer Line
LUC	Land Use Control
LUCIP	Land Use Control Implementation Plan
LUCAP	Land Use Control Assurance Plan
NTSB	New TNX Seepage Basin
ODA	Overflow Discharge Area
OTSB	Old TNX Seepage Basin
OU	Operable Unit
pCi	picocurie
PCM	Post-Closure Manager
QA	Quality Assurance
RCRA	Resource Conservation and Recovery Act
ROD	Record of Decision
SCDHEC	South Carolina Department of Health and Environmental Control
SGCP	Soil and Groundwater Closure Projects
SRS	Savannah River Site
USDOE	United States Department of Energy
USEPA	United States Environmental Protection Agency
WSRC	Westinghouse Savannah River Company, LLC

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1.0 INTRODUCTION

This Land Use Control Implementation Plan (LUCIP) has been prepared for TNX Area Operable Unit (OU) at the Savannah River Site (SRS). The purpose of the LUCIP is to describe how the land use controls (LUCs) selected in the TNX Area OU Record of Decision (ROD) will be implemented and maintained. These LUCs are:

- Providing access controls for on-site workers via the Site Use Program, Site Clearance Program, work control, worker training, worker briefing of health and safety requirements and identification signs located at the waste unit boundaries.

- Notifying the USEPA and SCDHEC in advance of any changes in land use or excavation of waste.

- Providing access controls against trespassers as described in the 1992 RCRA Part B Permit Renewal Application, Volume I, Section F.1, which describes the security procedures and equipment, 24-hour surveillance system, artificial or natural barriers, control entry systems, and warning signs in place at the SRS boundary.

The selected remedy leaves hazardous substances in place that pose a potential future risk and will require land use restrictions for an indefinite period of time. As agreed on March 30, 2000, among the United States Department of Energy (USDOE), the United States Environmental Protection Agency (USEPA), and the South Carolina Department of Health and Environmental Control (SCDHEC), SRS is implementing a LUCAP to ensure that the LUCs required by numerous remedial decisions at SRS are properly maintained and periodically verified. The requirements of that LUCAP also apply to the LUCs which were selected as part of the remedial action for TNX Area OU. This additional document, the TNX Area OU LUCIP, contains the detailed and specific measures required to implement and maintain the LUCs selected as part of this particular remedial decision. The USDOE is responsible for implementing, maintaining, monitoring, reporting upon, and enforcing the LUCs per the approved LUCIP. Upon final approval, the LUCIP will be appended to the LUCAP and is considered incorporated by

reference into the TNX Area Operable Unit ROD, establishing LUCs implementation and maintenance requirements enforceable under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). The LUCIP will remain in effect unless and until modifications are approved as needed to be protective of human health and the environment. This LUCIP will be evaluated for accuracy during the 5-year remedy review.

2.0 OVERVIEW OF TNX AREA OU REMEDIAL ACTION

2.1 TNX Area OU

The T Area consists of three OUs: the TNX Area OU, the TNX Outfall Delta, Lower Discharge Gully and Swamp (TNX OD) OU, and the X-001 Outfall Drainage Ditch OU; two site evaluation areas: the Neutralization Sump 678-T and the TNX Area Process Sewer Lines As Abandoned; and three buildings: 678-T, 677-T and 672-T. It is anticipated that the X-001 Outfall Drainage Ditch OU, site evaluation areas and remaining T Area buildings will be included under an area-wide ROD. The TNX Area OU is located 0.4 km (0.25 mi) east of the Savannah River on a terrace between Upper Three Runs Creek to the north and Fourmile Branch to the south (Figure 1). TNX Area OU consists of four major subunits: the New TNX Seepage Basin (NTSB)/Inactive Process Sewer Line (IPSL); the TNX Burying Ground (TBG)/Vadose Zone; the Old TNX Seepage Basin (OTSB)/IPSL/Upper Discharge Gully (UDG); and the TNX Groundwater (082-G).

The T Area was a pilot-scale testing and evaluation facility that supported fuel and target manufacturing chemical processes and the Defense Waste Processing Facility (DWPF). Presently, the buildings and laboratories located in the T Area are undergoing decontamination and decommissioning.

2.1.1 New TNX Seepage Basin/Inactive Process Sewer Line

The NTSB is an unlined earthen basin approximately 80 by 120 m (260 by 400 ft) in size. The NTSB includes the following four components:

- An Inlet Basin, 15 by 21 m (50 by 70 ft) in size and 1.2 m (4 ft) deep
- A Main Basin, 21 by 82 m (70 by 270 ft) in size and 2.1 m (7 ft) deep
- An Overflow Discharge Area (ODA), an irregularly shaped area defined by site topography with maximum lengths of 60 by 41 m (200 by 135 ft) and an area of approximately 2,500 m2 (27,000 ft2)

The operational history of the NTSB reveals that this basin was placed in operation in 1980 after closure of the OTSB. The NTSB operated until 1988. The NTSB, like the OTSB, received process wastewater flows from TNX pilot-scale simulations conducted in support of DWPF and the plant separations area. This wastewater consisted primarily of simulated nonradioactive sludge along with other nonradioactive wastes such as glass frit and laboratory sink discharges. No known hazardous waste was released to the basin. Prior to 1983, the discharges to the NTSB also included simulated nonradioactive salt supernate. On August 13, 1988, discharges to the NTSB were rerouted to the TNX Effluent Treatment Plant. When the IPSL was taken out of operation, the discharge from the process sewerline to the NTSB was plugged and a manhole where the process sewerline splits to the Effluent Treatment Plant and to the NTSB was filled with concrete, covering the outlet to the seepage basin.

2.1.2 TNX Burying Ground/Vadose Zone

The TBG, which consists of four known trenches at 6 to 8 ft below land surface (bls), was created in 1953 to dispose of debris from the accidental explosion of an experimental evaporator. A majority of the waste was excavated between 1982 and 1984. Waste in five areas within the original four trenches was not excavated due to underground and above-ground obstructions. Currently, most of the TBG underlies building slabs and Building 672-T. The groundwater beneath the TBG is known to be contaminated with chlorinated volatile organic compounds (CVOCs) sourced from releases to the vadose zone soil beneath the TBG at a depth of 6 to 14 m (20 to 45 ft) bls.

2.1.3 Old TNX Seepage Basin/Inactive Process Sewer Line/ Discharge Gully

The OTSB was an unlined excavation approximately 24 by 53 m (80 by 175 ft). The OTSB primarily includes the following components:

- An Inlet Basin, approximately 13 by 10 m (43 by 33 ft) in size and 2.4 m (8 ft) deep
- A Main Basin, approximately 39 by 25 m (129 by 83 ft) in size and 3 m (10 ft) deep
- The IPSL (east and north lines), which is a 19.8- to 20-cm (7.8 to 8 in) diameter VCP, 50 m (165 ft) (east line) and 33 m (108 ft) (north line) long, and approximately 1.2 to 4 m (4 to 4.5 ft) bls
- The DG, which is a gully approximately 1,330 m2 (14,318 ft2) in area (the DG includes both the UDG of the TNX Area OU and the LDG of the TNXOD OU).

The OTSB was an unlined liquid-waste disposal area that operated from the mid-1950s until 1980. The OTSB received a number of chemicals ranging from inorganic salts and low-level radionuclides to organic solvents through a series of process sewer lines originating from Buildings 677-T and 678-T. These lines are now inactive.

During periods of high flow, the Main Basin periodically overflowed downhill into the Savannah River flood plain adjacent to the TNX facility. In 1980, area wastewater was re-routed from the OTSB to the NTSB. During closure of the OTSB in 1981, the remaining liquid was drained to the nearby flood plain. As a result of these overflow events, erosion occurred in the hillside, forming a gully (DG) and sediment fan (Outfall Delta), and contaminated the inner portion of TNX swamp (Inner Swamp).

2.1.4 TNX Groundwater

Groundwater monitoring has been performed at TNX since the 1980s. This monitoring has identified CVOC contamination.

The unit is at an elevation of 46 m (150 ft) above mean sea level (msl). Local topography is relatively flat and slopes westward toward the Savannah River. A portion of the Savannah River flood plain swamp lies immediately west of the TNX Area OU at an elevation of 29 m (95 ft) msl.

2.2 Nature and Extent of Contamination in TNX Area OU

The COCs pertinent to the TNX Area OU, as presented in the ROD, include the source unit (e.g., contamination in the soil) from the waste units, the vadose zone under the TBG, and the groundwater in the area.

The nature and extent of contamination associated with the TNX Area OU, which includes the NTSB/IPSL, the OTSB/IPSL/DG, the TBG/Vadose Zone, and the groundwater subunits, is documented in the RFI/RI with Baseline Risk Assessment for the TNX-Area Operable Unit (WSRC, 1999) and the RFI/RI with Baseline Risk Assessment for the TNX Outfall Delta, Lower Discharge Gully and Swamp Operable Unit (WSRC, 2002). The RGs presented in the ROD were derived from risk assessment calculations presented in these documents, which also contain the supporting characterization results used to delineate the extent of contamination. The RGs and COCs associated with the TNX Area OU are presented by subunit in Table 1.

The COCs associated with the NTSB/IPSL are radium-226 and metals. The ODA associated with the NTSB/IPSL will also be institutionally controlled due to a risk to the future resident in excess of $1X10^{-6}$ residual risk due to barium, manganese, and nickel. The contamination at the TBG consists of VOCs in the deep vadose zone. The primary COCs for the OTSB subunit are mercury, thorium-228, radium-228, uranium (U)-233/234, U-235, and U-238. They are found in soils beneath the seepage basin and ISPLs and in discharge gully soils. The radionuclides remaining in the soil following the remedial action will have less than 1X10-3 residual risk, but will be inaccessible under the engineered cap.

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Table 1. Summary of Refined COCs and Remedial Goals Associated with Contaminated Media at the TNX Area OU

Subunit	Media	Remedial Action Objectives	Refined COC	Remedial Goal	Basis
New TNX Seepage Basin (Inlet Basin)	Sediment	Protect future industrial worker from exposure to radium-226 in sediment.	Radium-226	0.16 pCi/g	1E-06 risk level
		Protect sediment-dwelling biota from exposure to arsenic, chromium, copper, lead, mercury, nickel, silver and zinc in the sediment.	Arsenic	8.2 mg/kg	HQ=1
			Chromium	80 mg/kg	HQ=1
			Copper	70 mg/kg	HQ=1
			Lead	35 mg/kg	HQ=1
			Mercury	0.15 mg/kg	HQ=1
			Nickel	30 mg/kg	HQ=1
			Silver	1.0 mg/kg	HQ=1
			Zinc	150 mg/kg	HQ=1
	Surface Water	Protect aquatic biota from exposure to aluminum, barium, boron, copper, iron, lead, manganese, mercury, nickel, silver, vanadium, and zinc in the surface water.	Aluminum	87 µg/L	HQ=1
			Barium	3.9 µg/L	HQ=1
			Boron	750 µg/L	HQ=1
			Copper	1.51 µg/L	HQ=1
			Iron	1000 µg/L	HQ=1
			Lead	0.15 µg/L	HQ=1
			Manganese	22.7 µg/L	HQ=1
			Mercury	0.012 µg/L	HQ=1
			Nickel	20.5 µg/L	HQ=1
			Silver	0.012 µg/L	HQ=1
			Vanadium	20 µg/L	HQ=1
			Zinc	13.7 µg/L	HQ=1

Table 1. Summary of Refined COCs and RGs Associated with Contaminated Media at the TNX Area OU (Continued)

Subunit	Media	Remedial Action Objectives	Refined COC	Remedial Goal	Basis
New TNX Seepage Basin (Main Basin)	Sediment	Protect sediment-dwelling biota from exposure to mercury and nickel in the sediment.	Mercury Nickel	0.15 mg/kg 30 mg/kg	HQ=1 HQ=1
	Surface Water	Protect aquatic biota from exposure to aluminum, barium, boron and iron in the surface water.	Aluminum Barium Boron Iron	87 µg/L 3.9 µg/L 750 µg/L 1000 µg/L	HQ=1 HQ=1 HQ=1 HQ=1

Table 1. Summary of Refined COCs and RGs Associated with Contaminated Media at the TNX Area OU (Continued)

Subunit	Media	Remedial Action Objectives	Refined COC	Remedial Goal	Basis
Old TNX Seepage Basin/ IPSL/ Discharge Gully					
OTSB/IPSL	Soil	Prevent mercury contamination to groundwater above MCL (2 µg/L).	Mercury	0.078 mg/kg	Contaminant migration soil cleanup level.
		Prevent human exposure to Radium-228 and Thorium-228 and from exceeding PTSM levels in soils at basin bottom.	Thorium-228 Radium-228	Remove or treat contaminated PTSM 23.44 pCi/g 21.75 pCi/g	Combined carcinogenic risk of 6 x 10^{-3}

Table 1. Summary of Refined COCs and RGs Associated with Contaminated Media at the TNX Area OU (Continued)

Subunit	Media	Remedial Action Objectives	Refined COC	Remedial Goal	Basis
Old TNX Seepage Basin/ IPSL/ Discharge Gully					
UDG	Soil	Prevent mercury contamination to groundwater above MCLs (2 µg/L)	Mercury	0.13 mg/kg	Contaminant migration soil cleanup level
LDG[1]	Soil	Prevent total uranium contamination to groundwater above MCLs (30 µg/L, 2 µg/L, respectively)	U-233/234 U-235 U-238 Mercury	1.31 pCi/g, 0.06 pCi/g, 1.31 pCi/g 0.63 mg/kg	
	Soil	Prevent future industrial worker exposure to Actinium-228, Cesium-137, Lead-212, Radium-228, Thorium-228, Thorium-234, Uranium-233/234, Uranium-235, and Uranium-238	Actium-228 Cesium-137 Lead-212 Radium-228 Thorium-228 Thorium-234 Uranium-233/234 Uranium-235 Uranium-238	0.07 pCi/g 0.10 pCi/g 0.73 pCi/g 0.07 pCi/g 0.04 pCi/g 45.43 pCi/g 68.80 pCi/g 0.82 pCi/g 3.13 pCi/g	1E-06 risk level

Table 1. Summary of Refined COCs and RGs Associated with Contaminated Media at the TNX Area OU (Continued)

Subunit	Media	Remedial Action Objectives	Refined COC	Remedial Goal	Basis
TNX Burying Ground and Vadose Zone	Groundwater	Prevent VOCs in the deep Vadose Zone from contaminating groundwater above MCLs.	Carbon Tetrachloride PCE TCE	5 µg/L 5 µg/L 5 µg/L	Maximum Contaminant Level for groundwater cleanup
TNX Groundwater (Water Table Aquifer)	Groundwater	Protect the future industrial worker from exposure to carbon tetrachloride, PCE and TCE in groundwater above MCLs.	Carbon Tetrachloride PCE TCE	5 µg/L 5 µg/L 5 µg/L	Maximum Contaminant Level for groundwater cleanup
		Protect the future industrial worker from exposure to radiological constituents and mercury in groundwater above MCLs.	Gross Alpha Total Uranium Total Radium(Ra-226 and Ra-228) Mercury	15 pCi/L 30 µg/L* 5 pCi/L 2 µg/L	Maximum Contaminant Level for groundwater cleanup

*MCL effective 12/8/03

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2.3 Remedial Action Selected

2.3.1 NTSB/IPSL

The NTSB/IPSL subunit consists of four sections – the IPSL that delivered wastewater to a small settling area (Inlet Basin), a larger basin (Main Basin) that is connected to the Inlet Basin and received the "decanted" wastewater, and an Overflow Discharge Area where wastewater was released when the main Basin overflowed.

As stated in the Record of Decision Remedial Alternative Selection for the TNX Area OU (WSRC-RP-2003-4017), the selected RA for the TNX Area OU included the following elements for the NTSB:

- In situ grouting of the IPSL
- Discharge of surface water in the NTSB to an approved location (ground surface, permitted outfall or wastewater treatment facility)
- Backfill of the Main Basin and Inlet Basin with clean soil
- Implementation of institutional controls to ensure the integrity of the backfilled basins and overflow discharge area and prevent the future industrial worker from excavating contaminated media via access controls and field walkdown/maintenance and to prevent residential use through property notices/restrictions.
- Institutional controls will remain in place in perpetuity or until Core Team [United States Department of Energy (US DOE), United States Environmental Protection Agency (US EPA), and South Carolina Department of Health and Environmental Control (SCDHEC)] concurrence that no unacceptable risk to receptors is present.

A conceptual site model (CSM) is presented in Appendix C as figure C-1 which illustrates how implementation of the remedial action breaks the exposure pathways for the NTSB/IPSL/ODA subunit.

2.3.2 Old TNX Seepage Basin/IPSL and Discharge Gully

The selected remedy for the OTSB/IPSL/DG subunit is Engineered Cap with PTSM Removal and Institutional Controls. The selected remedy for this subunit entails the following:

- Removal of existing OTSB backfill
- Excavation of IPSL (where accessible) and associated radiologically contaminated soils for disposal
- Plugging ends of IPSL sections not excavated during this action
- Excavation of the PTSM layer in the OTSB (2- to 3-ft soil interval at the original bottom of the inlet and main basins)
- Backfill of pipeline excavation and replacement of asphalt
- Disposal of PTSM-contaminated soils and pipeline (estimated 2,180 yd^3 total) at an approved disposal facility
- Backfill of the OTSB and DG using the current backfill material where practical
- Placement of engineered soil cap (and associated institutional controls) over the OTSB and DG (from the TNX facility to the base of the slope at the TNX Outfall Delta)
- Monitoring of the subsurface for the presence of perched water in contact with waste exceeding CM RGs under the cover

- Implementation of institutional controls to ensure the integrity of the engineered cap and prevent the future industrial worker from excavating contaminated media via access controls and field walkdown/maintenance and to prevent residential use through property notices/restrictions. Institutional controls will remain in place in perpetuity or until Core Team concurrence that no unacceptable risk to receptors is present.

A CSM is presented in Appendix C as figure C-2 which illustrates how implementation of the remedial action breaks the exposure pathways for the OTSB/IPSL/DG subunit.

2.3.3 TNX Groundwater

The selected remedy for the TNX Groundwater subunit is Extraction in High Chlorinated Volatile Organic Compound (CVOC) Area with Monitoring/Mixing Zone and Institutional Controls. The selected remedy for this subunit entails the following:

- Extraction of volatile organic compounds (VOCs) in the high concentration areas of the Vadose Zone (i.e., SVE)

- Continued operation of existing pump-and-treat system until monitoring determines that passive remediation (mixing zone) is appropriate.

- Use of mixing zone and institutional controls, institutional controls will consist of deed restrictions and/or administrative directives, such as the Site Use Program, prohibiting installation of drinking waster wells to prevent use of groundwater beneath TNX with concentrations of contaminants above MCLs. These controls will remain in effect until Core Team concurrence that COC concentrations in groundwater do not present unacceptable risk to receptors. The applicability of a mixing zone application will be evaluated after conclusion of remediation of surface units and decontamination and decommissioning of the existing TNX facility. These activities are scheduled for completion in 2007.

A CSM is presented in Appendix C as figure C-3 which illustrates how implementation of the remedial action breaks the exposure pathways for the TBG/vadose zone/groundwater subunit.

3.0 LAND-USE CONTROL OBJECTIVES

Considering the residual risk mentioned above, the LUC objectives are to:

- Maintain the use of the site for industrial activities only.
- Prevent unauthorized access to the unit as long as the waste remains a threat to human health or the environment.
- Provide public notices for disclosing former waste management and disposal activities and remedial actions taken on the site.
- Prevent unauthorized residential or agricultural access to groundwater.

4.0 IMPLEMENTATION OF LAND-USE CONTROL

This section describes the LUCs selected in the ROD to achieve the objectives stated in Section 3.0.

4.1 Property Record Notices

In the long term, if the property is ever transferred to non-federal ownership, the US 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 contract for sale and the deed will contain the notification required by CERCLA Section 120(h).

The deed notification shall, in perpetuity, notify any potential purchaser that the property has been used for the management and disposal of waste. These requirements are also consistent

with the intent of Resource Conservation and Recovery Act (RCRA) deed notification requirements at final closure of a RCRA facility if contamination will remain at the unit.

4.2 Property Record Restrictions

The deed shall also include restrictions precluding residential use of the property. However, the need for these deed restrictions may be re-evaluated 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 re-evaluation of the need for the deed restrictions will be done though an amended ROD.

4.3 Other Public Notices

The LUCIP identifies the area under land use restriction via a survey plat. The Survey Plat will be incorporated in this LUCIP upon completion of the construction phase. The Survey Plat will appear in Appendix A-1, with the line marked, "AREA SUBJECT TO LAND USE CONTROLS".

In addition, if the site is ever transferred to non-federal ownership, a professional land surveyor certified survey plat of the OU will be recorded with the appropriate county recording agency.

4.4 Site Use Program

SRS is required under DOE Order 430.1A, *Life Cycle Management* (USDOE 1998), to implement an asset management program for the use, maintenance, and disposal of physical assets, including real estate. SRS has complied with this Order though the establishment of its Site Use Program per WSRC 1D, *Site Infrastructure and Services Manual*, Procedure 3.02, "Site Real Property Configuration Control" (WSRC 2003a). All employees, contractors, and visitors to the SRS are required to adhere to the Site Use Program. This program ensures that all work performed on the SRS that adds, modifies, or removes features portrayed on the SRS development maps is authorized. No use of land (i.e., excavation or any other land use) shall be undertaken without prior approval documented by a Site Use Permit. This authorization is

obtained through the completion of a Site Clearance Request Form. Also, in accordance with WSRC 1D, Procedure 3.02, all work at SRS that adds to or modifies features or facilities portrayed on SRS development maps (i.e., plot plans of facilities/utilities at SRS) will be authorized by a Site Clearance Permit before any excavation activities are conducted. All site clearance requests will be reviewed to verify that either an approved Site Use Permit has been obtained or that an existing Site Use Permit has sanctioned the request.

SRS is responsible for updating, maintaining, and reviewing site maps, including Federal Facility Agreement (FFA 1993) operable unit (OU) identifications. If a site clearance request is made that may impact an FFA OU, the Site Clearance Request Form is sent to the appropriate FFA OU reviewer for either approval or disapproval. The roles and responsibilities of each individual are detailed in WSRC 1D, Procedure 3.02. Verification of USDOE approval for intended land use must be obtained before issuance of a Site Clearance Permit. The site use and site clearance processes are applicable to all activities and personnel on site (including subcontractors).

The processes are controlled within the SRS Quality Assurance (QA) Program per WSRC 1Q Manual (WSRC 2003b). The SRS QA program is the governing QA program for all SRS activities.

SRS identifies all buildings and facilities on maps used in the Site Use Program. This waste unit is identified on these maps as a CERCLA facility.

Any work proposed in these areas will be strictly controlled and workers will be appropriately trained and briefed about health and safety requirements if work is deemed necessary for maintenance. No major change in land use nor excavation at the TNX Area OU shall be undertaken without USEPA and SCDHEC approval.

4.5 Signage

To prevent unknowing entry and to ensure that unrestricted use of the waste unit does not occur while under ownership of the government, access control warning signs will be posted at the

unit. The signs will be legible for a distance of at least 25 feet. There are several subunits at the TNX Area OU with individual signs. The details of the signs are shown in appendix D.

Custodial responsibilities for maintenance and inspection of the TNX Area Operable Unit will be maintained by the Post-Closure Maintenance Group within SGCP.

4.6 Other Access Controls and Security/Surveillance Measures

While under the ownership of US DOE, access control of the entire SRS will be maintained in accordance with the 1992 RCRA Part B Permit Renewal Application, Volume I, Section F.1. This section describes the 24-hour surveillance system (R.61-79.264.14(b)(1)), artificial or natural barriers (R.61-79.264.14(b)(2)(I)), control entry systems (R.61-79.264.14(b)(2)(ii)), and access control warning signs (R.61-79.264.14(c)) in place at the SRS boundary to comply with the security requirements for a RCRA-permitted facility.

4.7 Field Inspection and Maintenance for Institutional Controls

After the remediation of the TNX Area Operable Unit, maintenance activities will be required per this remedial action. It is anticipated that no operations other than Groundwater Mixing Zone Application (GMZA) monitoring (WSRC 1999b) will be required.

USEPA and SCDHEC will be notified of any events and/or actions that indicate some potential compromise of institutional controls within 30 days of identification. These events or actions will be documented in the FFA Annual Progress Report. All other routine maintenance activities will be documented and maintained in files subject to US EPA and SCDHEC review and audit. A copy of the completed inspection form is maintained in the SGCP Document Control. The LUCs will be implemented as long as the waste remains a threat to human health or the environment."

The following steps will be implemented to maintain the geosynthetic soil covers for as long as is necessary to prevent contaminant migration above MCL:

- Perform periodic (annual) visual inspections for evidence of damage to the soil cover due to erosion or intrusion by burrowing animals. The inspection will also address upkeep of the vegetative cover and access control barriers (e.g., the access control warning signs). (Appendix B provides a unit specific checklist for the TNX Area OU waste units).

- Perform necessary repairs (when required as identified during inspection) to maintain the functional integrity of the soil cover and access control warning signs.

- Enforce SRS institutional controls through access controls by restricting access to the closed waste unit. Institutional controls will be maintained as long as the waste remains a threat to human health or the environment.

- As required by the National Oil and Hazardous Substances Contingency Plan (NCP), a five-year review of the ROD for the TNA Area OU will be performed as long as the waste remains a threat to human health or the environment.

The waste unit inspectors are to be trained in Hazardous Waste Operations and Emergency Response (i.e., HAZWOPER), RCRA Well Inspections (SGCP-specific training), SGCP RCRA Waste Unit Inspections, Radiological Workers, etc., as applicable for the specific inspection. They will also be trained based on the individual requirements of the regulatory approved closure documents for each waste unit. In addition, the inspectors are to attend yearly refresher courses. Over the years, different personnel may conduct the inspections and grass cutting operations.

This unit-specific LUCIP, including the checklist (Appendix B), will be appended to the SRS LUCAP, upon final regulatory approval.

5.0 REFERENCES

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

USDOE, 1996. *Savannah River Site Future Use Project Report*, Stakeholder-Preferred Recommendations for SRS Land and Facilities, USDOE Savannah River Operations Office, January 1996

USDOE, 1998. DOE Order 430.1A, *Life Cycle Management* (Approved 10/14/98)

WSRC, 2003a. WSRC Procedure Manual 1D, *Site Infrastructure and Services Manual (U)*, Procedure 3.02, "Site Real Property Configuration Control", Westinghouse Savannah River Company, Savannah River Site, Aiken, SC

WSRC, 2003b. WRSC Procedure Manual 1Q, *Quality Assurance (U)*, Westinghouse Savannah River Company, Savannah River Site, Aiken, SC

WSRC, 2003c. "Record of Decision Remedial Alternatives Selection for the TNX Area Operable Unit (U)", Revision 0, March 2003, Westinghouse Savannah River Company, Savannah River Site, Aiken, SC

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APPENDIX A

SURVEY PLAT (Later)

The applicable Survey Plats for the TNX OU waste units will be provided in the PCR/CMIR documentation with as-built information for the waste unit closures. (See Section 2.2 of the LUCIP)

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APPENDIX B

FIELD INSPECTION CHECKLIST

FOR TNX AREA OPERABLE UNIT

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FIELD INSPECTION CHECKLIST

FOR TNX AREA OPERABLE UNIT WASTE UNIT

❑ **SCHEDULED** ❑ **UNSCHEDULED**

A= Satisfactory X= Unsatisfactory (Explanation required)	A or X	Observation of Corrective Action Taken
1. Verify that there are no excavation, digging, or construction activities on the soil cover.		
2. Verify that no woody vegetation is growing on the soil cover. Remove or identify as needed.		
3. Visually check the vegetative cover for grass density, with no bare spots more than 3-feet by 3-feet in area. The height of the vegetative cover should not impair the visual inspection of the soil cover. This will be determined by the inspector.		
4. Verify that the roads are accessible.		
5. Verify that the waste unit signs (21) are in acceptable condition, have the correct information and are legible from a distance of 25 feet		
6. Check the soil cover for signs of erosion or depressions (subsidence).		
7. Check for signs of burrowing animals.		
9. Check the integrity of drainage ditches for the presence of excessive erosion, sediment buildup, and any debris restricting water flow.		

Inspected by:

_____ / _____ Date:_____

(Print Name) (Signature)

Post-Closure Manager:

_____ / _____ Date:_____

(Print Name) (Signature)

CAUTION: The inspector shall notify the Post-Closure Manager (PCM) and Environmental Compliance Authority (ECA) **IMMEDIATELY** if there has been a breach or compromise of the institutional controls of this waste unit. Refer to post-closure inspection procedures.

NOTE: All monitoring wells associated with this waste unit are inspected using the SGCP Monitoring Well Inspection Procedure in compliance with South Carolina Hazardous Waste Management Regulation R.61-79, Subpart F, Groundwater Monitoring.

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APPENDIX C

POST-REMEDIAL ACTION CONCEPTUAL SITE MODEL

FOR THE TNX AREA OPERABLE UNIT POST-REMEDIAL ACTION

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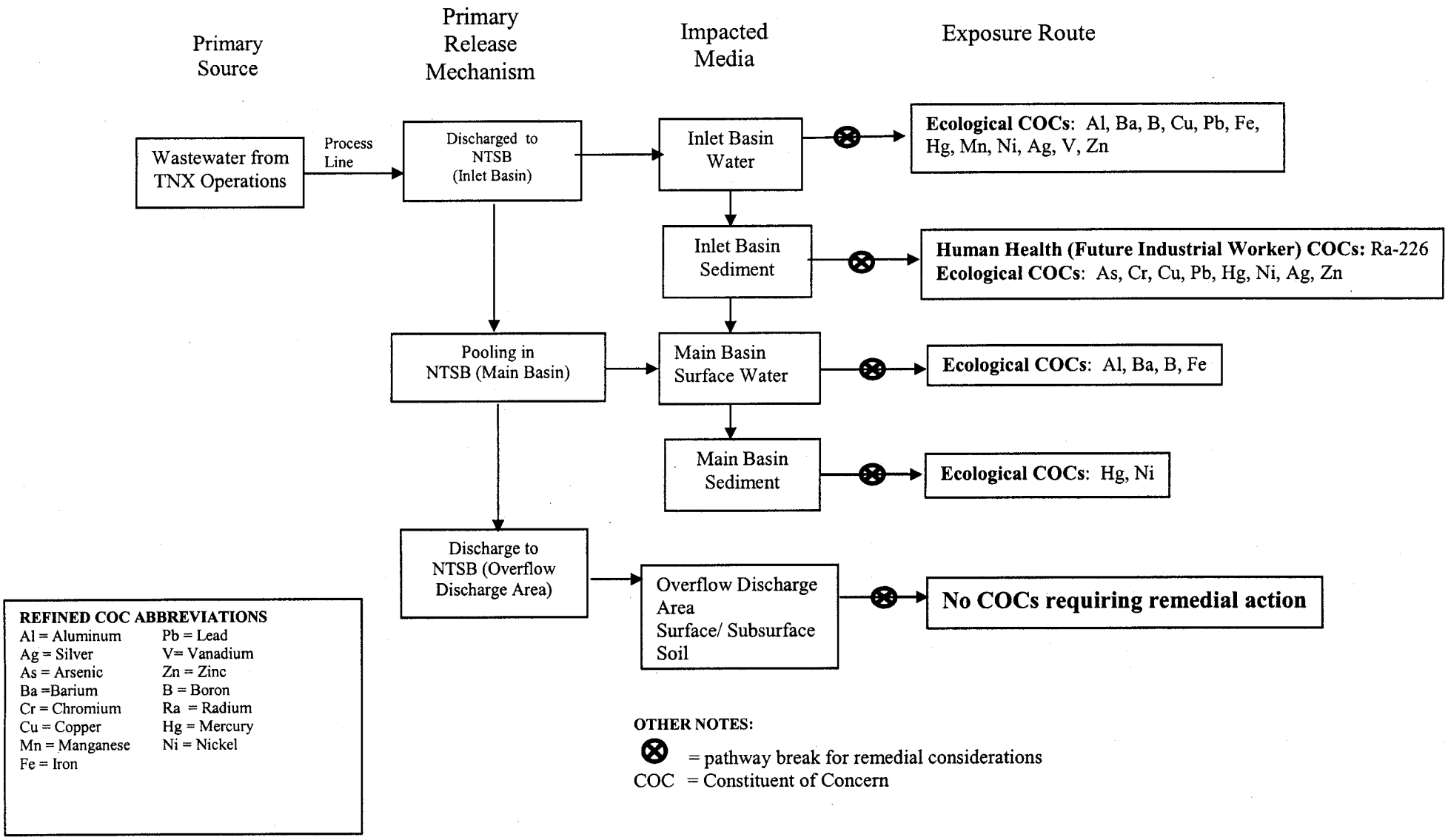


Figure C-1. Post Remedial Action Conceptual Site Model for TNX Area OU NTSB/IPSL/ODA Subunits

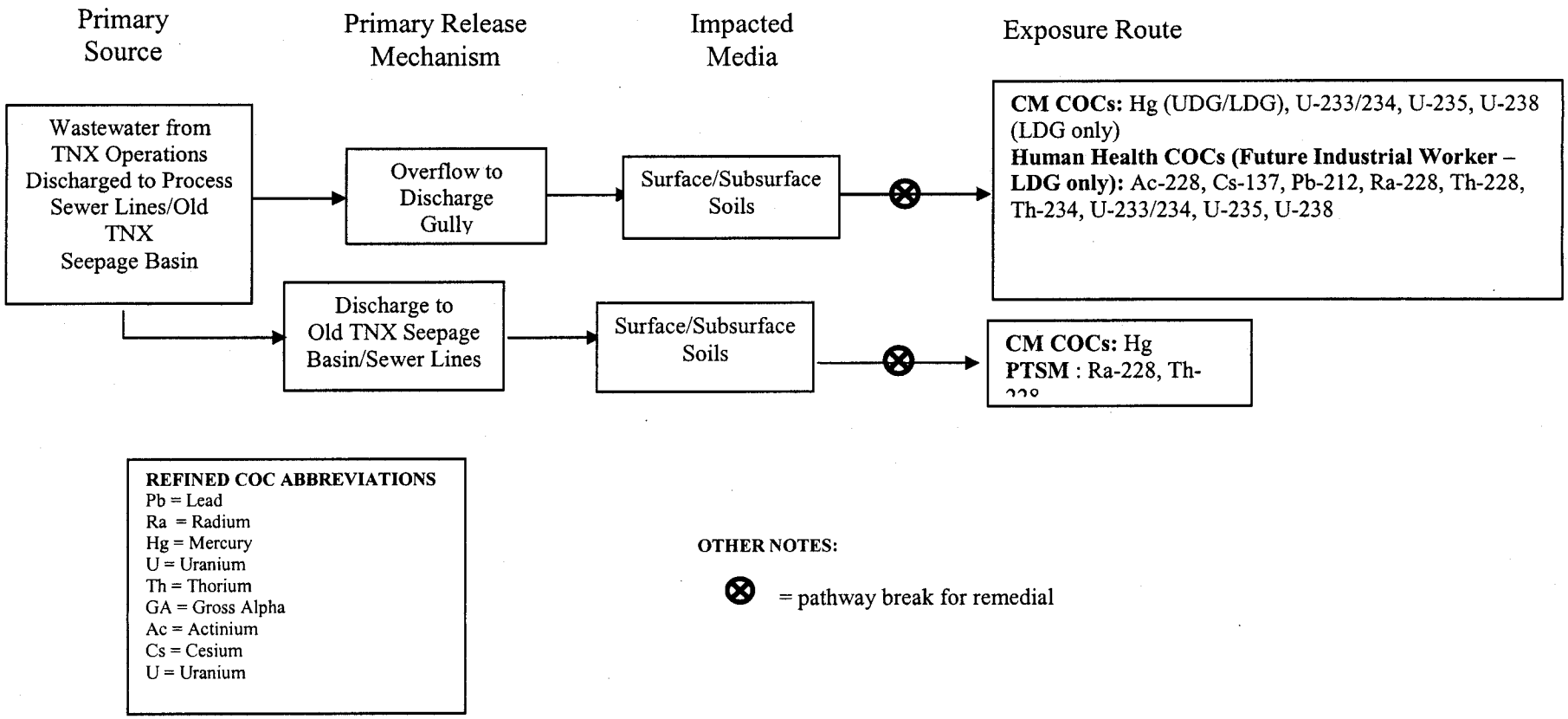


Figure C-2. Post Remedial Action Conceptual Site Model for TNX Area OU OTSB/IPSL/DG Subunits

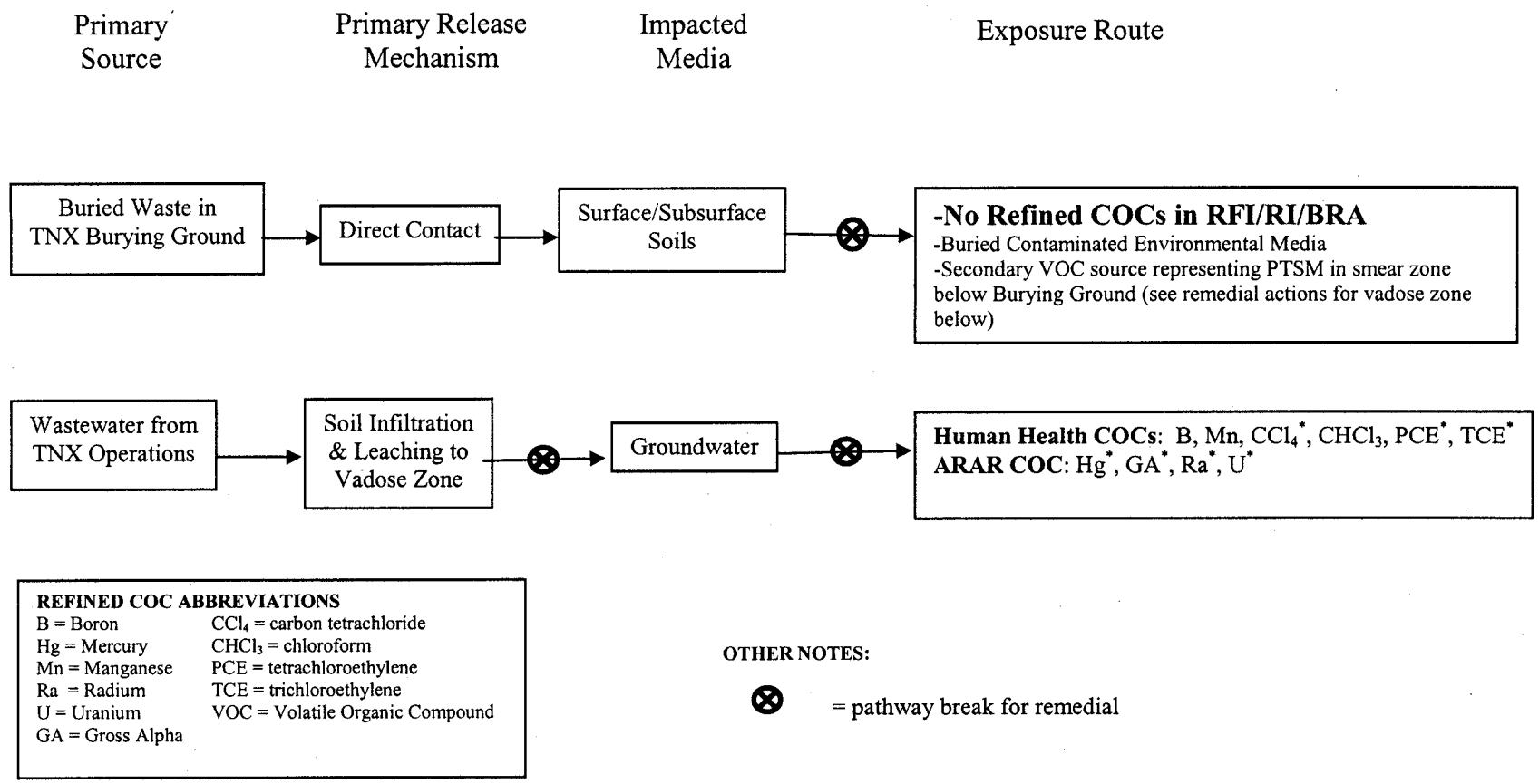


Figure C-3. Post Remedial Action Conceptual Site Model for TNX Area OU Burying Ground and Groundwater Subunits

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APPENDIX D

ACCESS CONTROL WARNING SIGNS

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New TNX Seepage Basin

904-102T

DANGER

UNAUTHORIZED PERSONNEL KEEP OUT.

THIS UNIT CONTAINS [HAZARDOUS, RADIOLOGICAL OR MIXED HAZARDOUS, AS APPLICABLE] SUBSTANCES.

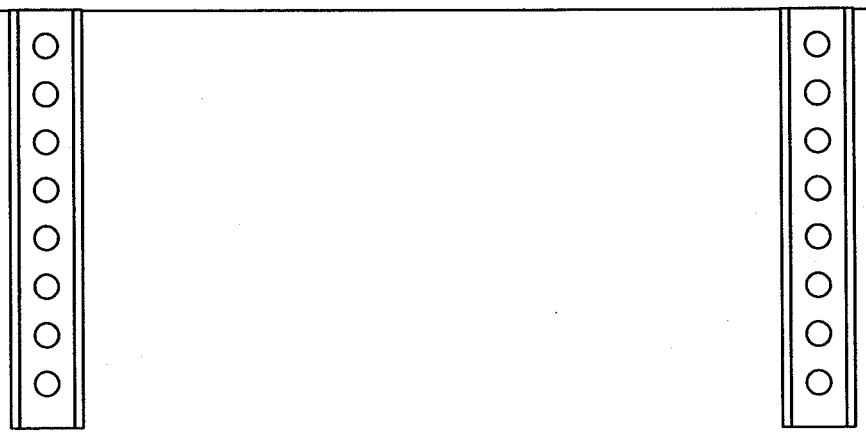
DO NOT DIG OR EXCAVATE.

DO NOT ENTER WITHOUT CONTACTING THE

WASTE UNIT CUSTODIAN.

CUSTODIAN: MANAGER, POST-CLOSURE MAINTENANCE

PHONE: (803) 952-6882



Old TNX Seepage Basin

904-76T

DANGER

UNAUTHORIZED PERSONNEL KEEP OUT.

THIS UNIT CONTAINS [HAZARDOUS, RADIOLOGICAL OR MIXED HAZARDOUS, AS APPLICABLE] SUBSTANCES.

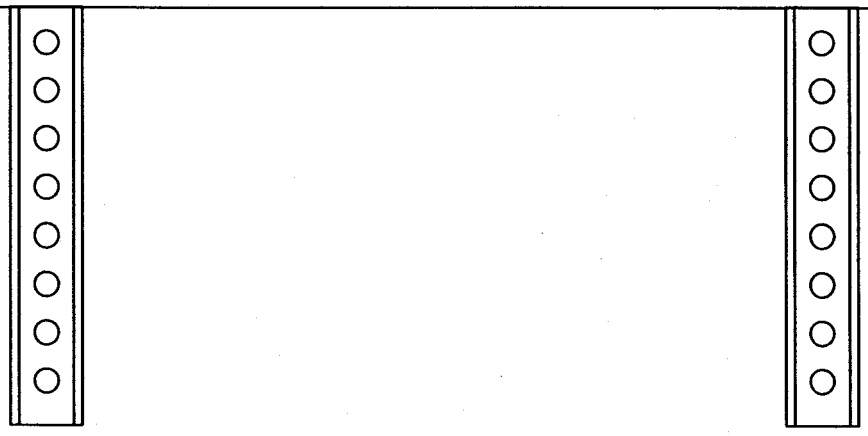
DO NOT DIG OR EXCAVATE.

DO NOT ENTER WITHOUT CONTACTING THE

WASTE UNIT CUSTODIAN.

CUSTODIAN: MANAGER, POST-CLOSURE MAINTENANCE

PHONE: (803) 952-6882



LUCIP for the
R-Area Reactor Seepage Basins, 904-57G, -58G, -59G, -60G, -103G, and -104G
Land Use Control Implementation Plan for R-Area Reactor Seepage Basins, 904-57G, -58G, -59G, -60G, -103G, and -104G
(WSRC-RP-2004-4032, Revision 1, September 2004)

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United States Department of Energy
Savannah River Site

Land Use Control Implementation Plan (LUCIP) for R-Reactor Seepage Basins Operable Unit (U)

WSRC–RP–2004-4032

Revision 1

September 2004

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



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

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and
Westinghouse Savannah River Company LLC
Aiken, South Carolina

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LIST OF ACRONYMS AND ABBREVIATIONS

CA	contamination area
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
Ci	curie
CMCOC	contaminant migration constituent of concern
COC	constituent of concern
ECA	Environmental Compliance Authority
FFA	Federal Facility Agreement
GWMZ	Groundwater Mixing Zone
HAZWOPER	Hazardous Waste Operations and Emergency Response
IC	institutional controls
LUC	Land Use Control
LUCIP	Land Use Control Implementation Plan
LUCAP	Land Use Control Assurance Plan
MCL	maximum contaminant level
OU	operable unit
pCi/L	picocurie per liter
PCM	Post-Closure Manager
PTSM	principal threat source material
QA	Quality Assurance
RAIP	Remedial Action Implementation Plan
RAO	remedial action objective
RBA	risk-based activity
RCRA	Resource Conservation and Recovery Act
RFI/RI/BRA	RCRA Facility Investigation/Remedial Investigation Report with Baseline Risk Assessment
ROD	Record of Decision
RRSB	R-Reactor Seepage Basins
SCDHEC	South Carolina Department of Health and Environmental Control
SGCP	Soil and Groundwater Closure Projects
SRS	Savannah River Site
USDOE	United States Department of Energy
USEPA	United States Environmental Protection Agency
UST	underground storage tank
WSRC	Westinghouse Savannah River Company, LLC

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1.0 INTRODUCTION

This Land Use Control Implementation Plan (LUCIP) has been prepared for the R-Reactor Seepage Basins (RRSB) OU at the Savannah River Site (SRS) (see Figure 1). The purpose of the LUCIP is to describe how the land use controls (LUCs) selected in the Record of Decision (ROD) (WSRC 2003c) will be implemented and maintained. The following LUCs have been selected for this OU:

- Prevent contact, removal, or excavation of contaminated soil and pipelines
- Preclude residential use of the area
- Prevent unauthorized access to contaminated groundwater in the area

The selected remedy leaves hazardous substances in place that pose a potential future risk and will require LUCs for an indefinite period of time. As agreed on March 30, 2000, among the United States Department of Energy (USDOE), the United States Environmental Protection Agency (USEPA), and the South Carolina Department of Health and Environmental Control (SCDHEC), SRS is implementing a Land Use Control Action Plan (LUCAP) (WSRC 1998a) to ensure that the LUCs required by numerous remedial decisions at SRS are properly maintained and periodically verified. The requirements of that LUCAP also apply to the LUCs that were selected as part of the remedial action for the RRSB OU. This additional document, the RRSB OU LUCIP, contains the specific measures required to implement and maintain the LUCs selected as part of this particular remedial decision. The LUCs shall be maintained until the OU is suitable for unlimited exposure and unrestricted use. Approval by USEPA and SCDHEC is required for any modification or termination of the institutional controls (ICs).

USDOE is responsible for implementing, maintaining, monitoring, reporting, and enforcing the LUCs in accordance with the approved LUCIP. Upon final approval, the LUCIP will be appended to the LUCAP and should be considered incorporated by reference into the RRSB/108-4R Overflow Basin OU ROD, establishing implementation and maintenance requirements for the

LUCs under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and the SRS Federal Facility Agreement. The LUCIP will remain in effect unless and until modifications are approved by USEPA and SCDHEC as necessary for protection of human health and the environment. This LUCIP will be evaluated for accuracy during the five-year remedy review and any approved LUCIP modification will be appropriately documented for incorporation by reference into the RRSB/108-4R Overflow Basin OU ROD.

1.1 Document Format

The format of this document is consistent with the LUCIP template approved on March 18, 2003.

2.0 OVERVIEW OF R-REACTOR SEEPAGE BASINS OU REMEDIAL ACTION

2.1 Description of R-Reactor Seepage Basins OU

The RRSB consists of six unlined basins, process sewer lines, sanitary sewer lines and an area of contaminated vegetation north of the R-Reactor building (Building 105-R). All six basins were constructed between June 1957 and March 1958 and received an estimated 5-million gallons of purge water from the R-Reactor disassembly basin. A non-routine discharge due to a calorimeter test failure in 1957 released approximately 2,700 curies (Ci) of radionuclides primarily to Basin 1, with Basins 2 through 5 receiving a lesser amount. The primary radionuclides present were strontium-90 (Sr-90) and cesium-137 (Cs-137). Lesser amounts of transuranics were found in the purge water. The abandoned process sewer line extends from the R-Reactor disassembly basin to Basins 1 and 6. A sanitary sewer system was breached during the construction of Basins 1 and 5 and received the contaminated water discharged to the basins.

Basins 1 through 5 were all deactivated and backfilled by 1960. Basin 6 was deactivated in 1964 and backfilled in 1977. Currently all six basins are covered with an asphalt bioturbation barrier. See Figure 1.

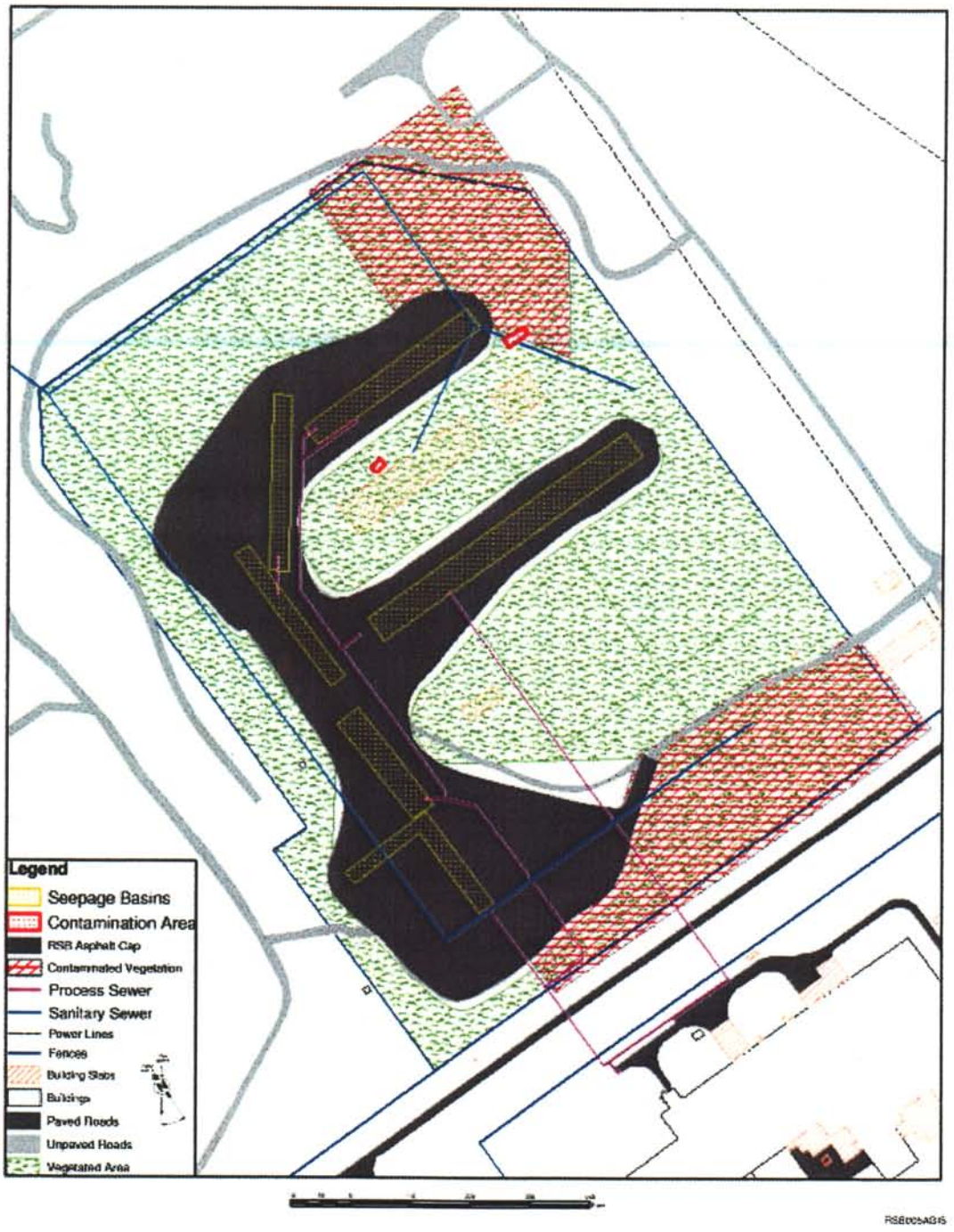
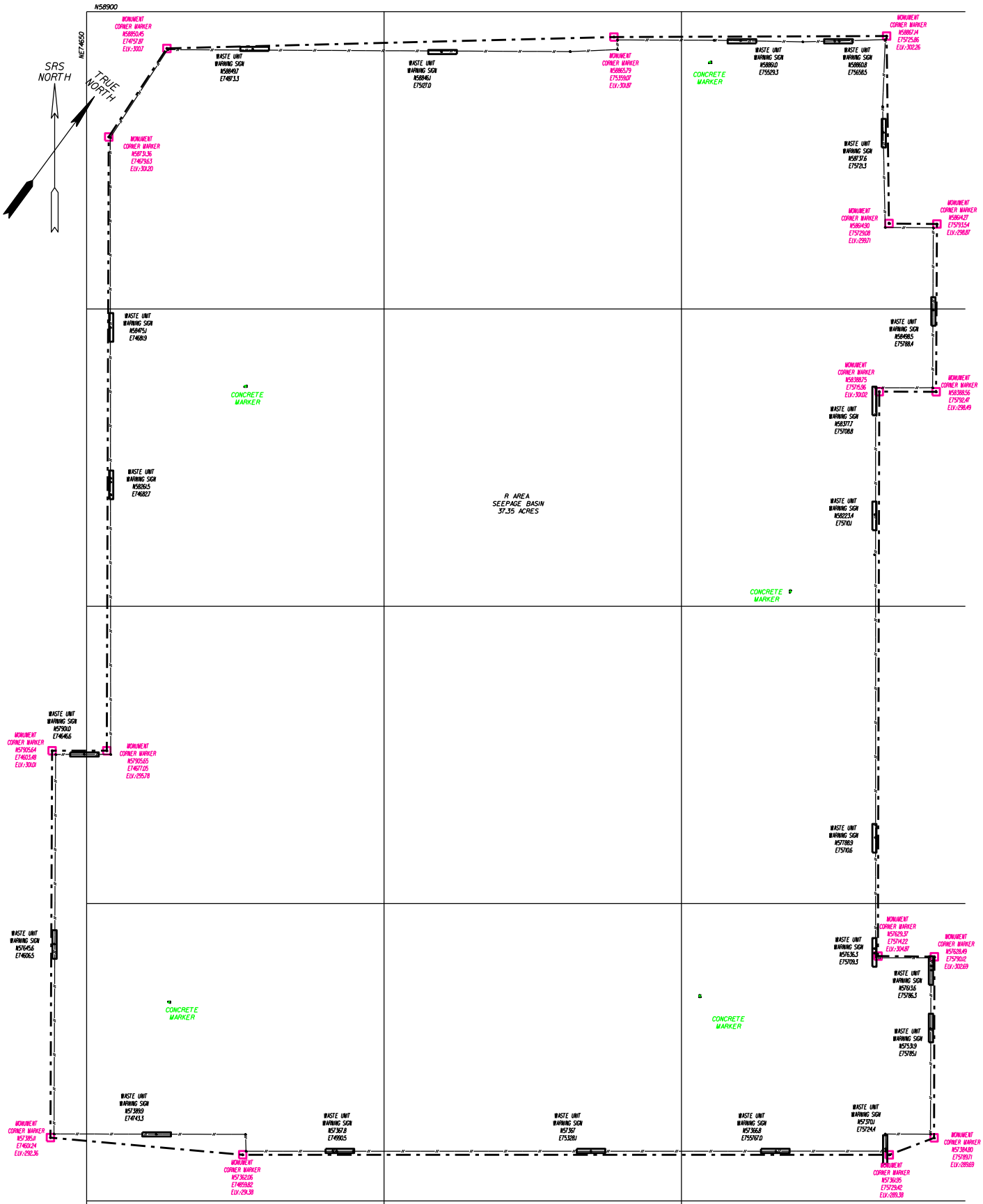


Figure 1. Pre-Remedial Action Layout of the R-Reactor Seepage Basins OU



LOCATION OF R AREA
SEEPAGE BASIN WASTE UNIT
PREPARED BY SRNS LAYOUT 7-5278 KLW AJ MLC
SCALE 1"=50' JULY 25, 2013
JOB ID 071213

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Based on the conclusions provided in the RCRA Facility Investigation (RFI)/Remedial Investigation (RI)/Baseline Risk Assessment (BRA) (WSRC 1998b), the Core Team has agreed that there are no problems warranting action (i.e., no constituents of concern (COCs)) for the surface water and sediment and the 108-4R Overflow Basin subunits; therefore, no further action will be taken for these subunits.

2.2 Nature and Extent of Contamination in R-Reactor Seepage Basins OU

The RRSB remedial action will leave soil and groundwater contamination at the unit above acceptable levels of risk for a long period of time. To prevent exposure to the contamination, long-term LUCs must be implemented until the risk is reduced to acceptable levels via radioactive decay to non-toxic stable elements. The residual risks are discussed below.

Seepage Basins 1 through 6 and Abandoned Process/Sanitary Sewer Lines

Table 1 identifies all human-health COCs and their associated risks for the future industrial worker. The subsurface soil that was evaluated for risk is located at the bottom of the basins and is covered by a least 8 feet of backfill. Due to the high risk associated with Cs-137 and the leachability of Sr-90, the soil at the bottom of the six basins was designated as principal threat source material (PTSM). The abandoned process/sanitary sewer lines were not evaluated quantitatively for risk. Based on the history and use of these lines, it is assumed that the contaminated portions of these lines are PTSM.

Table 1. Human Health Constituents of Concern and Associated Risk

COCs	Baseline Risk[1]
Cesium-137	9.0×10^{-2}
Americium-241	2.0×10^{-4}
Cobalt-60	2.0×10^{-5}
Plutonium-238	2.0×10^{-6}
Plutonium-239/240	1.0×10^{-5}
Strontium-90	1.0×10^{-4}

[1]Baseline risk for hypothetical future industrial workers for soils at depths of 8.0 to 14.5 ft.

Surface Water and Sediment COCs

There are no COCs for the surface water and sediment.

Ecological COCs

Based on the RFI/RI/BRA no final ecological COCs were identified for the SSL, basins, abandoned process sewer lines and associated vegetation. Subsequent to the completion of the BRA, an area of surface radioactivity near Basin 5 was identified. This area is approximately 15 X 20 feet. Therefore, it is a very limited area for ecological exposure. The maximum concentration of 858 pCi/g for Cs-137 is less than the ecological RGO of 1,830 pCi/g identified in the RFI/RI/BRA. Therefore no ecological COCs are identified.

Contaminant Migration Final COCs

Analyses from a vadose zone transport model identified americium-241 (Am-241), carbon-14 (C-14), plutonium-239/240 (Pu-239/240), and Sr-90 as contaminant migration constituents of concern (CMCOCs) since they are estimated to leach from the soil in the future at activity levels that exceed their risk-based activities (RBAs) (WSRC 1997). A more extensive study was performed that showed that the maximum saturated-zone concentrations calculated for C-14 and Pu-239/240 will not exceed the maximum contaminant level (MCL) or RBA for any combination of basin, water table, or basin cover configuration (WSRC 2002a). Therefore, C-14 and Pu-239/240 are no longer considered CMCOCs that warrant further action.

Groundwater COCs

During the characterization activities, the nature and extent of groundwater contamination were investigated (WSRC 1998b). Sr-90 was identified as the only COC in groundwater; however, Am-241 was also retained as a COC in the RFI/RI/BRA because of a single 1.3 pCi/L detection in one well in 1996. Subsequent samples taken in 2003 at this well were nondetects for Am-241. These results indicate that, to date, Am-241 is not present in groundwater at elevated levels. The extent of the Sr-90 groundwater contamination has not extended significantly beyond the footprint of the RRSB, and the contamination is located in the upper aquifer zones above the tan clay confining zone.

2.3 Remedial Action Selected

The selected remedial action for the RRSB OU includes the following elements:

- Installation of a 6-inch, reinforced-concrete, intruder barrier system with granite warning monuments extended over the PTSM and contaminated pipelines inside the RRSB

- Excavate all contaminated process and sanitary sewer lines and associated soil above PTSM levels located outside the boundary fence and dispose of on-unit in a trench covered by a concrete intruder barrier.

- Removal of contaminated vegetation associated with the RRSB and disposal within the RRSB boundary fence

- Placement of an asphalt bioturbation barrier over the contaminated vegetation area to prevent further disturbance of contaminated surface and subsurface soil

- Implementation of the requirements of the approved mixing zone application (WSRC 2002b) to ensure that groundwater contamination attenuates, as approved, by the SCDHEC.

- Continue implementation of ICs to ensure current workers and future industrial workers are protected from exposure to the contaminated media.

- Excavation and on-unit disposal of two small contamination areas (CAs).

The post-remedial action conceptual site model (see Appendix C to this LUCIP) shows the broken pathways and the remaining residual risk to the future industrial worker.

According to the *Savannah River Site Future Use Project Report* (USDOE 1996), residential use of SRS land is prohibited.

3.0 LAND-USE CONTROL OBJECTIVES

To reduce the residual risk, the LUC objectives will achieve the following:

- Maintain the use of the site for industrial activities only. This LUC objective attains the remedial action objectives (RAOs) to prevent residential development within the OU and prevents residential exposure to the contaminated media at the RRSB OU.

- Prevent unauthorized access to the unit as long as the waste remains a threat to human health or the environment. This LUC objective attains the RAO to prevent current, remedial and future industrial workers from exposure to the contaminated media at the RRSB OU.

- Provide public notices for disclosing former waste management and disposal activities and remedial actions taken on the site. This LUC supports RAOs that protect industrial workers, residents, trespassers, and inadvertent intruders from exposure to the contaminated media at the RRSB OU.

- Prevent unauthorized residential or agricultural access to groundwater. This LUC supports RAOs to protect industrial workers, residents, trespassers, and inadvertent intruders from exposure to the contaminated media at the RRSB OU and helps prevent the spread of groundwater contamination.

4.0 IMPLEMENTATION OF LAND-USE CONTROLS

This section describes the LUCs selected in the ROD to achieve the objectives stated in Section 3.0.

Implementation of Industrial Use Only, Deed Notification and Public Notification

The RRSB OU will be maintained for industrial use only in perpetuity.

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. These actions will include a deed notification disclosing former waste management and disposal activities as well as remedial action taken on the site. The deed shall include groundwater use control and deed restrictions precluding residential use of the property. The new owner will be required to ensure that the integrity of these controls continues until the contaminated media no longer pose an unacceptable threat to human health and the environment.

Implementation of Access Controls

Presently, the current worker is protected for exposure via the Site Use Program, Site Clearance program, work control, worker training, worker briefing of health and safety requirements, 6-foot boundary fence, and warning signs (see Table 2). Trespassers' exposure to the waste unit is controlled by security procedures and equipment, surveillance system, and warning signs.

If the land is ever transferred from federal to nonfederal ownership, public notifications, deed restrictions, etc., shall be implemented as discussed above. The deed restrictions will require the future hypothetical owner to ensure that unauthorized exposure to the contaminated groundwater and soil is prevented.

The planned remedial action will include the following engineering barriers that will serve as LUCs to prevent exposure of the future worker, trespasser, and inadvertent intruder to contaminated groundwater, soil, and vegetation.

- A reinforced-concrete intruder barrier will be installed over all PTSM. Granite monuments will be installed on the concrete intruder barrier to warn future generations of the presence of the highly toxic radioactive waste associated with the sewer lines and basins.

- All contaminated vegetation will be removed and disposed of on-unit under the additional asphalt bioturbation barrier.

Table 2. Land Use Controls for R-Reactor Seepage Basins

Type of Control	Purpose of Control	Duration	Implementation	Affected Areas[a]
1. Property Record Notices[b]	Provide notice to anyone searching records about the existence and location of contaminated areas.	Until the concentration of hazardous substances associated with the unit have been reduced to levels that allow for unlimited exposure and unrestricted use	Notice recorded by DOE in accordance with state laws at County Register of Deeds office: 1) if the property or any portion thereof is ever transferred to non-federal ownership	All waste management areas and other areas where hazardous substances are left in place at levels requiring land use and/or groundwater restrictions.
2. Property record restrictions[c]: A. Land Use B. Groundwater	Restrict use of property by imposing limitations. Prohibit the use of groundwater.	Until the concentration of hazardous substances associated with the unit have been reduced to levels that allow for unlimited exposure and unrestricted use	Drafted and implemented by DOE upon transfer of affected areas. Recorded by DOE in accordance with state law at County Register of Deeds office.	All waste management areas and other areas where hazardous substances are left in place at levels requiring land use and/or groundwater restrictions.
3. Other Notices[d]	Provide notice to county/city about the existence and location of waste disposal and residual contamination areas for zoning/planning purposes.	Until the concentration of hazardous substances associated with the unit have been reduced to levels that allow for unlimited exposure and unrestricted use	Notice recorded by DOE in accordance with state laws at County Register of Deeds office: 1) if the property or any portion thereof is ever transferred to non-federal ownership	All waste management areas and other areas where hazardous substances are left in place at levels requiring land use and/or groundwater restrictions.
4. Site Use Program[e]	Provide notice to worker/developer (i.e.., permit requestor) on extent of contamination and prohibit or limit excavation/penetration activity.	As long as property remains under DOE control	Implemented by DOE and site contractors Initiated by permit request	Remediation systems, all waste management areas and areas where levels require land use and / or groundwater restrictions.
5. Physical Access Controls[f] (e.g., intruder barrier fences, gates)	Control and restrict access to workers and the public to prevent unauthorized entry	Until the concentration of hazardous substances associated with the unit have been reduced to levels that allow for unlimited exposure and unrestricted use	Controls maintained by DOE	At RRSB OU and SRS boundary
6. Warning Signs[g]	Provide notice or warning to prevent unauthorized uses	Until the concentration of hazardous substances associated with the unit have been reduced to levels that allow for unlimited exposure and unrestricted use	Signage maintained by DOE	At RRSB OU and SRS boundary
7. Security Surveillance Measures	Control and monitor access by workers/public	Until the concentration of hazardous substances associated with the unit have been reduced to levels that allow for unlimited exposure and unrestricted use	Established and maintained by DOE Necessity of patrols evaluated upon completion of remedial actions.	Patrol of selected area throughout SRS, as necessary.

[a] Affected areas – Specific locations identified in the SRS LUCIP or subsequent post-ROD documents.
[b] Property Record Notices – Refers to any non-enforceable, purely informational document recorded along with the original property acquisition records of DOE and its predecessor agencies that alerts anyone searching property records to important information about residual contamination; waste disposal areas in the property.
[c] Property Record Restrictions – Includes conditions and/or covenants that restrict or prohibit certain uses of real property and are recoded along with original property acquisition records of DOE and its predecessor agencies.
[d] Other Notices – Includes information on the location of waste disposal areas and residual contamination depicted on as survey plat, which is provided to a zoning authority (i.e., city planning commission) for consideration in appropriate zoning decisions for non-DOE property.
[e] Site Use Program – Refers to the internal DOE/DOE contractor administrative program(s) that requires the permit requestor to obtain authorization, usually in the form of a permit, before beginning any excavation/penetration activity (e.g., well drilling) for the purpose of ensuring that the proposed activity will not affect underground utilities/structures, or in the case contaminated soil or groundwater, will not disturb the affected areas without the appropriate precautions and safeguards.
[f] Physical Access Controls – Physical barriers or restrictions to entry.
[g] Signs – Posted command, warning or direction.

4.1 Property Record Notices

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 contract for sale and the deed will contain the notification required by CERCLA Section 120(h).

The deed notification shall, in perpetuity, notify any potential purchaser that the property has been used to manage and dispose of waste. This requirement is consistent with the intent of Resource Conservation and Recovery Act (RCRA) deed notification requirements at final closure of a RCRA facility if contamination will remain at the unit.

4.2 Property Record Restrictions

The deed shall also include restrictions precluding residential use of the property and/or any other property record restrictions necessary to achieve the LUC objectives. The deed shall contain appropriate provisions to ensure that the restrictions continue with the land. USDOE shall provide a copy of the executed deeds to the regulatory agencies as soon as practicable after the transfer of fee title, but no later than 30 days. However, the need for these deed restrictions may be re-evaluated 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 re-evaluation of the need for the deed restrictions will be done though an amended ROD.

USDOE shall provide USEPA and SCDHEC 6 months notice prior to transfer to ensure that USEPA and SCDHEC can be involved in discussions to ensure that appropriate provisions are included in the transfer terms or conveyance documents to maintain effective ICs. If it is not possible for the facility to notify USEPA and SCDHEC at least six months prior to any transfer or sale, then the facility will notify USEPA and SCDHEC as soon as possible but no later than 60 days prior to the transfer or sale of any property subject to ICs. In addition to the land transfer

notice and discussion provisions above, USDOE further agrees to provide USEPA and SCDHEC with similar notice, within the same time frames, as to federal to federal transfer of property.

4.3 Other Public Notices

The LUCIP identifies the area under land use restriction in Appendix A via a design sketch (SK-C-53215). The sketch provides a plan views of the site with a line marked depicting the "SURFACE AREA SUBJECT TO LAND USE CONTROLS" and a line marked depicting the "CURRENT ESTIMATED LOCATION OF THE GROUNDWATER PLUME SUBJECT TO LAND USE CONTROLS." Preparation of a certified survey plat will be deferred until the site is transferred to non-federal ownership. Preparing the survey plat coincident with land transfer will maximize the accuracy of the groundwater area under the restrictive covenant. The deferred survey plat will be appended to this LUCIP when it is completed.

In addition, if the site is ever transferred to nonfederal ownership, a professional land surveyor-certified survey plat of the OU will be prepared at or near the time of conveyance to support the LUCIP required restrictive covenants on land use and will be recorded with the appropriate county recording agency.

4.4 Site Use Program

Under DOE Order 430.1A, *Life Cycle Management* (USDOE 1998), SRS is required to implement an asset management program for the use, maintenance, and disposal of physical assets, including real estate. SRS complies with this Order through its Site Use Program, which is conducted in accordance with WSRC 1D, *Site Infrastructure and Services Manual*, Procedure 3.02, "Site Real Property Configuration Control" (WSRC 2003a). All employees, contractors, and visitors at SRS are required to adhere to the Site Use Program. This program ensures authorization of any work performed at SRS if the work adds, modifies, or removes features portrayed on the SRS development maps. No land use (e.g., excavation) shall be undertaken without prior approval documented by a Site Use Permit. To obtain this authorization, a Site Clearance Request Form must be completed. In accordance with WSRC 1D, Procedure 3.02, all

work at SRS that adds to or modifies features or facilities portrayed on SRS development maps (i.e., plot plans of facilities/utilities at SRS) will be authorized by a Site Clearance Permit before any activities are conducted. All Site Clearance Requests will be reviewed to verify that either an approved Site Use Permit has been obtained or that the request is sanctioned by an existing Site Use Permit. All land use requirements applicable for the OU will be provided to the Site Use Program for use in determining issuance of Site Clearance permits. In addition, the Site Use permit must be amended when the geographic configuration or buffer zone used to establish the permit boundary changes or there is a change to the permitted land use.

SRS is responsible for updating, maintaining, and reviewing site maps, including Federal Facility Agreement (FFA) (1993) OU identifications. If a Site Clearance Request potentially impacts an FFA OU, the Site Clearance Request Form is sent to the appropriate FFA OU reviewer for approval. The roles and responsibilities of each individual are detailed in WSRC 1D, Procedure 3.02. Before a Site Clearance Permit is issued, verification of USDOE approval for intended land use must be obtained. The site use and site clearance processes are applicable to all activities and personnel on site (including subcontractors). The USEPA and SCDHEC will be notified within 30 days of any changes to the Site Use Program that impacts actual land use requirements by USDOE by revising the LUCAP.

The processes are controlled within the SRS Quality Assurance (QA) Program in accordance with WSRC 1Q Manual, *Quality Assurance* (WSRC 2003b). The SRS QA program governs all SRS activities.

SRS identifies all buildings and facilities on maps used in the Site Use Program. This waste unit is identified on these maps as a CERCLA facility.

Any work proposed in these areas will be strictly controlled, and workers will be appropriately trained and briefed about health and safety requirements if work is deemed necessary for maintenance. The USDOE will notify the USEPA and the SCDHEC in writing of changes in land use or excavation at least sixty (60) days prior to the initiation of such changes to obtain USEPA and SCHEC positions on the proper changes. USDOE shall seek prior concurrence of

USEPA and SCDHEC before any anticipated action that may disrupt the effectiveness of the land use controls, or any action that may alter or negate the need for land use controls.

4.5 Physical Access Controls

Presently the RRSB OU is surrounded by a 6-foot chain link fence, locked gates, and warning signs on the fence. The remedial action will retain the fence and will include a concrete intruder barrier, asphalt bioturbation barrier, warning signs, and granite warning monuments. USDOE will maintain these controls as long as the waste poses an unacceptable threat to human health and the environment or until the land is transferred to nonfederal ownership. Deed restrictions will require the new owner to continue maintenance of LUCs and engineered barriers as needed until the waste unit no longer poses an unacceptable threat to human health and the environment.

The areas subject to land-use controls are shown on Sketch SK-C-53215 in Appendix A. The sketch shows the surface area subject to LUCs and the current extent of groundwater subject to LUCs. It is expected that the extent of groundwater contamination will change and; consequently, the extent of the groundwater LUCs will also change.

The effectiveness of the LUCs will be monitored by annual field inspections in accordance with the Field Inspection Checklist in Appendix B. The effectiveness of the LUCs will be further evaluated in the 5-year remedy review.

4.6 Warning Signs and Granite Monuments

To prevent unknowing entry and to ensure that unrestricted use of the waste unit does not occur while the unit is under ownership of the government, or concentrations sufficiently reduced to allow for unrestricted use, access control warning signs and granite monuments will be placed at the unit. The signs will be legible for a distance of at least 25 feet. The signs will read as follows:

- R-Reactor Seepage Basins OU (Bldgs: 904-57G, 58G, 59G, 60G, 103G, 104G)

- "Danger – Unauthorized Personnel Keep Out. This unit contains radiological hazardous substances. Do not dig or excavate. Do not enter without contacting the waste unit custodian." See Appendix D for figure showing standard warning sign for the RRSB OU.
- Custodian: Manager, Post-Closure
- Phone: (803) 952-6882

Granite monuments will be placed on the concrete intruder barrier. The warnings on the granite monuments will read as follows:

"Danger – Buried Radioactive Waste – Do not Dig"

Custodial responsibilities for maintenance and inspection of the RRSB OU will be maintained by the Post-Closure Maintenance Group within Soil Groundwater Closure Projects (SGCP).

4.7 Other Access Controls and Security/Surveillance Measures

While under the ownership of USDOE, access control of the entire SRS will be maintained in accordance with the 2000 RCRA Part B Permit Renewal Application, Volume I, Section F.1. This section describes the 24-hour surveillance system (R.61-79.264.14(b)(1)), artificial or natural barriers (R.61-79.264.14(b)(2)(I)), control entry systems (R.61-79.264.14(b)(2)(ii)), and access control warning signs (R.61-79.264.14(c)) in place at the SRS boundary to comply with the security requirements for a RCRA-permitted facility.

4.8 Field Inspection and Maintenance for Institutional Controls

After remediation of the RRSB OU, only maintenance activities will be required by this remedial action. No operations other than groundwater mixing zone (WSRC 2002b) monitoring will be required.

The R-Reactor Seepage Basin will be inspected annually according to the Field Inspection Checklist in Appendix B. USEPA and SCDHEC will be notified by USDOE of any events and/or

actions that indicate potential compromise of the ICs and the proposed action to address the potential compromise within 30 days of identification. The FFA Annual Progress Report, submitted to the regulatory agencies by USDOE, will provide the status of the ICs and will address any control deficiencies or inconsistent uses of ICs. In the event of property transfer or lease, the Annual Report will cite findings on the following: whether the use of the property is affected by the deed or lease restrictions and controls; whether property use conforms with the deed or lease restrictions and controls; and whether the owners and state/local agencies have been notified regarding the deed or lease restrictions and controls.

All other routine maintenance activities will be documented and maintained in files subject to USEPA and SCDEHC review and audit. A copy of the completed inspection checklist is maintained in the SGCP Document Control. The LUCs shall be maintained until the concentration of hazardous substances associated with the unit have been reduced to levels that allow for unlimited exposure and unrestricted use.

The waste unit inspectors are to be trained in Hazardous Waste Operations and Emergency Response (HAZWOPER), RCRA Well Inspections (SGCP-specific training), SGCP RCRA Waste Unit Inspections, Radiological Worker Training, etc., as applicable for the specific inspection. They will also be trained based on the individual requirements of the regulatory approved closure documents for each waste unit. In addition, the inspectors are to attend yearly refresher courses. Over the years, different personnel may conduct the inspections and grass cutting operations.

This unit-specific LUCIP, including the checklist (Appendix B), will be appended to the SRS LUCAP upon final regulatory approval of the completed remedial action.

5.0 REFERENCES

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

USDOE, 1996. *Savannah River Site Future Use Project Report*, Stakeholder-Preferred Recommendations for SRS Land and Facilities, USDOE Savannah River Operations Office, January

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WSRC, 2002a. *Groundwater Flow and Contaminant Transport Modeling in Support of the RRSB-Operable Unit (U)*, WSRC-RP-2002-4081, Revision 1, Savannah River Site, Aiken, SC

WSRC, 2002b. *R-Area Reactor Seepage Basins (904-57G, -58G, -59G, -60G, -103G, - 104G) Operable Unit Groundwater Mixing Zone Application* (U), WSRC-RP-2002-4053, Revision 1.1, August, Westinghouse Savannah River Company, Savannah River Site, Aiken, SC

WSRC, 2003a. WSRC Procedure Manual 1D, *Site Infrastructure and Services Manual (U)*, Procedure 3.02, "Site Real Property Configuration Control," Westinghouse Savannah River Company, Savannah River Site, Aiken, SC

WSRC, 2003b. WSRC Procedure Manual 1Q, *Quality Assurance (U)*, Westinghouse Savannah River Company, Savannah River Site, Aiken, SC

WSRC 2003c, *Record of Decision for the R-Area Reactor Seepage Basin (904-57G, 58G, 59G, 60G, 103G, 104G) and 108-4R Overflow Basin Operable Unit* (U), WSRC RP-2003-4093, Rev. 1, Westinghouse Savannah River Company, Savannah River Site, Aiken, SC

APPENDIX A

DESIGN SKETCH

SK-C-53215 LAND USE CONTROL IMPLEMENTATION PLAN SKETCH

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EXIST CONCRETE/ASPHALT SURFACE

ASPHALT BIOTURBATION BARRIER

CONCRETE INTRUDER BARRIER

DRAINAGE FLOW

P PROCESS SEWER LINE

SCADA SCADA CABLE

FP FIRE PROTECTION

SS SANITARY SEWER LINE

DW DOMESTIC WATER

S STORM DRAIN

SURFACE AREA LIMITS

GROUNDWATER PLUME

1 ROW POWER LINE RIGHT OF WAY

NOTES:

1. THE EXISTING UTILITIES OUTSIDE THE R REACTOR SEEPAGE BASIN PERIMETER FENCE LIMIT ARE NOT UNDER LAND USE CONTROL LIMITS.
2. THIS SKETCH PROVIDES A PLAN VIEW OF THE SITE WITH A LINE MARKED DEPICTING THE "SURFACE AREA SUBJECT TO LAND USE CONTROLS" AND A LINE MARKED DEPICTING THE "CURRENT ESTIMATED LOCATION OF THE GROUNDWATER PLUME SUBJECT TO LAND USE CONTROLS".

60 120 180

1" = 60'

R REACTOR SEEPAGE BASIN OPERABLE UNIT CLOSURE (904-57G,58G,59G,60G,103G AND 104G)

LAND USE CONTROL IMPLEMENTATION PLAN (U)

SK-C-53215, REV 1

DRAWN BY (ORIG): P. CALAIS
TIME

LAST CADD REV. BY: P. CALAIS
DATE:

Scale shown on this drawing is only applicable when plotted at 30"x42" (actual drawing size)

...\RAIP\LUCIP\SKC53215.DGN 08/02/2004 12:51:46 PM

APPENDIX B

FIELD INSPECTION CHECKLIST

FOR R-REACTOR SEEPAGE BASINS

FIELD INSPECTION CHECKLIST

FOR R-REACTOR SEEPAGE BASINS

904-57G, -58G, -59G, -60G, -103G, -104G

❑ SCHEDULED ❑ UNSCHEDULED

A= Satisfactory X= Unsatisfactory (Explanation required)	A or X	Observation of Corrective Action Taken
1. Verify that the roads are accessible.		
2. Verify that the waste unit signs (16) and granite monument (6) are in acceptable condition, have the correct information, and are legible from a distance of 25 feet.		
3. Verify that the fence is in good condition and locked.		
4. Verify that there are no unauthorized excavation, digging, or construction activities in the RRSB OU.		
5. Check the integrity of drainage ditches for the presence of excessive erosion, sediment buildup, and any debris restricting water flow.		
6. Verify that no woody vegetation is growing through the asphalt bioturbation barrier. Remove or identify as needed.		
7. Visually check the buffer vegetative grass density, with no bare spots more than 3 by 3 feet in area. The height of the vegetative cover should not impair the visual inspection of the asphalt or concrete cover. This will be determined by the inspector.		

FIELD INSPECTION CHECKLIST

FOR R-REACTOR SEEPAGE BASINS

(904-57G, -58G, -59G, -60G, -103G, -104G) (Continued)

A= Satisfactory X= Unsatisfactory (Explanation required)	A or X	Observation of Corrective Action Taken
8. Verify granite monuments are in place and legible		
9. Check the asphalt cover for signs of cracking or depressions (subsidence).		
10. Check for signs of burrowing animals.		
11. Check sedimentation basins for excessive sediment build up as indicated by the sediment markers		

Inspected by:

_____ / _____ Date:_____
(Print Name) (Signature)

Post-Closure Manager:

_____ / _____ Date:_____
(Print Name) (Signature)

CAUTION: The inspector shall notify the Post-Closure Manager (PCM) and Environmental Compliance Authority (ECA) **IMMEDIATELY** if there has been a breach or compromise of the institutional controls at this waste unit. The notification shall be in accordance with SRS post-closure inspection procedures.

NOTE: Monitoring wells associated with this waste unit are maintained in accordance with SGCP Monitoring Well Procedures.

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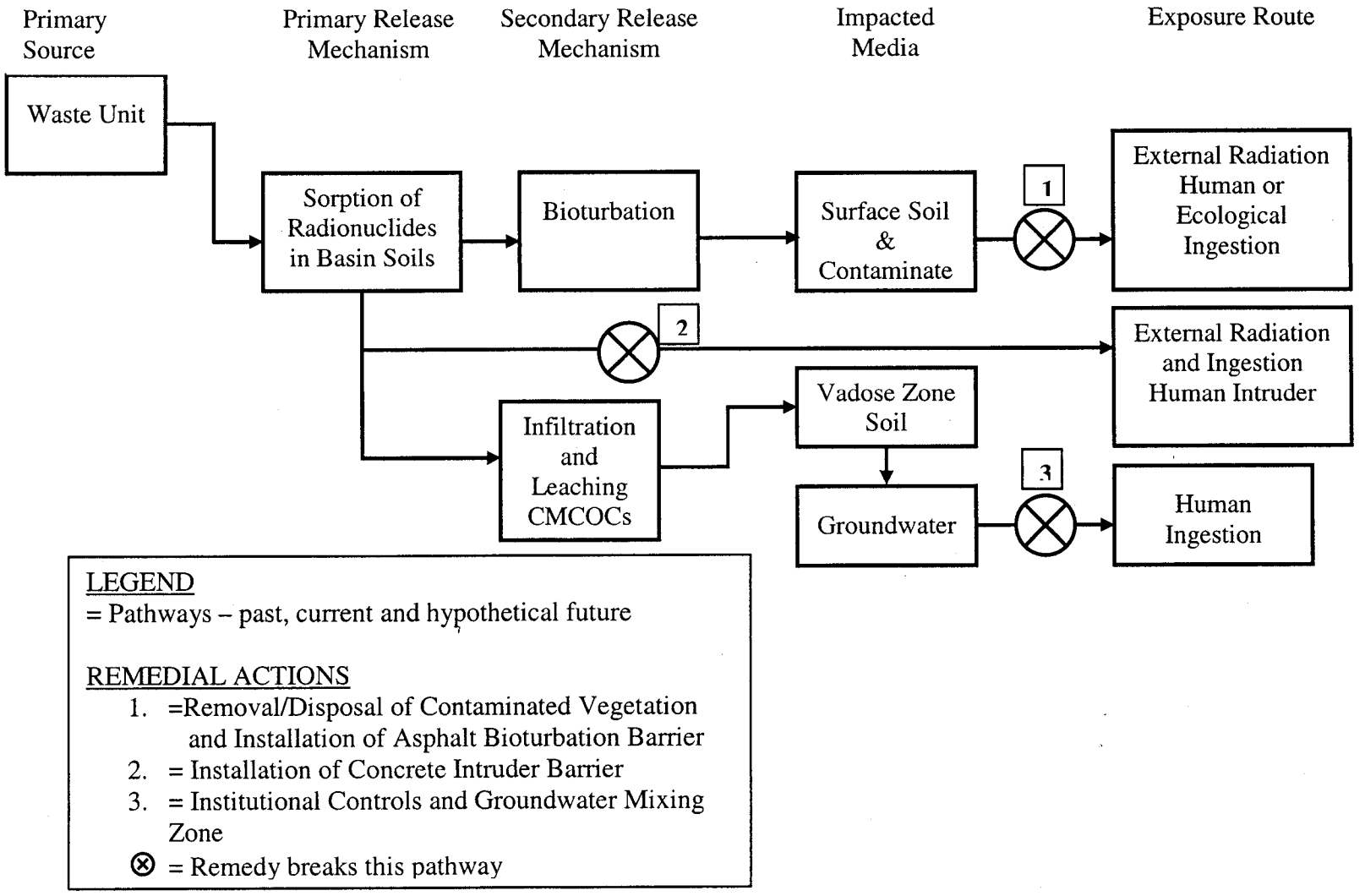
APPENDIX C

POST-REMEDIAL ACTION CONCEPTUAL SITE MODEL

FOR THE R-REACTOR SEEPAGE BASINS

POST-REMEDIAL ACTION

Figure C-1. Post-Remedial Action Conceptual Site Model for R-Reactor Seepage Basins OU



APPENDIX D

ACCESS CONTROL WARNING SIGNS

and

Typical Granite Marker

R-Reactor Seepage Basins Waste Unit

Building Numbers: 904-57G, -58G, -59G, -60G, -103G, and -104G

DANGER

UNAUTHORIZED PERSONNEL KEEP OUT

THIS UNIT CONTAINS RADIOLOGICAL SUBSTANCES.

DO NOT DIG OR EXCAVATE.

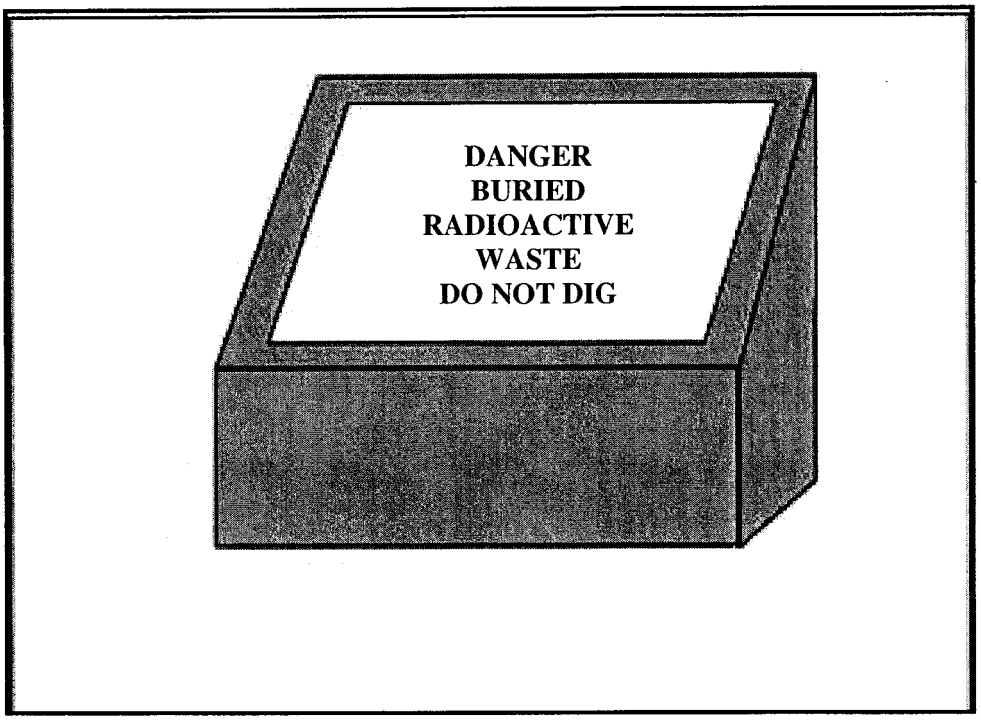
DO NOT ENTER WITHOUT CONTACTING THE

WASTE UNIT CUSTODIAN.

CUSTODIAN: MANAGER, POST-CLOSURE MAINTENANCE

PHONE: (803) 952-6882

Figure D-1. Access Control Warning Sign



TYPICAL SINGLE SLANT GRANITE MONUMENT
APPROXIMATELY 24" X 10" X 16"

Figure D-2. Typical Granite Warning Monument

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LUCIP for the
R-Area Burning/Rubble Pits (131-R and -1R) and R-Area Rubble Pile (631-25G)[15]
Land Use Control Implementation Plan R-Area Burning/Rubble Pits (131-R and -1R) and R-Area Rubble Pile (631-25G)
(WSRC-RP-2004-4119, Revision 0, January 2005)

[15] R-Area Rubble Pile is designated as a No Action/No Further Action Operable Unit.

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012051

United States Department of Energy
Savannah River Site

Land Use Control Implementation Plan (LUCIP) for R-Area Burning/Rubble Pits (131-R and 131-1R) and R- Area Rubble Pile (631-25G) Operable Unit (U)

CERCLIS NUMBER: 43

WSRC–RP–2004-4119

Revision 0

January 2005

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

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

DISCLAIMER

This report was prepared by Westinghouse Savannah River Company LLC (WSRC) for the United States Department of Energy under Contract No. DE-AC09-96SR18500 and is an account of work performed under that contract. Reference herein to any specific commercial product, process, or services by trademark, name, manufacturer or otherwise does not necessarily constitute or imply endorsement, recommendation, or favoring of same by WSRC or the United States Government or any agency thereof.

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Prepared for
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and
Westinghouse Savannah River Company LLC
Aiken, South Carolina

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LIST OF ACRONYMS AND ABBREVIATIONS

CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
COC	constituent of concern
ECA	Environmental Compliance Authority
FFA	Federal Facility Agreement
GMZA	Groundwater Mixing Zone Application
HAZWOPER	Hazardous Waste Operations and Emergency Response
LUC	Land Use Control
LUCIP	Land Use Control Implementation Plan
LUCAP	Land Use Control Assurance Plan
OU	Operable Unit
PCM	Post-Closure Manager
QA	Quality Assurance
RBRP	R-Area Burning/Rubble Pits
RCRA	Resource Conservation and Recovery Act
ROD	Record of Decision
RRP	R-Area Rubble Pile
SCDHEC	South Carolina Department of Health and Environmental Control
SGCP	Soil and Groundwater Closure Projects
SRS	Savannah River Site
USDOE	United States Department of Energy
USEPA	United States Environmental Protection Agency
WSRC	Westinghouse Savannah River Company, LLC

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1.0 INTRODUCTION

This Land Use Control Implementation Plan (LUCIP) has been prepared for R-Area Burning/Rubble Pits (RBRP) (131-R and 131-1R) and R-Area Rubble Pile (RRP) (631-25G) Operable Unit (OU) at the Savannah River Site (SRS). The purpose of the LUCIP is to describe how the land use controls (LUCs) selected in the RBRP/RRP Record of Decision (ROD) will be implemented and maintained. The following LUCs have been selected for this OU:

- prevent contact, removal, or excavation of RBRP and RRP soil
- protect the integrity of the low permeability cover system
- preclude residential use of the area

The selected remedy leaves hazardous substances in place that pose a potential future risk and will require land use restrictions for an indefinite period of time. As agreed on March 30, 2000, among the United States Department of Energy (USDOE), the United States Environmental Protection Agency (USEPA), and the South Carolina Department of Health and Environmental Control (SCDHEC), SRS is implementing a Land Use Control Action Plan (LUCAP) to ensure that the LUCs required by numerous remedial decisions at SRS are properly maintained and periodically verified. The requirements of that LUCAP also apply to the LUCs that were selected as part of the remedial action for RBRP/RRP. This additional document, the RBRP/RRP LUCIP, contains the detailed and specific measures required to implement and maintain the LUCs selected as part of this particular remedial decision. The LUCs shall be maintained until the Operable Unit is suitable for unlimited exposure and unrestricted use. Approval by USEPA and SCDHEC is required for any modification or termination of the ICs.

USDOE is responsible for implementing, maintaining, monitoring, reporting, and enforcing the LUCs in accordance with the approved LUCIP. Upon final approval, the LUCIP will be appended to the LUCAP and should be considered incorporated by reference into the RBRP/RRP ROD, establishing implementation and maintenance requirements for the LUCs

under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and the SRS Federal Facility Agreement. The LUCIP will remain in effect unless and until modifications are approved by USEPA and SCDHEC as necessary for protection of human health and the environment. This LUCIP will be evaluated for accuracy during the five-year remedy review and any approved LUCIP modification will be appropriately documented for incorporation by reference into the RBRP/RRP ROD.

1.1 Format of LUCIP

The format of this LUCIP is consistent with the FFA protocol format approved by the USEPA and SCDHEC in March 2004.

2.0 OVERVIEW OF RBRP/RRP REMEDIAL ACTION

2.1 Description of RBRP/RRP

RBRP/RRP is located near R-Area Reactor. RBRP is comprised of two parallel burial trenches, each approximately 230 x 30 feet (ft). One of the pits (131-R) has been backfilled with soil to grade. When operational, this pit was 13 ft deep. The other pit (131-1R) remains open. When operational, the open pit was 10 ft deep, but waste disposal and subsequent erosion of the side slopes into the pit has brought the current floor of the pit to 8 ft below local grade. The combined area of both pits is 13,800 ft^2. The area enclosed by orange marker balls, which define the perimeter of the unit, is 110 x 265 ft (29,150 ft^2).

RRP is an area of approximately 0.7 acres where miscellaneous debris was placed on the ground, forming one contiguous pile generally 2 to 3 ft deep. The pile consists of a mixture of debris and soil. Debris identified in the pile includes miscellaneous construction materials, friable asbestos material, stainless steel shavings, empty 55-gallon drums, approximately fifteen 25-gallon containers, railroad ties, building insulation, floor and ceiling tiles, lawn wastes, light bulbs, coiled metal, and small amounts of coal and ash. Friable asbestos is present in a large portion of the unit.

2.2 Nature and Extent of Contamination in RBRP/RRP

Characterization of the burning/rubble pits indicates that contaminated soil is confined to the pits. Highest concentrations of contaminants are located at the bottom of the open pit (131-1R) and at the original base of the closed pit (13 feet below ground surface). Contaminants of concern are metals (cadmium, copper, lead, manganese, thallium, zinc), PCE, and dioxins/furans.

Characterization of the rubble pile indicates that contamination is confined to the rubble pile and one foot of soil beneath the rubble pile. Contaminants of concern are metals (cadmium, lead, copper, barium, zinc) and asbestos.

2.3 Remedial Action Selected

The remedy selected for the RBRP/RRP OU is soil removal and a soil cover system. This remedy entails the following actions:

- consolidation of RCRA non-hazardous rubble pile material into/over open rubble pit sub-unit
- low permeability cover over the combination (pits and non-hazardous pile material)
- offsite disposal of any RCRA hazardous pile materials
- implementation of land-use controls to ensure continued protection of human health and the environment

The post-remedial action conceptual site model (see Appendix C-1 to this LUCIP) shows the broken pathways and the remaining residual risk to the future industrial worker.

According to the *Savannah River Site Future Use Project Report* (USDOE 1996), residential use of SRS land is prohibited.

3.0 LAND-USE CONTROL OBJECTIVES

Considering the residual risk, the LUC objectives are to:

- Maintain the use of the site for industrial activities only. This LUC objective attains the remedial action objectives (RAOs) to prevent residential development within the OU and prevents residential exposure to the contaminated media at the RBRP/RRP OU.

- Prevent unauthorized access to the unit as long as the waste remains a threat to human health or the environment. This LUC objective attains the RAO to prevent current, remedial and future industrial workers from exposure to the contaminated media at the RBRP/RRP OU.

- Provide public notices for disclosing former waste management and disposal activities and remedial actions taken on the site. This LUC supports RAOs that protect industrial workers, residents, trespassers, and inadvertent intruders from exposure to the contaminated media at the RBRP/RRP OU.

- Prevent unauthorized residential or agricultural access to groundwater. This LUC supports RAOs to protect industrial workers, residents, trespassers, and inadvertent intruders from exposure to the contaminated media at the RBRP/RRP OU and helps prevent the spread of groundwater contamination.

4.0 IMPLEMENTATION OF LAND-USE CONTROLS

This section describes the LUCs selected in the ROD to achieve the objectives stated in Section 3.0.

The RBRP will be maintained for industrial use only in perpetuity. At RRP, institutional controls will be contingent on the confirmatory sampling results. If no contamination above residential remedial goals remains at the RRP, unit-specific LUCs will not be implemented. If soil contamination above residential remedial goals does remain, institutional controls will be implemented.

Table 1. Land Use Controls for the RBRP/RRP

Type of Control	Purpose of Control	Duration	Implementation	Affected Areas[a]
1. Property Record Notices[b]	Provide notice to anyone searching records about the existence and location of contaminated areas.	Until the concentration of hazardous substances associated with the unit have been reduced to levels that allow for unlimited exposure and unrestricted use.	Notice recorded by DOE in accordance with state laws at County Register of Deeds office if the property or any portion thereof is ever transferred to non-federal ownership.	All waste management areas and other areas where hazardous substances are left in place at levels requiring land use and/or groundwater restrictions.
2. Property record restrictions[c]: A. Land Use B. Groundwater	Restrict use of property by imposing limitations. Prohibit the use of groundwater.	Until the concentration of hazardous substances associated with the unit have been reduced to levels that allow for unlimited exposure and unrestricted use.	Drafted and implemented by DOE upon transfer of affected areas. Recorded by DOE in accordance with state law at County Register of Deeds office.	All waste management areas and other areas where hazardous substances are left in place at levels requiring land use and/or groundwater restrictions.
3. Other Notices[d]	Provide notice to county/city about the existence and location of waste disposal and residual contamination areas for zoning/planning purposes.	Until the concentration of hazardous substances associated with the unit have been reduced to levels that allow for unlimited exposure and unrestricted use.	Notice recorded by DOE in accordance with state laws at County Register of Deeds office if the property or any portion thereof is ever transferred to non-federal ownership.	All waste management areas and other areas where hazardous substances are left in place at levels requiring land use and/or groundwater restrictions.
4. Site Use Program[e]	Provide notice to worker/developer) i.e., permit requestor) on extent of contamination and prohibit or limit excavation/penetration activity.	As long as property remains under DOE control.	Implemented by DOE and site contractors Initiated by permit request	Remediation systems, all waste management areas. And areas where levels requiring land use and / or groundwater restrictions.

Table 1. Land Use Controls for the RBRP/RRP (Continued)

Type of Control	Purpose of Control	Duration	Implementation	Affected Areas[a]
5. Warning Signs[f]	Provide notice or warning to prevent unauthorized uses	Until the concentration of hazardous substances associated with the unit have been reduced to levels that allow for unlimited exposure and unrestricted use.	Signage maintained by DOE	At RBRP OU and SRS boundary. RRP OU is dependant on confirmatory sampling results.
6. Security Surveillance Measures	Control and monitor access by workers/public	Until the concentration of hazardous substances associated with the unit have been reduced to levels that allow for unlimited exposure and unrestricted use.	Established and maintained by DOE Necessity of patrols evaluated upon completion of remedial actions.	Patrol of selected area throughout SRS, as necessary.

[a]Affected areas – Specific locations identified in the SRS LUCIP or subsequent post-ROD documents.

[b]Property Record Notices – Refers to any non-enforceable, purely informational document recorded along with the original property acquisition records of DOE and its predecessor agencies that alerts anyone searching property records to important information about residual contamination; waste disposal areas in the property.

[c]Property Record Restrictions – Includes conditions and/or covenants that restrict or prohibit certain uses of real property and are recoded along with original property acquisition records of Doe and its predecessor agencies.

[d]Other Notices – Includes information on the location of waste disposal areas and residual contamination depicted on as survey plat, which is provided to a zoning authority (i.e., city planning commission) for consideration in appropriate zoning decisions for non-DOE property.

[e]Site Use Program – Refers to the internal DOE/DOE contractor administrative program(s) that requires the permit requestor to obtain authorization, usually in the form of a permit, before beginning any excavation/penetration activity (e.g., well drilling) for the purpose of ensuring that the proposed activity will not affect underground utilities/structures, or in the case contaminated soil or groundwater, will not disturb the affected areas without the appropriate precautions and safeguards.

[f]Signs – Posted command, warning or direction.

4.1 Property Record Notices

In the long term, if the property is ever transferred to non-federal 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 contract for sale and the deed will contain the notification required by CERCLA Section 120(h).

The deed notification shall, in perpetuity, notify any potential purchaser that the property has been used to manage and dispose of waste. This requirement is consistent with the intent of Resource Conservation and Recovery Act (RCRA) deed notification requirements at final closure of a RCRA facility if contamination will remain at the unit.

4.2 Property Record Restrictions

The deed shall also include restrictions precluding residential use of the property and/or any other property record restrictions necessary to achieve the LUC objectives. The deed shall contain provisions to ensure that appropriate land use controls remain with the affected area upon any and all transfers. USDOE shall provide a copy of the executed deeds to the regulatory agencies as soon as practicable after the transfer of fee title, but no later than 30 days. However, the need for these deed restrictions may be re-evaluated 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 re-evaluation of the need for the deed restrictions will be done though an amended ROD.

USDOE shall provide USEPA and SCDHEC 6 months notice prior to transfer to ensure that USEPA and SCDHEC can be involved in discussions to ensure that appropriate provisions are included in the transfer terms or conveyance documents to maintain effective ICs. If it is not possible for the facility to notify USEPA and SCDHEC at least six months prior to any transfer or sale, then the facility will notify USEPA and SCDHEC as soon as possible but no later than 60 days prior to the transfer or sale of any property subject to ICs. In addition to the land

transfer notice and discussion provisions above, DOE further agrees to provide USEPA and SCDHEC with similar notice, within the same time frames, as to federal to federal transfer of property.

4.3 Other Public Notices

Prior to construction completion the LUCIP identifies in Appendix A the area under land use restriction via a design sketch, which provides a plan view of the site with a line marked depicting the area subject to land use controls. After construction completion, an as-built showing the as-built arrangement of the institutional controls will be submitted to USEPA and SCDHEC concurrently with the Post-Construction Report to replace the sketch.

In addition, if the site is ever transferred to non-federal ownership, a professional land surveyor-certified survey plat of the OU will be prepared at or near the time of conveyance to support the LUCIP required restrictive covenants on land use and will be recorded with the appropriate county recording agency.

4.4 Site Use Program

Under DOE Order 430.1A, *Life Cycle Management* (USDOE 1998), SRS is required, to implement an asset management program for the use, maintenance, and disposal of physical assets, including real estate. SRS complies with this Order through its Site Use Program, which is conducted in accordance with WSRC 1D, *Site Infrastructure and Services Manual*, Procedure 3.02, "Site Real Property Configuration Control" (WSRC 2003a). All employees, contractors, and visitors at SRS are required to adhere to the Site Use Program. This program ensures authorization of any work performed at SRS if the work adds, modifies, or removes features portrayed on the SRS development maps. No land use (e.g., excavation) shall be undertaken without prior approval documented by a Site Use Permit. To obtain this authorization, a Site Clearance Request Form must be completed. In accordance with WSRC 1D, Procedure 3.02, all work at SRS that adds to or modifies features or facilities portrayed on SRS development maps (i.e., plot plans of facilities/utilities at SRS) will be authorized by a Site Clearance Permit before any activities are conducted. All Site Clearance Requests will be reviewed to verify that either

an approved Site Use Permit has been obtained or that the request is sanctioned by an existing Site Use Permit. All land use requirements applicable for the OU will be provided to the Site Use Program for use in determining issuance of Site Clearance permits. In addition, the Site Use permit must be amended when the geographic configuration or buffer zone used to establish the permit boundary changes or there is a change to the permitted land use.

SRS is responsible for updating, maintaining, and reviewing site maps, including Federal Facility Agreement (FFA) (1993) OU identifications. If a Site Clearance Request potentially impacts an FFA OU, the Site Clearance Request Form is sent to the appropriate FFA OU reviewer for approval. The roles and responsibilities of each individual are detailed in WSRC 1D, Procedure 3.02. Before a Site Clearance Permit is issued, verification of USDOE approval for intended land use must be obtained. The site use and site clearance processes are applicable to all activities and personnel on site (including subcontractors). The USEPA and SCDHEC will be notified within 30 days of any changes to the Site Use Program that impacts actual land use requirements by USDOE via a revision to the LUCAP. The processes are controlled within the SRS Quality Assurance (QA) Program in accordance with WSRC 1Q Manual, *Quality Assurance* (WSRC 2003b). The SRS QA program governs all SRS activities.

SRS identifies all buildings and facilities on maps used in the Site Use Program. This waste unit is identified on these maps as a CERCLA facility.

Any work proposed in these areas will be strictly controlled, and workers will be appropriately trained and briefed about health and safety requirements if work is deemed necessary for maintenance. No change in land use or excavation at the RBRP/RRP OU shall be undertaken without USEPA and SCDHEC approval. USDOE shall seek prior concurrence of USEPA and SCDHEC before any anticipated action that may disrupt the effectiveness of the land use controls, or any action that may alter or negate the need for land use controls.

4.5 Warning Signs

To prevent unknowing entry and to ensure that unrestricted use of the waste unit does not occur while the unit is under ownership of the government, access control warning signs will be posted at the unit. The signs will be legible for a distance of at least 25 feet. The signs will read as follows:

- R-Area Burning/Rubble Pits (131-R and 131-1R)
- "Danger – Unauthorized Personnel Keep Out. This unit contains hazardous substances. Do not dig or excavate. Do not enter without contacting the waste unit custodian."
- Custodian: Manager, Post-Closure - Remediation Maintenance
- Phone: (803) 952-6882

Custodial responsibilities for maintenance and inspection of the RBRP/RRP OU will be maintained by the Post-Closure Maintenance Group. Similar signs for RRP would be created if institutional controls are deemed necessary.

4.6 Other Access Controls and Security/Surveillance Measures

While under the ownership of USDOE, access control of the entire SRS will be maintained in accordance with the 1992 RCRA Part B Permit Renewal Application, Volume I, Section F.1. This section describes the 24-hour surveillance system (R.61-79.264.14(b)(1)), artificial or natural barriers (R.61-79.264.14(b)(2)(I)), control entry systems (R.61-79.264.14(b)(2)(ii)), and access control warning signs (R.61-79.264.14(c)) in place at the SRS boundary to comply with the security requirements for a RCRA-permitted facility.

4.7 Field Inspection and Maintenance for Institutional Controls

After remediation of the RBRP/RRP OU, only maintenance activities will be required by this remedial action. No operations other than groundwater monitoring will be required.

The RBRP/RRP OU will be inspected annually per the Field Inspection Checklist in Appendix B. USEPA and SCDHEC will be notified by USDOE of any events and/or actions that indicate potential compromise of the institutional controls and the proposed action to address the potential compromise within 30 days of identification. The FFA Annual Progress Report, submitted to the regulatory agencies by the USDOE, will provide the status of the ICs and how any institutional control deficiencies or inconsistent uses have been addressed. In the event of property transfer or lease, the Annual Report will cite findings on the following: whether the use of the property is affected by the deed or lease restrictions and controls; whether property use conforms with the deed or lease restrictions and controls; and whether the owners and state/local agencies have been notified regarding the deed or lease restrictions and controls.

All other routine maintenance activities will be documented and maintained in files subject to USEPA and SCDEHC review and audit. A copy of the completed inspection form is maintained in the Soil and Groundwater Closure Projects (SGCP) Document Control. The LUCs shall be maintained until the concentration of hazardous substances associated with the unit have been reduced to levels that allow for unlimited exposure and unrestricted use.

The waste unit inspectors are to be trained in Hazardous Waste Operations and Emergency Response (HAZWOPER), RCRA Well Inspections (SGCP-specific training), SGCP RCRA Waste Unit Inspections, Radiological Worker Training, etc., as applicable for the specific inspection. They will also be trained based on the individual requirements of the regulatory approved closure documents for each waste unit. In addition, the inspectors are to attend yearly refresher courses. Over the years, different personnel may conduct the inspections and grass cutting operations.

This unit-specific LUCIP, including the checklist (Appendix B), will be appended to the SRS LUCAP upon final regulatory approval.

5.0 REFERENCES

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

USDOE, 1996. *Savannah River Site Future Use Project Report*, Stakeholder-Preferred Recommendations for SRS Land and Facilities, USDOE Savannah River Operations Office, January

USDOE, 1998. DOE Order 430.1A, *Life Cycle Management* (Approved October 14, 1998)

WSRC, 2003a. WSRC Procedure Manual 1D, *Site Infrastructure and Services Manual (U)*, Procedure 3.02, "Site Real Property Configuration Control," Westinghouse Savannah River Company, Savannah River Site, Aiken, SC

WSRC, 2003b. WSRC Procedure Manual 1Q, *Quality Assurance (U)*, Westinghouse Savannah River Company, Savannah River Site, Aiken, SC

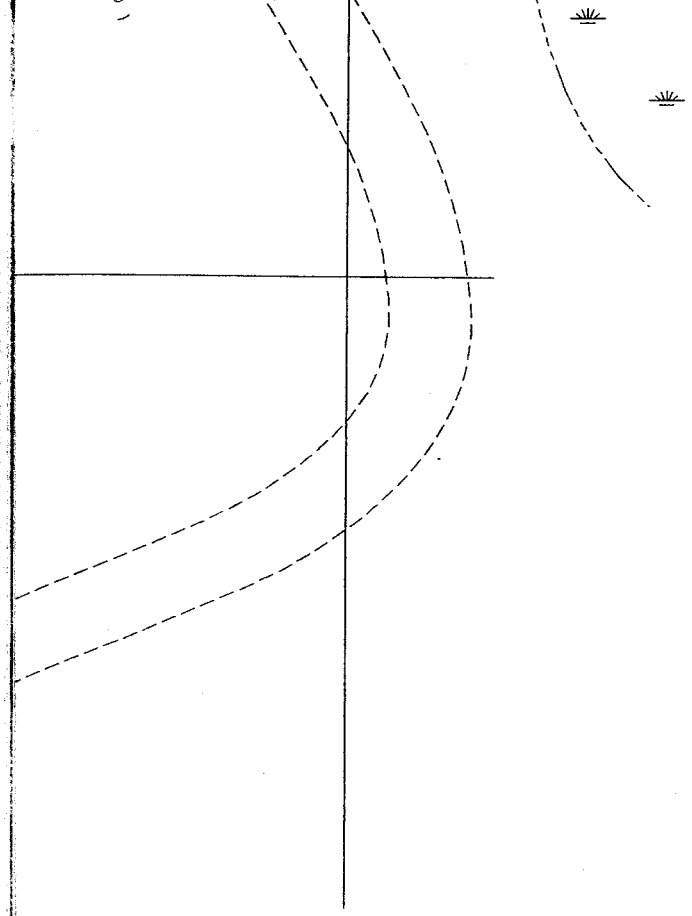
APPENDIX A

SURVEY PLAT

SK-C-53232

LAND USE CONTROL IMPLEMENTATION PLAN

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LEGEND

- EXISTING DIRT/GRAVEL ACCESS ROADS
- APPROXIMATE TREE LINE
- WETLAND
- EXISTING WELLS
- USGS BENCHMARK
- ACCESS CONTROL WARNING SIGN
- BOUNDARY MARKER
- GRADE BREAK LINE
- ℄ CHANNEL
- LAND USE CONTROL LIMIT

R-AREA BURNING/RUBBLE PITS AND RUBBLE PILE OPERABLE UNIT REMEDIATION

LAND USE CONTROL IMPLEMENTATION PLAN (U)

SCALE	SKETCH NO.	SHEET NO.	LATEST REVISION
NTS	SK-C-53232	1 OF 1	A

DRAWN BY (ORIG): P. CALAIS LAST CADD REV. BY: P. CALAIS
DATE: 10/28/04

Scale shown on this drawing is only applicable when plotted at 30"x42" (actual drawing size)

PV119E

P Q R S T U V W X Y

APPENDIX B

FIELD INSPECTION CHECKLIST

FOR RBRP/RRP

FIELD INSPECTION CHECKLIST

FOR RBRP/RRP WASTE UNIT

❑ **SCHEDULED** ❑ **UNSCHEDULED**

A= Satisfactory X= Unsatisfactory (Explanation required)	A or X	Observation of Corrective Action Taken
1. Verify that the roads are accessible.		
2. Verify that the 4 waste unit signs are in acceptable condition, have the correct information, and are legible from a distance of 25 feet.		
3. Verify that there are no excavation, digging, or construction activities on the soil cover.		
4. Check the integrity of drainage ditches (if any) for the presence of excessive erosion, sediment buildup, and any debris restricting water flow.		
5. Verify that no woody vegetation is growing on the soil cover. Remove or identify as needed.		
6. Visually check the vegetative cover for grass density, with no bare spots more than 3 by 3 feet in area. The height of the vegetative cover should not impair the visual inspection of the soil cover. This will be determined by the inspector.		

FIELD INSPECTION CHECKLIST

FOR RBRP/RRP WASTE UNIT (Continued)

7. Check the soil cover for signs of erosion or depressions (subsidence).		
8. Check for signs of burrowing animals.		

Inspected by:

_____ / _____ Date:_____
(Print Name) (Signature)

Post-Closure Manager:

_____ / _____ Date:_____
(Print Name) (Signature)

CAUTION: The inspector shall notify the Post-Closure Manager (PCM) and Environmental Compliance Authority (ECA) **IMMEDIATELY** if there has been a breach or compromise of the institutional controls of this waste unit. The notification shall be in accordance with SRS post-closure inspection procedures.

NOTE: Monitoring wells associated with this waste unit are maintained in accordance with SGCP Monitoring Well Procedures.

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APPENDIX C

POST-REMEDIAL ACTION CONCEPTUAL SITE MODEL

FOR THE R-AREA BURNING/RUBBLE PITS AND RUBBLE PILE OPERABLE UNIT

POST-REMEDIAL ACTION

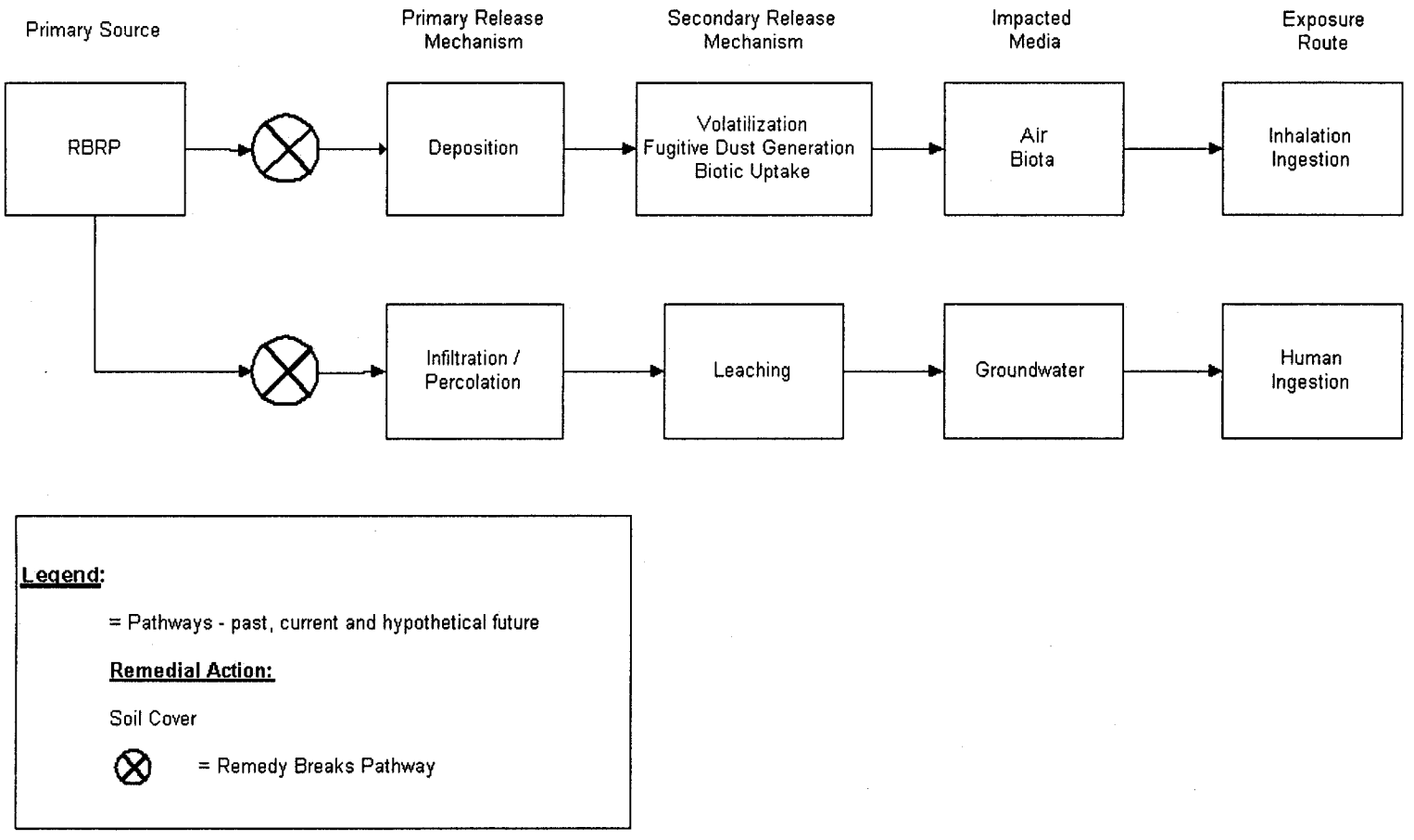


Figure C-1. Post-Remedial Action Conceptual Site Model for RBRP

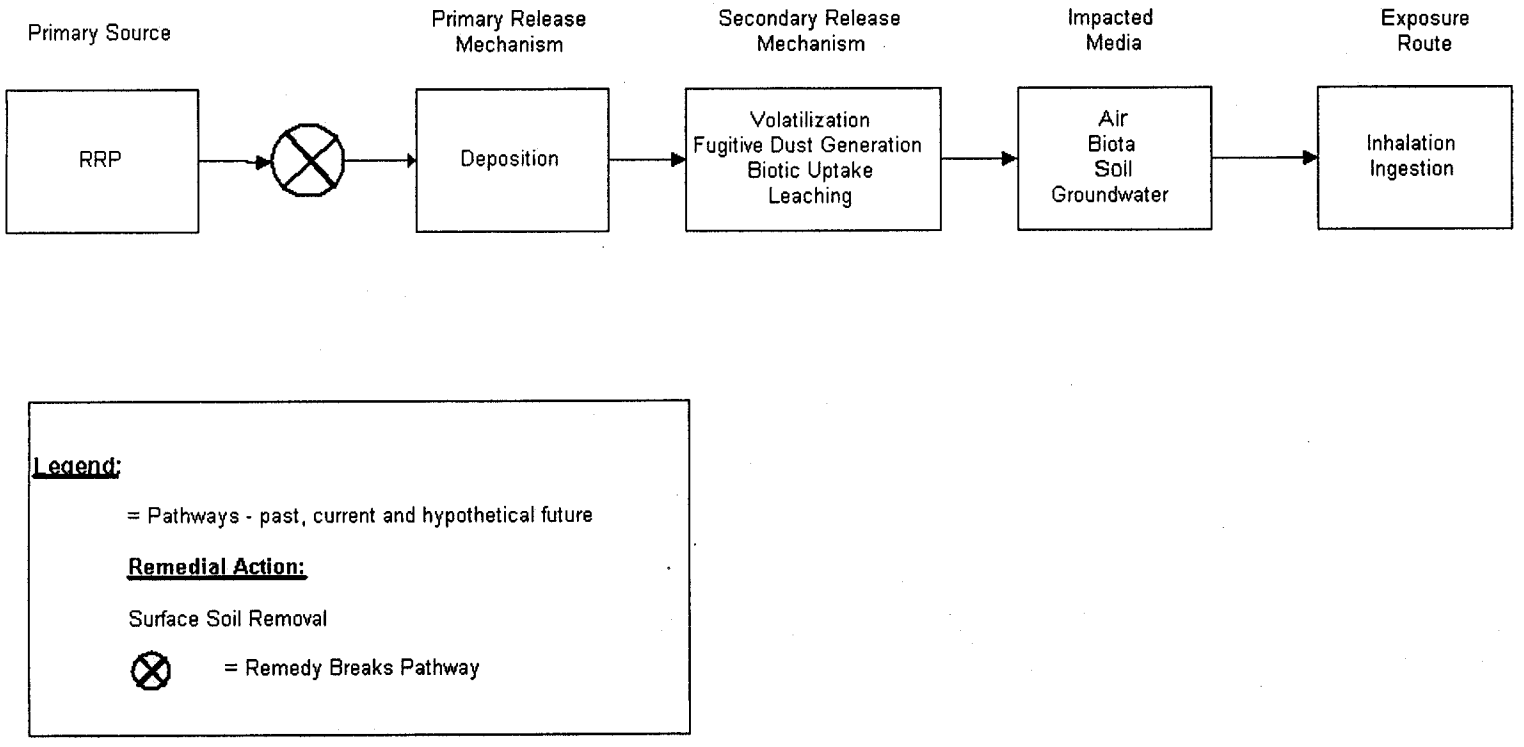


Figure C-2. Post-Remedial Action Conceptual Site Model for RRP

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APPENDIX D

ACCESS CONTROL WARNING SIGNS

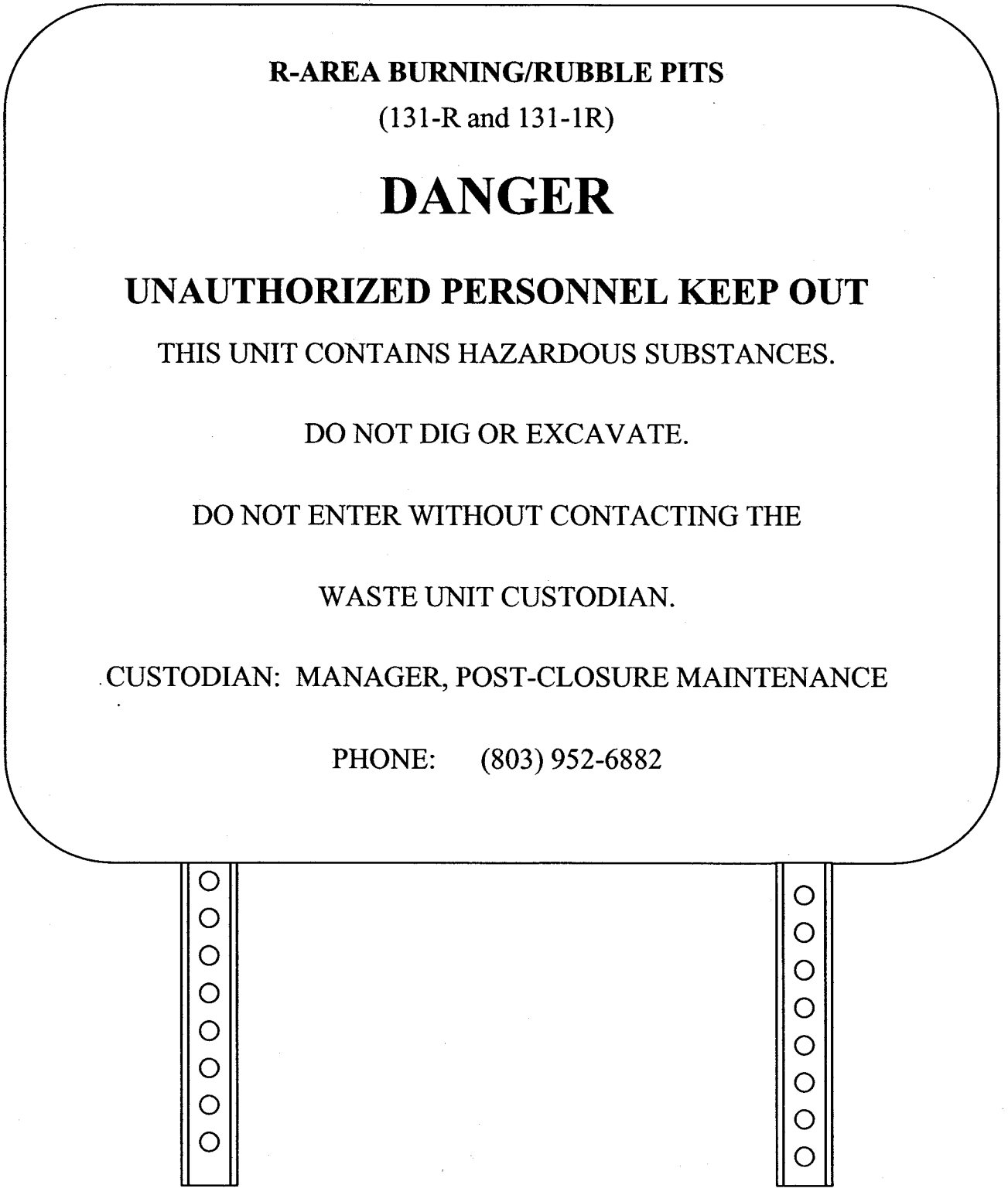


Figure D-1. Access Control Warning Sign

LUCIP for the
Heavy Equipment Wash Basin and Central Shops Burning Rubble Pit (631-5G)
Land Use Control Implementation Plan for the Heavy Equipment Wash Basin and Central Shops Burning Rubble Pit (631-5G)[16]
(WSRC-RP-2005-4015, Revision 1, July 2005)

[16] Central Shops Burning Rubble Pit (631-5G) is designated as a No Action/No Further Action Operable Unit.

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United States Department of Energy

Savannah River Site

Land Use Control Implementation Plan (LUCIP) for the Heavy Equipment Wash Basin and Central Shops Burning/Rubble Pit (631-5G) Operable Unit (U)

CERCLIS NUMBER: 53

WSRC–RP–2005-4015

Revision 1

July 2005

Prepared by:
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Savannah River Site
Aiken, SC 29808

Prepared for the 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

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LIST OF ACRONYMS AND ABBREVIATIONS

ac	acre
ARAR	applicable or relevant and appropriate requirement
BRA	baseline risk assessment
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act, 1980
CERCLIS	Comprehensive Environmental Response, Compensation, and Liability Information System
CM	contaminant migration
COC	constituent of concern
CSBRP	Central Shops Burning/Rubble Pit
CSM	conceptual site model
ECA	Environmental Compliance Authority
FFA	Federal Facility Agreement
ft	feet
ft^3	cubic feet
gal/min	gallon per minute
ha	hectare
HEMA	Heavy Equipment Maintenance Area
HEWA	Heavy Equipment Wash Area
HEWB	Heavy Equipment Wash Basin
HHCOC	human health constituent of concern
km	kilometer
LLTSM	low-level threat source material
L/min	liter per minute
LUC	land use control
LUCAP	Land Use Control Assurance Plan
LUCIP	Land Use Control Implementation Plan
m	meter
m^3	cubic meter
MCL	maximum contaminant level
mi	mile
ODA	Overflow Discharge Area
OU	operable unit
PCM	Post-Closure Manager
PTSM	principal threat source material

LIST OF ACRONYMS AND ABBREVIATIONS (Continued)

RA	remedial action
RAO	remedial action objective
RCOC	refined constituent of concern
RCRA	Resource Conservation and Recovery Act, 1976
RFI	RCRA Facility Investigation
RG	remedial goal
RI	Remedial Investigation
ROD	Record of Decision
SCDHEC	South Carolina Department of Health and Environmental Control
SRS	Savannah River Site
USDOE	United States Department of Energy
USEPA	United States Environmental Protection Agency
WSRC	Westinghouse Savannah River Company LLC

1.0 INTRODUCTION

The Heavy Equipment Wash Basin (HEWB) and Central Shops Burning/Rubble Pit (631-5G) (CSBRP-5G) Operable Unit (OU) was composed of three subunits: the HEWB, the HEWB Overflow Discharge Area (ODA), and the CSBRP-5G. The selected remedy for the ODA and CSBRP-5G was no further action. The selected remedy for HEWB was institutional controls.

This Land Use Control Implementation Plan (LUCIP) has been prepared for the HEWB at the Savannah River Site (SRS). The purpose of the LUCIP is to describe how the land use controls (LUCs) selected in the HEWB/CSBRP-5G OU Record of Decision (ROD) (WSRC 2004) will be implemented and maintained. The following LUCs have been selected for the HEWB subunit:

- Access controls
- Deed notification
- Field inspections and maintenance for the institutional controls

The selected remedy leaves hazardous substances in place that pose a potential future risk and will require land use restrictions for an indefinite period of time. As agreed on March 30, 2000, among the United States Department of Energy (USDOE), the United States Environmental Protection Agency (USEPA), and the South Carolina Department of Health and Environmental Control (SCDHEC), SRS is implementing a Land Use Control Action Plan (LUCAP) to ensure that the LUCs required by numerous remedial decisions at SRS are properly maintained and periodically verified. The requirements of that LUCAP also apply to the LUCs that were selected as part of the remedial action (RA) for the HEWB. This additional document, the HEWB LUCIP, contains the detailed and specific measures required to implement and maintain the LUCs selected as part of this

particular remedial decision. The LUCs shall be maintained until the HEWB is suitable for unlimited exposure and unrestricted use. Approval by USEPA and SCDHEC is required for any modification or termination of the institutional controls.

USDOE is responsible for implementing, maintaining, monitoring, reporting, and enforcing the LUCs in accordance with the approved LUCIP. Upon final approval, the LUCIP will be appended to the LUCAP and should be considered incorporated by reference into the HEWB/CSBRP-5G OU ROD (WSCR 2004), establishing implementation and maintenance requirements for the LUCs under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and the SRS Federal Facility Agreement (FFA) (1993). The LUCIP will remain in effect unless and until modifications are approved by USEPA and SCDHEC as necessary for protection of human health and the environment. This LUCIP will be evaluated for accuracy during the five-year remedy review, and any approved LUCIP modification will be appropriately documented for incorporation by reference into the HEWB/CSBRP-5G OU ROD.

1.1 Format of LUCIP

The format of this LUCIP is consistent with the FFA protocol format approved by USEPA and SCDHEC in March 2004.

2.0 OVERVIEW OF HEWB REMEDIAL ACTION

2.1 Description of HEWB

Central Shops Area (also known as N Area) is located in the central part of SRS, within the Fourmile Branch Watershed, approximately 10 km (6 mi) from the nearest (western) site boundary. HEWB is located in the northeastern part of Central Shops, approximately 0.9 km (0.6 mi) south of the intersection of SRS Roads 5 and C. The HEWB may be accessed by a gravel road adjacent to and parallel to the Heavy Equipment Maintenance Area (HEMA) fence.

Historically, during day shifts the HEWB received approximately 38 L/min (10 gal/min) of wastewater five days a week. The wastewater contained traces of oil, grease, and detergents, plus significant levels of solids that were allowed to settle in the basin. According to the wastewater permit, about one-half of the resulting wash water was lost through infiltration/evaporation.

Prior to 1951, the HEWB area was farmland, an area of moderate relief. The HEWB is located in a wooded area adjacent to a gravel road. It is upgradient and approximately 30 m (100 ft) southwest of the intermittent stream. It is approximately 30 m (100 ft) northeast of the fenced area associated with the HEMA (Figure 1). The basin itself is roughly 9 x 18 m (30 x 60 ft), with an earthen berm 1 to 1.5 m (4 to 5 ft) high, an area of 0.016 ha (0.04 ac). It accommodates a volume of 140 m^3 (3,800 ft^3) of standing water at full capacity. From 1950 until the early 1970s, the HEWB received Heavy Equipment Wash Area (HEWA) effluent wash water together with sanitary wastewater from Central Shops. The HEWA was a facility set up in the maintenance area to clean equipment prior to maintenance. After the construction of the Central Shops Sanitary Wastewater Treatment Plant in the early 1970s, the wash water from the HEWA ceased going to HEWB. Since 1981, the HEWB has not received water from Central Shops and the associated facilities. The HEWB currently receives only stormwater.

2.2 Nature and Extent of Contamination in HEWB

Characterization data was collected and evaluated in the Resource Conservation and Recovery Act (RCRA) Facility Investigation (RFI)/Remedial Investigation (RI)/Baseline Risk Assessment (BRA) (WSRC 2003c) to identify refined constituents of concern (RCOCs), which are constituents warranting remedial action. RCOCs are identified using the SRS protocols for data processing, human health and ecological risk assessment, and contaminant migration modeling. The six RCOCs identified for the HEWB (benzo(a)pyrene, alpha chlordane, gamma chlordane, heptachlor epoxide, p,p'-DDD, and p,p'-DDT) are human health constituents of concern (HHCOCs) based on

unrestricted (residential) land use. There were no RCOCs identified for the industrial worker scenario. There are no ecological constituents of concern (COCs), CM COCs, exceedances of applicable or relevant and appropriate requirements (ARARs), principal threat source material (PTSM), or low-level threat source material (LLTSM) at the HEWB. There are no RCRA-listed or characteristic wastes at the HEWB. The contamination is isolated to the surface soil in the basin and exposure to RCOCs is limited by land use restrictions. The HEWB is within an industrial land use area and is expected to remain an industrial area in the future.

The combined risk posed by the six RCOCs identified for the HEWB under unrestricted residential use is greater than 1.0×10^{-6} (risk = 2.7×10^{-5}). The 1.0×10^{-6} risk level is the point of departure above which remedial alternatives are generally evaluated. Although no RCOCs were identified for the industrial worker scenario, the combined risk for the six constituents that were identified as residential RCOCs equate to a risk of 4.7×10^{-6} for the future industrial worker. The six constituents identified as residential RCOCs were not identified as RCOCs for an industrial scenario because the individual risk levels did not exceed 1.0×10^{-6}. Per the human health constituents of concern protocol, only constituents with an individual cancer risk greater than or equal to 1.0×10^{-6} are identified as COCs. A hypothetical future resident exceeding 1.0×10^{-6} does not warrant a response action by USDOE because residential use of any part of the SRS (particularly areas that are historically or currently industrial) is not reasonably anticipated or foreseeable. Rather, such a risk warrants DOE's commitment to LUCs as described in the LUCAP for the SRS and documented in the ROD. When industrial use is considered, no problems warranting action are associated with ARARs, PTSM, human health analysis, ecological analysis, or contaminant migration analysis at the HEWB.

2.3 Remedial Action Selected

In accordance with the ROD, the selected remedy for the CSBRP-5G and the HEWB Overflow Discharge Area subunits is no action. The contaminant concentrations at these units do not pose risk to human health or the environment based on unrestricted land use assumptions.

For the HEWB subunit, Institutional Controls have been selected as the remedy which includes the following action:

- Institutional controls in accordance with the LUCAP for SRS. Controls will include erecting warning signs at the HEWB to mitigate any impact from ongoing operations in the Central Shops area (including the nearby Active Burning Area (631-2G)), conducting periodic field inspections, and maintaining the site for restricted (industrial) land use.

- Five-year remedy reviews will be performed to ensure that the remedy continues to provide adequate protection to human health and the environment.

The selected remedy is a permanent solution, is protective of both human health and the environment, and is effective in meeting the remedial action objective (RAO). The selected remedy will comply with ARARs and will not pose any short-term risks to remedial workers, the community, or the environment. The post-RA conceptual site model (CSM), Appendix C, illustrates the lack of exposure pathways at the HEWB after implementation of institutional controls.

3.0 LAND-USE CONTROL OBJECTIVES

To meet the remedial goal (RG), the following LUC objectives have been established:

- maintain the use of the HEWB for industrial activities only to prevent exposure to the future industrial worker,

- prevent unauthorized access to the HEWB as long as the waste remains a potential threat to human health or the environment in order to protect the industrial worker,

- provide public notices for disclosing former waste management and disposal activities and RAs taken on the site in order to protect the future residents, trespassers, and industrial workers, and

- prevent disturbance of the soil in the HEWB.

4.0 IMPLEMENTATION OF LAND-USE CONTROLS

This section describes the LUCs selected in the ROD to achieve the LUC objectives described in Section 3.0. The information provided in this section is summarized in Table 1.

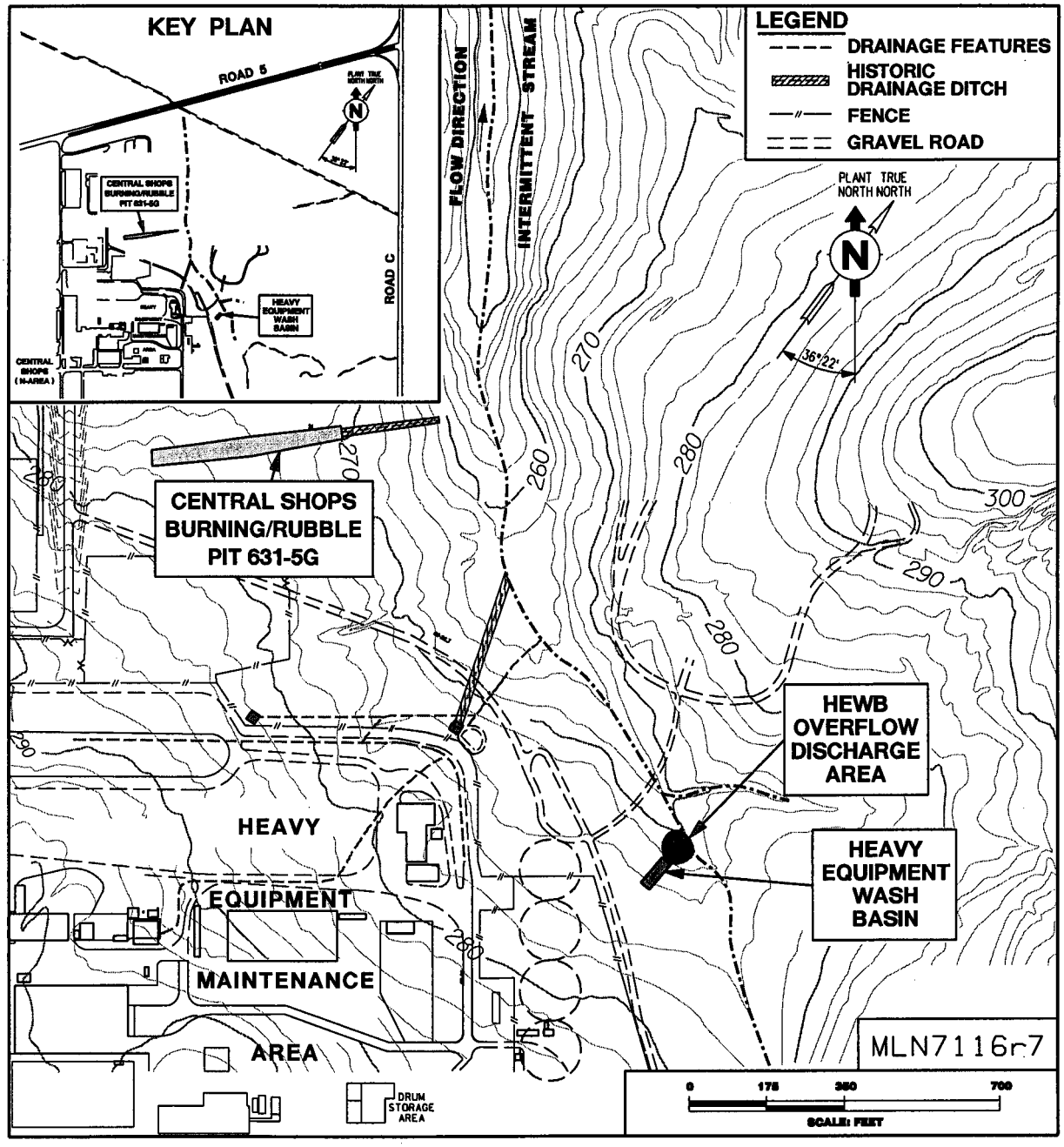


Figure 1. Central Shops Heavy Equipment Wash Basin

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Table 1. Land Use Controls for the HEWB

Type of Control	Purpose of Control	Duration	Implementation	Affected Areas[a]
1. Property Record Notices[b]	Provide notice to anyone searching records about the existence and location of contaminated areas.	Until the concentration of hazardous substances associated with the unit have been reduced to levels that allow for unlimited exposure and unrestricted use	Notice recorded by USDOE in accordance with state laws at County Register of Deeds office, if the property or any portion thereof is ever transferred to non-federal ownership.	All waste management areas and other areas where hazardous substances are left in place at levels requiring land use and/or groundwater restrictions.
2. Property record restrictions[c]: A. Land Use B. Groundwater	Restrict use of property by imposing limitations. Prohibit the use of groundwater.	Until the concentration of hazardous substances associated with the unit have been reduced to levels that allow for unlimited exposure and unrestricted use.	Drafted and implemented by USDOE upon transfer of affected areas. Recorded by USDOE in accordance with state law at County Register of Deeds office.	All waste management areas and other areas where hazardous substances are left in place at levels requiring land use and/or groundwater restrictions.
3. Other Notices[d]	Provide notice to city about the existence and location of waste disposal and residual contamination areas for zoning/planning purposes.	Until the concentration of hazardous substances associated with the unit have been reduced to levels that allow for unlimited exposure and unrestricted use.	Notice recorded by USDOE in accordance with state laws at County Register of Deeds office if the property or any portion thereof is ever transferred to non-federal ownership.	All waste management areas and other areas where hazardous substances are left in place at levels requiring land use and/or groundwater restrictions.
4. Site Use Program[e]	Provide notice to worker/developer (i.e., permit requestor) on extent of contamination and prohibit or limit excavation/penetration activity.	As long as property remains under USDOE control.	Implemented by USDOE and site contractors. Initiated by permit request.	Remediation systems, all waste management areas, and areas where levels requiring land use and/or groundwater restrictions.
5. Physical Access Controls[f] (e.g., fences, gates, portals)	Control and restrict access to workers and the public to prevent unauthorized access.	Until the concentration of hazardous substances associated with the unit have been reduced to levels that allow for unlimited exposure and unrestricted use.	Controls maintained by USDOE.	At select locations throughout SRS.
6. Warning Signs[g]	Provide notice or warning prevent unauthorized uses.	Until the concentrations of hazardous substances associated with the unit have been reduced to levels that allow for unlimited exposure and unrestricted use.	Signage maintained by USDOE.	At select locations throughout SRS.
7. Security Surveillance Measures	Control and monitor access by workers/public.	Until the concentrations of hazardous substances associated with the unit have been reduced to levels that allow for unlimited exposure and unrestricted use.	Established and maintained by USDOE Necessity of patrols evaluated upon completion of RAs.	Patrol of selected area throughout SRS as necessary.

Table 1. Land Use Controls for the HEWB (Continued)

[a]Affected areas – Specific locations identified in the SRS LUCIP or subsequent post-ROD documents.

[b]Property Record Notices – Refers to any non-enforceable, purely informational document recorded along with the original property acquisition records of USDOE and its predecessor agencies that alerts anyone searching property records to important information about residual contamination, waste disposal areas in the property.

[c]Property Record Restrictions – Includes conditions and/or covenants that restrict or prohibit certain uses of real property and are recoded along with original property acquisition records of USDOE and its predecessor agencies.

[d]Other Notices – Includes information on the location of waste disposal areas and residual contamination depicted on a survey plat, which is provided to a zoning authority (i.e., city planning commission) for consideration in appropriate zoning decisions for non-USDOE property.

[e]Site Use Program – Refers to the internal USDOE/USDOE contractor administrative program(s) that requires the permit requestor to obtain authorization, usually in the form of a permit, before beginning any excavation/penetration activity (e.g., well drilling) for the purpose of ensuring that the proposed activity will not affect underground utilities/structures, or in the case contaminated soil or groundwater, will not disturb the affected areas without the appropriate precautions and safeguards.

[f]Physical Access Control – Physical barriers or restrictions to entry.

[g]Signs – Posted command, warning or direction.

4.1 Property Record Notices

In the long term, if the property is ever transferred to non-federal 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 RAs taken on the site. The contract for sale and the deed will contain the notification required by CERCLA Section 120(h).

The deed notification shall, in perpetuity, notify any potential purchaser that the property has been used to manage and dispose of waste. This requirement is consistent with the intent of the RCRA deed notification requirements at final closure of a RCRA facility if contamination will remain at the unit.

4.2 Property Record Restrictions

The deed shall also include restrictions precluding residential use of the property and/or any other property record restrictions necessary to achieve the LUC objectives. The deed shall contain provisions to ensure that appropriate LUCs remain with the affected area upon any and all transfers. USDOE shall provide a copy of the executed deeds to the regulatory agencies as soon as practicable after the transfer of fee title, but no later than 30 days. However, the need for these deed restrictions may be re-evaluated 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 re-evaluation of the need for the deed restrictions will be done through an amended ROD. USDOE shall provide six months' notice to USEPA and SCDHEC prior to deed transfer to allow the parties time to ensure appropriate provisions are included in the transfer terms or conveyance documents to maintain effective institutional controls. If it is not possible for the facility to notify USEPA and SCDHEC at least six months prior to any transfer or sale, then the facility will notify USEPA and SCDHEC as soon as possible but no later than 60 days

prior to the transfer or sale of any property subject to institutional controls. In addition to the land transfer notice and discussion provisions above, USDOE further agrees to provide USEPA and SCDHEC with a similar notice, within the same time frames, as to federal-to-federal transfer of property.

4.3 Other Public Notices

The LUCIP provides the as-built arrangement of the institutional controls and identifies the area under land use restriction via an as-built drawing. **Note:** As-built drawing (Appendix A) and the line marked "AREA SUBJECT TO LAND USE CONTROLS."

In addition, if the site is ever transferred to non-federal ownership, a professional land surveyor-certified survey plat of the OU will be prepared at or near the time of conveyance to support the LUCIP-required restrictive covenants on land use and will be recorded with the appropriate county recording agency.

4.4 Site Use Program

Under DOE Order 430.1A, *Life Cycle Management* (USDOE 1998), SRS is required to implement an asset management program for the use, maintenance, and disposal of physical assets, including real estate. SRS complies with this Order through its Site Use Program, which is conducted in accordance with WSRC 1D, *Site Infrastructure and Services Manual*, Procedure 3.02, "Site Real Property Configuration Control" (WSRC 2003a). All employees, contractors, and visitors at SRS are required to adhere to the Site Use Program. This program ensures authorization of any work performed at SRS if the work adds, modifies, or removes features portrayed on the SRS development maps. No land use (e.g., excavation) shall be undertaken without prior approval documented by a Site Use Permit. To obtain this authorization, a Site Clearance Request Form must be completed. In accordance with WSRC 1D, Procedure 3.02, all work at SRS that adds to or modifies features or facilities portrayed on SRS development maps (i.e., plot plans of facilities/utilities at SRS) will be authorized by a Site Clearance Permit before any

activities are conducted. All Site Clearance Requests will be reviewed to verify that either an approved Site Use Permit has been obtained or that the request is sanctioned by an existing Site Use Permit. All land use requirements applicable for the OU will be provided to the Site Use Program for use in determining issuance of Site Clearance permits. In addition, the Site Use permit must be amended when the geographic configuration or buffer zone used to establish the permit boundary changes or there is a change to the permitted land use.

SRS is responsible for updating, maintaining, and reviewing site maps, including FFA (1993) OU identifications. If a Site Clearance Request potentially impacts an FFA OU, the Site Clearance Request form is sent to the appropriate FFA OU reviewer for approval. The roles and responsibilities of each individual are detailed in WSRC 1D, Procedure 3.02. Before a Site Clearance Permit is issued, verification of USDOE approval for intended land use must be obtained. The site use and site clearance processes are applicable to all activities and personnel on site (including subcontractors). USEPA and SCDHEC will be notified within 30 days of any changes to the Site Use Program that impacts actual land use requirements by USDOE via a revision to the LUCAP. The processes are controlled within the SRS Quality Assurance (QA) Program in accordance with WSRC 1Q Manual, *Quality Assurance* (WSRC 2003b). The SRS QA program governs all SRS activities.

SRS identifies all buildings and facilities on maps used in the Site Use Program. This waste unit is identified on these maps as a CERCLA facility.

Any work proposed in these areas will be strictly controlled, and workers will be appropriately trained and briefed about health and safety requirements if work is deemed necessary for maintenance. No change in land use or excavation at the HEWB shall be undertaken without USEPA and SCDHEC approval. USDOE shall seek prior concurrence of USEPA and SCDHEC before any anticipated action that may disrupt the effectiveness of the LUCs or any action that may alter or negate the need for LUCs.

4.5 Physical Access Controls

The selected remedy for HEWB is institutional controls. These controls will include warning signs, periodic inspections, and deed restrictions.

4.6 Warning Signs

To prevent unknowing entry and to ensure that unrestricted use of the waste unit does not occur while the unit is under ownership of the government, access control warning signs will be posted at the unit. The signs will be legible for a distance of at least 25 feet. The signs will read as follows (Appendix D):

- Central Shops Heavy Equipment Wash Basin
- "Danger – Unauthorized Personnel Keep Out. This unit contains hazardous substances. Do not dig or excavate. Do not enter without contacting the waste unit custodian."
- Custodian: Manager, Post-Closure – Remediation Maintenance
- Phone (803) 952-6882

Custodial responsibilities for maintenance and inspection of the HEWB will be maintained by the Post-Closure Maintenance Group within Soil and Groundwater Closure Projects (SGCP).

4.7 Other Access Controls and Security/Surveillance Measures

While under the ownership of USDOE, access control of the entire SRS will be maintained in accordance with the 1992 RCRA Part B Permit Renewal Application, Volume I, Section F.1. This section describes the 24-hour surveillance system (R.61-79.264.14(b)(1)), artificial or natural barriers (R.61-79.264.14(b)(2)(I)), control entry

systems (R.61-79.264.14(b)(2)(ii)), and access control warning signs (R.61-79.264.14(c)) in place at the SRS boundary to comply with the security requirements for a RCRA-permitted facility.

4.8 Field Inspection and Maintenance for Institutional Controls

Only maintenance activities will be required by this RA. No operations will be required.

The HEWB will be inspected annually using the Field Inspection Checklist provided as an attachment (Appendix B). USEPA and SCDHEC will be notified by USDOE of any events and/or actions that indicate potential compromise of the institutional controls and the proposed action to address the potential compromise within 30 days of identification. The FFA Annual Progress Report, submitted to the regulatory agencies by USDOE, will provide the status of the institutional controls and describe how any institutional control deficiencies or inconsistent uses have been addressed. In the event of property transfer or lease, the Annual Report will cite findings on the following: whether the use of the property is affected by the deed or lease restrictions and controls; whether property use conforms with the deed or lease restrictions and controls; and whether the owners and state/local agencies have been notified regarding the deed or lease restrictions and controls.

All other routine maintenance activities will be documented and maintained in files subject to USEPA and SCDHEC review and audit. A copy of the completed inspection form is maintained in the SGCP Document Control Center. The waste unit inspectors are to be trained in Hazardous Waste Operations and Emergency Response (HAZWOPER), RCRA Well Inspections (SGCP-specific training), SGCP RCRA Waste Unit Inspections, Radiological Worker Training, etc., as applicable for the specific inspection. They will also be trained based on the individual requirements of the regulatory approved closure documents for each waste unit. In addition, the inspectors are to attend yearly refresher courses. Over the years, different personnel may conduct the inspections.

This unit-specific LUCIP, including the checklist (Appendix B), will be appended to the SRS LUCAP upon final regulatory approval.

5.0 REFERENCES

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

USDOE, 1998. DOE Order 430.1A, Life Cycle Management (Approved October 14, 1998)

WSRC, 2003a. WSRC Procedure Manual 1D, *Site Infrastructure and Services Manual* (U), Procedure 3.02, "Site Real Property Configuration Control," Westinghouse Savannah River Company, Savannah River Site, Aiken, SC

WSRC, 2003b. WSRC Procedure Manual 1Q, *Quality Assurance* (U), Westinghouse Savannah River Company, Savannah River Site, Aiken, SC

WSRC, 2003c. *Resource Conservation and Recovery Act (RCRA) Facility Investigation/Remedial Investigation (RFI/RI) with Baseline Risk Assessment (BRA) for the Heavy Equipment Wash Basin and Central Shops Burning/Rubble Pit (631-5G) Operable Unit (U)*, WSRC-RP-2002-4088, Rev 1, June, Westinghouse Savannah River Company, Savannah River Site, Aiken, SC

WSRC, 2004. *Record of Decision (ROD) Remedial Alternative Selection for the Heavy Equipment Wash Basin and Central Shops Burning/Rubble Pit (631-5G) OU*, WSRC-RP-2003-4185, Rev 1.1, October, Westinghouse Savannah River Company, Savannah River Site, Aiken, SC

APPENDIX A

Survey Plat

Land Use Control Implementation Plan Survey Plat

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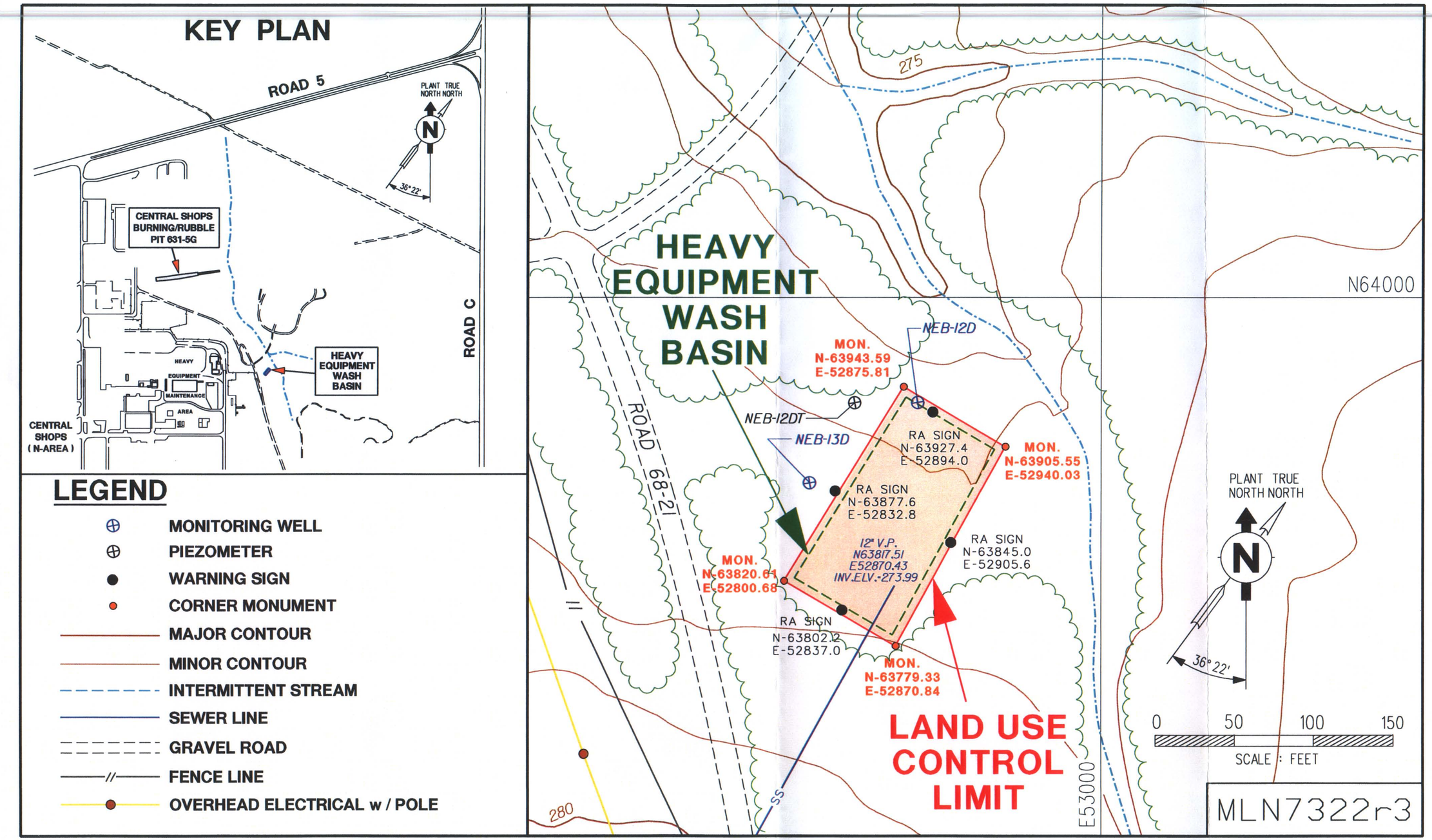


Figure A-1. Central Shops Heavy Equipment Wash Basin

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APPENDIX B

Field Inspection Checklist

for the Heavy Equipment Wash Basin

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Appendix B

Field Inspection Checklist

for the Heavy Equipment Wash Basin

❑ **SCHEDULED** ❑ **UNSCHEDULED**

A= Satisfactory X= Unsatisfactory (Explanation required)	A or X	Observation of Corrective Action Taken
1. Verify that the roads are accessible.		
2. Verify that the waste unit signs (# 4) are in acceptable condition, have the correct information, and are legible from a distance of 25 feet.		
3. Verify monuments are in acceptable condition.		
4. Other		

Inspected by:

_____ / _____ _____

Print Name Signature Date

Post-Closure Manager:

_____ / _____ _____

Print Name Signature Date

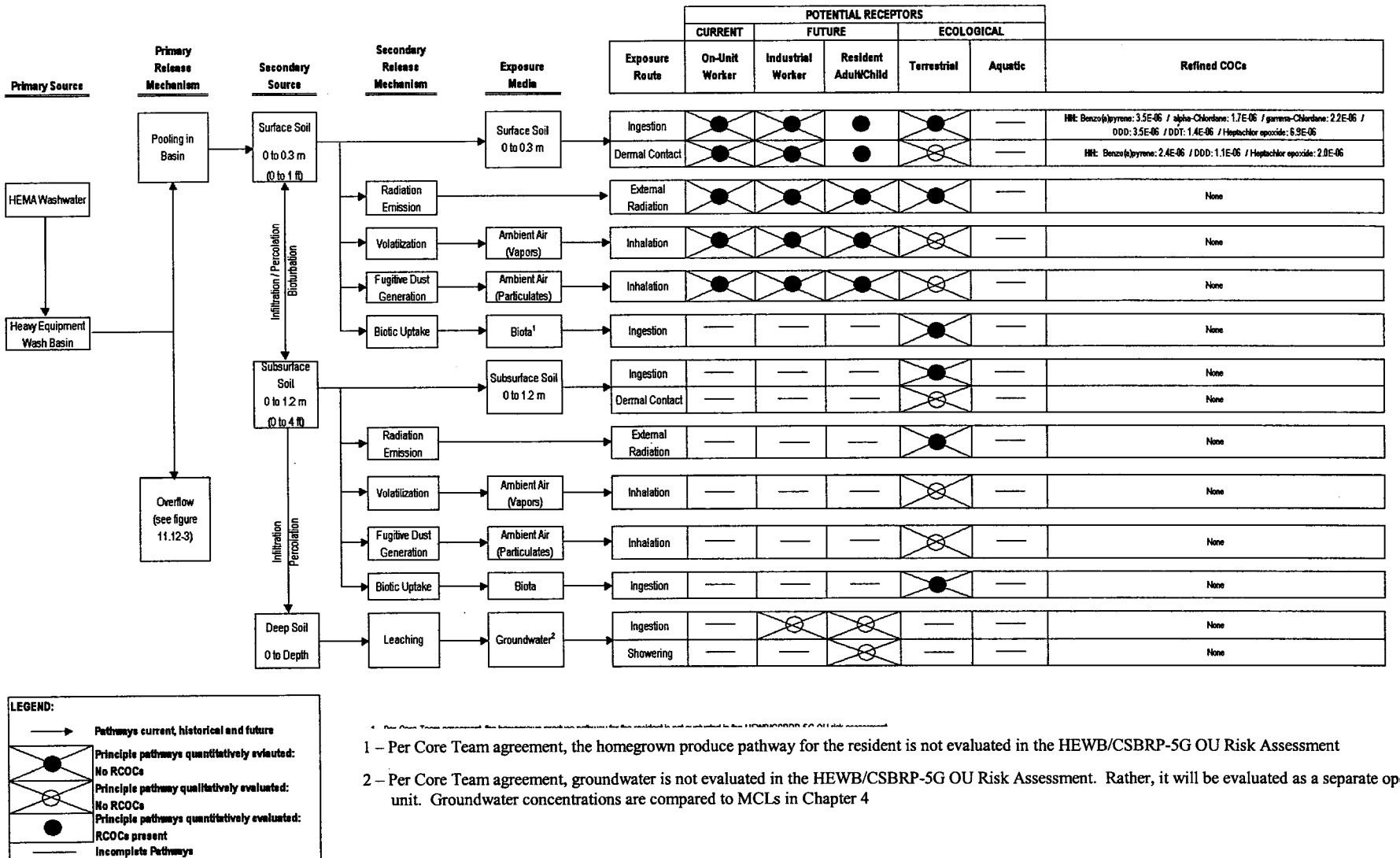
CAUTION: The inspector shall notify the Post-Closure Manager (PCM) and Environmental Compliance Authority (ECA) **IMMEDIATELY** if there has been a breach or compromise of the institutional controls at this waste unit. The notification shall be in accordance with SRS post-closure inspection procedures.

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APPENDIX C

Post-Remedial Action Conceptual Site Model for the Heavy Equipment Wash Basin Post-Remedial Action

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1 – Per Core Team agreement, the homegrown produce pathway for the resident is not evaluated in the HEWB/CSBRP-5G OU Risk Assessment

2 – Per Core Team agreement, groundwater is not evaluated in the HEWB/CSBRP-5G OU Risk Assessment. Rather, it will be evaluated as a separate operable unit. Groundwater concentrations are compared to MCLs in Chapter 4

Figure C-1. Conceptual Site Model

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APPENDIX D

Access Control Warning Signs

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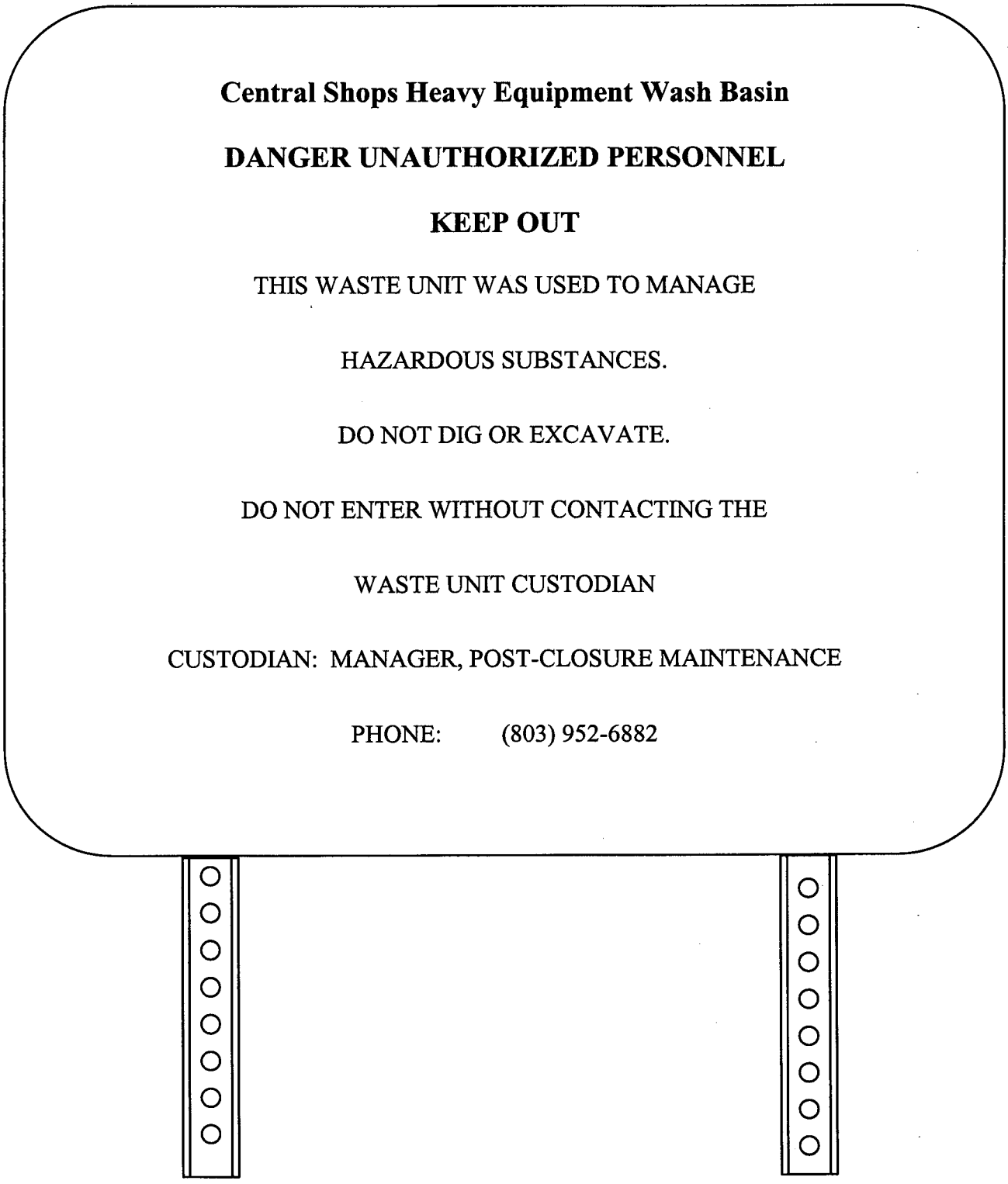


Figure D-1. Access Control Warning Sign

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LUCIP for the
D-Area Expanded Operable Unit
(consists of D-Area Ash Basin,488-D, and D-Area Rubble Pit, 431-2D)
Land Use Control Implementation Plan for the D-Area Expanded Operable Unit
(WSRC-RP-2004-4065, Revision 1, June 2005)

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012759

United States Department of Energy

Savannah River Site

Land Use Control Implementation Plan (LUCIP) for the D-Area Expanded Operable Unit (DEXOU) (U)

CERCLIS NUMBER: 67

WSRC–RP–2004-4065

Revision 1

June 2005

Prepared by:
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Aiken, SC 29808

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

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Aiken, South Carolina

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LIST OF ACRONYMS AND ABBREVIATIONS

ac	acre
ARAR	applicable or relevant and appropriate requirement
CAB	Citizens Advisory Board
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CM	contaminant migration
cm/s	centimeter per second
COC	constituent of concern
DEXOU	D-Area Expanded Operable Unit
488-DAB	488-D Ash Basin
DRP	D-Area Rubble Pit
DSVA	Dead and Stressed Vegetation Area
ECA	Environmental Compliance Authority
ECO	ecological
FFA	Federal Facility Agreement
ft	feet
GMZA	Groundwater Mixing Zone Application
ha	hectare
HAZWOPER	Hazardous Waste Operations and Emergency Response
HH	human health
LUC	Land Use Control
LUCIP	Land Use Control Implementation Plan
LUCAP	Land Use Control Assurance Plan
m	meter
mg/kg	milligram per kilogram
MSL	mean sea level
NCP	National Contingency Priorities
NOID	Notice of Intent to Delist
OU	operable unit
PCB	polychlorinated biphenyl
PCM	Post-Closure Manager
PTSM	potential threat source material

LIST OF ACRONYMS AND ABBREVIATIONS (Continued)

QA	quality assurance
RA	remedial action
RAO	remedial action objective
RCRA	Resource Conservation and Recovery Act
RG	remedial goal
ROD	Record of Decision
SCDHEC	South Carolina Department of Health and Environmental Control
SGCP	Soil and Groundwater Closure Projects
SRS	Savannah River Site
UCL	upper confidence level
USDOE	United States Department of Energy
USEPA	United States Environmental Protection Agency
WSRC	Westinghouse Savannah River Company, LLC
yd	yard

1.0 INTRODUCTION

This Land Use Control Implementation Plan (LUCIP) has been prepared for D-Area Expanded Operable Unit (DEXOU) at the Savannah River Site (SRS). The purpose of the LUCIP is to describe how the land use controls (LUCs) selected in the DEXOU Record of Decision (ROD) will be implemented and maintained. The following LUCs have been selected for this operable unit (OU):

- Provide physical access controls to the DEXOU to prevent trespasser exposure to residual risks at D-Area Rubble Pit (DRP) and 488-D Ash Basin (488-DAB) via existing SRS security gates and perimeter fences.

- Maintain the use of the DEXOU for industrial activities only through property record decisions, restriction of property use, and notices.

- Prevent onsite worker exposure to residual risks at the 488-DAB via the Site Use Program, warning signs, and other existing measures.

The selected remedy leaves hazardous substances in place that pose a potential future risk and will require land use restrictions for an indefinite period of time. As agreed on March 30, 2000, among the United States Department of Energy (USDOE), the United States Environmental Protection Agency (USEPA), and the South Carolina Department of Health and Environmental Control (SCDHEC), SRS is implementing a Land Use Control Action Plan (LUCAP) to ensure that the LUCs required by numerous remedial decisions at SRS are properly maintained and periodically verified (WSRC 2004c). The requirements of that LUCAP also apply to the LUCs that were selected as part of the remedial action (RA) for DEXOU. This additional document, the DEXOU LUCIP, contains the detailed and specific measures required to implement and maintain the LUCs selected as part of this particular remedial decision. The LUCs shall be maintained until the OU is suitable for unlimited exposure and unrestricted use. Approval by USEPA and SCDHEC is required for any modification or termination of the LUCs.

USDOE is responsible for implementing, maintaining, monitoring, reporting, and enforcing the LUCs in accordance with the approved LUCIP. Upon final approval, the LUCIP will be appended to the LUCAP and should be considered incorporated by reference into the DEXOU ROD, establishing implementation and maintenance requirements for the LUCs under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and the SRS Federal Facility Agreement (FFA). The LUCIP will remain in effect unless and until modifications are approved by USEPA and SCDHEC as necessary for protection of human health and the environment. This LUCIP will be evaluated for accuracy during the five-year remedy review and any approved LUCIP modification will be appropriately documented for incorporation by reference into the DEXOU ROD.

1.1 Format of LUCIP

The format of this LUCIP is consistent with the FFA protocol format approved by the USEPA and SCDHEC in March 2004.

2.0 OVERVIEW OF THE DEXOU REMEDIAL ACTION

2.1 Description of the DEXOU

The DEXOU is located within D Area at SRS in Barnwell County, South Carolina. Industrial activities associated with the operation of a coal-fired powerhouse (484-D) are expected to continue in D Area until 2015. The DEXOU lies approximately 914 m (3,000 ft) east of the nearest site boundary, the Savannah River, and includes two surface units: the DRP and the 488-DAB (WSRC 2001). The groundwater in D Area is addressed as a separate OU. See Figure 1 for a layout of the DEXOU surface units and subunits.

DRP

The DRP is a 3.2 ha (8-ac) area used from the early 1950s through 1989 for the disposal of construction debris and coal rejects. The DRP is located approximately 305 m (1,000 ft)

northwest of the 488-DAB. The area is heavily vegetated and bounded by a natural drainage (DRP Stream Boundary) both to the east and south of the unit.

Waste at DRP consists of soil mixed with asphalt, coal, paper, metal, plastic, glass fragments, foam insulation, fiberboard, asbestos, roofing materials, wire, road gravel, and other miscellaneous debris. Impacted soil in the northwest portion of DRP (approximately 2.3 ha (5.7 acres) is contaminated typically to a depth of 0.3 m (0-1 ft). The largest area of waste/debris disposal covers approximately 1.7 ha (4.1 ac). Disposed material is present at depths up to approximately 1.8 m (6 ft).

488-DAB

The 488-DAB is an unlined, earthen containment basin located approximately 274 m (900 ft) south of the 484-D powerhouse. The basin received ash-sluice from the 484-D powerhouse from the early 1950s until 1978 when the sluice was diverted to the newly constructed 488-1D and 488-2D ash basins. After 1978, the 488-DAB received dry ash and coal reject material until the early to mid 1990s. The 488-DAB is situated adjacent to the floodplain of the Savannah River on a terrace deposit with low relief. The 488-DAB is approximately 549 m (1,800 ft) long and 183 m (600 ft) wide. The basin was constructed above grade and is up to 5.5 m (18 ft) deep with the bottom near original grade.

The 488-DAB unit includes several subunits that are contaminated by processes related to the basin. These subunits are the 488-DAB (Interior), the 488-D Pooled Basin (within the western end of the basin), the 488-D Drainage, the 488-DAB (Exterior), and the Dead and Stressed Vegetation Area (DSVA). See Figure 1 for the location of these subunits.

The 488-DAB (Interior) subunit consists of the waste material within the 488-DAB and the basin berm. The waste material includes ash and coal rejects. The coal rejects are found primarily in the upper 4 ft of the eastern two-thirds of the basin.

Low pH surface runoff across the basin pools in the western end of the basin (488-D Pooled Basin) and is present at times even in drier months. The volume of pooled water is variable; the observed maximum is about 3.8 million liters (1 million gallons).

A standpipe in the western end of the 488-DAB was used to discharge pooled surface water from the 488-D Pooled Basin and to prevent basin overflow. Discharge from the standpipe goes into the 488-D Drainage. The 488-D Drainage is approximately 61 m (200 ft) long by 3 m (10 ft) wide. The standpipe was filled with cement in 1998 to eliminate release of low pH surface water from the Pooled Basin; however, minor pipe leakage continues.

The 488-DAB (Exterior) subunit consists of the area outside of the basin and along its northern perimeter. Stormwater runoff from the 484-D powerhouse is directed through a drainage (D-003 outfall) along the northern edge of the basin. Coal rejects on the north berm have sloughed off of the basin into the D-003 outfall drainage, causing acidification of the stormwater runoff. The low pH water has resulted in the zone of vegetative kill (the DSVA). The impacted area (including the DSVA and the D-003 outfall drainage) consists of about 1.8 ha (4.4 ac) and is contaminated typically to a depth of 0.3 m (1 ft).

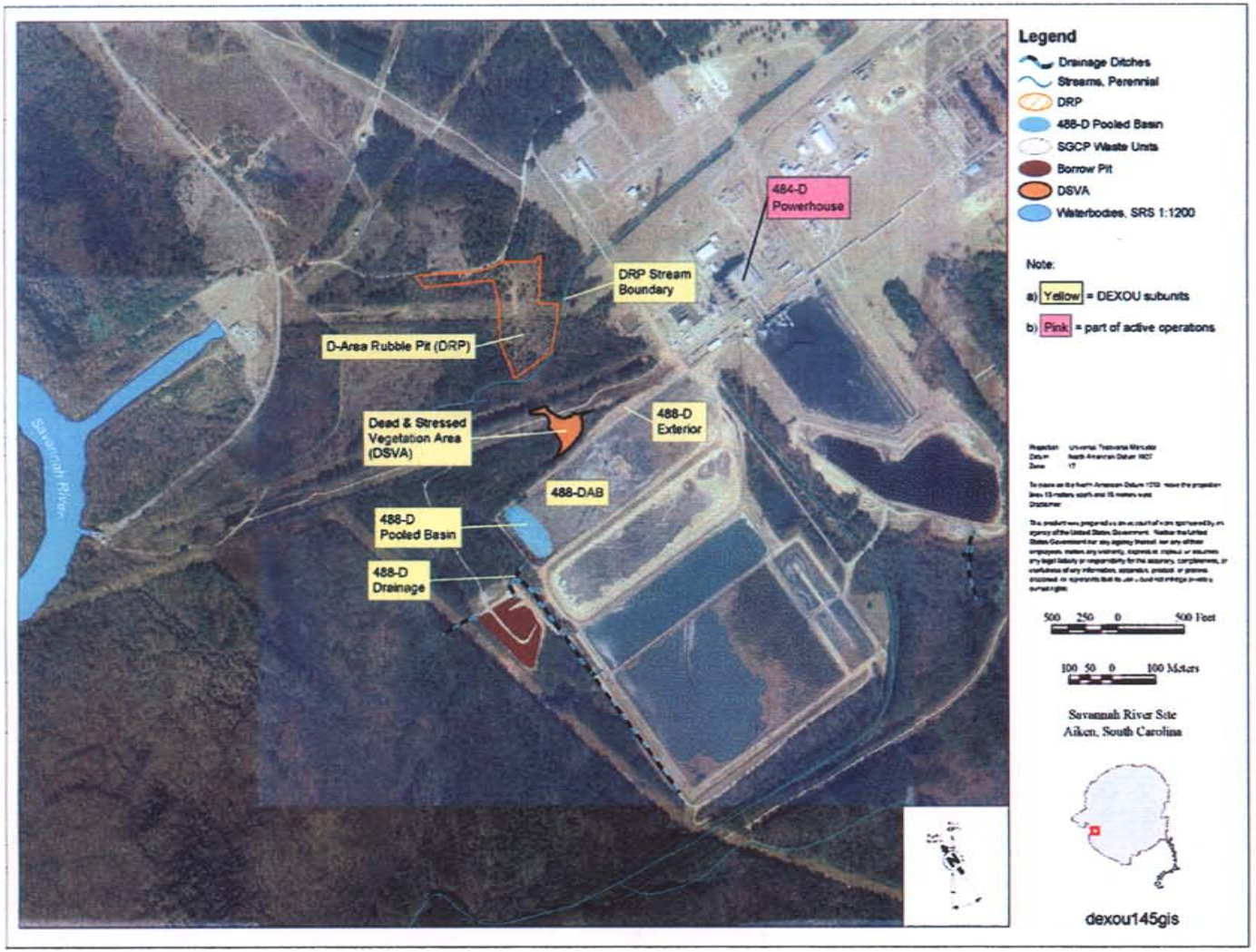


Figure 1. Layout of the DEXOU

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2.2 Nature and Extent of Contamination in the DEXOU

The constituents of concern (COCs) pertinent to the DEXOU, as presented in the ROD (WSRC 2004a), include contaminant migration (CM) COCs, ecological (ECO) COCs, and human health (HH) (for both future residents and industrial workers) COCs. COCs for principal threat source material (PTSM) and applicable or relevant and appropriate requirements (ARARs) have also been identified.

DRP

The surface soils and debris at depth are contaminated with antimony, arsenic, beryllium, selenium, zinc, benzo(a)pyrene, and polychlorinated biphenyls (PCBs). The RA (removal) addresses all ECO, CM, and ARAR COCs. The RA will address HH COCs (arsenic) to the industrial worker remedial goal (RG) of 3.3 mg/kg. Based on pre-design sample results, the 95th upper confidence limit (UCL) of the mean for arsenic in surface soils after implementation of RA is below the industrial RG (95th UCL of the mean is 2.45 mg/kg), which equates to a residual risk of 6 x 10^{-6}. All contamination below 0.3 m (1 ft) will be removed based on visual extent. LUCs are, therefore, required to restrict residential use.

488-DAB

The basin interior is contaminated with arsenic, other metals, and coal-related radionuclides. Outside the basin and north berm, surface soil is contaminated with arsenic; sediment is contaminated with arsenic and coal-related radionuclides. Low pH surface water is contaminated with arsenic and metals. The distribution of contaminants shows that primary source materials are the ash and coal rejects, as evidenced by the distribution of metals, coal-related radionuclides, and low surface water pH. The RA to treat low pH water addresses all ECO, ARAR and HH COCs for surface water. For soil and sediment outside the basin (the area that will not be under the geosynthetic cover), the RA (removal) addresses all HH (for the future industrial worker), and ECO COCs. The 95th UCL for arsenic in the surface soils outside the basin after implementation of the RA is 1.47 mg/kg compared to 2x the unit-specific

background. Since this demonstrates that the contamination outside the basin has been removed to background levels, LUCs are not required outside the basin.

Though the RA leaves contaminated material in the basin, the geosynthetic cover system will prevent leaching of the contaminants and will limit exposure by ecological receptors and future industrial workers to the contamination. However, contamination left in place under the geosynthetic cover system could potentially pose a risk to industrial workers. Without the cover, the risks associated with arsenic and coal-related radionuclides in the basin interior is 4.7×10^{-4} for the industrial worker. LUCs are, therefore, required at 488-DAB to inspect and maintain the cover system, prevent disturbance of the cover system and detention basin, ensure that industrial activities do not pose unacceptable risks to the workers (control industrial activities), and restrict residential use.

2.3 Remedial Action Selected

The selected remedy for the DEXOU, as established in the ROD and the Corrective Measures Implementation (CMI)/Remedial Action Implementation Plan (RAIP) (WSRC 2004a, WSRC 2004b), is described below.

DRP

- Excavate contaminated soil, coal rejects, and debris containing COCs above RGs.
- Backfill excavated areas with a minimum of 0.3 m (1 ft) of clean fill, regrade and vegetate to minimize erosion.
- Consolidate excavated material with the 488-DAB for inclusion under a geosynthetic cover.
- Implement institutional controls to maintain the area for industrial use only.

488-DAB

- Excavate soil and coal rejects from the 488-DAB Drainage, the DSVA, and the basin exterior.

- Consolidate excavated waste for inclusion under a geosynthetic cover.

- Ensure water that is discharged to the sedimentation/detention basin has a pH of at least 5.

- Backfill excavated areas, excluding the footprint of the detention basin, with a minimum of 0.3 m (1 ft) of clean fill.

- Place an engineered cover system over the entire 488-DAB and consolidated waste (approximately 11 ha [27 acres]). The cover will be designed to 1) require minimal maintenance for the life of the system, 2) promote drainage and minimize erosion or abrasion of the cover, and 3) accommodate settling and subsidence so that the integrity of the cover is maintained.

- Revegetate disturbed areas to minimize erosion.

- Implement institutional controls to maintain the area where waste is left in place and the detention basin for industrial use only, inspect and maintain the geosynthetic cover system, and prevent contact, removal or excavation of buried waste beneath the cover system.

The post-RA conceptual site models (see Appendix C-1 to this LUCIP) show the broken pathways for the DRP and 488-DAB after implementation.

The DEXOU is located in an area that has been recommended for future industrial (non-nuclear) use by the SRS Citizens Advisory Board (CAB). According to the *Savannah River Site Future Use Project Report* (USDOE 1996), residential uses of SRS land should be prohibited. The *Savannah River Site Federal Facility Agreement Implementation Plan* (WSRC 1996) designates

the DEXOU as being within an industrial-use area with an industrial buffer zone. Both the DRP and 488-DAB will have institutional controls that are discussed in Section 4.0.

3.0 LAND-USE CONTROL OBJECTIVES

The DEXOU RA will leave soil contamination at the unit above acceptable levels of residential risk at DRP and above acceptable levels for future industrial workers at 488-DAB. To prevent exposure to the contamination, long-term LUCs must be implemented until the risks are reduced to acceptable levels. Considering the residual risks previously identified and to ensure the protectiveness of the RA, DEXOU LUCs were developed to

- maintain the use of the DRP and 488-DAB for industrial activities only;
- prevent contact, removal, or excavation of waste left in place (beneath the geosynthetic cover) at the 488-DAB;
- prevent unauthorized access to the 488-DAB as long as the waste left in place remains a threat to human health or the environment; and
- provide public notices for disclosing former waste management and disposal activities and RAs taken on the site.

4.0 IMPLEMENTATION OF LAND-USE CONTROLS

This section describes the LUCs selected in the ROD to achieve the objectives stated in Section 3.0. A summary of the types of controls is provided in Table 1. USDOE will implement and maintain the LUCs required for the DEXOU.

The DRP and 488-DAB will be maintained as an industrial use area by implementation of property record notices (Section 4.1) and restrictions (Section 4.2), and the use of a certified LUC survey plat (Section 4.3).

The Site Use Program (Section 4.4) will be implemented to prevent onsite worker exposure to contamination left in place at the 488-DAB. Other existing measures (i.e., Site Clearance Program, worker training, health and safety requirements, work controls) will also be used to ensure worker safety at the 488-DAB.

Physical access controls (Section 4.5) are implemented at the SRS boundary to control and restrict public and trespasser access to the DRP and 488-DAB.

Signs at the 488-DAB will be maintained to alert onsite workers that the area is used to manage hazardous substances. The signs will also convey the restriction of unauthorized personnel.

Table 1. Land Use Controls for the D-Area Expanded Operable Unit

Type of Control	Purpose of Control	Duration	Implementation	Affected Areas[a]
1. Property Record Notices[b]	Provide notice to anyone searching records about the existence and location of contaminated areas	Until the concentration of hazardous substances associated with the unit have been reduced to levels that allow for unlimited exposure and unrestricted use	Notice recorded by USDOE in accordance with state laws at County Register of Deeds office: 1) if the property or any portion thereof is ever transferred to non-federal ownership or 2) upon submittal of Notice of Intent to Delist (NOID) the OU from the National Contingency Priorities (NCP) List.	All waste management areas and other areas where hazardous substances are left in place at levels requiring land use restrictions (DRP and 488-DAB)
2. Property record restrictions[c]: A. Land Use	Restrict use of property by imposing limitations	Until the concentration of hazardous substances associated with the unit have been reduced to levels that allow for unlimited exposure and unrestricted use	Drafted and implemented by USDOE upon transfer of affected areas. Recorded by USDOE in accordance with state law at County Register of Deeds office.	All waste management areas and other areas where hazardous substances are left in place at levels requiring land use (DRP and 488-DAB)
3. Other Notices[d]	Provide notice to county/city about the existence and location of waste disposal and residual contamination areas for zoning/planning purposes	Until the concentration of hazardous substances associated with the unit have been reduced to levels that allow for unlimited exposure and unrestricted use	Notice recorded by USDOE in accordance with state laws at County Register of Deeds office: 1) if the property or any portion thereof is ever transferred to non-federal ownership or 2) upon submittal of NOID the OU from the NCP List.	All waste management areas and other areas where hazardous substances are left in place at levels requiring land use restrictions (DRP and 488-DAB)
4. Site Use Program[e]	Provide notice to worker/developer)(i.e., permit requestor) on extent of contamination and remedial structures. Prohibit or limit excavation and penetration activity	As long as property remains under USDOE control	Implemented by USDOE. Initiated by permit request.	Cover system at 488-DAB

Table 1. Land Use Controls for the D-Area Expanded Operable Unit (Continued)

Type of Control	Purpose of Control	Duration	Implementation	Affected Areas[a]
5. Physical Access Controls[f] (e.g., fences, gates, portals)	Control and restrict access to workers and the public to prevent unauthorized access.	Until the concentration of hazardous substances associated with the unit have been reduced to levels that allow for unlimited exposure and unrestricted use	Controls maintained by USDOE	At SRS boundary and select locations throughout SRS. Not required at the DEXOU
6. Warning Signs[g]	Provide notice or warning to prevent unauthorized uses.	Until the concentration of hazardous substances associated with the unit have been reduced to levels that allow for unlimited exposure and unrestricted use	Signage maintained by USDOE	At select locations throughout SRS boundary. Spaced at regular intervals around 488-DAB and DRP
7. Security Surveillance Measures	Control and monitor access by workers/public.	Until the concentration of hazardous substances associated with the unit have been reduced to levels that allow for unlimited exposure and unrestricted use	Established and maintained by USDOE Necessity of patrols evaluated upon completion of RAs	Patrol of selected area throughout SRS, as necessary

[a]Affected areas – Specific locations identified in the SRS LUCIP or subsequent post-ROD documents.

[b]Property Record Notices – Refers to any non-enforceable, purely informational document recorded along with the original property acquisition records of USDOE and its predecessor agencies that alerts anyone searching property records to important information about residual contamination; waste disposal areas in the property.

[c]Property Record Restrictions – Includes conditions and/or covenants that restrict or prohibit certain uses of real property and are recoded along with original property acquisition records of Doe and its predecessor agencies.

[d]Other Notices – Includes information on the location of waste disposal areas and residual contamination depicted on a survey plat, which is provided to a zoning authority (i.e., city planning commission) for consideration in appropriate zoning decisions for non-USDOE property.

[e]Site Use Program – Refers to the internal USDOE/USDOE contractor administrative program(s) that requires the permit requestor to obtain authorization, usually in the form of a permit, before beginning any excavation/penetration activity (e.g., well drilling) for the purpose of ensuring that the proposed activity will not affect underground utilities/structures, or in the case of contaminated soil or groundwater, will not disturb the affected areas without the appropriate precautions and safeguards

[f]Physical Access Controls – Physical barriers or restrictions to entry

[g]Signs – Posted command, warning or direction

4.1 Property Record Notices

In the long term, if the property is ever transferred to non-federal 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 RAs taken on the site. The contract for sale and the deed will contain the notification required by CERCLA Section 120(h).

The deed notification shall, in perpetuity, notify any potential purchaser that the property has been used to manage and dispose of waste. This requirement is consistent with the intent of Resource Conservation and Recovery Act (RCRA) deed notification requirements at final closure of a RCRA facility if contamination will remain at the unit.

4.2 Property Record Restrictions

The deed shall also include restrictions precluding residential use of the property and/or any other property record restrictions necessary to achieve the LUC objectives. The deed shall contain provisions to ensure that appropriate land use controls remain with the affected areas at DRP and 488-DAB upon any and all transfers. USDOE shall provide a copy of the executed deeds to the regulatory agencies as soon as practicable after the transfer of fee title, but no later than 30 days. However, the need for these deed restrictions may be re-evaluated 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 re-evaluation of the need for the deed restrictions will be done though an amended ROD.

USDOE shall provide USEPA and SCDHEC six months notice prior to transfer to ensure that USEPA and SCDHEC can be involved in discussions to ensure that appropriate provisions are included in the transfer terms or conveyance documents to maintain effective institutional controls. If it is not possible for the facility to notify USEPA and SCDHEC at least six months prior to any transfer or sale, then the facility will notify USEPA and SCDHEC as soon as possible but no later than 60 days prior to the transfer or sale of any property subject to

institutional controls. In addition to the land transfer notice and discussion provisions above, USDOE further agrees to provide USEPA and SCDHEC with similar notice, within the same time frames, as to federal transfer of property.

4.3 Other Public Notices

The LUCIP identifies the proposed area under land use restriction via a pre-construction survey plat (SK-C-53223 provided in Appendix A) for the DRP and 488-DAB. After construction completion, a final survey plat will be prepared to document the as-built arrangement of the institutional controls and area subject to LUCs. This post-construction survey plat will be certified by a professional land surveyor and will be submitted to USEPA and SCDHEC concurrently with the Post-Construction Report (PCR)/Final Remediation Report (FRR).

In addition, if the site is ever transferred to non-federal ownership, a professional land surveyor-certified survey plat of the OU will be prepared at or near the time of conveyance to support the LUCIP-required restrictive covenants on land use and will be recorded with the appropriate county recording agency.

4.4 Site Use Program

Under USDOE Order 430.1A, *Life Cycle Management* (USDOE 1998), SRS is required to implement an asset management program for the use, maintenance, and disposal of physical assets, including real estate. SRS complies with this order through its Site Use Program, which is conducted in accordance with WSRC 1D, *Site Infrastructure and Services Manual*, Procedure 3.02, "Site Real Property Configuration Control" (WSRC 2003a). All employees, contractors, and visitors at SRS are required to adhere to the Site Use Program. This program ensures authorization of any work performed at SRS if the work adds, modifies, or removes features portrayed on the SRS development maps. No land use (e.g., excavation) shall be undertaken without prior approval documented by a Site Use Permit. To obtain this authorization, a Site Clearance Request Form must be completed. In accordance with WSRC 1D, Procedure 3.02, all work at SRS that adds to or modifies features or facilities portrayed on SRS development maps (i.e., plot plans of facilities/utilities at SRS) will be authorized by a Site Clearance Permit before

any activities are conducted. All Site Clearance Requests will be reviewed to verify that either an approved Site Use Permit has been obtained or that the request is sanctioned by an existing Site Use Permit. All land use requirements applicable for the OU will be provided to the Site Use Program for use in determining issuance of Site Clearance permits. In addition, the Site Use permit must be amended when the geographic configuration or buffer zone used to establish the permit boundary changes or there is a change to the permitted land use.

SRS is responsible for updating, maintaining, and reviewing site maps, including FFA (1993) OU identifications. If a Site Clearance Request potentially impacts an FFA OU, the Site Clearance Request Form is sent to the appropriate FFA OU reviewer for approval. The roles and responsibilities of each individual are detailed in WSRC 1D, Procedure 3.02. Before a Site Clearance Permit is issued, verification of USDOE approval for intended land use must be obtained. The site use and site clearance processes are applicable to all activities and personnel on site (including subcontractors). USEPA and SCDHEC will be notified within 30 days of any changes to the Site Use Program that impacts actual land use requirements by USDOE via a revision to the LUCAP. The processes are controlled within the SRS Quality Assurance (QA) Program in accordance with WSRC 1Q Manual, *Quality Assurance* (WSRC 2003b). The SRS QA program governs all SRS activities.

SRS identifies all buildings and facilities on maps used in the Site Use Program. This waste unit is identified on these maps as a CERCLA facility. At DRP, there are no restrictions on industrial use. For 488-DAB, the area subject to LUCs (the geosynthetic cover system and detention basin) requires control of industrial activities.

Any work proposed in the 488-DAB LUC area (such as maintenance or groundwater monitoring for the D-Area Groundwater OU) will be strictly controlled, and workers will be appropriately trained and briefed about health and safety requirements if maintenance work is deemed necessary. No change in land use at DRP or 488-DAB or excavation at the 488-DAB shall be undertaken without USEPA and SCDHEC approval. USDOE shall seek prior concurrence of USEPA and SCDHEC before any anticipated action that could disrupt the effectiveness of the land use controls or any action that could alter or negate the need for land use controls.

4.5 Physical Access Controls

There are no physical access controls required at DEXOU; however, physical access controls are provided at the SRS boundary as mentioned in Table 1, item 5.

4.6 Warning Signs and Monuments

To meet ROD requirement and prevent unknowing entry and to ensure inappropriate use of the 488-DAB and DRP does not occur while the unit is under ownership of the government, access control warning signs will be posted at 488-DAB and DRP. The signs will be legible for a distance of at least 25 feet. The signs will read as follows:

For 488-DAB:

- D-Area Expanded Operable Unit, 488-D Ash Basin
- "Danger – Unauthorized Personnel Keep Out. This waste unit was used to manage hazardous substances. Do not dig or excavate. Do not enter without contacting the waste unit custodian."
- Custodian: Manager, Post-Closure Maintenance
- Phone: (803) 952-6882

For DRP:

- D-Area Expanded Operable Unit, D-Area Rubble Pit
- "Danger – Unauthorized Personnel Keep Out. This waste unit was used to manage hazardous substances. Do not dig or excavate. Do not enter without contacting the waste unit custodian."
- Custodian: Manager, Post-Closure Maintenance

- Contact Phone: (See current phone number on the warning signs at the OU site.)

Custodial responsibilities for maintenance and inspection of the 488-DAB and DRP will be maintained by the Post-Closure Maintenance Group within Soil and Groundwater Closure Projects (SGCP). See Appendix D for a figure showing the standard warning sign for the 488-DAB and DRP. Monuments will be placed at the corners of the 488-DAB cover system.

4.7 Other Access Controls and Security/Surveillance Measures

While under the ownership of USDOE, access control of the entire SRS will be maintained in accordance with the 1992 RCRA Part B Permit Renewal Application, Volume I, Section F.1. This section describes the 24-hour surveillance system (R.61-79.264.14(b)(1)), artificial or natural barriers (R.61-79.264.14(b)(2)(I)), control entry systems (R.61-79.264.14(b)(2)(ii)), and access control warning signs (R.61-79.264.14(c)) in place at the SRS boundary to comply with the security requirements for a RCRA-permitted facility.

4.8 Field Inspection and Maintenance for Institutional Controls

After remediation of the DEXOU, only inspection and maintenance activities will be required by this RA at the 488-DAB and DRP.

The 488-DAB and DRP will be inspected per the Field Inspection Checklist. A preliminary checklist is provided in Appendix B. Field inspections will be performed annually. Additional inspections may be necessary in the event of unusual weather or any other condition warranting inspection. Inspections will be performed to ensure that the 488-DAB is developing a self-sustaining vegetative cover and/or has not been subject to erosion, subsidence, or intrusion by burrowing animals. For DRP, inspections will be performed to ensure that signs are in place and DRP is developing self-sustaining vegetation. Inspection records will be kept in the operations record file for future access.

Maintenance (including site inspections, mowing, general housekeeping, repair of erosion damage) will be performed as needed at 488-DAB in perpetuity. Necessary repairs for erosion

control damage will be performed for the geosynthetic cover system, including vegetation, the drainage system, and cover slopes. Necessary upkeep of the access control signs for 488-DAB and DRP will be performed.

USEPA and SCDHEC will be notified by USDOE of any events and/or actions that indicate potential compromise of the institutional controls and the proposed action to address the potential compromise within 30 days of identification. The FFA Annual Progress Report, submitted to the regulatory agencies by USDOE, will provide the status of the institutional controls and describe how any institutional control deficiencies or inconsistent uses have been addressed. In the event of property transfer or lease, the Annual Report will cite findings on the following: whether the use of the property is affected by the deed or lease restrictions and controls; whether property use conforms with the deed or lease restrictions and controls; and whether the owners and state/local agencies have been notified regarding the deed or lease restrictions and controls.

All other routine maintenance activities will be documented and maintained in files subject to USEPA and SCDHEC review and audit. A copy of the completed inspection form is maintained in the SGCP Document Control Center. The DEXOU LUCs shall be maintained until the concentration of hazardous substances associated with the unit has been reduced to levels that allow for unlimited exposure and unrestricted use.

The waste unit inspectors are to be trained in Hazardous Waste Operations and Emergency Response (HAXWOPER), RCRA Well Inspections (SGCP specific training), SGCP RCRA Waste Unit Inspections, Radiological Worker Training, etc., as applicable for the specific activity. They will also be trained based on the individual requirements of the regulatory approved closure documents for each waste unit. Over the years, different personnel may conduct the inspections and grass cutting operations.

This unit-specific LUCIP, including the preliminary checklist (Appendix B), will be appended to the SRS LUCAP upon final regulatory approval. After completion of the PCR, the preliminary checklist in the LUCAP will be replaced with the final, approved checklist.

5.0 REFERENCES

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

USDOE, 1996. *Savannah River Site Future Use Project Report*, Stakeholder-Preferred Recommendations for SRS Land and Facilities, USDOE Savannah River Operations Office, January

USDOE, 1998. DOE Order 430.1A, *Life Cycle Management* (Approved October 14, 1998)

WSRC 1996. *Federal Facility Agreement Implementation Plan*, Westinghouse Savannah River Company, Savannah River Site, Aiken, SC

WSRC, 2001. *RCRA Facility Investigation/Remedial Investigation Report with Baseline Risk Assessment for the D-Area Expanded Operable Unit (U),* Redline Rev. 12, WSRC-RP-2001-4162, Savannah River Site, Aiken, SC

WSRC, 2003a. WSRC Procedure Manual 1D, *Site Infrastructure and Services Manual (U)*, Procedure 3.02, "Site Real Property Configuration Control," Westinghouse Savannah River Company, Savannah River Site, Aiken, SC

WSRC, 2003b. WSRC Procedure Manual 1Q, *Quality Assurance (U)*, Westinghouse Savannah River Company, Savannah River Site, Aiken, SC

WSRC, 2004a, *Record of Decision for the D-Area Expanded Operable Unit* (U), WSRC RP-2004-4007, Rev. 0, Westinghouse Savannah River Company, Savannah River Site, Aiken, SC

WSRC, 2004b, *Corrective Measures Implementation/Remedial Action Implementation Plan (CMI/RAIP) for D-Area Expanded Operable Unit (U),* WSRC-RP-2004-4042, Westinghouse Savannah River Company, Savannah River Site, Aiken, SC

WSRC, 2004c, *Land Use Control Assurance Plan for the Savannah River Site*, WSRC-RP-98-4125, Rev. 1.1, Updated April 30, 2004. Westinghouse Savannah River Company, Savannah River Site, Aiken, SC

APPENDIX A

PROPOSED SURVEY PLAT

SK-C-53223 LAND USE CONTROL IMPLEMENTATION PLAN
PROPOSED SURVEY PLAT

2. ALL ELEVATIONS ARE REFERENCED FROM MEAN SEA LEVEL.

3. ALL AREAS WITHIN THE PROPOSED BOUNDARY MARKERS (▽) CONTAIN WASTE OR BURIED WASTE.

ALL N65000

36"RCP

4913
9522

412
522

ICAL)

0 100 200 300

1" = 100'

THIS DRAWING IS PLOTTED AT 2/3 SCALE

D-AREA EXPANDED OPERABLE UNIT (DEXOU) REMEDIATION

DEXOU PRELIMINARY LAND USE CONTROL IMPLEMENTATION PLAN (U)

SCALE	SKETCH NO.	SHEET NO.	LATEST REVISION
AS NOTED	SK-C-53223	1 OF 1	1

DRAWN BY (ORIG): P CALAIS LAST CADD REV. BY: FREEMAN
DATE: 06/12/05

Scale shown on this drawing is only applicable when plotted at 30"x42" (actual drawing size)

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APPENDIX B

FIELD INSPECTION PRELIMINARY CHECKLIST

FOR THE D-AREA EXPANDED OPERABLE UNIT

FIELD INSPECTION PRELIMINARY CHECKLIST

FOR D-AREA EXPANDED OPERABLE UNIT, 488-DAB

☐ SCHEDULED ☐ UNSCHEDULED

A= Satisfactory X= Unsatisfactory (Explanation required)	A or X	Observation of Corrective Action Taken
1. Verify that the roads are accessible.		
2. Verify that the waste unit signs (6) are in acceptable condition, have the correct information, and are legible from a distance of 25 feet.		
3. Verify that there are no excavation, digging, or construction activities on the 488-DAB cover system.		
4. Verify that the integrity of drainage system, and required land grading for proper drainage is maintained and that they are free of excessive erosion, sediment buildup, and any debris restricting water flow.		
5. Verify that no woody vegetation is growing on the 488-DAB cover system.		
6. Verify that grass density of the vegetation cover has no bare spots more than 3 by 3 feet in area. The height of the vegetative cover should not impair the visual inspection of the soil cover. This verification will be determined by the inspector.		

FIELD INSPECTION PRELIMINARY CHECKLIST

FOR D-AREA EXPANDED OPERABLE UNIT, 488-DAB (Continued)

7. Verify monuments have not been damaged.		
8. Verify that the soil cover at 488-DAB has no signs of unacceptable erosion or depressions (subsidence).		
9. Verify that signs of burrowing animals on the 488-DAB are not present.		
10 Other		

Inspected by:

_____ / _____ Date: _____

(Print Name) (Signature)

Post-Closure Manager:

_____ / _____ Date: _____

(Print Name) (Signature)

CAUTION: The inspector shall notify the Post-Closure Manager (PCM) and Environmental Compliance Authority (ECA) **IMMEDIATELY** if there has been a breach or compromise of the institutional controls of this waste unit. The notification shall be in accordance with SRS post-closure inspection procedures.

FIELD INSPECTION PRELIMINARY CHECKLIST

FOR D-AREA EXPANDED OPERABLE UNIT, DRP

☐ **SCHEDULED** ☐ **UNSCHEDULED**

A= Satisfactory X= Unsatisfactory (Explanation required)	A or X	Observation of Corrective Action Taken
1. Verify that the roads are accessible.		
2. Verify that the unit signs (8) are in acceptable condition, have the correct information, and are legible from a distance of 25 feet.		
3. Visually verify that DRP area is developing self-sustain vegetation.		

Inspected by:

_____ / _____ Date:_____
(Print Name) (Signature)

Post-Closure Manager:

_____ / _____ Date:_____
(Print Name) (Signature)

CAUTION: The inspector shall notify the Post-Closure Manager (PCM) and Environmental Compliance Authority (ECA) **IMMEDIATELY** if there has been a breach or compromise of the institutional controls of this waste unit. The notification shall be in accordance with SRS post-closure inspection procedures.

APPENDIX C

POST-REMEDIAL ACTION CONCEPTUAL SITE MODELS

FOR THE D-AREA EXPANDED OPERABLE UNIT POST-REMEDIAL ACTION

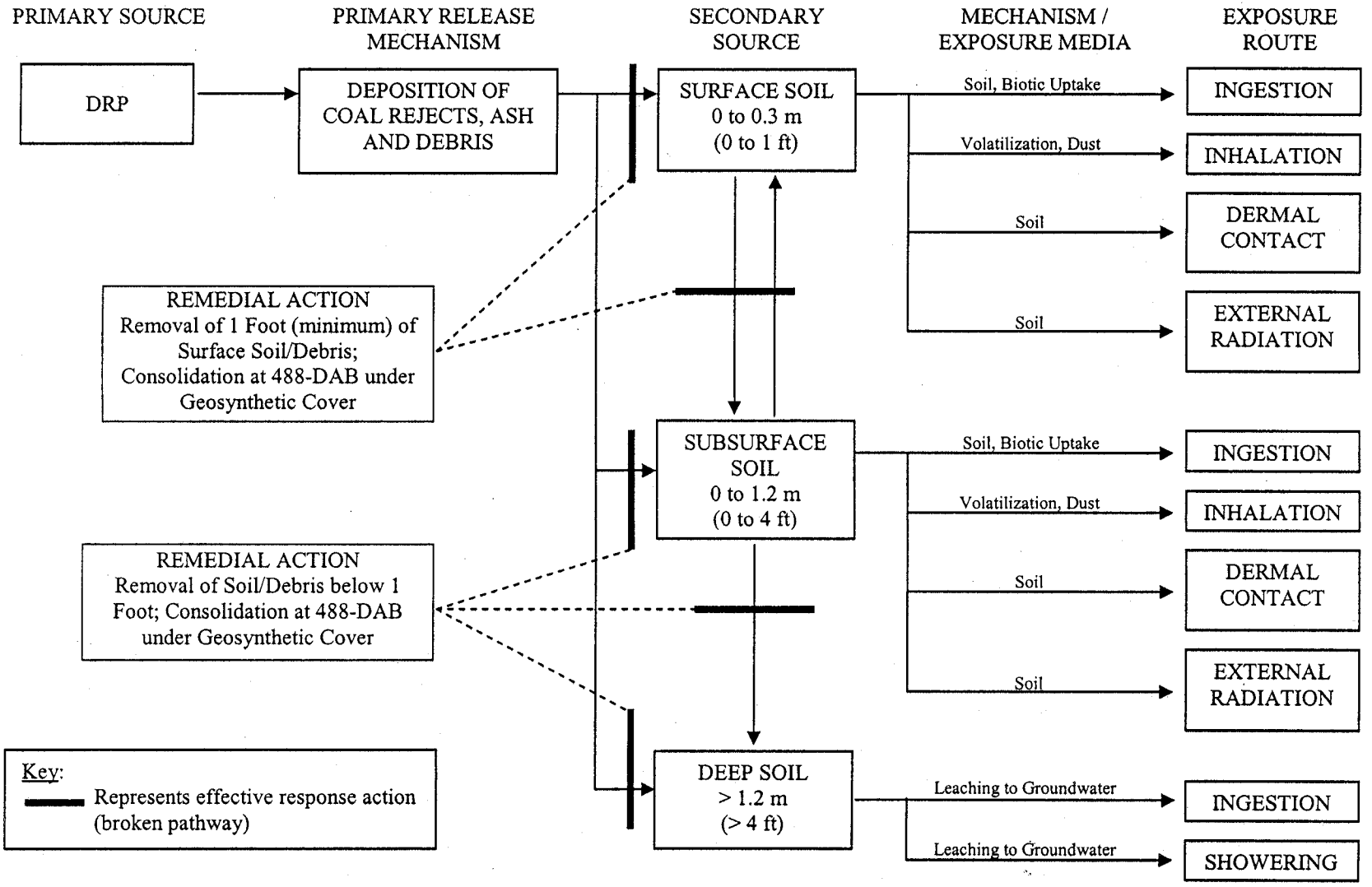


Figure C-1. Post-Remedial Action Conceptual Site Model for DRP

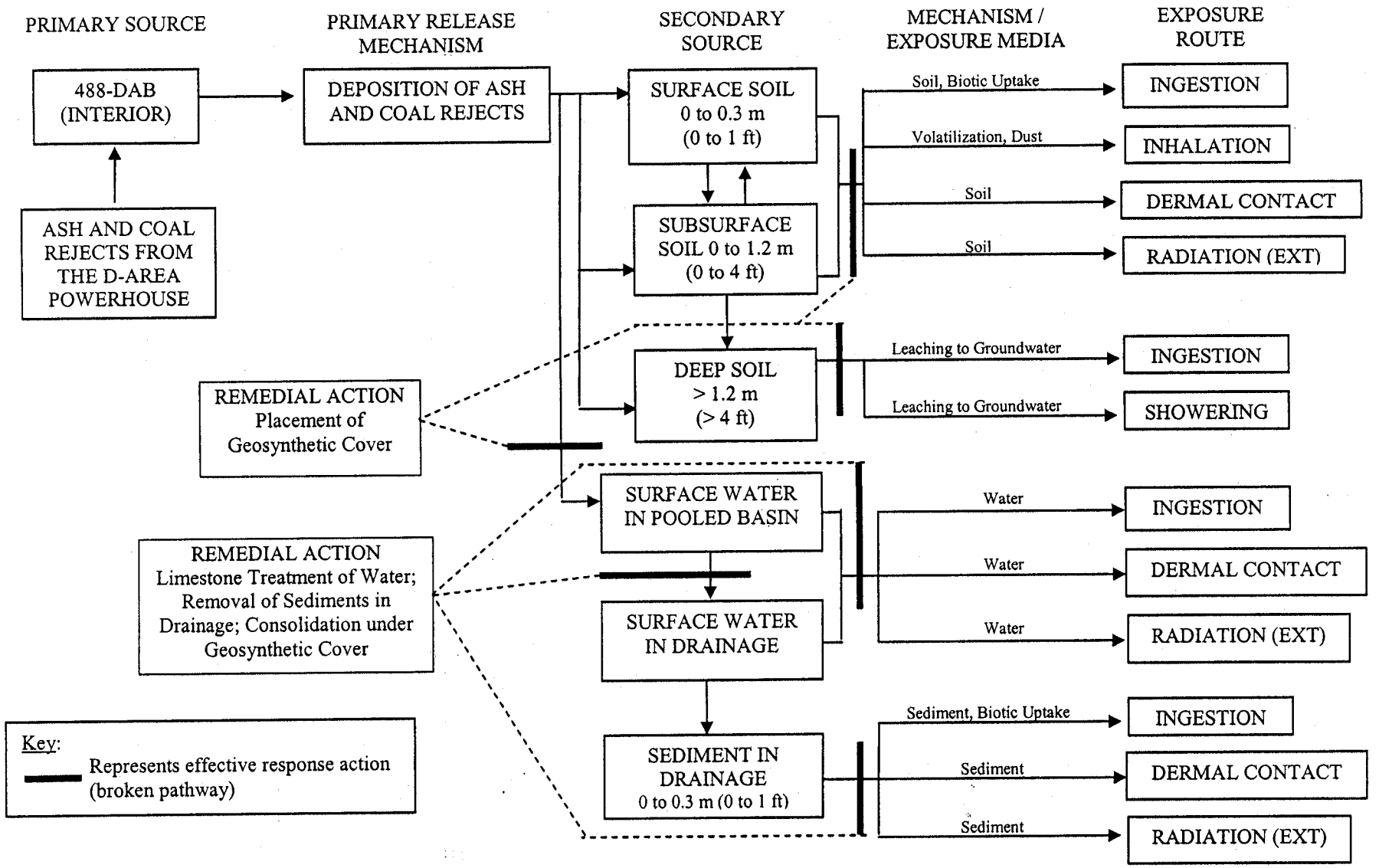


Figure C-2. Post-Remedial Action Conceptual Site Model for 488-DAB (Interior)

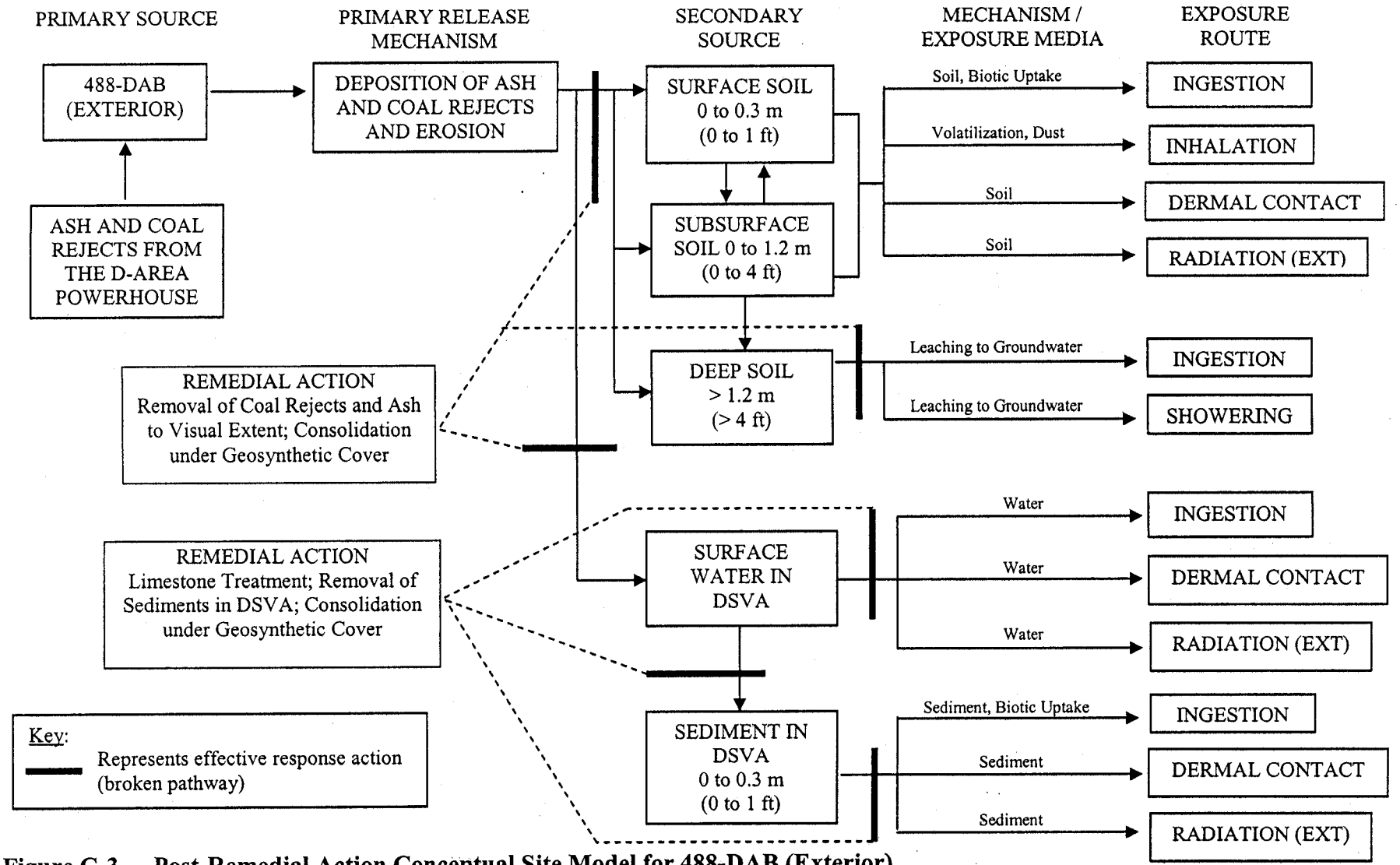


Figure C-3. Post-Remedial Action Conceptual Site Model for 488-DAB (Exterior)

APPENDIX D

ACCESS CONTROL WARNING SIGN

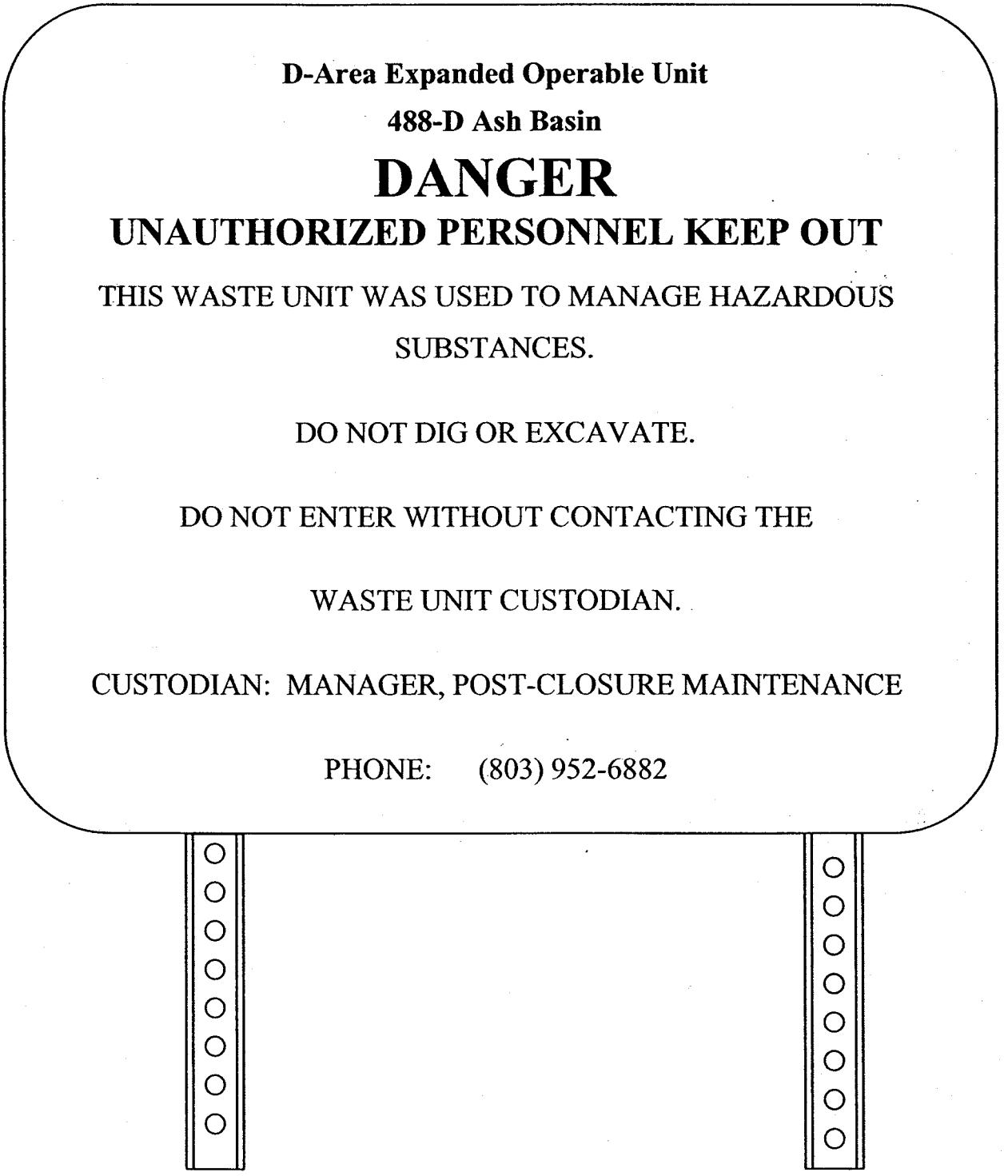


Figure D-1. Access Control Warning Sign for 488-DAB

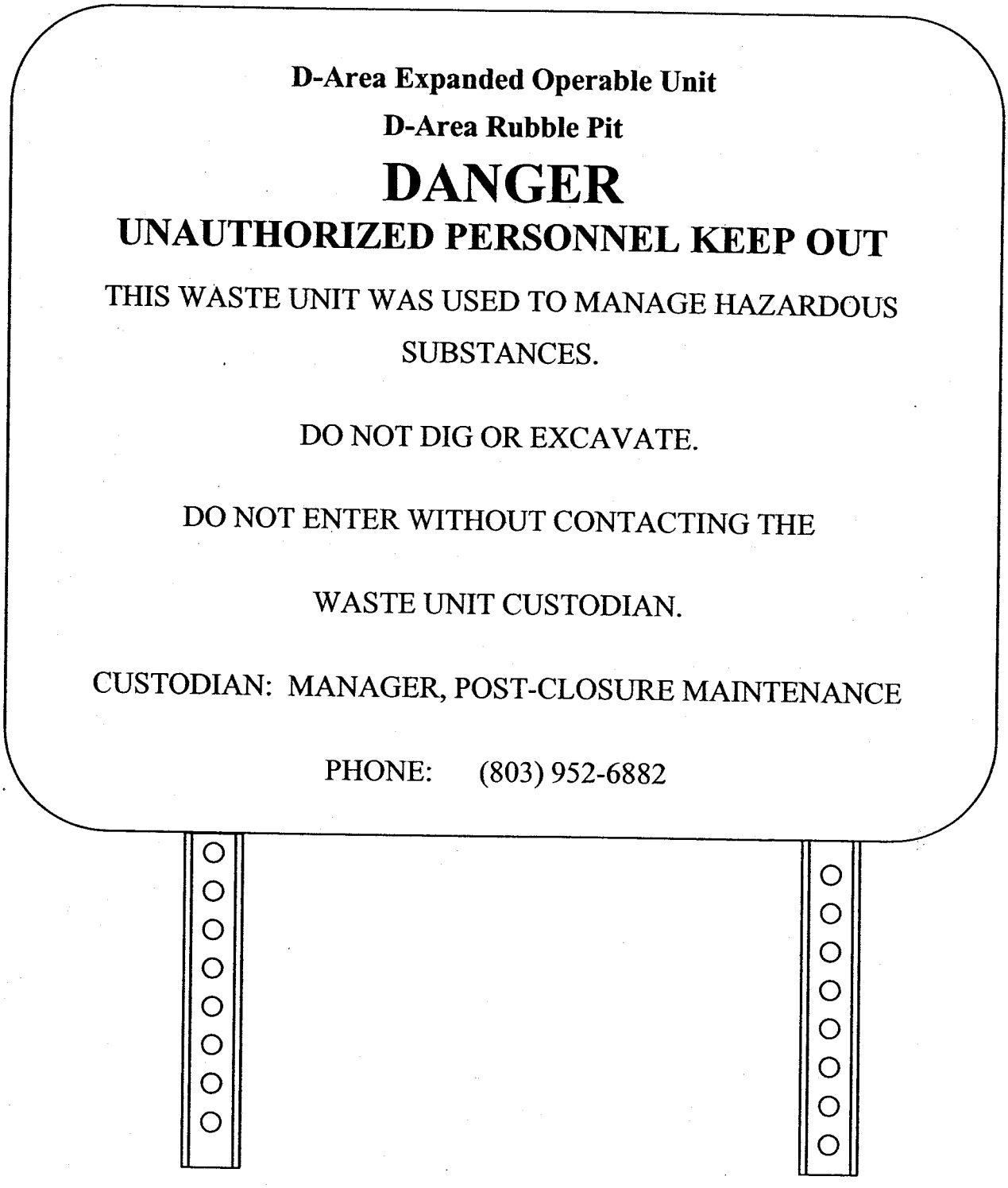


Figure D-2. Access Control Warning Sign for DRP

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LUCIP for the
T Area Operable Unit
(consists of Neutralization Sump, 678-T; X-001 Outfall Delta, NBN; Lower Discharge Gully, and Swamp, NBN; and TNX-Area Process Sewer Lines and Tile Fields as Abandoned, NBN)

Land Use Control Implementation Plan for T Area Operable Unit
(WSRC-RP-2005-4029, Revision 1, July 2006)

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United States Department of Energy

Savannah River Site

Land Use Control Implementation Plan (LUCIP) for T Area Operable Unit (U)

CERCLIS NUMBER: 96

WSRC–RP–2005-4029

Revision 1

July 2006

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

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

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and
Washington Savannah River Company LLC
Aiken, South Carolina

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LIST OF ACRONYMS AND ABBREVIATIONS

ac	acre
BRA	baseline risk assessment
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CM	contaminant migration
CMIR	Corrective Measures Implementation Report
COC	constituent of concern
ECA	Environmental Compliance Authority
FFA	Federal Facility Agreement
FRR	Final Remediation Report
GMZA	Groundwater Mixing Zone Application
ha	hectare
HAZWOPER	Hazardous Waste Operations and Emergency Response
HH	Human Health
IC	institutional control
IS	Inner Swamp
LUC	Land Use Control
LUCIP	Land Use Control Implementation Plan
LUCAP	Land Use Control Assurance Plan
OD	Outfall Delta
OTSB	Old TNX Seepage Basin
OU	Operable Unit
PCM	Post-Closure Manager
PCR	Post-Construction Report
QA	Quality Assurance
RA	remedial action
RCRA	Resource Conservation and Recovery Act
RFI/RI	RCRA Facility Investigation/ Remedial Investigation
RG	remedial goal
RGO	remedial goal option
ROD	Record of Decision
SA	soil amendment

SEA	Site Evaluation Area
SCDHEC	South Carolina Department of Health and Environmental Control
SGCP	Soil and Groundwater Closure Projects
SRS	Savannah River Site
TAOU	T Area Operable Unit
TBG	TNX Burying Ground
USDOE	United States Department of Energy
USEPA	United States Environmental Protection Agency
WSRC	Washington Savannah River Company, LLC

1.0 INTRODUCTION

This Land Use Control Implementation Plan (LUCIP) has been prepared for T Area Operable Unit (TAOU) at the Savannah River Site (SRS). The TAOU was subdivided into five geographic regions (Figure 2). The anticipated future land use for most of the TAOU is industrial. The Inner Swamp and Outfall Delta regions are considered to be industrial buffer area and support a recreational land use category. However, the portions of the operable unit closest to the river (Swamp High Ground and Outer Swamp) will support residential land use and do not require land use restrictions. The purpose of the LUCIP is to describe how the land use controls (LUCs) selected in the T Area Operable Unit (TAOU) Record of Decision (ROD) will be implemented and maintained. The following LUCs have been selected for this OU:

- Providing access controls for on-site workers via the Site Use Program, Site Clearance Program, work control, worker training, worker briefing of health and safety requirements, and identification signs located in T Area.

- Notifying the United States Environmental Protection Agency (USEPA) and the South Carolina Department of Health and Environmental Control (SCDHEC) in advance of any changes in land use or excavation.

- Providing access controls against trespassers as described in the 2000 Resource Conservation and Recovery Act (RCRA) Part B Permit Renewal Application, Volume I, Section F.1, which describes the security procedures and equipment, 24-hour surveillance system, artificial or natural barriers, control entry systems, and warning signs in place at the SRS boundary. Signs would be posted and maintained at T Area to indicate that the contamination remains buried at depth. At the Outfall Delta (OD) and Inner Swamp (IS), signs would be installed and maintained to prevent trespassers from inadvertently accessing these areas.

The selected remedy leaves hazardous substances in place that pose a potential future risk and will require land use restrictions until the concentrations of hazardous substances in the soil and

groundwater are at such levels to allow for unrestricted use. As agreed on March 30, 2000, among the United States Department of Energy (USDOE), the USEPA, and SCDHEC, SRS is implementing a Land Use Control Action Plan (LUCAP) to ensure that the LUCs required by numerous remedial decisions at SRS are properly maintained and periodically verified. The requirements of that LUCAP also apply to the LUCs that were selected as part of the remedial action for TAOU. This additional document, the TAOU LUCIP, contains the detailed and specific measures required to implement and maintain the LUCs selected as part of this particular remedial decision. The LUCs shall be maintained until the Operable Unit is suitable for unlimited exposure and unrestricted use. Approval by USEPA and SCDHEC is required for any modification or termination of the Institutional controls (ICs).

USDOE is responsible for implementing, maintaining, monitoring, reporting, and enforcing the LUCs in accordance with the approved LUCIP. Upon final approval, the LUCIP will be appended to the LUCAP and should be considered incorporated by reference into the TAOU ROD, establishing implementation and maintenance requirements for the LUCs under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and the SRS Federal Facility Agreement. The LUCIP will remain in effect unless and until modifications are approved by USEPA and SCDHEC as necessary for protection of human health and the environment. This LUCIP will be evaluated for accuracy during the five-year remedy review and any approved LUCIP modification will be appropriately documented for incorporation by reference into the TAOU ROD.

1.1 Format of LUCIP

The format of this LUCIP is consistent with the FFA protocol format approved by the USEPA and SCDHEC in March 2004.

2.0 OVERVIEW OF TAOU REMEDIAL ACTION

2.1 General Description and History of the Unit

T Area is one of several industrial areas at SRS (Figure 1). T Area was used in the development and testing of processes, facilities, and equipment for various SRS programs. Until 1978, T Area included three main buildings constructed in 1950 (Buildings 677-T, 678-T, and 679-T). After 1978, the area was expanded to include over 30 buildings (Figure 2) comprising office administrative buildings, process buildings for large-scale experimental demonstrations, laboratories for research and analytical purposes, pilot-scale facilities, bulk tank storage, industrial wastewater processing facilities, and warehouse storage for a wide range of chemicals and specialty equipment. All of the facilities in T Area have been dismantled and removed (Figure 3) with the following exceptions: the 678-5T pump test facility and ancillary structures, the 702-T telecommunications building, the 906-T air stripper, and a soil vapor extraction system.

The TNX Swamp was not used in T-Area industrial processes; however, it is used routinely to manage surface runoff and stormwater. The TNX Swamp was divided into four subunits: the Outfall Delta (OD), the Inner Swamp (IS), the High Ground Swamp, and the Outer Swamp. The TNX Swamp, and the Lower Discharge Gully and Swamp Operable Unit (OU), are included as part of the TAOU.

The TAOU is an area-based OU that incorporates most of the T-Area footprint and the TNX Swamp (Figure 2). As such, it includes all of the applicable OUs, Site Evaluation Areas (SEAs), and the dismantled facilities listed in the TAOU ROD (WSRC 2005c). The TAOU is approximately 26.8 hectares (66 acres). Before an area-based remedial strategy was implemented, remedial actions and removal actions for some of the waste units now identified under the TAOU were included in previous Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) documentation (WSRC 2005c). Remedial decisions for the T-Area waste units and facilities addressed by this document do not affect the RAs of other TAOU subunits previously addressed. These actions include the ongoing soil vapor extraction (SVE), which is associated with the TNX Burying Ground, and operation of the

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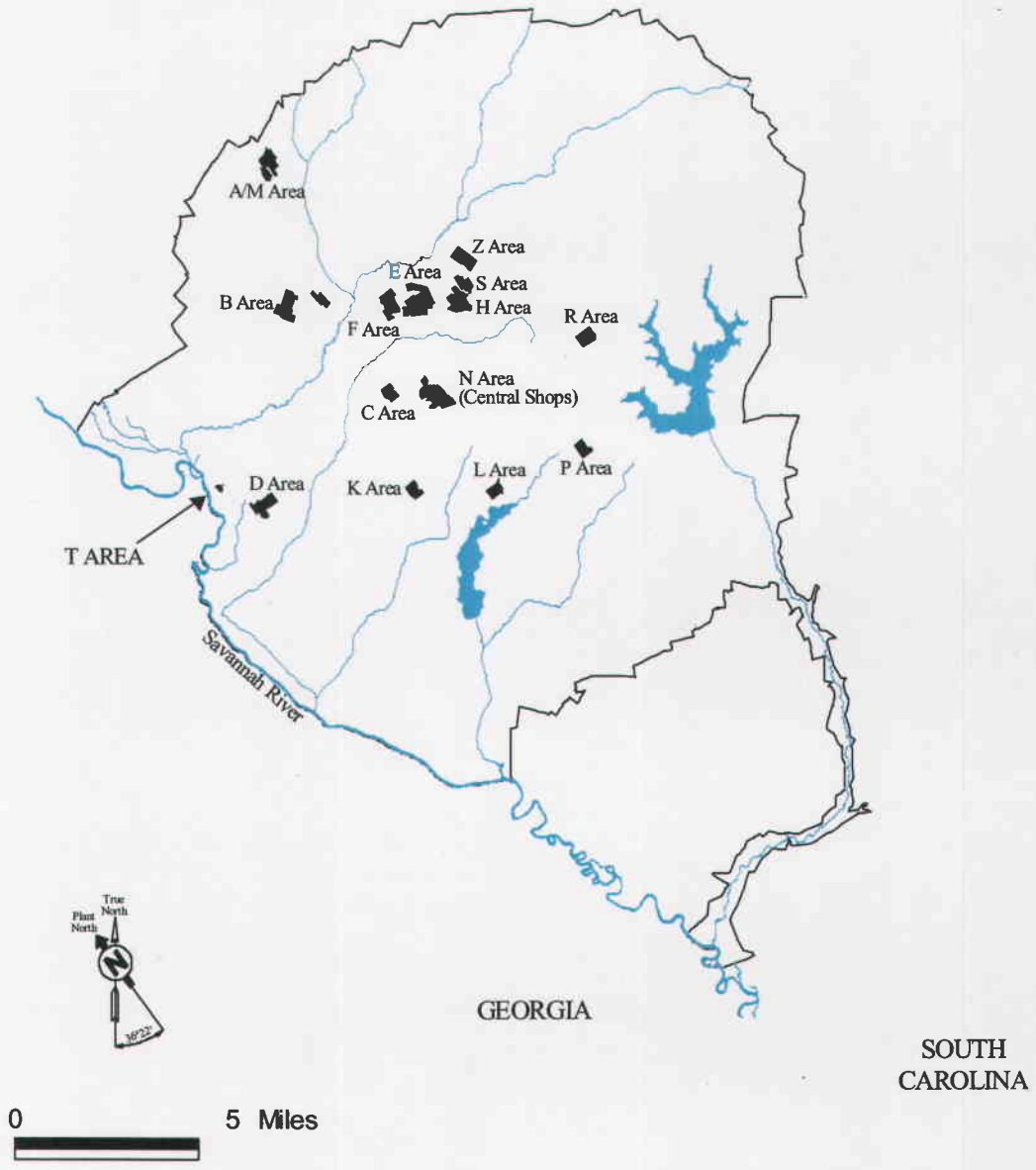


Figure 1. Location of T Area within SRS

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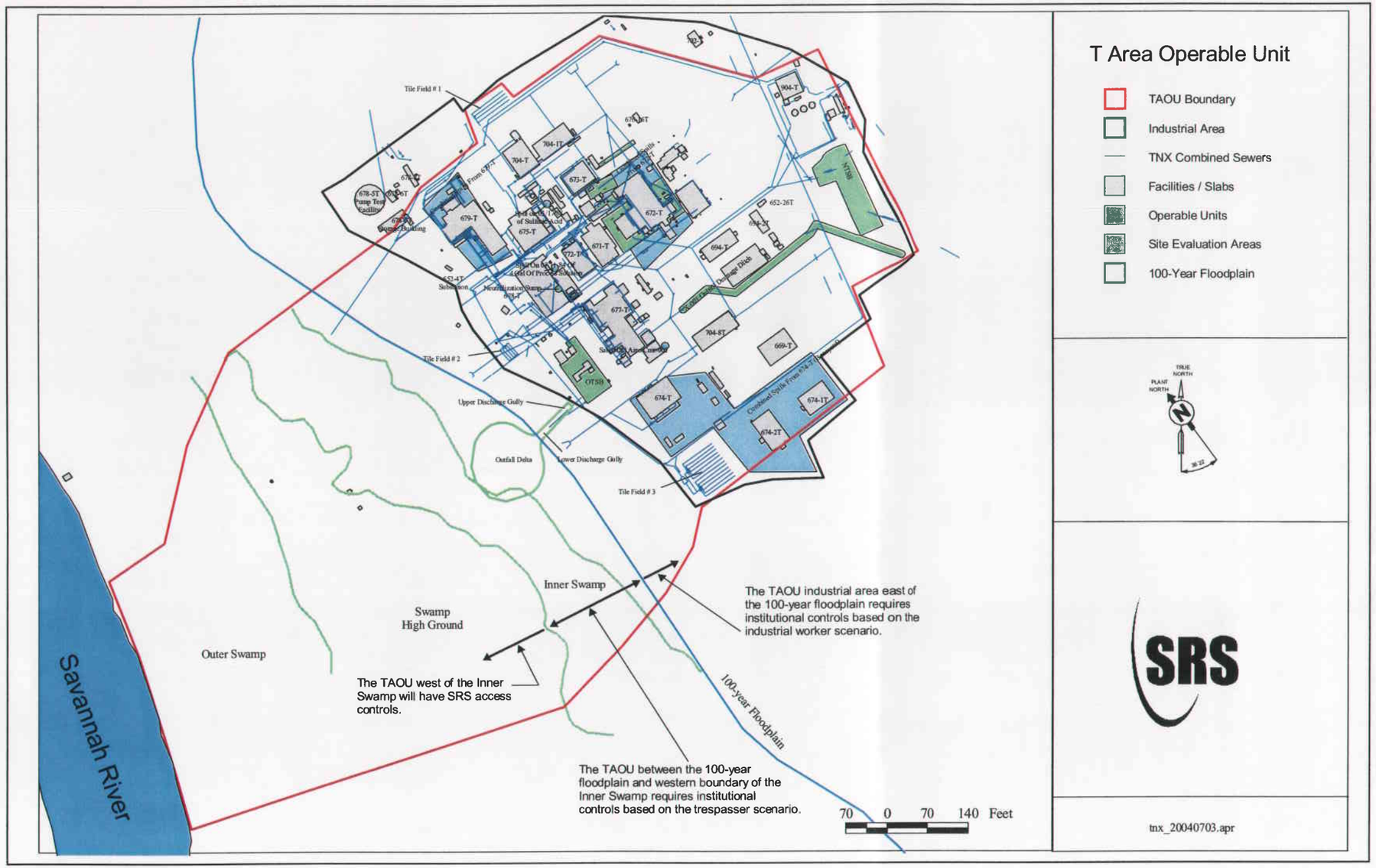


Figure 2. T-Area Operable Unit

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Figure 3. Aerial Photograph of T Area (facing southwest)

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air stripper, which is associated with the TNX-Area Groundwater. These remedies will continue as proposed by the TNX Area OU ROD (WSRC, 2003c). Progress will continue to be documented in the annual groundwater and effectiveness monitoring strategy report.

2.2 Nature and Extent of Contamination

The contamination requiring action at the TAOU is a result of T-Area industrial processes, waste management practices, and an industrial accident during facility operations. Within the industrial area, the contamination is related to leaks from industrial processes and from disposal facilities such as tile fields, burying grounds, and seepage basins. In the TNX Swamp, the contamination resulted from a release of process water and entrained sediment from the Old TNX Seepage Basin (OTSB) down the topographic slope and into the swamp. The OD was formed by these releases. The existing OUs and facilities remaining following dismantling activities in T Area are shown in Figure 2.

Sampling and evaluation was previously performed at the TAOU and the findings are contained in previous documents (WSRC 1999, WSRC 2002, WSRC 2005a). COCs in exceedance of the remedial goal (RG) were found in various locations within the TAOU and are listed by subunit in Table 1. The areas determined to warrant action based on exceedances of the RG are the TNX Burying Ground (TBG) (previously inaccessible areas), TNX OD, and TNX IS. The contamination found in the industrial portion of T Area exceeds human health, and contaminant migration RGs for uranium-238 in several locations (Figure 4). Soil from removal actions at the X-001 Drainage Ditch and Tile Field #2 has also been stockpiled within the footprint of the industrial portion of T Area in the vicinity of the slabs of Buildings 671-T, 672-T and 772-T (see Figure 2). These soils exceeded the remedial goal options (RGOs) listed on Table 1.

Soils in the TNX OD and IS exceed the established RGO for several radionuclides including actinium-228, lead-212, radium-228, thorium-228, uranium-233/234, uranium-235, and uranium-238. Radioisotopes in the thorium-232 decay-series are major risk contributors for human receptors. Of these, thorium-228 is the primary risk driver in the OD and IS. The highest activities of thorium-228 are in the IS southwest and south of the OD (Figure 5). Contaminant

fate and transport calculations in the Resource Conservation and Recovery Act (RCRA) Facility Investigation/Remedial Investigation (RFI/RI) with Baseline Risk Assessment (BRA) for the TNXOD OU (WSRC 2002) indicated that uranium-233/234, uranium-235, and uranium-238 at the OD and IS may present a potential leachability threat to groundwater (Figures 6 and 7).

Table 1. Remedial Goals for TAOU

Refined Constituent of Concerns (RCOCs)	Units	Type of Constituent of Concern (COC)	RGO from RFI/BRA	Remedial Action
Outfall Delta (soil)				
Actinium-228	pCi/g	HH	3.34	IC
Lead-212	pCi/g	HH	35.34	IC
Radium-228	pCi/g	HH	3.21	IC
Thorium-228	pCi/g	HH	1.73	IC
Uranium-233/234	pCi/g	CM	6.54	SA
Uranium-235	pCi/g	CM	0.31	SA
Uranium-238	pCi/g	CM	6.58	SA
Inner Swamp (Sediment)				
Actinium-228	pCi/g	HH	3.34	IC
Radium-228	pCi/g	HH	3.21	IC
Thorium-228	pCi/g	HH	1.73	IC
Uranium-233/234	pCi/g	CM	5.75	SA
Uranium-235	pCi/g	CM	0.27	SA
Uranium-238	pCi/g	CM	5.75	SA
TNX Burying Ground (TBG) (Previously Inaccessible Areas) (Soil)				
Uranium-238	pCi/g	CM, HH	1.79	Cover
Stockpiled Soils from X-001 Outfall (Soil)				
PCB-1260	mg/kg	ARAR	10	Cover
Uranium-238	pCi/g	HH	1.79	Cover
Stockpiled Soils from Tile Field #2				
Mercury	mg/kg	CM	0.078	Cover

IC= Institutional Control, SA= Soil Amendment, Cover = Geosynthetic Cover System

Most of the facilities in T Area have been dismantled and removed. The only exceptions are the 675-T pump test facility and ancillary structures, the 702-T telecommunications building, the 906-T air stripper, and an SVE system. Process sewer lines have been plugged and exterior sumps have been backfilled with dirt and gravel. Building slabs remain, but slabs with identified contamination have been scabbled such that residual contamination is below $1X10^{-3}$ industrial risk level. Information on sampling, analysis, and data quality under the Site Deactivation and

Decommissioning (SDD) program is provided in the TAOU Remedial Investigation/Focused Feasibility Study/Risk Assessment (RI/FFS/RA) (WSRC, 2005a). Analytical data for these units are presented in Decommissioning Project Final Reports (DPFRs) which are referenced in the CMI/RAIP (WSRC, 2005c) and are summarized in the ROD (WSRC 2005b). A listing of the buildings and associated final decommissioning date is provided in Table 2.

Table 2. Buildings Subject to Deactivation and Decommissioning

Building Number	Building Name	Date of Final Decommissioning
607-40T	TNX Sanitary Treatment Facility	July 2003
607-46T	Organic Removal Facility	April 2003
652-13T	TNX Secondary Transformer Substation #3	July 2003
671-T	Tank Gallery	April 2003
672-1T	Cooling Tower	April 2003
672-T	DWPF Semi-Works Building	March 2004
673-T	Containerization Equipment Development Facility	April 2003
675-T	Melter Demonstration and Multiple Process Facilities	January 2003
677-T	Pilot Plant	February 2004
678-T	Chemical Semi-Works Building	September 2004
679-7T	TNX Water Services Chemical Addition Building	May 2003
679-8T	Fire Pump House	May 2003
679-T	Administrative and Laboratory Building	May 2003
681-4T	TNX River Pump House	October 2003
682-T	Precipitate Hydrolysis Experimental Facility	July 2003
684-T	TNX Solvent Storage Building	September 2002
692-T	TNX Control Room	July 2003
694-2T	TNX Carpenter Shop	October 2002
694-T	TNX Warehouse Building	July 2003
704-1T	TNX Administrative Building Annex	October 2002
704-T	TNX Administrative Building	October 2002
711-T	TNX Electrical Maintenance Building	November 2002
772-T	Analytical Laboratory Building	September 2003
904-T	Effluent Treatment Plant	September 2003

The selected remedy for the TAOU leaves hazardous substances in place that pose a potential future risk and will require land use restrictions until the concentrations of hazardous substances in the soil and groundwater are at such levels to allow for unrestricted use and exposure.

2.3 Remedial Action Selected

As described in the ROD (WSRC 2005c), the selected RA for the T-Area OU included the following elements:

- Low permeability cover: The TAOU low permeability cap will cover disseminated residual contamination in soil, contaminated debris and building slabs left in place, and contaminated soils excavated from T-Area facilities under previous removal actions and staged for placement beneath the cover. The cover will prevent exposure to human and ecological receptors and restrict leaching of contaminants to groundwater. The TAOU cap will cover approximately 3.3 hectare (ha) (8.2 acre [ac]) and will be integrated with the TNX OU cap (WSRC 2003c). The combined caps will encompass approximately 3.8 ha (9.4 ac).

- Soil amendments: Soil amendments will be placed in the OD and IS to attenuate the leachability of radiological contaminants in soils. Soil amendments will be reapplied if long-term monitoring indicates that they are losing their effectiveness. Application of soil amendments will be within the area of Figure 2 between the 100 year flood plain and the western border of the Inner Swamp.

- Site maintenance: Site maintenance will consist of inspections of the OU and the low permeability cover, and maintenance of drainage features to minimize the formation of large gullies. Minor earthwork will be performed as needed to repair any erosion damage that may occur. Site maintenance will also include mowing.

- Access controls: Access controls will include security measures such as posting and maintenance of access control warning signs. Signs will be posted around the OU with a legend warning of the hazard. The signs will be posted at appropriate locations in sufficient numbers to be seen from any approach. Administrative controls (land use restrictions) will be implemented to restrict human exposure to contaminants remaining at the unit.

- CERCLA ROD Remedial Action reviews: The ROD RA will be reviewed every five years to ensure that the selected remedy remains protective of human health and the environment.

RGs are target cleanup criteria. RGs for subunits of the TAOU with COCs are provided in Table 1.

The remedial action for the industrial portion of the TAOU is construction of a geosynthetic cap system. The cap system is approximately 10 acres in size.

The remedial action for the swamp portion of the TAOU is the application of apatite over the area where exceedances of the CM RG occur.

For TAOU including the industrial and swamp areas, institutional controls will be instituted as part of the Remedial Action.

The post-remedial action conceptual site model (see Appendix C-1 to this LUCIP) shows the broken pathways and the remaining residual risk to the future industrial worker.

According to the *Savannah River Site Future Use Project Report* (USDOE 1996), residential use of SRS land is prohibited.

3.0 LAND-USE CONTROL OBJECTIVES

Considering the residual risk, the LUC objectives are to:

- Prohibit the development and use of property for residential housing, elementary and secondary schools, child care facilities and playgrounds.
- Prevent unauthorized access to the closed CERCLA unit as long as the waste remains a threat to human health or the environment in order to protect the industrial worker.
- Land use controls (LUCs): The LUC component of the remedy will 1) prevent access or use of the groundwater, except for remedial/monitoring purposes until cleanup levels are met; 2)

maintain the integrity of any current or future remedial or monitoring system such as monitoring wells; 3) prevent inadvertent human contact with contaminated soil in the OD and IS; 4) prohibit the development and use of property for residential housing, elementary and secondary schools, child care facilities, and playgrounds; and 5) ensure no construction on, excavation, or breaching of the low permeability cover system. The requirements described in the ROD (WSRC, 2005c) for the LUC are provided in the Land Use Control Implementation Plan (LUCIP) (WSRC 2005d).

- Maintain the integrity of any current or future remedial or monitoring system.

4.0 IMPLEMENTATION OF LAND-USE CONTROLS

This section describes the LUCs selected in the ROD to achieve the objectives stated in Section 3.0. DOE is responsible for implementing, maintaining, reporting on and enforcing the land use controls required for the TAOU. A summary of the types of controls is provided in Table 2. USDOE will implement and maintain the LUCs required for the TAOU. The LUCIP will become enforceable and will be implemented when approved by EPA and SCDHEC and following the completion of the remedial actions prescribed by the TAOU ROD. DOE shall notify US EPA and SCDHEC 60 days in advance of any proposed land use changes that are inconsistent with land use control objectives or the selected remedy.

The industrial portion of the TAOU will be maintained as an industrial use area by implementation of the property record notices (Section 4.1) and restrictions (Section 4.2), and the use of a certified LUC survey plat (Section 4.3).

The Site Use Program (Section 4.4) will be implemented to prevent onsite worker exposure to contamination left in place at the TAOU. Other existing measures (i.e., Site Clearance Program, worker training, health and safety requirements, work controls) will also be used to ensure worker safety at the TAOU.

Physical access controls (Section 4.5) are implemented at the SRS boundary to control and restrict public and trespasser access to the TAOU.

Signs at the TAOU will be maintained to alert onsite workers that the area is used to manage hazardous substances. The signs will also convey the restrictions of unauthorized personnel.

4.1 Property Record Notices

In the long term, if the property is ever transferred to non-federal 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 contract for sale and the deed will contain the notification required by CERCLA Section 120(h).

The deed notification shall, in perpetuity, notify any potential purchaser that the property has been used to manage and dispose of waste. This requirement is consistent with the intent of RCRA deed notification requirements at final closure of a RCRA facility if contamination will remain at the unit.

4.2 Property Record Restrictions

The deed shall also include restrictions precluding residential use of the property and/or any other property record restrictions necessary to achieve the LUC objectives. The deed shall contain provisions to ensure that appropriate land use controls remain with the affected area upon any and all transfers. USDOE shall provide a copy of the executed deeds to the regulatory agencies as soon as practicable after the transfer of fee title, but no later than 30 days. However, the need for these deed restrictions may be re-evaluated 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 re-evaluation of the need for the deed restrictions will be done though an amended ROD.

Table 3. Land Use Controls for the T Area Operable Unit

Type of Control	Purpose of Control	Duration	Implementation	Affected Areas[a]
Property Record Notices[b]	Provide notice to anyone searching records about the existence and location of contaminated areas.	Until the concentration of hazardous substances associated with the unit have been reduced to levels that allow for unlimited exposure and unrestricted use.	Notice recorded by DOE in accordance with state laws at County Register of Deeds office if the property or any portion thereof is ever transferred to non-federal ownership.	All waste management areas and other areas where hazardous substances are left in place at levels requiring land use and/or groundwater restrictions.
Property record restrictions[c]: A. Land Use B. Groundwater	Restrict use of property by imposing limitations. Prohibit the use of groundwater.	Until the concentration of hazardous substances associated with the unit have been reduced to levels that allow for unlimited exposure and unrestricted use.	Drafted and implemented by DOE upon transfer of affected areas. Recorded by DOE in accordance with state law at County Register of Deeds office.	All waste management areas and other areas where hazardous substances are left in place at levels requiring land use and/or groundwater restrictions.
Other Notices[d]	Provide notice to county/city about the existence and location of waste disposal and residual contamination areas for zoning/planning purposes.	Until the concentration of hazardous substances associated with the unit have been reduced to levels that allow for unlimited exposure and unrestricted use.	Notice recorded by DOE in accordance with state laws at County Register of Deeds office if the property or any portion thereof is ever transferred to non-federal ownership.	All waste management areas and other areas where hazardous substances are left in place at levels requiring land use and/or groundwater restrictions.
Site Use Program[e]	Provide notice to worker/developer) i.e., permit requestor) on extent of contamination and prohibit or limit excavation/penetration activity.	As long as property remains under DOE control.	Implemented by DOE and site contractors Initiated by permit request	Remediation systems, all waste management areas. And areas where levels requiring land use and / or groundwater restrictions.

Table 3. Land Use Controls for the T Area Operable Unit (Continued)

Type of Control	Purpose of Control	Duration	Implementation	Affected Areas[a]
5. Physical Access Controls[f] (e.g., fences, gates, portals)	Control and restrict access to workers and the public to prevent unauthorized.	Until the concentration of hazardous substances associated with the unit have been reduced to levels that allow for unlimited exposure and unrestricted use.	Controls maintained by DOE	At select locations throughout CSRA.
6. Warning Signs[g]	Provide notice or warning to prevent unauthorized uses	Until the concentration of hazardous substances associated with the unit have been reduced to levels that allow for unlimited exposure and unrestricted use.	Signage maintained by DOE	At select locations throughout SRS.
7. Security Surveillance Measures	Control and monitor access by workers/public	Until the concentration of hazardous substances associated with the unit have been reduced to levels that allow for unlimited exposure and unrestricted use.	Established and maintained by DOE Necessity of patrols evaluated upon completion of remedial actions.	Patrol of selected area throughout SRS, as necessary.

[a]Affected areas – Specific locations identified in the SRS LUCIP or subsequent post-ROD documents.

[b]Property Record Notices – Refers to any non-enforceable, purely informational document recorded along with the original property acquisition records of DOE and its predecessor agencies that alerts anyone searching property records to important information about residual contamination; waste disposal areas in the property.

[c]Property Record Restrictions – Includes conditions and/or covenants that restrict or prohibit certain uses of real property and are recoded along with original property acquisition records of Doe and its predecessor agencies.

[d]Other Notices – Includes information on the location of waste disposal areas and residual contamination depicted on as survey plat, which is provided to a zoning authority (i.e., city planning commission) for consideration in appropriate zoning decisions for non-DOE property.

[e]Site Use Program – Refers to the internal DOE/DOE contractor administrative program(s) that requires the permit requestor to obtain authorization, usually in the form of a permit, before beginning any excavation/penetration activity (e.g., well drilling) for the purpose of ensuring that the proposed activity will not affect underground utilities/structures, or in the case contaminated soil or groundwater, will not disturb the affected areas without the appropriate precautions and safeguards.

[f]Physical Access Controls – Physical barriers or restrictions to entry.

[g]Signs – Posted command, warning or direction.

USDOE shall provide USEPA and SCDHEC 6 months notice prior to transfer to ensure that USEPA and SCDHEC can be involved in discussions to ensure that appropriate provisions are included in the transfer terms or conveyance documents to maintain effective ICs. If it is not possible for the facility to notify USEPA and SCDHEC at least six months prior to any transfer or sale, then the facility will notify USEPA and SCDHEC as soon as possible but no later than 60 days prior to the transfer or sale of any property subject to ICs. In addition to the land transfer notice and discussion provisions above, DOE further agrees to provide USEPA and SCDHEC with similar notice, within the same time frames, as to federal to federal transfer of property.

4.3 Other Public Notices

The LUCIP identifies the proposed area under land use restrictions via Figure 2 for the TAOU and the final Survey Plat (when available) located in Appendix A. After construction completion, a final survey plat will be prepared to document the as-built arrangement of the institutional controls and area subject to LUCs. The drawing will present a polygon of the T-Area Operable Unit subject to land use controls, including the bench marks, the location of warning signs, access control points and other information for land use controls. This post construction survey plat will be certified by a professional land surveyor and will be submitted to USEPA and SCDHEC concurrently with the Post-Construction Report (PCR).

In addition, if the site is ever transferred to non-federal ownership, a professional land surveyor-certified survey plat of the OU will be prepared at or near the time of conveyance to support the LUCIP required restrictive covenants on land use and will be recorded with the appropriate county recording agency.

4.4 Site Use Program

Under DOE Order 430.1A, *Life Cycle Management* (USDOE 1998), SRS is required, to implement an asset management program for the use, maintenance, and disposal of physical assets, including real estate. SRS complies with this Order through its Site Use Program, which is conducted in accordance with WSRC 1D, *Site Infrastructure and Services Manual*, Procedure 3.02, "Site Real Property Configuration Control" (WSRC 2003a). All employees, contractors,

and visitors at SRS are required to adhere to the Site Use Program. This program ensures authorization of any work performed at SRS if the work adds, modifies, or removes features portrayed on the SRS development maps. No land use (e.g., excavation) shall be undertaken without prior approval documented by a Site Use Permit. To obtain this authorization, a Site Clearance Request Form must be completed. In accordance with WSRC 1D, Procedure 3.02, all work at SRS that adds to or modifies features or facilities portrayed on SRS development maps (i.e., plot plans of facilities/utilities at SRS) will be authorized by a Site Clearance Permit before any activities are conducted. All Site Clearance Requests will be reviewed to verify that either an approved Site Use Permit has been obtained or that the request is sanctioned by an existing Site Use Permit. All land use requirements applicable for the OU will be provided to the Site Use Program for use in determining issuance of Site Clearance permits. In addition, the Site Use permit must be amended when the geographic configuration or buffer zone used to establish the permit boundary changes or there is a change to the permitted land use.

SRS is responsible for updating, maintaining, and reviewing site maps, including Federal Facility Agreement (FFA) (FFA 1993) OU identifications. If a Site Clearance Request potentially impacts an FFA OU, the Site Clearance Request Form is sent to the appropriate FFA OU reviewer for approval. The roles and responsibilities of each individual are detailed in WSRC 1D, Procedure 3.02. Before a Site Clearance Permit is issued, verification of USDOE approval for intended land use must be obtained. The site use and site clearance processes are applicable to all activities and personnel on site (including subcontractors). The USEPA and SCDHEC will be notified within 30 days of any changes to the Site Use Program that impacts actual land use requirements by USDOE via a revision to the LUCAP. The processes are controlled within the SRS Quality Assurance (QA) Program in accordance with WSRC 1Q Manual, *Quality Assurance* (WSRC 2003b). The SRS QA program governs all SRS activities.

SRS identifies all buildings and facilities on maps used in the Site Use Program. This waste unit is identified on these maps as a CERCLA facility.

Any work proposed in these areas will be strictly controlled, and workers will be appropriately trained and briefed about health and safety requirements if work is deemed necessary for

maintenance. No change in land use or excavation at the TAOU OU shall be undertaken without USEPA and SCDHEC approval. Approval by USEPA and SCDHEC is required for any modification or termination of the institutional controls and implementation actions, and USDOE must obtain approval from USEPA and SCDHEC that a proposed new land use is sufficiently protective.

4.5 Physical Access Controls

There are no physical access controls required at TAOU; however, physical access controls are provided at the SRS boundary as mentioned in Table 3, item 5.

4.6 Warning Signs

To prevent unknowing entry and to ensure that unrestricted use of the waste unit does not occur while the unit is under ownership of the government, access control warning signs will be posted at the unit. The signs will be legible for a distance of at least 25 feet. The signs will read as follows:

"T Area Operable Unit

Danger – Unauthorized Personnel Keep Out. This unit contains radiological or mixed hazardous substances. Do not dig or excavate. Do not enter without contacting the waste unit custodian.

Custodian: Manager, Post-Closure - Remediation Maintenance

Phone: (803) 725-7243 (1-9192)"

Custodial responsibilities for maintenance and inspection of the TAOU will be maintained by the Post-Closure Maintenance Group within Soil and Groundwater Closure Projects (SGCP).

4.7 Other Access Controls and Security/Surveillance Measures

While under the ownership of USDOE, access control of the entire SRS will be maintained in accordance with the 1992 RCRA Part B Permit Renewal Application, Volume I, Section F.1. This section describes the 24-hour surveillance system (R.61-79.264.14(b)(1)), artificial or natural barriers (R.61-79.264.14(b)(2)(I)), control entry systems (R.61-79.264.14(b)(2)(ii)), and access control warning signs (R.61-79.264.14(c)) in place at the SRS boundary to comply with the security requirements for a RCRA-permitted facility.

4.8 Field Inspection and Maintenance for Institutional Controls

After remediation of the TAOU, only inspection and maintenance activities will be required by the RA at the TAOU.

The TAOU will be inspected per the Field Inspection Checklist in Appendix B. Field inspections will be performed annually. Additional inspections may be necessary in the event of unusual weather or any other condition warranting inspection. For TAOU, inspections will be performed to ensure that signs are in place and TAOU cover system is developing self-sustaining vegetation. Inspection records will be kept in the operations record file for future access.

Maintenance (including site inspections, mowing, general housekeeping, and repair of erosion damage) will be performed as needed at TAOU in perpetuity. Necessary repairs for erosion control damage will be performed for the geosynthetic cover system, including vegetation, the drainage system, and cover slopes. Necessary upkeep of the access control signs for TAOU will be performed.

USEPA and SCDHEC will be notified within 30 days of identification by USDOE of any events and/or actions that indicate potential compromise of the institutional controls including any activity that is inconsistent with the IC objectives or use restrictions, or any other action that may interfere with the effectiveness of the ICs and the proposed action to address the potential compromise. The FFA Annual Progress Report, submitted to the regulatory agencies by the USDOE, will provide the status of the ICs and how any institutional control deficiencies or

inconsistent uses have been addressed. In the event of property transfer or lease, the Annual Report will cite findings on the following: whether the use restrictions and controls referenced above were communicated in the deed(s) or lease restrictions; whether property use conforms with the deed or lease restrictions and controls; and whether the owners and state/local agencies have been notified regarding the deed or lease restrictions and controls.

All other routine maintenance activities will be documented and maintained in files subject to USEPA and SCDEHC review and audit. A copy of the completed inspection form is maintained in the SGCP Document Control. The LUCs shall be maintained until the concentration of hazardous substances associated with the unit have been reduced to levels that allow for unlimited exposure and unrestricted use.

The waste unit inspectors are to be trained in Hazardous Waste Operations and Emergency Response (HAZWOPER), RCRA Well Inspections (SGCP-specific training), SGCP RCRA Waste Unit Inspections, Radiological Worker Training, etc., as applicable for the specific inspection. They will also be trained based on the individual requirements of the regulatory approved closure documents for each waste unit. In addition, the inspectors are to attend yearly refresher courses. Over the years, different personnel may conduct the inspections and grass cutting operations.

This unit-specific LUCIP, including the checklist (Appendix B), will be appended to the SRS LUCAP upon final regulatory approval. After completion of the PCR, the preliminary checklist in the LUCAP will be replaced with the final, approved checklist.

5.0 REFERENCES

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

USDOE, 1996. *Savannah River Site Future Use Project Report*, Stakeholder-Preferred Recommendations for SRS Land and Facilities, USDOE Savannah River Operations Office, January

USDOE, 1998. DOE Order 430.1A, *Life Cycle Management* (Approved October 14, 1998)

WSRC, 1999. *RCRA Facility Investigation/Remedial Investigation Report with Baseline Risk Assessment for the TNX Area Operable Unit* (U), WSRC-TR-96-00808, Rev. 1.2, Westinghouse Savannah River Company, Savannah River Site, Aiken, SC

WSRC, 2002. *RCRA Facility Investigation/ Remedial Investigation Report with Baseline Risk Assessment for the TNX Outfall Delta, Lower Discharge Gully, and Swamp Operable Unit (U)*, WSRC-RP-98-4158, Rev. 1, Westinghouse Savannah River Company, Savannah River Site, Aiken, SC

WSRC, 2003a. WSRC Procedure Manual 1D, *Site Infrastructure and Services Manual (U)*, Procedure 3.02, "Site Real Property Configuration Control," Westinghouse Savannah River Company, Savannah River Site, Aiken, SC

WSRC, 2003b. WSRC Procedure Manual 1Q, *Quality Assurance (U)*, Westinghouse Savannah River Company, Savannah River Site, Aiken, SC

WSRC, 2003c. *Record of Decision Remedial Alternative Selection for the TNX Area Operable Unit (U)*, WSRC-RP-2003-4017, Rev. 1, Westinghouse Savannah River Company, Savannah River Site, Aiken, SC

WSRC, 2005a. *Remedial Investigation/Focused Feasibility Study/Risk Assessment for the T Area Operable Unit*, WSRC-RP-2004-4050, Redline Rev. 1.1, Westinghouse Savannah River Company, Savannah River Site, Aiken, South Carolina (January).

WSRC, 2005b. *Record of Decision Alternative Selection for the T Area Operable Unit*, Revision 0, Westinghouse Savannah River Company, Savannah River Site, Aiken, SC

WSRC, 2005c. *Corrective Measures Implementation/ Remedial Action Implementation Plan (CMI/RAIP) for the T-Area Operable Unit (U)*, WSRC-RP-2005-4003, Revision 1, December 2005.

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APPENDIX A

AS-BUILT DRAWINGS

LAND USE CONTROL IMPLEMENTATION PLAN

(Drawing to be provided at a later date.)

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APPENDIX B

FIELD INSPECTION CHECKLIST

for T Area Operable Unit (TAOU)

FIELD INSPECTION CHECKLIST

FOR TAOU WASTE UNIT

❑ **SCHEDULED** ❑ **UNSCHEDULED**

A= Satisfactory X= Unsatisfactory (Explanation required)	A or X	Observation of Corrective Action Taken
1. Verify that the roads are accessible.		
2. Verify that the waste unit signs (20) are in acceptable condition, have the correct information, and are legible from a distance of 25 feet.		
3. Verify that there are no excavation, digging, or construction activities on the soil cover.		
4. Verify that the integrity of any drainage ditches, and required land grading for proper drainage is maintained and they are free of excessive erosion, sediment buildup, and any debris restricting water flow.		
5. Verify that no woody vegetation is growing on the soil cover. Remove or identify as needed.		
6. Verify that the grass density has no bare spots more than 3 by 3 feet in area. The height of the vegetative cover should not impair the visual inspection of the soil cover.		
7. Verify that the soil cover has no signs of unacceptable erosion or depressions (subsidence).		
8. Verify that signs of burrowing or mounding animals are not present.		

Inspected by:

_____ / _____ Date:_____
(Print Name) (Signature)

Post-Closure Manager:

_____ / _____ Date:_____
(Print Name) (Signature)

CAUTION: The inspector shall notify the Post-Closure Manager (PCM) and Environmental Compliance Authority (ECA) **IMMEDIATELY** if there has been a breach or compromise of the institutional controls of this waste unit. The notification shall be in accordance with SRS post-closure inspection procedures.

NOTE: Monitoring wells associated with this waste unit are maintained in accordance with SGCP Monitoring Well Procedures.

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APPENDIX C

POST-REMEDIAL ACTION CONCEPTUAL SITE MODEL

FOR THE T AREA OPERABLE UNIT POST-REMEDIAL ACTION

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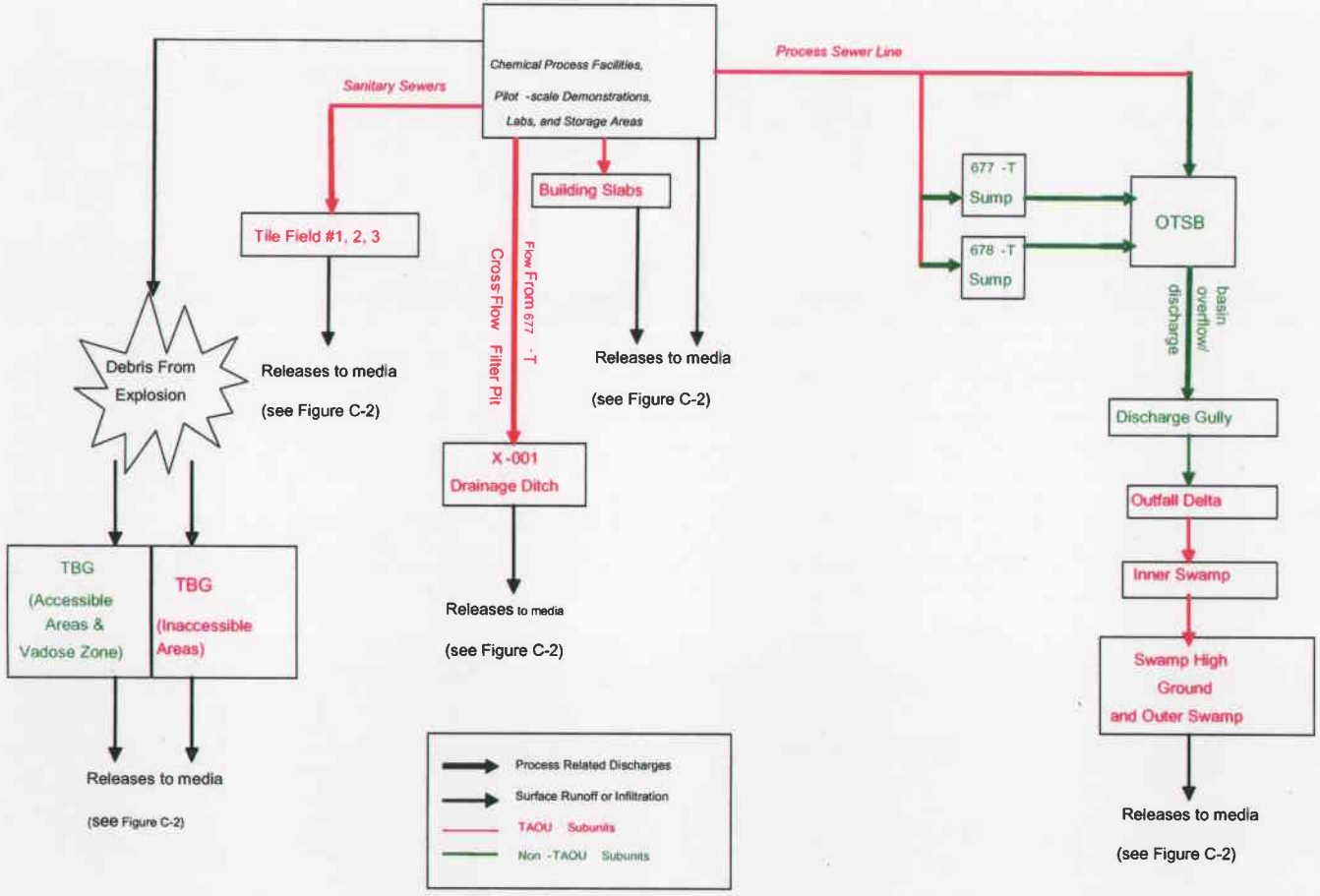


Figure C-1. CSM: Overview of the TAOU

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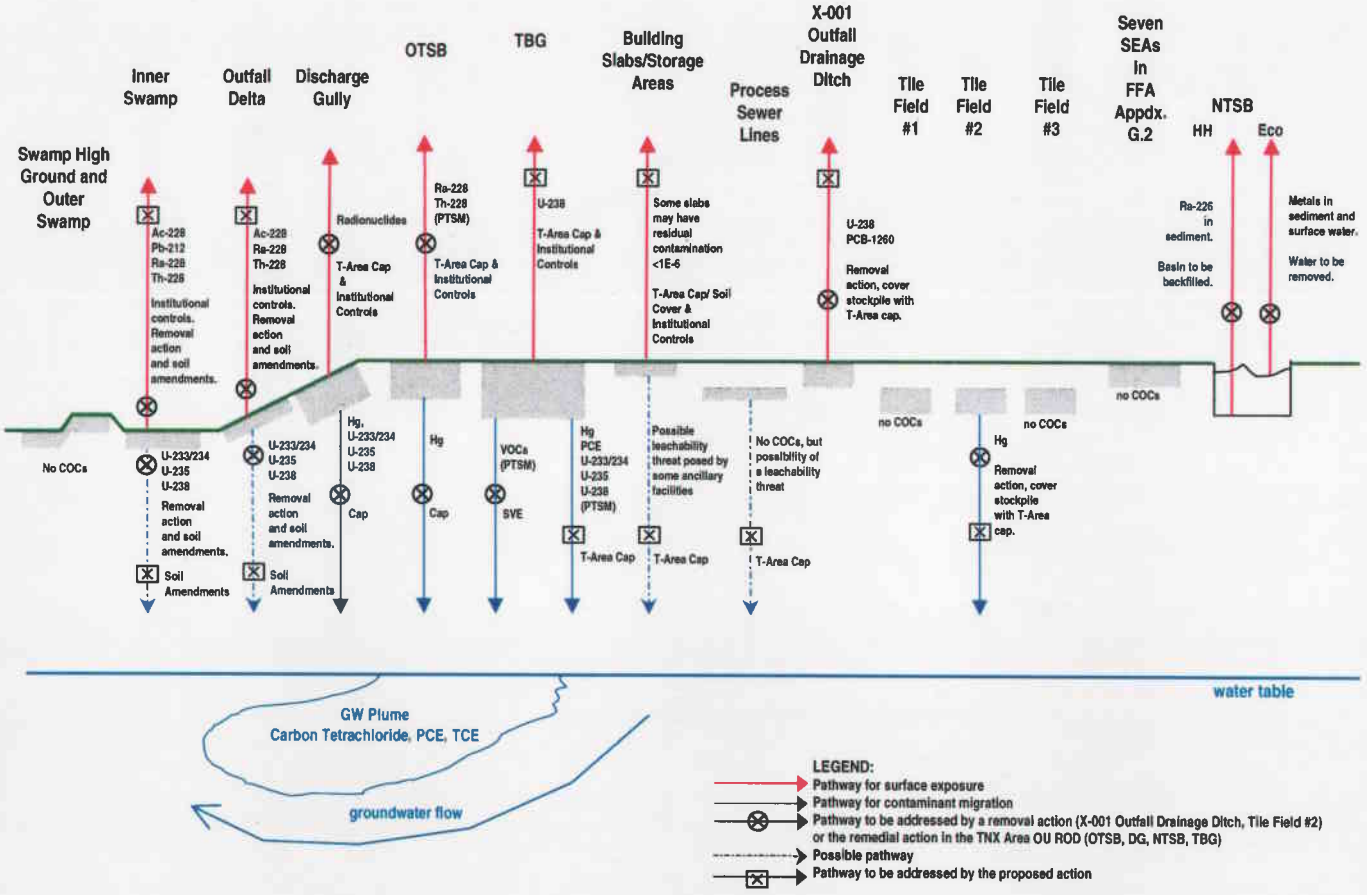


Figure C-2. Post Remedial Action CSM for the TAOU

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APPENDIX D

ACCESS CONTROL WARNING SIGNS

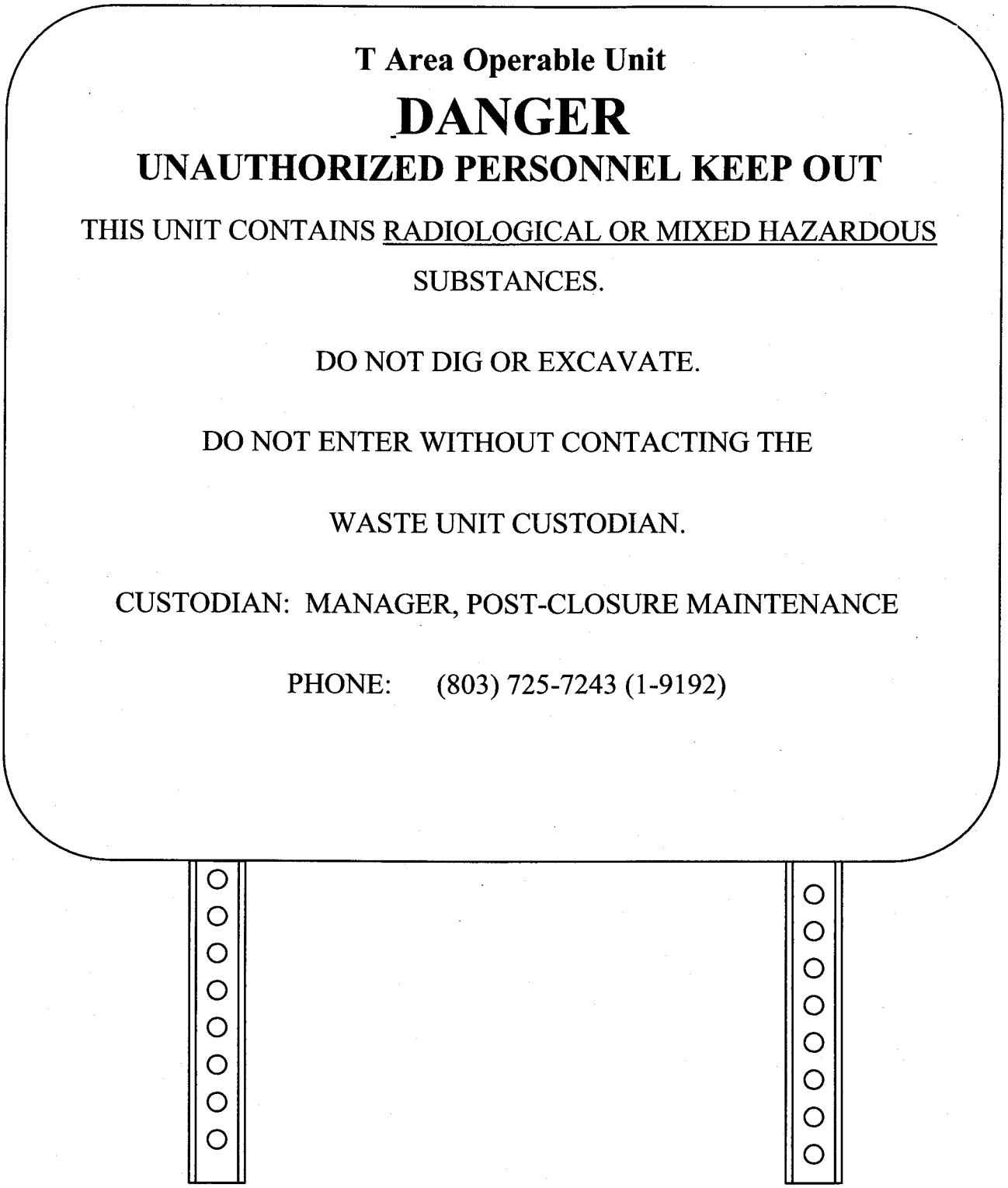


Figure D-1. Access Control Warning Sign

LUCIP for the
CMP Pits, 80-70G, -171G, -180G, -181G, -182G, -183G, and -190G
Land Use Control Implementation Plan for the Chemical, Metals, and Pesticides Pits Operable Unit, 080-170G, 080-180G, 080-181G, 080-182G, 080-183G, and 080-190G)
(WSRC-RP-2005-4078, Revision 1.2, July 2007)

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ARF # 14827

United States Department of Energy

Savannah River Site

Land Use Control Implementation Plan (LUCIP) for the Chemicals, Metals, and Pesticides Pits Operable Unit (080-170G, 080-171G, 080-180G, 080-181G, 080-182G, 080-183G and 080-190G) (U)

CERCLIS NUMBER: 24

WSRC–RP–2005-4078

Revision 1.2

July 2007

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

DISCLAIMER

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and
Washington Savannah River Company LLC
Aiken, South Carolina

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LIST OF ACRONYMS AND ABBREVIATIONS

bgs	below ground surface
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CMP	Chemicals, Metals, and Pesticides
CMCOC	contaminant migration constituent of concern
COC	constituent of concern
CMI	Corrective Measures Implementation
DCM	dichloromethane
DNAPL	Dense Non-Aqueous Phase Liquid
ECA	Environmental Compliance Authority
ERH	electrical resistance heating
FFA	Federal Facility Agreement
ft	feet
HAZWOPER	Hazardous Waste Operations and Emergency Response
km	kilometer
LAZ	lower aquifer zone
lb	pound
LUC	Land Use Control
LUCIP	Land Use Control Implementation Plan
LUCAP	Land Use Control Assurance Plan
OU	operable unit
m	meter
MAZ	middle aquifer zone
MCL	maximum contaminant level
µg/kilogram	microgram per kilogram
mg/kg	milligram per kilogram
mi	mile
MNA	Monitored natural attenuation
msl	mean sea level
OU	operable unit
PCB	polychlorinated biphenyl
PCE	tetrachloroethylene
PCM	Post-Closure Manager

LIST OF ACRONYMS AND ABBREVIATIONS (Continued)

QA	Quality Assurance
RAIP	Remedial Action Implementation Plan
RAO	remedial action objective
RCRA	Resource Conservation and Recovery Act
RFI/RI	RCRA Facility Investigation/Remedial Investigation
RG	remedial goal
ROD	Record of Decision
SCDHEC	South Carolina Department of Health and Environmental Control
SGCP	Soil and Groundwater Closure Projects
SRS	Savannah River Site
SVE	soil vapor extraction
TCE	trichloroethylene
TZ	transmissive zone
USDOE	United States Department of Energy
USEPA	United States Environmental Protection Agency
VOC	volatile organic compound
WSRC	Washington Savannah River Company, LLC

1.0 INTRODUCTION

This Land Use Control Implementation Plan (LUCIP) has been prepared for the Chemicals, Metals, and Pesticides (CMP) Pits Operable Unit (OU) at the Savannah River Site (SRS). The purpose of the LUCIP is to describe how the land use controls (LUCs) selected in the CMP Pits Record of Decision (ROD) (WSRC 2004) will be implemented and maintained. The anticipated future land use for the CMP Pits is industrial. As specified in the ROD, the following LUC objectives have been selected for this OU:

- Prevent contact, removal, or excavation of Ballast Area and Vadose Zone contaminated soil.
- Maintain the integrity of the existing cover.
- Maintain the use of the site for industrial activities only in order to prevent residential exposure.
- Prevent unauthorized access to the closed waste unit as long as the waste remains a threat to human health or the environment in order to protect the industrial worker.

The selected remedy leaves hazardous substances in place that pose a potential future risk and will require land use restrictions until the concentrations of hazardous substances in soil and groundwater are at such levels to allow for unrestricted use. As agreed on March 30, 2000, among the United States Department of Energy (USDOE), the United States Environmental Protection Agency (USEPA), and the South Carolina Department of Health and Environmental Control (SCDHEC), SRS is implementing a Land Use Control Action Plan (LUCAP) to ensure that the LUCs required by numerous remedial decisions at SRS are properly maintained and periodically verified. The requirements of that LUCAP also apply to the LUCs that were selected as part of the remedial action for CMP Pits. This additional document, the CMP Pits LUCIP, contains the detailed and specific measures required to implement and maintain the LUCs selected as part of this particular remedial decision. The LUCs shall be maintained until

the OU is suitable for unlimited exposure and unrestricted use. Approval by USEPA and SCDHEC is required for any modification or termination of the institutional controls.

USDOE is responsible for implementing, maintaining, monitoring, reporting, and enforcing the LUCs in accordance with the approved LUCIP. Upon final approval, the LUCIP will be appended to the LUCAP (WSRC 1999) and should be considered incorporated by reference into the CMP Pits ROD, establishing implementation and maintenance requirements for the LUCs under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and the SRS Federal Facility Agreement (FFA). The LUCIP will remain in effect unless and until modifications are approved by USEPA and SCDHEC as necessary for protection of human health and the environment. This LUCIP will be evaluated for accuracy during the five-year remedy review, and any approved LUCIP modification will be appropriately documented for incorporation by reference into the CMP Pits ROD.

1.1 Format of LUCIP

The format of this LUCIP is consistent with the FFA protocol format approved by the USEPA and SCDHEC in March 2004.

2.0 OVERVIEW OF CMP PITS REMEDIAL ACTION

2.1 Description of CMP Pits

The CMP Pits OU is located in the central portion of SRS, about one mile north of L Area. The CMP Pits OU is located within the Pen Branch watershed, approximately 380 m (1,250 ft) southeast of Pen Branch. The nearest plant boundary is approximately 11.9 km (7.4 mi) from the center of the OU.

The CMP Pits consist of seven unlined pits, placed in two rows, which occupy the top of a knoll at an approximate elevation of 310 feet mean sea level (msl). The pits received nonradioactive waste between 1971 and 1979. During that time, chemicals, metals, pesticides, and fluorescent lighting ballasts containing polychlorinated biphenyls (PCBs) were disposed of in the pits. In

1984, drums and other contaminated media were excavated from the pits. In a portion of the northwest pit, contaminated soils were excavated to depths of 7.6 m (25 ft) and 1.5 m (5 ft) below the bottom of the pit. These "over-excavation" areas were backfilled with coarse aggregate. The entire length of the pits was filled with approximately 0.6 m (2 ft) of coarse aggregate.

In 1999 the Interim ROD was issued for the residual volatile organic compounds (VOC) contamination present in the CMP Pits vadose zone. Two soil vapor extraction (SVE) systems, Field A and Field B, were constructed "to treat the soils beneath the pits where the combined tetrachloroethylene (PCE) and trichloroethylene (TCE) concentrations exceed 2,000 μg/kg with active treatment techniques as long as effective with an overall objective to reduce the potential migration of solvents to the water table that result in contamination exceeding the maximum contaminant level (MCL)." Field B SVE was operated from April 2001 to May 2002 and is now in a passive operation using Baroballs™ that were installed in 2002 SVE operation began in Field A in January 2002 but reached the point of diminishing returns and was shut down in August 2005. Although 9,300 lb of VOCs have been extracted from the Field A system, 2003 soil sampling indicated that PCE contamination remains in the less permeable soil horizons at concentrations indicative of dense non-aqueous phase liquid (DNAPL).

Fluorescent lighting ballasts and pesticides were found at or near ground surface to the west of the pits in what is now referred to as the "Ballast Area." The presence of the PCB- and pesticide-contaminated soil is attributed to stockpiling material recovered from the pits during the 1984 excavation activities. In 2004 and 2005, this soil was excavated, staged in windrows, and remediated via the addition and mixing of biological amendments. Once the amended soil samples were shown to be below remedial goals (RGs), the soil was placed back on the Ballast Area and seeded.

2.2 Nature and Extent of Contamination in CMP Pits

The CMP Pits OU comprises the following subunits:

- Ballast Area Soils
- CMP Pits and associated vadose zone (Field A)
- Vadose Zone (Field B)
- Groundwater
- Surface Water and Sediment

The nature and extent of surface soil contamination in the Ballast Area is described in greater detail in the Interim Corrective Measures Implementation (CMI)/Remedial Action Implementation Plan (RAIP) (WSRC 2000). The selected remedy for the CMP Pits OU leaves hazardous substances in place that pose a potential future risk and will require land use restrictions until the concentrations of hazardous substances in the soil and groundwater are at such levels to allow for unrestricted use and exposure.

2.2.1 CMP Pits Field A Vadose Zone

PCE and dichloromethane (DCM) have been identified as contaminant migration constituents of concern (CMCOCs) and are identified as principal threat source material (PTSM) for leachability in the vadose zone beneath the CMP Pits. No constituents of concern (COCs) were identified in the surface soils in the CMP Pits subunit.

The VOC contamination is highest in the northwest pit (Pit 080-183G) at depths between 6.0 and 18.0 m (20 and 60 ft) below ground surface (bgs). PCE is the most abundant contaminant at CMP Pits. The maximum concentration detected was 8,800 mg/kg in boring WS0303 at a depth of 11.6 m (38 ft) bgs. Sample locations that had PCE concentrations above 60 mg/kg, the threshold concentration indicative of DNAPL, were found adjacent to Pit 080-183G. PCE concentrations above 1,000 mg/kg were detected beneath Pit 080-183G in 1994 during the Resource Conservation and Recover Act (RCRA) Facility Investigation/Remedial Investigation (RFI/RI). Data collected during the 1984 removal action indicated that VOC contamination was

highest near this pit. Residual VOC contamination remained in the vadose zone beneath the 1984 excavation area.

2.2.2 CMP Pits Groundwater

The following VOCs and pesticides have been detected in groundwater monitoring wells above Safe Drinking Water Act MCLs: PCE, TCE, DCM, 1,1,2-trichloroethane, carbon tetrachloride, and lindane. Alpha-benzene hexachloride, beta-benzene hexachloride, delta-benzene hexachloride, dieldrin, lindane, bis (2-ethylhexyl) phthalate, bromodichloromethane, carbon tetrachloride, chloroform, DCM, PCE, and TCE have been identified as human health COCs for the future industrial worker and resident.

Two VOC groundwater plumes exist at the CMP Pits, designated as the main plume and the northeast plume. These plumes are moving northward toward Pen Branch sediment and surface water. Groundwater modeling indicates that the CMP Pits are the source for the main plume. Particle tracking toward and from the northeast plume suggests that this plume is from a different source than that of the main plume. The source of the northeast plume is depleted.

The vertical extent of the VOC plume includes the transmissive zone (TZ), middle aquifer zone (MAZ), and the lower aquifer zone (LAZ).

2.3 Remedial Action Selected

This section addresses the remedies described in the CMP Pits ROD (WSRC 2004).

Ballast Area Soils

Institutional controls after completion of the enhanced bioremediation interim action for pesticide- and PCB-contaminated surface soils

CMP Pits and Associated Vadose Zone (Field A)

Combination of electrical resistance heating (ERH) to remove DNAPL and continued operation of the SVE system

Vadose Zone (Field B)

Passive SVE (Baroballs™)

Groundwater

Monitored natural attenuation (MNA) and institutional controls

The post-remedial action conceptual site model (see Appendix C-1 to this LUCIP) shows the broken pathways and the remaining residual risk to the future industrial worker.

According to the *Savannah River Site Future Use Project Report* (USDOE 1996), residential use of SRS land is prohibited.

3.0 LAND USE CONTROL OBJECTIVES

Considering the residual risk, the LUC objectives are to

- prevent contact, removal, or excavation of Ballast Area and Vadose Zone contaminated soil. This LUC objective attains the remedial action objective (RAO) to prevent current, remedial and future industrial workers from exposure to the contaminated media at the CMP Pits.

- maintain the integrity of the existing cover. This LUC supports RAOs by reducing rainwater infiltration into the contaminated vadose zone to prevent leachate generation above MCLs.

- maintain the use of the site for industrial activities only in order to prevent residential exposure. This LUC supports RAOs by prohibiting development and use of the area for residential properties, elementary and secondary schools, child care and playgrounds.

- prevent unauthorized access to the closed waste unit as long as the waste remains a threat to human health or the environment in order to protect the industrial worker. This LUC objective attains the RAO to prevent current, remedial and future industrial workers from exposure to the contaminated media at the CMP Pits.

- provide public notices for disclosing former waste management and disposal activities and remedial actions taken on the site in order to protect future residents, trespassers and industrial workers. This LUC supports RAOs that protect industrial workers, residents, trespassers, and inadvertent intruders from exposure to the contaminated media at the CMP Pits.

- prevent unauthorized residential or agricultural access to groundwater in the area. This LUC supports RAOs to protect industrial workers, residents, trespassers, and inadvertent intruders from exposure to the contaminated media at the CMP Pits OU and helps prevent the spread of groundwater contamination.

- maintain the integrity of any current or future remedial or monitoring system

4.0 IMPLEMENTATION OF LAND USE CONTROLS

This section describes the LUCs selected in the ROD to achieve the objectives stated in Section 3.0. The description is contained in Table 1. USDOE is responsible for implementing, maintaining, reporting on and enforcing the land use controls required for the CMP Pits OU. The LUCIP will become enforceable and will be implemented when approved by USEPA and SCDHEC and following the completion of the remedial actions prescribed by the CMP Pits OU ROD. USDOE shall notify USEPA and SCDHEC 60 days in advance of any proposed land use changes that are inconsistent with land use control objectives or the selected remedy.

The CMP Pits OU will be maintained as an industrial use area by implementation of the property record notices (Section 4.1) and restrictions (Section 4.2), and the use of a certified LUC survey plat (Section 4.3).

The Site Use Program (Section 4.4) will be implemented to prevent onsite worker exposure to contamination left in place at the CMP Pits OU. Other existing measures (i.e. Site Clearance Program, worker training, health and safety requirements, work controls) will also be used to ensure worker safety at the CMP Pits OU.

4.1 Property Record Notices

In the long term, if the property is ever transferred to non-federal ownership, the United States 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 contract for sale and the deed will contain the notification required by CERCLA Section 120(h).

The deed notification shall, in perpetuity, notify any potential purchaser that the property has been used to manage and dispose of waste. This requirement is consistent with the intent of RCRA deed notification requirements at final closure of a RCRA facility if contamination will remain at the unit.

4.2 Property Record Restrictions

The deed shall also include restrictions precluding residential use of the property and/or any other property record restrictions necessary to achieve the LUC objectives. The deed shall contain provisions to ensure that appropriate LUCs remain with the affected area upon any and all transfers. USDOE shall provide a copy of the executed deeds to the regulatory agencies as soon as practicable after the transfer of fee title, but no later than 30 days. However, the need for these deed restrictions may be re-evaluated 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 re-evaluation of the need for the deed restrictions will be done though an amended ROD.

USDOE shall provide USEPA and SCDHEC six months' notice prior to transfer to ensure that USEPA and SCDHEC can be involved in discussions to ensure that appropriate provisions are

Table 1. Land Use Controls for the CMP Pits OU

Type of Control	Purpose of Control	Duration	Implementation	Affected Areas[a]
1. Property Record Notices[b]	Provide notice to anyone searching records about the existence and location of contaminated areas	Until the concentration of hazardous substances associated with the unit have been reduced to levels that allow for unlimited exposure and unrestricted use	Notice recorded by USDOE in accordance with state laws at County Register of Deeds office if the property or any portion thereof is ever transferred to nonfederal ownership	Ballast Area and Vadose Zone where hazardous substances are left in place at levels requiring land use and/or groundwater restrictions
2. Property record restrictions[c]: A. Land Use B. Groundwater	Restrict use of property by imposing limitations Prohibit the use of groundwater	Until the concentration of hazardous substances associated with the unit have been reduced to levels that allow for unlimited exposure and unrestricted use	Drafted and implemented by USDOE upon any transfer of affected areas; recorded by USDOE in accordance with state law at County Register of Deeds office	Ballast Area, Vadose Zone, and Groundwater (until RAOs are achieved) where hazardous substances are left in place at levels requiring land use and/or groundwater restrictions
3. Other Notices[d]	Provide notice to county/city about the existence and location of waste disposal and residual contamination areas for zoning/planning purposes	Until the concentration of hazardous substances associated with the unit have been reduced to levels that allow for unlimited exposure and unrestricted use	Notice recorded by USDOE in accordance with state laws at County Register of Deeds office if the property or any portion thereof is ever transferred to non-federal ownership	Ballast Area, Vadose Zone, and Groundwater (until RAOs are achieved) where hazardous substances are left in place at levels requiring land use and/or groundwater restrictions
4. Site Use Program[e]	Provide notice to worker/developer (i.e., permit requestor) on extent of contamination and prohibit or limit excavation/penetration activity.	As long as property remains under USDOE control	Implemented by USDOE and site contractors Initiated by permit request	Ballast Area, Vadose Zone, and Groundwater (until RAOs are achieved) where hazardous substances are left in place at levels requiring land use and/or groundwater restrictions

Table 1. Land Use Controls for the CMP Pits OU (Continued)

Type of Control	Purpose of Control	Duration	Implementation	Affected Areas[a]
5. Physical Access Controls[f] (e.g., fences, gates, portals)	Control and restrict access to workers and the public to prevent unauthorized entry	Until the concentration of hazardous substances associated with the unit have been reduced to levels that allow for unlimited exposure and unrestricted use	Controls maintained by USDOE	Fence at the SRS boundary
6. Warning Signs[g]	Provide notice or warning to prevent unauthorized uses	Until the concentration of hazardous substances associated with the unit have been reduced to levels that allow for unlimited exposure and unrestricted use	Signage maintained by USDOE	Signs around soil areas requiring LUC at the CMP Pits
7. Security Surveillance Measures	Control and monitor access by workers/public	Until the concentration of hazardous substances associated with the unit have been reduced to levels that allow for unlimited exposure and unrestricted use	Established and maintained by USDOE Necessity of patrols evaluated upon completion of remedial actions	Patrol of selected area throughout SRS, as necessary

[a]Affected areas – Specific locations identified in the SRS LUCIP or subsequent post-ROD documents.

[b]Property Record Notices – Refers to any non-enforceable, purely informational document recorded along with the original property acquisition records of USDOE and its predecessor agencies that alerts anyone searching property records to important information about residual contamination; waste disposal areas in the property.

[c]Property Record Restrictions – Includes conditions and/or covenants that restrict or prohibit certain uses of real property and are recoded along with original property acquisition records of USDOE and its predecessor agencies.

[d]Other Notices – Includes information on the location of waste disposal areas and residual contamination depicted on a survey plat, which is provided to a zoning authority (i.e., city planning commission) for consideration in appropriate zoning decisions for non-USDOE property.

[e]Site Use Program – Refers to the internal USDOE/USDOE contractor administrative program(s) that requires the permit requestor to obtain authorization, usually in the form of a permit, before beginning any excavation/penetration activity (e.g., well drilling) for the purpose of ensuring that the proposed activity will not affect underground utilities/structures, or in the case contaminated soil or groundwater, will not disturb the affected areas without the appropriate precautions and safeguards.

[f]Physical Access Controls – Physical barriers or restrictions to entry.

[g]Signs – Posted command, warning or direction.

included in the transfer terms or conveyance documents to maintain effective institutional controls. If it is not possible for the facility to notify USEPA and SCDHEC at least six months prior to any transfer or sale, then the facility will notify USEPA and SCDHEC as soon as possible but no later than 60 days prior to the transfer or sale of any property subject to institutional controls. In addition to the land transfer notice and discussion provisions above, USDOE further agrees to provide USEPA and SCDHEC with similar notice, within the same time frames, as to federal to federal transfer of property.

4.3 Other Public Notices

This LUCIP identifies the area under land use restriction via a design sketch in Appendix A (CMP-0017-GIS). The sketch provides a plan view of the site with a line marked depicting the surface area subject to LUCs and a line marked depicting the current estimated location of the groundwater plume subject to LUCs. Preparation of a certified survey plat will be deferred until the site is transferred to non-federal ownership. Preparing the survey plat coincident with land transfer will maximize the accuracy of the groundwater area under the restrictive covenant. The deferred survey plat will be appended to this LUCIP when it is completed.

After operation completion, an as-built drawing showing the as-built arrangement of the institutional controls will be submitted to USEPA and SCDHEC to replace the sketch in the Post-Construction Report (PCR)/Corrective Measures Implementation Report (CMIR)/Remedial Action Completion Report (RACR).

In addition, if the site is ever transferred to non-federal ownership, a professional land surveyor-certified survey plat of the OU will be prepared at or near the time of conveyance to support the LUCIP required restrictive covenants on land use and will be recorded with the appropriate county recording agency.

4.4 Site Use Program

Under DOE Order 430.1A, *Life Cycle Management* (USDOE 1998), SRS is required to implement an asset management program for the use, maintenance, and disposal of physical assets, including real estate. SRS complies with this Order through its Site Use Program which is conducted in accordance with WSRC 1D, Site Infrastructure and Services Manual, Procedure 3.02, "Site Real Property Configuration Control" (WSRC 2003a). All employees, contractors, and visitors at SRS are required to adhere to the Site Use Program. No use of land (i.e., excavation or any other land use) shall be undertaken without prior approval documented by a Site Use Permit. Also, in accordance with WSRC 1D, Procedure 3.02, all work at SRS that adds or modifies features or facilities portrayed on the SRS development maps (i.e., plot plans of facilities/utilities at SRS) will be authorized by a Site Clearance Permit before any activities are conducted. All Site Clearance Requests will be reviewed to verify that either an approved Site Use Permit has been obtained or that the request is sanctioned by an existing Site Use Permit. All land use requirements applicable for the OU will be provided to the Site Use Program for use in determining issuance of Site Clearance permits. In addition, the Site Use permit must be amended when the geographic configuration or buffer zone used to establish the permit boundary changes or there is a change to the permitted land use.

SRS is responsible for updating, maintaining, and reviewing site maps, including FFA (1993) OU identifications. If a Site Clearance Request potentially impacts an FFA OU, the Site Clearance Request Form is sent to the appropriate FFA OU reviewer for approval. The roles and responsibilities of each individual are detailed in WSRC 1D, Procedure 3.02. Before a Site Clearance Permit is issued, verification of USDOE approval for intended land use must be obtained. The site use and site clearance processes are applicable to all activities and personnel on site (including subcontractors). USDOE will notify USEPA and SCDHEC in advance of any change to any internal procedure, including the Site Use Program, that would affect implementing or maintaining the LUCs. The processes are controlled within the SRS Quality Assurance (QA) Program in accordance with WSRC 1Q Manual, *Quality Assurance* (WSRC 2003b). The SRS QA program governs all SRS activities.

SRS identifies all buildings and facilities on maps used in the Site Use Program. This waste unit is identified on these maps as a CERCLA facility.

Any work proposed in these areas will be strictly controlled, and workers will be appropriately trained and briefed about health and safety requirements if work is deemed necessary for maintenance. No change in land use or excavation at the CMP Pits OU shall be undertaken without USEPA and SCDHEC approval. Approval by USEPA and SCDHEC is required for any modification or termination of the institutional controls and implementation actions, and DOE must obtain approval from USEPA and SCDHEC that a proposed new land use is sufficiently protective.

4.5 Physical Access Controls

There are no physical access controls required at the CMP Pits OU; however, physical access controls are provided at the SRS boundary as mentioned in Table 1, item 5.

4.6 Warning Signs

To prevent unknowing entry and to ensure that unrestricted use of the waste unit does not occur while the unit is under ownership of the government, access control warning signs will be posted at the unit. The signs will be legible for a distance of at least 7.6 m (25 ft). The signs will read as indicated in Appendix D.

Custodial responsibilities for maintenance and inspection of the CMP Pits OU will be maintained by the Operations & Maintenance Post-Closure Maintenance Group within the Operating Services Department.

4.7 Other Access Controls and Security/Surveillance Measures

While under the ownership of USDOE, access control of the entire SRS will be maintained in accordance with the 1992 RCRA Part B Permit Renewal Application, Volume I, Section F.1. This section describes the 24-hour surveillance system (R.61-79.264.14(b)(1)), artificial or

natural barriers (R.61-79.264.14(b)(2)(I)), control entry systems (R.61-79.264.14(b)(2)(ii)), and access control warning signs (R.61-79.264.14(c)) in place at the SRS boundary to comply with the security requirements for a RCRA-permitted facility.

4.8 Field Inspection and Maintenance for Institutional Controls

After remediation of the CMP Pits OU, only maintenance activities will be required by this remedial action.

Field inspections will be performed annually. Additional inspections may be necessary in the event of unusual weather or any other condition warranting inspection. The CMP Pits will be inspected per the Field Inspection Checklist in Appendix B. Necessary repairs will be performed for items in Appendix B that are found to be in unsatisfactory condition. Necessary upkeep of the access control signs for CMP Pits will be performed. USEPA and SCDHEC will be notified within 30 days of identification by USDOE of any events and/or actions that indicate potential compromise of the institutional controls including any activity that is inconsistent with the IC objectives or use restrictions or any other action that may interfere with the effectiveness of the ICs and the proposed action to address the potential compromise. The FFA Annual Progress Report, submitted to the regulatory agencies by the USDOE, will provide the status of the institutional controls and how any institutional control deficiencies or inconsistent uses have been addressed. In the event of property transfer or lease, the Annual Report will cite findings on the following: whether the use restrictions and controls referenced above were communicated in the deed(s), or lease restrictions and controls; whether property use conforms with the deed or lease restrictions and controls; and whether the owners and state/local agencies have been notified regarding the deed or lease restrictions and controls.

All other routine maintenance activities will be documented and maintained in files subject to USEPA and SCDHEC review and audit. A copy of the completed inspection form is maintained in the SGCP Document Control Center. The LUCs (including inspections and repairs associated with the items in Appendix B) shall be maintained until the concentration of hazardous

substances associated with the unit have been reduced to levels that allow for unlimited exposure and unrestricted use.

The waste unit inspectors are to be trained in Hazardous Waste Operations and Emergency Response (HAZWOPER), RCRA Well Inspections (SGCP-specific training), SGCP RCRA Waste Unit Inspections, Radiological Worker Training, etc., as applicable for the specific inspection. They will also be trained based on the individual requirements of the regulatory approved closure documents for each waste unit. In addition, the inspectors are to attend yearly refresher courses. Over the years, different personnel may conduct the inspections and grass cutting operations.

This unit-specific LUCIP, including the checklist (Appendix B), will be appended to the SRS LUCAP upon final regulatory approval.

5.0 REFERENCES

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

USDOE, 1996. *Savannah River Site Future Use Project Report*, Stakeholder-Preferred Recommendations for SRS Land and Facilities, USDOE Savannah River Operations Office, January

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

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WSRC, 2003a. WSRC Procedure Manual 1D, *Site Infrastructure and Services Manual (U)*, Procedure 3.02, "Site Real Property Configuration Control," Westinghouse Savannah River Company, Savannah River Site, Aiken, SC

WSRC, 2003b. WSRC Procedure Manual 1Q, *Quality Assurance (U)*, Westinghouse Savannah River Company, Savannah River Site, Aiken, SC

WSRC, 2004. Record of Decision Remedial Alternative Selection for the Chemicals, Metals, and Pesticides Pits Operable Unit (U), WSRC-RP-2004-4090, Rev. 1, December, Westinghouse Savannah River Company, Savannah River Site, Aiken, SC

APPENDIX A

DESIGN SKETCH

CMP-0017-GIS LAND USE CONTROL IMPLEMENTATION PLAN SKETCH

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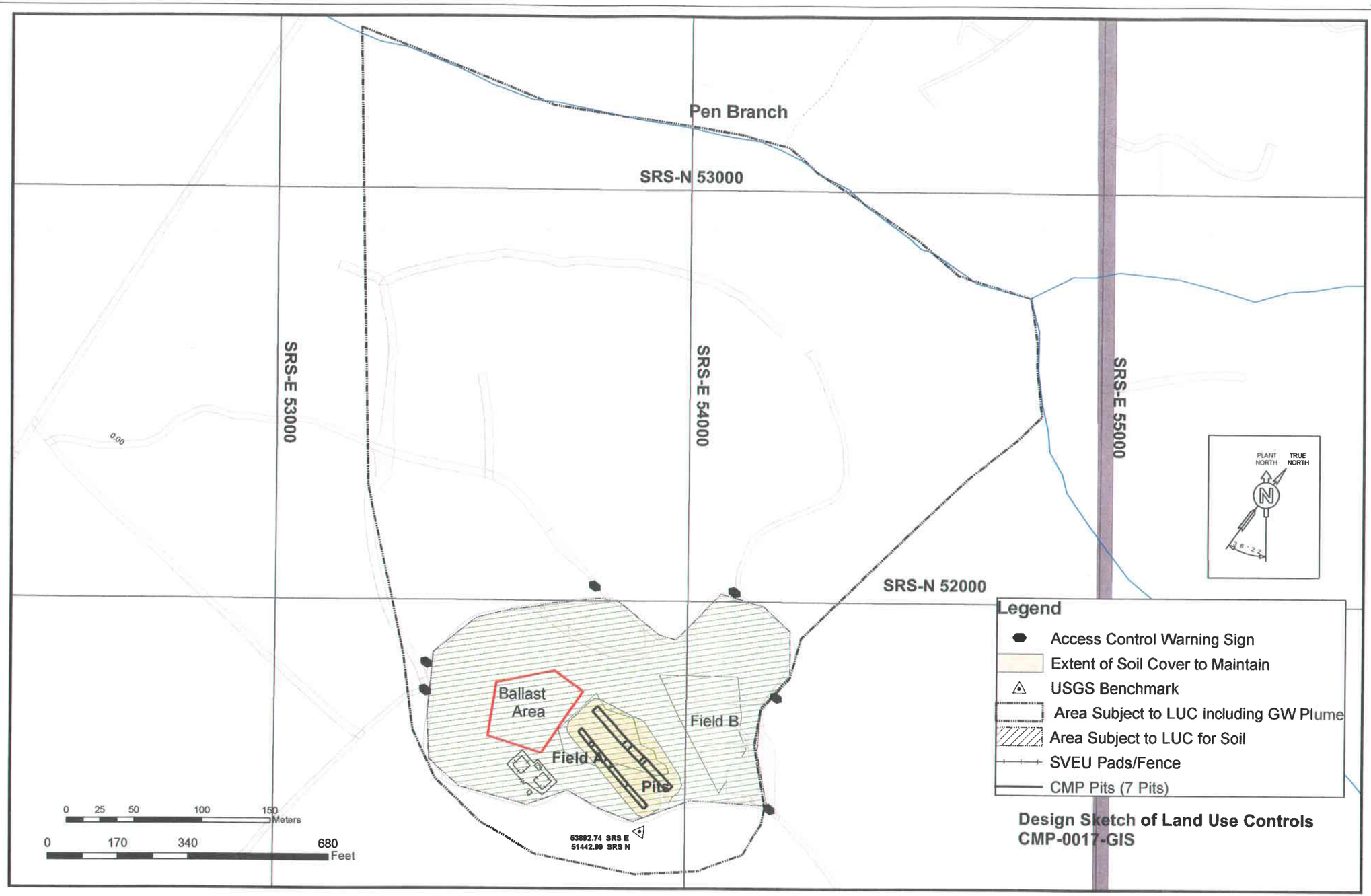
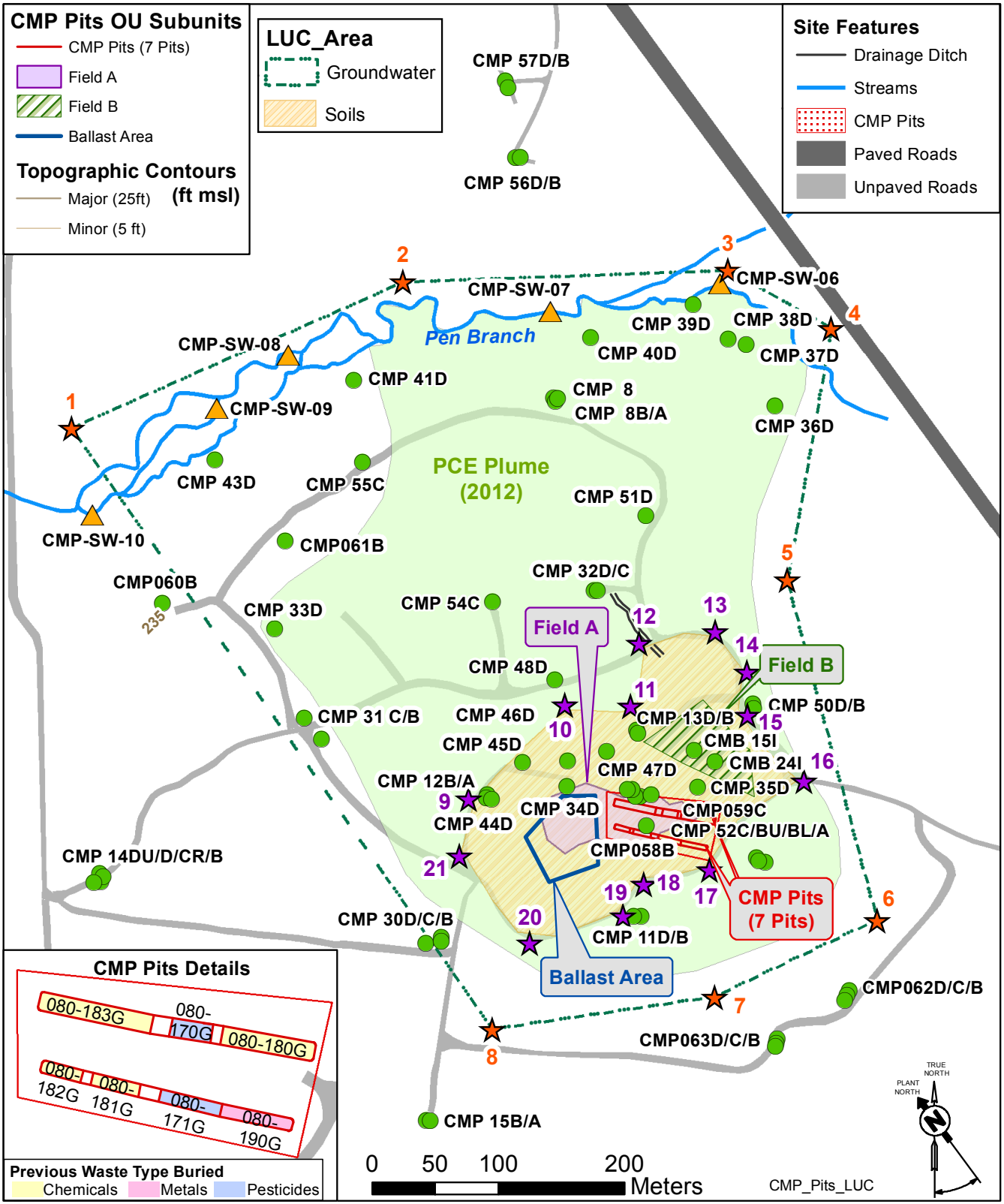


Figure A-1. GIS Land Use Control Implementation Plan Sketch


CMP Pits OU Subunits
CMP Pits (7 Pits)
Field A
Field B
Ballast Area
Topographic Contours (ft msl)
Major (25ft)
Minor (5 ft)
LUC_Area
Groundwater
Soils
Site Features
Drainage Ditch
Streams
CMP Pits
Paved Roads
Unpaved Roads
CMP 57D/B
CMP 56D/B
CMP-SW-06
CMP-SW-07
CMP-SW-08
CMP-SW-09
CMP-SW-10
Pen Branch
CMP 39D
CMP 38D
CMP 37D
CMP 40D
CMP 41D
CMP 8
CMP 8B/A
CMP 36D
CMP 43D
CMP 55C
PCE Plume (2012)
CMP 51D
CMP061B
CMP060B
CMP 32D/C
CMP 54C
CMP 33D
235
Field A
Field B
CMP 48D
CMP 46D
CMP 31 C/B
CMP 45D
CMP 12B/A
CMP 44D
CMP 34D
CMP 47D
CMP 13D/B
CMP 50D/B
CMB 15I
CMB 24I
CMP 35D
CMP059C
CMP 52C/BU/BL/A
CMP058B
CMP 14DU/D/CR/B
CMP 30D/C/B
CMP 11D/B
CMP Pits (7 Pits)
Ballast Area
CMP062D/C/B
CMP063D/C/B
CMP 15B/A
CMP Pits Details
080-183G
080-170G
080-180G
080-182G
080-181G
080-171G
080-190G
Previous Waste Type Buried
Chemicals
Metals
Pesticides
0 50 100 200
Meters
CMP_Pits_LUC
TRUE NORTH
PLANT NORTH

Point_Numb	Area Type	SRS Coordinate System (feet (us))	SRS Coordinate System (feet (us))
1	Groundwater	53210.33981	53358.6298
2	Groundwater	54133.09067	53158.10759
3	Groundwater	54834.75663	52684.26138
4	Groundwater	54963.28888	52403.53989
5	Groundwater	54484.94645	51941.55395
6	Groundwater	54151.84933	51086.87165
7	Groundwater	53692.73569	51174.88481
8	Groundwater	53174.25335	51447.68354
9	Soil	53478.50625	51969.68573
10	Soil	53824.42434	52019.01882
11	Soil	53961.68316	51915.55677
12	Soil	54075.98312	52036.0687
13	Soil	54254.62791	51943.22287
14	Soil	54258.25302	51809.49584
15	Soil	54193.66576	51718.33895
16	Soil	54211.78019	51492.57707
17	Soil	53876.92159	51451.13621
18	Soil	53717.21985	51521.33502
19	Soil	53624.33334	51486.20816
20	Soil	53386.19381	51572.76311
21	Soil	53371.1623	51863.59617

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APPENDIX B

FIELD INSPECTION CHECKLIST

FOR CHEMICALS, METALS, AND PESTICIDES PITS

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FIELD INSPECTION CHECKLIST

FOR CHEMICALS, METALS, AND PESTICIDES PITS OPERABLE UNIT

(080-170G, 080-171G, 080-180G, 080-181G, 080-182G, 080-183G and 080-190G)

☐ **SCHEDULED** ☐ **UNSCHEDULED**

A= Satisfactory X= Unsatisfactory (Explanation required)	A or X	Observation of Corrective Action Taken
1. Verify that the roads are accessible.		
2. Verify that the six waste unit signs are in acceptable condition, have the correct information, and are legible from a distance of 25 feet.		
3. Verify that there are no excavation, digging, or construction activities on the soil cover.		
4. Verify that the integrity of any drainage ditches, sediment basins and required land grading for proper drainage is maintained and they are free of excessive erosion, sediment buildup, and any debris restricting water flow.		
5. Verify that no woody vegetation is growing on the soil cover. Remove or identify as needed.		
6. Verify that the grass density has no bare spots more than 3 by 3 feet in area. The height of the vegetative cover should not impair the visual inspection of the soil cover.		

FIELD INSPECTION CHECKLIST

FOR CHEMICALS, METALS, AND PESTICIDES PITS OPERABLE UNIT (Continued)

❑ **SCHEDULED** ❑ **UNSCHEDULED**

A= Satisfactory X= Unsatisfactory (Explanation required)	A or X	Observation of Corrective Action Taken
7. Verify that the soil cover has no signs of unacceptable erosion or depressions (subsidence).		
8. Verify that signs of burrowing or mounding animals are not present.		

Inspected by:

_____/_____ Date:_____
(Print Name) (Signature)

Post-Closure Manager:

_____/_____ Date:_____
(Print Name) (Signature)

CAUTION: The inspector shall notify the Post-Closure Manager (PCM) and Environmental Compliance Authority (ECA) **IMMEDIATELY** if there has been a breach or compromise of the institutional controls of this waste unit. The notification shall be in accordance with SRS post-closure inspection procedures.

NOTE: Monitoring wells associated with this waste unit are maintained in accordance with SGCP Monitoring Well Procedures.

APPENDIX C

POST-REMEDIAL ACTION CONCEPTUAL SITE MODEL

FOR THE CMP PITS POST-REMEDIAL ACTION

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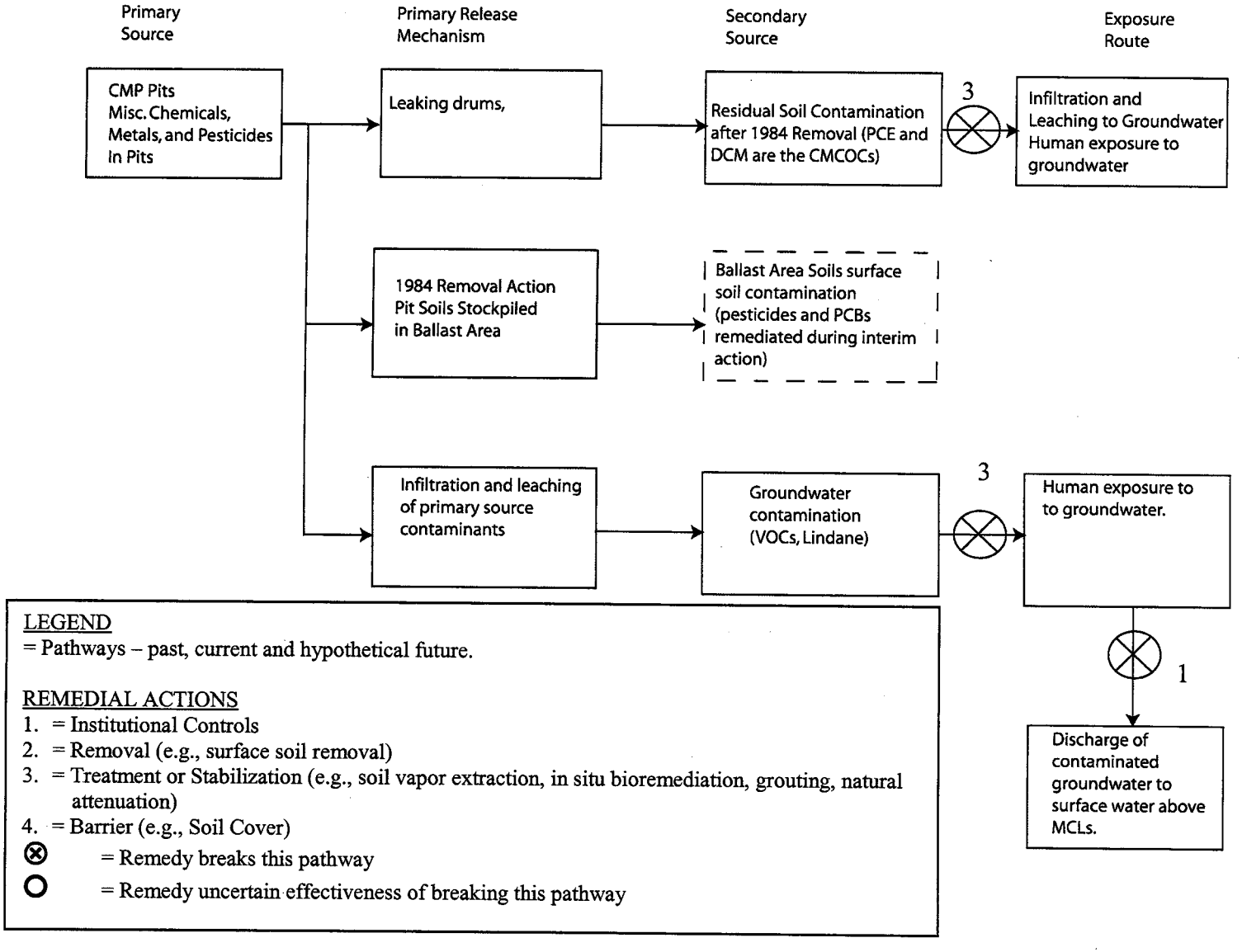


Figure C-1. Post-Remedial Action Conceptual Site Model for CMP Pits

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APPENDIX D

ACCESS CONTROL WARNING SIGN

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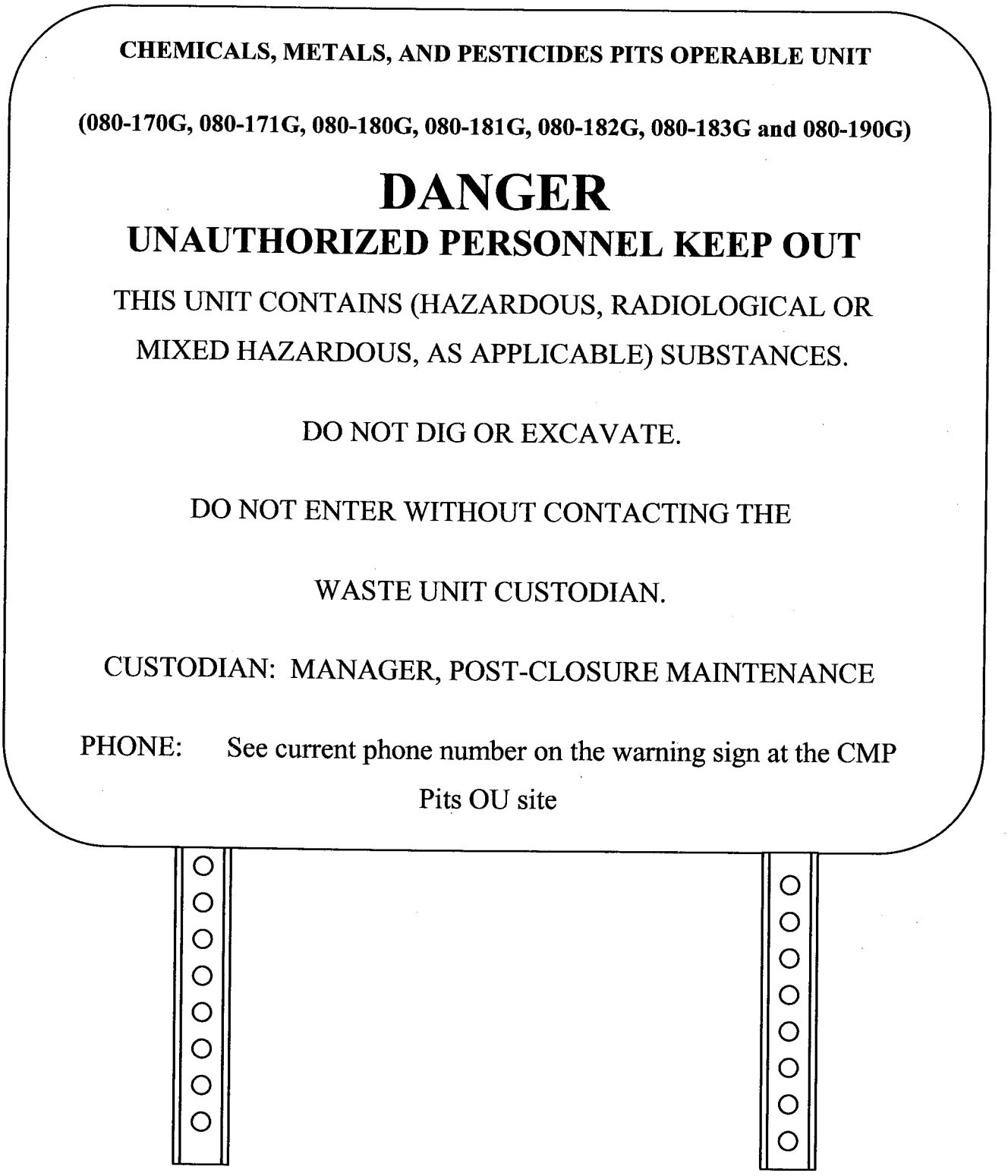


Figure D-1. Access Control Warning Sign

LUCIP for the
M-Area Inactive Process Sewer Lines Operable Unit, 081-M (consists of 313-M and 320-M Inactive Clay Process Sewers to Tims Branch, NBN)
Land Use Control Implementation Plan for the
M-Area Inactive Sewer Lines Operable Unit
(WSRC-RP-2006-4068, Revision 1, April 2007)

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United States Department of Energy

Savannah River Site

Land Use Control Implementation Plan (LUCIP) for the M-Area Inactive Process Sewer Lines Operable Unit (081-M) (U)

CERCLIS NUMBER: 92

WSRC–RP–2006-4068

Revision 1

April 2007

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

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

DISCLAIMER

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and
Washington Savannah River Company LLC
Aiken, South Carolina

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LIST OF ACRONYMS AND ABBREVIATIONS

ARAR	applicable or relevant and appropriate requirements
bgs	below ground surface
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
cm	centimeter
CMCOC	contaminant migration constituents of concern
COC	constituent of concern
ECA	Environmental Compliance Authority
ECO	ecological
FFA	Federal Facility Agreement
ft	feet
HAZWOPER	Hazardous Waste Operations and Emergency Response
HDPE	high density polyethylene
HH	human health
IC	institutional control
in	inch
LUC	land use control
LUCIP	Land Use Control Implementation Plan
LUCAP	Land Use Control Assurance Plan
m	meter
mg/kg	milligram per kilogram
MIPS	M-Area Inactive Process Sewer
MIPSL	M-Area Inactive Process Sewer Line
313-MIPS	313-M Inactive Process Sewer
NBN	no building number
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
OU	operable unit
PCE	tetrachloroethylene
PCM	Post-Closure Manager
PCR	Post-Construction Report
QA	Quality Assurance

LIST OF ACRONYMS AND ABBREVIATIONS (Continued)

RA	remedial action
RCRA	Resource Conservation and Recovery Act
RFI/RI	RCRA Facility Investigation/ Remedial Investigation
RG	remedial goal
RGO	remedial goal option
ROD	Record of Decision
SCDHEC	South Carolina Department of Health and Environmental Control
SGCP	Soil and Groundwater Closure Projects
SRS	Savannah River Site
SVE	soil vapor extraction
TCE	trichloroethylene
TCA	trichloroethane
USDOE	United States Department of Energy
USEPA	United States Environmental Protection Agency
VOC	volatile organic compound
WSRC	Washington Savannah River Company, LLC

1.0 INTRODUCTION

This Land Use Control Implementation Plan (LUCIP) has been prepared for the M-Area Inactive Process Sewer Lines Operable Unit (081-M) (MIPSL OU) at the Savannah River Site (SRS). The MIPSL OU includes approximately 1,158 m (3,800 ft) of underground sewer pipe, with diameters ranging in size from 30.5 to 76 cm (12 to 30 inches) and pipe depths ranging from about 2.1 to 3.7 m (7 to 12 ft) below ground surface (bgs), with pre-cast or brick manholes spaced approximately 107 to 122 m (350 to 400 ft) apart. The anticipated future land use for the MIPSL OU is industrial. The purpose of the LUCIP is to describe how the land use controls (LUCs) selected in the MIPSL OU Record of Decision (ROD) (WSRC 2006a) will be implemented and maintained. The following LUC objectives have been selected for this OU:

- prevent unauthorized contact, removal, or excavation of contaminated media (i.e., vadose zone soils and pipelines) in the OU areas designated in this LUCIP;
- maintain the use of the site for industrial activities only;
- prevent unauthorized access to the closed Resource Conservation and Recovery Act (RCRA) / Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) unit as long as the waste remains a threat to human health or the environment; and
- prevent unauthorized residential or agricultural access to groundwater until cleanup levels i.e., maximum contaminant levels, are met (under the RCRA program).

Current access controls and deed notification needed to maintain the future land use are described in the following sections of this LUCIP.

The selected remedy leaves hazardous substances in place that pose a potential future risk and will require land use restrictions until the concentrations of hazardous substances in the soil and groundwater are at levels that allow for unrestricted use. As agreed on March 30, 2000, among the United States Department of Energy (USDOE), the United States Environmental Protection Agency (USEPA), and South Carolina Department of Health and Environmental Control

(SCDHEC), SRS is implementing a Land Use Control Assurance Plan (LUCAP) to ensure that the LUCs required by numerous remedial decisions at SRS are properly maintained and periodically verified. The requirements of that LUCAP also apply to the LUCs that were selected as part of the remedial action (RA) for the MIPSL OU. This additional document, the MIPSL OU LUCIP, contains the detailed and specific measures required to implement and maintain the LUCs selected as part of this particular remedial decision. The LUCs shall be maintained until the OU is suitable for unlimited exposure and unrestricted use. Approval by USEPA and SCDHEC is required for any modification or termination of the institutional controls (ICs).

USDOE is responsible for implementing, maintaining, monitoring, reporting, and enforcing the LUCs in accordance with the approved LUCIP. Upon final approval, the LUCIP will be appended to the LUCAP and should be considered incorporated by reference into the MIPSL OU ROD (WSRC 2006a), establishing implementation and maintenance requirements for the LUCs under the CERCLA and the SRS Federal Facility Agreement (FFA) (FFA 1993). The LUCIP will remain in effect unless and until modifications are approved by USEPA and SCDHEC as necessary for protection of human health and the environment. This LUCIP will be evaluated for accuracy during the five-year remedy review and any approved LUCIP modification will be appropriately documented for incorporation by reference into the MIPSL OU ROD.

1.1 Format of LUCIP

The format of this LUCIP is consistent with the FFA protocol format approved by the USEPA and SCDHEC in March 2004.

2.0 OVERVIEW OF MIPSL OU REMEDIAL ACTION

2.1 General Description and History of the Unit

SRS occupies approximately 803 square kilometers (310 square miles) of land adjacent to the Savannah River, principally in Aiken and Barnwell counties of South Carolina. SRS is located approximately 40 kilometers (25 miles) southeast of Augusta, Georgia, and 32 kilometers (20

miles) south of Aiken, South Carolina. M Area is located in the northwest portion of SRS (Figure 1).

The MIPSL OU comprises portions of the M-Area Settling Basin Inactive Process Sewer to Manhole 1 (MIPS; Building Number 081-M) (including the Southern Portions of the 313-M Inactive Clay Process Sewer Lines to Tims Branch, No Building Number [NBN] and the Southern Portions of the 320-M Inactive Clay Process Sewer Lines from the Building Slab to the Former Security Fence, NBN [313-MIPS]). This includes the segment of pipe from the slab of the 320-M Alloy Building to the Former Security Fence (passing through Manholes 3A, 2A, 1N, 1A, and 1) and the segment of pipeline starting adjacent to the slab of the 322-M Metallurgical Laboratory (starting just south of the pipeline between 322-M and Manhole 6A) and extending to the A-014 Outfall (passing through Manholes 8, 9, 10, 11, 12, 13, and 14) (Figure 2).

From 1958 until the early 1985, several M-Area facilities (313-M, 320-M, and 321-M) manufactured reactor fuel and target assemblies. Associated operations included support buildings, maintenance operations, laboratories, and infrastructure for managing waste. Effluents from M Area were transported through two separate networks of vitrified clay pipes (Figure 2). The MIPS network discharged waste to the M-Area Settling Basin, and the 313-MIPS network released waste to the A-014 Outfall, which flowed to a tributary of Tims Branch. In May 1982, the 313-MIPS process waters were diverted from Tims Branch to conjoin with MIPS process waters already flowing to the M-Area Settling Basin, increasing the flow from an average of 1.6 to 3 million liters per day (430,000 to 800,000 gallons per day). In November 1982, process waters from 313-MIPS were redirected back to Tims Branch through the A-014 Outfall, resulting in a reduction of the flow to the M-Area Settling Basin to 950,000 liters per day (250,000 gallons per day) by the end of 1982.

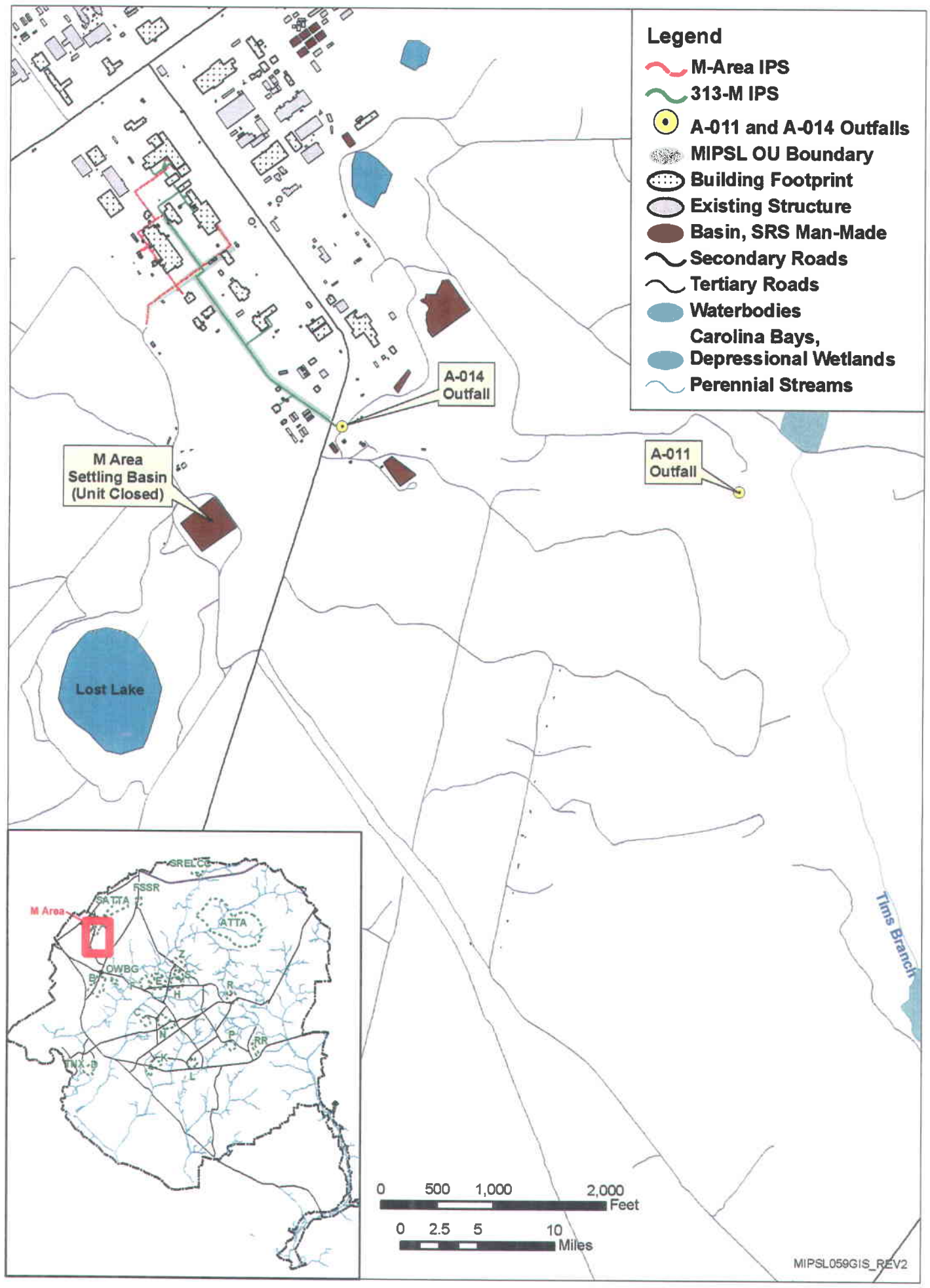


Figure 1. Location of the MIPSL OU in M Area within the Savannah River Site

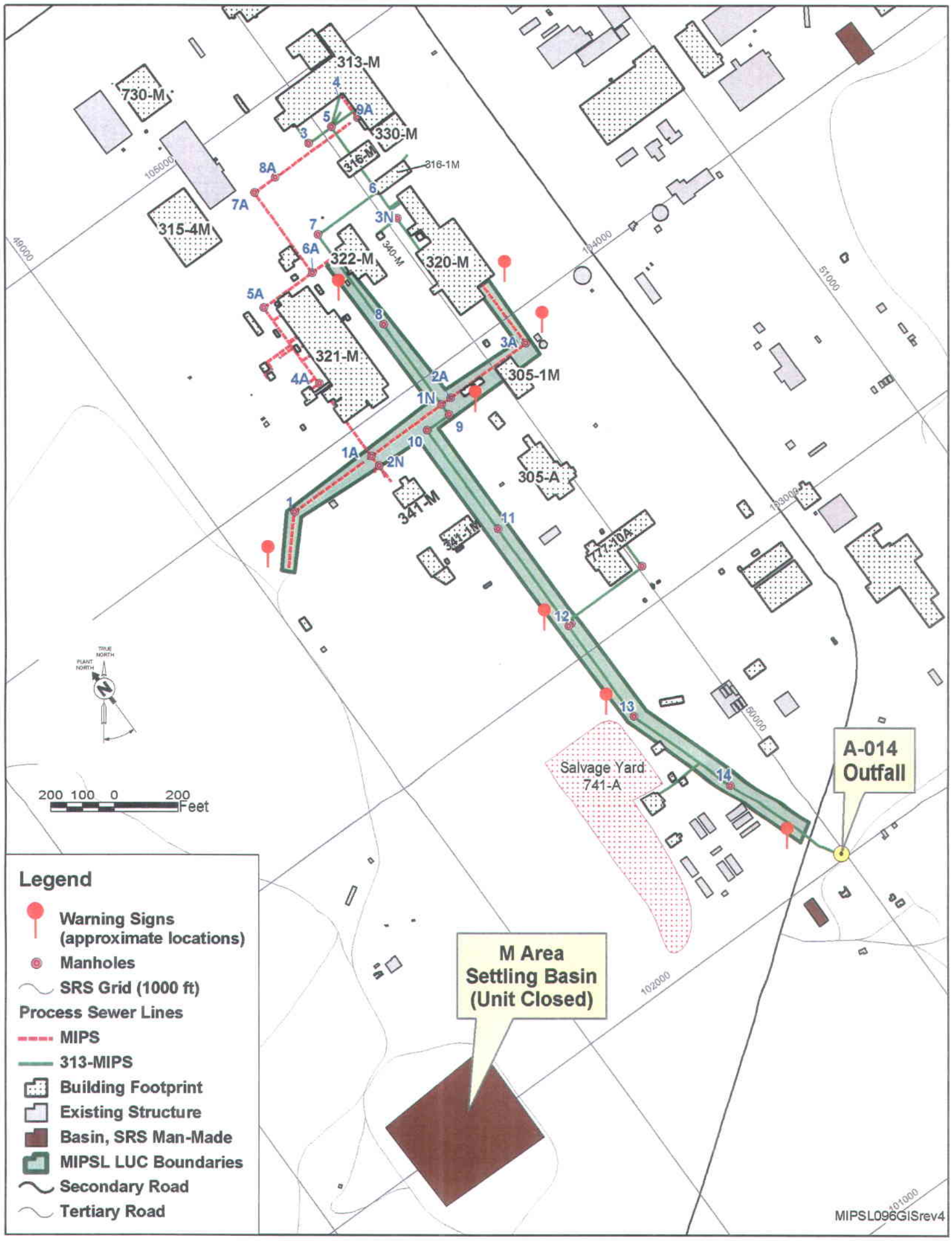


Figure 2. Layout of the MIPSL OU

The MIPSL OU includes approximately 1,158 m (3,800 ft) of underground piping [391 m (1,283 ft) of the MIPS and 768 m (2,520 ft) of 313-MIPS] and extends from the edges of the buildings (or former buildings) to the downstream discharge points of each line (Figure 2). Sewer pipes are made of vitrified clay, with diameters ranging from 30.5 to 76 cm (12 to 30 in) and pipe depths ranging from about 2.1 to 3.7 m (7 to 12 ft) below ground surface (bgs). High density polyethylene (HDPE) pipe liner, installed inside portions of the MIPS and 313-MIPS pipelines in 1983, ranges from 15 to 30 cm (6 to 12 in) in diameter.

Pre-cast concrete or brick manholes along the MIPS and 313-MIPS allowed access to the pipelines for inspection, maintenance, effluent sampling, etc. The manholes are spaced approximately 107 to 122 m (350 to 400 ft) apart along the MIPS and 313-MIPS sewer lines. An engineering review examined the construction, effluent capacity, and operational history for the MIPS and 313-MIPS and found little probability of process overflows at the manholes.

M-Area effluent wastes included chlorinated solvents (used for degreasing fuel and target assemblies), acids, caustics, heavy metals, and minor amounts of radioactive constituents. Specific constituents of interest include trichloroethylene (TCE), tetrachloroethylene (PCE), 1,1,1-trichloroethane (1,1,1-TCA), aluminum, copper, iron, lead, magnesium, manganese, mercury, nickel, zinc, and uranium.

2.2 Nature and Extent of Contamination

The primary contaminant release mechanism at the MIPSL OU is leakage of effluents from the process sewer lines serving multiple facilities in the M Area. Surficial soils in the M Area consist of fine-grained sediments to a depth of approximately 9 m (30 ft). This low permeability formation is referred to as the Upland Unit. More permeable sediments and sands with some clay lenses extend downward to the water table at a depth of approximately 36.6 m (120 ft) below the surface. The Upland Unit has limited contaminant mobility to a significant degree although volatile organic compounds (VOCs) have migrated downward, principally by diffusion from the source zone.

Because the inactive process sewer line and associated contamination are located at depths greater than 1.2 m (4 ft) bgs, there are no potentially exposed human or ecological receptors under current and future land use scenarios. Soil contaminant levels at depths greater than 1.2 m (4 ft) bgs do not exceed the threshold levels for toxicity risk to industrial workers. PCE and TCE have been determined to be contaminant migration constituents of concern (CMCOCs) at the MIPSL OU. PCE and/or TCE were found at concentrations exceeding remedial goals (RGs) at four manholes within the MIPSL OU. RGs are listed in Table 1. Although the proposed RA is intended to prevent the leaching of contaminants from deep soil to underlying aquifers, groundwater is not considered part of the MIPSL OU. Any groundwater contaminated by the MIPSL OU will be addressed by the SRS RCRA Part B Permit.

Table 1. Summary of Remedial Goals for the MIPSL OU

Refined COCs							
	Units	**Maximum Detected Value**	**ARAR RGO**	**CM RGO[a]**	**HH RGO**	**ECO RGO**	**Final RG[b]**
Tetrachloroethylene (PCE)	mg/kg	0.767	--	0.307	--	--	0.307
Trichloroethylene (TCE)	mg/kg	0.411	--	0.0408	--	--	0.0408

Notes:

[a] Contaminant migration (CM) RGO was calculated in Appendix G for the MIPSL combined document (WSRC 2005).

[b] Final RG is based upon the most conservative (smallest) calculated RGO presented in the table.

HH = human health; RGO = remedial goal option; ECO = ecological, ARAR = applicable or relevant and appropriate requirements

mg/kg = milligram per kilogram

The selected remedy for the MIPSL OU leaves hazardous substances in place that pose a potential future risk and will require land use restrictions until the concentrations of hazardous substances in the soil and groundwater are at levels that allow for unrestricted use and exposure.

2.3 Remedial Action Selected

The selected RA established in the ROD is based on an evaluation of potential alternatives performed in accordance with the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) and the CERCLA (as amended).

As stated in the ROD (WSRC 2006a), the selected RA for the MIPSL OU is Alternative S-2, Phased Soil Vapor Extraction Enhanced with Soil Fracturing and Institutional Controls. This includes the following elements:

- Soil Vapor Extraction – Four soil vapor extraction (SVE) wells will be installed, one at each of the four manholes where VOC contamination has been detected above RGs. The wells will enable the removal of mobile VOCs, which have leaked into the Upland Unit, as well as VOCs that have migrated downwards toward the water table by diffusion.

- Hydraulic Fracturing - The permeability of the Upland Unit at each SVE well will be enhanced by hydraulic fracturing using a sand amendment. The increased permeability will provide pathways for air flow through a larger portion of the contaminated soil at each SVE well allowing higher air flows and more rapid contaminant removal. This will reduce the time required to achieve the RGs.

- Grout Plugs – The process sewer connections at all of the manholes and the sewer discharge point at the A-014 Outfall will be plugged and the manholes will be filled with grout. This will permanently isolate the abandoned sewer line from future access by human or ecological receptors.

- Institutional Controls - The necessary land use controls described in the Record of Decision (WSRC 2006a) are provided in the Land Use Control Implementation Plan (LUCIP) for MIPSL OU (WSRC-RP-2006-4068). Institutional controls will consist of site maintenance (site inspections, mowing, general housekeeping, repair of erosion damage, and other routine maintenance as needed) and access controls (warning signs and land use restrictions). Institutional controls will include continued use of SRS's Site Use and Site Clearance Programs to restrict disturbance of the site and to prevent drinking water use of contaminated groundwater under each unit.

- CERCLA ROD RA Reviews - The ROD RA will be reviewed every five years to ensure that the selected remedy remains protective of human health and the environment.

RGs are target cleanup criteria. RGs are provided in Table 1.

The post-RA conceptual site model (see Appendix C to this LUCIP) shows the broken contaminant migration to groundwater pathways after removal of the source.

According to the *Savannah River Site Future Use Project Report* (USDOE 1996), residential use of SRS land should be prohibited.

3.0 LAND-USE CONTROL OBJECTIVES

The following MIPSL OU LUC objectives have been developed to ensure the protectiveness of the remedy described above:

- restrict worker access and prevent unauthorized contact, removal or excavation of contaminated media (i.e., vadose zone soils and pipelines);
- prohibit the development and use of property for residential housing, elementary schools, child care facilities and playgrounds;
- maintain the integrity of any current or future remedial or monitoring system such as SVE systems or groundwater monitoring wells; and
- prevent access to or use of the groundwater until cleanup levels, i.e., maximum contaminant levels, are met (under the RCRA program).

Current access controls and deed notification needed to maintain the future land use are described in the following sections of this LUCIP.

4.0 IMPLEMENTATION OF LAND-USE CONTROLS

This section describes the LUCs selected in the ROD to achieve the objectives stated in Section 3.0. USDOE is responsible for implementing, maintaining, reporting on, and enforcing the LUCs required for the MIPSL OU. A summary of the types of controls is provided in Table 2. USDOE will implement and maintain the LUCs required for the MIPSL OU. The LUCIP will become enforceable and will be implemented when approved by USEPA and SCDHEC and following the completion of the RA prescribed by the MIPSL OU ROD. USDOE shall notify

USEPA and SCDHEC 60 days in advance of any proposed land use changes that are inconsistent with LUC objectives or the selected remedy.

The MIPSL OU will be maintained as an industrial use area by implementation of the property record notices (Section 4.1) and restrictions (Section 4.2), and the use of a certified LUC survey plat (Section 4.3).

The Site Use Program (Section 4.4) will be implemented to prevent onsite worker exposure to contamination left in place at the MIPSL OU. Other existing measures (i.e., Site Clearance Program, worker training, health and safety requirements, work controls) will also be used to ensure worker safety at the MIPSL OU.

Physical access controls (Section 4.5) are implemented at the SRS boundary to control and restrict public and trespasser access to the MIPSL OU.

Signs at the MIPSL OU will be maintained to alert onsite workers to the presence of underground sewer lines that once conveyed hazardous substances. The signs will also convey the restrictions of unauthorized personnel. Access control warning signs will be placed and maintained around the general M Area (which surrounds the MIPSL OU) to prevent unknowing entry and unrestricted use of the larger M-Area waste unit.

Table 2. Land Use Controls for the MIPSL Operable Unit

Type of Control	Purpose of Control	Duration	Implementation	Affected Areas[a]
1. Property Record Notices[b]	Provide notice to anyone searching records about the existence and location of contaminated areas.	Until the concentration of hazardous substances associated with the unit have been reduced to levels that allow for unlimited exposure and unrestricted use.	Notice recorded by USDOE in accordance with state laws at County Register of Deeds office if the property or any portion thereof is ever transferred to non-federal ownership.	All waste management areas and other areas where hazardous substances are left in place at levels requiring land use and/or groundwater restrictions
2. Property record restrictions[c]: a. Land Use b. Groundwater	Restrict use of property by imposing limitations. Prohibit the use of groundwater.	Until the concentration of hazardous substances associated with the unit have been reduced to levels that allow for unlimited exposure and unrestricted use.	Drafted and implemented by USDOE upon any transfer of affected areas. Recorded by USDOE in accordance with state law at County Register of Deeds office.	All waste management areas and other areas where hazardous substances are left in place at levels requiring land use and/or groundwater restrictions
3. Other Notices[d]	Provide notice to city &/or county about the existence and location of waste disposal and residual contamination areas for zoning/planning purposes.	Until the concentration of hazardous substances associated with the unit have been reduced to levels that allow for unlimited exposure and unrestricted use.	Notice recorded by USDOE in accordance with state laws at County Register of Deeds office if the property or any portion thereof is ever transferred to non-federal ownership.	All waste management areas and other areas where hazardous substances are left in place at levels requiring land use and/or groundwater restrictions
4. Site Use Program[e]	Provide notice to worker/developer (i.e., permit requestor) on extent of contamination and prohibit or limit excavation/penetration activity.	As long as property remains under USDOE control.	Implemented by USDOE and site contractors. Initiated by permit request.	Remediation systems, all waste management areas, and areas where levels requiring land use and / or groundwater restrictions

Table 2. Land Use Controls for the MIPSL Operable Unit (Continued)

Type of Control	Purpose of Control	Duration	Implementation	Affected Areas[a]
5. Physical Access Controls[f] (e.g., fences, gates, portals)	Control and restrict access to workers and the public to prevent unauthorized access.	Until the concentration of hazardous substances associated with the unit have been reduced to levels that allow for unlimited exposure and unrestricted use.	Controls maintained by USDOE.	At select locations throughout SRS
6. Warning Signs[g]	Provide notice or warning to prevent unauthorized uses.	Until the concentration of hazardous substances associated with the unit have been reduced to levels that allow for unlimited exposure and unrestricted use.	Signage maintained by USDOE.	At select locations throughout SRS
7. Security Surveillance Measures	Control and monitor access by workers/public.	Until the concentration of hazardous substances associated with the unit have been reduced to levels that allow for unlimited exposure and unrestricted use.	Established and maintained by USDOE. Necessity of patrols evaluated upon completion of RAs.	Patrol of selected area throughout SRS, as necessary

[a] Affected areas – Specific locations identified in the SRS LUCIP or subsequent post-ROD documents.

[b] Property Record Notices – Refers to any non-enforceable, purely informational document recorded along with the original property acquisition records of USDOE and its predecessor agencies that alerts anyone searching property records to important information about residual contamination; waste disposal areas in the property.

[c] Property Record Restrictions – Includes conditions and/or covenants that restrict or prohibit certain uses of real property and are recoded along with original property acquisition records of USDOE and its predecessor agencies.

[d] Other Notices – Includes information on the location of waste disposal areas and residual contamination depicted on as survey plat, which is provided to a zoning authority (i.e., city planning commission) for consideration in appropriate zoning decisions for non-USDOE property.

[e] Site Use Program – Refers to the internal USDOE/USDOE contractor administrative program(s) that requires the permit requestor to obtain authorization, usually in the form of a permit, before beginning any excavation/penetration activity (e.g., well drilling) for the purpose of ensuring that the proposed activity will not affect underground utilities/structures, or in the case contaminated soil or groundwater, will not disturb the affected areas without the appropriate precautions and safeguards.

[f] Physical Access Controls – Physical barriers or restrictions to entry.

[g] Signs – Posted command, warning or direction.

4.1 Property Record Notices

In the long term, if the property is ever transferred to non-federal ownership, the United States 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 RAs taken on the site. The contract for sale and the deed will contain the notification required by CERCLA Section 120(h).

The deed notification shall notify any potential purchaser that the property has been used for the management and disposal of waste. These requirements are also consistent with the intent of RCRA deed notification requirements at final closure of a RCRA facility if contamination will remain at the unit.

4.2 Property Record Restrictions

The deed shall also include deed restrictions precluding residential use of the property and/or any other property record restrictions necessary to achieve the LUC objectives. The deed shall contain provisions to ensure that appropriate LUCs remain with the affected area upon any and all transfers. USDOE shall provide a copy of the executed deeds to the regulatory agencies as soon as practicable after the transfer of fee title, but no later than 30 days. However, the need for these deed restrictions may be re-evaluated 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 re-evaluation of the need for the deed restrictions will be done through an amended ROD.

USDOE shall provide USEPA and SCDHEC six months' notice prior to transfer to ensure that USEPA and SCDHEC can be involved in discussions to ensure that appropriate provisions are included in the transfer terms or conveyance documents to maintain effective ICs. If it is not possible for the facility to notify USEPA and SCDHEC at least six months prior to any transfer or sale, then the facility will notify USEPA and SCDHEC as soon as possible but no later than 60 days prior to the transfer or sale of any property subject to ICs. In addition to the land

transfer notice and discussion provisions above, USDOE further agrees to provide USEPA and SCDHEC with similar notice within the same time frames as to federal to federal transfer of property.

4.3 Other Public Notices

The LUCIP identifies the proposed area under land use restrictions via Figure 2 for the MIPSL OU and the final survey plat (when available) located in Appendix A. After construction completion, a final survey plat will be prepared to document the as-built arrangement of the ICs and area subject to LUCs. The drawing will present a polygon of the MIPSL OU subject to LUCs, including the benchmarks, the location of warning signs, access control points and other information for LUCs. This post-construction survey plat will be certified by a professional land surveyor and will be submitted to USEPA and SCDHEC concurrently with the Post-Construction Report (PCR).

In addition, if the site is ever transferred to non-federal ownership, a professional land surveyor-certified survey plat of the OU will be prepared at or near the time of conveyance to support the LUCIP required restrictive covenants on land use and will be recorded with the appropriate county recording agency.

4.4 Site Use Program

Under DOE Order 430.1A, *Life Cycle Management*, SRS is required to implement an asset management program for the use, maintenance, and disposal of physical assets, including real estate. SRS complies with this order through its Site Use Program, which is conducted in accordance with WSRC 1D, *Site Infrastructure and Services Manual*, Procedure 3.02, "Site Real Property Configuration Control" (WSRC 2006b). All employees, contractors, and visitors at SRS are required to adhere to the Site Use Program. No use of land (i.e., excavation or any other land use) shall be undertaken without prior approval documented by a Site Use Permit. Also, in accordance with WSRC 1D, Procedure 3.02, all work at SRS that adds to or modifies features or facilities portrayed on SRS development maps (i.e., plot plans of facilities/utilities at SRS) will be authorized by a Site Clearance Permit before any activities are conducted. All Site Clearance

Requests will be reviewed to verify that either an approved Site Use Permit has been obtained or that the request is sanctioned by an existing Site Use Permit. All land use requirements applicable for the OU will be provided to the Site Use Program for use in determining issuance of Site Clearance Permits. In addition, the Site Use Permit must be amended when the geographic configuration or buffer zone used to establish the permit boundary changes or there is a change to the permitted land use.

SRS is responsible for updating, maintaining, and reviewing site maps, including FFA (FFA 1993) OU identifications. If a Site Clearance Request potentially impacts an FFA OU, the Site Clearance Request Form is sent to the appropriate FFA OU reviewer for approval. The roles and responsibilities of each individual are detailed in WSRC 1D, Procedure 3.02. Before a Site Clearance Permit is issued, verification of USDOE approval for intended land use must be obtained. The site use and site clearance processes are applicable to all activities and personnel on site (including subcontractors). USEPA and SCDHEC will be notified in advance of any changes to the Site Use Program that impacts actual land use requirements. The processes are controlled within the SRS Quality Assurance (QA) Program in accordance with WSRC 1Q Manual, *Quality Assurance* (WSRC 2003). The SRS QA program governs all SRS activities.

SRS identifies all buildings and facilities on maps used in the Site Use Program. This waste unit is identified on these maps as a CERCLA facility.

Any work proposed in these areas will be strictly controlled, and workers will be appropriately trained and briefed about health and safety requirements if work is deemed necessary for maintenance. No change in land use or excavation at the MIPSL OU shall be undertaken without USEPA and SCDHEC approval. Approval by USEPA and SCDHEC is required for any modification or termination of the institutional controls and implementation actions, and USDOE must obtain approval from USEPA and SCDHEC that a proposed new land use is sufficiently protective.

4.5 Physical Access Controls

There are no physical access controls required at the MIPSL OU; however, physical access controls are provided at the SRS boundary as mentioned in Table 2, item 5.

4.6 Warning Signs

To prevent unknowing entry and to ensure that unrestricted use of the waste unit does not occur while the unit is under ownership of the government, access control warning signs will be posted at the unit as shown in Appendix D. The signs shall be legible for a distance of at least 25 feet.

Custodial responsibilities for maintenance and inspection of the MIPSL OU will be maintained by Post-Closure Maintenance Group within Soil and Groundwater Closure Projects (SGCP).

4.7 Other Access Controls and Security/Surveillance Measures

While under the ownership of USDOE, access control of the entire SRS will be maintained in accordance with the 2000 RCRA Part B Permit Renewal Application, Volume I, Section F.1. This section describes the 24-hour surveillance system (R.61-79.264.14(b)(1)), artificial or natural barriers (R.61-79.264.14(b)(2)(I)), control entry systems (R.61-79.264.14(b)(2)(ii)), and access control warning signs (R.61-79.264.14(c)) in place at the SRS boundary to comply with the security requirements for a RCRA-permitted facility.

4.8 Field Inspection and Maintenance for Institutional Controls

After remediation of the MIPSL OU, only inspection and maintenance activities will be required by the RA.

The MIPSL OU will be inspected per the Field Inspection Checklist in Appendix B. Field inspections will be performed annually. Additional inspections may be necessary in the event of unusual weather or any other condition warranting inspection. For the MIPSL OU, inspections

will be performed to ensure that signs are in place and that pipeline and manhole plugs are intact. Inspection records will be kept in the operations record file for future access.

Maintenance (including site inspections, mowing, general housekeeping, and repair of erosion damage) will be performed as needed at MIPSL OU. Necessary upkeep of the access control signs for MIPSL OU will be performed.

USEPA and SCDHEC will be notified within 30 days of identification by USDOE of any events and/or actions that indicate potential compromise of the ICs, including any activity that is inconsistent with the IC objectives or use restrictions, or any other action that may interfere with the effectiveness of the ICs and the proposed action to address the potential compromise. The FFA Annual Progress Report, submitted to the regulatory agencies by the USDOE, will provide the status of the ICs and describe how any IC deficiencies or inconsistent uses have been addressed. In the event of property transfer or lease, the Annual Report will cite findings on the following: whether the use restrictions and controls referenced above were communicated in the deed(s) or lease restrictions; whether property use conforms with the deed or lease restrictions and controls; and whether the owners and state/local agencies have been notified regarding the deed or lease restrictions and controls.

All other routine maintenance activities will be documented and maintained in files subject to USEPA and SCDHEC review and audit. A copy of the completed inspection form is maintained in the SGCP Document Control. The LUCs shall be maintained until the concentration of hazardous substances associated with the unit have been reduced to levels that allow for unlimited exposure and unrestricted use.

The waste unit inspectors are to be trained in Hazardous Waste Operations and Emergency Response (HAZWOPER), RCRA Well Inspections (SGCP-specific training), SGCP RCRA Waste Unit Inspections, Radiological Worker Training, etc., as applicable for the specific inspection. They will also be trained based on the individual requirements of the regulatory approved closure documents for each waste unit. In addition, the inspectors are to attend yearly

refresher courses. Over the years, different personnel may conduct the inspections and grass cutting operations.

This unit-specific LUCIP, including the checklist (Appendix B), will be appended to the SRS LUCAP upon final regulatory approval. After completion of the PCR, the preliminary checklist in the LUCAP will be replaced with the final approved checklist.

5.0 REFERENCES

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

USDOE, 1996. *Savannah River Site Future Use Project Report*, Stakeholder-Preferred Recommendations for SRS Land and Facilities, USDOE Savannah River Operations Office, January

WSRC, 2003. WSRC Procedure Manual 1Q, *Quality Assurance (U)*, Westinghouse Savannah River Company, Savannah River Site, Aiken, SC

WSRC, 2005. *RCRA Facility Investigation/Remedial Investigation (RFI/RI) Work Plan, RFI/RI Report with Baseline Risk Assessment, and Corrective Measures Study/Feasibility Study (CMS/FS) for the M Area Inactive Process Sewer Lines (081-M) (U),* WSRC-RP-2004-4214, Revision 1.1, Westinghouse Savannah River Company, Savannah River Site, Aiken, SC

WSRC, 2006a. *Record of Decision Remedial Alternative Selection for the M Area Inactive Process Sewer Lines Operable Unit (081-M) (U)*, WSRC-RP-2006-4001, Revision 0, Washington Savannah River Company, Aiken, SC

WSRC, 2006b. WSRC Procedure Manual 1D, *Site Infrastructure and Services Manual (U)*, Procedure 3.02, "Site Real Property Configuration Control," Westinghouse Savannah River Company, Savannah River Site, Aiken, SC

APPENDIX A - As-Built Drawings

LAND USE CONTROL IMPLEMENTATION PLAN

(Drawing to be provided at a later date.)

APPENDIX B - Field Inspection Checklist

FOR THE M-AREA INACTIVE PROCESS SEWER LINES OPERABLE UNIT

FIELD INSPECTION CHECKLIST

FOR THE M-AREA INACTIVE PROCESS SEWER LINES OPERABLE UNIT

☐ **SCHEDULED** ☐ **UNSCHEDULED**

A= Satisfactory X= Unsatisfactory (Explanation required)	A or X	Observation of Corrective Action Taken
1. Verify that roads are accessible.		
2. Verify that the waste unit signs (quantity to be inserted later) are in acceptable condition, have the correct information, and are legible from a distance of 25 feet. Verify that roads are acceptable.		
3. Verify that there are no excavation, digging, or construction activities over the underground sewer lines, at the sewer outlet at the A-014 Outfall, or at the manholes. Verify that pipelines and manhole plugs are intact.		

Inspected by:

_____ / _____ Date:_____
(Print Name) (Signature)

Post-Closure Manager:

_____ / _____ Date:_____
(Print Name) (Signature)

CAUTION: The inspector shall notify the Post-Closure Manager (PCM) and Environmental Compliance Authority (ECA) **IMMEDIATELY** if there has been a breach or compromise of the ICs of this waste unit. The notification shall be in accordance with SRS post-closure inspection procedures.

NOTE: Monitoring wells associated with this waste unit are maintained in accordance with SGCP Monitoring Well Procedures.

APPENDIX C - Post-Remedial Action Conceptual Site Model

FOR THE M-AREA INACTIVE PROCESS SEWER LINES OPERABLE UNIT

POST-REMEDIAL ACTION

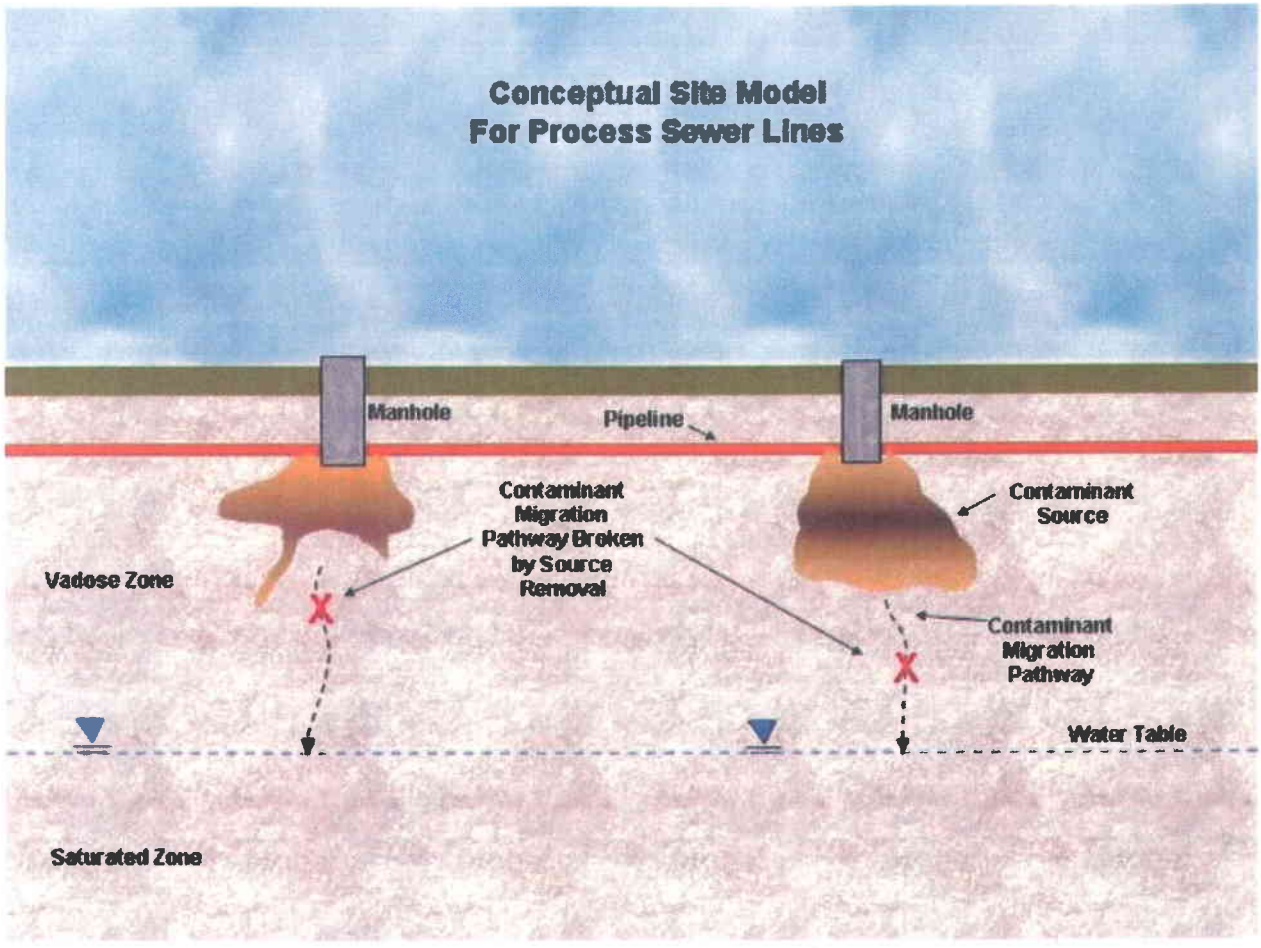


Figure C-1. Post-Remedial Action Conceptual Site Model for MIPSL OU

APPENDIX D - Access Control Warning Signs

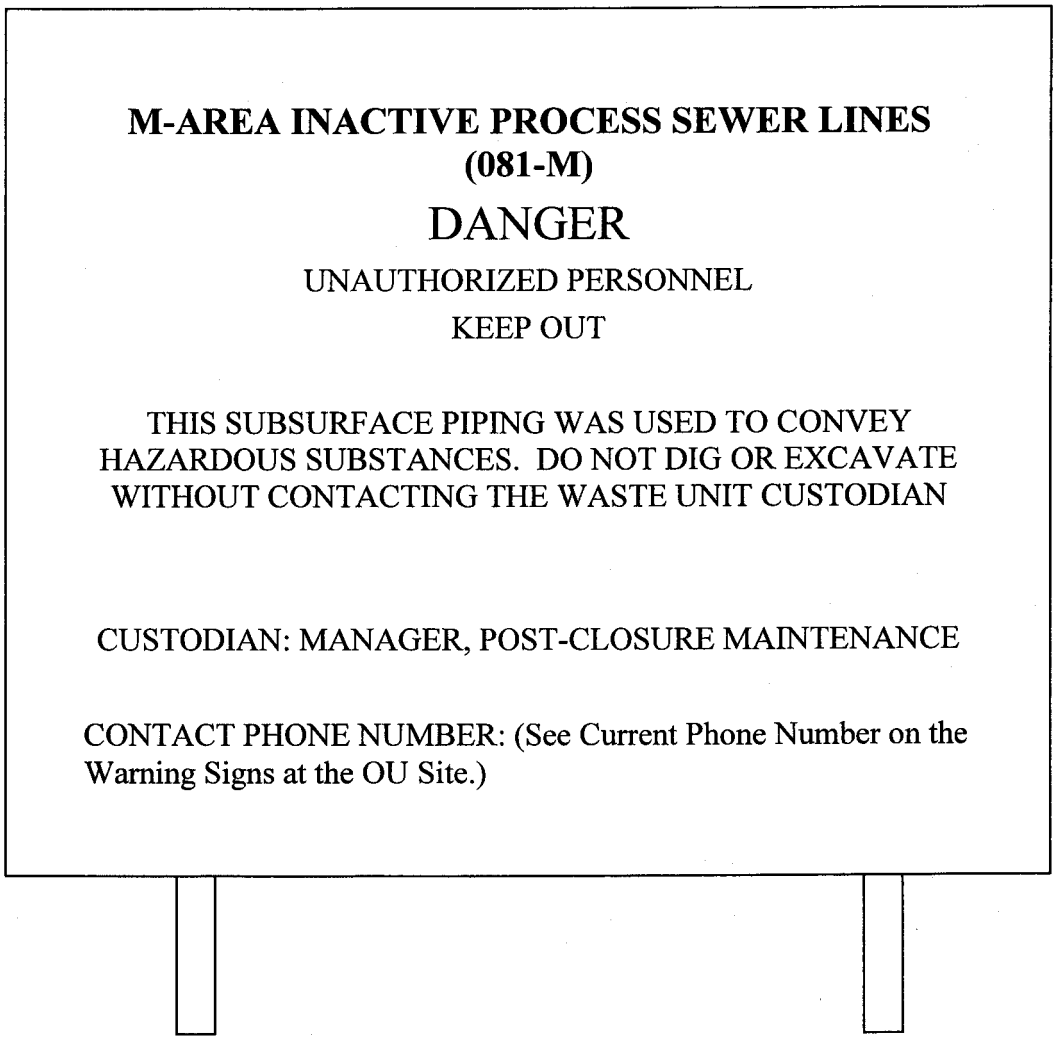


Figure D-1. Underground Piping Access Control Warning Sign

LUCIP for the D-Area Burning/Rubble Pits (431-D and 431-lD)
Section 2.0 of *Final Remediation Report for the*
D-Area Burning/Rubble Pits (431-D and 431-lD)
(WSRC-RP-97-406, Revision 1.1, March 1998)

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091847

United States Department of Energy

Savannah River Site

Final Remediation Report for the D-Area Burning/Rubble Pits (431-D and 431-1D) (U)

WSRC-RP-97-406
Revision 1.1
March 1998

Westinghouse Savannah River Company
Savannah River Site
Aiken, SC 29808

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

CERTIFICATION

FINAL REMEDIATION REPORT FOR THE
D-AREA BURNING/RUBBLE PITS
(431-D AND 431-1D)
Revision.1.1,WSRC-RP-97-406

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

Date: 6MAY98 Signature:

Richard R. Harbert
Vice President & General Manager
Environmental Restoration Division
Westinghouse Savannah River Company
Co-operator for the U.S. Dept. of Energy
Savannah River Operations

Date: 5/13/98 Signature:

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

DISCLAIMER

This report was prepared by Westinghouse Savannah River Company (WSRC) for the United States Department of Energy under Contract No. DE-AC09-96-SR18500 and is an account of work performed under that contract. Reference herein to any specific commercial product, process, or services by trademark, name, manufacturer or otherwise does not necessarily constitute or imply endorsement, recommendation, or favoring of same by WSRC or by the United States Government or any agency thereof.

Printed in the United States of America

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

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ACRONYMS

CERCLA	Comprehensive Environmental Response, Compensation and Liability Act, 1980
SCDHEC	South Carolina Department of Health and Environmental Control
DOE	United States Department of Energy
EPA	Environmental Protection Agency
DBRP	D-Area Burning Rubble/Pits
FFA	Federal Facility Agreement
MCL	Maximum Contaminant Level
RCRA	Resource Conservation and Recovery Act, 1976
ROD	Record of Decision
SRS	Savannah River Site
WSRC	Westinghouse Savannah River Company

1.0 GENERAL DESCRIPTION OF THE D-AREA BURNING/RUBBLE PITS (DBRP)

The D-Area Burning/Rubble Pits (431-D and 431-1D) (DBRP) comprise a RCRA/CERCLA source unit located within the Savannah River Site (SRS), approximately 2,600 feet west of D-Area and 1.6 miles west of State Highway 125 (Figure 1). The Savannah River is located about 0.6 miles west of the DBRP. The local topography of the area is flat and the pits are at an elevation of 130 feet above mean sea level and 45 feet above the Savannah River. The water table is approximately 10 feet below ground surface in the area of DBRP. Surface drainage is to the west-southwest toward an ephemeral tributary of the Savannah River.

The two parallel burning/rubble pits (Figure 2), which cover a total area of 0.54 acre, are designated as 431-D and 431-1D; a 15 foot wide berm of undisturbed soil separates these two pits. The approximate dimensions of 431-D are 257 feet by 46 feet by 10 feet deep, and the dimensions of 431-1D are 229 feet by 36 feet by 10 feet deep.

Between 1951 and 1973, burning pits were used at Savannah River Site to burn a variety of hazardous and non-hazardous waste (Figure 1). The chemical composition and volumes of the disposed waste are unknown. Combustible materials, which were burned monthly, included paper, plastics, wood, rubber, rags, cardboard, oil, degreasers, and spent organic liquids. No known or suspected radioactive materials were allowed in the burning pits.

Burning of waste in the SRS pits was discontinued by October, 1973. A layer of soil was then placed over the residue in the pits, and they were subsequently used as rubble pits. Materials allowed in the rubble pits generally included concrete, bricks, tile, asphalt, plastic, metal, empty drums, wood products, and rubber. When the DBRPs were filled to capacity in 1983 or were no longer needed, a 1 to 3 foot layer of clayey soil was placed over the contents and the surface was compacted and mounded above the surrounding terrain, which is essentially level, to enhance drainage. Vegetation was established to reduce erosion.

Contact information for DBRP is as follows:

Westinghouse Savannah River Company
Manager, Post Closure Maintenance
Aiken, SC 29808
(803) 952-6882

2.0 DESCRIPTION OF SELECTED REMEDY

The selected remedy for the DBRP source operable unit soils is Institutional Controls which will prohibit residential use of this area. Additional groundwater monitoring, as discussed in Section 2.5, will also be conducted. Based on the groundwater monitoring history, it has been determined that no significant groundwater contamination has originated from the DBRP. Thus, no remedial action and a period of continued monitoring for confirmation is judged as the most reasonable action for the groundwater at the DBRP. In the event that the condition of the local groundwater declines, the Department of Energy (DOE), the EPA, and the SCDHEC, will reevaluate the need for remedial action.

Implementation of this alternative will require both near- and long-term actions. For the near-term, signs will be posted indicating that this area was used to manage hazardous materials. In addition, existing SRS access controls will be used to prohibit residential use.

In the long-term, if the property is ever transferred from non-Federal ownership, the U. S. Government will create a deed for the new property owner in compliance with Section 120(h) of CERCLA. The deed will include notification disclosing former waste management and disposal activities, results from groundwater monitoring, and remedial actions taken on the site. The deed notification will, in perpetuity, notify any potential purchaser that the property has been used for the management and disposal of non-hazardous, inert construction debris, and that wastes containing hazardous substances, such as degreasers and organic liquids, were also managed and burned on the site. These requirements are also consistent with the RCRA deed notification required at final closure of the RCRA facility if contamination will remain on site. The deed will 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 contamination no longer poses an unacceptable risk under the residential use scenario. The Environmental Protection Agency (EPA) and the South Carolina Department of Health and Environmental Control (SCDHEC) will have to concur with this reevaluation before the deed restrictions are altered.

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

The SCDHEC has modified the SRS RCRA permit to incorporate the selected remedy.

This proposal is consistent with EPA guidance and is an effective use of risk management principles.

2.1 Deed Notification

A deed notification shall be filed in Barnwell County Records in accordance with CERCLA 120(h), which requires the government to create a deed when the land on which any hazardous substance was stored, released, or disposed is transferred to non-Federal ownership. Per CERCLA 120(h)(3)(A), the deed shall contain, to the extent practical, such information as is available based on the complete search of agency files:

- a notice of the type and quantity of such hazardous substances;
- notice of the time at which such storage, release, or disposal took place;
- a description of the remedial action taken, if any.

Per CERCLA 120(h)(3)(B), the deed shall also contain a covenant warranting that

- all remedial action necessary to protect human health and the environment with respect to any such substance remaining on the property has been taken before the date of such transfer;
- any additional remedial action found to be necessary after the date of such transfer shall be conducted by the United States Government;
- a clause granting the United States Government access to the property in any case in which remedial action or corrective action is found to be necessary after the date of such transfer.

This proposal is also consistent with the RCRA permit requirements to insure protection of human health and the environment by maintaining documentation of property restrictions and institutional control requirements by use of deed notification.

2.2 Access Controls

2.2.1 On-Site Workers

In accordance with WSRC 1D, *Site Infrastructure and Services Manual*, Procedure 3.02, *Site Real Property Configuration Control*, use of all lands and waters on the SRS shall be coordinated via the Site Use Program. No use of land (i.e., excavation or any other land use) shall be undertaken without prior approval documented by a Site Use Permit. Also, in accordance with Procedure 3.02, all work at SRS that adds to or modifies features or facilities portrayed on the SRS development maps (i.e., plot plans of facilities/utilities at SRS) is authorized by a Site Clearance Permit before execution. All Site Clearance requests are reviewed to verify that either an approved Site Use Permit has been obtained, or that the request has been sanctioned by an existing Site Use Permit. Verification of DOE approval for intended land use must be obtained before issuance of a Site Clearance Permit. The Site Use and Site Clearance processes are applicable to all activities and personnel on site (including subcontractors). The processes are controlled within the SRS Quality Assurance Program.

The SRS identifies all buildings and facilities on maps used in the Site Use/Site Clearance Program and includes a 200 foot buffer zone around each facility. This waste unit is identified on these maps as a RCRA/CERCLA facility.

Any work proposed in these areas will be strictly controlled and workers will be appropriately trained and briefed about health and safety requirements if work is deemed necessary for maintenance. Any changes in the use or disturbance of the DBRP will be cleared with the EPA and SCDHEC before the disturbance occurs. To prevent unknowing entry and to ensure that unrestricted use of the waste unit does not occur while under ownership of the government, identification signs will be posted at the waste unit access points (Figure 2). The signs will be legible from a distance of at least 25 feet. The signs will read:

Waste Unit Name, Building Number(s)

"Danger - Unauthorized Personnel Keep Out.
This waste unit was used to manage hazardous substances.
Do not dig or excavate. Do not enter without contacting the
the waste site custodian."
Custodian: Manager, Post Closure Maintenance

Phone: (803) 952-6882

Site specific access controls (i.e., fences) are not required for the DBRPs, since exposure to the casual worker or trespasser as calculated in the Baseline Risk Assessment does not justify this level of protection.

Figure 1
Location of D-Area
Burning/Rubble Pits

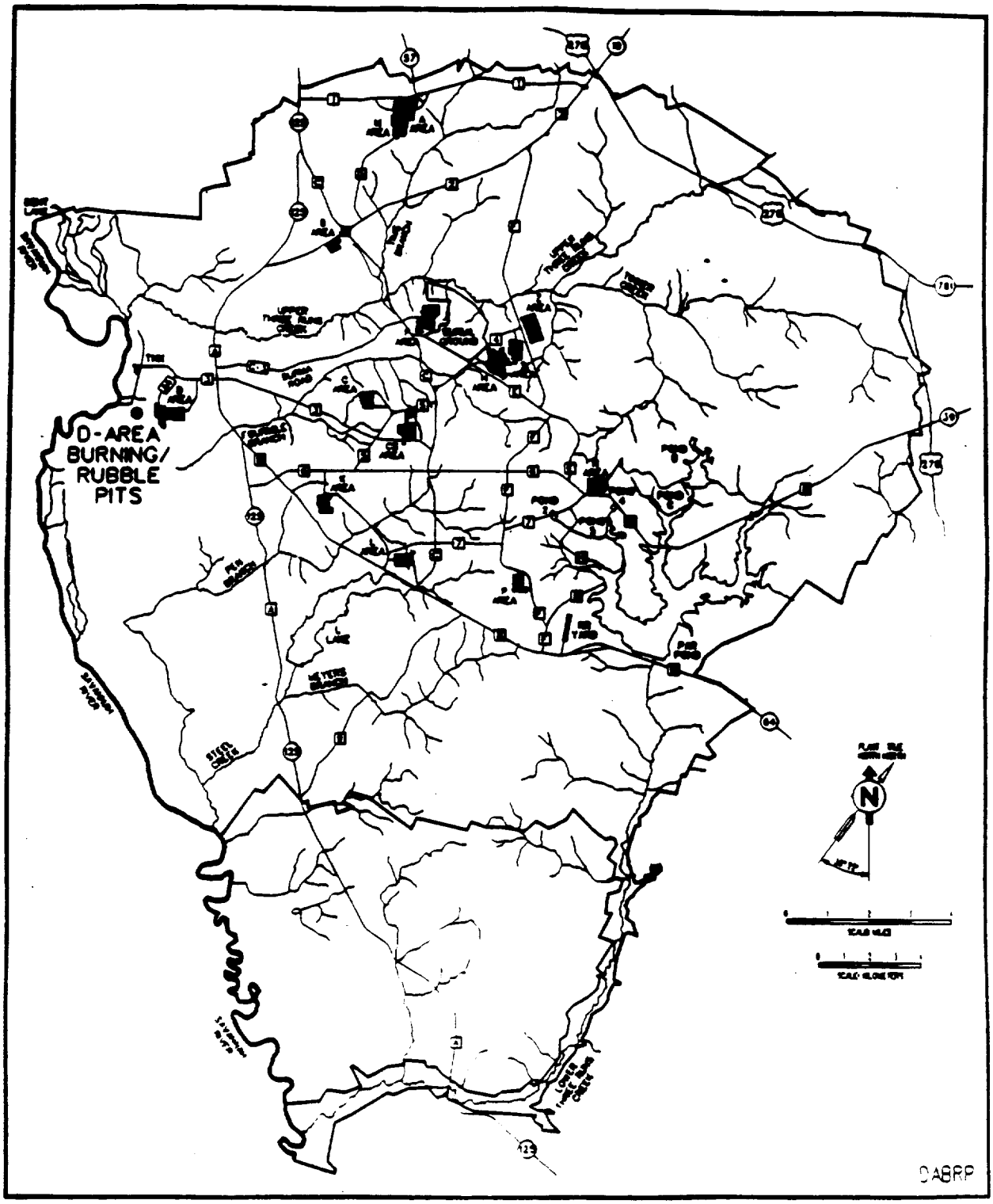
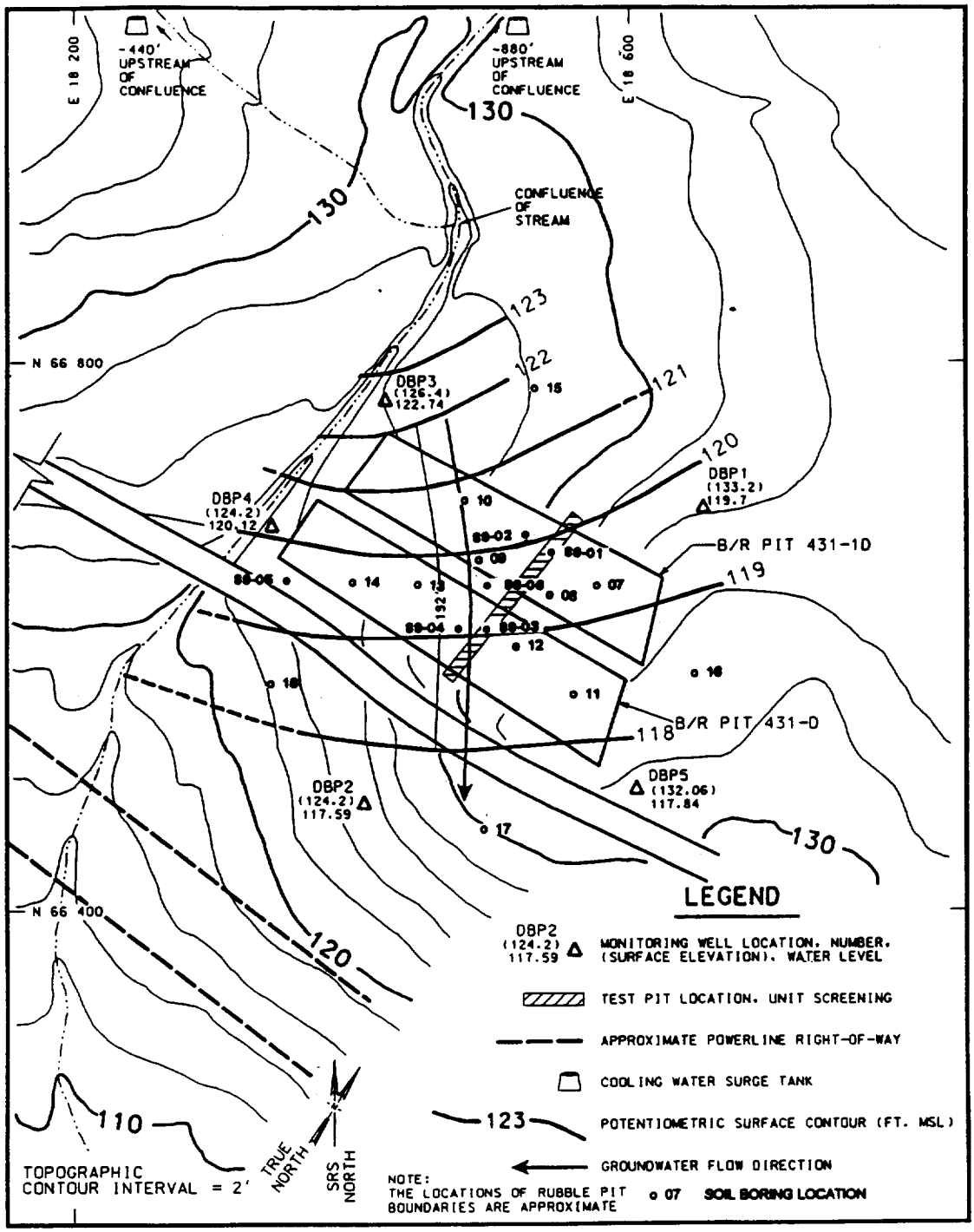
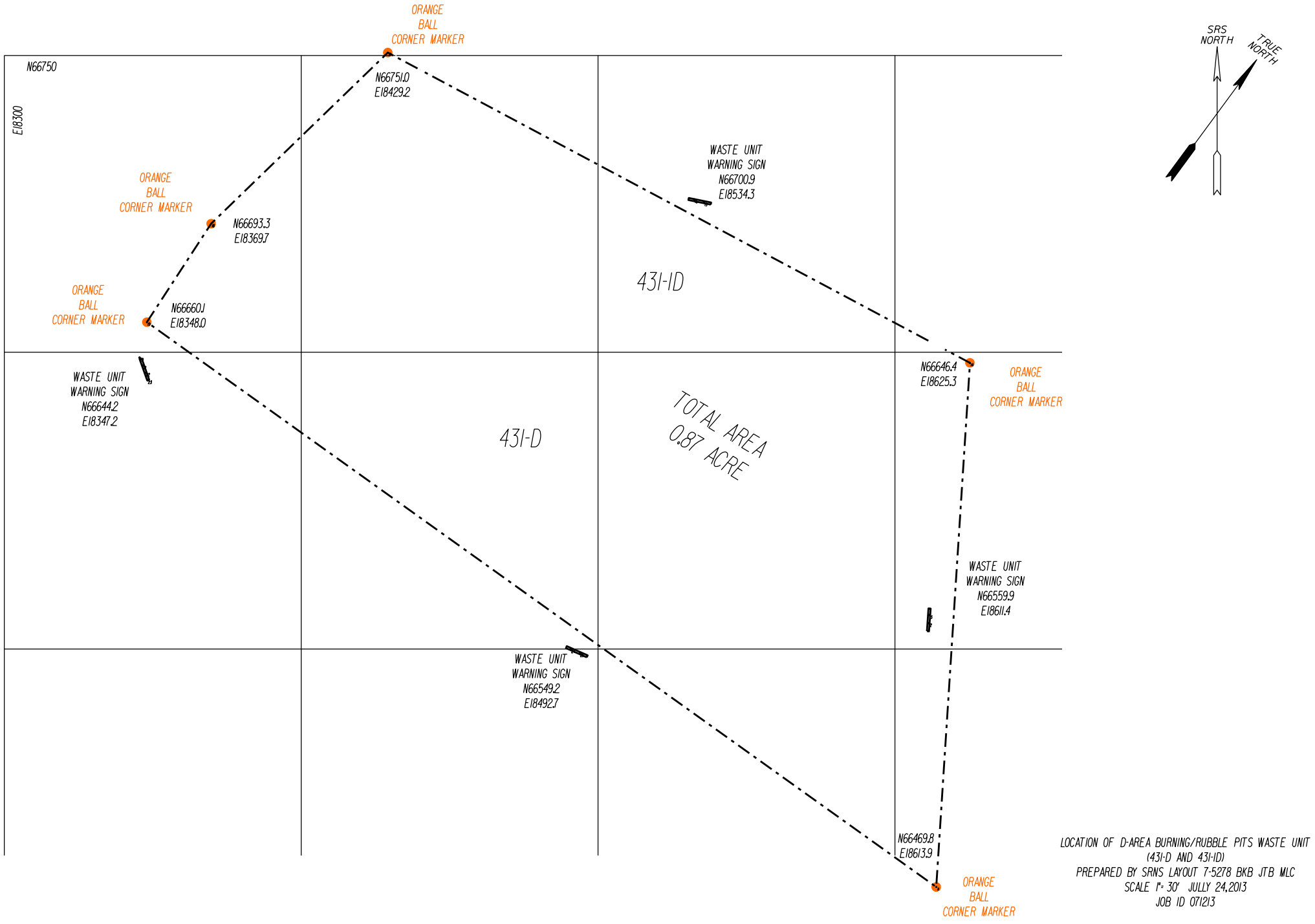


Figure 2
DBRP
Monitoring Well Location Map



120 0 120
SCALE IN FEET

HYDRAULIC GRADIENT = VERTICAL CHANGE IN HEAD (dh) / HORIZONTAL DISTANCE (d) = 4 FT. / 192 FT. = .02 FT./FT.



LOCATION OF D-AREA BURNING/RUBBLE PITS WASTE UNIT
(431-D AND 431-ID)
PREPARED BY SRNS LAYOUT 7-5278 BKB JTB MLC
SCALE 1"= 30' JULLY 24,2013
JOB ID 071213

2.2.2 *Trespassers*

Additionally, while under the ownership of the DOE, access control of the entire SRS will continue to be maintained in accordance with the SCDHEC 1992 RCRA Part B Permit Renewal Application, Volume I, Section F.1. This section describes the 24-hour surveillance system (R.61-79.264.14(b)(1)), artificial or natural barriers (R.61-79.264.14(b)(2)(i)), control entry systems (R.61-79.264.14(b)(2)(ii)), and warning signs (R.61-79.264.14(c)) in place at the SRS boundary to comply with the security requirements for a RCRA-permitted facility.

2.3 Field Walkdowns

Field walkdowns of the DBRPs will be conducted annually for items such as accuracy and legibility of identification signs, visible subsidence or erosion of the waste unit, evidence of water above ground surface, proper vegetation growth, mowing, etc. Subsidence or erosion will be corrected by backfilling the affected area with clean soil and seeding the area to prevent direct exposure of the waste or creation of an exposure pathway. The results of any events and/or actions that would indicate some potential compromise of institutional controls will be documented in the Federal Facility Agreement (FFA) Annual Progress Report. All other routine maintenance activities (i.e., mowing, etc.) will be documented and maintained on files which are subject to EPA and SCDHEC review and audit. Attachment A provides the typical field inspection checklist.

2.4 Certification Mechanism

The Vice-President and General Manager of the Environmental Restoration Division, Westinghouse Savannah River Company, and the Director of the Environmental Restoration Division, U.S. Department of Energy, shall certify on an annual basis that the DBRP is currently being restricted per the institutional controls corrective action described in the approved DBRP Record of Decision (*Record of Decision, Remedial Alternative Selection for the D-Area Burning/Rubble Pits (431-D and 431-1D) (U)*, WSRC-RP-96-867, Rev. 1, February, 1997). This certification shall be included in the FFA Annual Progress Report.

2.5 Groundwater Monitoring and Reporting

Groundwater monitoring will be performed as identified in the DBRP ROD (WSRC, 1997). The post-ROD groundwater monitoring reports, which will be located in the FFA Annual Progress Report, will discuss the analytical results and any trends in the data.

During the second calendar quarter of each year (starting in CY 1998), samples will be collected annually using the submersible pumps which have been installed in the five DBRP wells (DB1, DB2, DB3, DB4, and DB5) (Figure 2). The samples will be handled in accordance with SRS procedures and EPA established protocols and test methods.

The samples will be analyzed for the chemicals which were evaluated to be significant risk and hazard drivers in the Basline Risk Assessment or were identified in the fate and transport modeling as potential offenders. The list of analytes is provided in Table 1 below.

The analytical results will also be included in *The Savannah River Site's Groundwater Monitoring Program* report for the second calendar quarter of each year. Any of these analytes, which are not detected during a five calendar year monitoring and review cycle, will be dropped

from the list for subsequent cycles with concurrence by EPA and SCDHEC. If there are no exceedances of MCLs by any of the risk and hazard drivers during the preceding five year period, indicating no appreciable leaching to groundwater of these chemicals, SRS will request EPA and SCDHEC concurrence for the termination of groundwater monitoring. The request for concurrence/approval of the removal of analytes shall be submitted under separate cover. In addition, a full evaluation of all the groundwater data collected during a five year monitoring and review cycle will be performed as part of the Five-Year ROD Review.

Table 1
Monitoring and Reporting

Constituents	Wells to be Monitored	Sampling Frequency	Reporting Frequency
arsenic	DB1, DB2, DB3, DB4, DB5	Annual	Annual
benzene	DB1, DB2, DB3, DB4, DB5	Annual	Annual
benzo(a)anthracene	DB1, DB2, DB3, DB4, DB5	Annual	Annual
benzo(a)pyrene	DB1, DB2, DB3, DB4, DB5	Annual	Annual
benzo(b)fluoranthene	DB1, DB2, DB3, DB4, DB5	Annual	Annual
benzo(k)fluoranthene	DB1, DB2, DB3, DB4, DB5	Annual	Annual
chromium	DB1, DB2, DB3, DB4, DB5	Annual	Annual
chrysene	DB1, DB2, DB3, DB4, DB5	Annual	Annual
1,2-dichloroethane	DB1, DB2, DB3, DB4, DB5	Annual	Annual
dichloromethane	DB1, DB2, DB3, DB4, DB5	Annual	Annual
endrin	DB1, DB2, DB3, DB4, DB5	Annual	Annual
manganese	DB1, DB2, DB3, DB4, DB5	Annual	Annual
octachlorodibenzo-p-dioxin	DB1, DB2, DB3, DB4, DB5	Annual	Annual
PCB-1260	DB1, DB2, DB3, DB4, DB5	Annual	Annual
total radium	DB1, DB2, DB3, DB4, DB5	Annual	Annual
1,1,2-trichloroethane	DB1, DB2, DB3, DB4, DB5	Annual	Annual
tritium	DB1, DB2, DB3, DB4, DB5	Annual	Annual

3.0 SCHEDULE

The post-ROD document schedule is listed below:

1. Signs, described in Section 2.2.1, will be installed during the second calendar quarter of 1998.

2. Groundwater monitoring will begin in the second calendar quarter of 1998.

3. An annual groundwater monitoring report will be provided in the last calendar quarter of 1998.

4.0 REFERENCES

WSRC, 1997. *Record of Decision, Remedial Alternative Selection for the D-Area Burning/Rubble Pits (431-D and 431-1D) (U)*, WSRC-RP-96-867, Revision 1, Westinghouse Savannah River Company, Aiken, SC (February)

WSRC 1D, *Site Infrastructure and Services Manual*, Procedure 3.02, *Site Real Property Configuration Control*, Westinghouse Savannah River Company, Aiken, SC (February 1996)

ATTACHMENT A

TYPICAL FIELD INSPECTION CHECKLIST

TYPICAL ER INSPECTION SHEET FOR WATES SITES
Page 1 of 3

Waste Site:_____ **A** = Satisfactory **X** = Unsatisfactory (Comments Required)	**A** or **X**	Comments or Corrective Action Taken
Check for potential encroachments (Ensure there is no building on the site).		
Does site have brush or woody vegetation that needs cutting and disposal?		
Does site need grass cut?		
Verify wells and roads are accessible.		
Are the wells properly locked per R. 61-71.11.C.6?		

TYPICAL ER INSPECTION DATA SHEET FOR WASTE SITES
Page 2 of 3

A = Satisfactory **X** = Unsatisfactory (Comments Required)	**A** or **X**	Comments or Corrective Action Taken (See Maintenance Register for Corrected Items)
Is the concrete pad cracked or broken? Is the pad undercut or silted over?		
Is the well properly identified per R.61-71.6H?		
Verify the wells posts and protective covers are in place.		
Verify waste units signs have correct and legible information.		
Does site show signs of erosion or subsidence Are there any signs of burrowing animals (holes)?		
Verify that the orange ball markers are in place		

TYPICAL ER INSPECTION DATA SHEET FOR WASTE SITES
Page 3 of 3

A = Satisfactory **X** = Unsatisfactory (Comments Required)	**A** or **X**	Comments or Corrective Action Taken (See Maintenance Register for Correct Items)
Verify the fence is locked and in good condition (if applicable)		
Check integrity of drainage ditches (if any) for presence of excessive erosion, sediment buildup, and any debris restricting water flow		
Does site need general clean up (housekeeping)?		
Comments:		

Inspected By:_____/_____Date:_____Time:_____
(Print Name) (Signature)

Reviewed By:_____/_____Date:_____Time:_____
PM or Designee (Print Name) (Signature)

Note: EPA and SCDHEC must be notified within 30 days of identification of any area where any breach or compromise of restrictions placed on this institutional control operable unit has occurred.

LUCIP for the Silverton Road Waste Unit (731-3A)
Section 2.0 of *Final Remediation Report*
for the Silverton Road Waste Unit (731-3A)
(WSRC-RP-97-153, Revision 1.1, March 1998)

On February 6, 2014, the DOE submitted a letter (ACP-14-125, ARF #019315) to the EPA and SCDHEC to perform the inspections for this operable unit on an annual basis. The EPA and SCDHEC approved the request in letters dated March 20, 2014 (ARF #019385) and March 7, 2014 (ARF #019360), respectively.

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United States Department of Energy

Savannah River Site

Final Remediation Report for the Silverton Road Waste Unit (731-3A) (U)

WSRC-RP-97-153
Revision 1.1
March 1998

Westinghouse Savannah River Company
Savannah River Site
Aiken, SC 29808

SAFETY • RESPONSIBILITY • SECURITY
SRS
SAVANNAH RIVER SITE

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

DISCLAIMER

This report was prepared by Westinghouse Savannah River Company (WSRC) for the United States Department of Energy under Contract No. DE-AC09-96-SR18500 and is an account of work performed under that contract. Reference herein to any specific commercial product, process, or services by trademark, name, manufacturer, or otherwise does not necessarily constitute or imply endorsement, recommendation, or favoring of same by WSRC or by the United States Government or any agency thereof.

Printed in the United States of America

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

CERTIFICATION PAGE

Final Remediation Report for the Silverton Road Waste Unit (731-3A) (U)
WSRC-RP-97-153, Revision 1.1, March 1998

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

Date: 28APR98 Signature:

Title: Richard R. Harbert, Vice President and General Manager
Environmental Restoration Division
Westinghouse Savannah River Company
Co-operator for the U.S. Department of Energy
Savannah River Operations

Date: 5/13/98 Signature:

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

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LIST OF ACRONYMS

CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
DOE	Department of Energy
EPA	U.S. Environmental Protection Agency
FFA	Federal Facility Agreement
MCLs	Maximum Contaminant Levels
PCE	Tetrachloroethylene
RCRA	Resource Conservation and Recovery Act
ROD	Record of Decision
SCDHEC	South Carolina Department of Environmental Control
SDWA	Safe Drinking Water Act
SRS	Savannah River Site
SRWU	Silverton Road Waste Unit
TCE	Trichloroethylene
WSRC	Westinghouse Savannah River Company

1.0 GENERAL DESCRIPTION OF THE SILVERTON ROAD WASTE UNIT

The Silverton Road Waste Unit (SRWU), Building 731-3A, comprises a Resource Conservation and Recovery Act (RCRA)/Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) waste unit and is located in the northwestern part of the Savannah River Site (SRS) in Aiken County (Figure 1), approximately 1.5 miles southwest of A/M Area. The SRWU area is an irregular quadrilateral, unlined earthen depression dug into surficial soils that was later filled with various waste materials. This area has been designated as an "excavated area (filled)" as depicted in Figure 2.

The SRWU is located on the southwestern flank of an interstream divide between Upper Three Runs Creek (approximately 4.5 miles to the southeast) and the flood plain of the Savannah River (approximately 1.5 miles to the west). The ground surface elevation at the unit averages 350 feet above mean sea level. Surface drainage is southwestward, along a series of dry-wash tributaries, into the flood plain of the Savannah River. The water table at the SRWU ranges from about 40 feet below ground level to the southwest to about 130 feet below ground level to the northeast.

The SRWU was first used before construction of the SRS. Municipal, agricultural, and commercial trash, rubbish, garbage, debris, and refuse probably constituted the waste stream until the early 1950's. After procurement by the Federal government, the SRWU land continued to be used as an open dump for the disposal of metal shavings, 55-gallon drums, cardboard drums, tires, lumber, etc. No records of waste disposal activities were kept. In 1974, disposal of the waste at the SRWU ceased, and the area was bulldozed, graded, covered with soil, and planted with grasses.

The contact person (title, address, and phone number) for the SRWU is as follows:

Westinghouse Savannah River Company
Manager, Post Closure Maintenance
Building 730-2B
Aiken, SC 29808
(803) 952-6882

2.0 DESCRIPTION OF THE SELECTED REMEDY

Based on the SRWU RCRA Facility Investigation/Remedial Investigation Report (WSRC, 1996b) and the Baseline Risk Assessment (WSRC, 1996a), the SRWU poses no significant risk to the environment and minimal risk to human health. Fate and transport analyses indicated that residual contaminants in the soils will not migrate to the groundwater. However, the presence of surface soil contamination prohibits this waste unit for residential use. Therefore, a determination has been made that institutional controls are sufficient for protection of human health and the environment for the SRWU soils. This alternative is considered to be the least cost option, which is still protective of human health and the environment.

Implementation of this alternative will require both near- and long-term actions. For the near term, signs will be posted at the waste unit to indicate that this area was used for disposal of waste material and contains buried waste. In addition, existing SRS access controls will be used to maintain this site for nonresidential use. Further, excavation below 8 feet will be prohibited.

In the long term, if the property is ever transferred to non-Federal ownership, the U.S. Government will take those actions necessary pursuant to CERCLA Section 120(h). These actions will include

Figure 1. Location of the Silverton Road Waste Unit at the Savannah River Site

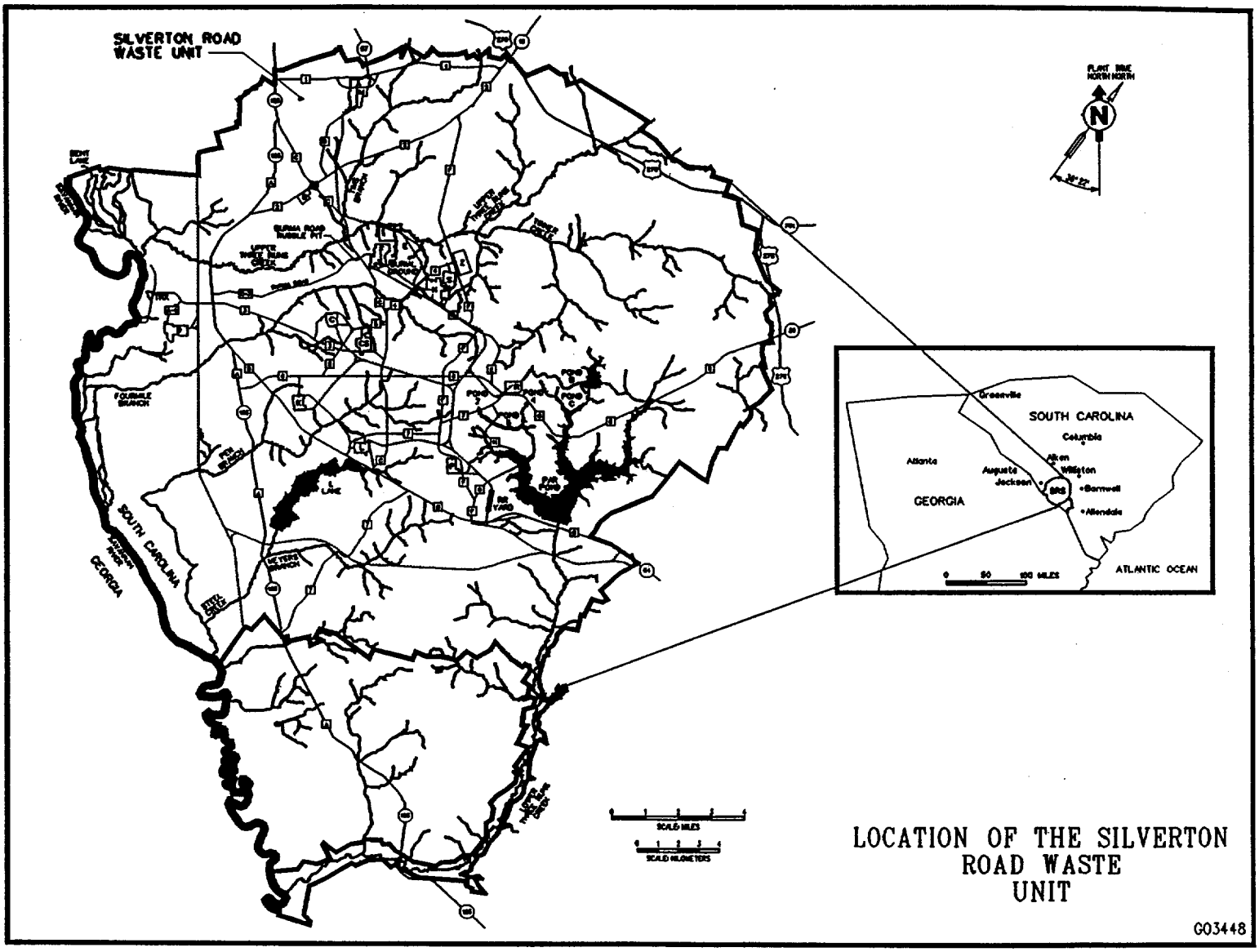
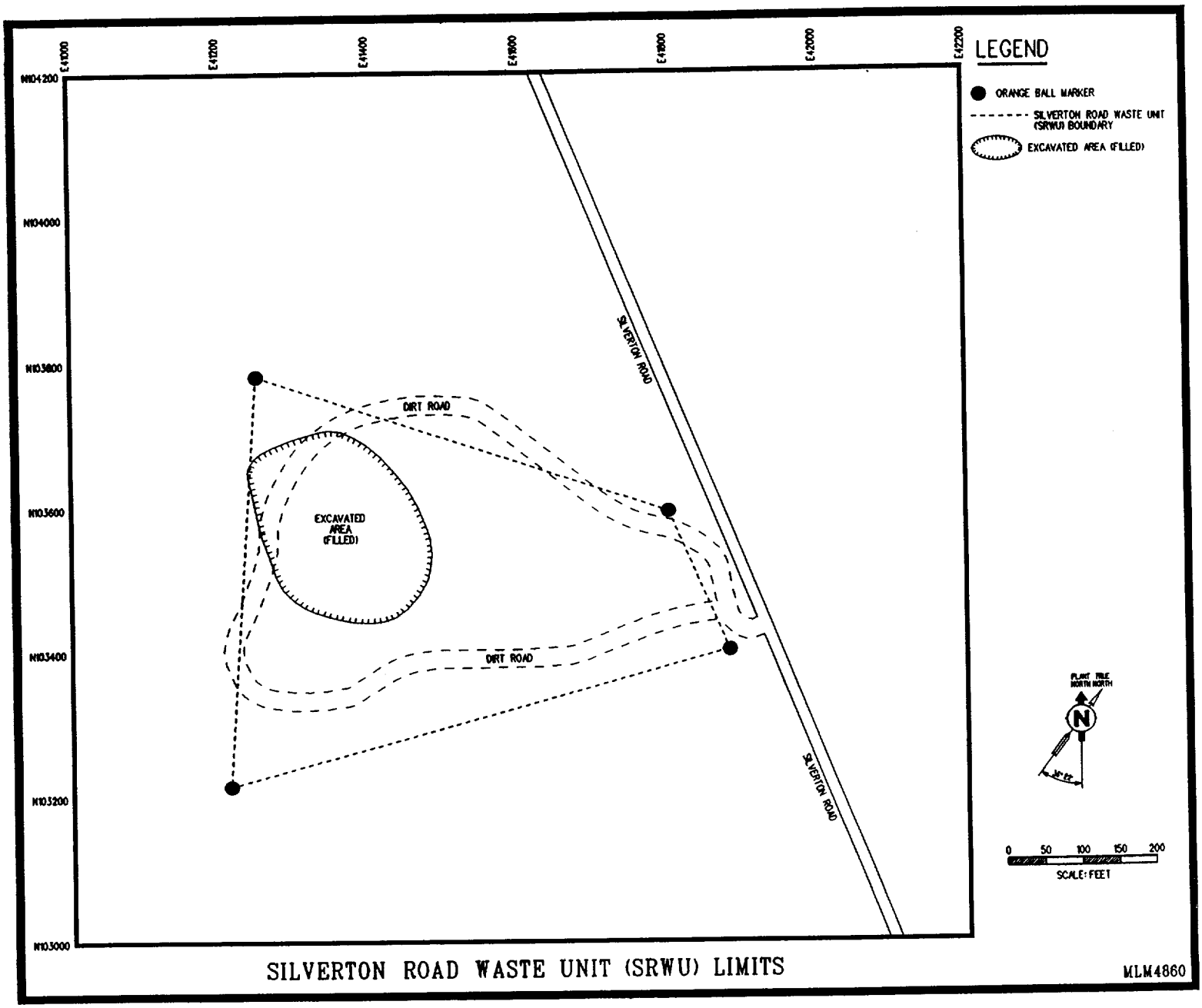
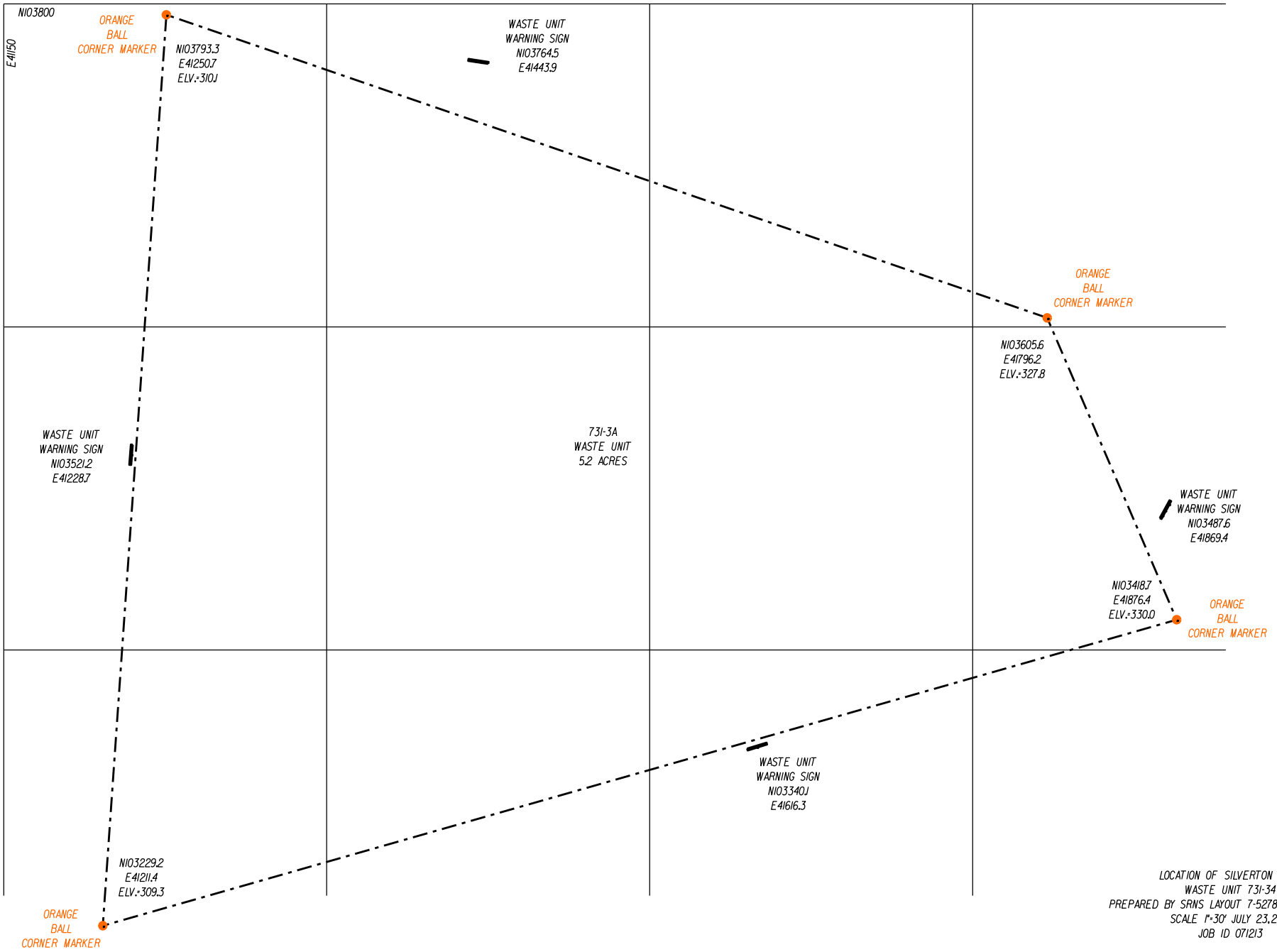


Figure 2. General Configuration of the Silverton Road Waste Unit





LOCATION OF SILVERTON ROAD
WASTE UNIT 731-34
PREPARED BY SRNS LAYOUT 7-5278 BKB JTB MLC
SCALE 1"=30' JULY 23,2013
JOB ID 071213

a deed notification disclosing former waste management and disposal activities, as well as remedial actions taken at the waste unit, and any continuing groundwater monitoring commitments. The deed notification will, in perpetuity, notify any potential purchaser that the property has been used for the management and disposal of construction debris and other materials, including hazardous substances. These requirements are also consistent with the RCRA deed notification required at final closure of the RCRA facility if contamination will remain at the site The deed will also include 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 contamination no longer poses an unacceptable risk under residential use. The Environmental Protection Agency (EPA) and the South Carolina Department of Health and Environmental Control (SCDHEC) will have to concur with this reevaluation before the deed restrictions are altered.

In addition, if the property is ever transferred to non-Federal ownership, a survey plat of the area will be prepared, certified by a professional land surveyor, and recorded with the appropriate county recording agency.

In the "M Area" (water table) groundwater aquifer, low levels of contaminants have been detected which minimally and infrequently exceed maximum contaminant levels (MCLs). The probable condition for the "M Area" groundwater aquifer is no significant groundwater contamination resulting from the SRWU. As a result, no remedial action is deemed appropriate for the SRWU "M Area" groundwater aquifer. However, a confirmatory groundwater monitoring program will be established to ensure that this is the appropriate remedial action for the "M Area" groundwater aquifer. In the event that the probable condition is no longer appropriate, the Department of Energy (DOE), EPA, and SCDHEC will evaluate the need for remedial action.

Under this groundwater monitoring program, additional background monitoring wells will be installed. One of the original background wells for the "M Area" (water table) groundwater unit went dry and was never monitored. The background wells will be used to further evaluate the upgradient concentrations of the contaminants in the "M Area" (water table) groundwater unit. In addition to the new background wells, the existing background well and approximately six existing "M Area" (water table) wells will also be monitored. This monitoring is intended to evaluate trends in groundwater contamination. However, at the five-year Record of Decision (ROD) review, the groundwater monitoring data will be evaluated to determine if any changes in the groundwater remedy are appropriate.

The SCDHEC has modified the SRS RCRA permit to incorporate the selected remedy. This proposal is consistent with EPA guidance and is an effective use of risk management principles.

The elements of the institutional controls corrective action, which consists of land restriction without any engineering controls, are comprised of deed notifications, access controls, which include posting of identification signs, field walkdowns for general site conditions, and groundwater monitoring and reporting.

Each element of the institutional controls corrective action is discussed below.

2.1 Deed Notification

A deed notification shall be filed in the appropriate county records in accordance with CERCLA 120(h), which requires the government to create a deed when land on which any hazardous substance was stored, released, or disposed is transferred to non-Federal ownership. Per CERCLA 120(h)(3)(A), the deed shall contain, to the extent practical, such information as is available based on the complete search of agency files, to include

- a notice of the type and quantity of such hazardous substances;
- notice of the time at which such storage, release, or disposal took place;
- a description of the remedial action taken, if any.

Per CERCLA 120(h)(3)(B), the deed shall also contain a covenant warranting that

- all remedial action necessary to protect human health and the environment with respect to any such substance remaining on the property has been taken before the date of such transfer;
- any additional remedial action found to be necessary after the date of such transfer shall be conducted by the United States Government;
- a clause granting the United States Government access to the property in any case in which remedial action or corrective action is found to be necessary after the date of such transfer.

This proposal is also consistent with the RCRA permit requirements to insure protection of human health and the environment by maintaining documentation of property restrictions and institutional control requirements through the use of a deed notification.

2.2 Access Controls

2.2.1 On-Site Workers

In accordance with WSRC 1D, *Site Infrastructure and Services Manual*, Procedure 3.02, *Site Real Property Configuration Control* (WSRC, 1996c), use of all lands and waters on the SRS shall be coordinated via the Site Use Program. No use of land (i.e., excavation or any other land use) shall be undertaken without prior approval documented by a Site Use Permit. Also, in accordance with Procedure 3.02, all work at SRS that adds to or modifies features or facilities portrayed on the SRS development maps (i.e., plot plans of facilities/utilities at SRS) is authorized by a Site Clearance Permit before execution. All Site Clearance requests are reviewed to verify that either an approved Site Use Permit has been obtained, or that an existing Site Use Permit has sanctioned the request. Verification of DOE approval for intended land use must be obtained before issuance of a Site Clearance Permit. The Site Use and Site Clearance processes are applicable to all activities and personnel on site (including subcontractors). The processes are controlled within the SRS Quality Assurance Program.

The SRS identifies all buildings and facilities on maps used in the Site Use/Site Clearance Program and includes a 200-foot buffer zone around each facility. This waste unit is identified on these maps as a RCRA/CERCLA facility.

Any work proposed in these areas will be strictly controlled and workers will be appropriately trained and briefed about health and safety requirements if work is deemed necessary for maintenance. Any changes in the use or disturbance of the SRWU will be cleared with the EPA and SCDHEC before the disturbance occurs. To prevent unknowing entry and to ensure that unrestricted use of the waste unit does not occur while under ownership of the government,

identification signs will be posted at the waste unit access points (Figure 3). The signs will be legible from a distance of at least 25 feet. The signs will read:

> Silverton Road Waste Unit (731-3A)
> "Danger - Unauthorized Personnel Keep Out.
> This waste unit was used to manage hazardous substances.
> Do not dig or excavate. Do not enter without contacting the
> waste site custodian."
> Custodian: Manager, Post Closure Maintenance
> Phone: (803) 952-6882

Site-specific access controls (i. e., fences) are not required for the Silverton Road Waste Unit since exposure to the casual worker or trespasser as calculated in the Baseline Risk Assessment does not warrant this level of protection.

2.2.2 *Trespassers*

Additionally, while under the ownership of the DOE, access control of the entire SRS will continue to be maintained in accordance with the 1992 RCRA Part B Permit Renewal Application, Volume I, Section F.1. This section describes the 24-hour surveillance system (R.61-79.264.14(b)(1)), artificial or natural barriers (R.61-79.264.14(b)(2)(i)), control entry systems (R.61-79.264.14(b)(2)(ii)), and warning signs (R.61-79.264.14(c)) in place at the SRS boundary to comply with the security requirements for a RCRA-permitted facility.

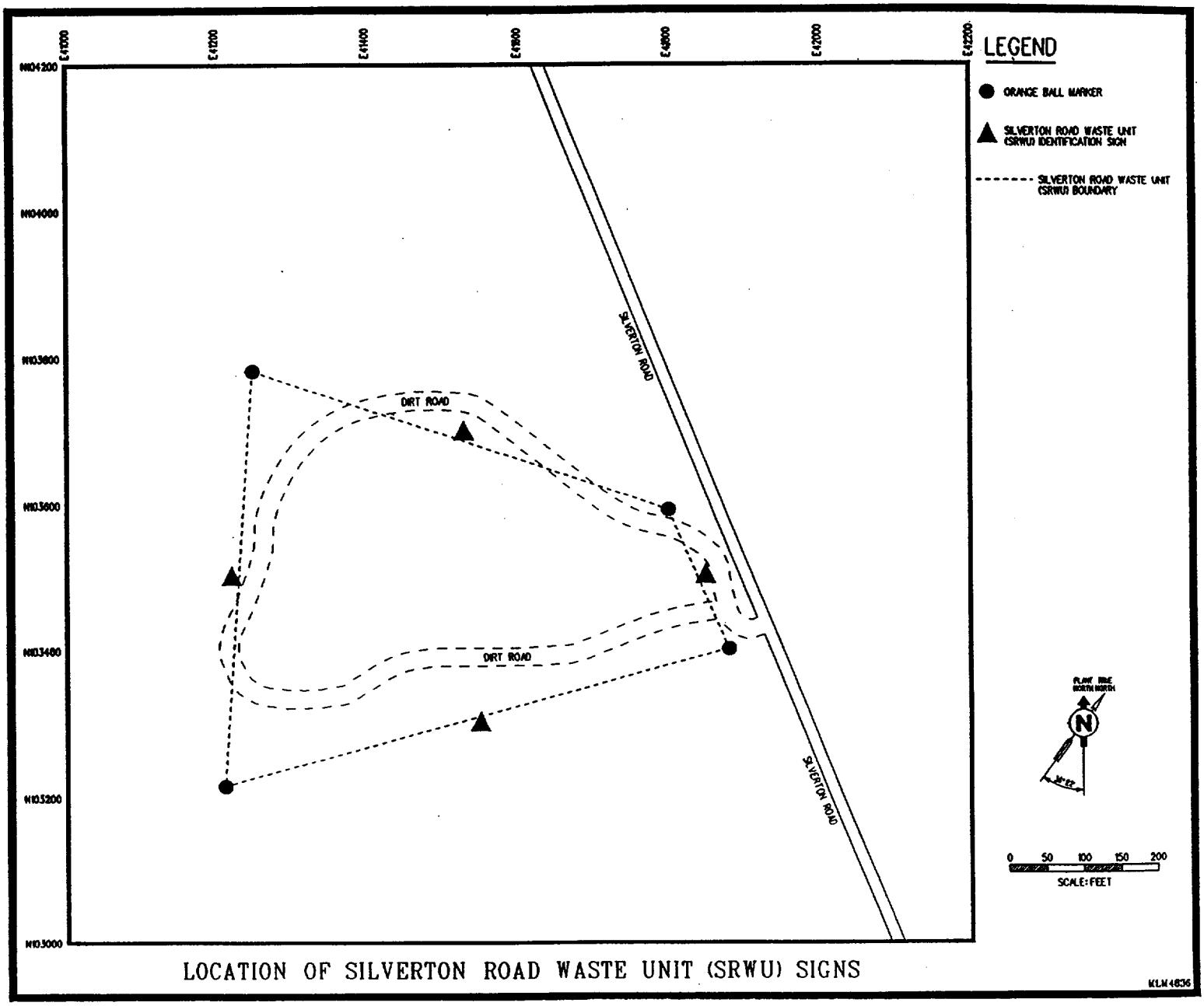
2.3 Field Walkdowns

Field walkdowns of the SRWU, 731-3A, will be conducted semi-annually for items such as accuracy and legibility of identification signs, visible subsidence or erosion of the waste unit, proper vegetation growth, mowing, etc. Subsidence or erosion will be corrected by backfilling the affected area with clean soil and seeding the area to prevent direct exposure of the waste or creation of an exposure pathway. The results of any events and/or actions that could indicate some potential compromise of institutional controls will be documented in the Federal Facility Agreement (FFA) Annual Progress Report. All other routine maintenance activities (i.e., mowing, etc.) will be documented and maintained in files, which are subject to EPA and SCDHEC review and audit. The field inspection checklist is included in this document as Attachment A.

2.4 Certification Mechanism

The Vice-President and General Manager of the Environmental Restoration Division, Westinghouse Savannah River Company, and the Director of the Environmental Restoration Division, U.S. Department of Energy, shall certify on an annual basis that the SRWU is currently being restricted per the institutional controls corrective action described in the approved *Record of Decision Remedial Alternative Selection for the Silverton Road Waste Unit (731-3A) (U)*, WRSC-RP-96-171, Revision 1, February 1997 (WSRC, 1997). This certification shall be included in the FFA Annual Progress Report.

Figure 3. Locations of the Silverton Road Waste Unit Identification Signs



2.5 Groundwater Monitoring and Reporting

Groundwater monitoring will be performed as identified in the SRWU ROD (WSRC, 1997). The post-ROD groundwater monitoring reports, which will be provided in the FFA Annual Progress Report, will discuss the analytical results for the proposed analytes and any trends in the data (i.e., concentrations are decreasing in the wells, upgradient vs. downgradient results, etc.).

Two new wells (SRW-18 and SRW-19) will be installed at the SRWU at locations to intercept the upgradient "M-Area" aquifer groundwater flow. In addition, background well SRW-17D will be replaced with a new well, SRW-17DR. SRW-17D went dry and was never sampled during the characterization of the unit. The replacement well and the new wells will not be installed until approved by the regulators. The existing wells to be monitored include SRW-2, SRW-4, SRW-7, SRW-8, SRW-9, SRW-12C, and SRW-16C (background well) (Figure 4).

The wells will be monitored for 1,2-dichloroethane, carbon tetrachloride, dichloromethane, tetrachloroethylene (PCE), and trichloroethylene (TCE) (Table 1) due to their sporadic exceedances of Safe Drinking Water Act (SDWA) MCLs. The wells will be monitored on a semi-annual basis during the 2nd and 4th quarters of each calendar year.

Analytes not exceeding background concentrations or SDWA MCLs, as applicable, for four (4) sequential monitoring events will be proposed for removal from the list for subsequent monitoring with concurrence by the EPA and the SCDHEC. The request for concurrence/approval of the removal of analytes shall be submitted under separate cover. In addition, a full evaluation of all the groundwater data collected during a five-year monitoring and review cycle will be performed as part of the five-year ROD review.

3.0 SCHEDULE

The remedial actions to be implemented at the SRWU include the installation of four identification signs as well as two new groundwater monitoring wells. One of the original background wells (SRW-17D) for the water table aquifer will also be replaced. The installation of the identification signs, as described in Section 2.2.1 and the installation of the new and replacement wells are planned to occur during the 2nd quarter of CY98. Groundwater monitoring and semi-annual site inspections are planned to also begin with the 2nd quarter of CY98. The date for the installation of the signs and wells in addition to the groundwater monitoring and site inspections is dependent on regulatory approval of the SRWU Final Remediation Report.

4.0 REFERENCES

WSRC (Westinghouse Savannah River Company), 1996a. *Final Baseline Risk Assessment for the Silverton Road Waste Unit (U)*, WSRC-RP-95-215, Rev. 1.1, Westinghouse Savannah River Company, Aiken, SC (January).

WSRC, 1996b. *Final RFI/RI Report for the Silverton Road Waste Unit (U)*, WSRC-RP-95-214, Rev. 1.2, Westinghouse Savannah River Company, Aiken, SC (April).

WSRC, 1996c. "Procedure 3.02, Site Real Property Configuration Control" located in WSRC 1D, *Site Infrastructure and Services Manual,* Westinghouse Savannah River Company, Aiken, SC (latest revision).

WSRC, 1997. *Record of Decision Remedial Alternative Selection for the Silverton Road Waste Unit (731-3A) (U)*, WSRC-RP-96-171, Rev. 1, Westinghouse Savannah River Company, Aiken, SC (February).

Figure 4. Locations of the Silverton Road Waste Unit Post-ROD Groundwater Monitoring Wells

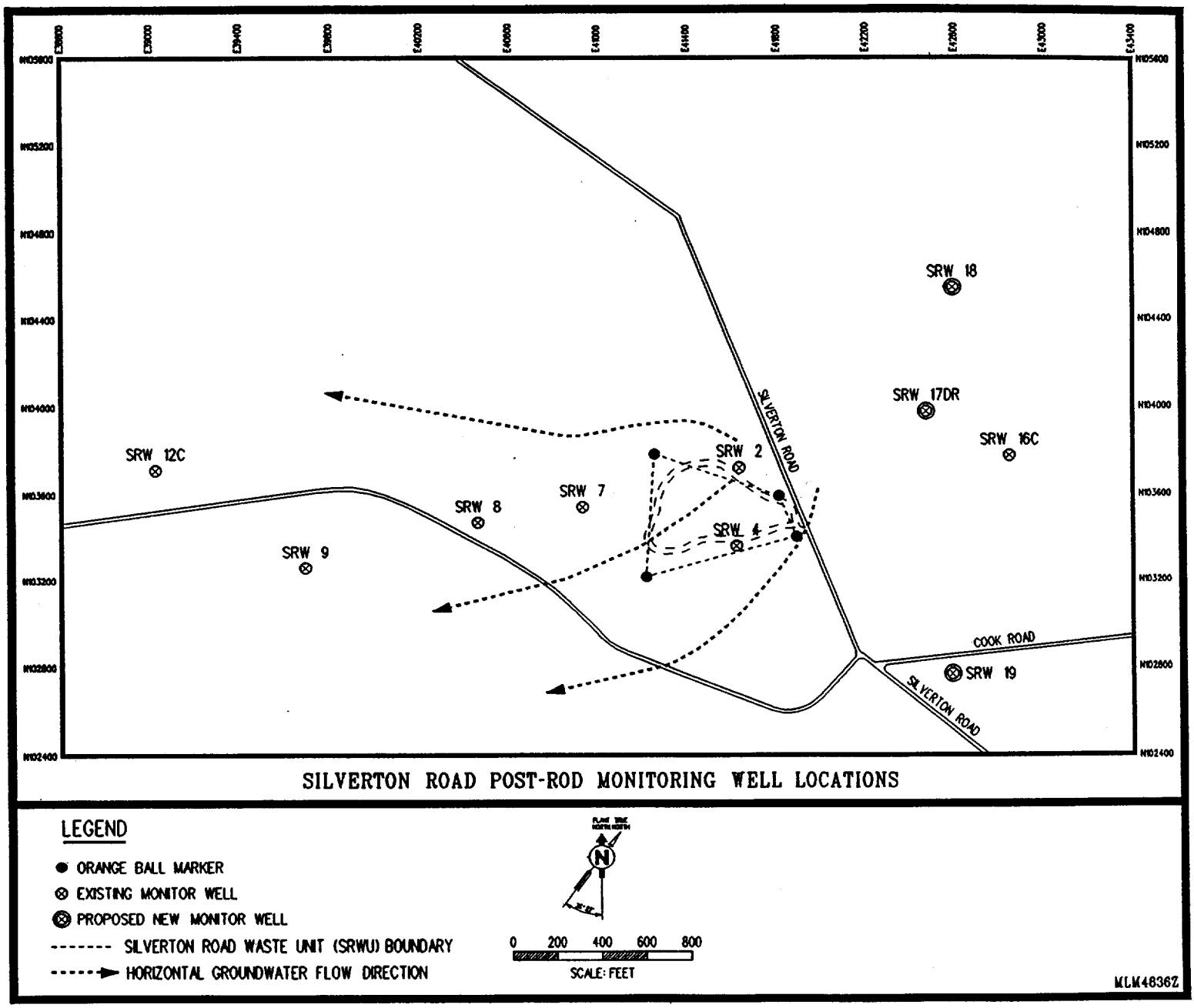


Table 1. Silverton Road Waste Unit Groundwater Monitoring Constituents

Constituents	Wells to be Monitored	Sampling Frequency	Reporting Frequency
1,2-Dichloroethane	SRW-2, SRW-4, SRW-7, SRW-8, SRW-9, SRW-12C, SRW-16C*, SRW-17DR*, and 2 new wells	Semi-Annual	Annual
Carbon tetrachloride	SRW-2, SRW-4, SRW-7, SRW-8, SRW-9, SRW-12C, SRW-16C*, SRW-17DR*, and 2 new wells	Semi-Annual	Annual
Dichloromethane	SRW-2, SRW-4, SRW-7, SRW-8, SRW-9, SRW-12C, SRW-16C*, SRW-17DR*, and 2 new wells	Semi-Annual	Annual
Tetrachloroethylene (PCE)	SRW-2, SRW-4, SRW-7, SRW-8, SRW-9, SRW-12C, SRW-16C*, SRW-17DR*, and 2 new wells	Semi-Annual	Annual
Trichloroethylene (TCE)	SRW-2, SRW-4, SRW-7, SRW-8, SRW-9, SRW-12C, SRW-16C*, SRW-17DR*, and 2 new wells	Semi-Annual	Annual

*** Background wells. SRW-17DR is a replacement well for SRW-17D, which went dry before it could be sampled.**

ATTACHMENT A

FIELD INSPECTION CHECKLIST

TYPICAL

ER INSPECTION DATA SHEET FOR WASTE SITES

Page 1 of 3

Waste Site: _____ **A = Satisfactory** **X = Unsatisfactory (Comments required)**	**A or X**	Comments or Corrective Action Taken (See Maintenance Register for Corrected Items)
Check for potential encroachments (Ensure that there is no building on the site).		
Does the site have brush or woody vegetation that needs cutting and disposal?		
Does the site need grass cut?		
Verify that the wells and roads are accessible.		
Are the wells properly locked per R.61-71.11.C.6?		

TYPICAL

ER INSPECTION DATA SHEET FOR WASTE SITES

Page 2 of 3

Waste Site: _____ **A = Satisfactory** **X = Unsatisfactory (Comments required)**	**A or X**	Comments or Corrective Action Taken (See Maintenance Register for Corrected Items)
Is the concrete pad cracked or broken? Is the pad undercut or silted over?		
Is the well properly identified per R.61-71.6.H?		
Verify that the wells' posts and protective covers are in place.		
Verify that the waste units' signs have the correct and legible information.		
Does the site show signs of erosion or subsidence? Are there any signs of burrowing animals (holes)?		
Verify that the orange ball markers are in place.		

TYPICAL

ER INSPECTION DATA SHEET FOR WASTE SITES

Page 3 of 3

Waste Site: _____ **A = Satisfactory** **X = Unsatisfactory (Comments required)**	**A or X**	Comments or Corrective Action Taken (See Maintenance Register for Corrected Items)
Verify that the fence is locked and in good condition (if applicable).		
Check the integrity of drainage ditches (if any) for presence of excessive erosion, sediment buildup, and any debris restricting water flow.		
Does the site need general clean up (housekeeping)?		
Comments:		

Inspected By:_____/_____Date:_____Time:_____
(Print Name) (Signature)

Reviewed By:_____/_____Date:_____Time:_____
PM or Designee (Print Name) (Signature)

Note: EPA and SCDHEC most be notified within 30 days of identification of any area where any breach or compromise or compromise of restrictions placed on this institutional control operable unit has occurred.

LUCIP for the F-Area Burning/Rubble Pits (231-F, 231-lF, and 231-2F)
Section 2.0 of *Final Remediation Report for the*
F-Area Burning/Rubble Pits (231-F, 231-lF, and 231-2F)
WSRC-RP-97-193 Revision 1.1, March 1998

On February 6, 2014, the DOE submitted a letter (ACP-14-125, ARF #019315) to the EPA and SCDHEC to perform the inspections for this operable unit on an annual basis. The EPA and SCDHEC approved the request in letters dated March 20, 2014 (ARF #019385) and March 7, 2014 (ARF #019360), respectively.

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004848

United States Department of Energy

Savannah River Site

Final Remediation Report for the F-Area Burning/Rubble Pits (231-F, 231-1F, and 231-2F) (U)

WSRC-RP-97-193
Revision 1.1
March 1998

Westinghouse Savannah River Company
Savannah River Site
Aiken, SC 29808

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

DISCLAIMER

This report was prepared by Westinghouse Savannah River Company (WSRC) for the United States Department of Energy under Contract No. DE-AC09-96-SR18500 and is an account of work performed under that contract. Reference herein to any specific commercial product, process, or services by trademark, name, manufacturer, or otherwise does not necessarily constitute or imply endorsement, recommendation, or favoring of same by WSRC or by the United States Government or any agency thereof.

Printed in the United States of America

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

1004848

CERTIFICATION

FINAL REMEDIATION REPORT
FOR THE
F-AREA BURNING/RUBBLE PITS
(231-F, 231-1F, and 231-2F) (U)
WSRC-RP-97-193
Revision 1.1
March 1998

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

Date: 11MAY98 Signature:

Richard R. Harbert
Vice President and General Manager
Environmental Restoration Division
Westinghouse Savannah River Company
Co-operator for the U.S. Dept. of Energy
Savannah River Operations

Date: 5/13/98 Signature:

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

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ACRONYMS

CERCLA	Comprehensive Environmental Response, Compensation and Liability Act, 1980
DOE	United States Department of Energy
EPA	United States Environmental Protection Agency
FBRP	F-Area Burning/Rubble Pits (231-F and 231-1F) and Rubble Pit (231-2F) Source Operable Unit
FBP	F-Area Burning Pit Groundwater Monitoring Well Series
FFA	Federal Facility Agreement
RCRA	Resource Conservation and Recovery Act, 1976
ROD	Record of Decision
SCDHEC	South Carolina Department of Health and Environmental Control
SRS	Savannah River Site
WSRC	Westinghouse Savannah River Company

1.0 GENERAL DESCRIPTION OF THE F-AREA BURNING/RUBBLE PITS

The F-Area Burning/Rubble Pits (231-F and 231-1F) and Rubble Pit (231-2F) (FBRP) comprise a RCRA/CERCLA source unit located within the Savannah River Site (SRS) (Figure 1), approximately 3000 feet west of F-Area and 1100 feet north of SRS Road C. Upper Three Runs is located approximately 2,300 feet northwest of the pits. The local topography of the area is flat upland and the pits are at an elevation of 290 feet above mean sea level and 170 feet above Upper Three Runs. The water table is 70 to 100 feet below ground surface in the area of the FBRP. Surface drainage is to the northwest toward an ephemeral tributary of Upper Three Runs about 7.5 miles upstream of its confluence with the Savannah River.

The two contiguous burning/rubble pits (Figure 2), which cover a total area of 1.05 acres, are designated as 231-F and 231-1F; a twenty foot wide berm of undisturbed soil separates these two pits. The rubble pit (231-2F) covers about 0.13 acre. The approximate dimensions of the pits are:

- o 231-F: 275 feet x 62 feet x 10 feet
- o 231-1F: 325 feet x 89 feet x 10 feet
- o 231-2F: 165 feet x 33 feet x 4-9 feet.

Between 1951 and 1973, SRS used Pits 231-F and 231-1F to burn a variety of wastes which were considered non-hazardous at that time. Waste was usually burned on a monthly basis. The chemical composition and volumes of the disposed waste are unknown, but waste materials burned included paper, plastics, wood, rubber, rags, cardboard, oil, degreasers, and spent organic solvents. No known or suspected radioactive materials were allowed in the burning pits.

Burning of waste in the SRS pits was discontinued by October 1973. A layer of soil was then placed over the residue in the pits and they were subsequently used as rubble pits. Materials allowed in the rubble pits included concrete, bricks, tile, asphalt, plastic, metal, empty drums, wood products, and rubber.

When the pits were filled to capacity in 1978, a layer of clayey soil was placed over the contents and the surface was compacted and mounded. Vegetation has been established to reduce erosion.

Contact information (person, title, address, and phone number) for the FBRP is as follows:

Westinghouse Savannah River Company
Manager, Post Closure Maintenance
Building 730-2B
Aiken, SC 29808
(803) 952-6882

2.0 DESCRIPTION OF THE SELECTED REMEDY

The selected remedy at the FBRP source control operable unit is institutional controls. Implementation of this remedy will require both near- and long-term actions. For the near-term, signs will be posted indicating that this area was used to manage hazardous materials. In addition, existing SRS access controls will be used to maintain use of this site exclusively for nonresidential activities.

Figure 1 **Location of the F-Area Burning/Rubble Pits (231-F and 231-1F) and Rubble Pit (231-2F) in Relation to Major Savannah River Site Facilities**

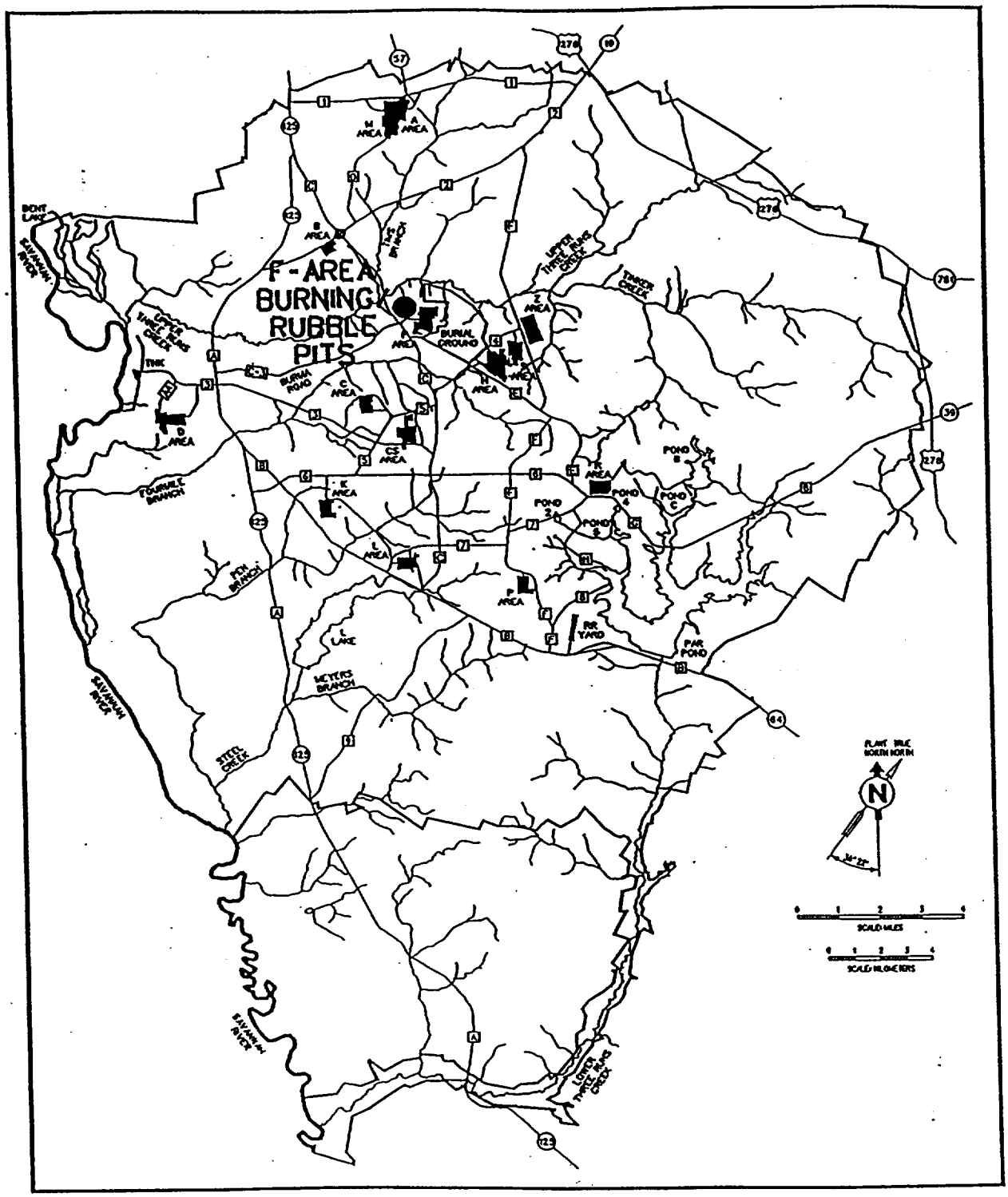
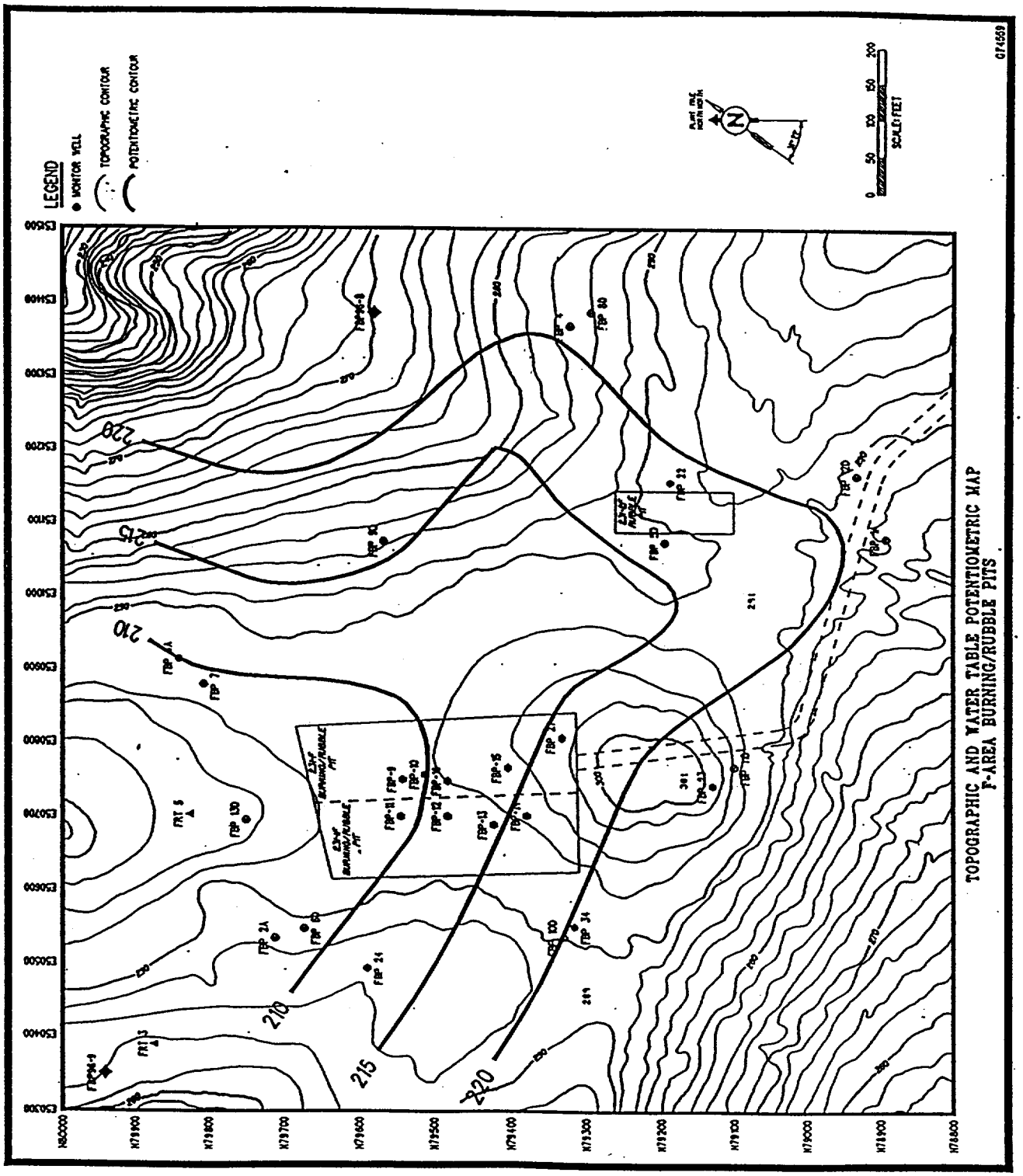
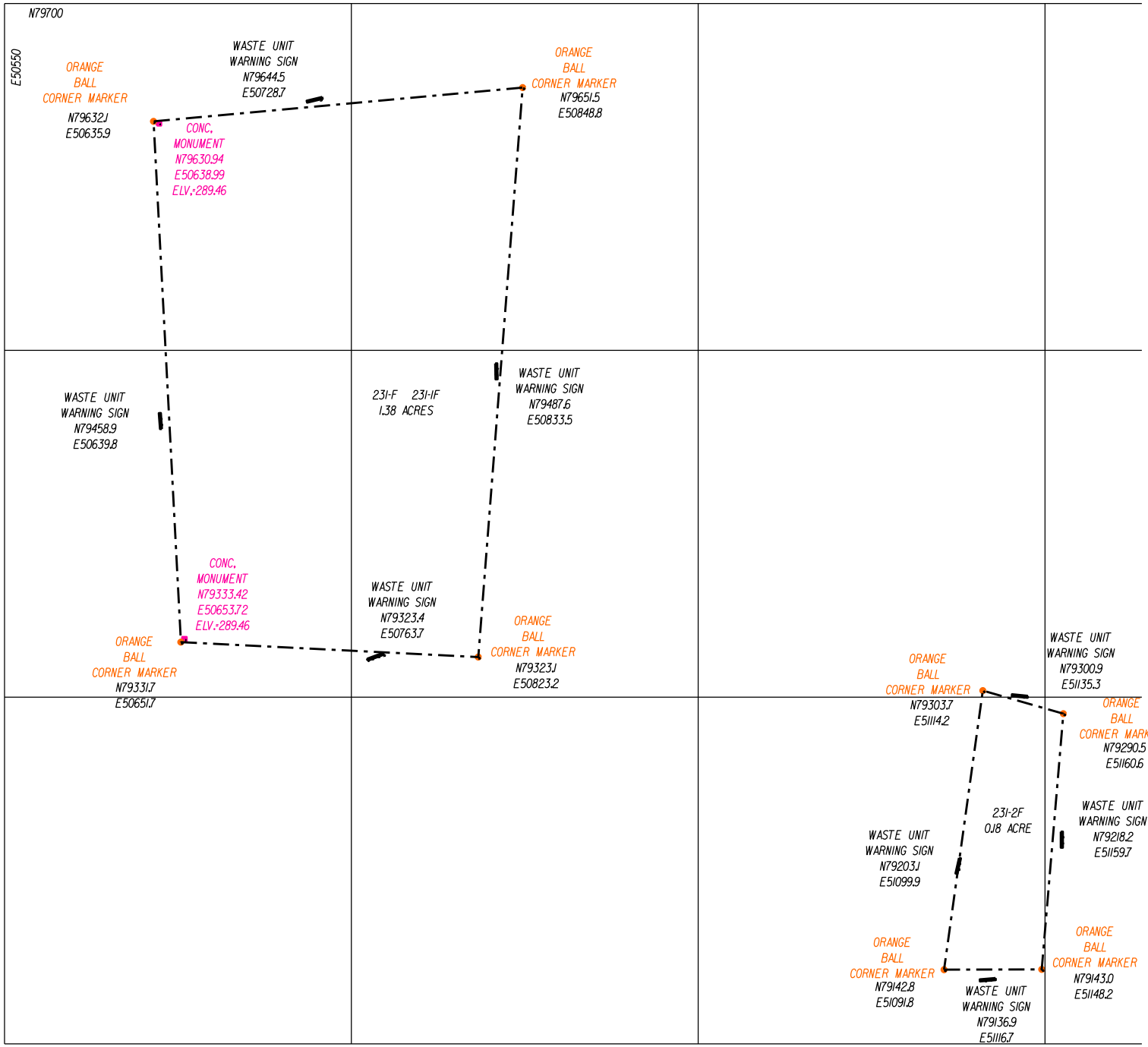


Figure 2 **Topographic and Water Table Potentiometric Map for the F-Area Burning/Rubble Pits**





LOCATION OF F-AREA BURNING/RUBBLE PITS WASTE UNITS
231-F 231-IF AND 231-2F
PREPARED BY SRNS LAYOUT 7-5278 BKB JTB MLC
SCALE 1"= 30' JULY 24,2013
JOB ID 071213

In the long-term, if the property is ever transferred to non-Federal ownership, the U.S. Government will take those actions necessary pursuant to CERCLA Section 120(h). These actions will include a deed notification disclosing former waste management and disposal activities, as well as remedial actions taken at the waste unit, and any continuing groundwater monitoring commitments. The deed notification will, in perpetuity, notify any potential purchaser that the property has been used for the management and disposal of non-hazardous, inert construction debris, and that wastes containing hazardous substances, such as degreasers and solvents, were also managed and burned on the site. These requirements are also consistent with the RCRA deed notification required at final closure of the RCRA facility, if contamination will remain at the site. The deed will also include 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 contamination no longer poses an unacceptable risk under residential use. The Environmental Protection Agency (EPA) and the South Carolina Department of Health and Environmental Control (SCDHEC) will have to concur with this reevaluation before the deed restrictions are altered. In addition, if the site is ever transferred to non-Federal ownership, a survey plat of the area will be prepared, certified by a professional land surveyor, and recorded with the appropriate county recording agency. The institutional controls remedy is intended to be the final action for the FBRP source unit. The solution is intended to be permanent and effective in both the long and near terms.

This proposal is consistent with EPA guidance and the National Contingency Plan for sites that have relatively large volumes of waste with low levels of contamination and is an effective use of risk management principles. The SCDHEC has modified the SRS RCRA permit to incorporate the selected remedy.

Since the initial groundwater assessment did not conclusively determine the source of groundwater contamination in the FBRP area, further assessment of the groundwater contamination is being conducted under the groundwater assessment program addenda to the Work Plan (WSRC 1996b and in preparation) to determine whether the FBRP source unit is the source of the contamination.

The elements of the institutional controls corrective action (which consists of land restriction without any engineering controls) are comprised of deed notifications, access controls which include posting of identification signs, field walkdowns for general site conditions, and groundwater characterization.

Each element of the institutional controls corrective action is discussed below.

2.1 Deed Notification

A deed notification shall be filed in the Aiken County Records in accordance with CERCLA 120(h), which requires the government to create a deed when land on which any hazardous substance was stored, released, or disposed is transferred to non-Federal ownership. Per CERCLA 120(h)(3)(A), the deed shall contain, to the extent practical, such information as is available based on the complete search of agency files, to include

- a notice of the type and quantity of such hazardous substances;
- notice of the time at which such storage, release, or disposal took place;
- a description of the remedial action taken, if any;
- a description of any continuing groundwater monitoring requirements.

Per CERCLA 120(h)(3)(B), the deed shall also contain a covenant warranting that

- all remedial action necessary to protect human health and the environment with respect to any such substance remaining on the property has been taken before the date of such transfer;
- any additional remedial action found to be necessary after the date of such transfer shall be conducted by the United States Government;
- a clause granting the United States Government access to the property in any case in which remedial action or corrective action is found to be necessary after the date of such transfer.

This proposal is also consistent with the RCRA permit requirements to insure protection of human health and the environment by maintaining documentation of property restrictions and institutional control requirements through the use of a deed notification.

2.2 Access Controls

2.2.1 On-Site Workers

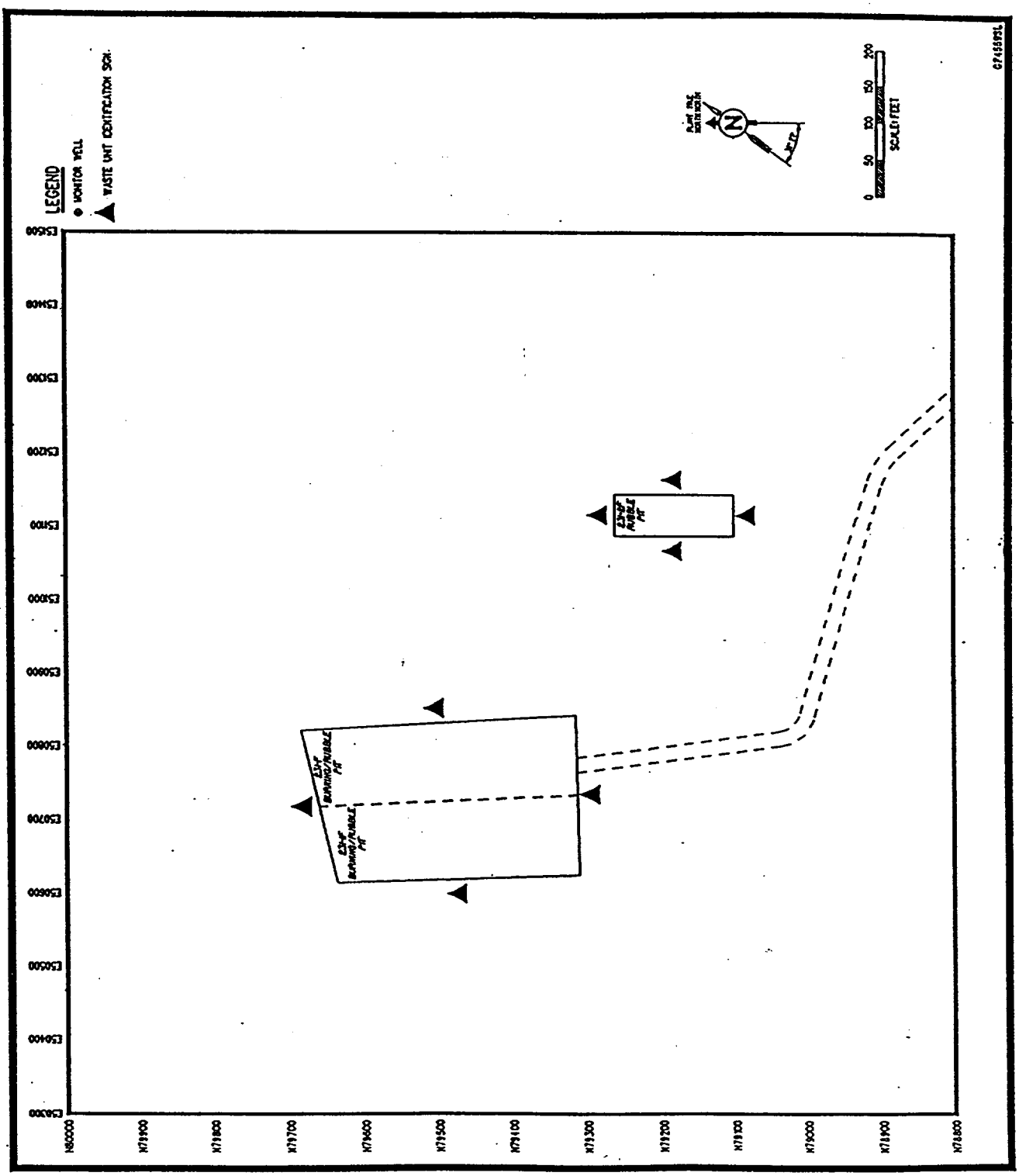
In accordance with WSRC 1D, *Site Infrastructure and Services Manual*, Procedure 3.02, *Site Real Property Configuration Control* (WSRC 1996), use of all lands and waters on the SRS shall be coordinated via the Site Use Program. No use of land (i.e., excavation or any other land use) shall be undertaken without prior approval documented by a Site Use Permit. Also, in accordance with Procedure 3.02, all work at SRS that adds to or modifies features or facilities portrayed on the SRS development maps (i.e., plot plans of facilities/utilities at SRS) is authorized by a Site Clearance Permit before execution. All Site Clearance requests are reviewed to verify that either an approved Site Use Permit has been obtained, or that an existing Site Use Permit has sanctioned the request. Verification of DOE approval for intended land use must be obtained before issuance of a Site Clearance Permit. The Site Use and Site Clearance processes are applicable to all activities and personnel on site (including subcontractors). The processes are controlled within the SRS Quality Assurance Program.

The SRS identifies all buildings and facilities on maps used in the Site Use/Site Clearance Program and includes a 200-foot buffer zone around each facility. This waste unit is identified on these maps as a RCRA/CERCLA facility.

Any work proposed in these areas will be strictly controlled and workers will be appropriately trained and briefed about health and safety requirements if work is deemed necessary for maintenance. Any changes in the use or disturbance of the FBRP will be cleared with the EPA and SCDHEC before the disturbance occurs. To prevent unknowing entry and to ensure that unrestricted use of the waste unit does not occur while under ownership of the government, identification signs will be posted at the waste unit access points (see Figure 3). The signs will be legible from a distance of at least 25 feet. The signs will read:

F-Area Burning/Rubble Pits (231-F and 231-1F) and Rubble Pit (231-2F)
"Danger - Unauthorized Personnel Keep Out.
This waste unit was used to manage hazardous substances.
Do not dig or excavate. Do not enter without contacting
the waste site custodian."
Custodian: Manager, Post Closure Maintenance
Phone: (803) 952-6882

Figure 3 **Location of Waste Unit Identification Signs at the F-Area Burning/Rubble Pits**



Site-specific access controls (i. e., fences) are not required for the FBRP since exposure to the casual worker or trespasser as calculated in the Baseline Risk Assessment does not warrant this level of protection.

2.2.2 Trespassers

Additionally, while under the ownership of the DOE, access control of the entire SRS will continue to be maintained in accordance with the 1992 RCRA Part B Permit Renewal Application, Volume I, Section F.1. This section describes the 24-hour surveillance system (R.61-79.264.14(b)(1)), artificial or natural barriers (R.61-79.264.14(b)(2)(i)), control entry systems (R.61-79.264.14(b)(2)(ii)), and warning signs (R.61-79.264.14(c)) in place at the SRS boundary to comply with the security requirements for a RCRA-permitted facility.

2.3 Field Walkdowns

Field walkdowns of the FBRP, will be conducted semi-annually for items such as accuracy and legibility of identification signs, visible subsidence or erosion of the waste unit, proper vegetation growth, mowing, etc. Subsidence or erosion will be corrected by backfilling the affected area with clean soil and seeding the area to prevent direct exposure of the waste or creation of an exposure pathway. The results of any events and/or actions that would indicate some potential compromise of institutional controls will be documented in the Federal Facility Agreement (FFA) Annual Progress Report. All other routine maintenance activities (i.e., mowing, etc.) will be documented and maintained in files, which are subject to EPA and SCDHEC review and audit. A typical field inspection checklist is included in this document as Attachment A.

2.4 Certification Mechanism

The Vice-President and General Manager of the Environmental Restoration Division, Westinghouse Savannah River Company, and the Director of the Environmental Restoration Division, U.S. Department of Energy, shall certify on an annual basis that the FBRP is currently being restricted per the institutional controls corrective action described in the approved *Record of Decision, Remedial Alternative Selection for the F-Area Burning/Rubble Pits (231-F, 231-1F, and 231-1F) (U)*, WSRC-RP-96-868, Revision 1, February 1997 (WSRC 1997a). This certification shall be included in the FFA Annual Progress Report.

2.5 Additional Groundwater Characterization

Additional groundwater characterization will be performed in the area surrounding the FBRP in an effort to determine the source of trichloroethylene and tetrachloroethylene found in the groundwater in the FBP Groundwater Monitoring Well Series. These activities, listed in the June 12, 1997 letter from DOE to EPA and SCDHEC (DOE 1997), include

- sampling of cone penetrometer locations
- sampling at the seeplines
- installation and sampling of additional monitoring wells

Specific details of these activities were proposed in the Rev 2.3 Workplan Addendum submitted to EPA and SCDHEC in December 1997 (WSRC 1997b). The Program Plan was submitted to EPA and SCDHEC in March 1998.

3.0 SCHEDULE

Waste site identification signs, as described in Section 2.2.1, will be installed during the second calendar quarter of 1998. Semi-annual field walkdowns will be conducted beginning the second calendar quarter of 1998. Additional groundwater characterization will be conducted under the schedule proposed in the June 12, 1997 letter from DOE to EPA and SCDHEC (DOE 1997). Results of additional groundwater characterization will be reported to EPA and SCDHEC as a technical memorandum during the fourth calendar quarter of 1998.

4.0 REFERENCES

DOE 1997. Correspondence: Hennessey, B. T. (DOE) to K. A. Collinsworth (SCDHEC) and J. L. Crane (EPA). "Submittal of the Proposed Revision 2.2 Workplan Addendum Schedule for the F-Area Burning/Rubble Pits (231-F, 231-1F, and 231-2F)." Department of Energy; Savannah River Operations Office; Aiken, South Carolina (June 12).

WRSC 1996. "Procedure 3.02 Site Real Property Configuration Control" in *WSRC 1D Site Infrastructure and Services Manual.* Westinghouse Savannah River Company; Aiken, South Carolina.

WSRC 1997a. *Record of Decision, Remedial Alternative Selection for the F-Area Burning/Rubble Pits (231-F, 231-1F, and 231-2F) (U).* WSRC-RP-96-868, Rev. 1, Westinghouse Savannah River Company; Aiken, South Carolina (February).

WSRC 1997b. *Phase II, RCRA Facility Investigation/Remedial Investigation Plan for the F-Area Burning/Rubble Pits (231-F and 231-1F) and Rubble Pit (231-2F) (U).* WSRC-RP-90-486, Rev. 2.3, Westinghouse Savannah River Company; Aiken, South Carolina (December).

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ATTACHMENT A

FIELD INSPECTION CHECKLIST

TYPICAL

TYPICAL

ER INSPECTION DATA SHEET FOR WASTE SITES

Page 1 of 3

Waste Site: _____ **A = Satisfactory** **X = Unsatisfactory (Comments required)**		Comments or Corrective Action Taken (See Maintenance Register for Corrected Items)
Check for potential encroachments (Ensure that there is no building on the site).		
Does the site have brush or woody vegetation that needs cutting and disposal?		
Does the site need grass cut?		
Verify that the wells and roads are accessible.		
Are the wells properly locked per R.61-71.11.C.6?		

TYPICAL

TYPICAL

ER INSPECTION DATA SHEET FOR WASTE SITES

Page 2 of 3

Waste Site: _____ **A = Satisfactory** **X = Unsatisfactory (Comments required)**		Comments or Corrective Action Taken (See Maintenance Register for Corrected Items)
Is the concrete pad cracked or broken? Is the pad undercut or silted over?		
Is the well properly identified per R.61-71.6H?		
Verify that the wells' posts and protective covers are in place.		
Verify that the waste units' signs have the correct and legible information.		
Does the site show signs of erosion or subsidence? Are there any signs of burrowing animals (holes)?		
Verify that the orange ball markers are in place.		

TYPICAL

TYPICAL

ER INSPECTION DATA SHEET FOR WASTE SITES

Page 3 of 3

Waste Site: _____ **A = Satisfactory** **X = Unsatisfactory (Comments required)**		Comments or Corrective Action Taken (See Maintenance Register for Corrected Items)
Verify that the fence is locked and in good condition (if applicable).		
Check the integrity of drainage ditches (if any) for presence of excessive erosion, sediment buildup, and any debris restricting water flow.		
Does the site need general clean up (housekeeping)?		
Comments:		

Inspected By:_____/_____Date:_____Time:_____

(Print Name) (Signature)

Reviewed By:_____/_____Date:_____Time:_____

PM or Designee (Print Name) (Signature)

Note: EPA and SCDHEC most be notified within 30 days of identification of any area where any breach or compromise or compromise of restrictions placed on this institutional control operable unit has occurred.

LUCIP for the
L-Area Southern Groundwater Operable Unit
Land Use Control Implementation Plan for L-Area Southern Groundwater Operable Unit
(WSRC-RP-2007-4049, Revision 1, April 2009)

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United States Department of Energy

Savannah River Site

Land Use Control Implementation Plan for L-Area Southern Groundwater Operable Unit (NBN) (U)

CERCLIS NUMBER: 77

WSRC–RP-2007-4049

Revision 1

February 2008

Prepared by:
Washington Savannah River Company LLC
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Prepared for the U. S. Department of Energy Under Contract No. DE-AC09-96SR18500

DISCLAIMER

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Washington Savannah River Company LLC
Aiken, South Carolina

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LIST OF ACRONYMS AND ABBREVIATIONS

ARAR	applicable or relevant and appropriate requirement
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CERCLIS	Comprehensive Environmental Response, Compensation, and Liability Information System
CMS/FS	corrective measures study/feasibility study
COC	constituent of concern
CPT	cone penetrometer technology
ECA	environmental compliance authority
FFA	Federal Facility Agreement
HAZWOPER	Hazardous Waste Operations and Emergency Response
IC	institutional control
LADB	L-Area Disassembly Basin
LASG	L-Area Southern Groundwater
LLC	limited liability company
LUC	land use control
LUCAP	Land Use Control Assurance Plan
LUCIP	Land Use Control Implementation Plan
µg/L	microgram per liter
MCL	maximum contaminant level
MNA	monitored natural attenuation
NBN	no building number
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
OU	operable unit
PCE	tetrachloroethylene
pCi/mL	picocurie per milliliter
QA	quality assurance
RA	remedial action
RAO	remedial action objective
RCOC	refined constituent of concern
RCRA	Resource Conservation and Recovery Act
RG	remedial goal
RI	remedial investigation
ROD	record of decision

LIST OF ACRONYMS AND ABBREVIATIONS *(Continued)*

SCDHEC	South Carolina Department of Health and Environmental Control
SGCP	Soil and Groundwater Closure Projects
SRS	Savannah River Site
TCE	trichloroethylene
USDOE	United States Department of Energy
USEPA	United States Environmental Protection Agency
VOC	volatile organic compound
WSRC	Westinghouse Savannah River Company LLC prior to December 8, 2005; Washington Savannah River Company LLC after December 8, 2005

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1.0 INTRODUCTION

This Land Use Control Implementation Plan (LUCIP) has been prepared for L-Area Southern Groundwater (LASG) Operable Unit (OU) at the Savannah River Site (SRS). Groundwater is the only environmental medium that will be addressed by the selected remedy at the LASG OU. The selected remedy is monitored natural attenuation (MNA) with institutional controls (ICs). The purpose of the LUCIP is to describe how the land use controls (LUCs) selected in the LASG Record of Decision (ROD) will be implemented and maintained. The anticipated future land use for the LASG OU is industrial. The following LUCs objectives have been selected for this OU:

- preclude future residential development or potable water use of local contaminated groundwater;

- maintain the integrity of any current or future remedial or monitoring system or component such as monitoring wells until remedial goals are achieved and restrictions are no longer warranted, and

- prevent access to contaminated groundwater in the area as long as contaminant concentrations exceed MCLs for purposes other than implementing the selected remedy.

The selected remedy leaves contaminated groundwater in place that poses a potential future risk to residents or on-site workers and will require land use restrictions until the contaminant concentrations are at levels that allow unrestricted use and unlimited exposure. As agreed on March 30, 2000, among the United States Department of Energy (USDOE), the United States Environmental Protection Agency (USEPA), and the South Carolina Department of Health and Environmental Control (SCDHEC), SRS implemented a Land Use Control Assurance Plan (LUCAP) (WSRC 1999) to ensure that the LUCs required by numerous remedial decisions at SRS are properly maintained and periodically verified. The requirements of that LUCAP also apply to the LUCs that were

selected as part of the remedial action (RA) for the LASG OU. This additional document, the LASG OU LUCIP, contains the detailed and specific measures required to implement and maintain the LUCs selected as part of this particular remedial decision. The LUCs shall be maintained until the OU is suitable for unlimited exposure and unrestricted use. Approval by USEPA and SCDHEC is required for any modification or termination of the ICs.

USDOE is responsible for implementing, maintaining, monitoring, reporting, and enforcing the LUCs in accordance with the approved LUCIP. Upon final approval, the LUCIP will be appended to the LUCAP and should be considered incorporated by reference into the LASG OU ROD (WSRC 2007a), establishing implementation and maintenance requirements for the LUCs under the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) and the SRS Federal Facility Agreement (FFA). The LUCIP will remain in effect unless and until modifications are approved by USEPA and SCDHEC as necessary for protection of human health and the environment. This LUCIP will be evaluated for accuracy and protectiveness during the five-year remedy review, and any approved LUCIP modification will be appropriately documented for incorporation by reference into the LASG OU ROD.

1.1 Format of LUCIP

The format of this LUCIP is consistent with the FFA protocol format approved by the USEPA and SCDHEC in March 2004.

2.0 OVERVIEW OF LASG OU REMEDIAL ACTION

2.1 Description of LASG OU

L Area is located in the south-central portion of SRS. The L-Area Reactor achieved criticality in August 1954 and operated from 1954 to 1968 and 1984 to 1988. Between 1968 and 1984, the status of L Reactor was warm standby due to decreased demand for

plutonium and tritium. L Lake was constructed in 1985 as a cooling pond for L-Reactor. It covers 1,034 acres and contains 7-billion gallons of water.

The LASG OU encompasses all of the groundwater from the L-Area groundwater divide south to L Lake. The original pre-work plan characterization LASG OU covered about 1,250 acres and included several remediated/depleted source units. These source units supported past production activities at L-Reactor and other production areas that produced nuclear materials for national defense. Past activities at the source units have resulted in groundwater contamination beneath LASG OU. As the result of characterization activities, SRS has identified the areas in which groundwater contamination exceeds applicable maximum contaminant levels (MCLs) and developed a LUC outline. The LUC outline, comprising approximately 950 acres, includes all groundwater contaminated above MCLs within the OU and under adjacent portions of L Lake, including a buffer zone to allow for changes in plume geometry over time. Restrictions on the use of groundwater within the LUC outline will be enforced as long as contaminant levels exceed MCLs.

The LASG OU has been administratively separated from surficial source units to provide a comprehensive evaluation of groundwater beneath southern L Area. The remedy selected under the LASG ROD only addresses contaminated groundwater. Recognized source units within L Area have been remediated to reduce the toxicity, mobility, or volume of the contamination that constituted sources of contamination to the groundwater. The source units were previously remediated under the appropriate unit-specific RODs.

2.2 Nature and Extent of Contamination at the LASG OU

The extent of the known contaminated groundwater above MCLs is limited to the Upper Three Runs aquifer. Additional wells to be installed as part of the effectiveness monitoring network will verify the vertical extent of contamination. Groundwater contamination at the LASG OU comprises three plumes (see Appendix A, Figure A-1):

- the western tritium plume, which originated at the L-Area Emergency Retention Basin;

- the southwest commingled volatile organic compounds (VOCs) and tritium plume, which originated in the vicinity of the L-Area Disassembly Basin (LADB); and

- the southeast commingled VOC and tritium plume, with likely sources in L-Area Reactor Seepage Basin, the L-Area Oil and Chemical Basin, and the L-Area Hot Shop.

The refined constituents of concern (RCOCs) for LASG OU are tetrachloroethylene (PCE), trichloroethylene (TCE), and tritium; these were applicable or relevant and appropriate requirement (ARAR) constituents of concern (COCs) because they all exceeded the MCLs. VOCs (PCE and TCE) are not present in the western tritium plume. The lateral extent of contamination above MCLs is shown in Figure A-1 since tritium has the largest footprint. The highest contaminant levels observed in local groundwater, broken into three groups (Pre-work plan remedial investigation [RI], RI, and Post-RI), are summarized in the following insert; cone penetrometer technology (CPT) data are included in the pre-RI data set.

RCOC	MCL	Pre-RI	RI	Post-RI
Tritium	20 pCi/mL	26,200	5,850	1,230
PCE	5 µg/L	165	58	60
TCE	5µg/L	124	9	21

A baseline risk assessment was not performed for the LASG OU. In place of a human health baseline risk assessment, regulatory concurrence was obtained to use MCLs (South Carolina Primary Drinking Water Regulation SC R61-58.5) as a point of comparison for definition of the problem(s) because the only medium under consideration in the LASG OU is groundwater. Using MCLs as a point of comparison is appropriate because MCL exceedances by RCOCs in groundwater provide the basis for demonstrating that an RA is

necessary to prevent human exposure, determining the appropriate RA, and justifying performance of the RA.

2.3 Remedial Action Selected

The remedial action objectives (RAOs) for the LASG OU are:

- Prevent human (current remedial workers, future industrial workers, hypothetical future residents, and current and future trespassers) exposure to groundwater above MCLs.

- Treat and/or mitigate groundwater contaminated above MCLs to mitigate the discharge of groundwater with contaminants above MCLs to L Lake

The selected RA established in the ROD is based on an evaluation of potential alternatives performed in accordance with the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) and CERCLA (as amended). As stated in the ROD (WSRC 2007a), the selected RA for the LASG OU is MNA/IC. The bases for selecting MNA/IC over the more robust technologies considered in the corrective measures study/feasibility study (CMS/FS) (WSRC 2006a) are as follows:

- There are no active, continuing sources of groundwater contamination at the LASG OU. The identified sources are remediated, depleted, or still active facilities; LADB is still in service as the receiving basin for offsite fuel assemblies.

- Numerous proven treatment technologies are available for VOC contamination, but there is no practicable treatment technology for tritium in groundwater.

- Natural attenuation processes (dispersion, dilution, and radioactive decay) are occurring at the LASG OU and are effective in reducing VOC and tritium contaminant concentrations below remedial goals (RGs) in L Lake.

- MNA/IC will achieve the LASG OU RAOs within a time frame (approximately 90 years) that is comparable to that offered by the more robust technologies and at significantly lower cost.

- Groundwater discharge to surface water is not impacting human health or ecological receptors.

The components of MNA/IC at the LASG OU will include the following:

- ICs at LASG OU will consist of general site access controls, groundwater use restrictions, the SRS Site Use/Site Clearance program, and deed restrictions and notifications.

- Contaminant concentrations in local groundwater and surface water will be reduced by natural attenuation processes including dispersion, dilution, and radioactive decay.

- The long-term monitoring of groundwater conditions in the plumes and surface water conditions in L Lake will allow an evaluation of the performance of the selected remedy and changing conditions in LASG OU.

- The ROD RA will be reviewed every five years to ensure that the selected remedy remains protective of human health and the environment.

Based on modeling and current conditions, RAOs and RGs are expected to be achieved in the western tritium plume in approximately 30 years and in the commingled VOCs and tritium plumes in approximately 90 years. MNA/IC will continue until the FFA Core Team agrees that RAOs and RGs have been met.

The post-RA conceptual site model (see Appendix B, Figure B-1 to this LUCIP) shows the broken pathways and the remaining residual risk to the future industrial worker.

The Savannah River Site Future Use Project Report (USDOE 1996) recommends that residential use of SRS land should be prohibited.

3.0 LAND-USE CONTROL OBJECTIVES

The following LUC objectives have been developed to ensure the protectiveness of the remedy described above:

- Preclude future residential development or potable water use of local contaminated groundwater. This LUC objective attains the RAO to prevent human (current remedial workers, future industrial workers, hypothetical future residents, and current and future trespassers) exposure to groundwater above MCLs.

- Maintain the integrity of any current or future remedial or monitoring system or component such as monitoring wells until RGs are achieved and restrictions are no longer warranted. This LUC objective attains the RAOs to treat and/or mitigate groundwater contaminated above MCLs and to mitigate the discharge of groundwater with contaminants above MCLs to L Lake.

- Prevent access to contaminated groundwater in the area as long as contaminant concentrations exceed MCLs for purposes other than implementing the selected remedy. This LUC objective attains the RAO to prevent human exposure to groundwater above MCLs.

4.0 IMPLEMENTATION OF LAND-USE CONTROLS

This section describes the LUCs selected in the ROD to achieve the objectives stated in Section 3.0. This description is included in Table 1. USDOE is responsible for implementing, maintaining, reporting on, and enforcing the LUCs required for the LASG OU. The LUCIP will become enforceable and will be implemented when approved by USEPA and SCDHEC. USDOE shall notify USEPA and SCDHEC 60 days prior to

implementation of any proposed land use changes that are inconsistent with LUC objectives or the selected remedy.

The LASG OU will be maintained as an industrial use area by implementation of the property record notices (Section 4.1), property record restrictions (Section 4.2), and the use of a certified LUC survey plat (Section 4.3).

The Site Use Program (Section 4.4) will be implemented to prevent onsite worker exposure to contaminated groundwater. Other existing measures that will also be used to ensure the safety of onsite workers at LASG OU include the Site Clearance Program, worker training, procedures, health and safety requirements, work controls, and jobsite briefings.

4.1 Property Record Notices

In the long term, if the property is ever transferred to non-federal ownership, the United States Government will take those actions necessary pursuant to Section 120(h) of CERCLA. Those actions will include a deed notification disclosing former onsite nuclear materials production, waste management, and disposal activities; areas of groundwater contamination that have exceeded MCLs; and RAs taken on the site. The contract for sale and the deed will contain the notification required by CERCLA Section 120(h).

The deed notification shall notify any potential purchaser that local groundwater beneath the property has been contaminated as a result of industrial activities. This requirement is consistent with the intent of Resource Conservation and Recovery Act (RCRA) deed notification requirements at final closure of a RCRA facility if contamination will remain at the unit.

4.2 Property Record Restrictions

The deed shall also include restrictions precluding residential use of the property, specifically preventing the installation of any groundwater supply well within the contaminated aquifer so that groundwater containing contaminants exceeding MCLs cannot be used for drinking water. The deed shall contain provisions to ensure that these restrictions remain with the affected area upon any and all transfers. USDOE shall provide a copy of the executed deeds to the regulatory agencies as soon as practicable after the transfer of fee title, but no later than 30 days. However, the need for these deed restrictions may be re-evaluated at the time of transfer in the event that exposure assumptions differ and/or the groundwater contamination levels no longer exceed MCLs. Any re-evaluation of the need for the deed restrictions will be done though an amended ROD.

USDOE shall notify USEPA and SCDHEC six months prior to property transfer to ensure that USEPA and SCDHEC can be involved in discussions to ensure that appropriate provisions are included in the transfer terms or conveyance documents to maintain effective ICs. If it is not possible for the facility to notify USEPA and SCDHEC at least six months prior to any transfer or sale, then the facility will notify USEPA and SCDHEC as soon as possible but no later than 60 days prior to the transfer or sale of any property subject to ICs. In addition to the land transfer notice and discussion provisions above, USDOE further agrees to provide USEPA and SCDHEC with similar notice, within the same time frames, as to property transfer between federal entities.

Table 1. Land Use Controls for LASG OU

Type of Control	Purpose of Control	Duration	Implementation	Affected Areas[a]
1. Property Record Notices[b]	Provide notice to anyone searching records about the existence and location of contaminated areas.	Until the concentrations of hazardous substances associated with the unit have been reduced to levels that allow for unlimited exposure and unrestricted use.	Notice recorded by USDOE in accordance with state laws at County Register of Deeds office if the property or any portion thereof is ever transferred to non-federal ownership.	Areas of groundwater contamination exceeding MCLs.
2. Property record restrictions[c]: Groundwater	Prohibit the use of groundwater in areas of known or suspected contamination.	Until the concentration of hazardous substances associated with the unit have been reduced to levels that allow for unlimited exposure and unrestricted use.	Drafted and implemented by USDOE upon any transfer of affected areas. Recorded by USDOE in accordance with state law at County Register of Deeds office.	Areas of groundwater contamination exceeding MCLs.
3. Other Notices[d]	Provide notice to city and/or county about the existence and location of waste disposal and residual contamination areas for zoning/planning purposes.	Until the concentrations of hazardous substances associated with the unit have been reduced to levels that allow for unlimited exposure and unrestricted use.	Notice recorded by USDOE in accordance with state laws at County Register of Deeds office if the property or any portion thereof is ever transferred to non-federal ownership.	Areas of groundwater contamination exceeding MCLs.
4. Site Use Program[e]	Provide notice to worker/developer (i.e., permit requestor) on extent of contamination and limit penetration activities to those approved by SRS.	As long as property remains under USDOE control	Implemented by USDOE. Initiated by permit request	Areas where groundwater contamination exceeds MCLs.
5. Physical Access Controls[f] (e.g., gates, portals)	Control and restrict general site access by workers and the public to prevent unauthorized entry.	Until the concentrations of hazardous substances associated with the unit have been reduced to levels that allow for unlimited exposure and unrestricted use.	Controls maintained by USDOE	At gated SRS entrances from major public roadways.
6. Security Surveillance Measures	Control and monitor access by workers/public	Until the concentrations of hazardous substances associated with the unit have been reduced to levels that allow for unlimited exposure and unrestricted use.	Established and maintained by USDOE Necessity of patrols evaluated upon completion of remedial actions.	Patrol of selected areas throughout SRS as necessary.

Table 1. Land Use Controls for LASG OU *(Continued)*

[a]Affected areas – Specific locations identified in the SRS LUCIP or subsequent post-ROD documents.

[b]Property Record Notices – Refers to any non-enforceable, purely informational document recorded along with the original property acquisition records of USDOE and its predecessor agencies that alerts anyone searching property records to important information about residual contamination and waste disposal areas in the property.

[c]Property Record Restrictions – Includes conditions and/or covenants that restrict or prohibit certain uses of real property and are recorded along with original property acquisition records of USDOE and its predecessor agencies.

[d]Other Notices – Includes information on the location of waste disposal areas and residual contamination depicted on the survey plat, which is provided to a zoning authority (i.e., city planning commission) for consideration in appropriate zoning decisions for non-USDOE property.

[e]Site Use Program – Refers to the internal USDOE/USDOE contractor administrative program(s) that requires the permit requestor to obtain authorization, usually in the form of a permit, before beginning any penetration activity (e.g., well drilling) for the purpose of ensuring that the proposed activity will not affect underground utilities/structures, or in the case of contaminated groundwater, will not disturb the affected areas without appropriate precautions and safeguards.

[f]Physical Access Controls – Physical barriers or restrictions to entry.

4.3 Other Public Notices

The LASG OU LUC outline, shown on the design sketch in Appendix A, encloses the area under land use restriction because contaminant concentrations in local groundwater exceed MCLs. The sketch provides a plan view of the LASG OU with the plumes outlined by the 20-pCi/mL tritium contour that encloses all groundwater exceeding the tritium MCL. Only the tritium plumes are shown on the design sketch for clarity and conciseness. In the commingled VOC and tritium plumes, there are a few small areas where PCE or TCE exceeds their MCL beyond the 20-pCi/mL tritium contour, but all areas of MCL exceedance are enclosed by the LASG OU LUC outline, which also provides a 200-m buffer zone around all MCL exceedances. Preparation of a survey plat will be deferred until the site is transferred to non-federal ownership. If the survey plat for the surface area subject to LUCs is prepared at the time the land is transferred, the description of the groundwater area under restrictive covenant will be more current and accurate. The deferred survey plat will be appended to this LUCIP when it is completed.

In addition, if the site is ever transferred to non-federal ownership, a professional land surveyor-certified survey plat of the OU will be prepared at or near the time of conveyance to support the LUCIP-required restrictive covenants on land use and will be recorded with the appropriate county recording agency.

4.4 Site Use Program

Under USDOE Order 430.1A, *Life Cycle Management* (USDOE 1998), SRS is required to implement an asset management program for the use, maintenance, and disposal of physical assets, including real estate. SRS complies with this Order through its Site Use Program, which is conducted in accordance with WSRC 1D, *Site Infrastructure and Services Manual*, Procedure 3.02, "Site Real Property Configuration Control" (WSRC 2006b). All employees, contractors, and visitors at SRS are required to adhere to the Site Use Program. No land use (e.g., excavation, well installation, or any other land use) shall be undertaken without prior approval documented by a Site Use Permit. Also, in

accordance with WSRC 1D, Procedure 3.02, all work at SRS that adds to or modifies features or facilities portrayed on SRS development maps (i.e., plot plans of facilities/utilities at SRS) will be authorized by a Site Clearance Permit before any activities are conducted. All Site Clearance Requests will be reviewed to verify that either an approved Site Use Permit has been obtained or that the request is sanctioned by an existing Site Use Permit. All land use requirements applicable for the OU will be provided to the Site Use Program for use in determining issuance of Site Clearance Permits. In addition, the Site Use Permit must be amended when the geographic configuration or buffer zone used to establish the permit boundary changes or there is a change to the permitted land use.

SRS is responsible for updating, maintaining, and reviewing site maps, including FFA (1993) OU identifications. If a Site Clearance Request potentially impacts an FFA OU, the Site Clearance Request Form is sent to the appropriate FFA OU reviewer for approval. The roles and responsibilities of each individual are detailed in WSRC 1D, Procedure 3.02. Before a Site Clearance Permit is issued, verification of USDOE approval for intended land use must be obtained. The site use and site clearance processes are applicable to all activities and personnel on site (including subcontractors). USDOE will notify USEPA and SCDHEC in advance of any change to any internal procedure, including the Site Use Program, that would affect implementing or maintaining the LUCs. The processes are controlled within the SRS Quality Assurance (QA) Program in accordance with WSRC 1Q Manual, *Quality Assurance* (WSRC 2007b). The SRS QA program governs all SRS activities.

SRS identifies all buildings and facilities on maps used in the Site Use Program. This waste unit is identified on these maps as a CERCLA facility.

Any work proposed in these areas will be strictly controlled, and workers will be appropriately trained and briefed about health and safety requirements if work is deemed necessary for maintenance. No change in land use at the LASG OU shall be undertaken without USEPA and SCDHEC approval. Approval by USEPA and SCDHEC is required

for any modification or termination of the ICs and implementation actions, and USDOE must obtain USEPA and SCDHEC approval that a proposed new land use is sufficiently protective.

4.5 Physical Access Controls

No physical access controls are required at the LASG OU. As discussed in item 5 of Table 1, SRS site boundary fencing and security personnel will prevent trespassers from gaining access to the monitoring wells.

4.6 Warning Signs

Warning signs were not included among the LUCs in the ROD because the depth to contaminated groundwater is generally a sufficient barrier to prevent exposure.

4.7 Other Access Controls and Security/Surveillance Measures

While under the ownership of USDOE, access control of the entire SRS will be maintained in accordance with the 1992 RCRA Part B Permit Renewal Application, Volume I, Section F.1. This section describes the 24-hour surveillance system (R.61-79.264.14(b)(1)), artificial or natural barriers (R.61-79.264.14(b)(2)(I)), control entry systems (R.61-79.264.14(b)(2)(ii)), and access control warning signs (R.61-79.264.14(c)) in place at the SRS boundary to comply with the security requirements for a RCRA-permitted facility.

4.8 Field Inspection and Maintenance for Institutional Controls

Custodial responsibilities for maintenance and inspection of the LASG OU will be maintained by the Post-Closure Maintenance Group within Soil and Groundwater Closure Projects (SGCP).

The LASG OU is a groundwater OU and the only surface facilities associated with the LASG OU are the groundwater monitoring wells. The wells will be inspected and

maintenance will be performed as needed in accordance with SGCP Monitoring Well Procedures (WSRC 2005). USEPA and SCDHEC will be notified within 30 days of identification by USDOE of any events and/or actions that indicate potential compromise of the ICs, including any activity that is inconsistent with the IC objectives or use restrictions, or any other action that may interfere with the effectiveness of the ICs and the proposed action to address the potential compromise. The FFA Annual Progress Report, submitted to the regulatory agencies by the USDOE, will provide the status of the ICs and how any IC deficiencies or inconsistent uses have been addressed. In the event of property transfer or lease, the Annual Report will cite findings on the following: whether the use of the property is affected by the deed or lease restrictions and controls; whether property use conforms with the deed or lease restrictions and controls; and whether the owners and state/local agencies have been notified regarding the deed or lease restrictions and controls.

All other routine maintenance activities will be documented and maintained in files subject to USEPA and SCDHEC review and audit. A copy of the completed inspection form is maintained in the SGCP Document Control Center. The LUCs shall be maintained until the concentrations of hazardous substances associated with the unit have been reduced to levels that allow for unlimited exposure and unrestricted use.

5.0 REFERENCES

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

USDOE, 1996. *Savannah River Site Future Use Project Report, Stakeholder-Preferred Recommendations for SRS Land and Facilities*, USDOE Savannah River Operations Office, Aiken, SC

USDOE, 1998. DOE Order 430.1A, *Life Cycle Management* (Approved October 14, 1998)

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

WSRC, 2005. *Hydrogeologic Data Collection Methods, Procedures and Specifications*, Manual 3Q5, Revision 5 (formerly DPSOP 254), adapted by Westinghouse Savannah River Company from E.I. du Pont de Nemours and Company, Savannah River Site, Aiken, SC

WSRC, 2006a. *Corrective Measures Study/ Feasibility Study Report for the L-Area Southern Groundwater Operable Unit (NBN) (U),* WSRC-RP-2005-4025, Rev. 1.1, Washington Savannah River Company, Savannah River Site, Aiken, SC

WSRC, 2006b. *Site Infrastructure and Services Manual (U),* WSRC Procedure Manual 1D, Procedure 3.02, "Site Real Property Configuration Control," Westinghouse Savannah River Company, Savannah River Site, Aiken, SC

WSRC, 2007a. *Record of Decision/Remedial Alternative Selection for the L-Area Southern Groundwater Operable Unit (NBN) (U).* WSRC-RP-2006-4052, Revision 1.1. Washington Savannah River Company, Savannah River Site, Aiken, SC

WSRC, 2007b. *Quality Assurance (U)*, WSRC Procedure Manual 1Q, Westinghouse Savannah River Company, Savannah River Site, Aiken, SC

APPENDIX A

LAND USE CONTROL IMPLEMENTATION PLAN DRAWING

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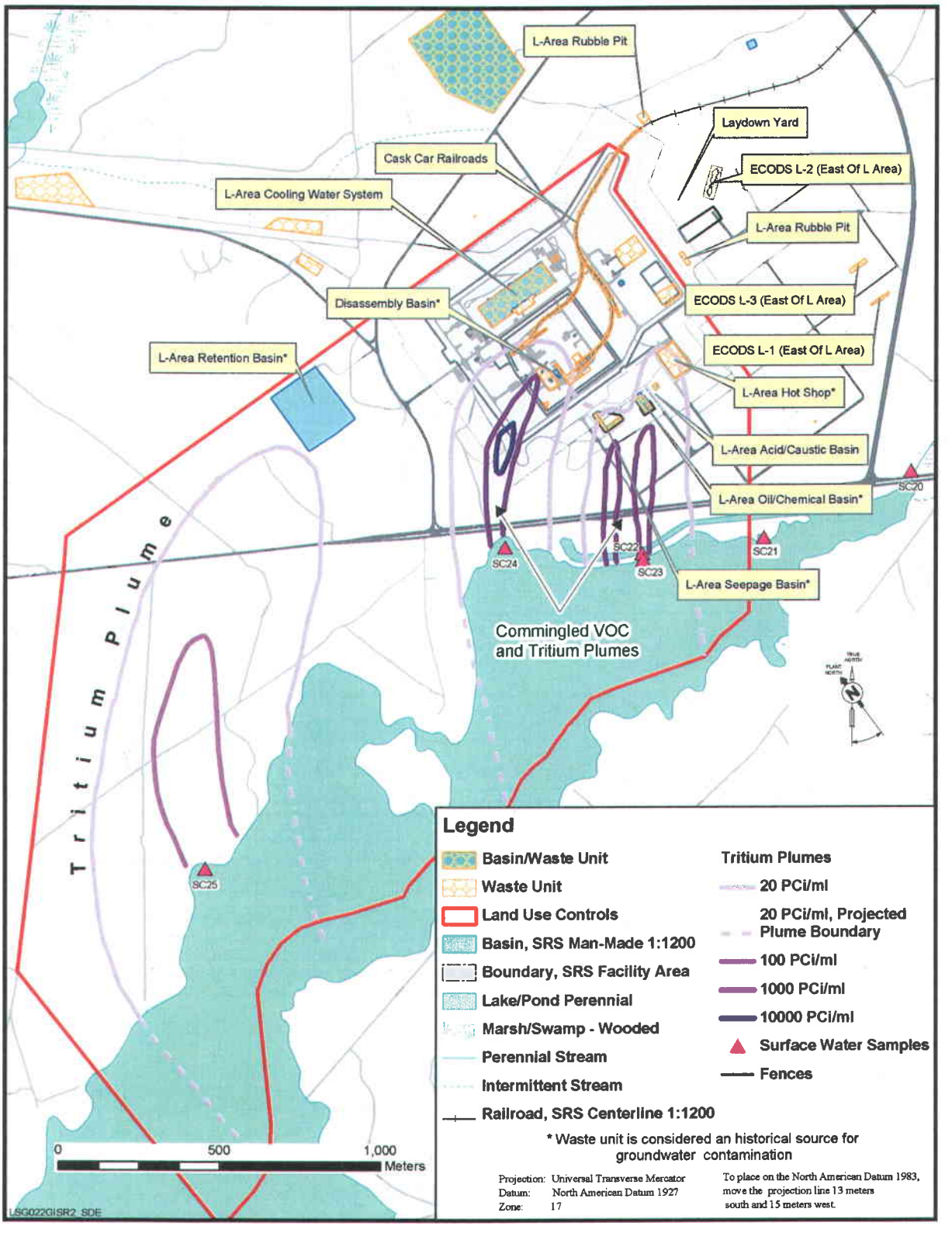


Figure A-1. Land Use Control Implementation Plan As-Built Drawing for LASG OU

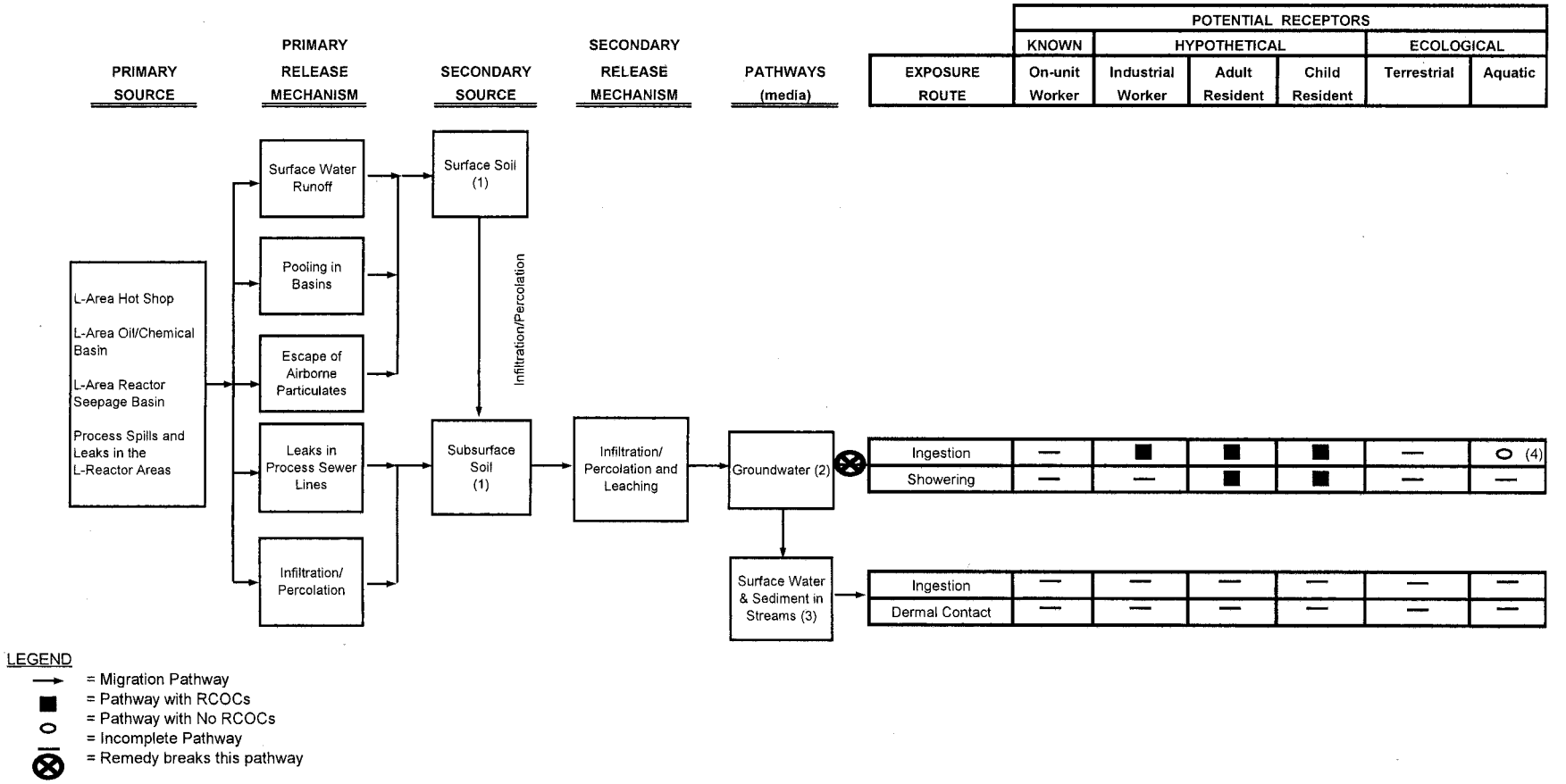
The Universal Transverse Mercador (UTM) coordinates for the major vertices of the LUC polygon are listed in the insert below. The corners are listed in clockwise order beginning with the most northerly corner, where the railroad tracks enter L Area.

Corner	UTM E	UTM N
NE1	442082.369	3675247.601
NE2	442141.219	3675211.500
NE3	4421010250	3675106.500
E	442521.164	3674526.899
SE	442522.012	363792.900
Drowned Steel Creek Channel		
S	440888.514	3671871.946
W	440254.562	3672671.249
NW	440404.026	3674025.446

APPENDIX B

POST-REMEDIAL ACTION CONCEPTUAL SITE MODEL FOR L-AREA SOUTHERN GROUNDWATER OPERABLE UNIT

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(1) Soils have been or will be addressed with the surface units
(2) Standard exposure scenarios are presented basd on MCL (ARAR) exceedances.
(3) Impact surface water/sediments will be addressed as part of the L-Lake OU in the Steel Creek IOU
(4) Groundwater does not provide an exposure pathway for ecological receptors; however, groundwater has been evaluated for ecological impact at the groundwater-surface water interface.

Figure B-1. Post-Remedial Action Conceptual Site Model for LASG OU

LUCIP for the C-Burning/Rubble Pit Operable Unit (131-C) and Old C-Area Burning/Rubble Pit (NBN)

Land Use Control Implementation Plan for the C-Burning/Rubble Pit Operable Unit (131-C) and Old C-Area Burning/Rubble Pit (NBN) (WSRC-RP-2008-4050, Revision 1.1, April 2009)

The LUCIP doesn't specify an inspection frequency. Therefore, DOE submitted a letter to the EPA and SCDHEC requesting approval to perform the inspections on an annual basis in accordance with the approved ICMI/Remedial Design/Remedial Design Report/Remedial Action Work Plan (WSRC-RP-98-4058, Revision 1.1, January 1999) (see ACP-10-276 dated October 1, 2010, ARF #017162). The EPA and SCDHEC approved the request in letters dated October 25, 2010 (ARF #017203) and October 29, 2010 (ARF #017204), respectively.

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United States Department of Energy

Savannah River Site

Land Use Control Implementation Plan for the C-Area Burning/Rubble Pit Operable Unit (131-C) and Old C-Area Burning/Rubble Pit (NBN) (U)

CERCLIS NUMBER: 31

WSRC–RP-2008-4050

Revision 1.1

April 2009

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LIST OF ACRONYMS AND ABBREVIATIONS

ACP	Area Completion Projects
ARAR	applicable or relevant and appropriate requirement
AS	air sparging
CBRP	C-Area Burning/Rubble Pit (131-C) Operable Unit and Old C-Area Burning/Rubble Pit (NBN)
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CERCLIS	Comprehensive Environmental Response, Compensation, and Liability Information System
CM	contaminant migration
Eco	ecological
FFA	Federal Facility Agreement
HAZWOPER	Hazardous Waste Operations and Emergency Response
HH	human health
IA	interim action
IC	institutional control
LLC	limited liability company
LUC	land use control
LUCAP	Land Use Control Assurance Plan
LUCIP	Land Use Control Implementation Plan
µg/L	microgram per liter
µg/kg	microgram/kilogram (parts per billion)
MCL	maximum contaminant level
MNA	monitored natural attenuation
NAD	North American Datum 1927
NBN	no building number
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
OU	operable unit
QA	quality assurance
RA	remedial action
RAO	remedial action objective
RCOC	refined constituent of concern
RCRA	Resource Conservation and Recovery Act
RFI/RI	RCRA facility investigation/remedial investigation
RGO	remedial goal option
RI	remedial investigation
ROD	record of decision
SCDHEC	South Carolina Department of Health and Environmental Control
SGCP	Soil and Groundwater Closure Projects
SRS	Savannah River Site
SVE	soil vapor extraction

LIST OF ACRONYMS AND ABBREVIATIONS *(Continued)*

TBC	to-be-considered
USDOE	United States Department of Energy
USEPA	United States Environmental Protection Agency
UTM	Universal Transverse Mercator
VOC	volatile organic compound
WSRC	Westinghouse Savannah River Company LLC prior to December 8, 2005; Washington Savannah River Company LLC after December 8, 2005

1.0 INTRODUCTION

This Land Use Control Implementation Plan (LUCIP) has been prepared for C-Area Burning/Rubble Pit (CBRP) Operable Unit (OU) (131-C) and Old C-Area Burning/Rubble Pit (no building number [NBN]) at the Savannah River Site (SRS). The purpose of the LUCIP is to describe how the land use controls (LUCs) selected in the CBRP Record of Decision (ROD) will be implemented and maintained. The anticipated future land use for the CBRP OU is industrial. The following LUC objectives have been selected for this OU:

- Restrict on-site worker access and prevent unauthorized contact, removal, or excavation of contaminated media (i.e., surface and vadose zone soils)
- Maintain the integrity of any current or future remediation or monitoring systems (i.e., soil cover, soil vapor extraction [SVE] systems, and groundwater monitoring wells)
- Prevent access to or use of groundwater and surface water until remedial goals options (RGOs) are attained
- Prohibit the development and use of property for residential housing, elementary schools, childcare facilities, and playgrounds
- Prevent construction of inhabitable buildings without an evaluation of indoor air quality to address vapor intrusion

The selected remedy leaves contaminated groundwater in place that poses a potential future risk to residents or on-site workers and will require land use restrictions until the contaminant concentrations are at levels that allow unrestricted use and unlimited exposure. As agreed on March 30, 2000, among the United States Department of Energy (USDOE), the United States Environmental Protection Agency (USEPA), and the South Carolina Department of Health and Environmental Control (SCDHEC), SRS implemented a Land Use Control Assurance Plan (LUCAP) (WSRC 1999) to ensure that the LUCs required by numerous remedial decisions at SRS are properly maintained and periodically verified. The requirements of that LUCAP also apply to the LUCs that were selected as part of the remedial action (RA) for the CBRP OU. This additional document, the CBRP OU LUCIP, contains the detailed and specific measures required

to implement and maintain the LUCs selected as part of this particular remedial decision. The LUCs shall be maintained until the OU is suitable for unlimited exposure and unrestricted use. Approval by USEPA and SCDHEC is required for any modification or termination of the institutional controls (ICs).

USDOE is responsible for implementing, maintaining, monitoring, reporting, and enforcing the LUCs in accordance with the approved LUCIP. Upon final approval, the LUCIP will be appended to the LUCAP and should be considered incorporated by reference into the CBRP OU ROD (WSRC 2008), establishing implementation and maintenance requirements for the LUCs under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and the SRS Federal Facility Agreement (FFA). The LUCIP will remain in effect unless and until modifications are approved by USEPA and SCDHEC as necessary for protection of human health and the environment. This LUCIP will be evaluated for accuracy and protectiveness during the five-year remedy review, and any approved LUCIP modification will be appropriately documented for incorporation by reference into the CBRP OU ROD.

1.1 Format of LUCIP

The format of this LUCIP is consistent with the FFA protocol format approved by USEPA and SCDHEC in March 2004.

2.0 OVERVIEW OF CBRP OU REMEDIAL ACTION

2.1 Description of CBRP OU

C Area is located in the central portion of SRS. C Reactor achieved criticality in March 1955 and operated until June 1985 when it was placed in warm standby. The reactor was placed in cold standby in 1987. All of the SRS production reactors were shut down as of February 1996.

The CBRP OU LUC outline encompasses all of the groundwater from CBRP west to Fourmile Branch, comprising about 130 acres. The CBRP OU included source units that supported past production activities at C Reactor and other production areas that produced nuclear materials for

national defense. Past activities at the source unit have resulted in groundwater contamination beneath CBRP OU. As the result of characterization activities, SRS has identified the areas in which groundwater contamination exceeds applicable maximum contaminant levels (MCLs) and developed a LUC outline. The LUC outline includes all groundwater contaminated above MCLs within the OU, including a buffer zone to allow for changes in plume geometry over time. Restrictions on the use of groundwater within the LUC outline will be enforced as long as contaminant levels exceed MCLs.

Recognized source units at CBRP have been remediated to reduce the toxicity, mobility, or volume of the contamination that constituted sources of contamination to the groundwater. The source units were previously remediated under the unit-specific interim ROD (WSRC 1998).

2.2 Nature and Extent of Contamination at the CBRP OU

The extent of the known contaminated groundwater above MCLs is limited to the Upper Three Runs (water table) aquifer. Additional wells to be installed as part of the effectiveness monitoring network will verify the vertical extent of contamination.

CBRP OU groundwater emerges along seeplines in the Twin Lakes wetland and Fourmile Branch; these are the only bodies of surface water impacted by CBRP OU refined constituents of concern (RCOCs). Vinyl chloride (VC) (MCL = 2 µg/L, parts per billion) is the only unit-specific RCOC reported from Fourmile Branch; the maximum concentration was 5.24 µg/L in 1998. VC has not been detected in Fourmile Branch in seven sampling events since September 2004. Tetrachloroethylene (PCE) (MCL = 5 µg/L), trichloroethylene (TCE) (MCL = 5 µg/L), and VC are the only unit-specific RCOCs reported in the Twin Lakes wetland, with maximum values of 7.06 µg/L, 26.2 µg/L, and 44.9 µg/L, respectively, in 1998. Only TCE has been detected since 2002, and it has been below the MCL since December 2006.

The RCOCs for CBRP OU are listed by subunit in the following insert:

Media	Subunit	HH RCOCs	CM RCOCs	ARAR (MCLs) RCOCs	Eco RCOCs
Soil	CBRP Disposal Pit	HpCDD, OCDD (future resident)	None	None	HpCDD
	Old CBRP	None	None	None	None
	Mounded area	None	None	None	None
	Concrete drainage ditch	None	None	None	None
	Vadose zone	None	TCE	None	None
Groundwater	Groundwater plume	TCE, cDCE, DCE, VC	None	PCE, TCE, cDCE, DCE, VC, DCM	None
Surface water	Twin Lakes	None	None	PCE, TCE, VC	None
	Fourmile Branch	None	None	VC	None

ARAR applicable or relevant and appropriate requirement
HpCDD 1,2,3,4,6,7,8-heptachlorodibenzo-p-dioxin
cDCE cis-1,2-dichloroethylene
CM contaminant migration
DCE 1,1-dichloroethylene
DCM dichloromethane
Eco ecological
HH human health
OCDD octachlorodibenzo-p-dioxin
PCE tetrachloroethylene or perchloroethylene
TCE trichloroethylene
VC vinyl chloride

2.3 Remedial Action Selected

The selected remedy for the CBRP OU consists of the following actions:

- continued operation of MicroBlower™ SVE system with maintenance of soil cover;
- monitored natural attenuation (MNA) with ICs of groundwater directly downgradient of CBRP; and
- MNA-IC for surface water in the Twin Lakes and Fourmile Branch wetlands.

Remedial action objectives (RAOs) are unit-specific goals that establish the extent of cleanup required to protect human health and the environment and to mitigate the effects of contamination. RAOs are based on an evaluation of ARARs and to-be-considered (TBC) requirements [CERCLA 121(d)(2)(A)].

These RAOs are intended to protect future industrial workers and ecological receptors from the RCOCs in the media of the CBRP OU subunits. RGOs for CBRP OU include contaminant

concentrations in vadose zone soils that will not leach to groundwater above the MCLs, contaminant concentrations in disposal pit soil that will not adversely impact ecological receptors, and contaminant concentrations in groundwater and surface water that do not exceed MCLs. The MCLs are the chemical-specific ARARs for groundwater and surface water. Surface water in Fourmile Branch and the Twin Lakes wetland is not used for any purpose where significant human exposure might occur (i.e., drinking water supply or hygiene, agricultural, process, or recreational purposes).

Disposal Pit Surface Soil

The RAO for surface soil in CBRP is: Prevent exposure of ecological receptors to HpCDD in the pit surface soils.

The RGO for HpCDD as an ecological RCOC is 0.07 µg/kg.

Vadose Zone beneath CBRP

The RAO for vadose zone beneath CBRP is: Prevent migration of TCE from vadose zone soils to groundwater at levels that will exceed the MCL.

The RAO for TCE has been attained due to the interim action (IA) soil cover, SVE system, and air sparging (AS) system. The RGO for TCE as a CM RCOC is 58 µg/kg.

Groundwater Plume

The RAOs for groundwater are:

- Treat and/or mitigate groundwater contaminated above MCLs.
- Prevent human exposure to groundwater contaminated with TCE and PCE above MCLs of 5.0 µg/L.
- Reduce the concentration of TCE and PCE in the groundwater to levels at or below MCLs and attenuate the groundwater plume to the extent practicable.

- Prevent discharge of contaminated groundwater to surface water resulting in concentrations exceeding their MCLs.

The RGOs for groundwater are the MCLs, which are 5.0 µg/L for PCE, 5.0 µg/L for TCE, 7.0 µg/L for DCE, 70.0 µg/L for cDCE, 2.0 µg/L for VC, and 5.0 µg/L for DCM.

Surface Water

The RAO for surface water is: Reduce the levels of TCE, DCE, and VC in surface water at or below the MCLs.

The RGOs for surface water are the MCLs: 5.0 µg/L for PCE, 5.0 µg/L for TCE, and 2.0 µg/L for VC.

Based on modeling and current conditions, RAOs and RGOs are expected to be achieved in the volatile organic compound (VOC) plume in approximately 70 years. MNA/IC will continue until the FFA Core Team agrees that RAOs and RGOs have been met.

The post-RA conceptual site model (see Appendix C, Figure C-1 to this LUCIP) shows the remaining residual risk pathways for the future industrial worker following implementation of the RA.

According to the Savannah River Site Future Use Project Report (USDOE 1996), residential use of SRS land should be prohibited.

3.0 LAND USE CONTROL OBJECTIVES

The following LUC objectives are necessary to ensure the protectiveness of the selected remedy:

- Restrict on-site worker access and prevent unauthorized contact, removal, or excavation of contaminated media (i.e., surface and vadose zone soils)
- Maintain the integrity of any current or future remediation or monitoring systems (i.e., soil cover, SVE systems, and groundwater monitoring wells)

- Prevent access to or use of groundwater and surface water until remedial goals are attained
- Prohibit the development and use of property for residential housing, elementary schools, childcare facilities, and playgrounds
- Prevent construction of inhabitable buildings without an evaluation of indoor air quality to address vapor intrusion

Groundwater contamination within the OU boundary was investigated during the Resource Conservation Recovery Act (RCRA) facility investigation/remedial investigation (RFI/RI) (WSRC 2002) and a TCE groundwater plume was mapped in the RFI/RI Report. The LUC boundary includes all areas currently contaminated above the MCLs and adequate buffer zone to include any changes in plume geometry over time. LUC boundaries extend westward from CBRP along the plume boundaries to Fourmile Branch and along the Twin Lakes wetland on the south (See Figure A-1 in Appendix A of this LUCIP). The TCE plume on Figure A-1 adequately depicts plume geometry and groundwater contamination concentrations for both TCE and PCE, since TCE plume extent and concentrations are greater than PCE.

4.0 IMPLEMENTATION OF LAND USE CONTROLS

This section describes the LUCs selected in the ROD to achieve the objectives stated in Section 3.0. This description is included in Table 1. USDOE is responsible for implementing, maintaining, reporting on, and enforcing the LUCs required for the CBRP OU. The LUCIP will become enforceable and will be implemented when approved by USEPA and SCDHEC. USDOE shall notify USEPA and SCDHEC 60 days prior to implementation of any proposed land use changes that are inconsistent with LUC objectives or the selected remedy.

The CBRP OU will be maintained as an industrial use area by implementation of the property record notices (Section 4.1), property record restrictions (Section 4.2), and the use of a certified LUC survey plat (Section 4.3).

Table 1. Land Use Controls for CBRP OU *(Page 1 of 2)*

Type of Control	Purpose of Control	Duration	Implementation	Affected Areas[a]
1. Property Record Notices[b]	Provide notice to anyone searching records about the existence and location of contaminated areas	Until the concentrations of hazardous substances associated with the unit have been reduced to levels that allow for unlimited exposure and unrestricted use	Notice recorded by USDOE in accordance with state laws at County Register of Deeds office if the property or any portion thereof is ever transferred to non-federal ownership	Areas of groundwater contamination exceeding MCLs and areas of remaining vadose zone contamination
2. Property record restrictions[c]: Groundwater	Prohibit the use of groundwater in areas of known or suspected contamination	Until the concentration of hazardous substances associated with the unit have been reduced to levels that allow for unlimited exposure and unrestricted use	Drafted and implemented by USDOE upon any transfer of affected areas. Recorded by USDOE in accordance with state law at County Register of Deeds office	Areas of groundwater contamination exceeding MCLs
3. Other Notices[d]	Provide notice to city and/or county about the existence and location of waste disposal and residual contamination areas for zoning/planning purposes	Until the concentrations of hazardous substances associated with the unit have been reduced to levels that allow for unlimited exposure and unrestricted use	Notice recorded by USDOE in accordance with state laws at County Register of Deeds office if the property or any portion thereof is ever transferred to non-federal ownership	Areas of groundwater contamination exceeding MCLs and areas of remaining vadose zone contamination
4. Site Use Program[e]	Provide notice to worker/developer (i.e., permit requestor) on extent of contamination and limit penetration activities to those approved by SRS	As long as property remains under USDOE control	Implemented by USDOE Initiated by permit request	Areas of groundwater contamination exceeding MCLs and areas of remaining vadose zone contamination

Table 2. Land Use Controls for CBRP OU *(Page 2 of 2)*

Type of Control	Purpose of Control	Duration	Implementation	Affected Areas[a]
5. Physical Access Controls[f] (e.g., gates, portals)	Control and restrict general site access by workers and the public to prevent unauthorized entry	Until the concentrations of hazardous substances associated with the unit have been reduced to levels that allow for unlimited exposure and unrestricted use	Controls maintained by USDOE	At gated SRS entrances from major public roadways
6. Security Surveillance Measures	Control and monitor access by workers/public	Until the concentrations of hazardous substances associated with the unit have been reduced to levels that allow for unlimited exposure and unrestricted use	Established and maintained by USDOE Necessity of patrols evaluated upon completion of RAs	Patrol of selected areas throughout SRS as necessary

[a]Affected areas – Specific locations identified in the SRS LUCIP or subsequent post-ROD documents

[b]Property Record Notices – Refers to any non-enforceable, purely informational document recorded along with the original property acquisition records of USDOE and its predecessor agencies that alerts anyone searching property records to important information about residual contamination and waste disposal areas in the property

[c]Property Record Restrictions – Includes conditions and/or covenants that restrict or prohibit certain uses of real property and are recorded along with original property acquisition records of USDOE and its predecessor agencies

[d]Other Notices – Includes information on the location of waste disposal areas and residual contamination depicted on the survey plat, which is provided to a zoning authority (i.e., city planning commission) for consideration in appropriate zoning decisions for non-USDOE property

[e]Site Use Program – Refers to the internal USDOE/USDOE contractor administrative program(s) that requires the permit requestor to obtain authorization, usually in the form of a permit, before beginning any penetration activity (e.g., well drilling) for the purpose of ensuring that the proposed activity will not affect underground utilities/structures, or in the case of contaminated groundwater, will not disturb the affected areas without appropriate precautions and safeguards

[f]Physical Access Controls – Physical barriers or restrictions to entry

The Site Use Program (Section 4.4) will be implemented to prevent onsite worker exposure to contaminated soil, groundwater, and surface water. Other existing measures that will also be used to ensure the safety of onsite workers at CBRP OU include the Site Clearance Program, worker training, procedures, health and safety requirements, work controls, and jobsite briefings.

Physical access controls (Section 4.5) are implemented at the SRS boundary to control and restrict public and trespasser access to the CBRP OU. Signs at the CBRP OU will be maintained to alert onsite workers to the presence of hazardous substances beneath the soil cover and to prevent unauthorized excavation of the soil cover. The signs will also convey the restrictions of unauthorized personnel. Access control warning signs will be placed and maintained at the CBRP OU to prevent unknowing entry and unrestricted use.

4.1 Property Record Notices

In the long term, if the property is ever transferred to non-federal ownership, the United States Government will take those actions necessary pursuant to Section 120(h) of CERCLA. Those actions will include a deed notification disclosing former onsite nuclear materials production, waste management, and disposal activities; areas of groundwater contamination that have exceeded MCLs; and RAs taken on the site. The contract for sale and the deed will contain the notification required by CERCLA Section 120(h).

The deed notification shall inform any potential purchaser that local groundwater beneath the property has been contaminated as a result of industrial activities. This requirement is consistent with the intent of RCRA deed notification requirements at final closure of a RCRA facility if contamination will remain at the unit.

4.2 Property Record Restrictions

The deed shall also include restrictions precluding residential use of the property, specifically preventing the installation of any groundwater supply well within the contaminated aquifer so that groundwater containing contaminants exceeding MCLs cannot be used for drinking water.

The deed shall expressly prohibit activities inconsistent with the remedial goals and objectives in this LUCIP upon any and all transfers. USDOE shall provide a copy of the executed deeds to the regulatory agencies as soon as practicable after the transfer of fee title, but no later than 30 days. However, the need for these deed restrictions may be re-evaluated at the time of transfer in the event that exposure assumptions differ and/or the groundwater contamination levels no longer exceed MCLs. Any re-evaluation of the need for the deed restrictions will be done through an amended ROD.

USDOE shall notify USEPA and SCDHEC at least six months prior to property transfer to ensure that USEPA and SCDHEC can be involved in discussions to ensure that appropriate provisions are included in the transfer terms or conveyance documents to maintain effective ICs. If it is not possible for the facility to notify USEPA and SCDHEC at least six months prior to any transfer or sale, then the facility will notify USEPA and SCDHEC as soon as possible but no later than 60 days prior to the transfer or sale of any property subject to ICs. In addition to the land transfer notice and discussion provisions above, USDOE further agrees to provide USEPA and SCDHEC with similar notice, within the same time frames as to property transfer between federal entities.

4.3 Other Public Notices

The CBRP OU LUC outline, shown on the design sketch in Appendix A, encloses the area under land use restriction because contaminant concentrations in local groundwater exceed MCLs. The sketch provides a plan view of the CBRP OU with the plume outlined by the 5-µg/L TCE contour that encloses all groundwater exceeding the TCE MCL. All areas of MCL exceedance are enclosed by the CBRP OU LUC outline, which also provides a buffer zone around all MCL exceedances. Preparation of a survey plat will be deferred until the site is transferred to non-federal ownership. If the survey plat for the surface area subject to LUCs is prepared at the time the land is transferred, the description of the groundwater area under restrictive covenant will be more current and accurate. The deferred survey plat will be appended to this LUCIP when it is completed.

In addition, if the site is ever transferred to non-federal ownership, a professional land surveyor-certified survey plat of the OU will be prepared at or near the time of conveyance to support the LUCIP-required restrictive covenants on land use and will be recorded with the appropriate county recording agency.

4.4 Site Use Program

Under USDOE Order 430.1A, *Life Cycle Management* (USDOE 1998), SRS is required to implement an asset management program for the use, maintenance, and disposal of physical assets, including real estate. SRS complies with this Order through its Site Use Program, which is conducted in accordance with WSRC 1D, *Site Infrastructure and Services Manual*, Procedure 3.02, "Site Real Property Configuration Control" (WSRC 2006). All employees, contractors, and visitors at SRS are required to adhere to the Site Use Program. No land use (e.g., excavation, well installation, or any other land use) shall be undertaken without prior approval documented by a Site Use Permit. Also, in accordance with WSRC 1D, Procedure 3.02, all work at SRS that adds to or modifies features or facilities portrayed on SRS development maps (i.e., plot plans of facilities/utilities at SRS) will be authorized by a Site Clearance Permit before any activities are conducted. All Site Clearance Requests will be reviewed to verify that either an approved Site Use Permit has been obtained or that the request is sanctioned by an existing Site Use Permit. All land use requirements applicable for the OU will be provided to the Site Use Program for use in determining issuance of Site Clearance Permits. In addition, the Site Use Permit must be amended when the geographic configuration or buffer zone used to establish the permit boundary changes or when there is a change to the permitted land use.

SRS is responsible for updating, maintaining, and reviewing site maps, including FFA (1993) OU identifications. If a Site Clearance Request potentially impacts an FFA OU, the Site Clearance Request Form is sent to the appropriate FFA OU reviewer for approval. The roles and responsibilities of each individual are detailed in WSRC 1D, Procedure 3.02. Before a Site Clearance Permit is issued, verification of USDOE approval for intended land use must be obtained. The site use and site clearance processes are applicable to all activities and personnel on site (including subcontractors). USDOE will notify USEPA and SCDHEC in advance of any

change to any internal procedure, including the Site Use Program, that would affect implementing or maintaining the LUCs. The processes are controlled within the SRS Quality Assurance (QA) Program in accordance with WSRC 1Q Manual, *Quality Assurance* (WSRC 2007). The SRS QA program governs all SRS activities.

SRS identifies all buildings and facilities on maps used in the Site Use Program. This waste unit is identified on these maps as a CERCLA facility. Any work proposed in these areas will be strictly controlled, and workers will be appropriately trained and briefed about health and safety requirements if work is deemed necessary for cover maintenance or sampling for groundwater or surface water.

No change in land use or excavation at the CBRP OU shall be undertaken without USEPA and SCDHEC approval. Approval by USEPA and SCDHEC is required for any modification or termination of the ICs and implementation actions, and USDOE must obtain prior approval from USEPA and SCDHEC before taking any anticipated action that may disrupt the effectiveness of the LUCs or alter or negate the need for LUCs.

4.5 Physical Access Controls

No physical access controls are required at the CBRP OU. As discussed in item 5 of Table 1, SRS site boundary fencing and security personnel will prevent trespassers from gaining access to the soil cover, monitoring wells, and surface water.

4.6 Warning Signs

Warning signs similar to the one shown in Appendix D, Figure D-1, will be erected and maintained around the soil cover to notify future workers of the presence of contaminants beneath the soil cover and to prevent inadvertent excavation of the soil cover. Warning signs will not be installed around the VOC plume because the depth to contaminated groundwater is generally a sufficient barrier to prevent exposure.

These warning signs will be installed as part of the CBRP OU construction per the Corrective Measures Implementation/ Remedial Action Implementation Plan (CMI/RAIP) (WSRC 2009b) schedule. In addition, the final placement of the signage will be documented in the Remedial Action Completion Report.

4.7 Other Access Controls and Security/Surveillance Measures

While under the ownership of USDOE, access control of the entire SRS will be maintained in accordance with the 1992 RCRA Part B Permit Renewal Application, Volume I, Section F.1. This section describes the 24-hour surveillance system (R.61-79.264.14(b)(1)), artificial or natural barriers (R.61-79.264.14(b)(2)(I)), control entry systems (R.61-79.264.14(b)(2)(ii)), and access control warning signs (R.61-79.264.14(c)) in place at the SRS boundary to comply with the security requirements for a RCRA-permitted facility.

4.8 Field Inspection and Maintenance for Institutional Controls

Custodial responsibilities for maintenance and inspection of the CBRP OU will be maintained by the Post-Closure Maintenance Group within Area Completion Projects (ACP) (formerly Soil and Groundwater Closure Projects [SGCP]).

Inspection and maintenance of the CBRP soil cover will be performed to ensure the long-term integrity of the soil cover. The groundwater monitoring wells will be inspected and maintenance will be performed as needed in accordance with ACP Monitoring Well Procedures (WSRC 2005). Any activity that is inconsistent with the IC objectives or use restrictions, or any other action that may interfere with the effectiveness of the ICs will be addressed by the USDOE as soon as practicable, but in no case will the process be initiated later than 10 days after the USDOE becomes aware of the breach. The USDOE will notify EPA and SCDHEC as soon as practicable but no longer than 10 days after discovery of any activity that is inconsistent with the IC objectives or use restrictions, or any other action that may interfere with the effectiveness of the ICs. The USDOE will notify EPA and SCDHEC regarding how the USDOE has addressed or will address the breach within 10 days of sending EPA and SCDHEC notification of the breach. The FFA Annual Progress Report, submitted to the regulatory agencies by the USDOE, will

provide the status of the ICs and describe how any IC deficiencies or inconsistent uses have been addressed. In the event of property transfer or lease, the Annual Report will cite findings on the following: whether the use restrictions and controls referenced above were communicated in the deed(s) or lease restrictions; whether the property use conforms with the deed or lease restrictions and controls; whether property use conforms with the deed or lease restrictions and controls; and whether the owners and state/local agencies have been notified regarding the deed or lease restrictions and controls. The FFA Annual Progress Report(s) will be used in the preparation of the Five-Year Remedy Review Report.

All other routine maintenance activities will be documented and maintained in files subject to USEPA and SCDHEC review and audit. A copy of the completed inspection form is maintained in the ACP Document Control Center. The LUCs shall be maintained until the concentrations of hazardous substances associated with the unit have been reduced to levels that allow for unlimited exposure and unrestricted use.

The waste unit inspectors are to be trained in Hazardous Waste Operations and Emergency Response (HAZWOPER), RCRA Well Inspections (ACP-specific training), ACP RCRA Waste Unit Inspections, Radiological Worker Training, etc., as applicable for the specific inspection. They will also be trained based on the individual requirements of the regulatory approved closure documents for each waste unit. In addition, the inspectors are to attend yearly refresher courses. Over the years, different personnel may conduct the inspections and maintenance activities.

This unit-specific LUCIP, including the checklist (similar to that in Appendix B), will be appended to the SRS LUCAP upon final regulatory approval. The preliminary checklist in the LUCAP will be replaced with the final approved checklist in the first biennial effectiveness monitoring report.

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5.0 REFERENCES

FFA, 1993. *Federal Facility Agreement for the Savannah River Site*, Administrative Docket No. 89-05-FF (Effective Date: August 16, 1993) WSRC-OS-94-42, http://www.srs.gov/general/programs/soil/ffa/ffa.pdf

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APPENDIX A

Land Use Control Implementation Plan Drawing

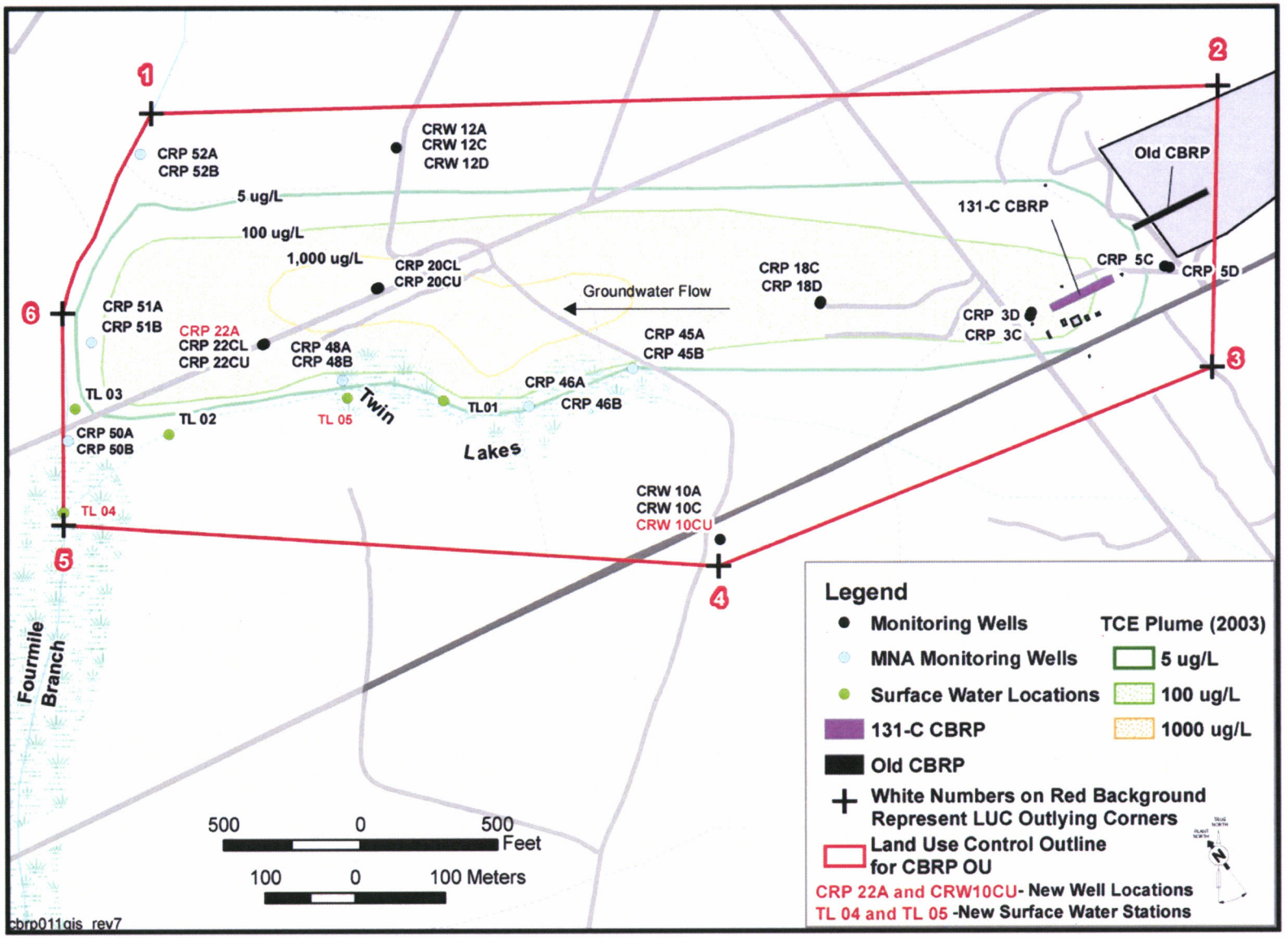


Figure A-1. Land Use Control Implementation Plan As-Built Drawing for CBRP OU

The SRS Grid, Universal Transverse Mercator (UTM), and longitude-latitude (North American Datum [NAD] 1927) coordinates for the major vertices of the CBRP LUC polygon are listed in the insert below. The corners are listed in clockwise order beginning with the most northwesterly corner along Fourmile Branch.

Corner	SRS E	SRS N	UTM E	UTM N	Long-27	Lat-27
NW 1	41854.43	71179.62	435273.502	3679190.748	-81.69484157	33.25148835
NE 2	45057.33	68966.38	436459.448	3679219.894	-81.68211323	33.25182171
SE 3	44439.27	68152.06	436453.22	3678908.448	-81.68215825	33.24901221
S 4	42558.79	68629.82	435904.284	3678688.914	-81.68803506	33.24699964
SW 5	40713.52	70163.06	435174.738	3678735.714	-81.69589621	33.24737818
W 6	41162.91	70785.92	435173.748	3678969.748	-81.69589657	33.24948902

APPENDIX B

Field Inspection Checklist for C-Area Burning/Rubble Pit (131-C) Operable Unit

SOIL & GROUNDWATER CLOSURE PROJECTS
CERCLIS OU #51, SRS INDEX #31

Document No. ER-IDS-019-016
Procedure No. ER-SOP-019
Effective Date 5/24/04

Field Inspection Checklist C-Area Burning/Rubble Pit (Bldg 131-C) (U) Page 1 of 3

FIELD INSPECTION CHECKLIST
C-AREA BURNING RUBBLE PIT
(Bldg. 131-C)

☐ SCHEDULED ☐ UNSCHEDULED

A= Satisfactory X= Unsatisfactory (Explanation required)	A or X	Observation or Corrective Action Taken
1. Verify that roads are accessible.		
2. Verify that the waste unit signs (4) are in acceptable condition, have the correct information*, and are legible from a distance of 25 ft. *Refer to ER-AP-127.		
3. Verify that there is no excavation digging or construction activities on the soil cover.		
4. Verify that there is no woody vegetation growing on the soil cover. Remove woody vegetation and repair soil cover as needed.		
5. Visually check vegetative cover for grass density, with no bare spots more than 3 by 3 ft in area. The height of the vegetative cover should not impair the visual inspection of the soil cover. This will be determined by the Inspector.		

FIELD INSPECTION CHECKLIST
C-AREA BURNING RUBBLE PIT
(Bldg. 131-C)

A= Satisfactory X= Unsatisfactory (Explanation required)	A or X	Observation or Corrective Action Taken
6. Visually check soil cover for signs of erosion or depression (subsidence).		
7. Check for signs of burrowing animals.		
8. Other:		

Inspected By: _____/_____ Date:_____
(Print name) (Signature)

Reviewed By: _____/_____ Date:_____
Post Closure Manager (Print name) (Signature)

CAUTION:
The Inspector shall notify the Post Closure Manager (PCM) and Environmental Compliance Authority (ECA) IMMEDIATELY if there has been a breach or compromise of the institutional controls of this waste unit. Refer to Post Closure Inspection procedures.

NOTE: All monitoring wells associated with this waste unit are maintained in accordance with SGCP Monitoring Well Procedures.

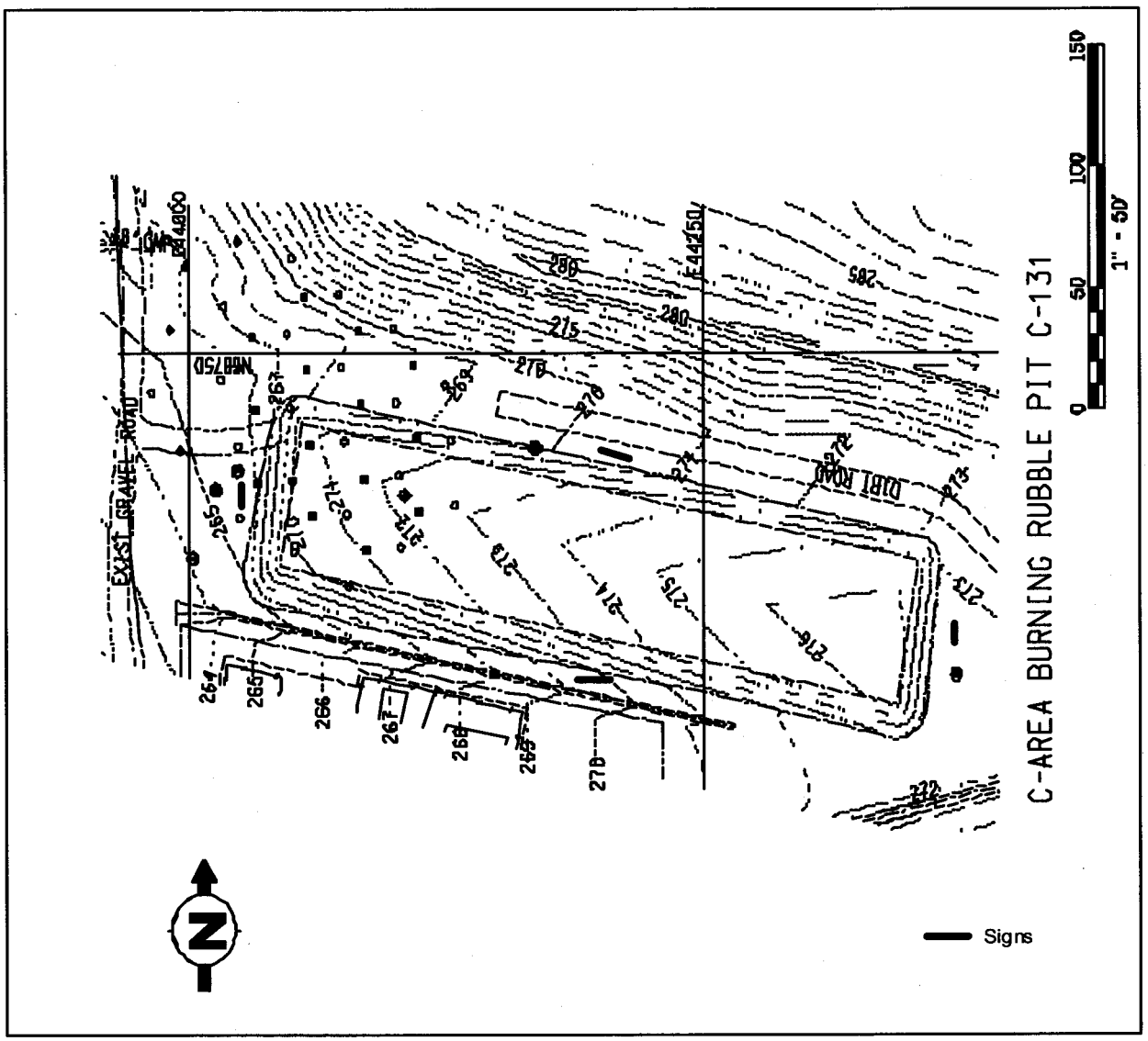


Figure B-1. Map of C-Area Burning Rubble Pit (Bldg. 131-C)

APPENDIX C.

Post-Remedial Action Conceptual Site Model for C-Area Burning/Rubble Pit (131-C) Operable Unit and Old C-Area Burning/Rubble Pit (NBN)

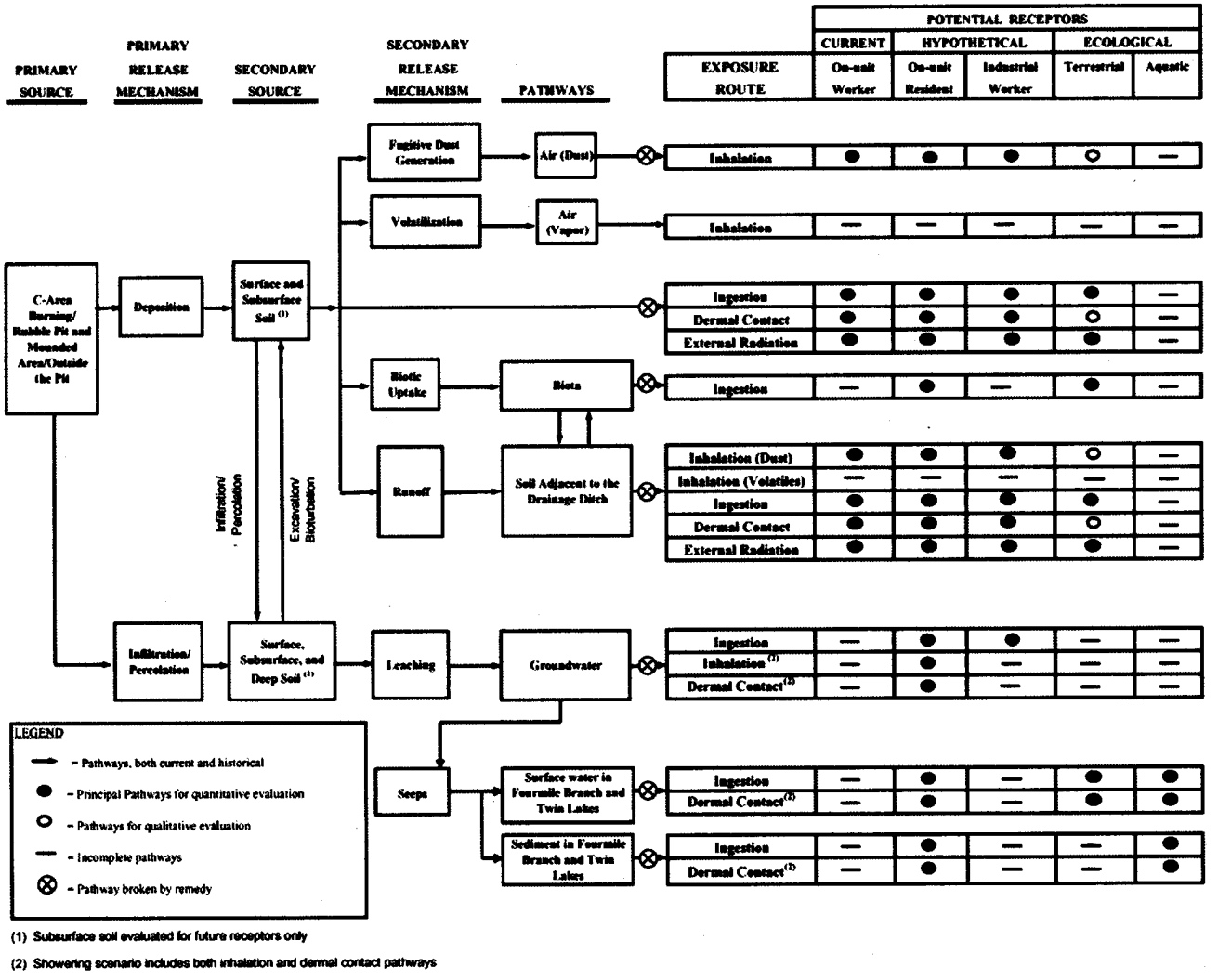


Figure C-1. Post-Remedial Action Conceptual Site Model for CBRP OU

APPENDIX D.

Access Control Warning Signs for C-Area Burning/Rubble Pit Operable Unit

C-Area Burning/Rubble Pit
(131-C)

DANGER
UNAUTHORIZED PERSONNEL KEEP OUT

THIS WASTE UNIT WAS USED TO MANAGE HAZARDOUS SUBSTANCES.

DO NOT DIG OR EXCAVATE.

DO NOT ENTER WITHOUT CONTACTING THE

WASTE UNIT CUSTODIAN.

CUSTODIAN: MANAGER, POST-CLOSURE MAINTENANCE

CONTACT PHONE: (803) 725-PAGE (19192)

Figure D-1. Access Control Warning Sign

LUCIP for the
M Area Operable Unit (consists of Underground Sump 321 M #001, Underground Sump 321 M #002, Salvage yard, 741-A, and Potential Release of TCT, TET TCE, HNO3, U, Heavy Metals from 321-M Abandoned Sewer Line, NBN)
Land Use Control Implementation Plan for the M Area Operable Unit (MAOU)
(WSRC-RP-2008-4067, Revision 1, April 2009)

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United States Department of Energy

Savannah River Site



Land Use Control Implementation Plan (LUCIP) for the M Area Operable Unit (MAOU) (U)

CERCLIS NUMBER: 92

WSRC–RP–2008-4067

Revision 1

April 2009

Prepared by:
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APPENDIX C – MAOU FIELD INSPECTION CHECKLIST C-1

LIST OF ACRONYMS AND ABBREVIATIONS

ACP	Area Completion Projects
bgs	below ground surface
BRA	Baseline Risk Assessment
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CM	contaminant migration
CMS/FS	Corrective Measures Study/Feasibility Study
COC	constituent of concern
ESD	Explanation of Significant Difference
FFA	Federal Facility Agreement
ft	feet
HH	human health
IC	institutional control
IPS	inactive process sewer
LETF	Liquid Effluent Treatment Facility
LUC	land use control
LUCIP	Land Use Control Implementation Plan
LUCAP	Land Use Control Assurance Plan
mg/kg	milligram per kilogram
MAOU	M Area Operable Unit
MIPS	M-Area Process Sewer
MIPSL	M-Area Inactive Process Sewer Line
OU	operable unit
PCE	tetrachloroethylene
PCR	Post-Construction Report
PSVE	passive soil vapor extraction
PTSM	principal threat source material
RA	remedial action
RCOC	refined constituent of concern
RCRA	Resource Conservation and Recovery Act
RFI/RI	RCRA Facility Investigation/Remedial Investigation
RG	remedial goal
ROD	Record of Decision
SCDHEC	South Carolina Department of Health and Environmental Control
SRNS	Savannah River Nuclear Solutions, LLC
SRS	Savannah River Site
SVE	soil vapor extraction
TCE	trichloroethylene
USDOE	U.S. Department of Energy
USEPA	U.S. Environmental Protection Agency
VOC	volatile organic compound
WSRC	Washington Savannah River Company LLC (formerly Westinghouse Savannah River Company LLC)

1.0 INTRODUCTION

This Land Use Control Implementation Plan (LUCIP) has been prepared for the M Area Operable Unit (MAOU) at the Savannah River Site (SRS). The MAOU includes all subunits within M Area and covers approximately 75 acres. The *Land Use Control Assurance Plan (LUCAP)* for the Savannah River Site (WSRC 1999) designates M Area for future industrial non-residential use. As detailed in the *MAOU Record of Decision (ROD)* (WSRC 2008a), groundwater is not considered part of the scope for the MAOU and, therefore, is not addressed within the scope of this document. Any groundwater contamination resulting from the MAOU is being addressed as part of the SRS Resource Conservation and Recovery Act (RCRA) Part B Permit Renewal Application for M-Area and Metallurgical Laboratory Hazardous Waste Management Facilities Postclosure. The purpose of the LUCIP is to describe how the land use controls (LUCs) selected in the ROD will be implemented and maintained. The LUC objectives have been documented in the MAOU ROD and are listed in Section 3.0.

The selected remedy leaves hazardous substances in place that pose a potential future risk and will require land use restrictions until the concentrations of hazardous substances in the soil and groundwater are at levels that allow for unrestricted use. The hazardous substances left in place could pose a risk if the waste is disturbed. As agreed on March 30, 2000, among the U.S. Department of Energy (USDOE), the U.S. Environmental Protection Agency (USEPA), and South Carolina Department of Health and Environmental Control (SCDHEC), SRS is implementing a LUCAP to ensure that the LUCs required by numerous remedial decisions at SRS are properly maintained and periodically verified. The requirements of that LUCAP also apply to the LUCs that were selected as part of the MAOU remedial action (RA). This document, the MAOU LUCIP, contains the detailed and specific measures required to implement and maintain the LUCs selected as part of this particular remedial decision. The LUCs shall be maintained until the operable unit (OU) is suitable for unlimited exposure and unrestricted use. Approval by USEPA and SCDHEC is required for any modification or termination of the institutional controls (ICs).

The USDOE is responsible for implementing, maintaining, monitoring, reporting, and enforcing the LUCs in accordance with the approved LUCIP. Upon final approval, the LUCIP will be

appended to the LUCAP and should be considered incorporated by reference into the MAOU ROD (WSRC 2008a) and Explanation of Significant Difference (ESD) to the MAOU ROD (SRNS 2009), establishing implementation and maintenance requirements for the LUCs under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and the SRS Federal Facility Agreement (FFA) (FFA 1993). The LUCIP will remain in effect unless and until modifications are approved by USEPA and SCDHEC as necessary for protection of human health and the environment. This LUCIP will be evaluated for accuracy during the five-year remedy review and any approved LUCIP modification will be appropriately documented for incorporation by reference into the MAOU ROD and ESD.

1.1 Format of LUCIP

The format of this LUCIP is consistent with the FFA protocol format approved by the USEPA and SCDHEC in March 2004.

2.0 OVERVIEW OF MAOU REMEDIAL ACTION

2.1 General Description and History of the Unit

SRS occupies approximately 310 square miles of land adjacent to the Savannah River, principally in Aiken and Barnwell counties of South Carolina. SRS is located approximately 25 miles southeast of Augusta, Georgia, and 20 miles south of Aiken, South Carolina. The MAOU is located in the northwest portion of SRS, covering approximately 75 acres, and is located within the Upper Three Runs Integrator Operable Unit (Figure 1).

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

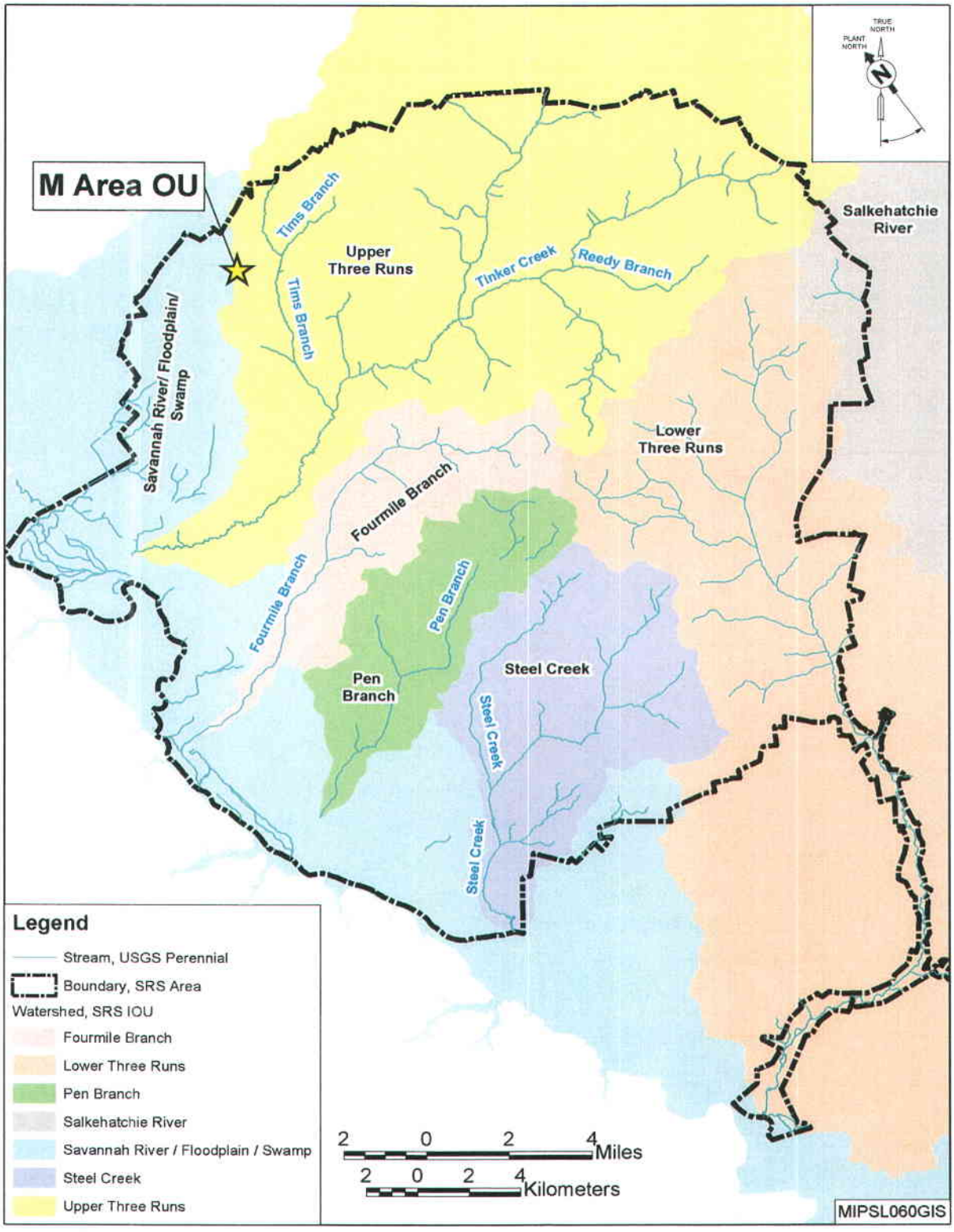


Figure 1. Location of the MAOU within the Savannah River Site

The MAOU is located in the northwest portion of SRS. For evaluation purposes, the MAOU was divided into four distinct areas based on the historical operations at the unit. These areas are the Production Area, the Liquid Effluent Treatment Facility (LETF), Test Reactor Facilities, and the Salvage Area. These areas are depicted on Figure 2 and include facilities that have been combined based on physical location and common problems warranting action:

- Production Area: 313-M, 321-M (including Underground Sumps #001 and #002), 320-M, 322-M, 340-M, and 324-M (including the northern portions of the M-Area Inactive Process Sewer Line [MIPSL] and associated feeder lines)
- LETF: 341-M, 341-1M, and 341-8M
- Test Reactor Facilities: 305-A and 777-10A
- Salvage Area: 740-A, 743-A, and 741-A
- Warehouses: 330-M and 331-M

The northernmost portion of the MAOU contains the Production Area, which has the earliest history of use. Reactor fuel and target assemblies were produced in this area between 1952 and 1988. The following major facilities were used to support production of special nuclear material:

- Building 313-M — Used for the canning and storage of uranium slugs for use in the production reactors
- Building 320-M — Used to produce lithium aluminum target tubes for target assemblies
- Building 321-M — Used for the production of reactor fuel assemblies

All of the major facilities used industrial cleaning processes and products (trichloroethylene [TCE], tetrachloroethylene [PCE], and trichloroethane) that were discarded to the M-Area Settling Basin via process sewer lines. The basin was closed with the installation of a protective cap in 1991 per the RCRA Closure Plan. The M-Area Settling Basin is not part of the MAOU but is shown on Figure 2 for information only.

The 330-M Slug Warehouse and 331-M Core Storage Warehouse were used to store slugs of depleted uranium. The inventory of depleted uranium was removed prior to decommissioning. Buildings 330-M and 331-M were dismantled and removed during the summer of 2003.

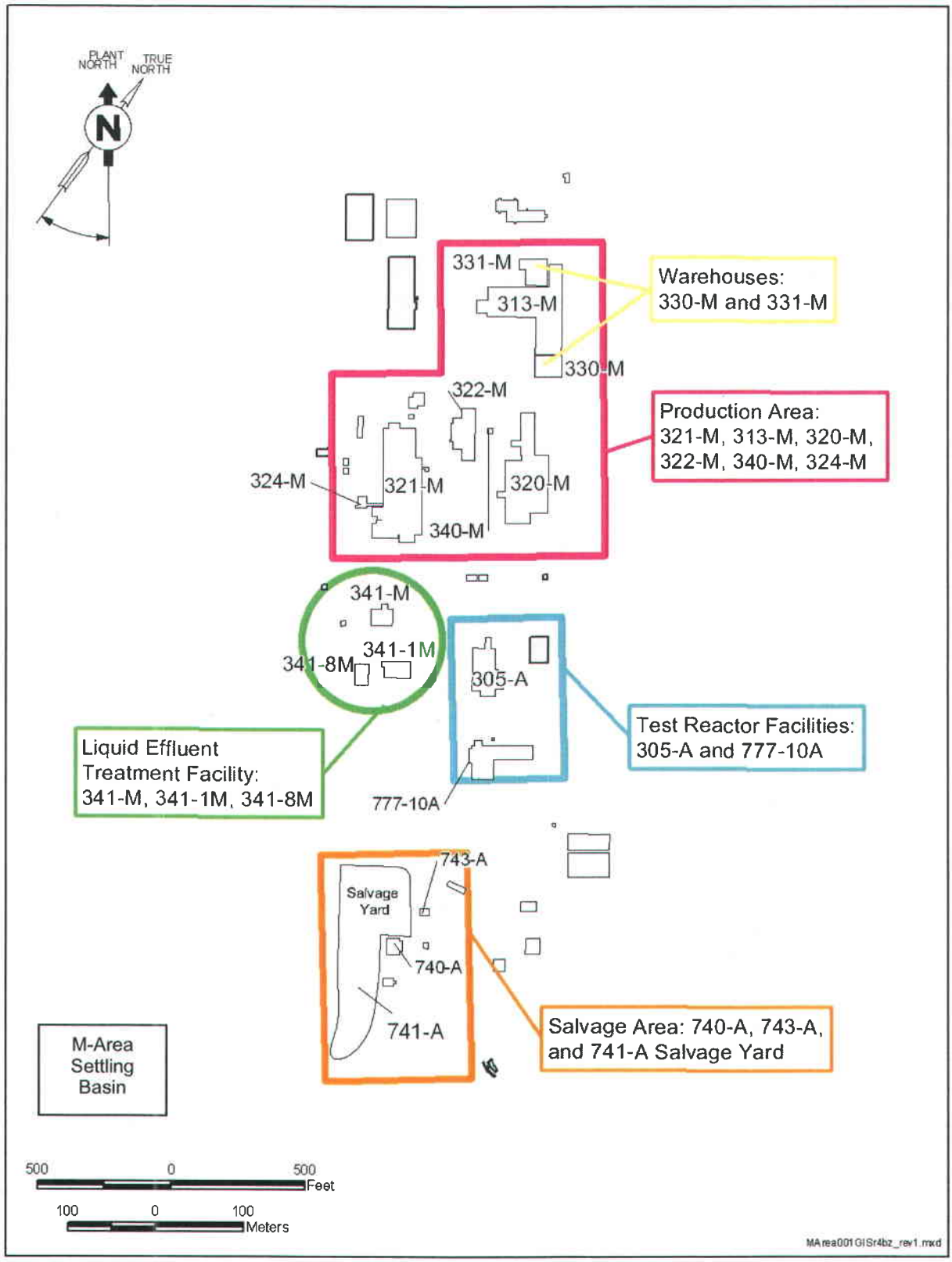


Figure 2. Layout of the M Area Operable Unit

The LETF is southwest of the Production Area. This facility was built in 1988, and all of the Production Area liquid effluent was sent to this treatment facility. This facility contained buildings that were used to treat the wastewater stream, to package and store the residue from the treatment, and to treat the residue.

The Test Reactor Facilities are east of the LETF. This area housed two buildings (305-A and 777-10A) that contained small test reactors used to determine the appropriate properties for the fuel elements and the target assemblies.

The southern portions of MAOU were designated as the Salvage Area and include the 741-A Salvage Yard where excess materials and equipment were stored on an approximate two-acre lot. In addition, Building 740-A was used to recondition non-nuclear material. This reconditioning involved painting and cleaning with solvents.

M Area is the second OU at SRS to be addressed under an area-wide remedial strategy. As part of this strategy, RCRA/CERCLA/Site Evaluation units and deactivation and decommissioning facilities (or remnants) in the former M-Area industrial area were consolidated into a single OU (i.e., the MAOU). The characterization evaluation and analysis of the MAOU were documented in the *RCRA Facility Investigation/Remedial Investigation (RFI/RI) Work Plan, RFI/RI Report with Baseline Risk Assessment (BRA), and Corrective Measures Study/Feasibility Study (CMS/FS) for M Area Operable Unit* (WSRC 2007a). A summary of M-Area remedial and removal actions is shown in Table 1.

Table 1. M-Area Previous Corrective/Remedial or Removal Actions

	Status
M-Area Salvage Yard Removal Action (Approved Removal Action Report - WSRC 2008b, July 2008)	Complete
M-Area Production Area Removal Action (Removal Action Report - WSRC 2008c, October 2008)	Complete
RCRA Clean Closure for 315-4M and 316-M	Ongoing
MIPSL OU Remedial Action [1,3] (Soil Vapor Extraction [SVE] Enhanced with Soil Fracturing, Institutional Controls [WSRC 2008d])	Ongoing
M-Area Settling Basin Hazardous Waste Management Facility Source Control[2]	Ongoing
Metallurgical Laboratory Hazardous Waste Management Facility Source Control[2]	Ongoing
M-Area Groundwater[2]	Ongoing

[1] Separate Operable Unit [2] Per SCDHEC RCRA Permit [3] Subject to FFA Five-Year Remedy Review

The M Area at SRS is located in an area of historically heavy industrial and nuclear land use. The LUCAP (WSRC 1999) designates M Area for future industrial non-residential use. Remedial action objectives and likely response actions were developed consistent with future industrial non-residential land use. ICs will restrict use because of the large area of vadose zone and groundwater contamination, including operation of remedial systems. Appropriate LUCs against unrestricted and/or residential use will be part of all RAs for the MAOU. As detailed herein, the entire area outlined as the MAOU LUC boundary depicted on Figure 3 will be limited to industrial use, and further restrictions will be placed on certain portions of this area. However, the MIPSL OU has a separate ROD (WSRC 2007b) and LUCIP (WSRC 2007c), which includes access controls (grouting of manholes) and management of volatile organic compound (VOC) contamination in the vadose zone by SVE with soil fracturing. Therefore, the MAOU LUC boundary is formally defined as the MAOU LUC boundary on Figure 3 with the exclusion of the MIPSL OU boundary, which is the green-shaded area shown on Figure 3.

2.2 Nature and Extent of Contamination

The MAOU has been the subject of various investigations, including the following:

- Sampling of concrete slabs, below-grade concrete barriers, and soils in connection with the deactivation and decommissioning of various buildings
- Sampling of soils adjacent to the inactive process sewer lines
- Sampling of concrete slabs, below-grade concrete structures and soils beneath the slab, sumps, trenches and process feeder pipelines as part of the MAOU investigation

The *RCRA Facility Investigation/Remedial Investigation (RFI/RI) Work Plan, RFI/RI Report with Baseline Risk Assessment (BRA), and Corrective Measures Study/Feasibility Study (CMS/FS) for M Area Operable Unit* (WSRC 2007a) records the cumulative results from these investigations and details the nature and extent of contamination and the problems warranting action. Table 1 documents completed early actions.

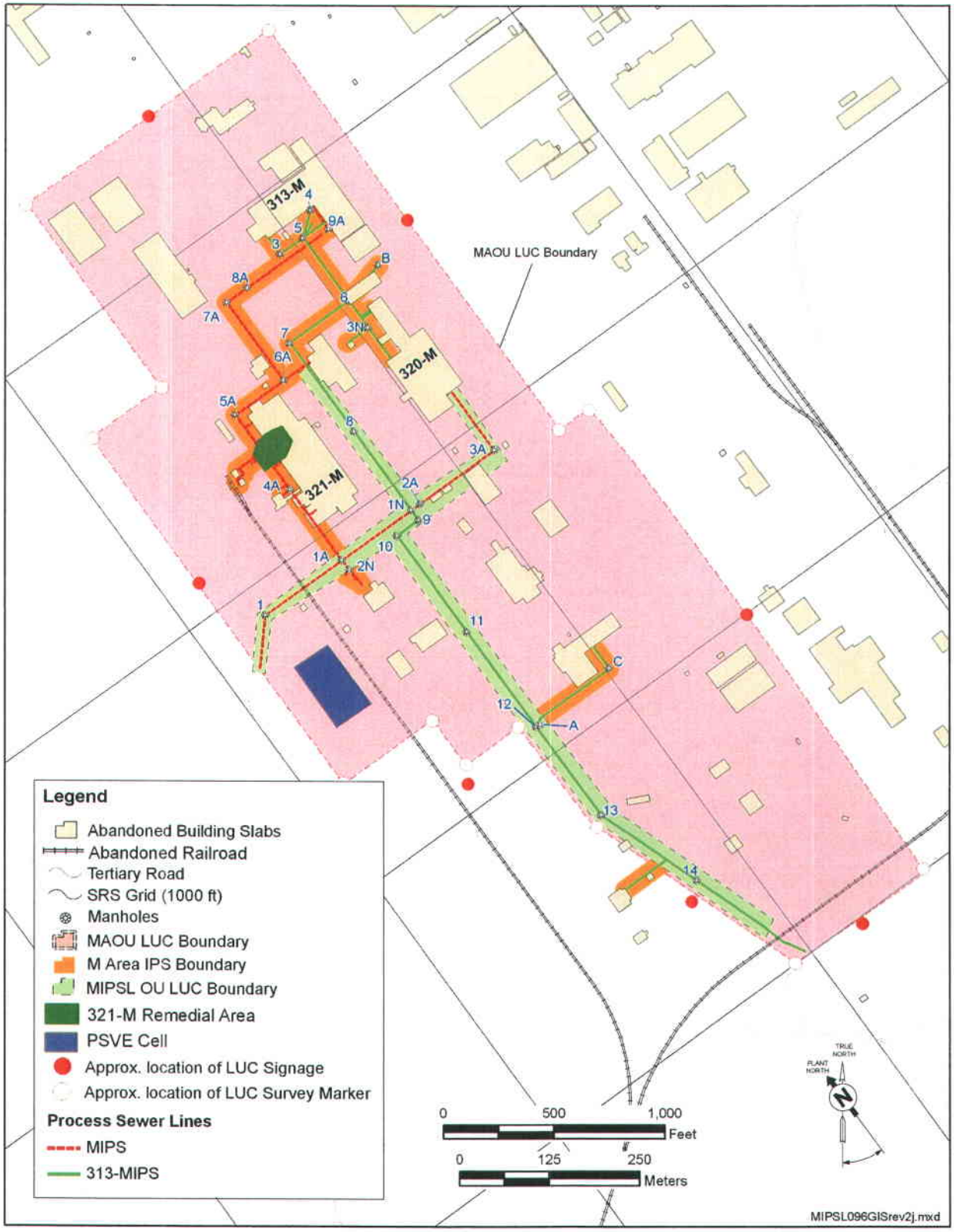


Figure 3. **M Area OU LUC Boundary and M Area Inactive Process Sewer OU LUC Boundary**

The MAOU early action removed approximately 70% of the soils containing >50 mg/kg VOCs beneath the 320-M and 321-M slabs and all of the >50 mg/kg VOC soils at 313-M (WSRC 2008c). Following the completion of MAOU early actions, the only contaminants requiring RA were PCE or TCE, which remain as contaminant migration (CM) constituents of concerns (COCs) at the Production Area (i.e., 313-M, 320-M, and 321-M facilities) in vadose zone soils. Additionally, residual PCE remains below 321-M in deep soils as principal threat source material (PTSM). The RA selected for the CM refined constituents of concern (RCOCs) and deep soil PTSM is designed to remove PCE and TCE from the soil and prevent additional groundwater impacts.

The selected remedy for the MAOU leaves hazardous substances in place that pose a potential future risk and will require land use restrictions until the concentrations of hazardous substances in the soil and groundwater are at levels that allow for unrestricted use and exposure.

2.3 Remedial Actions Selected

The below selected RA, established in the ROD (WSRC 2008a) and an ESD (SRNS 2009) to the MAOU ROD, is based on an evaluation of potential alternatives performed in accordance with the National Oil and Hazardous Substances Pollution Contingency Plan and CERCLA (as amended).

Passive Soil Vapor Extraction and Institutional Controls

Vadose zone remediation using passive soil vapor extraction (PSVE) reduces and removes the VOC source and is typically performed to manage the release of VOCs to groundwater. The pressure gradient created by a PSVE well causes the soil-gas to flow through the soil pore spaces toward the well. This remedy has two beneficial aspects. The first is that the remedy focuses on the VOC contamination that has been mobilized and is in the form of soil-gas. By removing the soil-gas, there is a relatively immediate impact on groundwater since the source of contamination to the groundwater has been cut off. The second benefit is that PSVE is a treatment technology that reduces the contamination mass subsurface over time. As detailed in the MAOU ROD (WSRC 2008a) and an ESD (SRNS 2009) to the MAOU ROD, PSVE will be employed at five

locations (i.e., 313-M, 320-M, 321-M, Manhole 4A and the PSVE Cell, see Figure 3). As the 321-M PSVE wells and the PSVE Cell include shallow (2 to 9 ft below ground surface [bgs]) horizontal wells, a vapor barrier at 1 ft bgs is included to prevent the PSVE well screens from preferentially drawing from the surface rather than the underlying contaminated soils at 1 to 10 ft bgs. This phenomenon would hinder the effectiveness of SVE operations. Approximately 1 ft of clean common fill will be provided over the vapor barrier.

The LUCs, which include ICs and physical access controls, are listed below and will be implemented throughout the MAOU.

- property record notices and restrictions
- site use/site clearance program
- ICs will also consist of the site maintenance (site inspections, general housekeeping, repair of erosion damage and other routine maintenance as needed) and access controls (warning signs and land use restrictions). ICs will include continued use of SRS's Site Use and Site Clearance Programs to restrict disturbance of the site and to prevent access to or use of groundwater until cleanup levels are met. ICs will also include physical access controls. Specifically, the sewer connections to all manholes and Manholes 2N, 3, 3N, 4, 4A, 5, 5A, 6, 7, 7A, 8A, 9A, A and B shown within the orange shaded area of Figure 3 will be grouted. Warning signs will also be posted as depicted in Figure 3 at the LUC boundary surrounding the entire MAOU. Note: Manholes 6A and C and all manholes within the green-shaded area of Figure 3 were grouted as part of the early actions. Grouting makes access virtually impossible by accidental means and with warning signs at the MAOU boundary, human digging is controlled. These ICs will isolate the abandoned sewer line from future access by human or ecological receptors.
- CERCLA ROD RA Reviews – The ROD RA will be reviewed every five years to ensure that the selected remedy remains protective of human health and the environment.

Remedial goals (RGs) are target cleanup criteria. RGs are provided in Table 2.

The post-RA conceptual site model (Figure 4) shows the broken pathways and the remaining residual risk to the future industrial worker.

Table 2. Summary of Final Action RGs for MAOU

RCOC	Units	CM[1]	HH	RGs
SOIL MEDIA				
Organics				
Tetrachloroethylene (PCE)	mg/kg	1.80[2] 3.00[4]	NA[5]	1.80[2] 3.00[4]
Trichloroethylene (TCE)	mg/kg	15.00[3]	NA[5]	15.00[3]

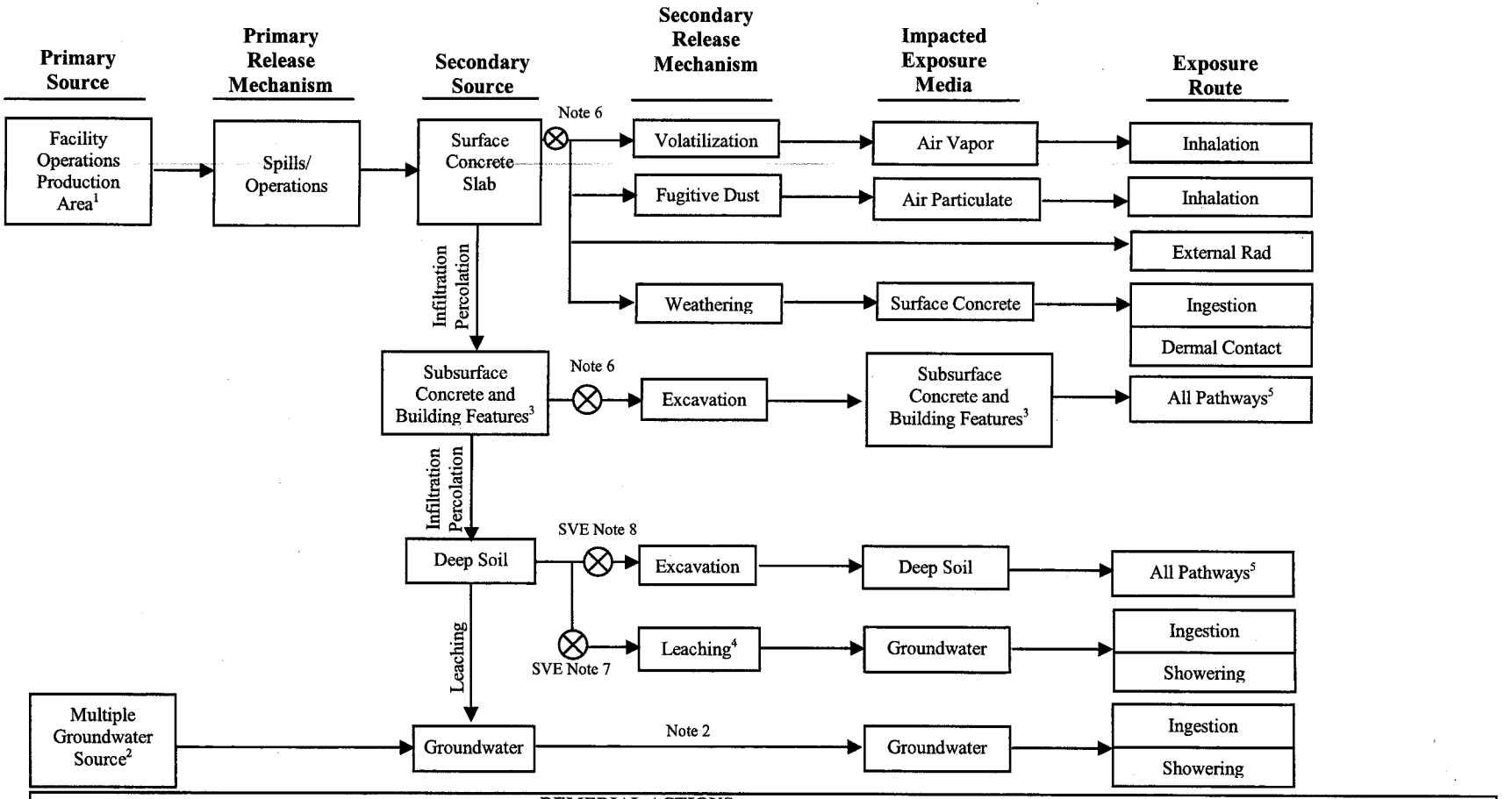
1. The contaminant migration (CM) RGs are the soil concentrations that are not predicted to impact groundwater above maximum contaminant levels based on the waste unit configuration after early actions.
2. RGs for Building 313-M and the PSVE cell.
3. RGs for Building 320-M MIPSL Tie-in and the PSVE cell
4. RGs for Building 321-M
5. NA - not applicable (no RCOCs)

3.0 LAND-USE CONTROL OBJECTIVES

The following MAOU LUC objectives have been developed to ensure the protectiveness of the remedy described above:

- Restrict worker access and prevent unauthorized contact, removal or excavation of contaminated media
- Prevent access through manholes and pipelines
- Prohibit the development and use of property for residential housing, elementary schools, child care facilities and playgrounds
- Maintain the integrity of any current or future remedial or monitoring systems such as SVE systems or groundwater monitoring wells
- Prevent access to or use of the groundwater until cleanup levels are met (under the RCRA program)

Current access controls and deed notification needed to maintain the future land use are described in the following sections of this LUCIP.



1. Production Area facilities include Buildings 313-M, 320-M, 321-M, 322-M, 324-M, 340-M and the inactive process sewer lines in the MIPSL OU and those portions from Manhole 6A to 322-M.
2. Groundwater has been impacted by multiple sources within M Area and will be addressed under the M Area RCRA Corrective Action Program.
3. Subsurface concrete and building features include sumps, trenches, pipelines, etc., that are currently below grade of concrete slab.
4. Leaching represents the potential of a contaminant in deep soil to migrate to groundwater above maximum contaminant levels per the CM analysis.
5. All pathways represent ingestion, inhalation, dermal contact, and external radiation exposure for PTSM. Evaluation for toxicity.
6. All contaminated surface concrete, subsurface concrete and building features were removed during the early actions (WSRC 2008c), thereby eliminating this pathway.
7. The early action (WSRC 2008c) removed 70% of the PTSM VOC contamination at 320-M and 321-M by auger removal. The remaining VOCs will be removed by PSVE. PSVE will also be employed at 313-M and Manhole 4A to remove VOCs.
8. Institutional Controls will prevent deep soil excavation.

Figure 4. Conceptual Site Model for the MAOU Final Action

4.0 IMPLEMENTATION OF LAND-USE CONTROLS

This section describes the LUCs selected in the ROD to achieve the objectives stated in Section 3.0. A summary of the types of controls is provided in Table 3. USDOE is responsible for implementing, maintaining, reporting on, and enforcing the MAOU LUCs. The LUCIP will become enforceable and will be implemented when approved by USEPA and SCDHEC following the completion of the RA prescribed by the MAOU ROD and ESD. USDOE shall notify USEPA and SCDHEC 60 days in advance of any proposed land use changes that are inconsistent with LUC objectives or the selected remedy.

The MAOU will be maintained as an industrial use area by implementation of the property record notices (Section 4.1) and restrictions (Section 4.2), and the use of a certified LUC survey plat (Section 4.3). Figure 3 illustrates approximate MAOU land use boundary requirements. As previously noted, groundwater is excluded herein and instead handled by the RCRA Part B Program, and the MIPSL OU boundary (depicted as the green-shaded area shown within the Figure 3 MAOU LUC boundary) is also excluded herein and instead is being managed under the MIPSL LUCIP (WSRC 2007c).

The Site Use Program (Section 4.4) will be implemented to prevent onsite worker exposure to contamination left in place at the MAOU. Other existing measures (i.e., Site Clearance Program, worker training, health and safety requirements, work controls) will also be used to ensure worker safety at the MAOU. Physical access controls (Section 4.5) are implemented at the SRS boundary to control and restrict public and trespasser access to the MAOU.

Signs at the MAOU will be maintained to alert onsite workers to the presence of hazardous substances. The signs will also convey the restrictions of unauthorized personnel. Access control warning signs will be placed and maintained around the MAOU to prevent unknowing entry and unrestricted use.

Table 3. MAOU Land Use Controls

Type of Control	Purpose of Control	Duration	Implementation	Affected Areas[a]
1. Property Record Notices[b]	Provide notice to anyone searching records about the existence and location of contaminated areas.	Until the concentrations of hazardous substances associated with the unit have been reduced to levels that allow for unlimited exposure and unrestricted use	Notice recorded by USDOE in accordance with state laws at County Register of Deeds office if the property or any portion thereof is ever transferred to non-federal ownership.	All waste management areas and other areas where hazardous substances are left in place at levels requiring land use and/or groundwater restrictions
2. Property record restrictions[c]: A. Land Use B. Groundwater	Restrict use of property by imposing limitations. Prohibit the use of groundwater.	Until the concentrations of hazardous substances associated with the unit have been reduced to levels that allow for unlimited exposure and unrestricted use	Drafted and implemented by USDOE upon any transfer of affected areas. Recorded by USDOE in accordance with state law at County Register of Deeds office	All waste management areas and other areas where hazardous substances are left in place at levels requiring land use and/or groundwater restrictions
3. Other Notices[d]	Provide notice to city &/or county about the existence and location of waste disposal and residual contamination areas for zoning/planning purposes.	Until the concentrations of hazardous substances associated with the unit have been reduced to levels that allow for unlimited exposure and unrestricted use	Notice recorded by USDOE in accordance with state laws at County Register of Deeds office if the property or any portion thereof is ever transferred to non-federal ownership	All waste management areas and other areas where hazardous substances are left in place at levels requiring land use and/or groundwater restrictions
4. Site Use Program[e]	Provide notice to worker/developer (i.e., permit requestor) on extent of contamination and prohibit or limit excavation/penetration activity	As long as property remains under USDOE control	Implemented by USDOE and site contractors Initiated by permit request	Remediation systems, all waste management areas and other areas where hazardous substances are left in place at levels requiring land use and/or groundwater restrictions
5. Physical Access Controls[f] (e.g., fences, gates, portals)	Control and restrict access to workers and the public to prevent unauthorized access	Until the concentrations of hazardous substances associated with the unit have been reduced to levels that allow for unlimited exposure and unrestricted use	Controls maintained by USDOE	At select locations throughout SRS

Table 3. MAOU Land Use Controls *(Continued/End)*

Type of Control	Purpose of Control	Duration	Implementation	Affected Areas
6. Warning Signs[g]	Provide notice or warning to prevent unauthorized uses	Until the concentrations of hazardous substances associated with the unit have been reduced to levels that allow for unlimited exposure and unrestricted use	Signage maintained by USDOE	At select locations throughout SRS
7. Security Surveillance Measures	Control and monitor access by workers/public	Until the concentrations of hazardous substances associated with the unit have been reduced to levels that allow for unlimited exposure and unrestricted use	Established and maintained by USDOE Necessity of patrols evaluated upon completion of remedial actions	Patrol of selected area throughout SRS, as necessary

[a]Affected areas – Specific locations identified in the SRS LUCIP or subsequent post-ROD documents.
[b]Property Record Notices – Refers to any non-enforceable, purely informational document recorded along with the original property acquisition records of USDOE and its predecessor agencies that alerts anyone searching property records to important information about residual contamination or waste disposal areas in the property.
[c]Property Record Restrictions – Includes conditions and/or covenants that restrict or prohibit certain uses of real property and are recoded along with original property acquisition records of USDOE and its predecessor agencies.
[d]Other Notices – Includes information on the location of waste disposal areas and residual contamination depicted on as survey plat, which is provided to a zoning authority (i.e., city planning commission) for consideration in appropriate zoning decisions for non-USDOE property.
[e]Site Use Program – Refers to the internal USDOE/USDOE contractor administrative program(s) that requires the permit requestor to obtain authorization, usually in the form of a permit, before beginning any excavation/penetration activity (e.g., well drilling) for the purpose of ensuring that the proposed activity will not affect underground utilities/structures, or in the case of contaminated soil or groundwater, will not disturb the affected areas without the appropriate precautions and safeguards.
[f]Physical Access Controls – Physical barriers or restrictions to entry.
[g]Signs – Posted command, warning or direction.

4.1 Property Record Notices

In the long term, if the property is ever transferred to non-federal ownership, the United States 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 RAs taken on the site. The contract for sale and the deed will contain the notification required by CERCLA Section 120(h).

The deed notification shall notify any potential purchaser that the property has been used for the management and disposal of waste. These requirements are also consistent with the intent of RCRA deed notification requirements at final closure of a RCRA facility if contamination will remain at the unit.

4.2 Property Record Restrictions

The deed shall also include deed restrictions precluding residential use of the property and/or any other property record restrictions necessary to achieve the LUC objectives. The deed shall expressly prohibit activities inconsistent with the RGs and objectives in the MAOU ROD upon any and all transfers. USDOE shall provide a copy of the executed deeds to the regulatory agencies as soon as practicable after the transfer of fee title, but no later than 30 days. However, the need for these deed restrictions may be re-evaluated 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 re-evaluation of the need for the deed restrictions will be done through an amended ROD.

USDOE shall provide USEPA and SCDHEC six-months notice prior to transfer or sale to ensure that USEPA and SCDHEC can be involved in discussions to ensure that appropriate provisions are included in the transfer terms or conveyance documents to maintain effective ICs. If it is not possible for the facility to notify USEPA and SCDHEC at least six months prior to any transfer or sale, then the facility will notify USEPA and SCDHEC as soon as possible but no later than 60 days prior to the transfer or sale of any property subject to ICs. In addition to the land

transfer notice and discussion provisions above, USDOE further agrees to provide USEPA and SCDHEC with similar notice within the same time frames as to federal to federal transfer of property.

4.3 Other Public Notices

The LUCIP identifies the proposed area under land use restrictions via Figure 3 for the MAOU and the final survey plat (when available) located in Appendix A. After construction completion, a final survey plat will be prepared to document the as-built arrangement of the ICs and area subject to LUCs. The drawing will present a polygon of the MAOU subject to LUCs, including the benchmarks, the location of warning signs, access control points and other information for LUCs. This post-construction survey plat will be certified by a professional land surveyor and will be submitted to USEPA and SCDHEC concurrently with the Post-Construction Report (PCR). In addition, if the site is ever transferred to non-federal ownership, a professional land surveyor-certified survey plat of the OU will be prepared at or near the time of conveyance to support the LUCIP required restrictive covenants on land use and will be recorded with the appropriate county recording agency.

4.4 Site Use Program

Under DOE Order 430.1A, *Life Cycle Management* (USDOE 1998), SRS is required to implement an asset management program for the use, maintenance, and disposal of physical assets, including real estate. SRS complies with this order through its Site Use Program, which is conducted in accordance with WSRC 1D, *Site Infrastructure and Services Manual*, Procedure 3.02, "Site Real Property Configuration Control" (WSRC 2007d). All employees, contractors, and visitors at SRS are required to adhere to the Site Use Program. No use of land (i.e., excavation or any other land use) shall be undertaken without prior approval documented by a Site Use Permit. Also, in accordance with WSRC 1D, Procedure 3.02, all work at SRS that adds to or modifies features or facilities portrayed on SRS development maps (i.e., plot plans of facilities/utilities at SRS) will be authorized by a Site Clearance Permit before any activities are conducted. All Site Clearance Requests will be reviewed to verify that either an approved Site

Use Permit has been obtained or that the request is sanctioned by an existing Site Use Permit. All land use requirements applicable for the OU will be provided to the Site Use Program for use in determining issuance of Site Clearance Permits. In addition, the Site Use Permit must be amended when the geographic configuration or buffer zone used to establish the permit boundary changes or there is a change to the permitted land use.

SRS is responsible for updating, maintaining, and reviewing site maps, including FFA (FFA 1993) OU identifications. If a Site Clearance Request potentially impacts an FFA OU, the Site Clearance Request Form is sent to the appropriate FFA OU reviewer for approval. The roles and responsibilities of each individual are detailed in WSRC 1D, Procedure 3.02. Before a Site Clearance Permit is issued, verification of USDOE approval for intended land use must be obtained. The site use and site clearance processes are applicable to all activities and personnel on site (including subcontractors). The USDOE will notify USEPA and SCDHEC in advance of any change to any internal procedure, including the Site Use Program, which would affect implementing or maintaining the LUCs. The processes are controlled within the SRS Quality Assurance Program in accordance with WSRC 1Q Manual, *Quality Assurance* (WSRC 2008e). The SRS Quality Assurance program governs all SRS activities.

SRS identifies all buildings and facilities on maps used in the Site Use Program. This waste unit is identified on these maps as a CERCLA facility.

Any work proposed in these areas will be strictly controlled, and workers will be appropriately trained and briefed about health and safety requirements if work is deemed necessary for maintenance. No change in land use or excavation at the MAOU shall be undertaken without USEPA and SCDHEC approval. Approval by USEPA and SCDHEC is required for any modification or termination of the ICs and implementation actions, and USDOE must obtain prior approval from USEPA and SCDHEC before taking any anticipated action that may disrupt the effectiveness of the LUCs or alter or negate the need for LUCs.

4.5 Physical Access Controls

Site-specific physical access controls are required at the MAOU. Specifically, Manholes 2N, 3, 3N, 4, 4A, 5, 5A, 6, 6A, 7, 7A, 8A, 9A, B and C shown within the orange-shaded area of Figure 3 and the sewer connections to those manholes will be grouted per the *Corrective Measures Implementation/Remedial Action Implementation Plan (CMI/RAIP)* for the MAOU (U) (WSRC 2009). Note: As detailed in Section 2.1, the manholes within the green-shaded area of Figure 3 are managed as part of the MIPSL OU LUC and therefore excluded from the MAOU LUC. SRS-wide physical access controls are provided at the SRS boundary as mentioned in Table 3, item 5.

4.6 Warning Signs

To prevent unknowing entry and to ensure that unrestricted use of the waste unit does not occur while the unit is under ownership of the government, access control warning signs will be posted at the unit as shown in Appendix B. The signs shall be legible for a distance of at least 25 ft. Custodial responsibilities for maintenance and inspection of the MAOU will be maintained by a Post-Closure Maintenance Group. Warning signs will be installed as part of the MAOU construction per the CMI/RAIP (WSRC 2009) schedule. In addition, the final placement of the signage will be documented in the PCR.

4.7 Other Access Controls and Security/Surveillance Measures

While under the ownership of USDOE, access control of the entire SRS will be maintained in accordance with the 2000 RCRA Part B Permit Renewal Application, Volume I, Section F.1. This section describes the 24-hour surveillance system (R.61-79.264.14(b)(1)), artificial or natural barriers (R.61-79.264.14(b)(2)(I)), control entry systems (R.61-79.264.14(b)(2)(ii)), and access control warning signs (R.61-79.264.14(c)) in place at the SRS boundary to comply with the security requirements for a RCRA-permitted facility.

4.8 Field Inspection and Maintenance for Institutional Controls

After remediation of the MAOU, only inspection and maintenance activities will be required by the RA. The MAOU will be inspected per the Field Inspection Checklist (Appendix C). Field inspections will be performed annually. Additional inspections may be necessary in the event of unusual weather or any other condition warranting inspection. For the MAOU, inspections will be performed to ensure that signs are in place. Inspection records will be kept in the operations record file for future access.

Maintenance (including site inspections, general housekeeping, and repair of erosion damage) will be performed as needed at MAOU. Necessary upkeep of the access control signs for MAOU will be performed.

Any activity that is inconsistent with the IC objectives or use restrictions, or any other action that may interfere with the effectiveness of the ICs will be addressed by the USDOE as soon as practicable, but in no case will the process be initiated later than 10 days after the USDOE becomes aware of the breach. The USDOE will notify EPA and SCDHEC as soon as practicable but no longer than 10 days after discovery of any activity that is inconsistent with the IC objectives or use restrictions, or any other action that may interfere with the effectiveness of the ICs. The USDOE will notify EPA and SCDHEC regarding how the USDOE has addressed or will address the breach within 10 days of sending EPA and SCDHEC notification of the breach. The FFA Annual Progress Report, submitted to the regulatory agencies by USDOE, will provide the status of the ICs and describe how any IC deficiencies or inconsistent uses have been addressed. In the event of property transfer or lease, the Annual Report will cite findings on the following: whether the use restrictions and controls referenced above were communicated in the deed(s) or lease restrictions; whether property use conforms with the deed or lease restrictions and controls; and whether the owners and state/local agencies have been notified regarding the deed or lease restrictions and controls. The FFA Annual Progress Report(s) will be used in the preparation of the Five-Year Remedy Review Report.

All other routine maintenance activities will be documented and maintained in files subject to USEPA and SCDHEC review and audit. A copy of the completed inspection form is maintained in the Area Completion Projects (ACP) Document Control Center. The LUCs shall be maintained until the concentration of hazardous substances associated with the unit have been reduced to levels that allow for unlimited exposure and unrestricted use.

The waste unit inspectors are to be trained in Hazardous Waste Operations and Emergency Response, RCRA Well Inspections (ACP-specific training), ACP RCRA Waste Unit Inspections, Radiological Worker Training, etc., as applicable for the specific inspection. They will also be trained based on the individual requirements of the regulatory approved closure documents for each waste unit. In addition, the inspectors are to attend yearly refresher courses. Over the years, different personnel may conduct the inspections.

This unit-specific LUCIP, including the checklist (Appendix C), will be appended to the SRS LUCAP upon final regulatory approval. After completion of the PCR, the preliminary checklist in the LUCAP will be replaced with the final approved checklist.

5.0 REFERENCES

FFA, 1993. *Federal Facility Agreement for the Savannah River Site*, (Effective Date: August 16, 1993)

SRNS, 2009. *Explanation of Significant Difference to the Revision 1 Record of Decision for the M Area Operable Unit (U),* SRNS-RP-2009-00406, Revision 1, Savannah River Nuclear Solutions, LLC, Savannah River Site, Aiken, SC

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WSRC, 1999. *Land Use Control Assurance Plan (LUCAP) for the Savannah River Site (SRS),* WSRC-RP-98-4125, Revision 1.1, Westinghouse Savannah River Company, Savannah River Site, Aiken, SC

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WSRC, 2008d. *Post-Construction Report (PCR) for the M-Area Inactive Process Sewer Lines (MIPSL) (081-M) Operable Unit (OU) (U),* WSRC-RP-2008-4029, Revision 1, Washington Savannah River Company LLC, Savannah River Site, Aiken, SC

WSRC, 2008e. WSRC Procedure Manual 1Q, *Quality Assurance (U)*, Westinghouse Savannah River Company, Savannah River Site, Aiken, SC

WSRC, 2009. *Corrective Measures Implementation/Remedial Action Implementation Plan (CMI/RAIP) for the M Area Operable Unit (MAOU) (U),* WSRC-RP-2008-4063, Revision 1, Savannah River Nuclear Solutions, LLC, Savannah River Site, Aiken, SC

APPENDIX A – AS-BUILT DRAWINGS

(Drawing to be provided with the submission of the MAOU PCR.)

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APPENDIX B – ACCESS CONTROL WARNING SIGN

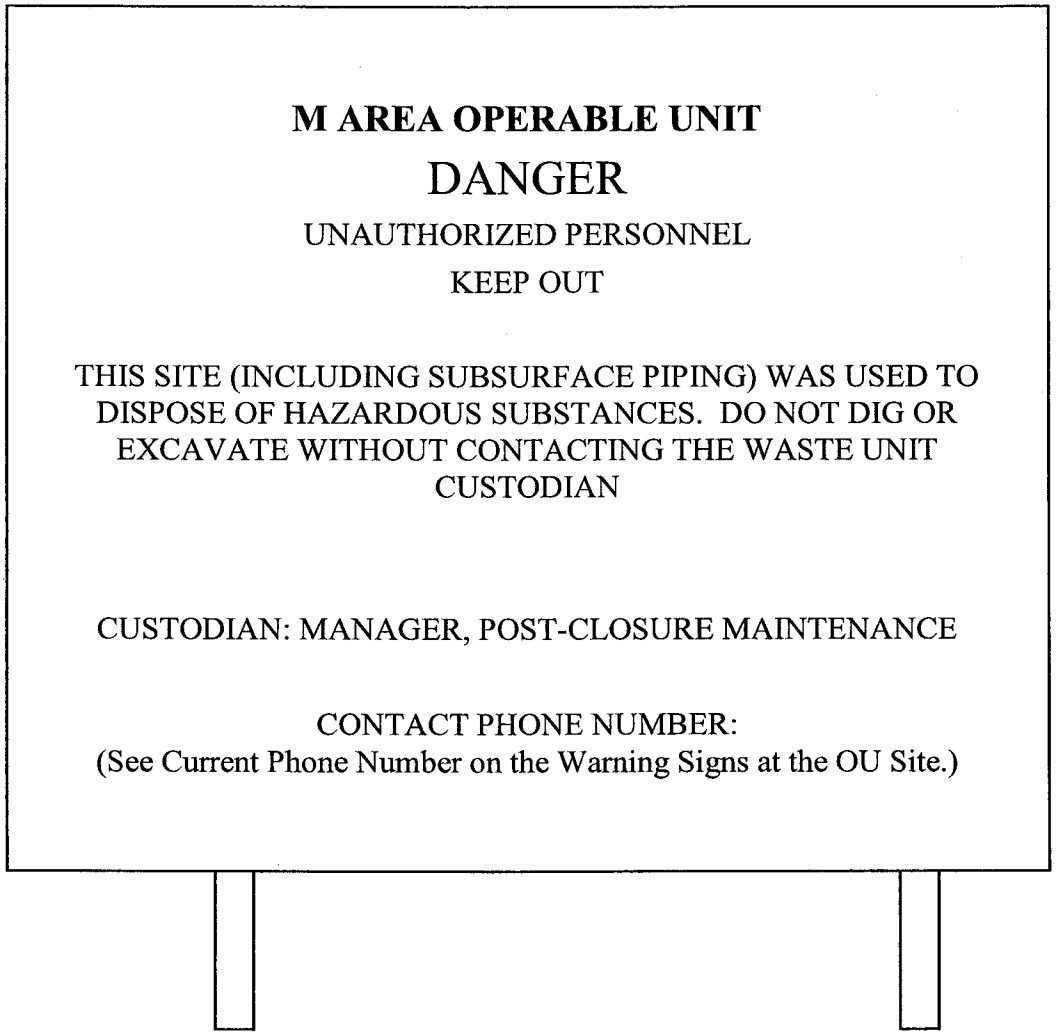


Figure B-1. Access Control Warning Sign

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APPENDIX C – MAOU FIELD INSPECTION CHECKLIST

FIELD INSPECTION CHECKLIST

❑ SCHEDULED ❑ UNSCHEDULED

A= Satisfactory X= Unsatisfactory (Explanation required)	A or X	Observation of Corrective Action Taken
1. Verify that roads are accessible.		
2. Verify that the waste unit signs (seven) are in acceptable condition, have the correct information, and are legible from a distance of 25 feet.		
3. Verify that there are no unauthorized excavation, digging, or construction activities at the PSVE sites (i.e., 313-M, 320-M, 321-M, the PSVE Cell and Manhole 4A) or at Manholes 2N, 3, 3N, 4, 4A, 5, 5A, 6, 6A, 7, 7A, 8A, 9A, B&C.		
4. Verify that the passive SVE wells at the PSVE sites (i.e., 313-M, 320-M, 321-M, the PSVE Cell and Manhole 4A) and support systems are accessible and in good condition.		
5. Verify the vapor intrusion barrier over 321-M and the PSVE Cell are not visible beneath the approximate 1 foot common fill and repair visible damage to vapor barrier.		

Inspected by:		
(Print Name)	(Signature)	(Date)

Post-Closure Manager:		
(Print Name)	(Signature)	(Date)

CAUTION: The inspector shall notify the Post-Closure Manager and Environmental Compliance Authority **IMMEDIATELY** if there has been a breach or compromise of the institutional controls of this waste unit. The notification shall be in accordance with SRS post-closure inspection procedures.

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LUCIP for the
A-Area Burning/Rubble Pits (731-A, -1A) and Rubble Pit (731-2A) and the Miscellaneous Chemical Basin/Metals Burning Pit (731-4A and -5A) Operable Unit
Land Use Control Implementation Plan for the A-Area Burning/Rubble Pits (731-A, -1A) and Rubble Pit (731-2A) & the Miscellaneous Chemical Basin/Metals Burning Pit (731-4A & -5A) Operable Unit
(WSRC-RP-2006-4073, Rev.1, September 2007)

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ARF # 15075

United States Department of Energy

Savannah River Site

Land Use Control Implementation Plan (LUCIP) for the A-Area Burning/Rubble Pits (731-A, -1A) and Rubble Pit (731-2A) and the Miscellaneous Chemical Basin / Metals Burning Pit (731-4A, -5A) Operable Unit (U)

CERCLIS NUMBER: 19, 28, 92

WSRC–RP–2006-4073

Revision 1

September 2007

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

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

DISCLAIMER

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

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LIST OF ACRONYMS AND ABBREVIATIONS

ABRP	A-Area Burning/Rubble Pits (731-A, -1A) and Rubble Pit (731-2A)
ARAR	applicable or relevant and appropriate requirements
bgs	below ground surface
BRA	Baseline Risk Assessment
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
cm	centimeter
CM	contaminant migration
CMCOC	contaminant migration constituent of concern
COC	constituent of concern
ECA	Environmental Compliance Authority
ECO	ecological
ESD	Explanation of Significant Difference
FFA	Federal Facility Agreement
ft	feet
ft^2	square feet
ft^3	cubic feet
HAZWOPER	Hazardous Waste Operations and Emergency Response
HH	human health
HQ	hazard quotient
IC	institutional control
in	inch
IROD	Interim Record of Decision
LOAEL	lowest observable adverse effects level
LUC	land use control
LUCIP	Land Use Control Implementation Plan
LUCAP	Land Use Control Assurance Plan
$\mu g/kg$	microgram per kilogram
$\mu g/L$	microgram per liter
m	meter
m^2	square meter
m^3	cubic meter
MBP	Metals Burning Pit (731-5A)
MCB	Miscellaneous Chemical Basin (731-4A)
MCL	maximum contaminant level
mg/kg	milligram per kilogram
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
OU	operable unit

LIST OF ACRONYMS AND ABBREVIATIONS *(Continued)*

PCB	polychlorinated biphenyl
PCE	tetrachloroethylene
pCi/g	picoCurie per gram
PCM	Post-Closure Manager
PCR	Post-Construction Report
QA	Quality Assurance
RA	remedial action
RCOC	refined constituent of concern
RCRA	Resource Conservation and Recovery Act
RFI/RI	RCRA Facility Investigation/ Remedial Investigation
RG	remedial goal
RGO	remedial goal option
ROD	Record of Decision
SCDHEC	South Carolina Department of Health and Environmental Control
SGCP	Soil and Groundwater Closure Projects
SRS	Savannah River Site
SVE	soil vapor extraction
TCE	trichloroethylene
USDOE	United States Department of Energy
USEPA	United States Environmental Protection Agency
VOC	volatile organic compound
WSRC	Washington Savannah River Company LLC
yd^3	cubic yard

ARF #15075

1.0 INTRODUCTION

This Land Use Control Implementation Plan (LUCIP) has been prepared for the A-Area Burning/Rubble Pits (731-A, -1A) and Rubble Pit (731-2A) and the Miscellaneous Chemical Basin / Metals Burning Pit (731-4A, -5A) Operable Unit (ABRP/MCB/MBP OU) at the Savannah River Site (SRS). The ABRP/MCB/MBP OU includes the eight ABRP subunits (Burning/Rubble Pit 731-A, Burning/Rubble Pit 731-1A, Rubble Pit 731-2A, Potential Pit, Depressional Area, Ash Scatter Area/Ditch, A-Area Ash Pile 788-2A, and Trench), two MCB subunits (MCB Surface Soil and MCB Vadose Zone) and one MBP subunit (MBP Surface Soil). The anticipated future land use for the ABRP/MCB/MBP OU is industrial. Due to groundwater contamination, institutional controls (ICs) to prevent access to or use of groundwater until cleanup level are met under the Resource Conservation Recovery Act (RCRA) program are required for all of the subunits in this OU. Groundwater contamination in the vicinity of the ABRP/MCB/MBP OU is being addressed under the RCRA Part B Permit Renewal Application for M-Area and Metallurgical Laboratory Hazardous Waste Management Facilities Postclosure. The purpose of the LUCIP is to describe how the land use controls (LUCs) selected in the ABRP/MCB/MBP OU Record of Decision (ROD) (WSRC 2006a) will be implemented and maintained. The following LUC objectives have been selected for this OU:

- Restrict worker access and prevent unauthorized contact, removal or excavation of contaminated media (i.e., vadose zone soils)

- Prohibit the development and use of property for residential housing, elementary schools, childcare facilities and playgrounds

- Maintain the integrity of any current or future remedial or monitoring systems such as soil vapor extraction (SVE) systems, soil cover, or groundwater monitoring wells

- Prevent access to or use of groundwater until cleanup levels are met (under the RCRA program)

- Prevent construction of inhabitable buildings without an evaluation of indoor air quality to address vapor intrusion

Current access controls and deed notification needed to maintain the future land use are described in the following sections of this LUCIP.

The selected remedy leaves hazardous substances in place that pose a potential future risk and will require land use restrictions until the concentrations of hazardous substances in the soil and groundwater are at levels that allow for unrestricted use. As agreed on March 30, 2000, among the United States Department of Energy (USDOE), the United States Environmental Protection Agency (USEPA), and South Carolina Department of Health and Environmental Control (SCDHEC), SRS is implementing a Land Use Control Assurance Plan (LUCAP) to ensure that the LUCs required by numerous remedial decisions at SRS are properly maintained and periodically verified. The requirements of that LUCAP also apply to the LUCs that were selected as part of the remedial action (RA) for the ABRP/MCB/MBP OU. This additional document, the ABRP/MCB/MBP OU LUCIP, contains the detailed and specific measures required to implement and maintain the LUCs selected as part of this particular remedial decision. The LUCs shall be maintained until the OU is suitable for unlimited exposure and unrestricted use. Approval by USEPA and SCDHEC is required for any modification or termination of the ICs.

USDOE is responsible for implementing, maintaining, monitoring, reporting, and enforcing the LUCs in accordance with the approved LUCIP. Upon final approval, the LUCIP will be appended to the LUCAP and should be considered incorporated by reference into the ABRP/MCB/MBP OU ROD (WSRC 2006a), establishing implementation and maintenance requirements for the LUCs under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and the SRS Federal Facility Agreement (FFA) (FFA 1993). The LUCIP will remain in effect unless and until modifications are approved by USEPA and SCDHEC as necessary for protection of human health and the environment. This LUCIP will be evaluated for accuracy during the five-year remedy review and any approved LUCIP

modification will be appropriately documented for incorporation by reference into the ABRP/MCB/MBP OU ROD.

1.1 Format of LUCIP

The format of this LUCIP is consistent with the FFA protocol format approved by the USEPA and SCDHEC in March 2004.

2.0 OVERVIEW OF ABRP/MCB/MBP OU REMEDIAL ACTION

2.1 General Description and History of the Unit

SRS occupies approximately 803 square kilometers (310 square miles) of land adjacent to the Savannah River, principally in Aiken and Barnwell counties of South Carolina. SRS is located approximately 40 kilometers (25 miles) southeast of Augusta, Georgia, and 32 kilometers (20 miles) south of Aiken, South Carolina. The ABRP/MCB/MBP OU is located within the Upper Three Run Creek Integrator Operable Unit. M Area is located in the northwest portion of SRS.

The ABRP/MCB/MBP OU is comprised of three separate, adjacent waste sites; the A-Area Burning/Rubble Pits (ABRP), the Miscellaneous Chemical Basin (MCB), and the Metals Burning Pit (MBP) (See Figure 1).

The ABRP is divided into eight subunits (Burning/Rubble Pit 731-A, Burning/Rubble Pit 731-1A, Rubble Pit 731-2A, Potential Pit, Depressional Area, Ash Scatter Area/Ditch, A-Area Ash Pile 788-2A, and Trench) as shown in Figure 2. These potential waste sites were identified based upon field investigations of existing sites and surface features and by reviewing historical aerial photographs from the 1950's through 1980's.

The two Burning/Rubble Pits (731-A, 731-1A) were constructed in 1951 and are approximately 6.7 m (22 ft) wide, 2.7 to 3 m (9 to 10 ft) deep, and 76.2 m (250 ft) long. They were used on a monthly schedule to burn paper, plastics, wood, rubber, rags, cardboard, oil degreasers, and solvents. After burning was discontinued in October 1973, the burned remains were covered

with a layer of soil. The pits were subsequently filled with rubble consisting of paper, wood, concrete, empty galvanized steel barrels, and cans. The pits reached capacity in 1978 and were taken out of service in 1983. The pits were then covered with native soils to grade level, and vegetation was allowed to re-establish.

Rubble Pit 731-2A was used from about 1951 until 1983 and is approximately 12.2 m (40 ft) wide and 198.1 m (650 ft) long, with an unknown depth that could extend to 6.1 m (20 ft). No specific disposal records are known to exist for this pit. However, SRS rubble pits were generally used to dispose of construction debris, waste wood products, and non-returnable empty drums. After the last use of Rubble Pit 731-2A in 1983, the area was backfilled and seeded.

The Potential Pit has estimated dimensions of 61 x 79.2 m (200 x 260 ft). This subunit was designated based on the existence of an area of depression/subsidence located approximately 15.2 m (50 ft) east of the A-Area Ash Pile and discussions with SRS personnel. Ground penetrating radar results suggested the presence of a trench boundary; however, further investigation produced no evidence of a trench.

The Depressional Area has estimated dimensions of 48.8 x 112.8 m (160 x 370 ft). It was identified by field observations as a potential receptor of surface runoff from the overflow of the pits/trenches or from spills in the immediate area. Although this area is a topographical "low spot," it does not contain permanent standing water or boggy areas, nor does it exhibit characteristic wetland soils and vegetation.

As shown in Figure 2, the Ash Scatter Area/Ditch is located between the A-Area Ash Pile and the Depressional Area and has approximate dimensions of 91 x 46 m (300 x 150 ft). A historic east-northeast trending ditch (currently filled) is located within this subunit and measures approximately 91 x 6 m (300 x 20 ft).

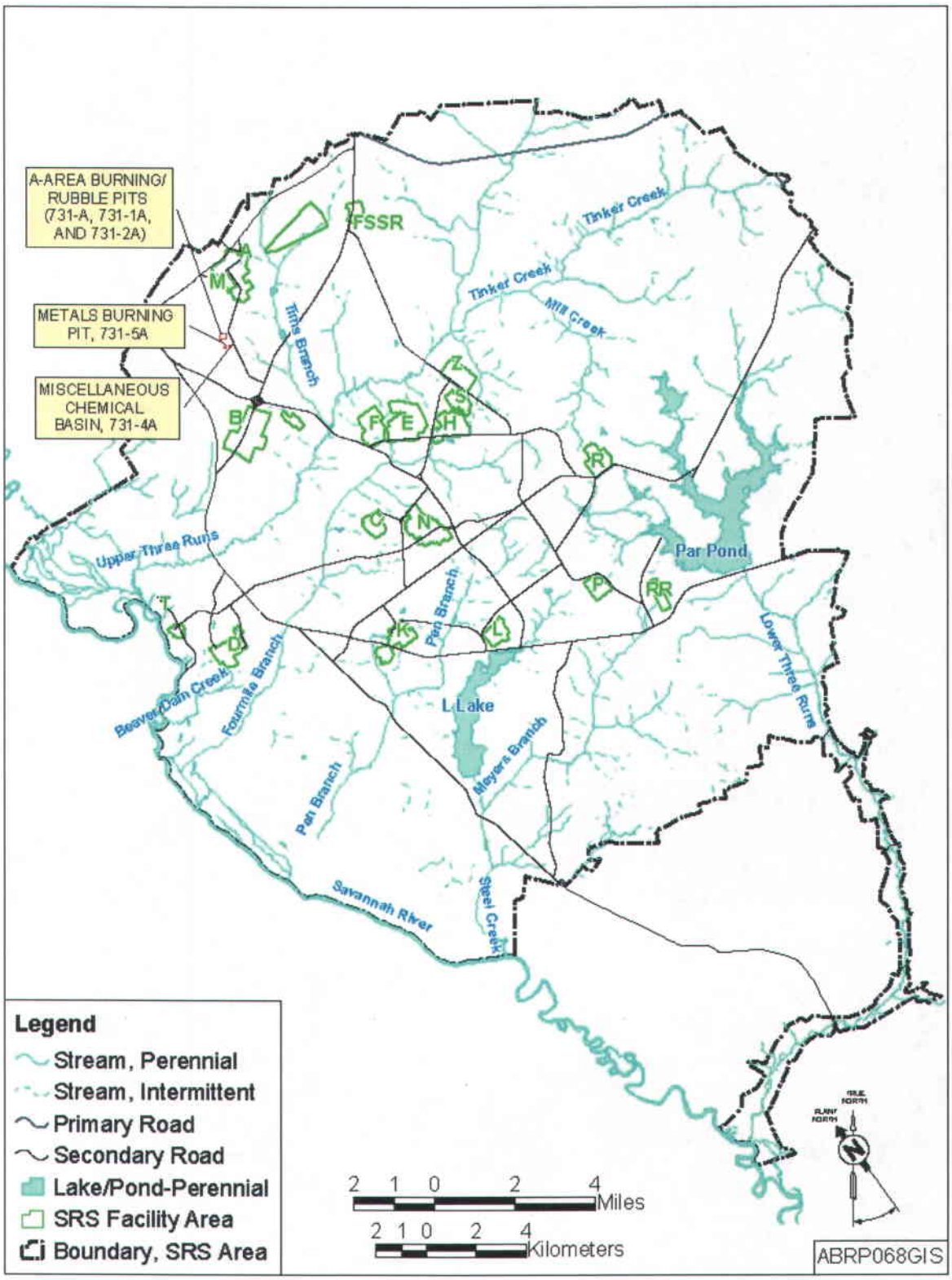


Figure 1. Location of the ABRP/MCB/MBP OU in M Area within the Savannah River Site

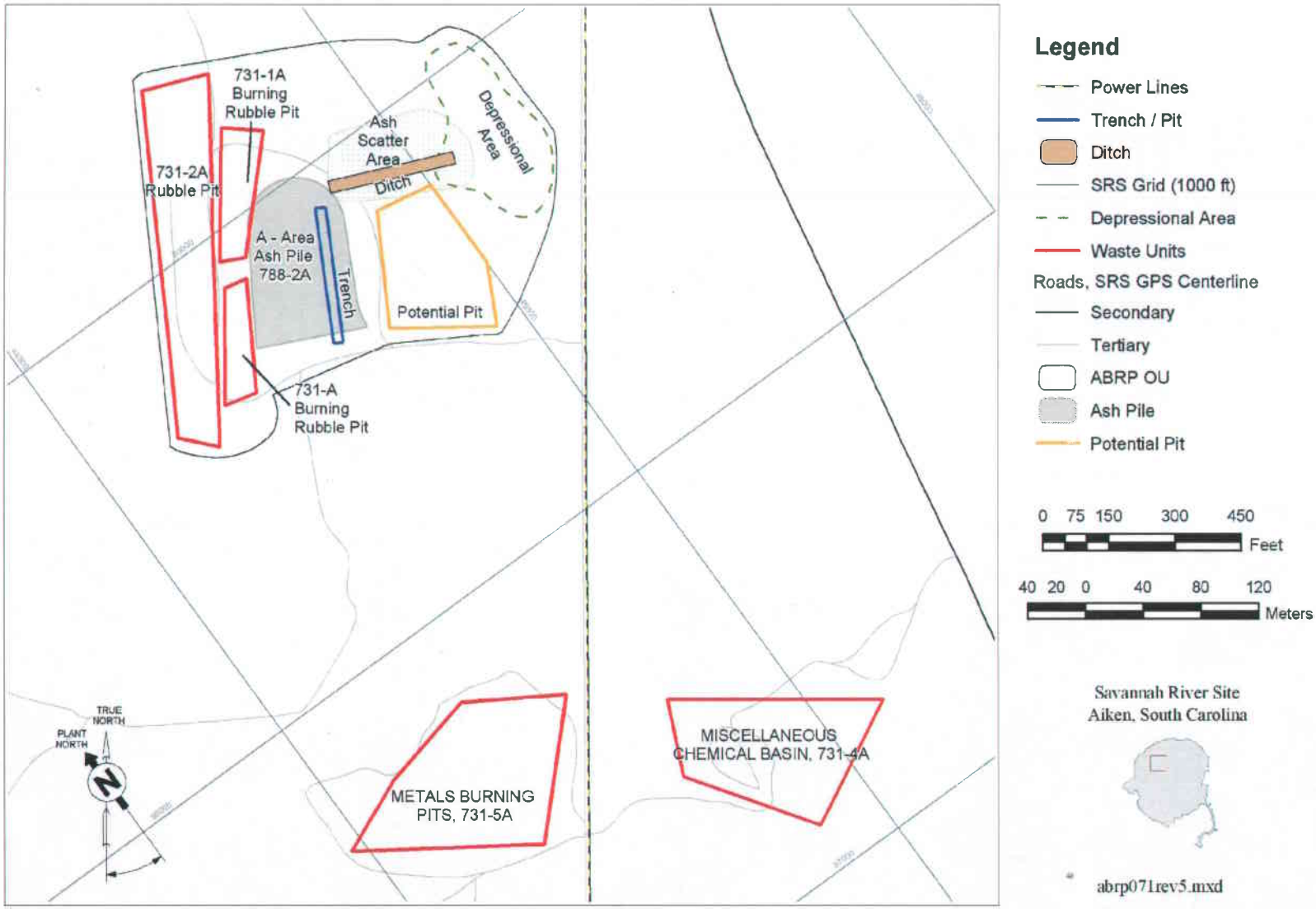


Figure 2. Layout of the ABRP/MCB/MBP OU

The A-Area Ash Pile 788-2A subunit is located in the central portion of the ABRP. It covers an area of approximately 128 x 79 m (420 x 260 ft) and rises approximately 4.6 to 8 m (14 to 24 ft) above the surrounding topography. The A-Area Ash Pile was used to dispose of ash from the A-Area Powerhouse prior to 1994. The A-Area Ash Pile is permitted under Industrial Wastewater Permit No. 7289, which was issued on June 29, 1981.

The Trench subunit extends north-south and is mostly buried beneath 6.1 m (20 ft) of compacted ash along the eastern portion of the A-Area Ash Pile. The Trench was filled with debris and covered with soil prior to construction of the A-Area Ash Pile. The Trench measures approximately 4.6 x 91.4 m (15 x 300 ft). The Trench is between 2.4 and 4.6 m (8 and 15 ft) deep with approximately 5 to 10% of its length is exposed to the south of the A-Area Ash Pile.

MCB/MBP Operational History

The MCB is an old borrow pit that received liquid chemical waste from about 1956 to 1974. No records of the types or amounts of material disposed of are available. It is believed that drums were emptied at the MCB and then discarded at the MBP. In 1974, the MCB, which was approximately 6 x 6 m (20 x 20 ft) and approximately 0.3 m (1 ft) deep, was graded and allowed to revegetate naturally.

The MBP is a cleared area that was used to burn lithium-aluminum alloys, scrap, and cuttings from A/M-Area operations. The MBP is irregular in shape, approximately 122 x 122 m (400 x 400 ft); it is not an excavated pit. Materials deposited there were placed in piles from 0.9 to 1.8 m (3 to 6 ft) high upon the ground. Wastes were accumulated in two areas, one large pile and a series of small piles oriented in a semicircular arc. The MBP reportedly was in service from about 1960 to 1974. In 1974, the area was graded and allowed to revegetate with weeds, grasses and small pine trees.

2.2 Nature and Extent of Contamination

No human health (HH), ecological (ECO) or contaminant migration (CM) refined constituents of concern (RCOCs) have been identified at the Burning/Rubble Pits (731-A, -1A), Potential Pit, Depressional Area, and Ash Scatter Area/Ditch subunits. Thus, there is no problem warranting action for these subunits.

Benzo(a) pyrene in surface soil at Rubble Pit 731-2A was identified as an RCOC for the future industrial worker at concentrations exceeding the remedial goal (RG) of 0.2 mg/kg. The final action selected for the surface soil in the ABRP Interim Record of Decision (IROD) consisted of a minimum 0.3 m (1-ft) thick soil cover combined with ICs. Construction of the soil cover, which also covered the Burning/Rubble Pits (731-A, 731-1A) in order to insure adequate drainage, was completed in 2001. This action remains protective of human health. No further problems warranting action exist at the Rubble Pit 731-2A surface soil subunit.

At the MCB subunit, polychlorinated biphenyls (PCBs) exceeding both the human health RG (1 mg/kg) and the ecological RG (0.215 mg/kg) were present in soils. Octachlorodibenzo-p-dioxin was also present as a human health RCOC. The final action selected for MCB surface soils in the MCB IROD was ICs combined with excavation of PCB-contaminated soils to a maximum depth of 1 .2 m (4 ft). The excavation, which included an area of about 8826 m^2 (95,000 ft^2), was completed in February 2002. Confirmatory sampling was performed to verify that RGs were met. The excavation was backfilled with clean soil. This action remains protective of human health. No further problems warranting action exist at the MCB surface soil subunit.

Aluminum concentrations at the MBP subunit exceeded the ecological RG of 11,000 mg/kg at two areas totaling approximately 1,765 m^2 (19,000 ft^2). The final action selected for MBP surface soils in the MCB/MBP IROD was excavation of contaminated soils to a maximum depth of 1.2 m (4 ft). Confirmatory sampling was performed to verify that RGs were met. The excavation was backfilled with clean soil. No further problems warranting action exist at the MBP surface soil subunit.

Arsenic and coal-related radionuclides are present at the A-Area Ash Pile (788-2A) subunit at concentrations that exceed the $1x10^{-6}$ risk for the future industrial worker. Arsenic and selenium are present in concentrations that may be predictive of a potential ecological hazard (lowest observable adverse effects level [LOAEL] hazard quotients [HQs] > 1). These RGs are listed in Table 1. The A-Area Ash Pile covers approximately 10,000 m^2 (110,000 ft^2). Based on an average thickness of 6.1 m (20 ft), the total volume of the ash is approximately 60,400 m^3 (79,000 yd^3).

The Trench subunit is approximately 4.6 m (15 ft) wide by 91.4 m (300 ft) long, most of which is overlain by about 6.1 m (20 ft) of compacted ash. The Trench is between 2.4 and 4.6 m (8 and 15 ft) deep, and approximately 5 to 10% of the Trench is exposed south of the Ash Pile. The vadose zone in the vicinity of the ABRP is about 40 m (130 ft) thick. The upper 24 m (80 ft) is made up of sands and silt. This is underlain by a predominantly clay, 1.8 to 2.4 m (6 to 8 ft) layer that sits atop another sand/silt layer approximately 12.2 m (40 ft) thick. A perched water zone is present at times just above the clay-rich zone at a depth of 22.9 to 25.9 m (75 to 85 ft) below the surface. The ABRP IROD was supplemented by an Explanation of Significant Difference (ESD) that added an interim action of low-energy SVE to address trichloroethylene (TCE) contamination in the vadose zone beneath the Trench. Three wells are currently in operation as MicroBlowers™ and one is operating with a BaroBall™ as part of this ongoing interim action. In 2001, before the start of the interim action, the maximum detection of TCE was 487 mg/kg. TCE concentrations are also present at levels in the vadose zone that would migrate to groundwater above the maximum contaminant level (MCL) of 5.0 μg/L in less than 10 years.

The MCB vadose zone is approximately 36.6 m (120 ft) thick. The vadose zone contains a fine-grained sediment zone up to 4.6 m (15 ft) below ground surface (bgs), underlain by 18.3 to 21.3 m (60 to 70 ft) of sands/silts, a 3.0 m (10 ft) thick clay lens at a depth of 22.9 to 25.9 m (75 to 85 ft), and sands and silts to the water table. Tetrachloroethylene (PCE) and TCE contamination was found in the vadose zone at levels that would migrate to groundwater at a concentration above the MCL of 5.0 μg/L in less than 10 years. The final action selected for the MCB vadose zone in the MCB IROD was active/passive SVE, with a

contaminant migration remedial goal option (RGO) of 0.344 mg/kg for both PCE and TCE. Twenty-seven SVE wells were installed covering an area of about 8,659 m^2 (93,200 ft^2). Active SVE operation has been completed and passive SVE is ongoing. Effectiveness monitoring indicates declining contaminant concentrations consistent with effective removal of contaminated soil gas. Residual TCE and PCE contamination remains above the RG of 0.344 mg/kg at depths of 0 to 4.6 m (0 to 15 ft) bgs. Passive SVE is ongoing per the MCB/MBP IROD, with 14 wells currently venting. No further response action is required.

PCE and TCE have been determined to be contaminant migration constituents of concern (CMCOCs) at the Trench Area and at the MCB subunit. Computer modeling was used to establish TCE and PCE soil concentrations that would not adversely impact the underlying groundwater. These RGs are listed in Table 1. Actual soil sampling in the vadose zone at the points of greatest contamination will be conducted to determine when the RGs have been achieved, and no change in the operation of the SVE process will be allowed without the concurrence of the Core Team.

Although the proposed RA is intended to prevent the leaching of contaminants from the soil to underlying aquifers, groundwater is not considered part of the ABRP/MCB/MBP OU. Any groundwater contaminated by the ABRP/MCB/MBP OU will be addressed by the remedial systems operating under the SRS RCRA Part B Permit.

The selected remedy for the ABRP/MCB/MBP OU leaves hazardous substances in place that pose a potential future risk and will require land use restrictions until the concentrations of hazardous substances in the soil and groundwater are at levels that allow for unrestricted use and exposure.

2.3 Remedial Actions Selected

The selected RA established in the ROD is based on an evaluation of potential alternatives performed in accordance with the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) and the CERCLA (as amended).

As stated in the ROD (WSRC 2006a), for the ABRP/MCB/MBP OU, no action is required for the following subunits:

- Burning/Rubble Pits 731-A and 731-1A
- Depressional Area
- Potential Pit
- Ash Scatter Area/Ditch

This decision is based on a hypothetical future resident scenario; i.e., unrestricted land use. These subunits do not require any surficial land use controls as part of the final remedy. The future land use for ABRP/MCB/MBP OU is anticipated to be industrial. Due to groundwater contamination, ICs to prevent access to or use of groundwater until cleanup levels are met under the RCRA program are required for all of the subunits in this operable unit. Groundwater contamination in the vicinity of the ABRP/MCB/MBP OU is being addressed under the 2000 RCRA Part B Permit Renewal Application for M-Area and Metallurgical Laboratory Hazardous Waste Management Facilities Postclosure.

As per the respective IRODs, final actions have been completed for the following subunits and no further action is required:

- Rubble Pit 731-2A (WSRC 2000)
- MCB/MBP surface soils (WSRC 1999)

The decisions for the Rubble Pit and MCB are based on the future industrial worker scenario; these subunits require land use controls as part of the final remedy. The MBP does not require surface land use controls (based on a hypothetical future resident scenario, i.e., unrestricted land use) as part of the final remedy since it only had an ecological risk driver.

The future land use for ABRP/MCB/MBP OU is anticipated to be industrial. Due to groundwater contamination, ICs to prevent access to or use of groundwater until cleanup level are met under the RCRA program are required for all of the subunits in this operable unit. Groundwater contamination in the vicinity of the ABRP/MCB/MBP OU is being addressed

under the RCRA Part B Permit Renewal Application for M-Area and Metallurgical Laboratory Hazardous Waste Management Facilities Postclosure.

A final action for the MCB vadose zone is on-going and will continue. The final action is the continued passive operation of SVE BaroBall™ wells.

The selected RA for the ABRP Trench area is Alternative AT-3, Operation of SVE and ICs. This includes the following elements:

- Soil Vapor Extraction – Up to eleven new SVE wells will be installed to remove volatile organic compound VOC source material from the vadose zone adjacent to the Trench area. The existing four SVE wells will remain in service. The wells will enable the removal of mobile VOCs, which have migrated downwards toward the water table. Should actual vadose zone sampling indicate that the VOCs have not been removed to the levels specified in the ROD, additional action must be taken as specified by concurrence of the Core Team.
- Institutional Controls - ICs will consist of site maintenance (site inspections, mowing, general housekeeping, repair of erosion damage, and other routine maintenance as needed) and access controls (warning signs and land use restrictions). ICs will include continued use of SRS's Site Use and Site Clearance Programs to restrict disturbance of the site and to prevent access to or use of groundwater until cleanup levels are met.
- CERCLA ROD RA Reviews - The ROD RA will be reviewed every five years to ensure that the selected remedy remains protective of human health and the environment.

RGs are target cleanup criteria. RGs are provided in Table 1.

The post-RA conceptual site model (see Appendix C to this LUCIP) shows the broken pathways and the remaining residual risk to the future industrial worker.

Table 1. Summary of Remedial Action Objectives and Remedial Goals for Soil

Area/Media of Concern	Refined COCs	Type of COC				Final Remedial Goal Option	Final Remedial Goal Option Basis
		ARAR	CM	HH	ECO		
MCB Vadose Zone	TCE		X			344 µg/kg	Final RG – WSRC 1999
Remedial Action Objectives	PCE		X			344 µg/kg	Final RG – WSRC 1999
▪ Prevent migration of TCE and PCE contamination in soil to groundwater at a concentration above its MCL							
ABRP Trench Subunit	TCE		X			610 µg/kg	Contaminant Migration
Remedial Action Objectives							
▪ Treat or remove the TCE to the extent practicable.[2]							
▪ Prevent migration of TCE contamination in soil to groundwater at a concentration above its MCL							
A-Area Ash Pile Subunit	Arsenic			X	X	9,753 µg/kg	Background[1]
Remedial Action Objectives	Selenium				X	15,280 µg/kg	Background[1]
• Prevent human exposure to refined COCs that present a risk to future industrial workers	Potassium-40			X		1.60 pCi/g	Background[1]
• Prevent ecological exposure to refined COCs that present a hazard to ecological receptors	Radium-226			X		0.0255 pCi/g	HH-industrial
	Radium-228			X		1.83 pCi/g	Background[1]
	Thorium-228			X		1.69 pCi/g	Background[1]
	Uranium-238			X		1.79 pCi/g	HH – Industrial

1. Background value is two times average site-specific background concentration from Table 4-3 of the RFI/RI with BRA for the A-Area Burning/Rubble Pits and Rubble Pit (WSRC 1997). The activities of the daughter products of some of the radiological COCs identified in the table were used to establish the activity of the parent since these constituents are in secular equilibrium. Specifically, the two times background mean of Ac-22 (from Table 4-3) was used to establish the Ra-228 concentration and the two times background mean of Pb-212 (from Table 4-3) was used to establish the Th-228 background concentration.
2. Actual soil sampling in the vadose zone at the points of greatest contamination will be conducted to determine when the RGs have been achieved and no change in the operation of the SVE process will be allowed without concurrence of the Core Team.

The selected RA for the A-Area Ash Pile (788-2A) is Alternative AP-3, Soil Cover and Institutional Controls. This includes the following elements:

- Soil Cover – A minimum of a 0.6 m (2 ft) thick soil layer on the A Area Ash Pile. This consists of 46 cm (18 in) of clean common fill, 15 cm (6 in) of topsoil and grass sod. The purpose is to establish a 0.6 m (2 ft) thick barrier on the ash to prevent ecological receptors from coming in contact with the ash. The cover will be contoured for the control of stormwater runoff and will be vegetated to prevent erosion.

- Institutional Controls - ICs will consist of site maintenance (site inspections, mowing, general housekeeping, repair of erosion damage, and other routine maintenance as needed) and access controls (warning signs and land use restrictions). ICs will include continued use of SRS's Site Use and Site Clearance Programs to restrict disturbance of the site and to prevent access to or use of groundwater until cleanup levels are met.

- CERCLA ROD RA Reviews - The ROD RA will be reviewed every five years to ensure that the selected remedy remains protective of human health and the environment.

RGs are target cleanup criteria. RGs are provided in Table 1.

The post-RA conceptual site model (see Appendix C to this LUCIP) shows the broken pathways and the remaining residual risk to the future industrial worker.

According to the *Savannah River Site Future Use Project Report* (USDOE 1996), residential use of SRS land should be prohibited.

3.0 LAND-USE CONTROL OBJECTIVES

The following ABRP/MCB/MBP OU LUC objectives have been developed to ensure the protectiveness of the remedy described above:

- Restrict worker access and prevent unauthorized contact, removal or excavation of contaminated media (i.e., vadose zone soils);

- Prohibit the development and use of property for residential housing, elementary schools, child care facilities and playgrounds;
- Maintain the integrity of any current or future remedial or monitoring system such as SVE systems or groundwater monitoring wells;
- Prevent access to or use of the groundwater until cleanup levels are met (under the RCRA program); and
- Prevent construction of inhabitable buildings without an evaluation of indoor air quality to address vapor intrustion.

Current access controls and deed notification needed to maintain the future land use are described in the following sections of this LUCIP.

4.0 IMPLEMENTATION OF LAND-USE CONTROLS

This section describes the LUCs selected in the ROD to achieve the objectives stated in Section 3.0. A summary of the remedies for the different subunits is provided in Table 2. A summary of the types of controls is provided in Table 3. USDOE is responsible for implementing, maintaining, reporting on, and enforcing the LUCs required for the ABRP/MCB/MBP OU. The LUCIP will become enforceable and will be implemented when approved by USEPA and SCDHEC and following the completion of the RA prescribed by the ABRP/MCB/MBP OU ROD. USDOE shall notify USEPA and SCDHEC 60 days in advance of any proposed land use changes that are inconsistent with LUC objectives or the selected remedy.

The ABRP/MCB/MBP OU will be maintained as an industrial use area by implementation of the property record notices (Section 4.1) and restrictions (Section 4.2), and the use of a certified LUC survey plat (Section 4.3). Figure 3 illustrates land use requirements at the different subunits.

The Site Use Program (Section 4.4) will be implemented to prevent onsite worker exposure to contamination left in place at the ABRP/MCB/MBP OU. Other existing measures (i.e., Site

Clearance Program, worker training, health and safety requirements, work controls) will also be used to ensure worker safety at the ABRP/MCB/MBP OU.

Physical access controls (Section 4.5) are implemented at the SRS boundary to control and restrict public and trespasser access to the ABRP/MCB/MBP OU.

Signs at the ABRP/MCB/MBP OU will be maintained to alert onsite workers to the presence of hazardous substances. The signs will also convey the restrictions of unauthorized personnel. Access control warning signs will be placed and maintained around the ABRP/MCB/MBP OU to prevent unknowing entry and unrestricted use.

4.1 Property Record Notices

In the long term, if the property is ever transferred to non-federal ownership, the United States 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 RAs taken on the site. The contract for sale and the deed will contain the notification required by CERCLA Section 120(h).

The deed notification shall notify any potential purchaser that the property has been used for the management and disposal of waste. These requirements are also consistent with the intent of RCRA deed notification requirements at final closure of a RCRA facility if contamination will remain at the unit.

4.2 Property Record Restrictions

The deed shall also include deed restrictions precluding residential use of the property and/or any other property record restrictions necessary to achieve the LUC objectives. The deed shall expressly prohibit activities inconsistent with the remedial goals and objectives in the ABRP/MCB/MBP OU ROD upon any and all transfers. USDOE shall provide a copy of the executed deeds to the regulatory agencies as soon as practicable after the transfer of fee title, but no later than 30 days. However, the need for these deed restrictions may be re-evaluated 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 re-evaluation of the need for the deed restrictions will be done through an amended ROD.

USDOE shall provide USEPA and SCDHEC six months' notice prior to transfer or sale to ensure that USEPA and SCDHEC can be involved in discussions to ensure that appropriate provisions are included in the transfer terms or conveyance documents to maintain effective ICs. If it is not possible for the facility to notify USEPA and SCDHEC at least six months prior to any transfer or sale, then the facility will notify USEPA and SCDHEC as soon as possible but no later than 60 days prior to the transfer or sale of any property subject to ICs. In addition to the land transfer notice and discussion provisions above, USDOE further agrees to provide USEPA and SCDHEC with similar notice within the same time frames as to federal to federal transfer of property.

4.3 Other Public Notices

The LUCIP identifies the proposed area under land use restrictions via Figure 3 for the ABRP/MCB/MBP OU and the final survey plat (when available) located in Appendix A. After construction completion, a final survey plat will be prepared to document the as-built arrangement of the ICs and area subject to LUCs. The drawing will present a polygon of the ABRP/MCB/MBP OU subject to LUCs, including the benchmarks, the location of warning signs, access control points and other information for LUCs. This post-construction survey plat will be certified by a professional land surveyor and will be submitted to USEPA and SCDHEC concurrently with the Post-Construction Report (PCR). In addition, if the site is ever transferred to non-federal ownership, a professional land surveyor- certified survey plat of the OU will be prepared at or near the time of conveyance to support the LUCIP required restrictive covenants on land use and will be recorded with the appropriate county recording agency.

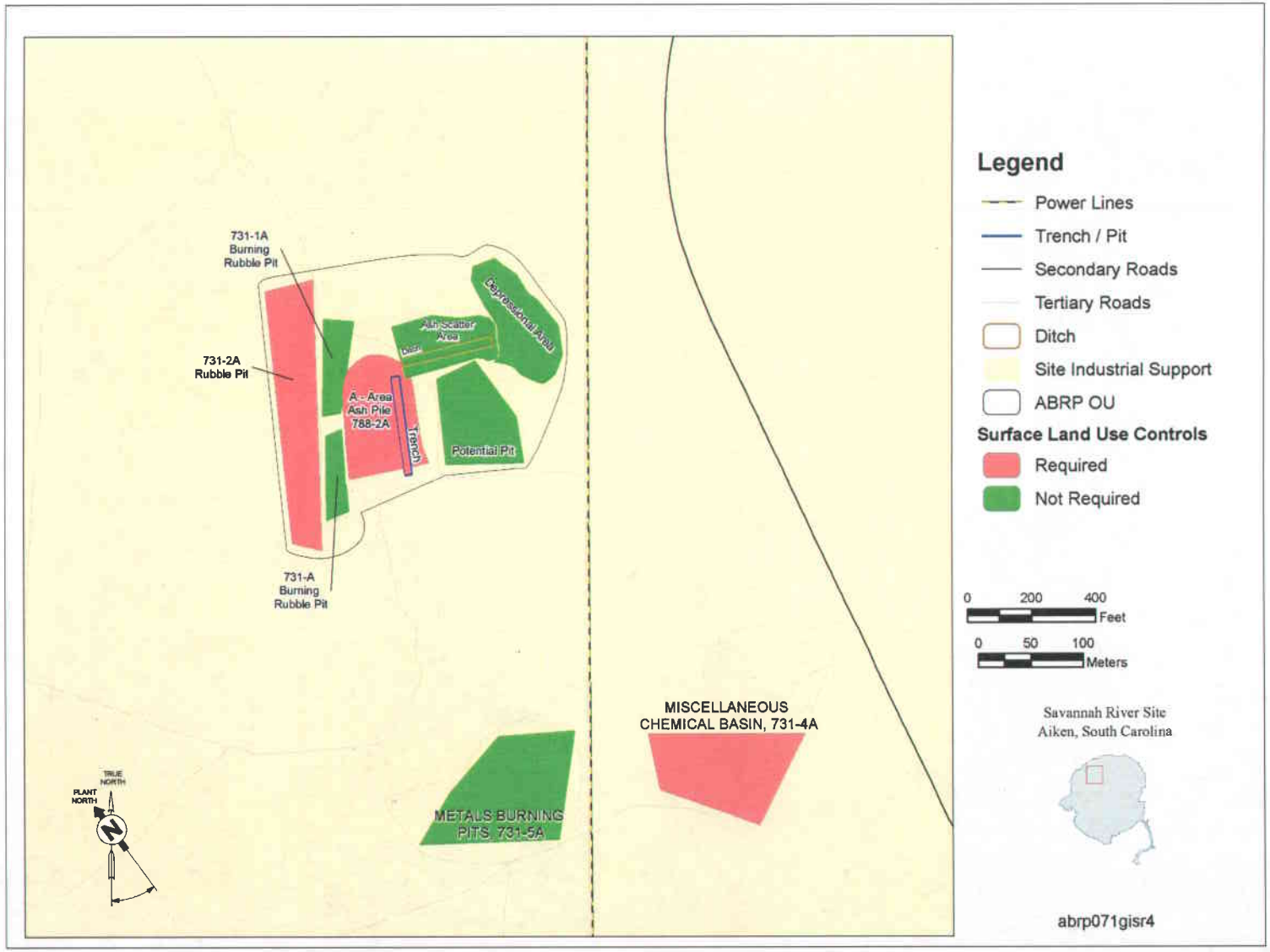


Figure 3. Land Use Map for ABRP/MCB/MBP OU

Note:

Land use refers to the soil portion of the unit. Due to groundwater contamination, ICs to prevent access to or use of groundwater until cleanup levels are met under the RCRA program are required for all of the subunits in this OU.

Table 2. Remedial Summary for the ABRP/MCB/MBP Operable Unit

Unit	Media	Land Use*	Remedy	Regulatory Mechanism
ABRP OU				
Burning/Rubble Pit 731-A Burning/Rubble Pit 731-1A Potential Pit Depressional Area	Surface Soil Vadose Zone	Residential	No Action (soil) No Action (vadose zone)	WSRC 2000 IROD for ABRP
Rubble Pit 731-2A	Surface Soil	Industrial	Earthen Cap, IC No Further Action (final action complete)	WSRC 2000 IROD for ABRP WSRC 2006a ROD for ABRP/MCB/MBP OU
Ash Scatter Area/ Ditch	Surface Soil Vadose Zone	Residential	No Action (soil) No Action (vadose zone)	WSRC 2006a ROD for the ABRP/MCB/MBP OU
Trench	Surface Soil Vadose Zone	Industrial	No Action (soil) SVE, IC (vadose zone)	WSRC 2002 ESD for ABRP IROD WSRC 2006a ROD for ABRP/MCB/MBP OU
788-2A A-Area Ash Pile	Surface Soil Vadose Zone	Industrial	Earthen Cap, IC (soil) No Action (vadose zone)	WSRC 2006a ROD for ABRP/MCB/MBP OU
MCB/MBP OU				
MCB	Surface Soil	Industrial	Excavation, Off-site Disposal No Further Action (final action complete)	WSRC 1999 IROD for MCB/MBP WSRC 2006a ROD for the ABRP/MCB/MBP OU
MCB Vadose Zone	Vadose Zone	Industrial	SVE, IC (final action ongoing)	WSRC 1999 IROD for MCB/MBP WSRC 2006a ROD for the ABRP/MCB/MBP OU
MBP	Surface Soil	Residential	Excavation, Off-site Disposal (ecological risk driver) No Further Action (final action complete)	WSRC 1999 IROD for MCB/MBP WSRC 2006a ROD for ABRP/MCB/MBP OU

* Land use refers to the soil portion of the unit. Due to the groundwater contamination, ICs to prevent access to or use of groundwater until cleanup levels are met under the RCRA program are required for all of the subunits in this OU. Although the interim actions for groundwater were described in the respective IRODs, groundwater is not within the scope of this OU and is not presented in this table.

Table 3. Land Use Controls for the ABRP/MCB/MBP Operable Unit

Type of Control	Purpose of Control	Duration	Implementation	Affected Areas[a]
1. Property Record Notices[b]	Provide notice to anyone searching records about the existence and location of contaminated areas.	Until the concentration of hazardous substances associated with the unit have been reduced to levels that allow for unlimited exposure and unrestricted use.	Notice recorded by USDOE in accordance with state laws at County Register of Deeds office if the property or any portion thereof is ever transferred to non-federal ownership.	All waste management areas and other areas where hazardous substances are left in place at levels requiring land use and/or groundwater restrictions
2. Property record restrictions[c]: a. Land Use b. Groundwater	Restrict use of property by imposing limitations. Prohibit the use of groundwater.	Until the concentration of hazardous substances associated with the unit have been reduced to levels that allow for unlimited exposure and unrestricted use.	Drafted and implemented by USDOE upon any transfer of affected areas. Recorded by USDOE in accordance with state law at County Register of Deeds office.	All waste management areas and other areas where hazardous substances are left in place at levels requiring land use and/or groundwater restrictions
3. Other Notices[d]	Provide notice to county/city about the existence and location of waste disposal and residual contamination areas for zoning/planning purposes.	Until the concentration of hazardous substances associated with the unit have been reduced to levels that allow for unlimited exposure and unrestricted use.	Notice recorded by USDOE in accordance with state laws at County Register of Deeds office if the property or any portion thereof is ever transferred to non-federal ownership.	All waste management areas and other areas where hazardous substances are left in place at levels requiring land use and/or groundwater restrictions
4. Site Use Program[e]	Provide notice to worker/developer (i.e., permit requestor) on extent of contamination and prohibit or limit excavation/penetration activity.	As long as property remains under USDOE control.	Implemented by USDOE and site contractors. Initiated by permit request.	Remediation systems, all waste management areas, and areas where levels requiring land use and / or groundwater restrictions

Table 3. Land Use Controls for the ABRP/MCB/MBP Operable Unit (Continued)

Type of Control	Purpose of Control	Duration	Implementation	Affected Areas[a]
5. Physical Access Controls[f] (e.g., fences, gates, portals)	Control and restrict access to workers and the public to prevent unauthorized access.	Until the concentration of hazardous substances associated with the unit have been reduced to levels that allow for unlimited exposure and unrestricted use.	Controls maintained by USDOE.	At select locations throughout SRS
6. Warning Signs[g]	Provide notice or warning to prevent unauthorized uses.	Until the concentration of hazardous substances associated with the unit have been reduced to levels that allow for unlimited exposure and unrestricted use.	Signage maintained by USDOE.	At select locations throughout SRS
7. Security Surveillance Measures	Control and monitor access by workers/public.	Until the concentration of hazardous substances associated with the unit have been reduced to levels that allow for unlimited exposure and unrestricted use.	Established and maintained by USDOE. Necessity of patrols evaluated upon completion of RAs.	Patrol of selected area throughout SRS, as necessary

[a]Affected areas – Specific locations identified in the SRS LUCIP or subsequent post-ROD documents.

[b]Property Record Notices – Refers to any non-enforceable, purely informational document recorded along with the original property acquisition records of USDOE and its predecessor agencies that alerts anyone searching property records to important information about residual contamination; waste disposal areas in the property.

[c]Property Record Restrictions – Includes conditions and/or covenants that restrict or prohibit certain uses of real property and are recoded along with original property acquisition records of USDOE and its predecessor agencies.

[d]Other Notices – Includes information on the location of waste disposal areas and residual contamination depicted on as survey plat, which is provided to a zoning authority (i.e., city planning commission) for consideration in appropriate zoning decisions for non-USDOE property.

[e]Site Use Program – Refers to the internal USDOE/USDOE contractor administrative program(s) that requires the permit requestor to obtain authorization, usually in the form of a permit, before beginning any excavation/penetration activity (e.g., well drilling) for the purpose of ensuring that the proposed activity will not affect underground utilities/structures, or in the case contaminated soil or groundwater, will not disturb the affected areas without the appropriate precautions and safeguards.

[f]Physical Access Controls – Physical barriers or restrictions to entry.

[g]Signs – Posted command, warning, or direction.

4.4 Site Use Program

Under DOE Order 430.1A, *Life Cycle Management* (USDOE 1998), SRS is required to implement an asset management program for the use, maintenance, and disposal of physical assets, including real estate. SRS complies with this order through its Site Use Program, which is conducted in accordance with WSRC 1D, *Site Infrastructure and Services Manual*, Procedure 3.02, "Site Real Property Configuration Control" (WSRC 2006b). All employees, contractors, and visitors at SRS are required to adhere to the Site Use Program. No use of land (i.e., excavation or any other land use) shall be undertaken without prior approval documented by a Site Use Permit. Also, in accordance with WSRC 1D, Procedure 3.02, all work at SRS that adds to or modifies features or facilities portrayed on SRS development maps (i.e., plot plans of facilities/utilities at SRS) will be authorized by a Site Clearance Permit before any activities are conducted. All Site Clearance Requests will be reviewed to verify that either an approved Site Use Permit has been obtained or that the request is sanctioned by an existing Site Use Permit. All land use requirements applicable for the OU will be provided to the Site Use Program for use in determining issuance of Site Clearance Permits. In addition, the Site Use Permit must be amended when the geographic configuration or buffer zone used to establish the permit boundary changes or there is a change to the permitted land use.

SRS is responsible for updating, maintaining, and reviewing site maps, including FFA (FFA 1993) OU identifications. If a Site Clearance Request potentially impacts an FFA OU, the Site Clearance Request Form is sent to the appropriate FFA OU reviewer for approval. The roles and responsibilities of each individual are detailed in WSRC 1D, Procedure 3.02. Before a Site Clearance Permit is issued, verification of USDOE approval for intended land use must be obtained. The site use and site clearance processes are applicable to all activities and personnel on site (including subcontractors). The USDOE will notify USEPA and SCDHEC in advance of any change to any internal procedure, including the Site Use Program, which would affect implementing or maintaining the LUCs. The processes are controlled within the SRS Quality Assurance (QA) Program in accordance with WSRC 1Q Manual, *Quality Assurance* (WSRC 2007). The SRS QA program governs all SRS activities.

SRS identifies all buildings and facilities on maps used in the Site Use Program. This waste unit is identified on these maps as a CERCLA facility.

Any work proposed in these areas will be strictly controlled, and workers will be appropriately trained and briefed about health and safety requirements if work is deemed necessary for maintenance. No change in land use or excavation at the ABRP/MCB/MBP OU shall be undertaken without USEPA and SCDHEC approval. Approval by USEPA and SCDHEC is required for any modification or termination of the ICs and implementation actions, and USDOE must obtain approval from USEPA and SCDHEC that a proposed new land use is sufficiently protective.

4.5 Physical Access Controls

There are no physical access controls required at the ABRP/MCB/MBP OU; however, physical access controls are provided at the SRS boundary as mentioned in Table 3, item 5.

4.6 Warning Signs

To prevent unknowing entry and to ensure that unrestricted use of the waste unit does not occur while the unit is under ownership of the government, access control warning signs will be posted at the unit as shown in Appendix D. The signs shall be legible for a distance of at least 7.6 m (25 ft).

Custodial responsibilities for maintenance and inspection of the ABRP/MCB/MBP OU will be maintained by Post-Closure Maintenance Group within Soil and Groundwater Closure Projects (SGCP).

4.7 Other Access Controls and Security/Surveillance Measures

While under the ownership of USDOE, access control of the entire SRS will be maintained in accordance with the 2000 RCRA Part B Permit Renewal Application, Volume I, Section F.1. This section describes the 24-hour surveillance system (R.61-79.264.14(b)(1)), artificial or

natural barriers (R.61-79.264.14(b)(2)(I)), control entry systems (R.61-79.264.14(b)(2)(ii)), and access control warning signs (R.61-79.264.14(c)) in place at the SRS boundary to comply with the security requirements for a RCRA-permitted facility.

4.8 Field Inspection and Maintenance for Institutional Controls

After remediation of the ABRP/MCB/MBP OU, only inspection and maintenance activities will be required by the RA.

The ABRP/MCB/MBP OU will be inspected per the Field Inspection Checklist in Appendix B. Field inspections will be performed annually. Additional inspections may be necessary in the event of unusual weather or any other condition warranting inspection. For the ABRP/MCB/MBP OU, inspections will be performed to ensure that signs are in place and that the Ash Pile cover is developing self-sustaining vegetation. Inspection records will be kept in the operations record file for future access.

Maintenance (including site inspections, mowing, general housekeeping, and repair of erosion damage) will be performed as needed at ABRP/MCB/MBP OU. Necessary upkeep of the access control signs for ABRP/MCB/MBP OU will be performed.

USEPA and SCDHEC will be notified within 30 days of identification by USDOE of any events and/or actions that indicate potential compromise of the ICs, including any activity that is inconsistent with the IC objectives or use restrictions, or any other action that may interfere with the effectiveness of the ICs and the proposed action to address the potential compromise. The FFA Annual Progress Report, submitted to the regulatory agencies by the USDOE, will provide the status of the ICs and describe how any IC deficiencies or inconsistent uses have been addressed. In the event of property transfer or lease, the Annual Report will cite findings on the following: whether the use restrictions and controls referenced above were communicated in the deed(s) or lease restrictions; whether property use conforms with the deed or lease restrictions and controls; and whether the owners and state/local agencies have been notified regarding the deed or lease restrictions and controls.

All other routine maintenance activities will be documented and maintained in files subject to USEPA and SCDHEC review and audit. A copy of the completed inspection form is maintained in the SGCP Document Control. The LUCs shall be maintained until the concentration of hazardous substances associated with the unit have been reduced to levels that allow for unlimited exposure and unrestricted use.

The waste unit inspectors are to be trained in Hazardous Waste Operations and Emergency Response (HAZWOPER), RCRA Well Inspections (SGCP-specific training), SGCP RCRA Waste Unit Inspections, Radiological Worker Training, etc., as applicable for the specific inspection. They will also be trained based on the individual requirements of the regulatory approved closure documents for each waste unit. In addition, the inspectors are to attend yearly refresher courses. Over the years, different personnel may conduct the inspections and grass cutting operations.

This unit-specific LUCIP, including the checklist (Appendix B), will be appended to the SRS LUCAP upon final regulatory approval. After completion of the PCR, the preliminary checklist in the LUCAP will be replaced with the final approved checklist.

5.0 REFERENCES

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

USDOE, 1996. *Savannah River Site Future Use Project Report*, Stakeholder-Preferred Recommendations for SRS Land and Facilities, USDOE Savannah River Operations Office, January

USDOE, 1998. DOE Order 430.1A, Life Cycle Management (approved October 14, 1998)

WSRC, 1997. *RCRA Facility Investigation / Remedial Investigation Report with Baseline Risk Assessment for the A-Area Burning/Rubble Pits and Rubble Pit,* Revision 1.2, WSRC-RP-96-168, Savannah River Site, Aiken, SC (June)

WSRC, 1999. *Interim Record of Decision Remedial Alternative Selection for the Miscellaneous Chemical Basin/Metals Burning Pit (731-4A/5A),* Revision 1.1, WSRC-RP-98-4031, Savannah River Site, Aiken, SC (December)

WSRC, 2000. *Interim Record of Decision Remedial Alternative Selection for the A-Area Burning/Rubble Pits (731-A/1A) and Rubble Pit (731-2A),* Revision 1, WSRC-RP-2000-4001, Savannah River Site, Aiken, SC (April)

WSRC, 2002. *Explanation of Significant Difference (ESD) for the A-Area Burning/Rubble Pits (731-A/1A) and Rubble Pit (731-2A) (ABRP)*, WSRC-RP-2001-4281, Westinghouse Savannah River Company, Savannah River Site, Aiken, SC (April)

WSRC, 2006a. *Record of Decision Remedial Alternative Selection for the A-Area Burning/Rubble Pits (731-A, -1A) and Rubble Pit (731-2A) and the Miscellaneous Chemical Basin / Metals Burning Pit (731-4A, -5A) Operable Unit (U)*, WSRC-RP-2005-4095, Revision 0, Washington Savannah River Company, Aiken, SC

WSRC, 2006b. WSRC Procedure Manual 1D, *Site Infrastructure and Services Manual (U)*, Procedure 3.02, "Site Real Property Configuration Control," Westinghouse Savannah River Company, Savannah River Site, Aiken, SC

WSRC, 2006c. *Corrective Measures Implementation/Remedial Action Implementation Plan (CMI/RAIP) for the A-Area Burning/Rubble Pits (731-A, -1A) and Rubble Pit (731-2A) and the Miscellaneous Chemical Basin / Metals Burning Pit (731-4A, -5A) Operable Unit (U)* , WSRC-RP-2006-4071, Revision 0, Westinghouse Savannah River Company, Savannah River Site, Aiken, SC

WSRC, 2007. WSRC Procedure Manual 1Q, *Quality Assurance (U)*, Westinghouse Savannah River Company, Savannah River Site, Aiken, SC

APPENDIX A – AS-BUILT DRAWINGS

Land Use Control Implementation Plan

(Drawing to be provided at a later date.)

APPENDIX B – FIELD INSPECTION CHECKLIST

For the A-Area Burning/Rubble Pits (731-A, -1A) and Rubble Pit (731-2A)
and the
Miscellaneous Chemical Basin / Metals Burning Pit (731-4A, -5A) OU

FIELD INSPECTION CHECKLIST

A-Area Burning/Rubble Pits (731-A, -1A) and Rubble Pit (731-2A) and the Miscellaneous Chemical Basin / Metals Burning Pit (731-4A, -5A) OU

☐ SCHEDULED ☐ UNSCHEDULED

A= Satisfactory X= Unsatisfactory (Explanation required)	A or X	Observation of Corrective Action Taken
1. Verify that roads are accessible.		
2. Verify that the waste unit signs (quantity to be inserted later) are in acceptable condition, have the correct information, and are legible from a distance of 25 feet.		
3. Verify that there are no unauthorized excavation, digging, or construction activities.		
4. Verify that SVE wells and support systems are accessible and in good condition.		

Inspected by:		
(Print Name)	(Signature)	(Date)

Post-Closure Manager:		
(Print Name)	(Signature)	(Date)

CAUTION: The inspector shall notify the Post-Closure Manager (PCM) and Environmental Compliance Authority (ECA) **IMMEDIATELY** if there has been a breach or compromise of the ICs of this waste unit. The notification shall be in accordance with SRS post-closure inspection procedures.

NOTE: Monitoring wells associated with this waste unit are maintained in accordance with SGCP Monitoring Well Procedures.

APPENDIX C – POST-REMEDIAL ACTION CONCEPTUAL SITE MODEL

Area Burning/Rubble Pits (731-A, -1A) and Rubble Pit (731-2A) and the Miscellaneous Chemical Basin/Metals Burning Pit (731-4A, -5A) OU Post-Remedial Action

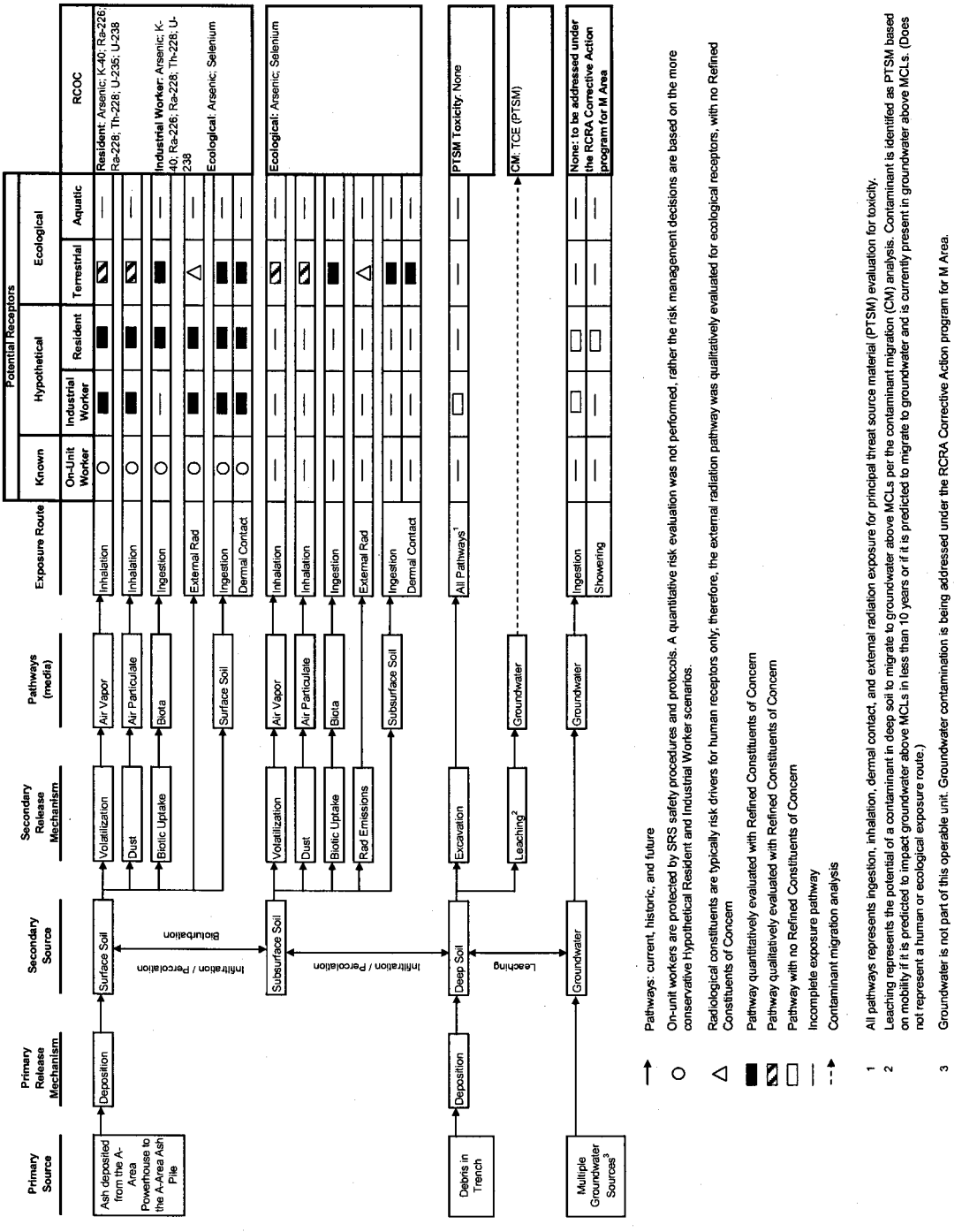


Figure C-1. Post-Remedial Action Conceptual Site Model for the ABRP/MCB/MBP OU

APPENDIX D – ACCESS CONTROL WARNING SIGN

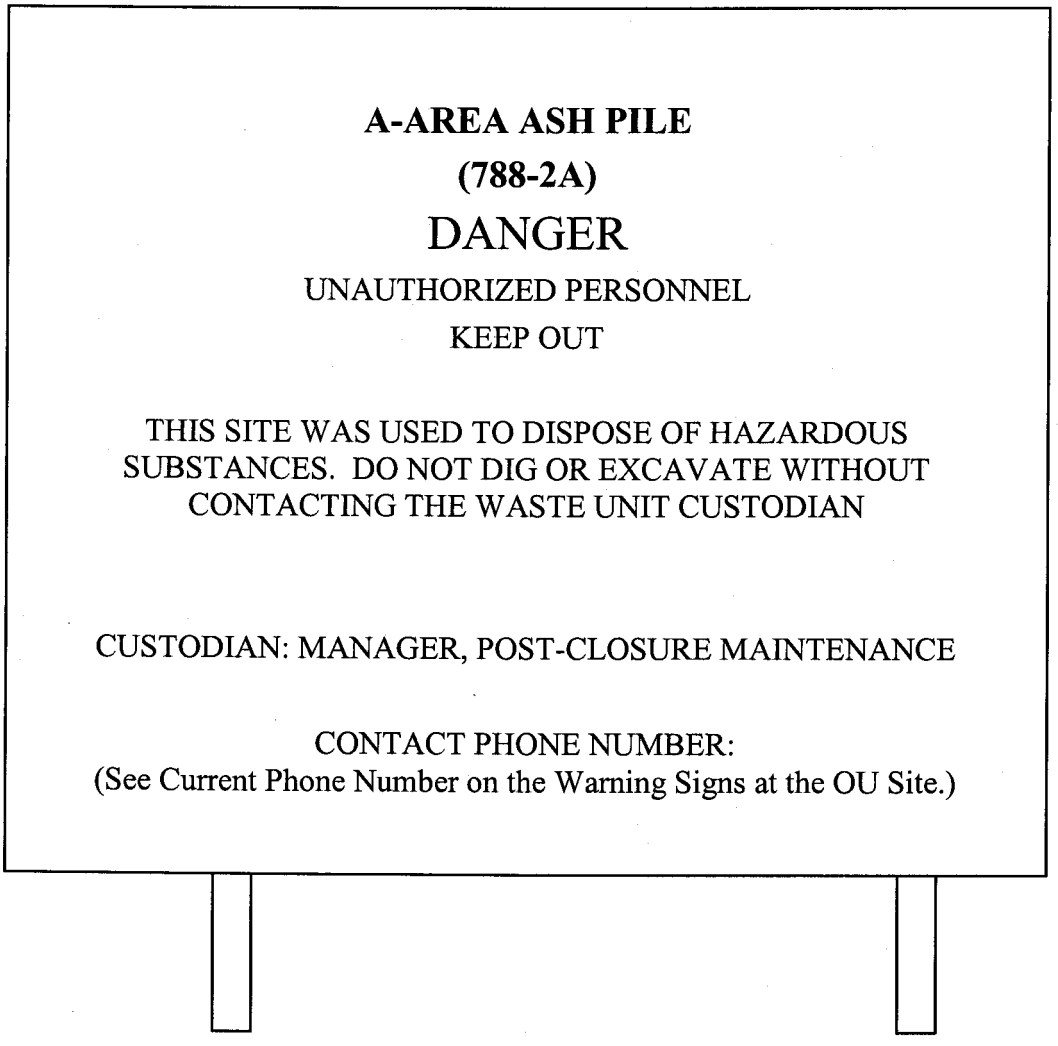


Figure D-1. Access Control Warning Sign

LUCIP for the
C-, K-, and L-Reactor Complexes Early Action
Land Use Control Implementation Plan for the
C-, K-, and L-Reactor Complexes Early Action
(SRNS- RP-2009-01470, Rev.1, May 2010)

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United States Department of Energy

Savannah River Site

Early Action Land Use Control Implementation Plan (EALUCIP) for the C-, K-, and L-Reactor Complexes (U)

CERCLIS Numbers: 79, 90, and 91

SRNS–RP–2009-01470

Revision 1

May 2010

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Aiken, SC 29808

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LIST OF ACRONYMS AND ABBREVIATIONS

ACP	Area Completion Projects
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
COC	constituent of concern
EALUCIP	Early Action Land Use Control Implementation Plan
EAROD	Early Action Record of Decision
ECA	Environmental Compliance Authority
FFA	Federal Facility Agreement
HAZWOPER	Hazardous Waste Operations and Emergency Response
ICs	Institutional Controls
ISD	In Situ Decommissioning
LUC	Land Use Control
LUCIP	Land Use Control Implementation Plan
LUCAP	Land Use Control Assurance Plan
OU	Operable Unit
PCM	Post-Closure Manager
PPA	Property Protection Area
PTSM	Principal Threat Source Material
QA	Quality Assurance
RA	Remedial Action
RCRA	Resource Conservation and Recovery Act
ROD	Record of Decision
SCDHEC	South Carolina Department of Health and Environmental Control
SRNS	Savannah River Nuclear Solutions, LLC
SRS	Savannah River Site
USDOE	United States Department of Energy
USEPA	United States Environmental Protection Agency
WSRC	Washington Savannah River Company, LLC

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1.0 INTRODUCTION

This Early Action Land Use Control Implementation Plan (EALUCIP) has been prepared for the C-, K-, and L-Reactor Complexes at the Savannah River Site (SRS). The purpose of the EALUCIP is to describe how the land use controls (LUCs) selected in the C-, K-, L- and R-Reactor Complexes Early Action Record of Decision (EAROD) (SRNS 2009) will be implemented and maintained.[1] The following LUC objectives were defined in the EAROD for these reactor complexes:

- Restrict unauthorized worker access and prevent unauthorized contact, removal, or excavation of contaminated media;
- Prohibit the development and use of property for residential housing, elementary and secondary schools, child care facilities and playgrounds;
- Maintain the integrity of any current or future remedial or monitoring systems;
- Prevent access or use of contaminated groundwater until cleanup levels are met; and
- Prevent construction of inhabitable buildings without an evaluation of indoor air quality to address vapor intrusion.

As documented in the EAROD, the *in situ* decommissioning (ISD) end state remedy leaves hazardous substances in place that pose a potential future risk and will require land use restrictions until the concentrations of hazardous substances in the soil and groundwater are at levels that allow for unrestricted use. As agreed on March 30, 2000, among the United States Department of Energy (USDOE), the United States Environmental Protection Agency (USEPA), and the South Carolina Department of Health and Environmental Control (SCDHEC), SRS is implementing a Land Use Control Assurance Plan (LUCAP) to ensure that the LUCs required by numerous remedial decisions at SRS are properly maintained and periodically verified (WSRC 1999). The requirements of that LUCAP also apply to the LUCs that were selected as part of the

[1] Although included in the Record of Decision with the C-, K-, and L-Reactor Complexes, the R-Reactor Complex is being addressed in a separate LUCIP to facilitate accelerated implementation under the American Recovery and Reinvestment Act.

ISD remedial action (RA) for the C-, K-, and L-Reactor Complexes. This additional document, the C-, K-, and L-Reactor Complexes EALUCIP, contains the detailed and specific measures required to implement and maintain the LUCs selected as part of this particular remedial decision. It is important to recognize that operational activities in support of ongoing USDOE missions will continue to occur at the C-, K-, and L-Area facilities. The LUCs shall be maintained until the reactor complexes are suitable for unlimited exposure and unrestricted use. However, since LUCs and institutional controls are already in place for the reactor complexes, no additional LUCs other than those currently used are proposed. Approval by USEPA and SCDHEC is required for any modification or termination of the LUCs. Upon future physical implementation of the ISD remedy, a final LUCIP will be prepared for each reactor area specifying final LUCs.

USDOE is responsible for implementing, maintaining, monitoring, reporting, and enforcing the LUCs in accordance with the approved EALUCIP. Upon final approval, the EALUCIP will be appended to the LUCAP and should be considered incorporated by reference into the C-, K-, L-, and R-Reactor Complexes EAROD, establishing implementation and maintenance requirements for the LUCs under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and the SRS Federal Facility Agreement (FFA) (FFA 1993). The EALUCIP will remain in effect unless and until modifications are approved by USEPA and SCDHEC as necessary for protection of human health and the environment. This EALUCIP will be evaluated for accuracy and protectiveness during the five-year remedy review and any approved EALUCIP modification will be appropriately documented for incorporation by reference into the C-, K-, L-, and R-Reactor Complexes EAROD.

1.1 Format of EALUCIP

The format of this EALUCIP is consistent with the FFA protocol format for LUCIP documents approved by the USEPA and SCDHEC in March 2004.

2.0 OVERVIEW OF C-, K-, and L-REACTOR COMPLEX REMEDIAL ACTION

2.1 General Description and History of the C-, K-, and L-Reactor Complexes

The Reactor Complexes are located in the central portion of SRS. Each Reactor Complex lies within its own Area Operable Unit (OU) (for example, the C-Reactor Complex is located within the C Area OU).

The C-, K-, and L-Reactor Complexes operated in support of SRS's primary mission to produce tritium, plutonium, and other special nuclear materials for our nation's defense programs. C-Reactor began operating in 1955 and was shut down in 1986. K-Reactor began operating in 1954 and was placed in standby in 1988; it was restarted in 1992 for power ascension tests before being shut down in 1993. L-Reactor operated from 1954 to 1968 and again from 1985 to 1988. Operations in the C-, K-, and L-Reactor Complexes resulted in the generation of chemical and radioactive waste that remains primarily within the reactor vessel, Disassembly Basin, and building and attached structures subunits of each Reactor Complex.

Nuclear material is no longer being produced at the reactor facilities. Although the Reactor Complexes are no longer producing nuclear material, the C-, K-, and L-Reactor Complexes have continuing USDOE missions. The C-Reactor Complex is used for cask car refurbishment; the K-Reactor Complex is used for nuclear materials disposition activities; and the L-Reactor Complex is used for nuclear materials storage. These missions will cease prior to implementation of the ISD end state remedy.

2.2 Nature and Extent of Contamination in the C-, K-, and L-Reactor Complexes

Since characterization data for C-, K-, and L-Reactor Complexes will be collected to support the specific Area Completions and does not presently exist, the nature and extent of contamination for these Reactor Complexes is inferred based on similarities between the P- and R-Reactor Complexes and the C-, K-, and L-Reactor Complexes. As such, specific residual risk levels and constituents of concern (COCs) for the C-, K-, and L-Reactor Complexes have not been

quantified. However, based on the data for the P- and R-Reactor Complexes it is assumed that the reactor vessel subunit, the disassembly basin subunit, and parts of the building and attached structures subunit can all be considered principal threat source material (PTSM) (SRNS 2009). Additionally, existing evaluations of contaminants in the P- and R-Reactor Complexes resulted in the identification of the following cumulative human health risks and similar risk levels are expected in the C-, K-, and L-Reactor Complexes:

- Reactor Vessel Subunit:
  - P-Area: 1.3E+03
  - R-Area: 5.5E+01
- Disassembly Basin Subunit:
  - P-Area: 6.3E+00
- Building and Attached Structures Subunit:
  - P-Area: 1.4E-02

The primary risk drivers are cobalt-60, cesium-137 plus daughter products, and tritium. The reactor-specific characterization activities will fully evaluate any potential sources of contamination related to the RBC and associated facilities, considering missions conducted at the reactors after their shutdown. Because waste management activities associated with ongoing missions must comply with existing regulations, the release of contaminants to the environment from these missions is unlikely.

The selected remedy for the C-, K-, and L-Reactor Complexes leaves hazardous substances in place, including PTSM, which poses a potential risk of unacceptable exposure to both current and future industrial workers. To manage this potential risk, LUCs are an integral part of the RA selected in the EAROD necessary to control unauthorized access or unacceptable exposure to residual contaminants.

2.3 Remedial Action Selected

As documented in the EAROD for the C-, K-, L-, and R-Reactor Complexes, the selected remedy for the Reactor Complexes is ISD with LUCs. ISD consists of 1) maintaining the structural integrity of the above-ground portions of each facility for at least a period of 200 years, preventing exposure to receptors from residual short-lived radioisotopes in building structure and preventing tritium migration due to infiltration; 2) stabilizing contaminants in place as necessary to prevent unacceptable release to the environment; and 3) sealing the building to eliminate routes of human and animal intruder access thereby eliminating unacceptable exposure to radiological or hazardous contamination. The ISD end state will not be implemented until all missions have ceased at these Reactor Complexes.

The LUCs (i.e., engineering controls and institutional controls [ICs]) included as part of the selected remedy are in place as part of ongoing operations and include:

- Access controls to prevent exposure to on-site workers via the Site Use Program, work control, worker training, worker briefing of health and safety requirements.
- Access controls to prevent exposure to trespassers, as described in the 2000 Resource Conservation and Recovery Act (RCRA) Part B Permit Renewal Application, Volume I, Section F.1, which describes the security procedures and equipment, 24-hour surveillance system, artificial or natural barriers, control entry systems, and warning signs in place at the SRS boundary.

The ISD remedy will achieve the remedial action objectives established for the Reactor Complexes and documented in the EAROD as follows:

- Preventing industrial worker exposure to radioactive or hazardous contamination exceeding 1E-06 industrial worker risk and 1E-03 PTSM risk thresholds from the Reactor Complexes by controlling access to the building and associated structures through LUCs (i.e., engineering controls and ICs)

- Preventing migration of radiological and hazardous contaminants from the Reactor Complexes to groundwater to the extent practicable through infiltration control, stabilization, and isolation of contamination remaining within the Reactor Complex
- Preventing animal intruder exposure to radioactive and hazardous contamination within the Reactor Complexes by controlling access to the building and associated structures through engineering controls.

The post-RA conceptual site model (see Appendix A to this LUCIP) shows the exposure pathways being managed.

According to the *Savannah River Site Future Use Project Report* (USDOE 1996), residential use of SRS land is prohibited.

3.0 LAND-USE CONTROL OBJECTIVES

The following C-, K-, and L-Reactor Complexes early action LUC objectives have been developed to ensure the protectiveness of the remedy described above:

- Restrict unauthorized worker access and prevent unauthorized contact, removal, or excavation of contaminated media;
- Prohibit the development and use of property for residential housing, elementary and secondary schools, child care facilities and playgrounds;
- Maintain the integrity of any current or future remedial or monitoring systems;
- Prevent unauthorized access to or use of contaminated groundwater until cleanup levels are met; and
- Prevent construction of inhabitable buildings without an evaluation of indoor air quality to address vapor intrusion.

Current access controls and deed notification needed to maintain the future land use are described in the following sections of this EALUCIP.

4.0 IMPLEMENTATION OF LAND-USE CONTROLS

This section describes the LUCs selected in the EAROD to achieve the objectives stated in Section 3.0. A summary of the types of controls is provided in Table 1. USDOE is responsible for implementing, maintaining, reporting on and enforcing the LUCs required for the C-, K-, and L-Reactor Complexes. The EALUCIP will become enforceable when approved by USEPA and SCDHEC and approval will constitute RA start since no additional LUCs beyond what are already in place will be instituted. USDOE shall notify USEPA and SCDHEC 60 days in advance of any proposed land use changes that are inconsistent with LUC objectives or the selected remedy.

The C-, K-, and L-Reactor Complexes will be maintained as an industrial use area by implementation of the property record notices (Section 4.1) and restrictions (Section 4.2), and the use of a certified LUC survey plat (Section 4.3).

The Site Use Program (Section 4.4) will be implemented to prevent onsite worker exposure to contamination left in place at the C-, K-, and L-Reactor Complexes. Other existing measures (i.e., worker training, health and safety requirements, work controls) will also be used to ensure worker safety at the C-, K-, and L-Reactor Complexes.

Physical access controls (Section 4.5) are implemented at the SRS boundary to control and restrict public and trespasser access to the C-, K-, and L-Reactor Complexes.

Signs that alert onsite workers to the presence of radioactive materials and/or hazardous substances at the C-, K-, and L-Reactor Complexes will be maintained. Access control warning signs will be maintained around the C-, K-, and L-Reactor Complexes to prevent unauthorized entry and unrestricted use.

4.1 Property Record Notices

In the long term, if the property is ever transferred to non-federal 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 RAs taken on the site. The contract for sale and the deed will contain the notification required by CERCLA Section 120(h).

The deed notification shall notify any potential purchaser that the property has been used for the management and disposal of waste. These requirements are also consistent with the intent of RCRA deed notification requirements at final closure of a RCRA facility if contamination will remain at the unit.

4.2 Property Record Restrictions

The deed shall also include deed restrictions precluding residential use of the property and/or any other property record restrictions necessary to achieve the LUC objectives. The deed shall expressly prohibit activities inconsistent with the remedial goals and objectives in the EAROD upon any and all transfers. USDOE shall provide a copy of the executed deeds to the regulatory agencies as soon as practicable after the transfer of fee title, but no later than 30 days. However, the need for these deed restrictions may be re-evaluated 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 re-evaluation of the need for the deed restrictions will be done though an amended EAROD.

USDOE shall provide USEPA and SCDHEC at least six months' notice prior to any transfer or sale to ensure that USEPA and SCDHEC can be involved in discussions to ensure that appropriate provisions are included in the transfer terms or conveyance documents to maintain effective ICs. If it is not possible for the facility to notify USEPA and SCDHEC at least six months prior to any transfer or sale, then the facility will notify USEPA and SCDHEC as soon as possible but no later than 60 days prior to the transfer or sale of any property subject to ICs. In addition to the land transfer notice and discussion provisions above, USDOE further agrees to provide USEPA and SCDHEC with similar notice within the same time frames as to federal to federal transfer of property.

Table 1. Land Use Controls for the C-, K-, and L-Reactor Complexes

Type of Control	Purpose of Control	Duration	Implementation	Affected Areas
1. Property Record Notices[a]	Provide notice to anyone searching records about the existence and location of contaminated areas.	Until the concentration of hazardous substances associated with the unit have been reduced to levels that allow for unlimited exposure and unrestricted use.	Notice recorded by USDOE in accordance with state laws at County Register of Deeds office if the property or any portion thereof is ever transferred to non-federal ownership.	C-, K-, and L-Reactor Complexes where hazardous substances are left in place at levels requiring land use restrictions.
2. Property record restrictions:[b] A. Land Use B. Groundwater	Restrict use of property by imposing limitations. Prohibit the use of groundwater.	Until the concentration of hazardous substances associated with the unit have been reduced to levels that allow for unlimited exposure and unrestricted use.	Drafted and implemented by USDOE upon any transfer of affected areas. Recorded by USDOE in accordance with state law at County Register of Deeds office.	C-, K-, and L-Reactor Complexes where hazardous substances are left in place at levels requiring land use restrictions.
3. Other Notices[c]	Provide notice to city &/or county about the existence and location of waste disposal and residual contamination areas for zoning/planning purposes.	Until the concentration of hazardous substances associated with the unit have been reduced to levels that allow for unlimited exposure and unrestricted use.	Notice recorded by USDOE in accordance with state laws at County Register of Deeds office if the property or any portion thereof is ever transferred to non-federal ownership.	C-, K-, and L-Reactor Complexes where hazardous substances are left in place at levels requiring land use restrictions.
4. Site Use Program[d]	Provide notice to worker/developer (i.e., permit requestor) on extent of contamination and prohibit or limit excavation/penetration activity.	As long as property remains under USDOE control	Implemented by USDOE and site contractors Initiated by permit request	C-, K-, and L-Reactor Complexes where hazardous substances are left in place at levels requiring land use restrictions.
5. Physical Access Controls[e] (e.g., fences, gates, portals)	Control and restrict access to workers and the public to prevent unauthorized access.	Until the concentration of hazardous substances associated with the unit have been reduced to levels that allow for unlimited exposure and unrestricted use.	Controls maintained by USDOE.	Each Reactor Complex is a fenced area, as shown in Figures B-1 through B-3. Security is provided in accordance with SRS procedures.

Table 1. Land Use Controls for the C-, K-, and L-Reactor Complexes *(Continued/End)*

Type of Control	Purpose of Control	Duration	Implementation	Affected Areas
6. Warning Signs[f]	Provide notice or warning to prevent unauthorized uses.	Until the concentration of hazardous substances associated with the unit have been reduced to levels that allow for unlimited exposure and unrestricted use.	Signage maintained by USDOE.	Warning signs posted in accordance with applicable site procedures and are placed in appropriate areas at each Reactor Complex.
7. Security Surveillance Measures	Control and monitor access by workers/public.	Until the concentration of hazardous substances associated with the unit have been reduced to levels that allow for unlimited exposure and unrestricted use.	Established and maintained by USDOE Necessity of patrols evaluated upon completion of RAs or property transfer.	Security and surveillance measure are in place at the SRS boundary in accordance with RCRA-permit requirements.

[a]Property Record Notices – Refers to any non-enforceable, purely informational document recorded along with the original property acquisition records of USDOE and its predecessor agencies that alerts anyone searching property records to important information about residual contamination; waste disposal areas in the property.

[b]Property Record Restrictions – Includes conditions and/or covenants that restrict or prohibit certain uses of real property and are recorded along with original property acquisition records of USDOE and its predecessor agencies.

[c]Other Notices – Includes information on the location of waste disposal areas and residual contamination depicted on as survey plat, which is provided to a zoning authority (i.e., city planning commission) for consideration in appropriate zoning decisions for non-USDOE property.

[d]Site Use Program – Refers to the internal USDOE/USDOE contractor administrative program(s) that requires the permit requestor to obtain authorization, usually in the form of a permit, before beginning any excavation/penetration activity (e.g., well drilling) for the purpose of ensuring that the proposed activity will not affect underground utilities/structures, or in the case contaminated soil or groundwater, will not disturb the affected areas without the appropriate precautions and safeguards.

[e]Physical Access Controls – Physical barriers or restrictions to entry.

[f]Signs – Posted command, warning or direction.

4.3 Other Public Notices

This EALUCIP identifies the proposed area under land use restriction via Figures B-1 through B-3 of Appendix B for the C-, K-, and L-Reactor Complexes. If the site is ever transferred to non-federal ownership, a professional land surveyor certified survey plat of each Area OU will be prepared at or near the time of conveyance to support the LUCIP required restrictive covenants on land use and will be recorded with the appropriate county recording agency.

4.4 Site Use Program

Under DOE Order 430.1A, *Life Cycle Management* (USDOE 1998), SRS is required to implement an asset management program for the use, maintenance, and disposal of physical assets, including real estate. SRS complies with this order through its Site Use Program, which is conducted in accordance with manual 1D, *Site Infrastructure and Services Manual*, Procedure 3.02, "Site Real Property Configuration Control" (WSRC 2006). All employees, contractors, and visitors at SRS are required to adhere to the Site Use Program. No use of land (i.e., excavation or any other land use) shall be undertaken without prior approval documented by a Site Use Permit. Also, in accordance with manual 1D, Procedure 3.02, all work at SRS that adds to or modifies features or facilities portrayed on SRS development maps (i.e., plot plans of facilities/utilities at SRS) will be authorized by a Site Clearance Permit before any activities are conducted. All Site Clearance Requests will be reviewed to verify that either an approved Site Use Permit has been obtained or that the request is sanctioned by an existing Site Use Permit. All land use requirements applicable for the OU will be provided to the Site Use Program for use in determining issuance of Site Clearance Permits. In addition, the Site Use Permit must be amended when the geographic configuration or buffer zone used to establish the permit boundary changes or there is a change to the permitted land use.

SRS is responsible for updating, maintaining, and reviewing site maps, including FFA (FFA 1993) OU identifications. If a Site Clearance Request potentially impacts an FFA OU (i.e., C-, K-, or L-Reactor Complexes), the Site Clearance Request Form is sent to the appropriate FFA OU reviewer for approval. The roles and responsibilities of each individual are detailed in

manual 1D, Procedure 3.02. Before a Site Clearance Permit is issued, verification of USDOE approval for intended land use must be obtained. The site use and site clearance processes are applicable to all activities and personnel at SRS (including subcontractors). The USDOE will notify USEPA and SCDHEC in advance of any change to any internal procedure, including the Site Use Program which would affect implementing or maintaining the LUCs. The processes are controlled within the SRS Quality Assurance (QA) Program in accordance with 1Q Manual, *Quality Assurance*, (WSRC 2008). The SRS QA program governs all SRS activities.

All maintenance and engineering work performed at SRS is controlled though SRS Work Control Procedures. Any work proposed in the C-, K-, or L-Reactor Complex areas will be strictly controlled and workers will be appropriately trained and briefed about health and safety requirements if work is deemed necessary.

No change in land use at the C-, K-, or L-Reactor Complexes shall be undertaken without USEPA and SCDHEC approval. Approval by USEPA and SCDHEC is required for any modification or termination of the ICs and implementation actions, and USDOE must obtain prior approval from USEPA and SCDHEC before taking any anticipated action that may disrupt the effectiveness of the LUCs or alter or negate the need for LUCs.

4.5 Physical Access Controls

The C-, K-, and L-Reactor Areas are, at a minimum, defined as Property Protection Areas (PPA). Entrance requirements, warning signs and/or notices are often posted around the perimeter and at the entrances to buildings designated as a PPA. Access requirements include holding a valid security or visitor badge. Access to buildings during non-business hours are controlled by cipher-locked doors.

4.6 Warning Signs

Locations within the C-, K-, or L-Reactor Complexes that contain hazardous or radiological materials/contaminants are identified by posting (existing signs) to those individuals granted access through the physical access controls described above. The purposes of the signs are to

provide notice to prevent access to unauthorized areas; to warn individuals of the presence of hazardous or radiological materials/contaminants; and provide contact information on the hazards therein. Signs are so designed to be legible from a distance of at least 7.6 m (25 ft).

4.7 Other Access Controls and Security/Surveillance Measures

While under the ownership of USDOE, access control of the entire SRS will be maintained in accordance with the 2000 RCRA Part B Permit Renewal Application, Volume I, Section F.1. This section describes the 24-hour surveillance system (R.61-79.264.14(b)(1)), artificial or natural barriers (R.61-79.264.14(b)(2)(I)), control entry systems (R.61-79.264.14(b)(2)(ii)), and access control warning signs (R.61-79.264.14(c)) in place at the SRS boundary to comply with the security requirements for a RCRA-permitted facility.

4.8 Field Inspection and Maintenance for Land Use Controls

Upon approval of this EALUCIP for the C-, K-, and L-Reactor Complexes, only inspection and maintenance activities will be required by this RA. The Reactor Complexes will be inspected per the Field Inspection Checklist in Appendix C. Field inspections will be performed annually. Additional inspections may be necessary in the event of unusual weather or any other condition warranting inspection.

Any activity that is inconsistent with the IC objectives or use restrictions, or any other action that may interfere with the effectiveness of the ICs will be addressed by the USDOE as soon as practicable, but in no case will the process be initiated later than 10 days after the USDOE becomes aware of the breach. The USDOE will notify USEPA and SCDHEC as soon as practicable but no longer than 10 days after discovery of any activity that is inconsistent with the IC objectives or use restrictions, or any other action that may interfere with the effectiveness of the ICs. The USDOE will notify USEPA and SCDHEC regarding how the USDOE has addressed or will address the breach within 10 days of sending USEPA and SCDHEC notification of the breach. The FFA Annual Progress Report, submitted to the regulatory agencies by USDOE, will provide the status of the ICs and describe how any IC deficiencies or

inconsistent uses have been addressed. In the event of property transfer or lease, the Annual Report will cite findings on the following: whether the use restrictions and controls referenced above were communicated in the deed(s) or lease restrictions; whether property use conforms with the deed or lease restrictions and controls; and whether the owners and state/local agencies have been notified regarding the deed or lease restrictions and controls. The FFA Annual Progress Report(s) will be used in the preparation of the Five-Year Remedy Review Report.

All other routine maintenance activities will be documented and maintained in files subject to USEPA and SCDHEC review and audit. A copy of the completed inspection form is maintained in the Area Completion Projects (ACP) Document Control. The LUCs shall be maintained until the concentration of hazardous substances associated with the unit have been reduced to levels that allow for unlimited exposure and unrestricted use.

The waste unit inspectors are to be trained in Hazardous Waste Operations and Emergency Response (HAZWOPER), RCRA Well Inspections (ACP-specific training), ACP RCRA Waste Unit Inspections, Radiological Worker Training, etc., as applicable for the specific inspection. They will also be trained based on the individual requirements of the regulatory approved closure documents for each waste unit. In addition, the inspectors are to attend yearly refresher courses. Over the years, different personnel may conduct the inspections and maintenance activities.

This EALUCIP, including the checklist (Appendix C), will be appended to the SRS LUCAP upon final regulatory approval.

5.0 REFERENCES

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

SRNS, 2009. *Early Action Record of Decision Remedial Alternative Selection for the C-, K-, L, and R-Reactor Complexes (U),* Revision 1, SRNS-RP-2009-00707, Savannah River Nuclear Solutions, Savannah River Site, Aiken SC (September)

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WSRC, 1999. *Land Use Control Assurance Plan for the Savannah River Site*, WSRC-RP-98-4125, Current Updated Version, Savannah River Nuclear Solutions, Savannah River Site, Aiken, SC

WSRC, 2006*. Procedure Manual 1D, *Site Infrastructure and Services Manual (U)*, Procedure 3.02, "Site Real Property Configuration Control," Current Revision, Westinghouse Savannah River Company, Savannah River Site, Aiken, SC

WSRC, 2008*. Procedure Manual 1Q, *Quality Assurance (U)*, Current Revision, Westinghouse Savannah River Company, Savannah River Site, Aiken, SC

*WSRC procedures have been accepted by SRNS, but have not yet received an SRNS or SRS procedure number.

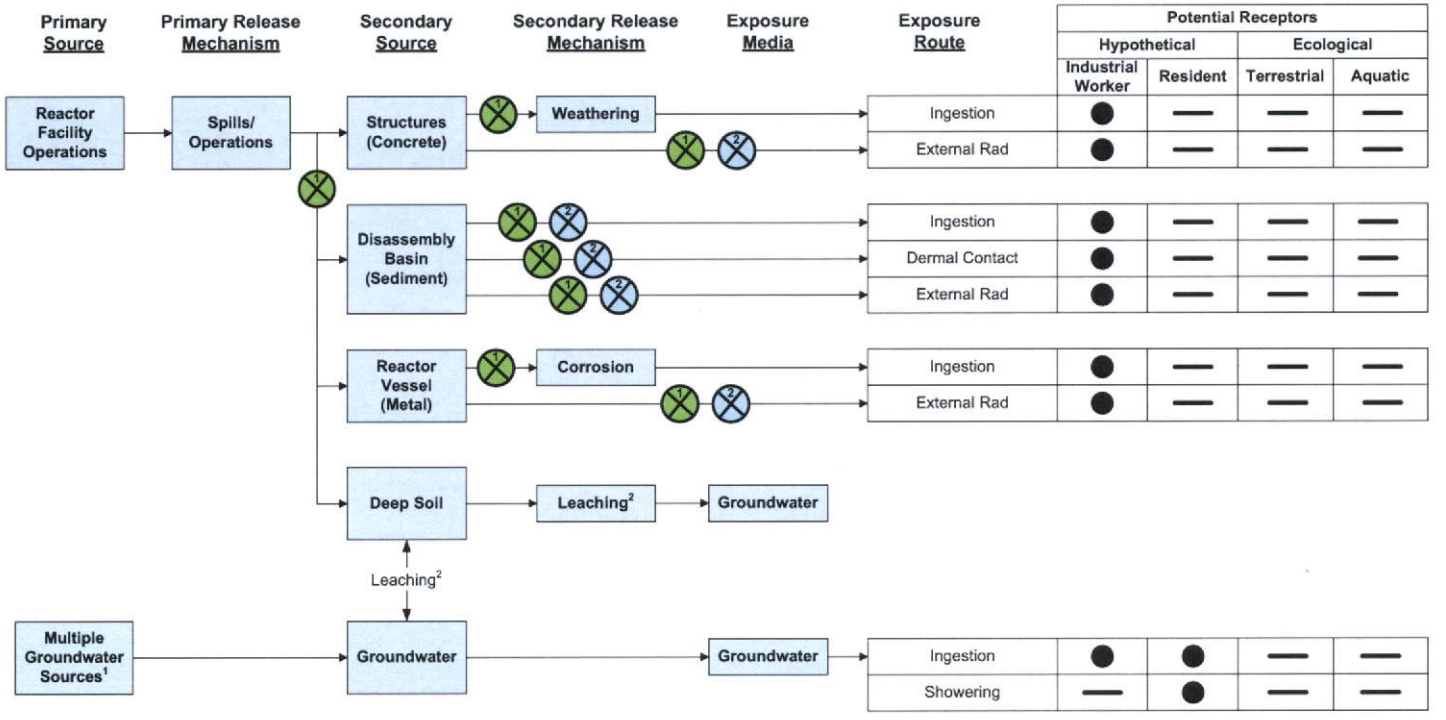
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APPENDIX A

POST-REMEDIAL ACTION CONCEPTUAL SITE MODEL

FOR THE C-, K-, AND L-REACTOR COMPLEXES

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Key:
- Pathways: Current, historic, and hypothetical future
- Complete Exposure Pathway
- Incomplete Exposure Pathway
- Remedy Component 1 (ISD) Breaks this Pathway
- Remedy Component 2 (LUCs) Breaks this Pathway

Footnotes:
[1] Groundwater has been impacted by multiple sources within the various Area OUs and will be addressed under the Groundwater OUs for each of the Area OUs that include the Reactor Complexes.
[2] Leaching represents the potential of a contaminant in deep soil to migrate to groundwater above MCLs and does not represent a human or ecological exposure route. This pathway will be evaluated under the Groundwater OUs for each of the Reactor Complexes.

Figure A-1. Post-Remedial Action Conceptual Site Model for the C-, K-, and L-Reactor Complexes

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APPENDIX B

AS-BUILT LAND USE MAPS

FOR C-, K-, AND L-REACTOR COMPLEXES

EARLY ACTION LAND USE CONTROL IMPLEMENTATION PLAN

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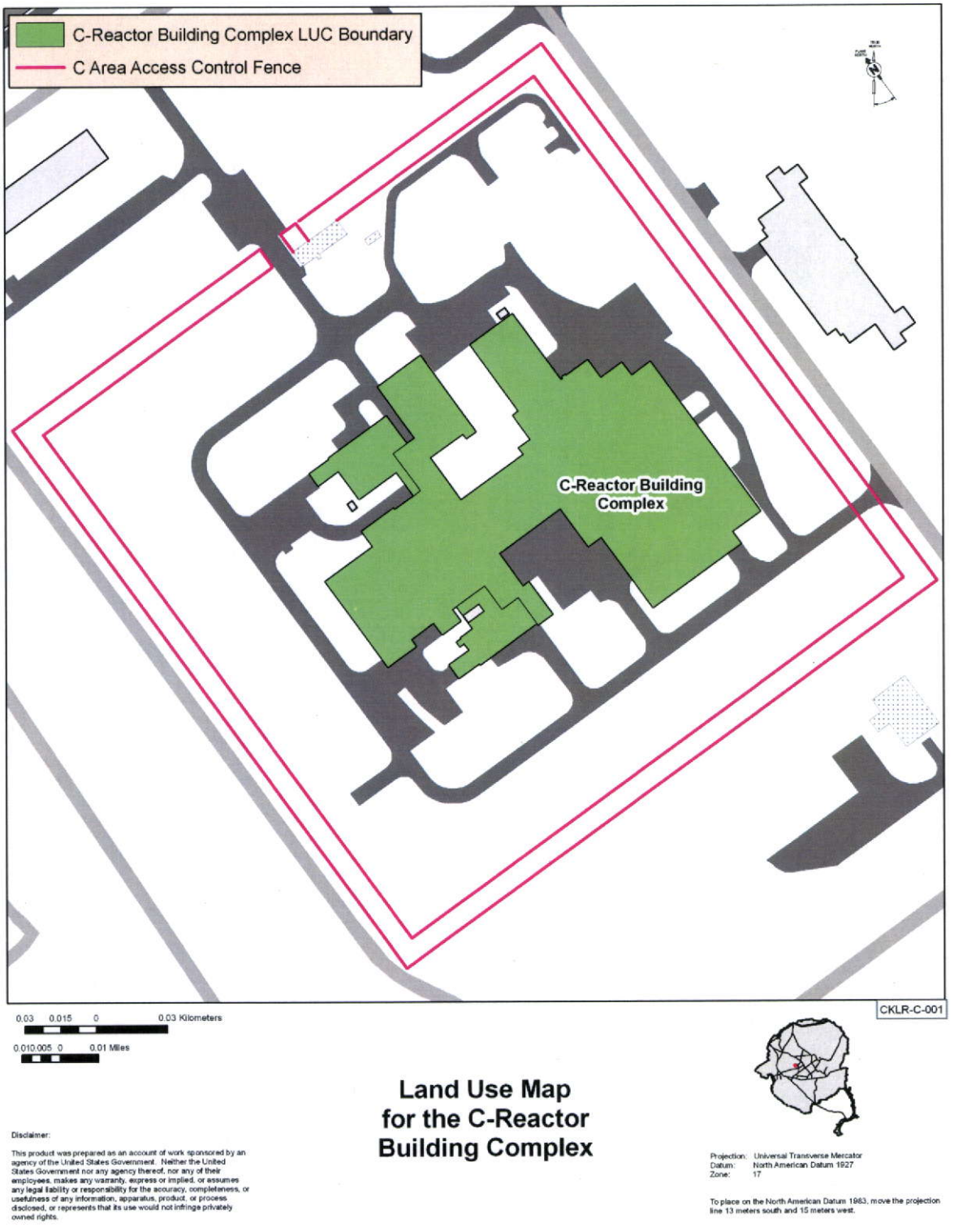


Figure B-1. Land Use Map for the C-Reactor Building Complex

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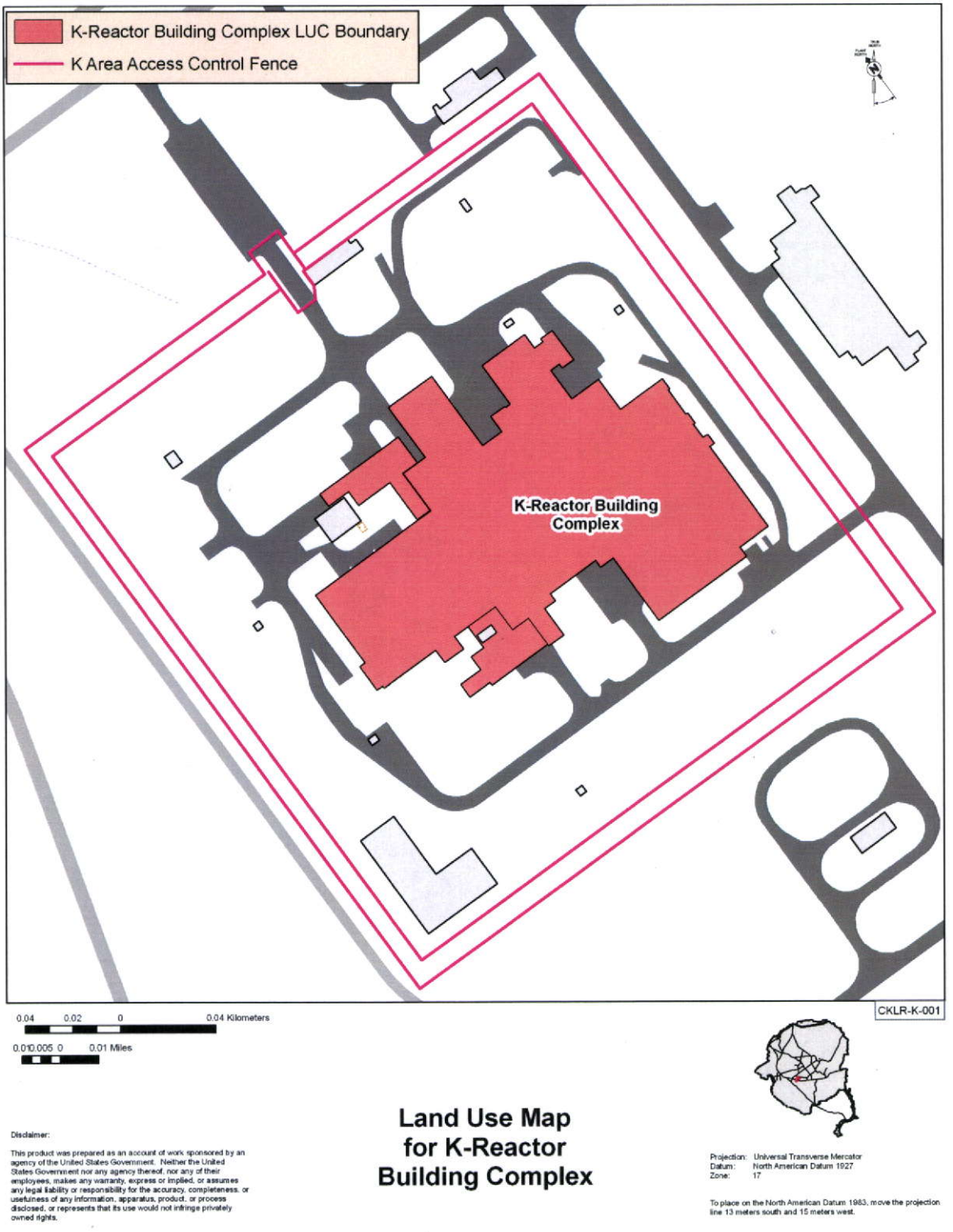


Figure B-2. Land Use Map for the K-Reactor Building Complex

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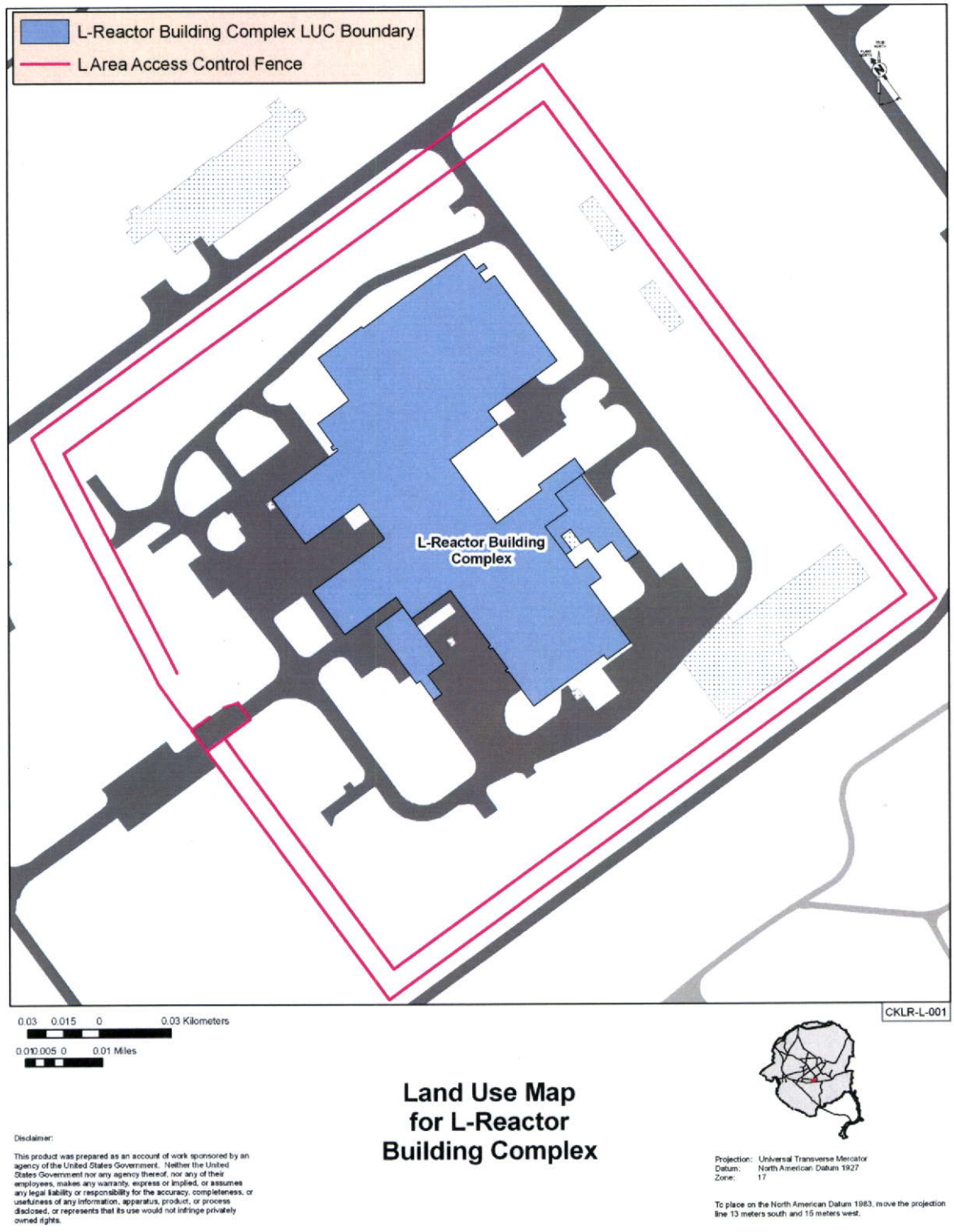


Figure B-3. Land Use Map for the L-Reactor Building Complex

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APPENDIX C

FOR THE C-, K-, AND L-REACTOR COMPLEXES

FIELD INSPECTION CHECKLIST

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FIELD INSPECTION CHECKLIST

FOR THE C-, K-, AND L-REACTOR COMPLEXES WASTE UNIT

☐ **SCHEDULED** ☐ **UNSCHEDULED**

A= Satisfactory X= Unsatisfactory (Explanation required)	A or X	Observation of Corrective Action Taken
1. Verify that the roads are accessible.		
2. Verify that the existing warning signs are in acceptable condition, have the correct information, and are legible from a distance of 25 feet.		
3. Verify that any required access controls to the reactor building complexes are in place and functioning.		

Inspected by:

_____ / _____ _____
(Print Name) (Signature) (Date)

Post-Closure Manager:

_____ / _____ _____
(Print Name) (Signature) (Date)

CAUTION: The inspector shall notify the Post-Closure Manager (PCM) and Environmental Compliance Authority (ECA) IMMEDIATELY if there has been a breach or compromise of the institutional controls of this waste unit. The notification shall be in accordance with SRS post-closure inspection procedures.

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LUCIP for the
Early Construction and Operational Disposal Site (ECODS)
L-1, N-2, P-2, and R-1A, -1B, -1C

Land Use Control Implementation Plan for the Early Construction and Operational Disposal Site (ECODS) L-1, N-2, P-2, & R-1A, -1B, -1C
(SRNS-RP-2009-01373, Rev.1, April 2010)

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United States Department of Energy

Savannah River Site

Land Use Control Implementation Plan (LUCIP) for the Early Construction and Operational Disposal Sites (ECODS) L-1, N-2, P-2, and R-1A, -1B, -1C Operable Unit (OU) (U)

CERCLIS Number: 22

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Revision 1

April 2010

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LIST OF ACRONYMS AND ABBREVIATIONS

ACP	Area Completion Projects
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CM	contaminant migration
CMIR	Corrective Measures Implementation Report
COC	constituent of concern
CSM	conceptual site model
ECODS	Early Construction and Operational Disposal Site
FFA	Federal Facility Agreement
ft	feet
IC	institutional control
IOU	Integrator Operable Unit
km	kilometer
km^2	square kilometer
LUC	land use control
LUCAP	Land Use Control Assurance Plan
LUCIP	Land Use Control Implementation Plan
m	meter
mi	mile
mi^2	square mile
NBN	no building number
OU	operable unit
PTSM	principal threat source material
QA	Quality Assurance
RA	remedial action
RACR	Remedial Action Completion Report
RAO	remedial action objective
RCOC	refined constituent of concern
RCRA	Resource Conservation and Recovery Act
ROD	Record of Decision
SB/PP	Statement of Basis/Proposed Plan
SCDHEC	South Carolina Department of Health and Environmental Control
SGCP	Soil and Groundwater Closure Projects
SRNS	Savannah River Nuclear Solutions, LLC
SRS	Savannah River Site
USDOE	U.S. Department of Energy
USEPA	U.S. Environmental Protection Agency
WSRC	Washington Savannah River Company

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1.0 INTRODUCTION

This Land Use Control Implementation Plan (LUCIP) has been prepared for the Early Construction and Operational Disposal Sites (ECODS) L-1, N-2, P-2, and R-1A, -1B, -1C Operable Unit (OU) at the Savannah River Site (SRS). The purpose of this LUCIP is to describe how the land use controls (LUCs) selected in the Record of Decision (ROD) (SRNS 2009) will be implemented and maintained. The following LUC objectives have been selected for this OU:

- Prevent contact, removal, or excavation of subsurface soils.
- Prohibit the development and use of property for residential housing, elementary and secondary schools, child care facilities and playgrounds.

Current access controls and deed notifications needed to maintain the future land use are described in the following sections of this LUCIP.

The selected remedy leaves hazardous substances in place that pose a potential future risk and will require land use restrictions until the hazardous substances in the soil and groundwater are at levels that allow for unrestricted use. As agreed on March 30, 2000, among the U.S. Department of Energy (USDOE), U.S. Environmental Protection Agency (USEPA), and South Carolina Department of Health and Environmental Control (SCDHEC), SRS is implementing a Land Use Control Assurance Plan (LUCAP) to ensure that the LUCs required by numerous remedial decisions at SRS are properly maintained and periodically verified. The requirements of that LUCAP also apply to the LUCs that were selected as part of the remedial action (RA) for ECODS L-1, N-2, P-2, and R-1A, -1B, -1C. This additional document, the ECODS L-1, N-2, P-2, and R-1A, -1B, -1C LUCIP, contains the detailed and specific measures required to implement and maintain the LUCs selected as part of this particular remedial decision. The LUCs shall be maintained until the OU is suitable for unlimited exposure and unrestricted use. Approval by USEPA and SCDHEC is required for any modification or termination of the institutional controls (ICs).

USDOE is responsible for implementing, maintaining, monitoring, reporting, and enforcing the LUCs in accordance with the approved LUCIP. Upon final approval, the LUCIP will be appended to the LUCAP and should be considered incorporated by reference into the ECODS L-1, N-2, P-2, and R-1A, -1B, -1C ROD, establishing implementation and maintenance requirements for the LUCs under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and the SRS Federal Facility Agreement (FFA) (FFA 1993). The LUCIP will remain in effect unless and until modifications are approved by USEPA and SCDHEC as necessary for protection of human health and the environment. This LUCIP will be evaluated for accuracy and protectiveness during the five-year remedy review and any approved LUCIP modification will be appropriately documented for incorporation by reference into the ECODS L-1, N-2, P-2, and R-1A, -1B, -1C ROD.

1.1 Format of the LUCIP

The format of this LUCIP is consistent with the FFA protocol format approved by USEPA and SCDHEC in March 2004.

2.0 OVERVIEW OF THE REMEDIAL ACTION

2.1 General Description and History of the Operable Unit

SRS occupies approximately 804 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 40.2 km (25 mi) southeast of Augusta, Georgia, and 32.2 km (20 mi) south of Aiken, South Carolina.

ECODS at SRS are typically shallow (less than 3.65 m [12 ft] below ground surface) land disposal pits used between 1951 to 1955 to dispose of waste material associated with the construction of SRS facilities. Construction waste was buried in shallow, elongated trenches, with some also used as burn pits for combustible waste disposal. Figure 2 shows the locations at SRS of ECODS L-1, N-2, P-2, and R-1A, -1B, and -1C. ECODS L-1 and P-2 are located in the

Steel Creek Integrator Operable Unit (IOU). ECODS N-2 is located in the Pen Branch IOU. ECODS R-1A, -1B, and -1C are located in the Lower Three Runs IOU.

ECODS L-1 is located in the southern portion of SRS, immediately east of L Area (Figure 3) within the Steel Creek IOU. ECODS L-1 was created during the construction of the L Reactor and associated support buildings for the burning and/or burial of construction waste. Aerial photographs identify ECODS L-1 as being in use from November 1953 to June 1954 (WSRC 2003). The area is relatively flat, slopes gradually to the southwest (toward L Lake), and is covered with small pine trees.

ECODS N-2 is located in the central portion of SRS, near the southwestern edge of N Area (Figure 4) within the Pen Branch IOU. Aerial photographs identify ECODS N-2 as being in use from January 1953 to May 1955 (WSRC 2000). Waste was buried in trenches and sections of the trenches may have been used as a burn pit or combustible waste disposal. The area is relatively flat and slopes gradually to the south and southwest. The area is lightly wooded with pine trees and underbrush.

ECODS P-2 is located in the southeastern portion of the SRS, immediately south of P Area (Figure 5) within the Steel Creek IOU. Aerial photographs identify the ECODS P-2 as being in use from approximately January 1953 to May 1955 (WSRC 2001). The area is relatively flat and slopes gradually to the southeast. It is heavily wooded with pine trees and dense underbrush.

ECODS R-1A, -1B, and -1C are located in the southeastern portion of SRS, immediately northeast of R Area (Figure 6) within the Lower Three Runs IOU. Aerial photographs identify ECODS R-1A, R-1B, and R-1C as being in use from approximately September 1951 to August 1952 (WSRC 2002). ECODS R-1A, -1B, and -1C are located in a relatively flat area that slopes gradually to the northwest and is covered with small pine trees and heavy underbrush. The center of the ECODS is approximately 91.4 m (300 ft) east of the southern end of the Old R-Area Discharge Canal (no building number [NBN]).

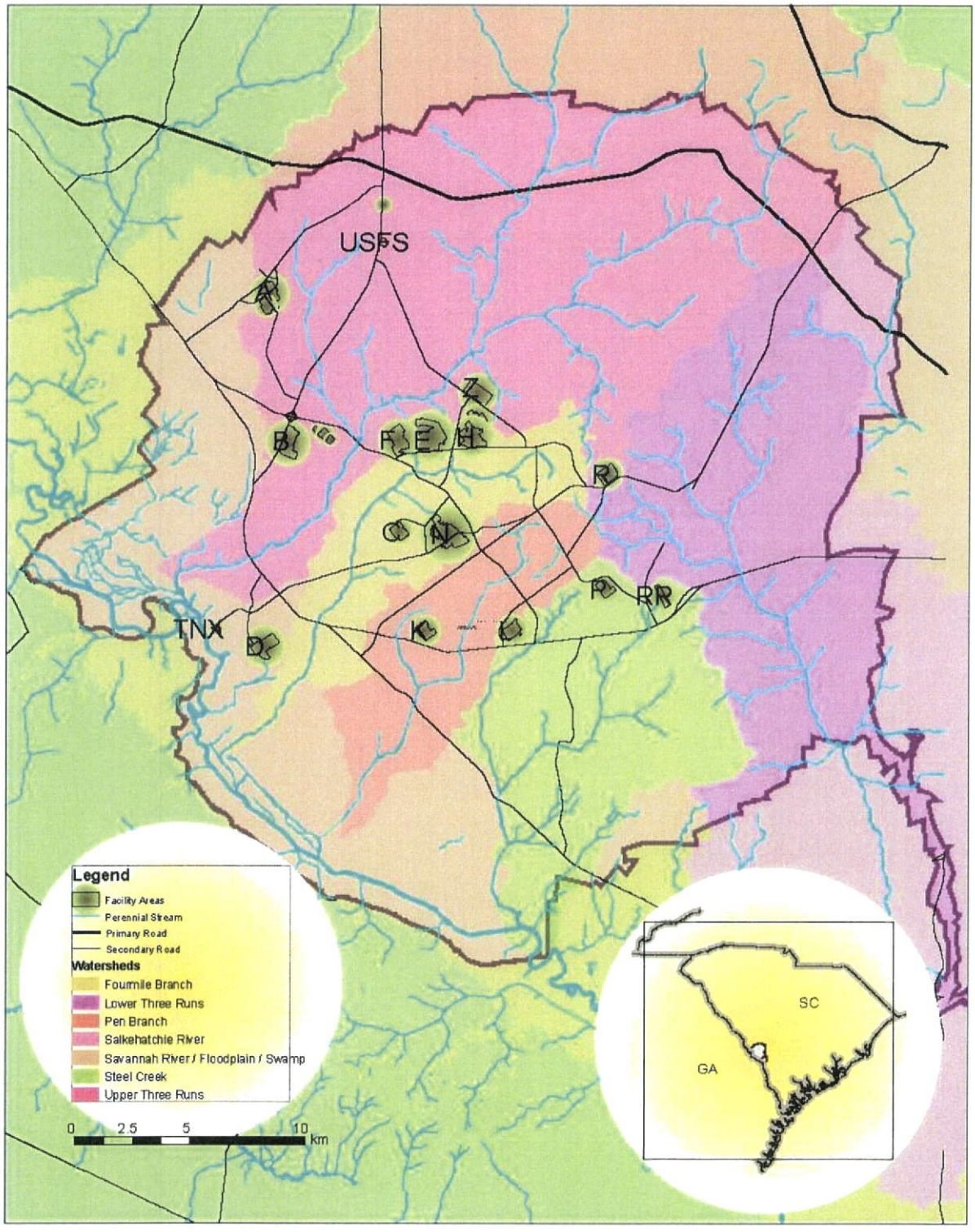


Figure 1. Map Showing the Location of the Savannah River Site and Facilities

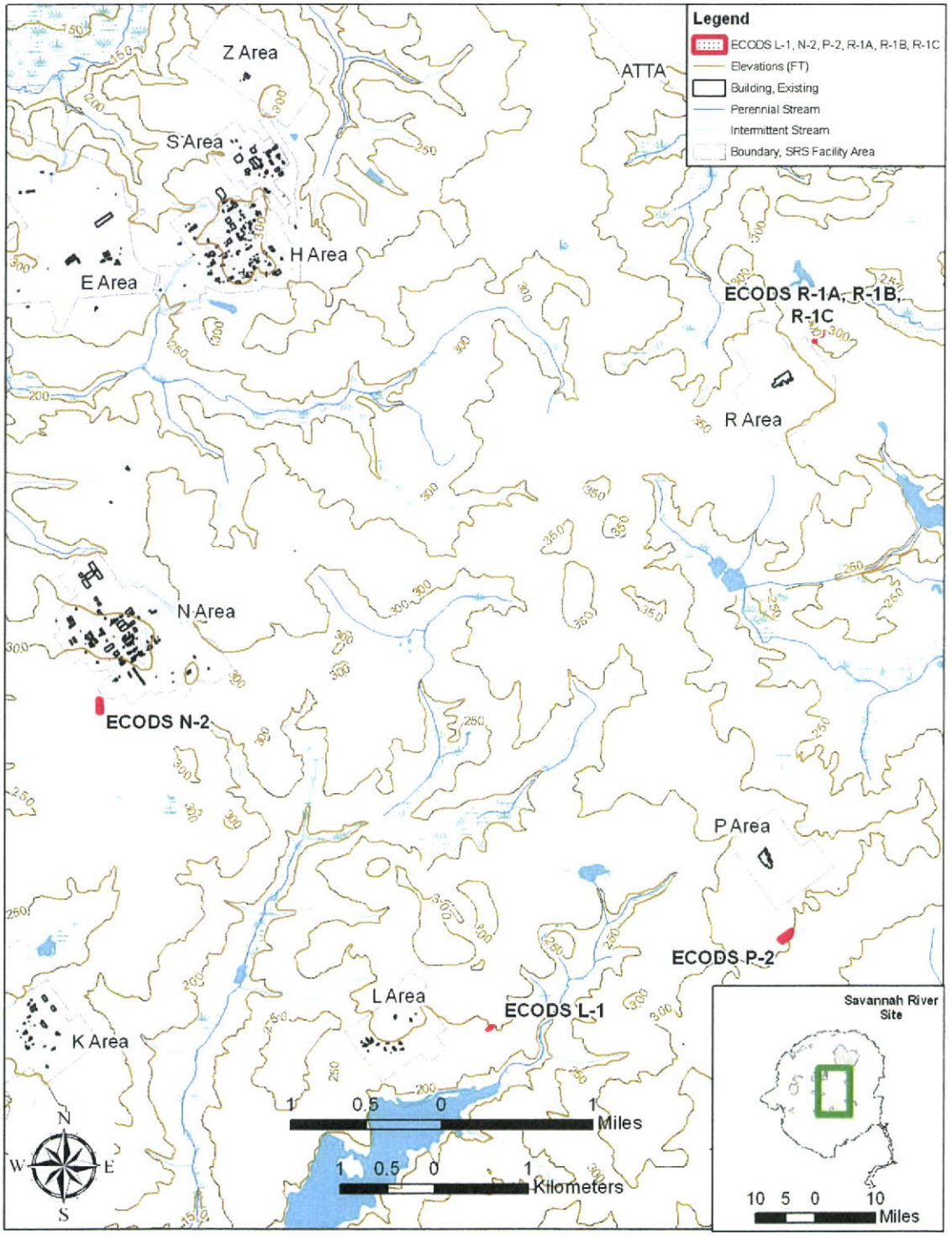


Figure 2. Map Showing the Locations of ECODS L-1, N-2, P-2, and R-1A, -1B, -1C within the Savannah River Site

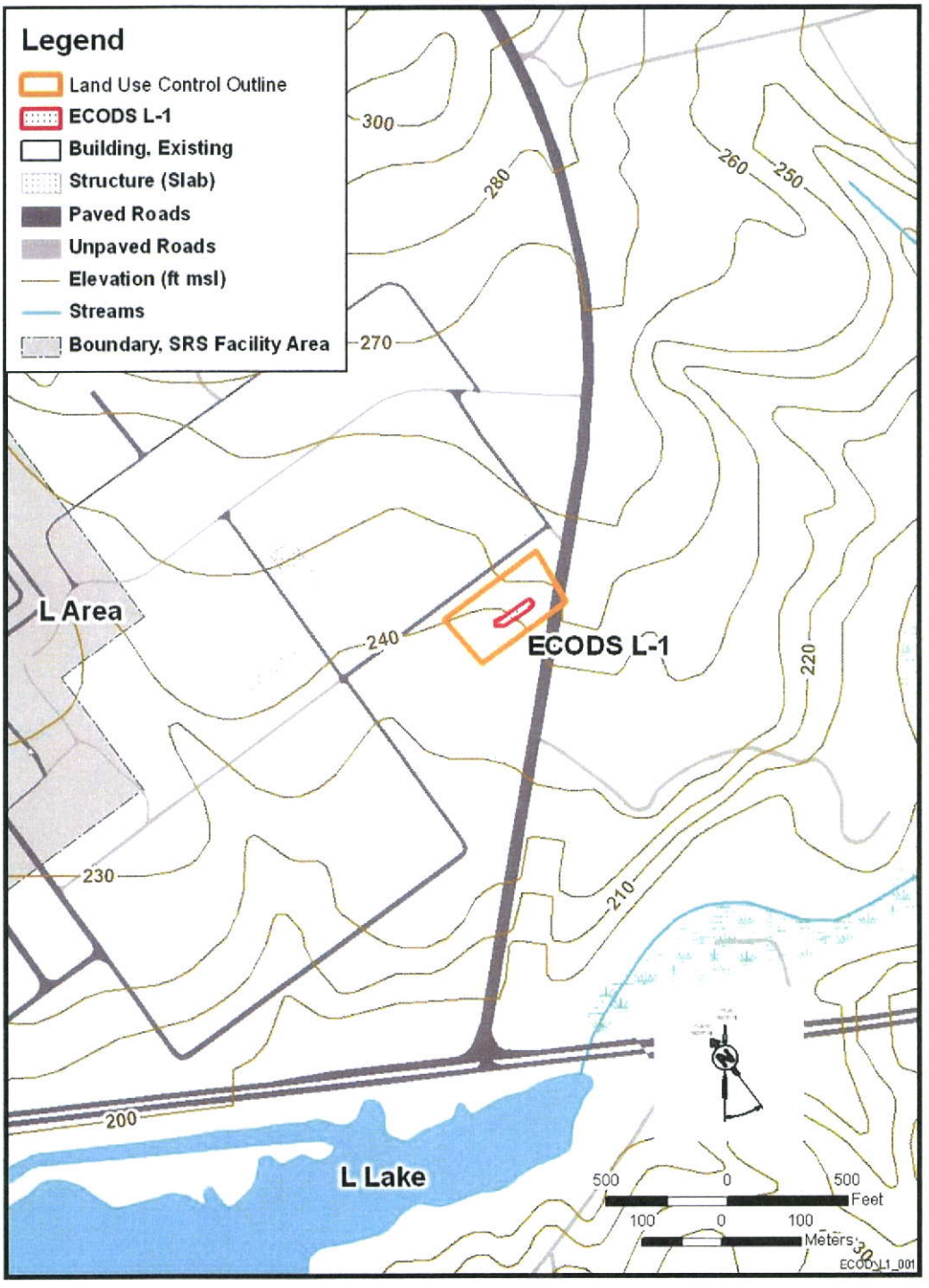


Figure 3. **Map Showing the Locations of ECODS L-1 and the Approximate Land Use Control Boundary**

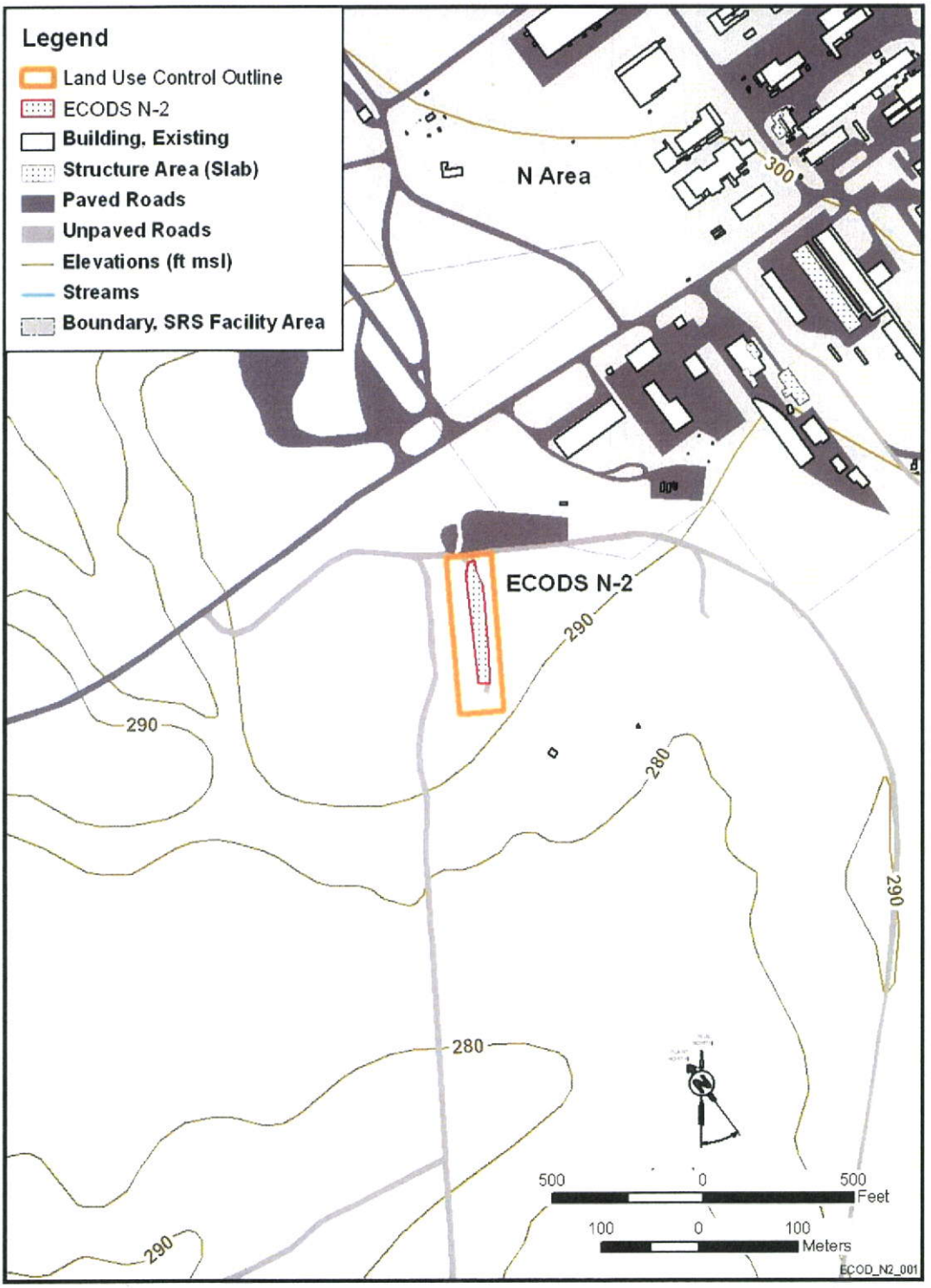


Figure 4. Map Showing the Location of ECODS N-2 and the Approximate Land Use Control Boundary

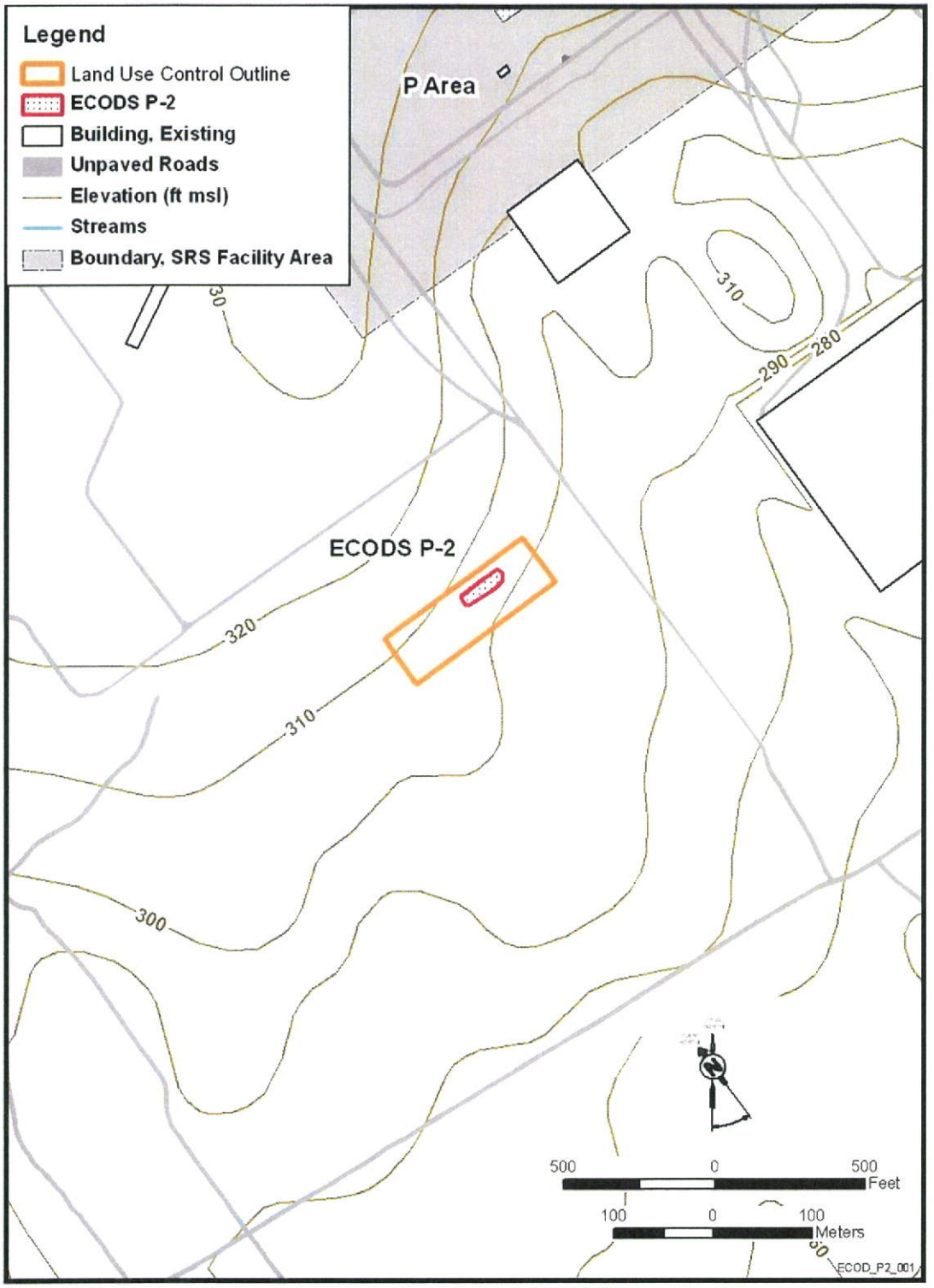


Figure 5. Map Showing the Location of ECODS P-2 and the Approximate Land Use Control Boundary

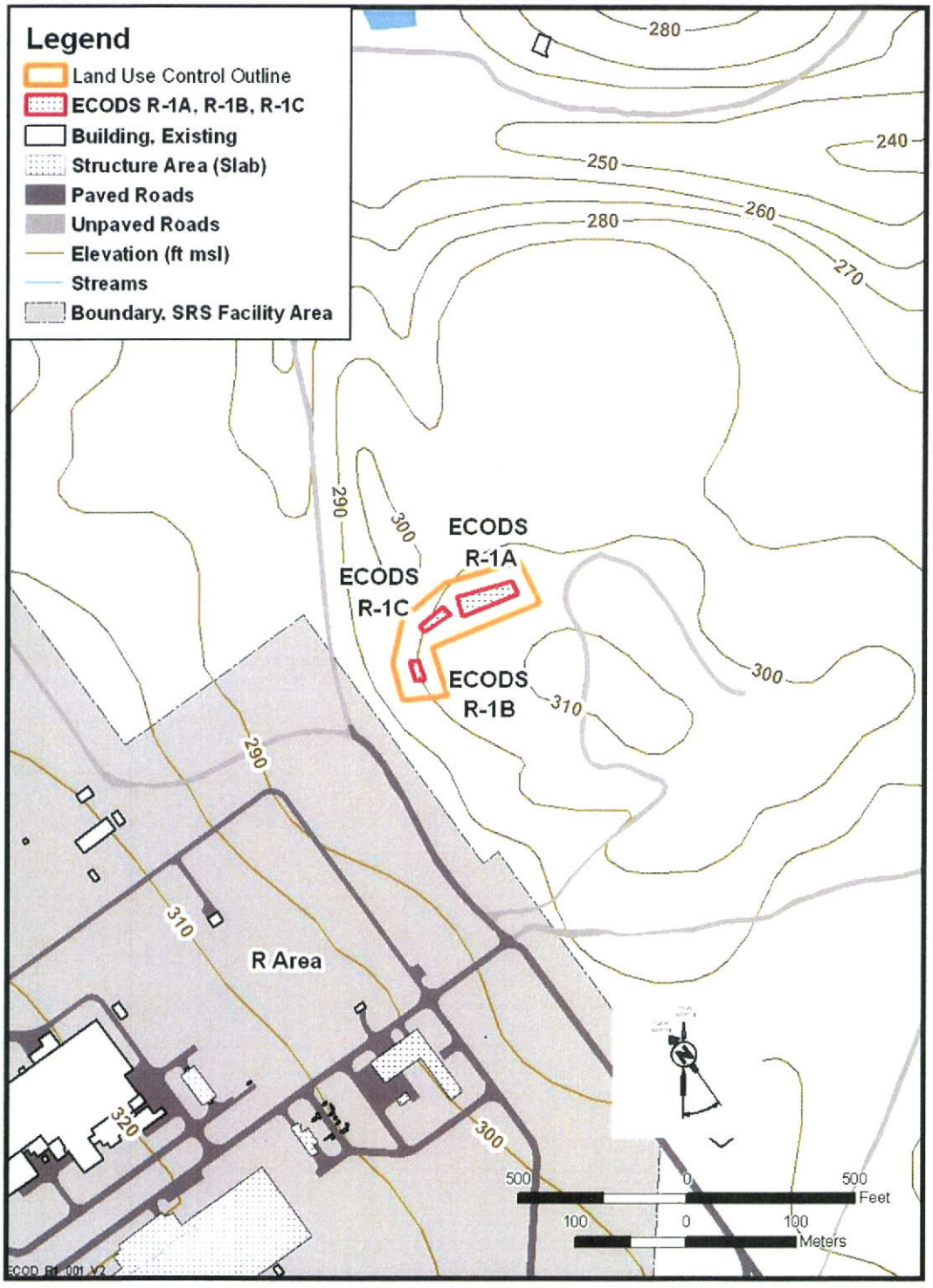


Figure 6. Map Showing the Locations of ECODS R-1A, -1B, and 1-C and the Approximate Land Use Control Boundary

2.2 Nature and Extent of Contamination

Identification of ECODS at SRS in the last few years has led to the investigation of these disposal pits under the Site Evaluation Program. Upon identification, these areas were added to Appendix G.1 (Areas to be Investigated) of the FFA.

Site Evaluation Reports were developed for ECODS L-1, N-2, P-2, and R-1A, -1B, -1C and contain detailed information and analytical data for all of the investigations conducted and all of the composite soil samples that were collected (WSRC 2000, WSRC 2001, WSRC 2002, WSRC 2003). In addition, a Trenching Report (SGCP 2005; WSRC 2006a) was prepared for ECODS P-2.

The four ECODS were subsequently transferred to Appendix C of the FFA as a Resource Conservation and Recovery Act (RCRA) / CERCLA OU for further evaluation. Due to the similar history and nature of the contaminants, the four ECODS were addressed in a single Statement of Basis/Proposed Plan (SB/PP) (WSRC 2007a). A streamlined RCRA Facility Investigation/Remedial Investigation, Baseline Risk Assessment, and Corrective Measures Study/Feasibility Study were prepared for each of the ECODS and included in the SB/PP.

The investigation at ECODS L-1, N-2, P-2, and R-1A, -1B, -1C indicated that a release to the environment had occurred of polycyclic aromatic hydrocarbons, polychlorinated biphenyls, volatile organic compounds, metals, and potentially friable asbestos. However, the human health and ecological risk assessments, contaminant migration (CM) analysis, and principal threat source material (PTSM) evaluation identified no refined constituents of concern (RCOCs) for ECODS L-1, ECODS N-2, ECODS P-2, or ECODS R-1A, -1B, and -1C. It was recognized that there was a potential for friable asbestos exposure to human health receptors should buried debris (> 0.3 m [1 ft] depth) be brought to the surface. Soil, dust, or air samples were not taken for asbestos; however, USDOE has exercised the option to proceed directly to a response because there is threat of release of asbestos (USEPA 2008).

The selected remedy for the ECODS L-1, N-2, P-2, and R-1A, -1B, -1C leaves hazardous substances in place that pose a potential future risk and will require land use restrictions until the concentrations of hazardous substances in the soil are at levels that allow for unrestricted use and exposure.

2.3 Remedial Action Selected

The selected remedy for the ECODS L-1, N-2, P-2, and R-1A, -1B, -1C is ICs. Although there are no PTSM, human health, or ecological RCOCs or CM constituents of concern (COCs), there is the potential for friable asbestos exposure to human receptors should buried debris (> 0.3 m [1 ft] depth) be brought to the surface. Therefore, ICs will be implemented to prevent land disturbance activities and to prevent exposure to subsurface soils that may contain friable asbestos. ICs will consist of signage and Site Use/Site Clearance restrictions. The RCRA permit will be revised to reflect selection of the final remedy using the procedures under 40 Code of Federal Regulations Part 270, and South Carolina Hazardous Waste Management Regulations R.61-79.264.101; 270.

The RA selected in the ROD (SRNS 2009) is based on an evaluation of potential alternatives performed in accordance with the National Oil and Hazardous Substances Pollution Contingency Plan and CERCLA (as amended). The conceptual site model (CSM) for ECODS L-1, N-2, P-2, and R-1A, -1B, -1C shows there are no human health or ecological RCOCs, or CM COCs (Appendix A). According to the *Savannah River Site Future Use Project Report* (USDOE 1996), residential use of SRS land is prohibited. This alternative was selected because it effectively protects against residential and industrial exposure and provides the best balance of tradeoffs between no action and removal and offsite disposal.

Remedial action objectives (RAOs) are medium- or OU-specific objectives for protecting human health and the environment. RAOs usually specify protection of potential receptors and exposure pathways. They are typically identified during the scoping process once the CSM is understood. The following RAO has been identified for ECODS L-1, N-2, P-2, and R-1A, -1B, -1C:

- Prevent human exposure to contaminants including buried asbestos present in the subsurface soils that may present a risk to a future industrial worker or resident.

3.0 LAND USE CONTROL OBJECTIVES

The following ECODS L-1, N-2, P-2, and R-1A, -1B, -1C LUC objectives have been developed to ensure the protectiveness of the remedy described above:

- Prevent contact, removal, or excavation of subsurface soils.

- Prohibit the development and use of property for residential housing, elementary and secondary schools, child care facilities and playgrounds

Current access controls and deed notification needed to maintain the future land use are described in the following sections of this LUCIP.

4.0 IMPLEMENTATION OF LAND-USE CONTROLS

This section describes the LUCs selected in the ROD to achieve the objectives stated in Section 3.0. A summary of the LUCs is provided in Table 1. USDOE is responsible for implementing, maintaining, reporting on and enforcing the LUCs required for the ECODS L-1, N-2, P-2, and R-1A, -1B, -1C. This LUCIP will become enforceable and will be implemented when approved by USEPA and SCDHEC and following the completion of the RA prescribed by the ECODS L-1, N-2, P-2, and R-1A, -1B, -1C ROD. USDOE shall notify USEPA and SCDHEC 60 days in advance of any proposed land use changes that are inconsistent with LUC objectives or the selected remedy.

The selected alternative for the ECODS L-1, N-2, P-2, and R-1A, -1B, -1C is ICs. ICs effectively protect against residential and industrial exposure and provide the best balance of tradeoffs between no action and removal and offsite disposal.

Table 1. Land Use Controls for ECODS L-1, N-2, P-2, and R-1A, -1B, -1C

Type of Control	Purpose of Control	Duration	Implementation	Affected Areas[a]
1. Property Record Notices[b]	Provide notice to anyone searching records about the existence and location of contaminated areas.	Until the hazardous substances associated with the unit no longer pose an unacceptable risk under unlimited exposure and unrestricted use.	Notice recorded by USDOE in accordance with state laws at County Register of Deeds office if the property or any portion thereof is ever transferred to non-federal ownership.	Waste management areas under this LUCIP where hazardous substances are left in place at levels requiring land use restrictions.
2. Property record restrictions[c]: A. Land Use	Restrict use of property by imposing limitations.	Until the hazardous substances associated with the unit no longer pose an unacceptable risk under unlimited exposure and unrestricted use.	Drafted and implemented by USDOE upon any transfer of affected areas. Recorded by USDOE in accordance with state law at County Register of Deeds office.	Waste management areas under this LUCIP where hazardous substances are left in place at levels requiring land use restrictions.
3. Other Notices[d]	Provide notice to city &/or county about the existence and location of waste disposal and residual contamination areas for zoning/planning purposes.	Until the hazardous substances associated with the unit no longer pose an unacceptable risk under unlimited exposure and unrestricted use.	Notice recorded by USDOE in accordance with state laws at County Register of Deeds office if the property or any portion thereof is ever transferred to non-federal ownership.	Waste management areas under this LUCIP where hazardous substances are left in place at levels requiring land use restrictions.
4. Site Use Program[e]	Provide notice to worker/developer (i.e., permit requestor) on extent of contamination and prohibit excavation/ penetration activity.	As long as property remains under USDOE control.	Implemented by USDOE and site contractors Initiated by permit request	Waste management areas under this LUCIP where hazardous substances are left in place at levels requiring land use restrictions.
5. Physical Access Controls[f] (e.g., fences, gates, portals)	Control and restrict access to workers and the public to prevent unauthorized access.	Until the hazardous substances associated with the unit no longer pose an unacceptable risk under unlimited exposure and unrestricted use.	Controls maintained by USDOE.	Waste management areas under this LUCIP.

Table 1. Land Use Controls for ECODS L-1, N-2, P-2, and R-1A, -1B, -1C *(Continued/End)*

Type of Control	Purpose of Control	Duration	Implementation	Affected Areas[a]
6. Warning Signs[g]	Provide notice or warning to prevent unauthorized uses.	Until the hazardous substances associated with the unit no longer pose an unacceptable risk under unlimited exposure and unrestricted use.	Signage maintained by USDOE.	Waste management areas under this LUCIP.
7. Security Surveillance Measures	Control and monitor access by workers/public.	Until the hazardous substances associated with the unit no longer pose an unacceptable risk under unlimited exposure and unrestricted use.	Established and maintained by USDOE Necessity of patrols evaluated upon completion of remedial actions or property transfer.	Waste management areas under this LUCIP, as necessary.

[a]Affected areas – Specific locations identified in the site-specific LUCIP or subsequent post-ROD documents.

[b]Property Record Notices – Refers to any non-enforceable, purely informational document recorded along with the original property acquisition records of USDOE and its predecessor agencies that alerts anyone searching property records to important information about residual contamination; waste disposal areas in the property.

[c]Property Record Restrictions – Includes conditions and/or covenants that restrict or prohibit certain uses of real property and are recoded along with original property acquisition records of USDOE and its predecessor agencies.

[d]Other Notices – Includes information on the location of waste disposal areas and residual contamination depicted on as survey plat, which is provided to a zoning authority (i.e., city planning commission) for consideration in appropriate zoning decisions for non-USDOE property.

[e]Site Use Program – Refers to the internal USDOE/USDOE contractor administrative program(s) that requires the permit requestor to obtain authorization, usually in the form of a permit, before beginning any excavation/penetration activity (e.g., well drilling) for the purpose of ensuring that the proposed activity will not affect underground utilities/structures, or in the case contaminated soil or groundwater, will not disturb the affected areas without the appropriate precautions and safeguards.

[f]Physical Access Controls – Physical barriers or restrictions to entry.

[g]Signs – Posted command, warning or direction.

ICs will be implemented by:

- Access controls to prevent exposure to onsite workers via the Site Use Program, Site Clearance Program, work control, worker training, worker briefing of health and safety requirements, and identification signs located at the waste unit boundaries.

- Access controls to prevent exposure to trespassers, as described in the 2000 RCRA Part B Permit Renewal Application, Volume I, Section F.1, which describes the security procedures and equipment, 24-hour surveillance system, artificial or natural barriers, control entry systems, and warning signs in place at the SRS boundary and at the ECODS.

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 RAs taken on the site. The contract for sale and the deed will contain the notification required by CERCLA Section 120(h). The deed notification shall notify any potential purchaser that the property has been used for the management and disposal of waste. These requirements are also consistent with the intent of the RCRA deed notification requirements at final closure of a RCRA facility if contamination will remain at the unit.

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

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

As agreed by USDOE, USEPA, and SCDHEC on March 30, 2000, SRS is implementing a LUCAP to ensure that the LUCs required by numerous remedial decisions at SRS are properly maintained and periodically verified. This unit-specific LUCIP provides details and specific measures required to implement and maintain the LUCs selected as part of this remedy. Upon final approval, the LUCIP will be appended to the LUCAP and is considered incorporated by reference into the ROD, establishing LUC implementation and maintenance requirements enforceable under CERCLA and the FFA (FFA 1993). The approved LUCIP will establish implementation, monitoring, maintenance, reporting, and enforcement requirements for the unit. The LUCIP will remain in effect unless and until modifications are approved as needed to be protective of human health and the environment. The deed shall expressly prohibit activities inconsistent with the remedial goals and objectives in the ROD upon any and all transfers. The LUCs shall be maintained until the hazardous substances associated with the unit (i.e., buried potential friable asbestos) no longer pose an unacceptable risk under unlimited exposure and unrestricted use. Approval by USEPA and SCDHEC is required for any modification or termination of the ICs.

USDOE has recommended that residential use of SRS land be controlled; therefore, future residential use and potential residential water usage will be restricted to ensure long-term protectiveness. LUCs, including ICs, will restrict the ECODS L-1, N-2, P-2, and R-1A, -1B, -1C to future industrial use and will prohibit residential use of the area. Unauthorized excavation will also be prohibited and the waste unit will remain undisturbed. LUCs selected as part of this action will be maintained for as long as they are necessary to meet the RAOs and termination of any LUCs will be subject to CERCLA requirements for documenting changes in remedial actions.

The ECODS L-1, N-2, P-2, and R-1A, -1B, -1C will be maintained as an industrial use area by implementation of the property record notices (Section 4.1) and restrictions (Section 4.2), and the use of a certified LUC survey plat (Section 4.3). Figures 3 through 6 illustrate land use boundary requirements at the different subunits.

The Site Use Program (Section 4.4) will be implemented to prevent onsite worker exposure to contamination left in place at the ECODS L-1, N-2, P-2, and R-1A, -1B, -1C. Other existing measures (i.e., Site Clearance Program, worker training, health and safety requirements, work controls) will also be used to ensure worker safety at the ECODS L-1, N-2, P-2, and R-1A, -1B, -1C.

Physical access controls (Section 4.5) are implemented at the SRS boundary to control and restrict public and trespasser access to the ECODS L-1, N-2, P-2, and R-1A, -1B, -1C.

Signs at the ECODS L-1, N-2, P-2, and R-1A, -1B, -1C will be maintained to alert onsite workers to the presence of hazardous substances. The signs will also convey the restrictions of unauthorized personnel. Access control warning signs will be placed and maintained around the ECODS L-1, N-2, P-2, and R-1A, -1B, -1C to prevent unknowing entry and unrestricted use.

4.1 Property Record Notices

In the long term, if the property is ever transferred to non-federal 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 RAs taken on the site. The contract for sale and the deed will contain the notification required by CERCLA Section 120(h).

The deed notification shall notify any potential purchaser that the property has been used for the management and disposal of waste. These requirements are also consistent with the intent of RCRA deed notification requirements at final closure of a RCRA facility if contamination will remain at the unit.

4.2 Property Record Restrictions

The deed shall also include deed restrictions precluding residential use of the property and/or any other property record restrictions necessary to achieve the LUC objectives. The deed shall expressly prohibit activities inconsistent with the remedial goals and objectives in the ROD upon

any and all transfers. USDOE shall provide a copy of the executed deeds to the regulatory agencies as soon as practicable after the transfer of fee title, but no later than 30 days. However, the need for these deed restrictions may be re-evaluated 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 re-evaluation of the need for the deed restrictions will be done though an amended ROD.

USDOE shall provide USEPA and SCDHEC at least six months' notice prior to transfer or sale to ensure that USEPA and SCDHEC can be involved in discussions to ensure that appropriate provisions are included in the transfer terms or conveyance documents to maintain effective ICs. If it is not possible for the facility to notify USEPA and SCDHEC at least six months prior to any transfer or sale, then the facility will notify USEPA and SCDHEC as soon as possible but no later than 60 days prior to the transfer or sale of any property subject to ICs. In addition to the land transfer notice and discussion provisions above, USDOE further agrees to provide USEPA and SCDHEC with similar notice within the same time frames as to federal transfer of property.

4.3 Other Public Notices

This LUCIP identifies the proposed area under land use restrictions via Figures 3 through 6 for each of the ECODS L-1, N-2, P-2, and R-1A, -1B, -1C and the final survey plats (when available) located in Appendix B. After installation of warning signs, a final survey plat will be prepared to document the as-built arrangement of the ICs and area subject to LUCs. The drawing will present a polygon of the ECODS L-1, N-2, P-2, and R-1A, -1B, -1C subject to LUCs, including the benchmarks, the location of warning signs, access control points and other information for LUCs. This post-construction survey plat will be certified by a professional land surveyor and will be submitted to USEPA and SCDHEC concurrently with the Corrective Measures Implementation Report (CMIR) / Remedial Action Completion Report (RACR).

In addition, if the site is ever transferred to non-federal ownership, a professional land surveyor-certified survey plat of the OU will be prepared at or near the time of conveyance to support the LUCIP required restrictive covenants on land use and will be recorded with the appropriate county recording agency.

4.4 Site Use Program

Under DOE Order 430.1A, *Life Cycle Management* (USDOE 1998), SRS is required to implement an asset management program for the use, maintenance, and disposal of physical assets, including real estate. SRS complies with this Order through its Site Use Program, which is conducted in accordance with WSRC 1D, *Site Infrastructure and Services Manual*, Procedure 3.02, "Site Real Property Configuration Control" (WSRC 2006b). All employees, contractors, and visitors at SRS are required to adhere to the Site Use Program. No use of land (i.e., excavation or any other land use) shall be undertaken without prior approval documented by a Site Use Permit. Also, in accordance with WSRC 1D, Procedure 3.02, all work at SRS that adds or modifies features or facilities portrayed on the SRS development maps (i.e., plot plans of facilities/utilities at SRS) will be authorized by a Site Clearance Permit before any activities are conducted. All Site Clearance Requests will be reviewed to verify that either an approved Site Use Permit has been obtained or that the request is sanctioned by an existing Site Use Permit. All land use requirements applicable for the OU will be provided to the Site Use Program for use in determining issuance of Site Clearance permits. In addition, the Site Use permit must be amended when the geographic configuration or buffer zone used to establish the permit boundary changes or there is a change to the permitted land use.

SRS is responsible for updating, maintaining, and reviewing site maps, including FFA (FFA 1993) OU identifications. If a Site Clearance Request potentially impacts an FFA OU, the Site Clearance Request Form is sent to the appropriate FFA OU reviewer for approval. The roles and responsibilities of each individual are detailed in WSRC 1D, Procedure 3.02. Before a Site Clearance Permit is issued, verification of USDOE approval for intended land use must be obtained. The site use and site clearance processes are applicable to all activities and personnel on site (including subcontractors). The USDOE will notify USEPA and SCDHEC in advance of any change to any internal procedure, including the Site Use Program, which would affect implementing or maintaining the LUCs. The processes are controlled within the SRS Quality Assurance (QA) Program in accordance with WSRC 1Q Manual, *Quality Assurance* (WSRC 2007b). The SRS QA program governs all SRS activities.

SRS identifies all buildings and facilities on maps used in the Site Use Program. This waste unit is identified on these maps as a CERCLA facility.

Any work proposed in these areas will be strictly controlled, and workers will be appropriately trained and briefed about health and safety requirements if work is deemed necessary for maintenance. No change in land use or excavation at the ECODS L-1, N-2, P-2, and R-1A, -1B, -1C OU shall be undertaken without USEPA and SCDHEC approval. Approval by USEPA and SCDHEC is required for any modification or termination of the ICs and implementation actions, and USDOE must obtain prior approval from USEPA and SCDHEC before taking any anticipated action that may disrupt the effectiveness of the LUCs or alter or negate the need for LUCs.

4.5 Physical Access Controls

There are no physical access controls required at ECODS L-1, N-2, P-2, and R-1A, -1B, -1C; however, physical access controls are provided at the SRS boundary as mentioned in Table 1, item 5.

4.6 Warning Signs

To prevent unknowing entry and to ensure that unrestricted use of the waste unit does not occur while the unit is under ownership of the government, access control warning signs will be posted at the unit as shown in Appendix C. Warning signs will be installed in accordance with the implementation schedule (i.e., Remedial Action Start date) located in the ECODS L-1, N-2, P-2, R-1A, -1B, -1C ROD (SRNS 2009). In addition, the final placement of the signage will be documented in the survey plat submitted with the CMIR/RACR. The signs will be legible for a distance of at least 25 feet.

Custodial responsibilities for maintenance and inspection of ECODS L-1, N-2, P-2, and R-1A, -1B, -1C will be maintained by the SRS Post-Closure Maintenance Group.

4.7 Other Access Controls and Security/Surveillance Measures

While under the ownership of USDOE, access control of the entire SRS will be maintained in accordance with the 2000 RCRA Part B Permit Renewal Application, Volume I, Section F.1. This section describes the 24-hour surveillance system (R.61-79.264.14(b)(1)), artificial or natural barriers (R.61-79.264.14(b)(2)(I)), control entry systems (R.61-79.264.14(b)(2)(ii)), and access control warning signs (R.61-79.264.14(c)) in place at the SRS boundary to comply with the security requirements for a RCRA-permitted facility.

4.8 Field Inspection and Maintenance for Institutional Controls

After remediation of ECODS L-1, N-2, P-2, and R-1A, -1B, -1C, only inspection and maintenance activities will be required by this RA. ECODS L-1, N-2, P-2, and R-1A, -1B, -1C will be inspected per the Field Inspection Checklist in Appendix D. Field inspections will be performed annually by USDOE. Additional inspections may be necessary in the event of unusual weather or any other condition warranting inspection. For ECODS L-1, N-2, P-2, and R-1A, -1B, -1C, inspections will be performed to ensure that access control signs are in place. Inspection records will be kept in the operations record file for future access. Maintenance (including inspections, general housekeeping, and repair of erosion damage) will be performed as needed at ECODS L-1, N-2, P-2, and R-1A, -1B, -1C. Necessary upkeep of the access control signs will be performed.

Any activity that is inconsistent with the IC objectives or use restrictions, or any other action that may interfere with the effectiveness of the ICs, will be addressed by the USDOE as soon as practicable, but in no case will the process be initiated later than 10 days after the USDOE becomes aware of the breach. The USDOE will notify USEPA and SCDHEC as soon as practicable but no longer than 10 days after discovery of any activity that is inconsistent with the IC objectives or use restrictions, or any other action that may interfere with the effectiveness of the ICs. The USDOE will notify USEPA and SCDHEC regarding how the USDOE has addressed or will address the breach within 10 days of sending USEPA and SCDHEC notification of the breach. The FFA Annual Progress Report, submitted to the regulatory

agencies by USDOE, will provide the status of the ICs and describe how any IC deficiencies or inconsistent uses have been addressed. In the event of property transfer or lease, the Annual Report will cite findings on the following: whether the use restrictions and controls referenced above were communicated in the deed(s) or lease restrictions; whether property use conforms with the deed or lease restrictions and controls; and whether the owners and state/local agencies have been notified regarding the deed or lease restrictions and controls. The FFA Annual Progress Report(s) will be used in the preparation of the Five-Year Remedy Review Report.

All other routine maintenance activities will be documented and maintained in files subject to USEPA and SCDHEC review and audit. A copy of the completed inspection form is maintained in the Area Completion Projects (ACP) Document Control Center. The LUCs shall be maintained until the hazardous substances associated with the unit have been reduced to levels that allow for unlimited exposure and unrestricted use.

The waste unit inspectors are to be trained in Hazardous Waste Operations and Emergency Response, RCRA Well Inspections (ACP-specific training), ACP RCRA Waste Unit Inspections, Radiological Worker Training, etc., as applicable for the specific inspection. They will also be trained based on the individual requirements of the regulatory approved closure documents for each waste unit. In addition, the inspectors are to attend yearly refresher courses. Over the years, different personnel may conduct the inspections and maintenance activities.

This unit-specific LUCIP, including the checklist (Appendix D), will be appended to the SRS LUCAP upon final regulatory approval. After completion of the CMIR/RACR, the preliminary checklist in the LUCAP will be replaced with the final approved checklist.

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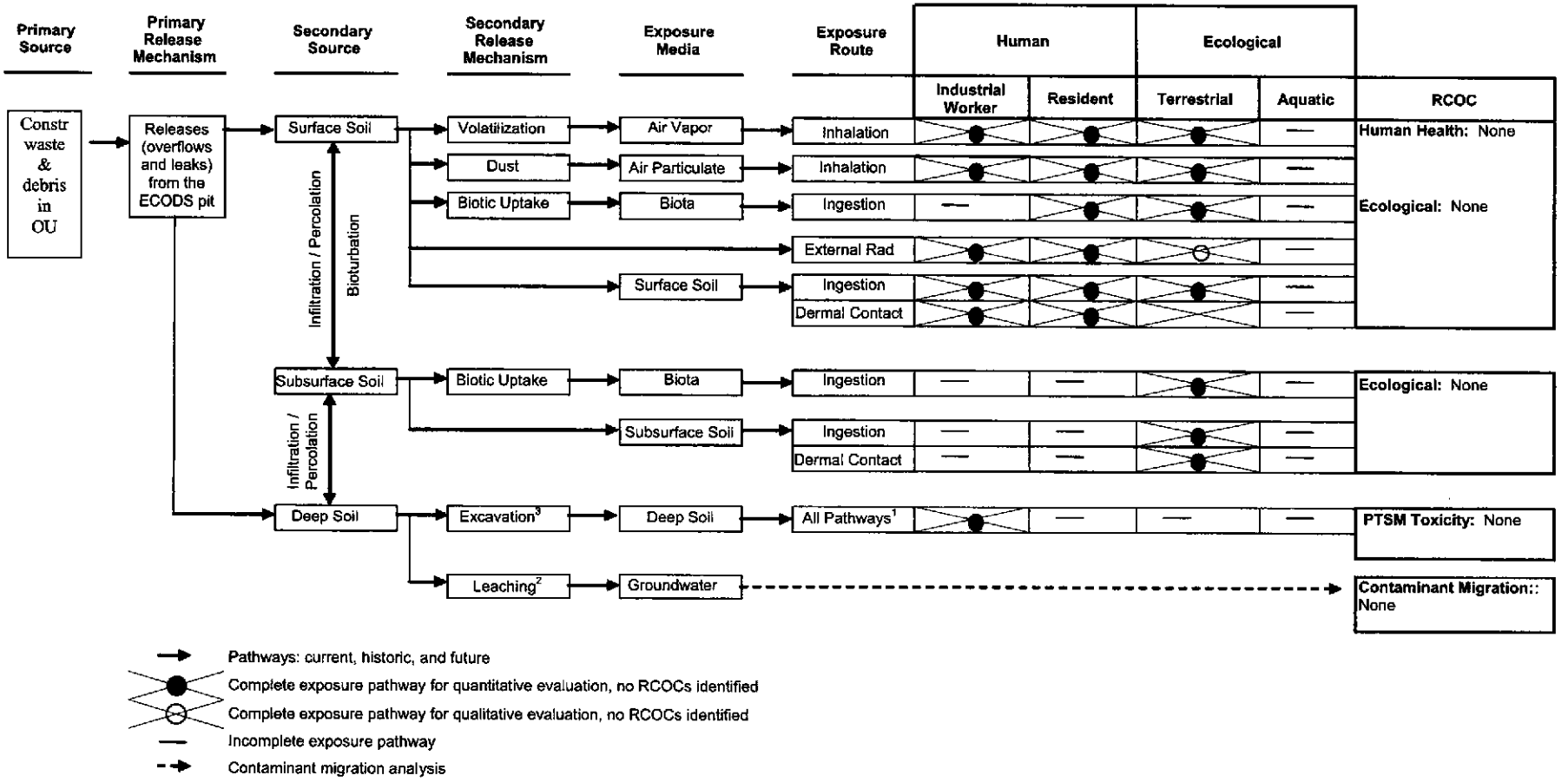
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* WSRC procedures have been accepted by SRNS, but have not yet received an SRNS or SRS procedure number.

Appendix A

Conceptual Site Model

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[1] All pathways represent ingestion, inhalation, dermal contact, and external radiation exposure for a PTSM evaluation for toxicity
[2] Leaching represents the potential of a contaminant in soil to migrate to groundwater above maximum contaminant levels per the contaminant migration analysis and does not represent a human or ecological exposure route
[3] There is potential for friable asbestos exposure to human receptors should buried debris be exposed or brought to the surface under an excavation scenario. This pathway was not quantitatively evaluated in the risk assessment.

Figure A-1. Conceptual Site Model for the ECODS L-1, N-2, P-2, and R-1A, -1B, -1C

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Appendix B

Survey Plats

Land Use Control Implementation Plan

(Plats to be provided at a later date in accordance with the Implementation Schedule in the ROD.)

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Appendix C

Access Control Warning Signs

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Figure C-1. Access Control Warning Sign

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Appendix D

Field Inspection Checklist

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Field Inspection Checklist

For ECODS L-1, N-2, P-2, AND R-1A, -1B, -1C

☐ **SCHEDULED** ☐ **UNSCHEDULED**

A= Satisfactory **X**= Unsatisfactory (Explanation required)	**A** or **X**	Observation of Corrective Action Taken
Verify that the roads are accessible.		
Verify that the waste unit signs (quantity to be inserted later) are in acceptable condition, have the correct information, and are legible from a distance of 25 feet.		
Verify that there are no excavation, digging, or construction activities.		
Verify that signs of burrowing or mounding animals are not present.		
Verify that signs of erosion or depression (subsidence) are not present.		

Inspected by:

_____ / _____ Date:_____
(Print Name) (Signature)

Post-Closure Manager:

_____ / _____ Date:_____
(Print Name) (Signature)

CAUTION: The inspector shall notify the Post-Closure Manager (PCM) and Environmental Compliance Authority (ECA) **IMMEDIATELY** if there has been a breach or compromise of the institutional controls of this waste unit. The notification shall be in accordance with SRS post-closure inspection procedures.

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LUCIP for the
P Area Operable Unit (consists of P-Area Ash Basin [Including Outfall P-007], 188-P; P-Area Process Sewer Lines as Abandoned, NBN and Spill on 03/15/79 of 5500 Gallons of Contaminated Water, NBN; P-Area Reactor Area Cask Car Railroad Tracks as Abandoned, NBN; Potential Release from P-Area Disassembly Basin, NBN; Potential Release from P-Area Reactor Cooling Water System, 186/190-P)
Land Use Control Implementation Plan for the
P Area Operable Unit
(SRNS-RP-2010-00619, Rev.1, October 2010)

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United States Department of Energy

Savannah River Site



Land Use Control Implementation Plan (LUCIP) for the P Area Operable Unit (PAOU) (U)

CERCLIS Number: 94

SRNS–RP–2010-00619

Revision 0

June 2010

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LIST OF ACRONYMS AND ABBREVIATIONS

ac	acre
ACP	Area Completion Projects
bgs	below ground surface
BRA	Baseline Risk Assessment
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
Ci	curie
CMS/FS	Corrective Measures Study/Feasibility Study
EARAIP	Early Action Remedial Action Implementation Plan
EAROD	Early Action Record of Decision
EE/CAs	Engineering Evaluation/Cost Analyses
ESD	Explanation of Significant Difference
FFA	Federal Facility Agreement
ft	feet
ha	hectare
HCA	high contamination area
ISD	in situ decommissioning
km	kilometer
km^2	square kilometer
LUC	land use control
LUCIP	Land Use Control Implementation Plan
LUCAP	Land Use Control Assurance Plan
mg/kg	milligram per kilogram
mi	mile
mi^2	square mile
NBN	no building number
NTC	non-time critical
OU	operable unit
PAOU	P Area Operable Unit
PCE	tetrachloroethylene
pCi/g	picocuries per gram
PCR	Post-Construction Report
PSA	potential source area
PSL	process sewer line
RA	remedial action
RCRA	Resource Conservation and Recovery Act
RFI/RI	RCRA Facility Investigation/Remedial Investigation
RG	remedial goal
ROD	Record of Decision
RSER	Removal Site Evaluation Report

LIST OF ACRONYMS AND ABBREVIATIONS *(Continued/End)*

SCDHEC	South Carolina Department of Health and Environmental Control
SRNS	Savannah River Nuclear Solutions, LLC
SRS	Savannah River Site
SVE	soil vapor extraction
TCE	trichloroethylene
USDOE	U.S. Department of Energy
USEPA	U.S. Environmental Protection Agency
WSRC	Washington Savannah River Company LLC (formerly Westinghouse Savannah River Company LLC)

1.0 INTRODUCTION

This Land Use Control Implementation Plan (LUCIP) has been prepared for the P Area Operable Unit (PAOU) at the Savannah River Site (SRS). The PAOU comprises several subunits within P Area and covers approximately 50 ha (126 ac). Groundwater is not considered part of the scope for the PAOU as detailed in the Early Action Record of Decision (EAROD) (SRNS 2008) and the Record of Decision (ROD) (SRNS 2009c). Any groundwater contamination resulting from the PAOU is being addressed as part of the P-Area Reactor Groundwater Operable Unit (OU). The purpose of this LUCIP is to describe how the land use controls (LUCs) selected in the ROD for the PAOU subunits will be implemented and maintained. The LUC objectives have been documented in the PAOU ROD and are listed in Section 3.0.

The selected remedy leaves hazardous substances in place that pose a potential future risk and will require land use restrictions until the concentrations of hazardous substances in the soil and groundwater are at levels that allow for unrestricted use. The hazardous substances left in place could pose a risk if the waste is disturbed. As agreed on March 30, 2000, among the U.S. Department of Energy (USDOE), the U.S. Environmental Protection Agency (USEPA), and South Carolina Department of Health and Environmental Control (SCDHEC), SRS has implemented a Land Use Control Assurance Plan (LUCAP) to ensure that the LUCs required by numerous remedial decisions at SRS are properly maintained and periodically verified. The requirements of that LUCAP also apply to the LUCs that were selected as part of the PAOU remedial action (RA). This document, the PAOU LUCIP, contains the detailed and specific measures required to implement and maintain the LUCs selected as part of this particular remedial decision. The LUCs shall be maintained until the OU is suitable for unlimited exposure and unrestricted use. Approval by USEPA and SCDHEC is required for any modification or termination of the LUCs.

USDOE is responsible for implementing, maintaining, monitoring, reporting, and enforcing the LUCs in accordance with the approved LUCIP. Upon final approval, the LUCIP will be appended to the LUCAP and should be considered incorporated by reference into the PAOU ROD (SRNS 2009c), establishing implementation and maintenance requirements for the LUCs

under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and the SRS Federal Facility Agreement (FFA) (FFA 1993). The LUCIP will remain in effect unless and until modifications are approved by USEPA and SCDHEC as necessary for protection of human health and the environment. This LUCIP will be evaluated for accuracy during the five-year remedy review and any approved LUCIP modification will be appropriately documented for incorporation by reference into the PAOU ROD.

1.1 Format of LUCIP

The format of this LUCIP is consistent with the FFA protocol format approved by the USEPA and SCDHEC in March 2004.

2.0 OVERVIEW OF PAOU REMEDIAL ACTION

2.1 General Description and History of the Unit

SRS occupies approximately 802.8 km^2 (310 mi^2) of land adjacent to the Savannah River, principally in Aiken and Barnwell counties of South Carolina. SRS is located approximately 6.4 km (25 mi) southeast of Augusta, Georgia, and 32.1 km (20 mi) south of Aiken, South Carolina.

The PAOU is located approximately 4 km (2.5 mi) east-southeast of the geographical center of SRS and about 6.4 km (4 mi) west of the nearest site boundary. PAOU is located in an upland area between the Steel Creek and Lower Three Runs watersheds. It has a flat to gently rolling topography with an approximate elevation of 96.0 km (315 ft) above mean sea level (Figure 1).

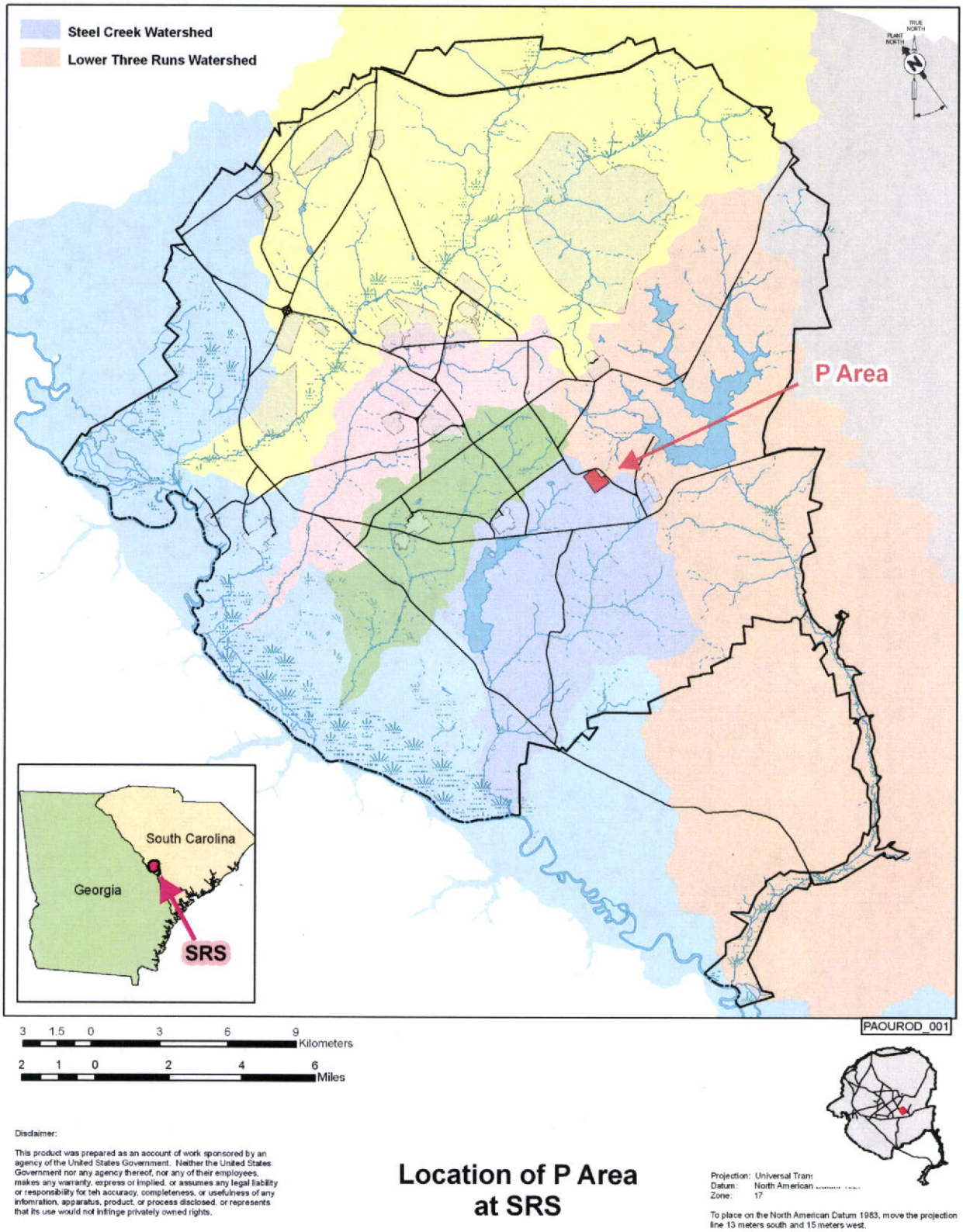


Figure 1. Location of the PAOU within the Savannah River Site

In February 1954, P-Reactor began operations. It was taken off-line for maintenance and safety upgrades in 1987, placed in warm standby in 1988, and placed in shutdown status in 1991. In 1993, P-Reactor was placed in cold shutdown with no capability of restart. The primary sources of radioactive contamination in P Area are activation products, fission products, and tritium, the majority of which were the consequence of P-Reactor operations.

P Area is the third OU at SRS to be addressed under an area-wide remedial strategy. As part of this strategy, Resource Conservation and Recovery Act (RCRA)/CERCLA/Site Evaluation units and deactivation and decommissioning facilities (or remnants) in the former P-Area industrial area were consolidated into a single OU (i.e., the PAOU). The characterization evaluation and analysis of the PAOU were documented in the *RCRA Facility Investigation/Remedial Investigation (RFI/RI) Work Plan, RFI/RI Report with Baseline Risk Assessment (BRA), and Corrective Measures Study/Feasibility Study (CMS/FS) for P Area Operable Unit* (WSRC 2008b).

The PAOU (Figure 2) comprises the following:

- P-Reactor Building (105-P) Complex and its Ancillary Structures including Engine House (108-1P), Engine House (108-2P) with Standby Pumphouse 191-P
- Disposition of Water in the P-Reactor Disassembly Basin (no building number [NBN]
- Potential Release from the P-Area Reactor Cooling Water System (186/190-P)
- Potential Release from the P-Area Disassembly Basin (105-P)
- Process Sewer Lines (PSLs) As Abandoned (NBN); including the Spill on 03/15/79 of 5,000 gallons of Contaminated Water; and various components of the PSLs, including Process Water Storage Tank (106-P), Process Water Storage Basin (109-P); Cooling Water Effluent Sump (107-P/107-1P); outfalls; manholes, miscellaneous weirs and boxes; sumps, etc.
- P-Area Reactor Area Cask Car Railroad Tracks as Abandoned (NBN)
- All Railroad Tracks within the P-Area Fence

- High Contamination Area (HCA) associated with the P-Area Cask Car Railroad Tracks
- P-Area Ash Basin (including Outfall P-007) (188-P)
- Slab Associated with Containment Tank within Emergency Cooling Water Retention Basin (904-86G)
- Slab Associated with Pipe Fabrication Shop Building (717-9P)
- Slab Associated with Radiological Zone Storage Building (710-P)
- Slab and Sumps Associated with No. 2&5 Basin Deionizers Pad (105-1P)
- Potential Source Area (PSA) 1 – Emergency Cooling Water Retention Basin (904-86G)
- PSA 2 – Area around the Cooling Water Effluent Sump (107-P/107-1P)
- PSA 3A – Area near the Northern end of the Reactor Building (105-P)
- PSA 3B – Area West of the Administrative/ Maintenance Slab
- PSA 4 – Area East of the Reactor Building (105-P)
- PSA 5 – Two Localized Areas in the Southwestern Part of P Area
- Outfall P02

Regulatory decisions were previously made on select PAOU subunits. These decisions included early RAs documented in the EAROD (SRNS 2008) and an Explanation of Significant Difference (ESD) to the EAROD (SRNS 2009e) and Non-Time Critical (NTC) RAs documented in the three Removal Site Evaluation Reports (RSER)/Engineering Evaluation/Cost Analyses (EE/CAs) (SRNS 2009a and b, USDOE 2009). The subunits not selected for an early RA or an NTC removal action were presented in the RCRA Facility Investigation (RFI)/Remedial Investigation (RI) with Baseline Risk Assessment (BRA) and Corrective Measures Study (CMS)/Feasibility Study (FS) report (WSRC 2008). Figure 3 and Table 1 present this information for each of the subunits.

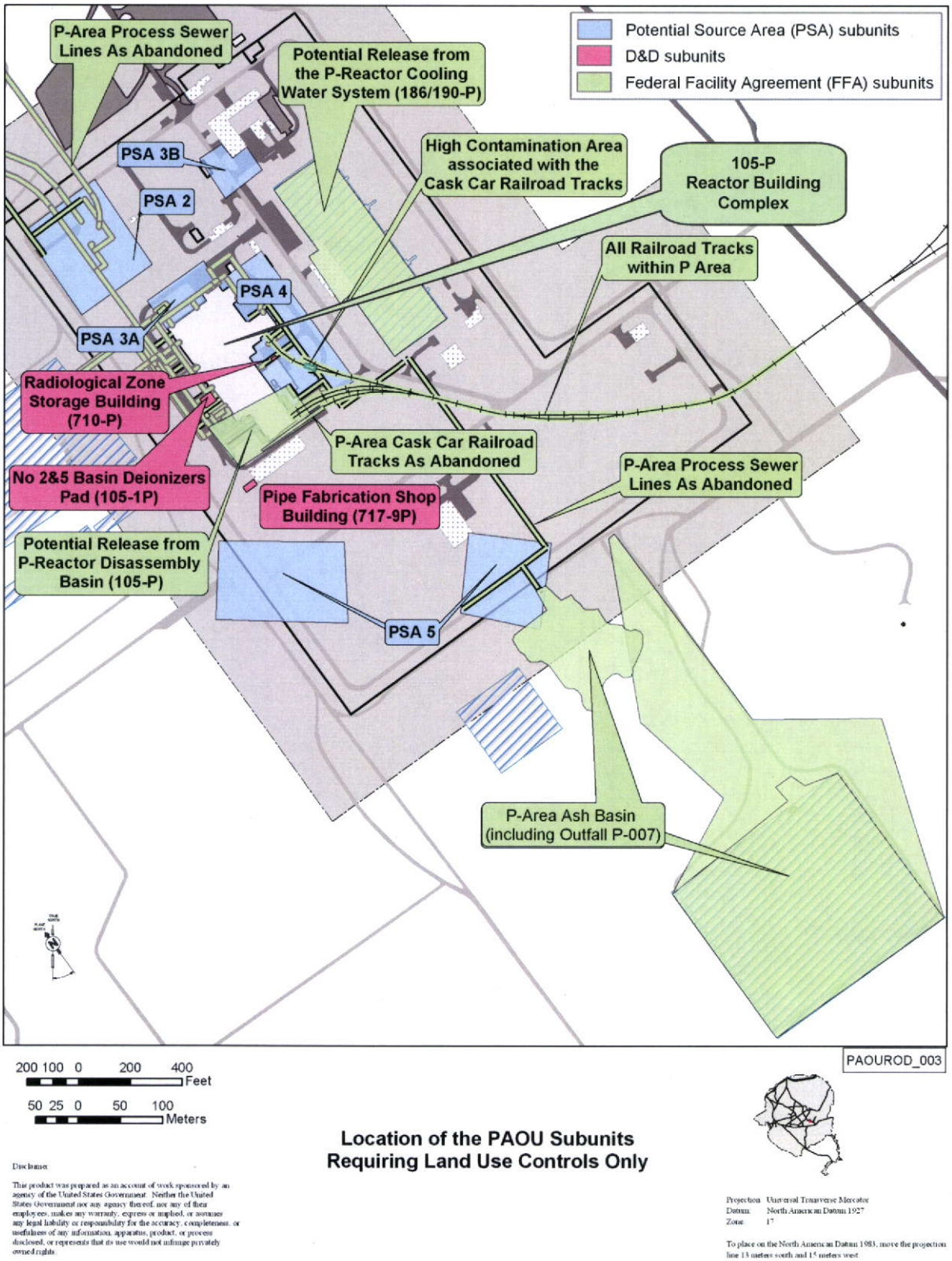


Figure 2. Layout of the P Area Operable Unit

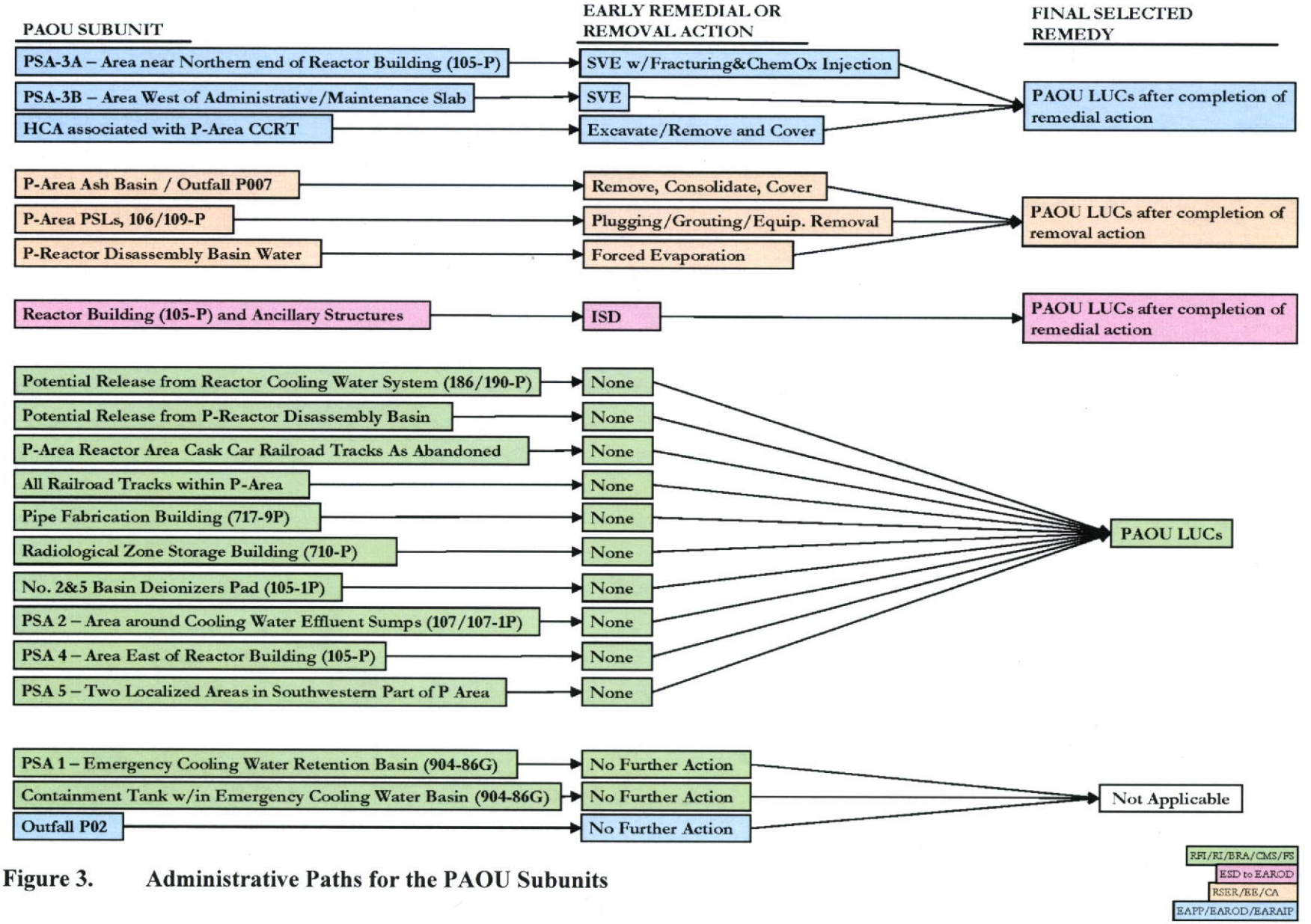


Figure 3. Administrative Paths for the PAOU Subunits

Table 1. List and Status of Subunits at the PAOU

		Subunit	Early Action or Removal Action	Reference Document	Final Selected Remedy
Federal Facility Agreement Subunits		Potential Release from Reactor Cooling Water System (186/190-P)	None	RFI/RI/BRA/CMS/FS	Manage with PAOU Land Use Controls (LUCs)
		Potential Release from P-Reactor Disassembly Basin (105-P)	None	RFI/RI/BRA/CMS/FS	Manage with PAOU LUCs
	P-Area Process Sewer Lines	Process Sewer Lines As Abaondoned (no building number [NBN]); including the spill on 03/15/79 of 500 gallons of contaminated water	Alternative P-2: Isolation Plugging of P-Reactor Building (105-P) PSLs and Drainage System; Grouting of Manholes, Diversion Boxes, and Process Tanks; Select Removal of Process Equipment External to the P-Reactor Building (105-P); Sealing/Plugging of Outfalls; LUCs	RSER/EE/CA - P-Area PSLs	Manage with PAOU LUCs
	P-Area Process Sewer Lines	Process Water Storage Tank (106-P)			
	P-Area Process Sewer Lines	Process Water Storage Basin (109-P)			
	P-Area Cask Car Railroad Tracks	P-Area Reactor Area Cask Car Railroad Tracks As Abandoned (NBN)	None	RFI/RI/BRA/CMS/FS	Manage with PAOU LUCs
	P-Area Cask Car Railroad Tracks	All railroad tracks within the P Area fence	None	RFI/RI/BRA/CMS/FS	Manage with PAOU LUCs
	P-Area Cask Car Railroad Tracks	High Contamination Area near the 105-P	Alternative AC-2: Alternative Excavation and Removal; Confirmatory Sampling	EAROD	Manage with PAOU LUCs
	P-Reactor Building (105-P) Complex	P-Reactor Building (105-P)	Alternative R-2A: In-Situ Decommissioning	ESD	Manage with PAOU LUCs
	P-Reactor Building (105-P) Complex	Engine House (108-1P)			
	P-Reactor Building (105-P) Complex	Enging House (108-2P) with Standby Pumphouse (191-P)			
		P-Area Ash Basin (Including Outfall P-007) (188-P)	Alternative P-3: Removal and Disposal of Cesium-137; Consolidation as Needed; Soil Cover; LUCs	RSER/EE/CA - P-Area Ash Basin (Including Outfall P-007)	Manage with PAOU LUCs
		Containment Tank within Emergency Cooling Water Retention Basin (904-86G)	None	RFI/RI/BRA/CMS/FS	No Futher Action
		Pipe Fabrication Shop Building (717-9P)	None	RFI/RI/BRA/CMS/FS	Manage with PAOU LUCs
		Radiological Zone Storage Building (710-P)	None	RFI/RI/BRA/CMS/FS	Manage with PAOU LUCs
		No. 2 & 5 Basin Deionizers Pad (105-1P)	None	RFI/RI/BRA/CMS/FS	Manage with PAOU LUCs
Potential Source Area Subunits		PSA-1 - Emergency Cooling Water Retention Basin (904-86G)	None	RFI/RI/BRA/CMS/FS	No Further Action
		PSA-2 - Area around the Cooling Water Effluent Sumps (107/107-1P)	None	RFI/RI/BRA/CMS/FS	Manage with PAOU LUCs
	PSA 3	PSA-3A - Area near the northern end of the Reactor Building (105-P)	Alternative AV-3: Soil Vapor Extraction [SVE] with Fracturing and Chemical Oxidation Injection)	EAROD	Manage with PAOU LUCs
	PSA 3	PSA-3B - West of the Administrative/Maintenance slab	Alternative AV-2: SVE		
		PSA-4 - Area east of the Reactor Building (105-P)	None	RFI/RI/BRA/CMS/FS	Manage with PAOU LUCs
		PSA-5 - Two localized areas in the southwestern part of P Area	None	RFI/RI/BRA/CMS/FS	Manage with PAOU LUCs
Other		P02 Outfall	No Further Action	EARAIP	No Further Action
		Disposition of Water in the P-Reactor Disassembly Basin	Alternative 3: Forced Evaporation	RSER/EE/CA & Action Memos - Disposition of Water in the P-Reactor Disassembly Basin	Manage with PAOU LUCs

- Early Action Record of Decision (EAROD) or Early Action Remedial Action Implementation Plan (EARAIP)
- Explanation of Significant Difference for the Revision 1.1 Early Action Record of Decision for the P-Area Operale Unit (ESD)
- RCRA Facility Investigation / Remedial Investigation with Baseline Risk Assessment and Corrective Measure Study / Feasibility Study (RFI/RI/BRA/CMS/FS)
- Removal Site Evalution Reports / Engineering Evaluation / Cost Assessments (RSER/EE/CA)

Based on the results of the RFI/RI/BRA/CMS/FS, two areas within the PAOU require No Further Action since it has been determined that they pose no impact to human health or the environment based on an unrestricted land use scenario. They include the Slab Associated with Containment Tank within the Emergency Cooling Water Retention Basin (904-86G) and the PSA 1 - Emergency Cooling Water Retention Basin (904-86G). In addition, Outfall P02 has also been determined to require No Further Action as documented in the Early Action Remedial Action Implementation Plan (EARAIP) (SRNS 2009d). These areas are located outside of the P-Area fence line. The remaining subunits, located within the P-Area fence line, require LUCs to prevent unrestricted land use (Figure 4) and are the focus of this LUCIP.

The P Area at SRS is located in an area of historically heavy industrial (nuclear) land use, as identified in the LUCAP (WSRC 1999). Remedial action objectives and likely response actions were developed consistent with future industrial non-residential land use. LUCs will restrict use because of the contamination that will be left behind at the PAOU. Appropriate LUCs against unrestricted and/or residential use will be part of all RAs for the PAOU. As detailed herein, the entire area outlined as the PAOU LUC boundary depicted on Figure 4 will be limited to industrial use, and further restrictions will be placed on certain portions of this area.



Figure 4. Land Use Control Boundary for the P Area Operable Unit

Nature and Extent of Contamination

The characterization evaluation and analysis of each of the subunits requiring LUCs in the PAOU are documented in the *RCRA Facility Investigation/Remedial Investigation (RFI/RI) Work Plan, RFI/RI Report with Baseline Risk Assessment (BRA), and Corrective Measures Study/Feasibility Study (CMS/FS) for P Area Operable Unit* (WSRC 2008b). The subunits that required early actions are discussed briefly below.

P-Reactor Building (105-P) Complex is located centrally within P Area. The building is sub-divided into three components, which include the reactor vessel, the disassembly basin, and the remainder of the reactor building, which includes the engine houses and system components. The reactor vessel contains approximately 211,000 Ci of radionuclide inventory, primarily activation products in the stainless steel and aluminum. The disassembly basin will contain approximately 9,600 Ci of radionuclide inventory after evaporation of the disassembly basin water is completed. The remainder of 105-P is estimated to contain 14,200 Ci of radionuclide inventory, including fission products such as cesium-137 and tritium. Hazardous material is also present in the subunit. Lead and polychlorinated biphenyls constitute the majority of the hazardous inventory.

P-Area Process Sewer Lines (PSLs) are located throughout the PAOU. The PSLs consist of 4.7 km (2.9 mi) of underground lines of various sizes and configuration throughout P Area. Radiological contamination (such as cesium-137 and cobalt-60) may be fixed within the pore spaces of the concrete or trapped in the rust and scale in these lines above principal threat source material thresholds. Any structures outside the Reactor Building Complex (105-P) that came in contact with the P-Area PSLs are also assumed to be contaminated with cobalt-60 and cesium-137. Review of piping drawings and extensive field walkdowns have resulted in the identification of associated underground structures, manholes, and other miscellaneous weirs and boxes that encompass the P-Area PSLs subunit.

The High Contamination Area associated with the Cask Car Railroad Tracks subunit is located southeast of the P-Reactor Building (105-P) Complex. Soils, railroad ties, and rail bed material in the HCA were contaminated with cesium-137 (+D) and cobalt-60 as a result of railroad cask car leakage. The HCA is less than 0.04 ha (0.1 acres) in area.

The P Ash Basin and the **P-007 Outfall** are located south of the P-Reactor Building (105-P) Complex. The P Ash Basin received coal ash from the P Area Powerhouse. Ash covers approximately 97,124 m^2/9.7 ha (116,160 yd^2/24 ac); this includes the basin, the ash placed around the basin perimeter, and the ash released from the basin to the south. The thickness of the ash exterior to the basin varies from less than 0.3 m (1 ft) to greater than 3 m (10 ft). The P-007 Outfall is included with the P Ash Basin because of the presence of ash around the outfall area. The P-007 Outfall received material from process line discharges that originated from the P-Area Disassembly Basin. These discharges are the source of the cesium-137 (+D) and cobalt-60 contamination found at the outfall. The total area contaminated within the P-007 Outfall area (including ash) is approximately 28,328 m^2/2.8 ha (33,880 yd^2/7 ac) in size.

PSA-3A is located north of the reactor building. It is approximately 0.40 ha (1 ac) in area. It is primarily contaminated with trichloroethylene (TCE). The highest concentrations of TCE exist at a depth of 13.7 m (45 ft) below ground surface (bgs), near the water table. This subunit is linked to TCE contamination in the groundwater, indicating that it is an active zone of groundwater contamination.

PSA-3B exists in an area to the west of the administrative/maintenance slab (704-P) and is primarily contaminated with tetrachloroethylene (PCE). It is approximately 0.028 ha (0.7 acres) in area. The highest concentrations of PCE are at a depth of 7.3 m (24 ft) bgs. This subunit is linked to PCE contamination in the groundwater, indicating that it is an active zone of groundwater contamination.

The *RCRA Facility Investigation/Remedial Investigation (RFI/RI) Work Plan, RFI/RI Report with Baseline Risk Assessment (BRA), and Corrective Measures Study/Feasibility Study (CMS/FS) for P Area Operable Unit* (WSRC 2008b) provides the characterization data and

interpretation of the nature and extent of contamination for the remaining 10 subunits that are included within the LUC boundary. These subunits were evaluated based on the use by a future industrial receptor. No problems warranting action were identified. However, LUCs are required to prevent unrestricted use.

The selected remedy for the PAOU leaves radioactive and hazardous substances that pose a potential future risk in place. Land use restrictions will be required until the concentrations of radioactive and hazardous substances in the soil are at levels that allow for unrestricted use and exposure.

2.2 Remedial Actions Selected

Early RA and removal action decisions were previously made on those PAOU subunits discussed in Section 2.2. These decisions included early RAs documented in the EAROD (SRNS 2008) and in an Explanation of Significant Difference (ESD) to the EAROD (SRNS 2009e) as well as NTC removal actions documented in the three Removal Site Evaluation Reports (RSER)/Engineering Evaluation/Cost Analyses (EE/CAs) (SRNS 2009a and 2009b, USDOE 2009). These actions will require long-term maintenance as part of this final action LUCIP to ensure that the remedy remains protective. The early actions are presented below.

- Soil vapor extraction (SVE) enhanced with soil fracturing and chemical oxidation at PSA-3A;
- SVE at PSA-3B;
- Excavation and disposal of contaminated media at the HCA at the Cask Car Railroad Tracks;
- Soil removal at the P-007 Outfall along with a soil cover over the P Ash Basin and the P-007 Outfall;
- Isolation/plugging of Reactor Building (105-P) Complex PSLs; grouting of associated underground structures, manholes, weirs and boxes; select removal of process equipment external to the Reactor Building (105-P) Complex; sealing/plugging of outfalls; and

- In situ Decommissioning (ISD) of the P-Reactor Building (105-P) Complex. ISD of the P-Reactor Building (105-P) Complex entails the following:
  - Leave the Process, the Purification, the Assembly Areas of the P-Reactor Building (105-P) Complex and the Actuator Tower in place.
  - Evaporate the P-Reactor Disassembly Basin water.
  - Demolish the above-grade structure of the Disassembly Area to grade-level.
  - Grout the contents of the disassembly basin to stabilize the contaminants.
  - Remove the stack above the plus 16.8-m (55-ft) elevations.
  - Construct a new partial roof over the shield door slots to prevent rainwater ingress.
  - Grout the Reactor Vessel in place with a constructed concrete cover, sloped to allow water runoff in the event of future rainwater ingress.
  - Leave the Process Room, an above-grade structure, in its current state.
  - Place a sloped concrete cover over the grouted disassembly basin.
  - Grout all vacant spaces from the 0-m (0-ft) level (grade) down to the minus 15.1-m (49.5-ft) level in place (to the extent practical).
  - Grout the Purification Area cells and the below-grade area of Purification in place.

Following successful completion of the early actions, residual hazardous substances will remain at the PAOU. The selected final remedy for the PAOU, as established in the PAOU ROD (SRNS 2009c), includes LUCs. These LUCs are also for the entire PAOU, including the subunits designated in Table 1 that were not included in the early RAs or removal actions decisions but are located within the P-Area fence line.

LUCs will include administrative controls (i.e., institutional controls) and engineering controls. LUCs will consist of property record notices and restrictions, Site Use/Site Clearance Program restrictions, and physical access controls. Sewer connections to all manholes and underground

tanks within the PAOU will be grouted, and warning signs will be posted at the LUC boundary as depicted in Figure 4. LUCs will also include site maintenance (site inspections, general housekeeping, repair of erosion damage and other routine maintenance as needed).

The post-RA conceptual site model (Figure 5) demonstrates that the exposure pathways to an industrial worker are incomplete following implementation of the RA. According to the *Savannah River Site Future Use Project Report* (USDOE 1996), residential use of SRS land is prohibited.

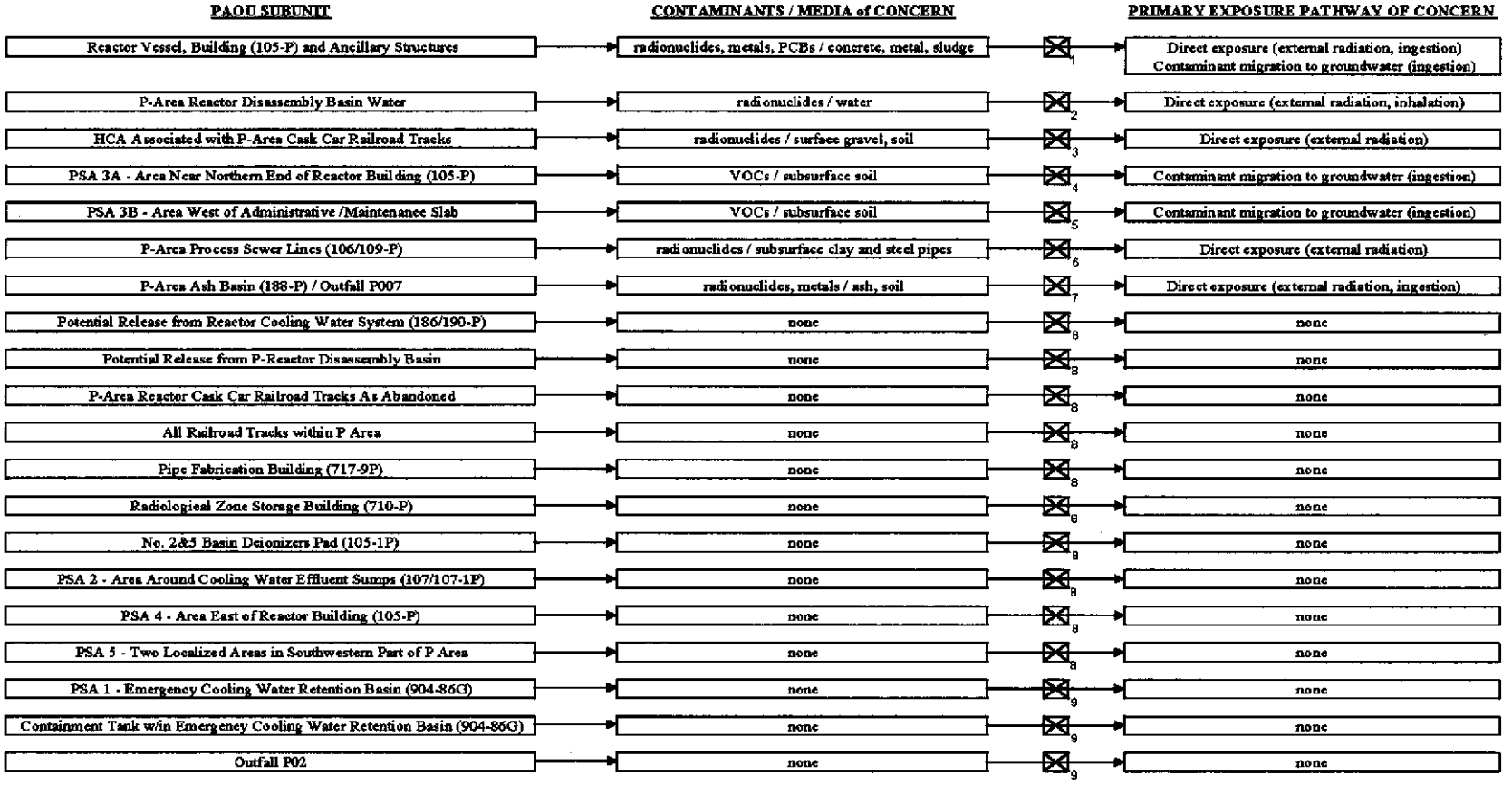


Figure 5. Conceptual Site Model for the P Area Operable Unit Final Action

3.0 LAND-USE CONTROL OBJECTIVES

The following PAOU LUC objectives have been developed to ensure the protectiveness of the remedy described above:

- Restrict worker access and prevent unauthorized contact, removal or excavation of contaminated media
- Prevent access to the 105-P Reactor Building Complex
- Prevent access through manholes and pipelines
- Prohibit the development and use of property for residential housing, elementary schools, childcare facilities and playgrounds
- Maintain the integrity of any current or future remedial or monitoring systems such as SVE systems or groundwater monitoring wells
- Prevent access to or use of the groundwater until cleanup levels are met
- Prevent construction of inhabitable buildings without an evaluation of indoor air quality to address vapor intrusion

Current access controls and deed notification needed to maintain the future land use are described in the following sections of this LUCIP.

4.0 IMPLEMENTATION OF LAND-USE CONTROLS

This section describes the LUCs selected in the ROD to achieve the objectives stated in Section 3.0. A summary of the types of controls is provided in Table 2. USDOE is responsible for implementing, maintaining, reporting on, and enforcing the PAOU LUCs. The LUCIP will become enforceable and will be implemented when approved by USEPA and SCDHEC following the completion of the RA prescribed by the PAOU ROD and ESD. USDOE shall notify USEPA and SCDHEC 60 days in advance of any proposed land use changes that are inconsistent with LUC objectives or the selected remedy.

Table 2. PAOU Land Use Controls

Type of Control	Purpose of Control	Duration	Implementation	Affected Areas[a]
1. Property Record Notices[b]	Provide notice to anyone searching records about the existence and location of contaminated areas.	Until the concentrations of hazardous substances associated with the unit have been reduced to levels that allow for unlimited exposure and unrestricted use	Notice recorded by USDOE in accordance with state laws at County Register of Deeds office if the property or any portion thereof is ever transferred to non-federal ownership.	PAOU where hazardous substances are left in place at levels requiring land use restrictions.
2. Property record restrictions[c]: a. Land Use b. Groundwater	Restrict use of property by imposing limitations. Prohibit the use of groundwater.	Until the concentrations of hazardous substances associated with the unit have been reduced to levels that allow for unlimited exposure and unrestricted use	Drafted and implemented by USDOE upon any transfer of affected areas. Recorded by USDOE in accordance with state law at County Register of Deeds office	PAOU where hazardous substances are left in place at levels requiring land use restrictions.
3. Other Notices[d]	Provide notice to city &/or county about the existence and location of waste disposal and residual contamination areas for zoning/planning purposes.	Until the concentrations of hazardous substances associated with the unit have been reduced to levels that allow for unlimited exposure and unrestricted use	Notice recorded by USDOE in accordance with state laws at County Register of Deeds office if the property or any portion thereof is ever transferred to non-federal ownership	PAOU where hazardous substances are left in place at levels requiring land use restrictions.
4. Site Use Program[e]	Provide notice to worker/developer (i.e., permit requestor) on extent of contamination and prohibit or limit excavation/penetration activity	As long as property remains under USDOE control	Implemented by USDOE and site contractors Initiated by permit request	Subunits at PAOU where remedy components cannot be disturbed and where levels requiring land use and groundwater restrictions.
5. Physical Access Controls[f] (e.g., fences, gates, portals)	Control and restrict access to workers and the public to prevent unauthorized access	Until the concentrations of hazardous substances associated with the unit have been reduced to levels that allow for unlimited exposure and unrestricted use	Controls maintained by USDOE	Security is provided at site boundaries in accordance with SRS procedures.

Table 2. PAOU Land Use Controls *(Continued/End)*

Type of Control	Purpose of Control	Duration	Implementation	Affected Areas
6. Warning Signs[g]	Provide notice or warning to prevent unauthorized uses	Until the concentrations of hazardous substances associated with the unit have been reduced to levels that allow for unlimited exposure and unrestricted use	Signage maintained by USDOE	Warning signs will be posted in accordance with applicable site procedures and will be placed in appropriate areas of the PAOU.
7. Security Surveillance Measures	Control and monitor access by workers/public	Until the concentrations of hazardous substances associated with the unit have been reduced to levels that allow for unlimited exposure and unrestricted use	Established and maintained by USDOE Necessity of patrols evaluated upon completion of remedial actions	Security and surveillance measures are in place at the SRS boundary in accordance with RCRA-permit requirements.

[a]Affected areas – Specific locations identified in the SRS LUCIP or subsequent post-ROD documents.
[b]Property Record Notices – Refers to any non-enforceable, purely informational document recorded along with the original property acquisition records of USDOE and its predecessor agencies that alerts anyone searching property records to important information about residual contamination or waste disposal areas in the property.
[c]Property Record Restrictions – Includes conditions and/or covenants that restrict or prohibit certain uses of real property and are recoded along with original property acquisition records of USDOE and its predecessor agencies.
[d]Other Notices – Includes information on the location of waste disposal areas and residual contamination depicted on as survey plat, which is provided to a zoning authority (i.e., city planning commission) for consideration in appropriate zoning decisions for non-USDOE property.
[e]Site Use Program – Refers to the internal USDOE/USDOE contractor administrative program(s) that requires the permit requestor to obtain authorization, usually in the form of a permit, before beginning any excavation/penetration activity (e.g., well drilling) for the purpose of ensuring that the proposed activity will not affect underground utilities/structures, or in the case of contaminated soil or groundwater, will not disturb the affected areas without the appropriate precautions and safeguards.
[f]Physical Access Controls – Physical barriers or restrictions to entry.
[g]Signs – Posted command, warning or direction.

The PAOU will be maintained as an industrial use area by implementation of the property record notices (Section 4.1) and restrictions (Section 4.2), and the use of a certified LUC survey plat (Section 4.3). Figure 4 illustrates approximate PAOU land use boundary requirements. As previously noted, groundwater LUCs are excluded herein and instead will be managed by the P Area Groundwater OU decision document and LUCIP.

The Site Use Program (Section 4.4) will be implemented to prevent onsite worker exposure to contamination left in place at the PAOU. Other existing measures (i.e., Site Clearance Program, worker training, health and safety requirements, work controls) will also be used to ensure worker safety at the PAOU. Physical access controls (Section 4.5) are implemented at the SRS boundary to control and restrict public and trespasser access to the PAOU, and to prevent unauthorized entry into the Reactor Building Complex.

Signs at the PAOU will be maintained to alert onsite workers to the presence of hazardous substances. The signs will also convey the restrictions of unauthorized personnel. Access control warning signs will be placed and maintained around the PAOU to prevent unknowing entry and unrestricted use.

4.1 Property Record Notices

In the long term, if the property is ever transferred to non-federal ownership, the United States 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 RAs taken on the site. The contract for sale and the deed will contain the notification required by CERCLA Section 120(h).

The deed notification shall notify any potential purchaser that the property has been used for the management and disposal of waste. These requirements are also consistent with the intent of RCRA deed notification requirements at final closure of a RCRA facility if contamination will remain at the unit.

4.2 Property Record Restrictions

The deed shall also include deed restrictions precluding residential use of the property and/or any other property record restrictions necessary to achieve the LUC objectives. The deed shall expressly prohibit activities inconsistent with the RGs and objectives in the PAOU ROD upon any and all transfers. USDOE shall provide a copy of the executed deeds to the regulatory agencies as soon as practicable after the transfer of fee title, but no later than 30 days. However, the need for these deed restrictions may be re-evaluated 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 re-evaluation of the need for the deed restrictions will be done through an amended ROD.

USDOE shall provide USEPA and SCDHEC six-months notice prior to transfer or sale to ensure that USEPA and SCDHEC can be involved in discussions to ensure that appropriate provisions are included in the transfer terms or conveyance documents to maintain effective LUCs. If it is not possible for the facility to notify USEPA and SCDHEC at least six months prior to any transfer or sale, then the facility will notify USEPA and SCDHEC as soon as possible but no later than 60 days prior to the transfer or sale of any property subject to LUCs. In addition to the land transfer notice and discussion provisions above, USDOE further agrees to provide USEPA and SCDHEC with similar notice within the same time frames as to federal transfer of property. USDOE shall provide a copy of the executed deed or transfer assembly to USEPA and SCDHEC.

4.3 Other Public Notices

The LUCIP identifies the proposed area under land use restrictions in Figure 4 for the PAOU and the final survey plat (when available) located in Appendix A. After construction completion, a final survey plat will be prepared to document the as-built arrangement and area subject to LUCs. The drawing will present a polygon of the PAOU subject to LUCs, including the benchmarks, the location of warning signs, access control points, and other information for LUCs. This post-construction survey plat will be certified by a professional land surveyor and

will be submitted to USEPA and SCDHEC concurrently with the Post-Construction Report (PCR). In addition, if the site is ever transferred to non-federal ownership, a professional land surveyor-certified survey plat of the OU will be prepared at or near the time of conveyance to support the LUCIP-required restrictive covenants on land use and will be recorded with the appropriate county recording agency.

4.4 Site Use Program

Under DOE Order 430.1A, *Life Cycle Management* (USDOE 1998), SRS is required to implement an asset management program for the use, maintenance, and disposal of physical assets, including real estate. SRS complies with this order through its Site Use Program, which is conducted in accordance with SRS Manual 1D, *Site Infrastructure and Services Manual*, Procedure 3.02, "Site Real Property Configuration Control" (SRS 2006). All employees, contractors, and visitors at SRS are required to adhere to the Site Use Program. No use of land (i.e., excavation or any other land use) shall be undertaken without prior approval documented by a Site Use Permit. Also, in accordance with SRS Manual 1D, Procedure 3.02, all work at SRS that adds to or modifies features or facilities portrayed on SRS development maps (i.e., plot plans of facilities/utilities at SRS) will be authorized by a Site Clearance Permit before any activities are conducted. All Site Clearance Requests will be reviewed to verify that either an approved Site Use Permit has been obtained or that the request is sanctioned by an existing Site Use Permit. All land use requirements applicable for the OU will be provided to the Site Use Program for use in determining issuance of Site Clearance Permits. In addition, the Site Use Permit must be amended when the geographic configuration or buffer zone used to establish the permit boundary changes or there is a change to the permitted land use.

SRS is responsible for updating, maintaining, and reviewing site maps, including FFA (FFA 1993) OU identifications. If a Site Clearance Request potentially impacts an FFA OU, the Site Clearance Request Form is sent to the appropriate FFA OU reviewer for approval. The roles and responsibilities of each individual are detailed in SRS Manual 1D, *Site Infrastructure and Services Manual*, Procedure 3.02, "Site Real Property Configuration Control." Before a Site Clearance Permit is issued, verification of USDOE approval for intended land use must be

obtained. The site use and site clearance processes are applicable to all activities and personnel on site (including subcontractors). USDOE will notify USEPA and SCDHEC in advance of any change to any internal procedure, including the Site Use Program, which would affect implementing or maintaining the LUCs. The processes are controlled within the SRS Quality Assurance Program in accordance with SRS 1Q Manual, *Quality Assurance* (SRS 2010). The SRS Quality Assurance Program governs all SRS activities.

SRS identifies all buildings and facilities on maps used in the Site Use Program. This waste unit is identified on these maps as a CERCLA facility. The PAOU LUC boundaries are shown in Figure 4.

Any work proposed in these areas will be strictly controlled, and workers will be trained and briefed about health and safety requirements if work is deemed necessary for maintenance. No change in land use at the PAOU shall be undertaken without USEPA and SCDHEC approval. Proposed excavation activities within the PAOU LUC boundary must be approved by the PAOU facility custodian. Approval by USEPA and SCDHEC is required for any modification or termination of the LUCs and implementation actions, and USDOE must obtain prior approval from USEPA and SCDHEC before taking any anticipated action that may disrupt the effectiveness of the LUCs or alter or negate the need for LUCs.

4.5 Physical Access Controls

Site-specific physical access controls are required at the PAOU. Specifically, manholes and the sewer connections to those manholes will be grouted per the RSER/EE/CA (SRNS 2009a). In addition, the entry doors will be sealed so access to the Reactor Building Complex will be prevented. SRS-wide physical access controls are provided at the SRS boundary as mentioned in Table 2, item 5.

4.6 Warning Signs

To prevent unknowing entry and to ensure that unrestricted use of the waste unit does not occur while the unit is under ownership of the government, access control warning signs will be posted

at the unit as shown in Appendix B. The signs shall be legible for a distance of at least 7.6 m (25 ft). Custodial responsibilities for maintenance and inspection of the PAOU will be maintained by the SRS Post-Closure Maintenance Group. Warning signs will be installed as part of the PAOU construction. The signs will be placed at a maximum distance of 100 m (328 ft) apart. Closer spacing will be used as needed (at roads that enter the area, corners, etc.). The final placement of the signage will be documented in the PCR.

4.7 Other Access Controls and Security/Surveillance Measures

While under the ownership of USDOE, access control at the SRS boundary will be in compliance with the current RCRA Part B Permit Renewal Application section describing the 24-hour surveillance system (R.61-79.264.14(b)(1)), artificial or natural barriers (R.61-79.264.14(b)(2)(I)), control entry systems (R.61-79.264.14(b)(2)(ii)), and access control warning signs (R.61-79.264.14(c)).

4.8 Field Inspection and Maintenance for Land Use Controls

After remediation of the PAOU, inspection, monitoring, and maintenance activities will be required as part of the RA. The PAOU will be inspected annually per the example Field Inspection Checklist (Appendix C) and will include:

- The roof structure of the 105-P Reactor Building Complex to ensure that it is functioning properly. Herbicides will be applied to the 105-P Reactor Building Complex roof structure as necessary to prevent the growth of woody vegetation on the roof structure.

- The doors into the 105-P Reactor Building Complex to ensure that they remain sealed.

- The disassembly basin cover to ensure that excessive deterioration has not occurred and that no woody vegetation is growing on the cover.

- The P Ash Basin cover to verify that significant erosion has not occurred (60.9 cm [2 ft] thickness maintained), to ensure that no woody vegetation is growing on the cover, and to ensure that no burrowing or mounding animals are present.

- The PAOU to ensure that are no unauthorized excavations, digging, or construction activities within the LUC boundaries have occurred.

- Posted signs.

Additional inspections may be necessary in the event of unusual weather or any other condition warranting inspection. Inspection records will be kept in the operations record file for future access.

Groundwater monitoring will be conducted to ensure that the ISD remedy is performing as expected and that no contaminant migration constituents of concern have impacted groundwater. Soil-gas monitoring and soil sampling will also be conducted to verify the effectiveness of the SVE actions at PSA-3A and PSA-3B. The details of these monitoring efforts are described in the PAOU Effectiveness Monitoring Plan (SRNS 2010).

Maintenance (including site inspections, general housekeeping, and repair of erosion damage) will be performed as needed at PAOU. Annual inspections will ensure that access control signs are in place. Maintenance activities will be documented and maintained in files subject to USEPA and SCDHEC review and audit. A copy of the completed inspection form is maintained in the SRS Document Control Center. The LUCs shall be maintained until the concentration of hazardous substances associated with the unit have been reduced to levels that allow for unlimited exposure and unrestricted use.

The waste unit inspectors are to be trained in Hazardous Waste Operations and Emergency Response, RCRA Well Inspections (ACP-specific training), RCRA Waste Unit Inspections, Radiological Worker Training, etc., as applicable for the specific inspection. They will also be trained based on the individual requirements of the regulatory approved closure documents for each waste unit.

Any activity that is inconsistent with the LUC objectives or use restrictions, or any other action that may interfere with the effectiveness of the LUCs will be addressed by the USDOE as soon as practicable, but in no case will the process be initiated later than 10 days after the USDOE becomes aware of the breach. The USDOE will notify USEPA and SCDHEC as soon as practicable but no later than 10 days after discovery of any activity that is inconsistent with the LUC objectives or use restrictions, or any other action that may interfere with the effectiveness of the LUCs. The USDOE will notify USEPA and SCDHEC regarding how the USDOE has addressed or will address the breach within 10 days of sending USEPA and SCDHEC notification of the breach. The FFA Annual Progress Report, submitted to the regulatory agencies by USDOE, will provide the status of the LUCs and describe how any LUC deficiencies or inconsistent uses have been addressed. In the event of property transfer or lease, the Annual Report will cite findings on the following: whether the use restrictions and controls referenced above were communicated in the deed(s) or lease restrictions; whether property use conforms with the deed or lease restrictions and controls; and whether the owners and state/local agencies have been notified regarding the deed or lease restrictions and controls. The FFA Annual Progress Report(s) will be used in the preparation of the Five-Year Remedy Review Report.

This unit-specific LUCIP, including the checklist (Appendix C), will be appended to the SRS LUCAP upon final regulatory approval. After completion of the PCR, the preliminary checklist in the LUCAP will be replaced with the final approved checklist.

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APPENDIX A – AS-BUILT DRAWINGS

(Drawings to be provided with the submission of the PAOU PCR.)

APPENDIX B –

TYPCIAL ACCESS CONTROL WARNING SIGN

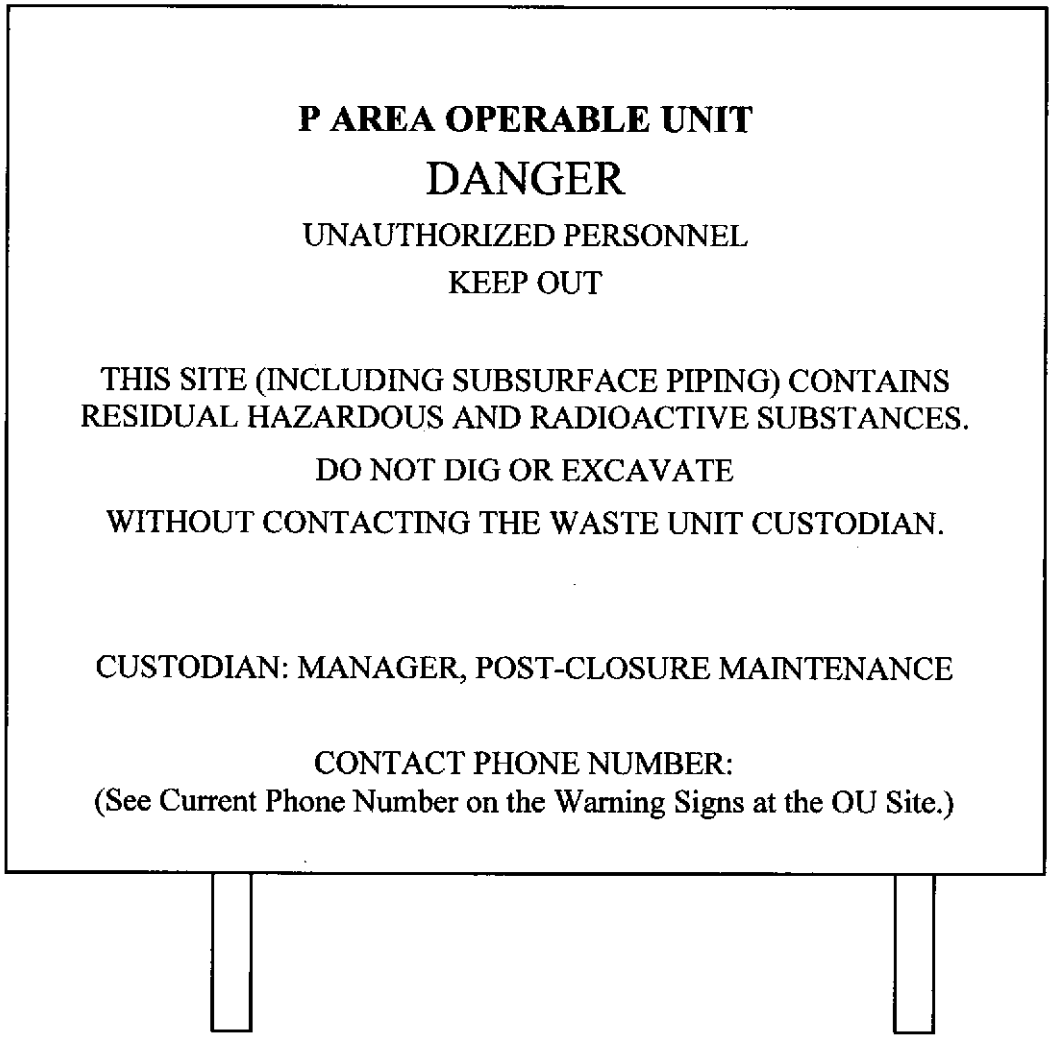


Figure B-1. Typical Access Control Warning Sign

APPENDIX C –

PAOU FIELD INSPECTION CHECKLIST

FIELD INSPECTION CHECKLIST

☐ SCHEDULED ☐ UNSCHEDULED

A= Satisfactory X= Unsatisfactory (Explanation required)	A or X	Observation of Corrective Action Taken
1. Verify that roads are accessible.		
2. Verify that the waste unit signs are in acceptable condition, have the correct information, and are legible from a distance of 25 feet (ft).		
3. Verify that roof structure of 105-P Reactor Building Complex is free of woody vegetation.		
4. Verify that doors to 105-P Reactor Building Complex are sealed.		
5. Verify that excessive deterioration of the disassembly basin cover has not occurred and that the disassembly basin cover is free of woody vegetation.		
6. Verify that no woody vegetation is growing on the P Ash Basin soil cover. Remove or identify as needed.		
7. Verify that the P Ash Basin soil cover has no signs of unacceptable erosion (subsidence).		
8. Verify that signs of burrowing or mounding animals are not present at the P Ash Basin soil cover.		
9. Verify that there are no unauthorized excavations, digging, or construction activities within the LUC boundaries at PAOU.		

Inspected by:		
(Print Name)	(Signature)	(Date)

Post-Closure Manager:		
(Print Name)	(Signature)	(Date)

CAUTION: The inspector shall notify the Post-Closure Manager and Environmental Compliance Authority **IMMEDIATELY** if there has been a breach or compromise of the land use controls of this waste unit. The notification shall be in accordance with SRS post-closure inspection procedures.

LUCIP for the
D Area Operable Unit Early Action (consists of Combined Spills from 483-D and Associated Areas (NBN), D-Area Asbestos Pit, 080-20G, D-Area Coal Pile Runoff Basin, 489-D, D-Area Process Sewer Lines as Abandoned, NBN, D-Area Waste Oil Facility, 484-10D, D-006 Petroleum Release Site, NBN)
Land Use Control Implementation Plan for the D Area Operable Unit
(SRNS-RP-2011-01166, Revision 0 (corrected), July 2011)

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United States Department of Energy

Savannah River Site

Early Action Land Use Control Implementation Plan (EALUCIP) for the D-Area Operable Unit (DAOU) (U)

CERCLIS Number: 63

SRNS-RP-2011-01166

Revision 0 (corrected)

July 2011

Prepared by:
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Prepared for U.S. Department of Energy under Contract No. DE-AC09-08SR22470

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

ERRATA SHEET

Early Action Land Use Control Implementation Plan (EALUCIP) for the D-Area Operable Unit (DAOU) (U), SRNS-RP-2011-01166, Revision 0, July 2011

Replacement of the following pages is necessary to correct two figures in the regulatory approved Revision 0 document.

Change Pages	Reason for Change
Cover Page: Replace cover page with new cover page reflecting "Revision 0 (corrected)"	The revised cover page indicates that a correction was made.
Table of Contents, Page iii of vi: Replace Table of Contents page with new page that reflects "Rev.0 (corrected)" in the header.	Corrected Table of Contents page reflects the revised figure names for Figure 2 and Figure 3, correct page number for Table 1, and corrected titles for Appendix A and Appendix B.
Page 23: Replace "Figure 2. Site Areas and Subunits In and Around the DAOU" with "Figure 2. Site Areas and Subunits In and Around the DAOU (corrected)."	The revised figure correctly depicts the land use control boundary to include the D Area Inactive Process Sewer Lines (DIPSL) subunit.
Page 25: Replace "Figure 3. Early Action LUC Boundary Map" with "Figure 3. Early Action LUC Boundary Map (corrected)."	The revised figure correctly depicts the land use control boundary to include the D Area Inactive Process Sewer Lines (DIPSL) subunit.

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LIST OF ABBREVIATIONS AND ACRONYMS

ac	acre
ARAR	applicable or relevant and appropriate requirement
ARRA	American Recovery and Reinvestment Act
BRA	Baseline Risk Assessment
CA	Cost Analysis
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CERCLIS	Comprehensive Environmental Response, Compensation, and Liability Information System
cm	centimeter
CM	contaminant migration
CMI	Corrective Measures Implementation
CMI/RAIP	Corrective Measures Implementation Remedial Action Implementation Plan
CPRB	Coal Pile Runoff Basin
CSM	conceptual site model
DAOU	D-Area Operable Unit
DHWF	D-Area Heavy Water Facility
DIPSL	D-Area Inactive Process Sewer Line
EA	Early Action
EALUCIP	Early Action Land Use Controls Implementation Plan
EAROD	Early Action Record of Decision
EE	Engineering Evaluation
ERA	ecological risk assessment
FFA	Federal Facility Agreement
FS	Feasibility Study
ft	feet
EE/CA	Engineering Evaluation/Cost Analysis
GMZA	Groundwater Mixing Zone Application
ha	hectare
HAZWOPER	Hazardous Waste Operations and Emergency Response
HHRA	human health risk assessment
in	inch
IOU	Integrated Operable Unit
km	kilometer
LLC	Limited Liability Company
LUC	Land Use Controls
LUCAP	Land Use Controls Assurance Plan
LUCIP	Land Use Controls Implementation Plan

LIST OF ABBREVIATIONS AND ACRONYMS *(Continued/End)*

m	meter
mi	mile
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
OU	operable unit
PAH	polycyclic aromatic hydrocarbon
PCE	tetrachloroethylene
PCR	Post-Construction Report
PTSM	principal threat source material
QA	Quality Assurance
RAIP	Remedial Action Implementation Plan
RAO	remedial action objective
RCRA	Resource Conservation and Recovery Act
RFI	RCRA Facility Investigation
RFI/RI	RCRA Facility Investigation/Remedial Investigation
RG	remedial goal
RI	Remedial Investigation
ROD	Record of Decision
RSER	Removal Site Evaluation Report
SB/PP	Statement of Basis/Proposed Plan
SCDHEC	South Carolina Department of Health and Environmental Control
SCHWMR	South Carolina Hazardous Waste Management Regulations
SDC	Site Development Control
SE	Site Evaluation
SRFS	Savannah River/Floodplain/Swamp
SRNS	Savannah River Nuclear Solutions, LLC
SRS	Savannah River Site
SVE	Soil Vapor Extraction
USDOE	United States Department of Energy
USEPA	United States Environmental Protection Agency
UST	underground storage tank
VOC	volatile organic compound
WOF	Waste Oil Facility
WP	Work Plan
WSRC	Washington Savannah River Company, LLC (October 2005 to present)
WSRC	Westinghouse Savannah River Company, LLC (before October 2005)

1.0 INTRODUCTION

This Early Action Land Use Control Implementation Plan (EALUCIP) has been prepared for D-Area Operable Unit (DAOU) at the Savannah River Site (SRS). The DAOU is comprised of multiple subunits and includes both deactivation and decommissioning (D&D) facilities and active facilities associated with the operation of the 484-D Powerhouse. The DAOU is approximately 85 hectare (ha) (210 acres [ac]). Groundwater is not considered part of the scope of the DAOU. An Early Action Record of Decision (EAROD) documented the selection of an early action remedy to implement land use controls (LUCs) for completed DAOU subunits (SRNS 2011). The purpose of this EALUCIP is to describe how the LUCs selected in the DAOU EAROD will be implemented and maintained. The early action LUC objectives have been documented in the DAOU EAROD and are listed in Section 3.0.

The selected remedy leaves hazardous substances in place that pose a potential future risk and will require land use restrictions until the concentrations of hazardous substances in the soil are at levels that allow for unrestricted use. As agreed on March 30, 2000, among the United States Department of Energy (USDOE), the United States Environmental Protection Agency (USEPA), and the South Carolina Department of Health and Environmental Control (SCDHEC), SRS is implementing a Land Use Control Assurance Plan (LUCAP) (WSRC, 2009) to ensure that the LUCs required by numerous remedial decisions at SRS are properly maintained and periodically verified. The requirements of that LUCAP also apply to the LUCs that were selected as part of the early action remedy for the DAOU. This additional document, the DAOU EALUCIP, contains the detailed and specific measures required to implement and maintain the LUCs selected as part of this particular remedial decision. The LUCs shall be maintained until the OU is suitable for unlimited exposure and unrestricted use. Approval by USEPA and SCDHEC is required for any modification or termination of the LUCs.

USDOE is responsible for implementing, maintaining, monitoring, reporting, and enforcing the LUCs in accordance with the approved EALUCIP. Upon final approval, the EALUCIP will be appended to the LUCAP and should be considered incorporated by reference into the DAOU EAROD, establishing implementation and maintenance requirements for the LUCs under the

Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and the SRS Federal Facility Agreement (FFA) (FFA 1993). The EALUCIP will remain in effect unless and until modifications are approved by USEPA and SCDHEC as necessary for protection of human health (HH) and the environment. In accordance with Section 121(c) of CERCLA and National Oil and Hazardous Substances Pollution Contingency Plan (NCP) §300.430(f)(5)(iii)(c), a statutory review will be conducted within five years of initiation of the remedial action, and every five years thereafter, to ensure that the remedy continues to be protective of HH and the environment. Any approved EALUCIP modification will be appropriately documented for incorporation by reference into the DAOU EAROD.

The format of this EALUCIP is consistent with the FFA protocol format approved by the USEPA and SCDHEC in March 2004.

2.0 OVERVIEW OF EARLY REMEDIAL ACTION

2.1 General Description and History of the DAOU

SRS occupies approximately 802.9 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 40.2 km (25 mi) southeast of Augusta, Georgia, and 32.1 km (20 mi) south of Aiken, South Carolina.

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

The DAOU is located in the southwest quadrant of the SRS, approximately 914 m (3,000 ft) east of the nearest site boundary, the Savannah River (see Figure 1). The DAOU is approximately 85 ha (210 ac) and is composed of multiple subunits and includes both D&D facilities and active facilities associated with the operation of the 484-D Powerhouse as identified in Figure 2.

Regulatory decisions (i.e., early removal actions) were previously made for the Bubble Tower Subunit, the Moderator Processing Subunit, the Powerhouse Subunit, and Miscellaneous Units and documented in their Action Memorandums. Cleanup goals established for the DAOU subunits (including goals identified for the early removal actions) are based on industrial land use. Therefore, hazardous substances will remain at the DAOU at levels that pose a threat to human health and prevent unrestricted land use. The response action selected in the EAROD for a portion of DAOU is necessary to protect the public health or welfare or the environment from actual or threatened releases of hazardous substances into the environment.

During a teleconference held on September 15, 2010, SCDHEC identified a problem with proceeding with a final ROD for the DAOU given that the 484-D Powerhouse would still be operational after approval of the ROD. Therefore, the Core Team agreed to instead pursue an EAROD. Pursuing an EAROD would allow the project to remain on track and achieve the targeted footprint reduction. The scope of the EAROD would cover LUCs of completed subunits and areas. The final ROD would cover LUCs for all remaining subunits and areas. Specifically, the remedial decision for the 484-D Powerhouse building and ancillary subunits are not included in the early action LUCs for DAOU. Final LUCs required for the 484-D Powerhouse building and associated facilities will be addressed by the appropriate remedial decision after operational closure of the Powerhouse building is complete. Table 1 provides a summary of administrative paths for subunits and areas in and around DAOU, as established in the EAROD (SRNS 2011).

2.2 Nature and Extent of Contamination

A complete site history for each DAOU subunit is documented in the RCRA Facility Investigation/Remedial Investigation (RFI/RI) Work Plan (WP) and Baseline Risk Assessment (BRA) for the DAOU (SRNS 2009a). A summary of the nature and extent of contamination for the DAOU subunits selected for early remedial action as identified in Table 1 is presented below.

Bubble Tower Subunit

The Bubble Tower Subunit is approximately 38 ha (95 ac) and consists of the D-Heavy Water Facility (DHWF), Firefighting Training Facility, and the 717-D Maintenance Facility. The RFI/RI/BRA determined that the DHWF and Firefighting Training Facility pose no threat to future industrial workers or ecological receptors, no contaminant migration (CM) threat, and no constituents identified as PTSM. However, tetrachloroethylene (PCE) was identified as a CM refined constituents of concern (RCOCs) in the vicinity of the 717-D Maintenance Facility. The contaminated area is approximately 11,000 ft^2 and a volume of 4,033 yd^3 of contaminated soil.

The volatile organic compound (VOC) contaminated soil is being addressed as an early removal action (USDOE 2009a) with the installation of eleven MicroBlower™-equipped soil vapor extraction (SVE) systems. The MicroBlower™ system is anticipated to operate for less than a decade to achieve the remedial goals. Additional details of this selected alternative can be found in the Removal Site Evalution Report/Engineering Evaluation/Cost Analysis (RSER/EE/CA) for the VOC-contaminated soil at the Bubble Tower Subunit (SRNS 2009c). The PCE contamination is being addressed with SVE as an early removal action. Once the removal action achieves remedial goals, no further action is warranted beyond LUCs to prevent land disturbance activities and unrestricted use. Petroleum product contamination was also detected at the 717-D Maintenance Facility and will be addressed under the Underground Storage Tank (UST) Program under Permit Number 18936.

Moderator Processing Subunit

The Moderator Processing Subunit is composed of the 420-D Concentrator Building, 420-2D Rework Handling Facility, 421-D Finishing Building, 421-2D Moderator Handling and Storage Building, 421-4D Drum Storage Facility, and the 772-D Control Laboratory and Supervisor's Office. The Moderator Processing Subunit is approximately 6 ha (15 ac). No problems that warrant a remedial action were identified for 421-D, 421-4D and 772-D.

Tritium was identified as a CM RCOC for concrete 15.2 cm (6 in) thick and soil 0 to 3 m (0 to 10 ft) bls at the 420-D, 420-2D, and 421-2D locations. The total impacted media volume is approximately 2,294 m^3 (3,000 yd^3) of tritium contaminated soil and concrete.

The tritium contaminated media is being addressed as an early removal action with the selected remedy being on unit thermal treatment with LUCs (USDOE 2009b). This remedy involves excavating contaminated media and application of heat to the stockpiled material to induce volatilization of tritium using thermal treatment. The four thermal detritiation units completed operation in July 2011. The review of the confirmation results indicated RGs have been achieved. Further details regarding this removal action can be found in the RSER/EE/CA for the Tritium-Contaminated Soil and Concrete at the Moderator Processing Subunit at the DAOU (SRNS 2009d). Once the removal action achieves RGs, no further action is warranted beyond LUCs to prevent unrestricted use.

489-D Coal Pile Runoff Basin (CPRB) - Northern 25%

The CPRB received runoff from the Powerhouse coal pile. The CPRB has been segmented into a northern 25% section and a southern 75% section (see Figure 2) so that the southern area can continue with Powerhouse operations while the northern section begins closure under the early action. The nature and extent of contamination identified arsenic as a human health RCOC in the 489-D CPRB sediment. Ecological RCOCs for the 489-D CPRB include arsenic and 2-methylnaphthalene in sediment and aluminum, beryllium, cobalt, copper, iron, manganese, zinc, and pH in surface water.

The human health and ecological problems warranting action are being addressed as an early removal action. The selected remedy is surface water management at the 489-D CPRB, consolidation of the contaminated sediment from the D-006 Outfall and 484-10D Waste Oil Facility (WOF) into the northern 25% of the 489-D CPRB, and application of a soil cover (USDOE 2009b, USDOE 2010, USDOE 2011a, USDOE 2011b). Under the early action, the northern 25% of the CPRB will be isolated from the southern 75% with the installation of a new berm, and a new swale will be installed directing runoff to the southern section of the CPRB.

The northern 25% of the CPRB will then be dewatered by pumping runoff into the southern section. After placement of a soil cover over the northern section of the CPRB, it will then be considered finalized and closed under the EAROD. The DAOU final ROD will document closure of the southern section, which will continue to operate until the shut down of the Powerhouse. Further details concerning this Early Action can be found in the RSER/EE/CA for the 489-D CPRB, D-006 Outfall and 484-10D WOF at the DAOU (SRNS 2009e). Once the removal action achieves remedial goals, no further action is warranted other than LUCs to prevent land disturbance activities and unrestricted use.

Miscellaneous Units (904-50G Outfall and D Area Asbestos Pit)

There are two miscellaneous units identified in the DAOU and include the 904-50G Outfall and D-Area Asbestos Pit. At the 904-50G Outfall, three soil samples and a surface water sample were obtained. There were no RCOCs for surface water or surface soil associated with the 904-50G Outfall. Based on CM screening, no contaminants pose a CM risk. There are no contaminants that constitute principal threat source material (PTSM) in soil. As documented in the RFI/RI/BRA, no constituents exceeded the preliminary constituents of potential concern screen based on a residential scenario. Therefore, there is no threat to human health or ecological receptors and LUCs are not needed at the 904-50G Outfall.

At the D-Area Asbestos Pit (080-20G), there is a threat of release of and unacceptable exposure to asbestos if the cover is breached and asbestos containing material is brought to the surface. Therefore, USDOE is taking a response action as allowed in the USEPA "Framework for Investigating Asbestos-Contaminated Superfund Sites, OSWER Directive #9200.0-68" (USEPA 2008). USDOE is proceeding directly to a response because, if LUCs are not in place to prevent land disturbances, an exposure is possible.

D-Area Inactive Process Sewer Lines (DIPSL)

The DIPSLs traverse approximately 4,328 m (14,200 ft) of the DAOU and are located in all three subunits. They are composed of vitrified clay pipe and reinforced-concrete pipe ranging in diameter from 15.2 cm (6 in) to 61 cm (24 in). No CM or PTSM RCOCs were identified for the

sediment in the DIPSLs based on the evaluation of contaminant migration and PTSM. Because the potential releases from the DIPSLs are at a depth greater than 12 m (4 ft), there are no human health or ecological concerns. The manholes associated with the DIPSLs have been plugged and grouted as an engineering control to restrict access to impacted areas (i.e., residual contaminants in the DIPSLs) and for general safety. Because of the location of the DIPSLs within the DAOU industrial setting, LUCs will be in place to prevent residential (i.e., unrestricted) land use.

Electrical Transformers

Electrical transformer substations are located throughout D Area. In 1996, SRS determined that all of the SRS transformers and large capacitors that were regulated due to PCB content had been replaced or rendered non-PCB. There are no records indicating a spill or release from the transformers while they were operated with PCB oil. During pre-work plan characterization, visual inspections of the remaining concrete pads were performed with no evidence of spills on the pads. There are no problems warranting action for the electrical transformers and LUCs are not required.

Miscellaneous Buildings

In addition to the probable source facilities within each subunit, D Area contains miscellaneous buildings (SRNS 2009a) that were used for administrative purposes, general storage, etc. The miscellaneous buildings have been classified through the Facility Decommissioning Evaluation process as Simple Model Decommissioning and have been deactivated and decommissioned with concurrence from USEPA and SCDHEC. There are no problems warranting action for the miscellaneous buildings and LUCs are not required.

2.3 Early Remedial Actions Selected

The current land use for the DAOU is industrial with USDOE maintaining control of the land as long as necessary to keep the selected remedy fully protective of human health and the environment. As documented in the EAROD for the DAOU, the selected early remedial action is LUCs. Successful completion of the removal actions at the Bubble Tower Subunit, Moderator

Processing Subunit, and CPRB (25% northern section) will result in hazardous substances remaining at the DAOU above levels that allow for unrestricted land use. In addition, there is a threat of release of and unacceptable exposure to asbestos at the D-Area Asbestos Pit (080-20G) if the cover is breached and asbestos containing material is brought to the surface. Early action LUCs are needed for the Bubble Tower Subunit, Moderator Processing Subunit, northern 25% portion of the CPRB, Asbestos Pit, and DIPSLs to prevent unrestricted land use and land disturbances.

Table 2 shows the types of LUCs, purposes of control, duration, and affected areas. The early action LUCs for the DAOU will consist of the following:

- Controlled physical access into D Area. A single primary road leads into D Area with access to the area controlled (i.e., fence, guard house) and monitored by SRS security personnel. Only authorized personnel may enter.

- Signage and monuments will be located at the boundaries shown in Figure 3 to alert on-site workers to the presence of hazardous substances and to prevent unknowing entry and unrestricted use. The date and location for installation of the signs and monuments are documented in Section 4.5.

- Administrative controls as managed through the SRS Site Use/Site Clearance Program to require authorization before beginning any excavation activity. This authorization is usually in the form of an internal SRS permit.

- Maintenance of the existing soil cover for the D-Area Asbestos Pit to ensure that there is no erosion damage and to prevent unauthorized excavation or construction activities.

- Maintenance of newly installed soil cover at the northern section of the 489-D CPRB to ensure that there is no erosion damage and to prevent unauthorized excavation or construction activities.

- Plugging and grouting of the manholes associated with the DIPSLs as an engineering control to restrict access to impacted areas and for general safety.

The post-remedial action conceptual site model (CSM) (Figure 4) demonstrates that the exposure pathways to an industrial worker are incomplete following implementation of the remedial action. According to the *Savannah River Site Future Use Project Report* (USDOE 1996), residential use of SRS land is prohibited.

3.0 DAOU LAND USE CONTROL OBJECTIVES

The following DAOU LUC objectives have been developed to ensure the protectiveness of the selected EA remedy:

- Prevent contact, removal, or excavation of subsurface soil and buried asbestos-containing waste;
- Prohibit the development and use of property for residential housing, elementary and secondary schools, child care facilities and playgrounds;
- Maintain the integrity of any current or future remedial or monitoring systems, such as soil vapor extraction systems, soil covers; and
- Prevent construction of inhabitable buildings without an evaluation of indoor air quality to address vapor intrusion.

Current access controls and land transfer requirements needed to maintain the future land use are described in the following sections of this LUCIP.

4.0 IMPLEMENTATION OF LAND USE CONTROLS

This section describes the remedial actions prescribed by the EAROD to achieve the LUC objectives stated in Section 3.0. A summary of the types of LUCs controls is provided in Table 2. USDOE is responsible for implementing, maintaining, reporting on and enforcing the LUCs. The LUCIP will become enforceable and will be implemented when approved by USEPA and SCDHEC following the completion of the remedial actions prescribed by the EAROD. USDOE

shall notify USEPA and SCDHEC 60 days in advance of any proposed land use changes that are inconsistent with LUC objectives or the selected remedy.

The affected area will be maintained as an industrial use area by implementation of the property record notices and restrictions (Section 4.1) and the LUC boundary map (Section 4.2). The Site Use Program (Section 4.3) will be implemented to prevent onsite worker exposure to contamination left in place. Other existing measures (i.e. Site Clearance Program, worker training, health and safety requirements, work controls) will also be used to ensure worker safety. Physical access controls (Section 4.4) are implemented at the SRS boundary to control and restrict public and trespasser access.

Signs will be maintained to alert onsite workers to the presence of hazardous substances. The signs will also convey the restrictions of unauthorized personnel. Access control warning signs will be placed as shown in Figure 3 and maintained to prevent unknowing entry and unrestricted use

4.1 Property Record Notices and Restrictions

In the long term, if the property, or any portion thereof, is ever transferred from USDOE, the U.S. Government and/or USDOE will take those actions necessary pursuant to Section 120(h)(1) of CERCLA. Those actions will include in any contract, deed, or other transfer document, notice of the type and quantity of any hazardous substances that were known to have been stored (for more than one year), released, or disposed of on the property. The notice will also include the time at which the storage, release, or disposal took place to the extent such information is available.

In addition, if the property, or any portion thereof, is ever transferred by deed, the U.S. Government will also satisfy the requirements of CERCLA 120(h)(3). The requirements include: a description of the remedial action taken, a covenant, and an access class. These requirements are also consistent with the intent of the RCRA deed notification requirements at final closure of a RCRA facility if contamination will remain at the unit.

LUCs will be implemented through the following:

- The contract, deed, or other transfer document shall also include restrictions precluding residential use of the property. However, the need for these 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 LUCs will be done through an amended ROD with USEPA and SCDHEC review and approval.

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

In the event of a property lease or interagency agreement, the equivalent restrictions will be implemented as required by CERCLA Section 120(h).

USDOE shall provide the USEPA and SCDHEC at least six months notice prior to transfer or sale of property subject to LUCs to ensure that USEPA and SCDHEC can be involved in discussions to ensure that appropriate provisions are included in the transfer documents to maintain effective LUCs. If it is not possible for the USDOE to notify the USEPA and SCDHEC at least six months prior to the transfer or sale, then the facility will notify the USEPA and SCDHEC as soon as possible but no later than 60 days prior to the transfer or sale of any property subject to LUCs. In addition to the land transfer notice and discussion provisions above, USDOE further agrees to provide the USEPA and SCDHEC with similar notice within the same time frames as to federal-to-federal transfer of property.

4.2 LUC Boundary Maps

This EALUCIP identifies the proposed areas under land use restrictions in Figure 3. Following field implementation of the remedial action, a final (as-built) survey plat is developed and certified by a professional land surveyor registered in the State of SC. The final plat will include the boundary coordinates for the area subject to land use restrictions and general locations of

access control warning signs. The final as-built survey plat will be submitted to USEPA and SCDHEC in the final action DAOU Post-Construction Report (PCR).

In addition, if the site is ever transferred to non-federal ownership, a certified survey plat of the OU will be prepared at or near the time of conveyance to support the EALUCIP required restrictive covenants on land use and will be recorded with the appropriate county recording agency.

4.3 Site Use Program

Under DOE Order 430.1A, *Life Cycle Management* (USDOE 1998), SRS is required to implement an asset management program for the use, maintenance, and disposal of physical assets, including real estate. SRS complies with this DOE Order through the Site Use Program which is administered by Site Development Control (SDC) in accordance with SRS Manual 1D, *Site Infrastructure and Services Manual*, Procedure 3.02, "Site Real Property Configuration Control" (SRS 2006). Use of all lands and waters on the SRS are coordinated via the Site Use Program. No use of land (i.e., excavation or any other land use) shall be undertaken without prior approval by the USDOE and documented by a Site Use Permit.

SRS identifies all buildings, facilities, and FFA waste units on SRS site development maps that are maintained by SDC in accordance with SRS Manual 1D. If LUCs are required for an FFA waste unit, the unit-specific LUC boundaries are identified on the SRS site development maps. SDC must verify that any proposed work to be performed on a site is sanctioned by a Site Use Permit and verify that the proposed activity does not conflict with any previously approved land use.

In addition to the management of the use of SRS lands and waters through the Site Use Program, the SDC also administers the Site Clearance Program to control the construction, alteration, or demolition activities at SRS. Before any work that adds or modifies features or facilities portrayed on the SRS site development maps is conducted, a Site Clearance Permit is required. USDOE approval of the intended land via a Site Use Permit must be verified before a Site

Clearance Permit is issued. If a Site Clearance request potentially impacts a FFA waste unit, the Site Clearance Request Form is sent to the appropriate FFA reviewer for approval. The FFA reviewer will evaluate the proposed activity to identify any conflicts with the waste unit and to verify that waste unit specific LUCs are not compromised. The roles and responsibilities of the individuals responsible for review and approval of Site Use and Site Clearance permits are detailed in SRS 1D, Procedure 3.02. All employees, contractors, and visitors at SRS are required to adhere to the Site Use Program and the Site Clearance Program.

The USDOE will notify USEPA and SCDHEC in advance of any change to any internal procedure, including the Site Use Program, which would affect implementing or maintaining the LUCs. Approval by USEPA and SCDHEC is required for any modification or termination of the LUCs and implementation actions, and the USDOE must obtain prior approval from USEPA and SCDHEC before taking any anticipated action that may disrupt the effectiveness of the LUCs or alter or negate the need for LUCs. The Site Use Permit and site development maps must be amended when the geographic configuration or buffer zone used to establish the permit boundary changes or there is a change to the land use. The processes are controlled within the SRS Quality Assurance (QA) Program in accordance with SRS 1Q Manual, *Quality Assurance* (SRS 2007). The SRS QA program governs all SRS activities.

4.4 Physical Access Controls

- Controlled physical access into D Area. A single primary road leads into D Area with access to the area controlled (i.e., fence, guard house) and monitored by SRS security personnel. Only authorized personnel may enter.

- Plugging and grouting of the manholes associated with the DIPSLs as an engineering control to restrict access to impacted areas and for general safety.

- Physical access controls are also provided at the SRS boundary as mentioned in Table 2, Item 5.

4.5 Warning Signs

To prevent unknowing entry and to ensure that unrestricted use of the waste unit does not occur while the unit is under ownership of the USDOE, monuments and access control warning signs, as worded in Appendix A, will be posted at the unit. Installation of the access control warning signs will follow the construction schedule as described in the EAROD and will be completed by mid 2012. Signs will be located as depicted in Figure 3. The final placement of the signage will be documented in the final EA post-construction report (PCR). The signs will be legible for a distance of at least 25 ft. Custodial responsibilities for maintenance and inspection will be performed by the SRS Post-Closure Maintenance Group.

4.6 Other Access Controls and Security/Surveillance Measures

While under the ownership of USDOE, access control of the entire SRS will be maintained in accordance with the 2000 RCRA Part B Permit Renewal Application, Volume I, Section F.1. This section describes the 24-hour surveillance system (R.61-79.264.14(b)(1)), artificial or natural barriers (R.61-79.264.14(b)(2)(I)), control entry systems (R.61-79.264.14(b)(2)(ii)), and access control warning signs (R.61-79.264.14(c)) in place at the SRS boundary to comply with the security requirements for a RCRA-permitted facility.

4.7 Field Inspection and Maintenance for Land Use Controls

After remediation, only inspection and maintenance activities will be required by this remedial action. Inspections will be performed annually per the Field Inspection Checklist in Appendix B. Additional inspections may be necessary in the event of unusual weather or any other condition warranting inspection.

Any activity that is inconsistent with the LUC objectives or use restrictions, or any other action that may interfere with the effectiveness of the LUCs will be addressed by the USDOE as soon as practicable, but in no case will the process be initiated later than 10 days after the USDOE becomes aware of the breach. The USDOE will notify USEPA and SCDHEC as soon a

practicable but no longer than 10 days after discovery of any activity that is inconsistent with the LUC objectives or use restrictions, or any other action that may interfere with the effectiveness of the LUCs. The USDOE will notify USEPA and SCDHEC regarding how the USDOE has addressed or will address the breach within 10 days of sending USEPA and SCDHEC notification of the breach.

The FFA Annual Progress Report, submitted to the regulatory agencies by USDOE, will provide the status of the LUCs and describe how any LUC deficiencies or inconsistent uses have been addressed. In the event of property transfer or lease, the Annual Report will cite findings on the following: whether the use restrictions and controls referenced above were communicated in the deed(s) or lease restrictions; whether property use conforms with the deed or lease restrictions and controls; and whether the owners and state/local agencies have been notified regarding the deed or lease restrictions and controls. The FFA Annual Progress Report(s) will be used in the preparation of the Five-Year Remedy Review Report.

All other routine maintenance activities will be documented and maintained in files subject to USEPA and SCDHEC review and audit. A copy of the completed inspection form is maintained in SRS records. The LUCs shall be maintained until the concentration of hazardous substances associated with the unit have been reduced to levels that allow for unlimited exposure and unrestricted use.

The waste unit inspectors are to be trained in Hazardous Waste Operations and Emergency Response (HAZWOPER), RCRA Well Inspections, RCRA Waste Unit Inspections, Radiological Worker Training, etc., as applicable for the specific inspection. They will also be trained based on the individual requirements of the regulatory approved closure documents for each waste unit. In addition, the inspectors are to attend yearly refresher courses. Over the years, different personnel may conduct the inspections and maintenance activities.

This unit-specific LUCIP, including the checklist (Appendix B), will be appended to the SRS LUCAP upon final regulatory approval. After completion of the final PCR, the preliminary checklist in the LUCAP will be replaced with the final approved checklist.

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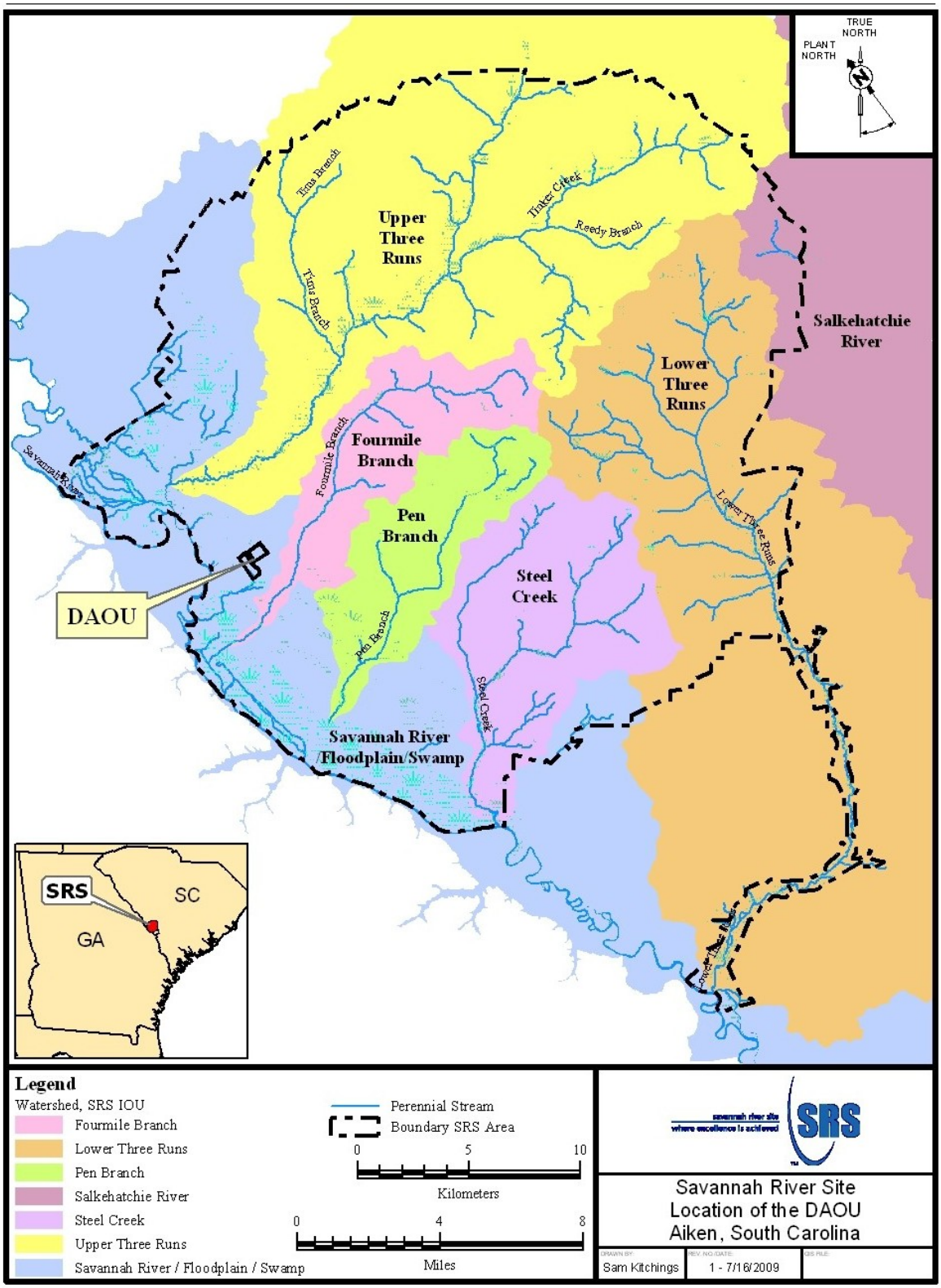


Figure 1. Location of the DAOU within the Savannah River Site

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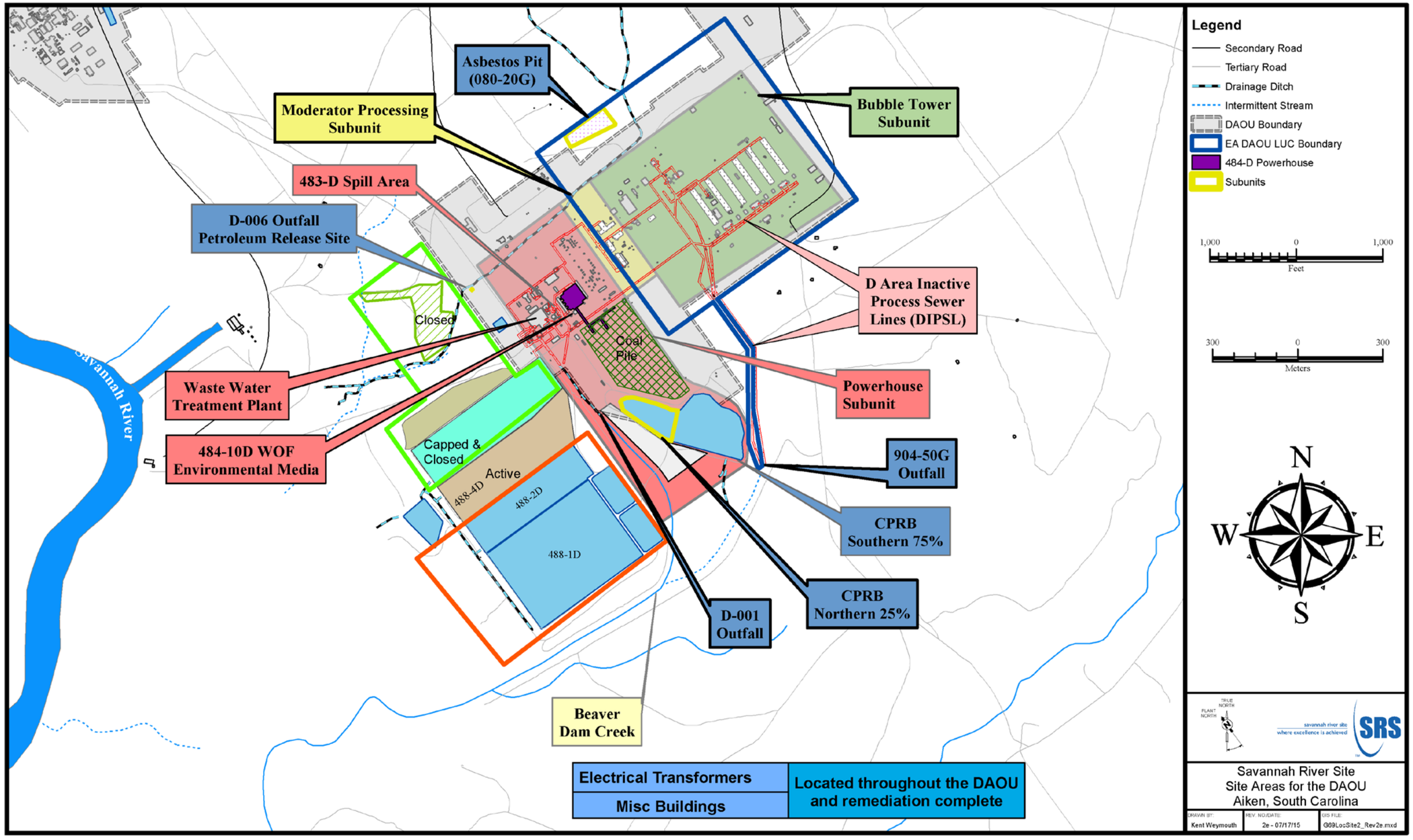


Figure 2. Site Areas and Subunits in and Around the DAOU (corrected)

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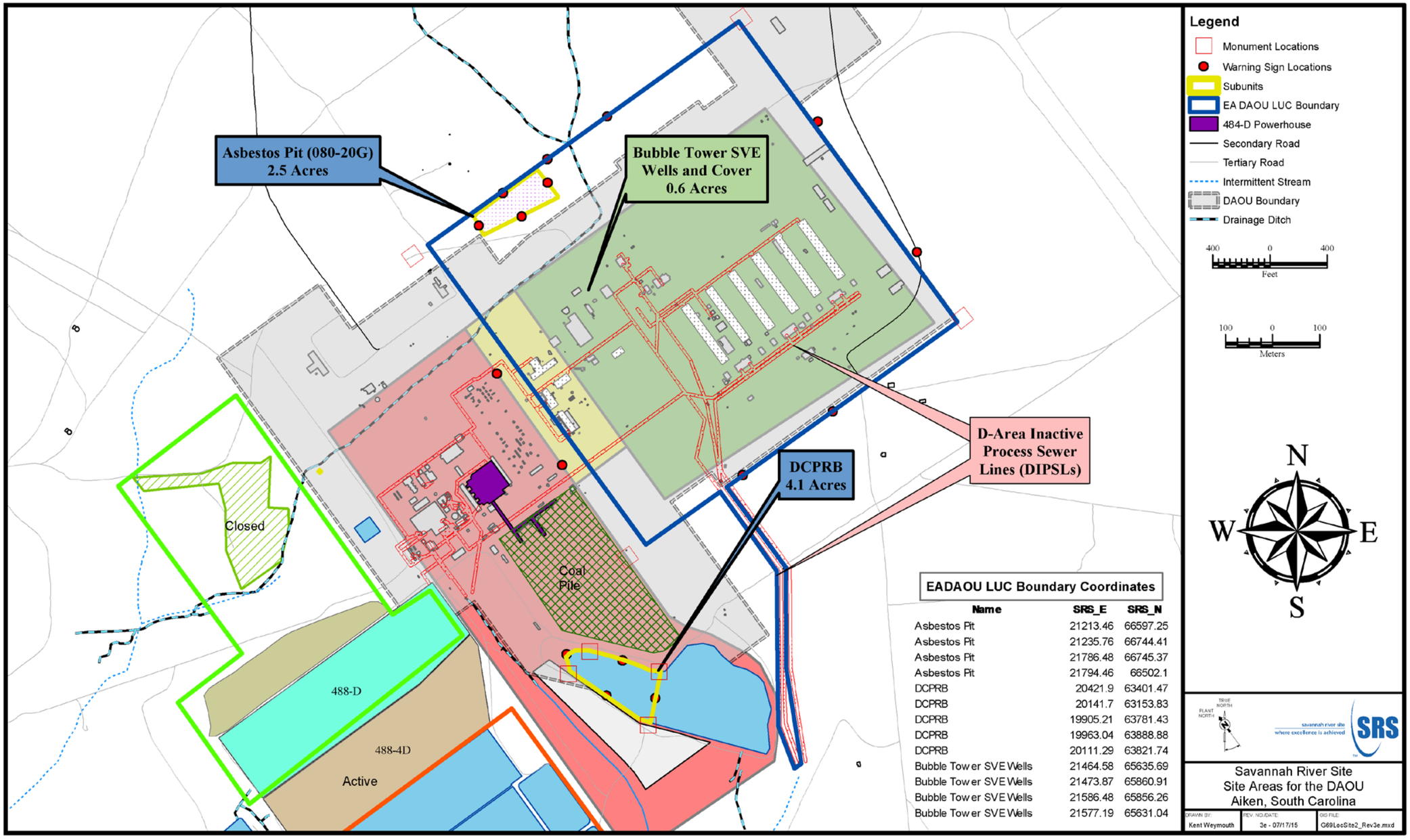
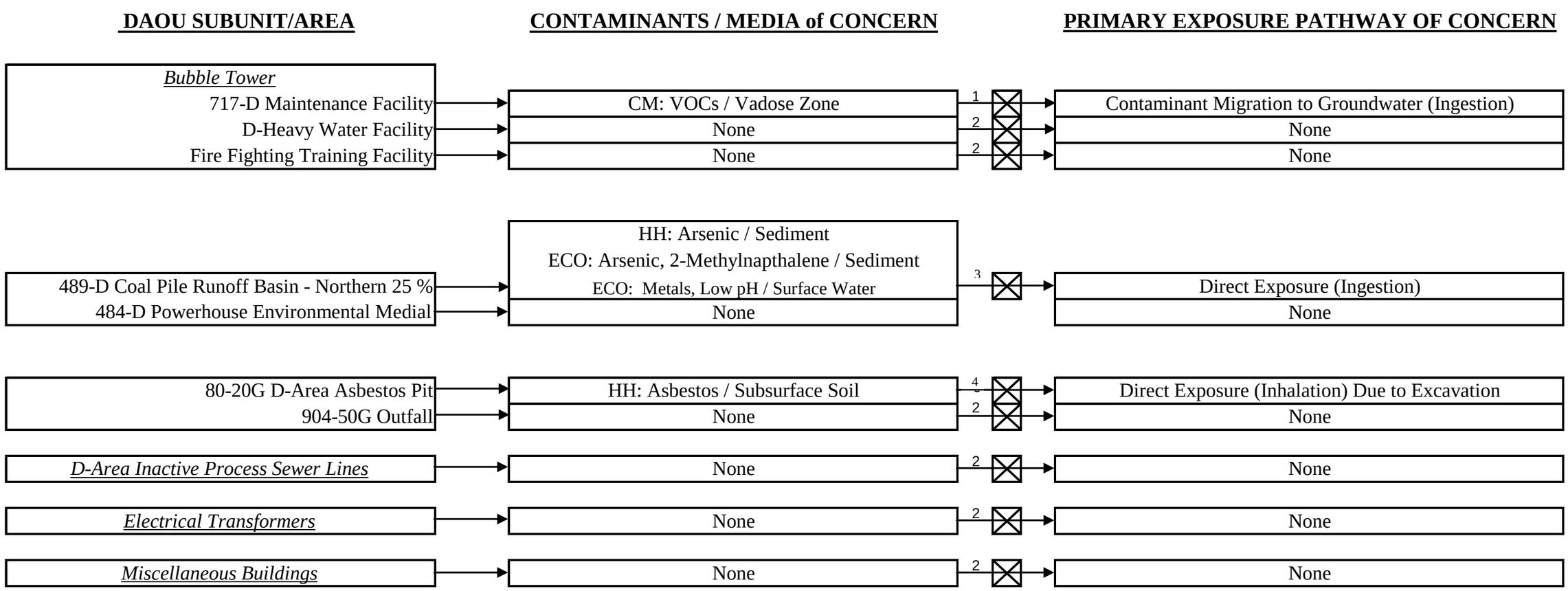


Figure 3. Early Action LUC Boundary Map (corrected)

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LEGEND

Complete exposure pathway

Incomplete exposure pathway due to final remedial action

CM = contaminant migration evaluation
HH = human health risk assessment
ECO = ecological risk assessment (ERA)
1 - Soil Vapor Extraction per RSER/EE/CA (SRNS 2009c); EA DAOU Land Use Controls required after completion of early removal action to prevent land disturbance activities and unrestricted land use.
2 - No COCs based on an industrial land use scenario; EA DAOU Land Use Controls required to prevent unrestricted land use.
3 - Surface Water Management, Consolidation of Contaminated Soil and Sediment, Placement of Soil Cover per RSER/EE/CA (SRNS 2009e); Land Use Controls required after completion of early removal action to prevent land disturbance activities and unrestricted land use.
4 - Although not formally evaluated in the HHRA, asbestos waste present in subsurface is a problem warranting action under an excavation scenario; Land Use Controls required to prevent land disturbance activities and unrestricted land use.

Figure 4. Conceptual Site Model after Completion of the Early Remedial Actions

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Table 1. Summary of Administrative Paths for the DAOU

SUBUNIT/AREA	ADMINISTRATIVE PATH				
	EAROD	Final ROD	IOU	GW OU	Other
Bubble Tower Subunit	X				
Moderator Processing Subunit	X				
489-D CPRB - Northern 25%	X				
489-D CPRB - Southern 75%		X			
484-D Powerhouse Building		X			
484-10D WOF Building		X			
484-10D WOF Environmental Media		X			
ash sluice lines		X			
D-Area Coal Pile		X			
483-D Combined Spills		X			
D-001 Outfall				X	
D-006 Outfall (Petroleum Release Site)			X		
904-50G Outfall	X				
D-Area Asbestos Pit (80-20G)	X				
DIPSLs	X				
Electrical Transformers	X				
Miscellaneous Buildings	X				
D-Area Rubble Pit (431-2D)					Closed; DEXOU ROD 2004
D-Area Oil Seepage Basin					Closed; DAOSB ROD 1998
Ash Basin (488-D)					Closed; DEXOU ROD 2004
Ash Basin (488-1D)					Operational: to be closed via IWT
Ash Basin (488-2D)					Operational: to be closed via IWT
Ash Basin (488-4D)					Operational; to be closed via SW permit
D Area Groundwater				X	

Table 2. Land Use Controls for the DAOU

Type of Control	Purpose of Control	Duration	Implementation	Affected Areas[a]
1. Property Record Notices[b]	Provide notice to anyone searching records about the existence and location of contaminated areas.	Until the concentration of hazardous substances associated with the unit have been reduced to levels that allow for unlimited exposure and unrestricted use.	Notice recorded by USDOE in accordance with state laws at County Register of Deeds office if the property or any portion thereof is ever transferred to non-federal ownership.	At DAOU, where hazardous substances are left in place at levels requiring land use and/or groundwater restrictions.
2. Property record restrictions[c]: A. Land Use B. Groundwater	Restrict use of property by imposing limitations. Prohibit the use of groundwater.	Until the concentration of hazardous substances associated with the unit have been reduced to levels that allow for unlimited exposure and unrestricted use.	Drafted and implemented by USDOE upon any transfer of affected areas. Recorded by USDOE in accordance with state law at County Register of Deeds office.	At DAOU, where hazardous substances are left in place at levels requiring land use and/or groundwater restrictions.
3. Other Notices[d]	Provide notice to city &/or county about the existence and location of waste disposal and residual contamination areas for zoning/planning purposes.	Until the concentration of hazardous substances associated with the unit have been reduced to levels that allow for unlimited exposure and unrestricted use.	Notice recorded by USDOE in accordance with state laws at County Register of Deeds office if the property or any portion thereof is ever transferred to non-federal ownership.	At DAOU, where hazardous substances are left in place at levels requiring land use and/or groundwater restrictions.
4. Site Use Program[e]	Provide notice to worker/developer (i.e., permit requestor) on extent of contamination and prohibit or limit excavation/penetration activity.	As long as property remains under USDOE control	Implemented by USDOE and site contractors Initiated by permit request	At DAOU where levels requiring land use and/or groundwater restrictions.
5. Physical Access Controls[f] (e.g., fences, gates, portals)	Control and restrict access to the public to prevent unauthorized access.	Until the concentration of hazardous substances associated with the unit have been reduced to levels that allow for unlimited exposure and unrestricted use.	Controls maintained by USDOE.	Security is provided at site boundaries in accordance with SRS procedures.
6. Warning Signs[g]	Provide notice or warning to prevent unauthorized uses.	Until the concentration of hazardous substances associated with the unit have been reduced to levels that allow for unlimited exposure and unrestricted use.	Signage maintained by USDOE.	Warning signs will be posted in accordance with applicable site procedures and will be placed in appropriate areas of the DAOU.
7. Security Surveillance Measures	Control and restrict access to the public.	Until the concentration of hazardous substances associated with the unit have been reduced to levels that allow for unlimited exposure and unrestricted use.	Established and maintained by USDOE Necessity of patrols evaluated upon completion of remedial actions.	Security and surveillance measures are in place at the SRS boundary in accordance with RCRA permit requirements.

[a] Affected areas – Specific locations identified in the LUCIP or subsequent post-ROD documents.
[b] Property Record Notices – Refers to any non-enforceable, purely informational document recorded along with the original property acquisition records of USDOE and its predecessor agencies that alerts anyone searching property records to important information about residual contamination; waste disposal areas in the property.
[c] Property Record Restrictions – Includes conditions and/or covenants that restrict or prohibit certain uses of real property and are recorded along with original property acquisition records of USDOE and its predecessor agencies.
[d] Other Notices – Includes information on the location of waste disposal areas and residual contamination depicted on as survey plat, which is provided to a zoning authority (i.e., city planning commission) for consideration in appropriate zoning decisions for non-USDOE property.
[e] Site Use Program – Refers to the internal USDOE/USDOE contractor administrative program(s) that requires the permit requestor to obtain authorization, usually in the form of a permit, before beginning any excavation/penetration activity (e.g., well drilling) for the purpose of ensuring that the selected activity will not affect underground utilities/structures, or in the case of contaminated soil or groundwater, will not disturb the affected areas without the appropriate precautions and safeguards.
[f] Physical Access Controls – Physical barriers or restrictions to entry.
[g] Signs – Posted command, warning or direction.

APPENDIX A

ACCESS CONTROL WARNINGS SIGNS



Figure A-1a. *EXAMPLE* — Access Control Warning Sign



Figure A-1b. *EXAMPLE* — Access Control Warning Sign (Asbestos)

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APPENDIX B

FIELD INSPECTION CHECKLIST

ANNUAL FIELD INSPECTION CHECKLIST FOR DAOU EARLY ACTION

☐ **SCHEDULED** ☐ **UNSCHEDULED**

A = Satisfactory **X** = Unsatisfactory (Explanation required)	**A** or **X**	Observation of Corrective Action Taken
1. Verify that the roads are accessible for authorized maintenance and inspections.		
2. Verify that the waste unit signs (12) are in acceptable condition, have the correct information, and are legible from a distance of 25 feet.		
3. Verify that there are no unauthorized excavation, digging, or construction activities within the LUC Boundaries.		
4. At the Asbestos Pit, on the Bubble Tower Subunit Coal Pile Runoff Basin soil covers, verify that the integrity of any drainage ditches, sediment basins and required land grading for proper drainage is maintained and they are free of excessive erosion, sediment buildup, and any debris restricting water flow.		
5. Verify that no woody vegetation is growing at the Asbestos Pit, the Bubble Tower Subunit or the Coal Pile Runoff Basin soil covers. Remove or identify as needed.		
6. Verify that the grass density has no bare spots more than 3 by 3 feet in area at the Asbestos Pit, the Bubble Tower Subunit or the Coal Pile Runoff Basin soil covers. The height of the vegetative cover should not impair the visual inspection of the soil cover.		
7. Verify that the soil cover at the Asbestos Pit, the Bubble Tower Subunit and the Coal Pile Runoff Basin have no signs of unacceptable erosion or depressions (subsidence).		
8. Verify that signs of burrowing or mounding animals are not present at the Asbestos Pit, the Bubble Tower Subunit or the Coal Pile Runoff Basin soil covers.		

Inspected by:

_____/_____ Date:_____
(Print Name) (Signature)

Post-Closure Manager:

_____/_____ Date:_____
(Print Name) (Signature)

CAUTION: The inspector shall notify the Post-Closure Manager (PCM) and Environmental Compliance Authority (ECA) **IMMEDIATELY** if there has been a breach or compromise of the land use controls of this waste unit. The notification shall be in accordance with SRS post-closure inspection procedures.

LUCIP for the
Gunsite 012 Operable Unit
(consists of Gunsite 012 Rubble Pile, NBN, Rubble Pile Across from Gunsite 012, NBN, and ECODS G-3 (Adjacent to Gunsite 012), NBN)[17]
Land Use Control Implementation Plan for the Gunsite 012 Operable Unit
(SRNS-RP-2011-00293, Revision 1, August 2011)

[17] Rubble Pile Across from Gunsite 012, NBN and ECODS G-3 (Adjacent to Gunsite 012), NBN are No Action/No Further Action Operable Units.

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United States Department of Energy

Savannah River Site

Land Use Control Implementation Plan (LUCIP) for the Gunsite 012 Operable Unit (OU) (NBN) (U)

CERCLIS Number: 78

SRNS–RP–2011-00293

Revision 1

August 2011

Prepared by:
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LIST OF ACRONYMS AND ABBREVIATIONS

ARAR	applicable or relevant and appropriate requirement
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CMIR	Corrective Measures Implementation Report
COC	constituent of concern
ECA	Environmental Compliance Authority
ECODS	Early Construction Operation Disposal Site
FFA	Federal Facility Agreement
HAZWOPER	Hazardous Waste Operations and Emergency Response
LUC	Land Use Control
LUCIP	Land Use Control Implementation Plan
LUCAP	Land Use Control Assurance Plan
NBN	no building number
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NTC	non-time critical
OU	operable unit
PAH	polycyclic aromatic hydrocarbon
PTSM	principal threat source material
QA	Quality Assurance
RA	remedial action
RACR	Remedial Action Completion Report
RACR	Remedial Action Completion Report
RCRA	Resource Conservation and Recovery Act
RFI/RI	RCRA Facility Investigation/Remedial Investigation
ROD	Record of Decision
SCDHEC	South Carolina Department of Health and Environmental Control
SDC	Site Development Control
SRNS	Savannah River Nuclear Solutions, LLC
SRS	Savannah River Site
USDOE	United States Department of Energy
UST	Underground Storage Tank
USEPA	United States Environmental Protection Agency
WSRC	Washington Savannah River Company, LLC

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1.0 INTRODUCTION

This Land Use Control Implementation Plan (LUCIP) has been prepared for Gunsite 012 (no building number [NBN]) (OU) at the Savannah River Site (SRS). The Gunsite 012 Operable Unit (OU) is inclusive of three Resource Conservation and Recovery Act/ Comprehensive Environmental Response, Compensation, and Liability Act (RCRA/CERCLA) units which are listed in the SRS Federal Facility Agreement (FFA) Appendix C RCRA/CERCLA Units as follows:

- Gunsite 012 Rubble Pile (NBN)
- Rubble Pile across from Gunsite 012 (NBN)
- Early Construction Operation Disposal Site (ECODS) G-3 (Adjacent to Gunsite 012) (NBN)

The three RCRA/CERCLA units, collectively, are referred to as the Gunsite 012 OU.

The purpose of this LUCIP is to describe how the land use controls (LUCs) selected in the Gunsite 012 OU Record of Decision (ROD) (SRNS, 2011) as the final remedy will be implemented and maintained. The LUC objectives have been documented in the Gunsite 012 OU ROD and are listed in Section 3.0.

The selected remedy leaves hazardous substances in place that pose a potential future risk and requires land use restrictions until the concentrations of hazardous substances in the OU are at levels that allow for unrestricted use. As agreed on March 30, 2000, among the United States Department of Energy (USDOE), the United States Environmental Protection Agency (USEPA), and the South Carolina Department of Health and Environmental Control (SCDHEC), SRS is implementing a Land Use Control Assurance Plan (LUCAP) (WSRC, 2009) to ensure that the LUCs required by numerous remedial decisions at SRS are properly maintained and periodically verified. The requirements of the LUCAP also apply to the LUCs that were selected as part of the remedial action (RA) for the Gunsite 012 OU. This LUCIP for the Gunsite 012 OU contains the detailed and specific measures required to implement and maintain the LUCs required by this particular remedial decision. The LUCs shall be maintained until the OU is suitable for

unlimited exposure and unrestricted use. Approval by USEPA and SCDHEC is required for any modification or termination of the LUCs.

USDOE is responsible for implementing, maintaining, monitoring, reporting, and enforcing the LUCs in accordance with the approved LUCIP. Upon final approval, the LUCIP will be appended to the LUCAP and should be considered incorporated by reference into the Gunsite 012 OU ROD, establishing implementation and maintenance requirements for the LUCs under the CERCLA and the SRS FFA (FFA 1993). The LUCIP will remain in effect unless and until modifications are approved by USEPA and SCDHEC as necessary for protection of human health and the environment. In accordance with Section 121(c) of CERCLA and National Oil and Hazardous Substances Pollution Contingency Plan (NCP) §300.430(f)(5)(iii)(c), a statutory review will be conducted within 5 years of initiation of the remedial action, and every 5 years thereafter, to ensure that the remedy continues to be protective of human health and the environment. Any approved LUCIP modification will be appropriately documented for incorporation by reference into the Gunsite 012 OU ROD.

1.1 Format of LUCIP

The format of this LUCIP is consistent with the FFA protocol format approved by the USEPA and SCDHEC in March 2004.

2.0 OVERVIEW OF GUNSITE 012 OU REMEDIAL ACTION

2.1 General Description and History of the Operable Unit

SRS occupies approximately 804 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 40.2 km (25 mi) southeast of Augusta, Georgia, and 32.2 km (20 mi) south of Aiken, South Carolina.

Gunsite 012 OU is located northeast of the geographical center of the SRS and about 4.75 km (3 mi) from the nearest site boundary (Figure 1). The Gunsite 012 OU is located within the Lower

Three Runs watershed, approximately 274 m (300 yd) southeast of Pond B (Figure 1). The area is flat to gently rolling and approximately 85.3 m (280 ft) above mean sea level. A detailed discussion of the operational and compliance history of Gunsite 012 OU was provided in the ROD. Subsequent paragraphs and sub-sections in this document provide a summary of this information.

Gunsites were anti-aircraft gun emplacements that operated from 1955 to 1957 to provide physical protection for SRS against possible enemy attack. The Gunsite 012 was one of five central gunsites that featured 90-mm anti-aircraft guns as well as extensive administrative support facilities, including barracks, mess halls, office buildings, and motor pools.

For RCRA/CERCLA investigation purposes, the Gunsite 012 OU was partitioned into four (4) soil subunits entitled the Building Pad Subunit, Parking Area Subunit, Gun Emplacement Area Subunit, and ECODS G-3 Subunit and one (1) Groundwater Subunit. The Building Pad and the Parking Area Subunits are contained within the Gunsite 012 Rubble Pile (NBN) RCRA/CERCLA unit. The Gun Emplacement Area Subunit is located in the Rubble Pile across from Gunsite 012 (NBN) RCRA/CERCLA unit. Finally, the ECODS G-3 Subunit is contained within the ECODS G-3 (Adjacent to Gunsite 012) (NBN) RCRA/CERCLA unit. Figure 2 provides an illustration of the surface subunits and their features. Figure 3 provides an aerial photograph of the Gunsite 012 OU during its operational years.

Descriptions of the RCRA/CERCLA units and their corresponding surface subunits are presented in further detail below.

Gunsite 012 Rubble Pile (NBN)

The Gunsite 012 Rubble Pile (NBN) RCRA/CERCLA unit is approximately 3.6 ha (9 acres) and contains the Building Pad Subunit and the Parking Area Subunit (Figure 2). A brief description of both subunits is provided as follows:

Building Pad Subunit

The buildings in the Building Pad Subunit (as shown in Figure 2) of the Gunsite 012 Rubble Pile (NBN) were dismantled in 1961. Currently the subunit consists of the concrete slab foundations from the four barracks, the mess hall, the two administrative buildings, and the remaining sidewalks and driveways; an abandoned drinking water well and associated concrete pad; and the former locations of seven underground storage tanks. The storage tanks contained fuel and were associated with each building (barracks, mess hall, administrative buildings). The 7,571 L (2,000 gal) storage tanks were buried 2.4 m (8 ft) below surface level and located between 6.1 and 12.2 m (20 and 40 ft) from the building each supported. The exact date when the tanks were removed is unknown; however, based on historical information, this event most likely occurred prior to 1990. Neither a 1997 ground penetrating radar analysis nor the RCRA Facility Investigation/Remedial Investigation (RFI/RI) characterization borings found any underground tanks at these seven locations.

The drinking water well was disconnected and capped after dismantlement of the Gunsite buildings to prevent use. To ensure no pathway exists into the subsurface, the drinking water well was abandoned and grouted to surface in April 2010.

An underground septic system, leading away from the Building Pad subunit, consisted of approximately 944.9 m (3,100 ft) of 20.3 cm (8 in) diameter vitrified pipe and a 37,854 L (10,000 gal) septic tank. Septic lines extended from each of the administrative buildings and barracks and joined at a point to empty into the septic tank located to the west of Gunsite 012 OU. From the septic tank, the septic lines ran about 487.7 m (1,600 ft) to the southwest to discharge near an unnamed tributary flowing into Pond C. Soil and groundwater samples in relation to the septic system were obtained during characterization activities and no contaminants were identified. Monitoring of any potential impact from discharge of the septic system into the tributary is beyond the scope of this OU's remedial action and will be included in the ongoing investigation of the Lower Three Runs Integrator Operable Unit (IOU).

Soil characterization conducted in May 2007 showed that polycyclic aromatic hydrocarbons (PAHs) existed in the 0 to 0.3 m (0 to 1 ft) soil interval at the Building Pad Subunit. In addition, asbestos contained in asphalt floor tiles placed in piles on the ground and adhesive and tar material remaining on the building pads was determined to pose a potential risk to human health.

During 2010, a non-time critical removal (NTCR) action and a maintenance action were conducted at the Building Pad Subunit. The NTCR action was specific for the removal of asbestos-containing floor tiles within the soil surrounding the building pads and is documented in the *Removal Site Evaluation Report/Engineering Evaluation/Cost Analysis (RSER/EE/CA) for Asphalt Floor Tile Piles at Gunsite 012 Operable Unit* (SRNS 2009). SRS also performed a maintenance action to remove the remaining floor tiles adhering to the building pads including the associated adhesive and tar material located on the building pads and expansion joints (SRNS 2009). The results of the removal action and the maintenance action are documented in the *Removal Action Report for Asbestos Removal at Gunsite 012 OU (NBN)* (SRNS, 2010).

Parking Area Subunit

The Parking Area Subunit (Figure 2) of the Gunsite 012 Rubble Pile (NBN) is adjacent to the Building Pad Subunit. The Parking Area Subunit consists of the remains of the old gravel parking lot and the disposal trench that is located within the trees to the northeast of the parking lot. The parking lot was periodically sprayed with an asphalt emulsion to suppress dust. From 1992 to 1997, the parking lot was used as a storage area for creosote-treated railroad crossties and utility poles. The railroad crossties and utility poles were removed in January 1997.

Soil characterization conducted in May 2007 determined the presence of PAHs at low levels consistent with parking lot material. Because of these low levels of PAHs, it was determined that no remedial action was needed to address the PAH constituents. However, antimony was found to exist in the top 0 to 0.3 m (0 to 1 ft) of surface soil in a disposal trench located within the Parking Area Subunit above levels acceptable for unrestricted use. The existence of antimony in the ditch appears to have originated from the scraps of metal and/or cans and buckets deposited within the disposal trench from past uses.

Rubble Pile Across From Gunsite 012 (NBN)

The Rubble Pile across from the Gunsite 012 (NBN) RCRA/CERCLA unit is approximately 1.6 ha (4 acres) and contains the Gun Emplacement Area Subunit (Figure 2), briefly described below.

Gun Emplacement Area Subunit

The Gun Emplacement Area Subunit characterization encompassed the four circular gun emplacements and the Rubble Pile across from Gunsite 012 (NBN). The building pad is located between the gun emplacements and the Gunsite 012 Rubble Pile (NBN). The generator building was located at the building pad footprint. The building pad might have also been used for limited chemical storage. The generator building also had an Underground Storage Tank (UST) for generator fuel which was removed prior to 1990.

The results of the soil characterization conducted in May 2007 identified one PAH and trace amounts of petroleum analytes. All concentrations were below action levels for both industrial and unrestricted use and no remedial action was needed at the Gun Emplacement Area Subunit.

ECODS G-3 (Adjacent to Gunsite 012) (NBN)

The ECODS G-3 (Adjacent to Gunsite 012) (NBN) RCRA/CERCLA unit (refer to Figure 2) is approximately 0.3 ha (0.75 acres) and contains the ECODS G-3 Subunit, briefly described below.

ECODS G-3 Subunit

The ECODS G-3 Subunit is located in the southwest corner of the OU approximately 61 m (200 ft) southwest of the Gunsite 012 Rubble Pile (NBN). During construction of Gunsite 012, construction waste seems to have been disposed in the ECODS G-3 facility. The results of the soil characterization conducted in May 2007 identified trace amounts of petroleum analytes,

solvents, pesticides, polychlorinated biphenyls and metals. All concentrations were below action levels for industrial or unrestricted use and no response action was needed.

Groundwater

Groundwater Subunit

Although the groundwater is not a unit listed on the FFA, the groundwater underlying the Gunsite 012 OU was included as part of the RCRA/CERCLA investigation process and identified as the Groundwater Subunit.

The water table at the Gunsite 012 is 10.6 to 13.7 m (35 to 45 ft) below land surface. Due to the presence of the nearby impoundments (e.g., Pond B) and knowledge of the variability of the groundwater in the Gunsite 012 area from work plan characterization, it is expected that groundwater flows radially from the OU towards the east, south, and southwest. Results of the groundwater sampling conducted in May 2007 determined that there were no exceedences in groundwater. In addition, a contaminant migration analysis of the soil subunits did not identify any problems associated with the transport of soil contaminants to groundwater.

2.2 Nature and Extent of Contamination

Gunsite 012 OU was investigated to determine the nature and extent of contamination, the risk to future industrial workers and hypothetical future residents (i.e., unrestricted land use), risk to the environment, the presence of principal threat source material (PTSM), and if there are any contaminant migration concerns. Soil and groundwater samples were collected, evaluated, and screened against appropriate regulatory thresholds and technical protocols to identify constituents of concern (COCs) that would warrant further remedial action.

The results of these evaluations are documented in the ROD and are summarized below to support the selected remedy:

- There are no ecological COCs, contaminant migration COCs, or PTSM for any of the Gunsite 012 OU subunits.

- No human health COCs was identified for the Gun Emplacement Area Subunit, ECODS G-3 Subunit, or the Groundwater Subunit.

- Human health COCs were identified at the Building Pad Subunit (i.e., PAHs in surface soil) and the Parking Area Subunit (i.e., antimony in surface soil) at levels that do not allow for unrestricted use.

The selected remedy for the Gunsite 012 OU leaves hazardous substances in place that pose a potential future risk and will require land use restrictions until the concentrations of hazardous substances in the soil and groundwater are at levels that allow for unrestricted use and exposure. If LUCs are not implemented, actual or threatened releases of hazardous substances from the Building Pad Subunit and the Parking Area subunit may present a current or potential threat to public health, welfare, or the environment.

2.3 Remedial Action Selected

Following successful completion of the NTCR action and the maintenance action, residual hazardous substances remain at the Gunsite 012 OU at levels that do not allow for unrestricted use. The selected remedy for the Gunsite 012 Rubble Pile (NBN), as established in the ROD (SRNS 2011), are LUCs for the Building Area Subunit and the Parking Area Subunit to prevent unrestricted use. LUCs will include institutional controls (i.e., administrative measures) as managed through the SRS Site Use/Site clearance Program to require authorization before beginning an excavation activity at the site. This authorization is usually in the form of an internal permit. Other administrative measures include property record notices and property record restrictions. LUCs will also include signage at the Gunsite 012 OU to alert on site workers to the presence of hazardous substances and to prevent unknowing entry and unrestricted use. As shown in Figure 4, the LUCs apply to the Building Pad Subunit and the Parking Area Subunit and not the entire Gunsite 012 OU.

The post-RA conceptual site model (Figure 5) for the Building Pad Subunit and the Parking Area Subunit demonstrate that the exposure pathways are incomplete following implementation of the

RA. According to the *Savannah River Site Future Use Project Report* (USDOE 1996), residential use of SRS land is prohibited and future land use is neither intended nor reasonably anticipated to be unrestricted.

3.0 LAND USE CONTROL OBJECTIVES

The following Gunsite 012 OU LUC objectives have been developed to ensure the protectiveness of the remedy described above:

- Prevent unrestricted use of the Building Pad Subunit and the Parking Area Subunit.
- Prohibit the development and use of property for residential housing, elementary and secondary schools, child care facilities and playgrounds.

Current access controls and land transfer requirements needed to maintain the future land use are described in the following sections of this LUCIP.

4.0 IMPLEMENTATION OF LAND USE CONTROLS

This section describes the LUCs selected in the ROD to achieve the LUC objectives stated in Section 3.0. A summary of the types of LUCs controls is provided in Table 1. USDOE is responsible for implementing, maintaining, reporting on and enforcing the LUCs required for the Gunsite 012 OU. The LUCIP will become enforceable and will be implemented when approved by USEPA and SCDHEC following the completion of the RA prescribed by the Gunsite 012 OU ROD. USDOE shall notify USEPA and SCDHEC 60 days in advance of any proposed land use changes that are inconsistent with LUC objectives or the selected remedy.

The Gunsite 012 OU will be maintained as an industrial use area by implementation of the property record notices and restrictions (Section 4.1) and the LUC boundary map (Section 4.2).

The Site Use Program (Section 4.3) will be implemented to prevent onsite worker exposure to contamination left in place at the Gunsite 012 OU. Other existing measures (i.e. Site Clearance Program, worker training, health and safety requirements, work controls) will also be used to ensure worker safety at the Gunsite 012 OU. Physical access controls (Section 4.4) are

implemented at the SRS boundary to control and restrict public and trespasser access to the Gunsite 012 OU.

Warning Signs (Section 4.5) at the Gunsite 012 OU will be maintained to alert onsite workers to the presence of hazardous substances. The signs will also convey the restrictions of unauthorized personnel. Access control warning signs will be placed and maintained around the Gunsite 012 OU to prevent unknowing entry and unrestricted use.

4.1 Property Record Notices and Restrictions

In the long term, if the property, or any portion thereof, is ever transferred from DOE, the U.S. Government and/or DOE will take those actions necessary pursuant to Section 120(h)(1) of CERCLA. Those actions will include in any contract, deed, or other transfer document, notice of the type and quantity of any hazardous substances that were known to have been stored (for more than one year), released, or disposed of on the property. The notice will also include the time at which the storage, release, or disposal took place to the extent such information is available.

In addition, if the property, or any portion thereof, is ever transferred by deed, the U.S. Government will also satisfy the requirements of CERCLA 120(h)(3). The requirements include: a description of the remedial action taken, a covenant, and an access class. These requirements are also consistent with the intent of the RCRA deed notification requirements at final closure of a RCRA facility if contamination will remain at the unit.

LUCs will be implemented through the following:

- The contract, deed, or other transfer document shall also include restrictions precluding residential use of the property. However, the need for these 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 LUCs will be done through an amended ROD with USEPA and SCDHEC review and approval.

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

In the event of a property lease or interagency agreement, the equivalent restrictions will be implemented as required by CERCLA Section 120(h).

USDOE shall provide the USEPA and SCDHEC at least six months notice prior to transfer or sale of property subject to LUCs to ensure that USEPA and SCDHEC can be involved in discussions to ensure that appropriate provisions are included in the transfer documents to maintain effective LUCs. If it is not possible for the USDOE to notify the USEPA and SCDHEC at least six months prior to the transfer or sale, then the facility will notify the USEPA and SCDHEC as soon as possible but no later than 60 days prior to the transfer or sale of any property subject to LUCs. In addition to the land transfer notice and discussion provisions above, USDOE further agrees to provide the USEPA and SCDHEC with similar notice within the same time frames as to federal-to-federal transfer of property.

4.2 LUC Boundary Maps

This LUCIP identifies the proposed area under land use restrictions in Figure 4 for the Gunsite 012 OU. Following field implementation of the remedial action, a final (as-built) survey plat is developed and certified by a professional land surveyor registered in the State of South Carolina. The final survey plat will include the boundary coordinates for the area subject to land use restrictions and general locations of access control warning signs. The final as-built survey plat will be submitted to USEPA and SCDHEC in the Corrective Measures Implementation Report (CMIR)/Remedial Action Completion Report (RACR).

In addition, if the site is ever transferred to non-federal ownership, a certified survey plat of the OU will be prepared at or near the time of conveyance to support the LUCIP required restrictive covenants on land use and will be recorded with the appropriate county recording agency.

4.3 Site Use Program

Under DOE Order 430.1A, *Life Cycle Management* (USDOE 1998), SRS is required to implement an asset management program for the use, maintenance, and disposal of physical assets, including real estate. SRS complies with this DOE Order through the Site Use Program which is administered by Site Development Control (SDC) in accordance with SRS Manual 1D, *Site Infrastructure and Services Manual*, Procedure 3.02, "Site Real Property Configuration Control" (SRS 2006). Use of all lands and waters on the SRS are coordinated via the Site Use Program. No use of land (i.e., excavation or any other land use) shall be undertaken without prior approval by the USDOE and documented by a Site Use Permit.

SRS identifies all buildings, facilities, and FFA waste units on SRS site development maps that are maintained by SDC in accordance with SRS Manual 1D. If LUCs are required for an FFA waste unit, the unit-specific LUC boundaries are identified on the SRS site development maps. SDC must verify that any proposed work to be performed on a site is sanctioned by a Site Use Permit and verify that the proposed activity does not conflict with any previously approved land use.

In addition to the management of the use of SRS lands and waters through the Site Use Program, the SDC also administers the Site Clearance Program to control the construction, alteration, or demolition activities at SRS. Before any work that adds or modifies features or facilities portrayed on the SRS site development maps is conducted, a Site Clearance Permit is required. USDOE approval of the intended land via a Site Use Permit must be verified before a Site Clearance Permit is issued. If a Site Clearance Request potentially impacts a FFA waste unit, the Site Clearance Request Form is sent to the appropriate FFA reviewer for approval. The FFA reviewer will evaluate the proposed activity to identify any conflicts with the waste unit and to verify that waste unit specific LUCs are not compromised. The roles and responsibilities of the individuals responsible for review and approval of Site Use and Site Clearance permits are detailed in SRS 1D, Procedure 3.02. All employees, contractors, and visitors at SRS are required to adhere to the Site Use Program and the Site Clearance Program.

The USDOE will notify USEPA and SCDHEC in advance of any change to any internal procedure, including the Site Use Program, which would affect implementing or maintaining the LUCs. Approval by USEPA and SCDHEC is required for any modification or termination of the LUCs and implementation actions, and the USDOE must obtain prior approval from USEPA and SCDHEC before taking any anticipated action that may disrupt the effectiveness of the LUCs or alter or negate the need for LUCs. The Site Use Permit and site development maps must be amended when the geographic configuration or buffer zone used to establish the permit boundary changes or there is a change to the land use. The processes are controlled within the SRS Quality Assurance (QA) Program in accordance with SRS 1Q Manual, *Quality Assurance* (SRS 2007). The SRS QA program governs all SRS activities.

4.4 Physical Access Controls

There are no physical access controls required at the Gunsite 012 OU; however, physical access controls are provided at the SRS boundary as mentioned in Table 1, Item 5.

4.5 Warning Signs

To prevent unknowing entry and to ensure that unrestricted use of the waste unit does not occur while the unit is under ownership of the USDOE, access control warning signs, as shown in Appendix A will be posted at the unit. Warning signs will be installed in accordance with the implementation schedule presented in the Gunsite 012 OU ROD (SRNS, 2011) and will be completed by November 2011. In addition, the final placement of the signage will be documented in the final survey plat submitted with the CMIR/RACR (see Section 4.2). The signs will be legible for a distance of at least 25 ft.

Custodial responsibilities for maintenance and inspection of the Gunsite 012 OU will be maintained by the SRS Post-Closure Maintenance Group.

4.6 Other Access Controls and Security/Surveillance Measures

While under the ownership of USDOE, access control of the entire SRS will be maintained in accordance with the 2000 RCRA Part B Permit Renewal Application, Volume I, Section F.1. This section describes the 24-hour surveillance system (R.61-79.264.14(b)(1)), artificial or natural barriers (R.61-79.264.14(b)(2)(I)), control entry systems (R.61-79.264.14(b)(2)(ii)), and access control warning signs (R.61-79.264.14(c)) in place at the SRS boundary to comply with the security requirements for a RCRA-permitted facility.

4.7 Field Inspection and Maintenance for Land Use Controls

After remediation of the Gunsite 012 OU, only inspection and maintenance activities will be required by this RA.

The Gunsite 012 OU will be inspected per the Field Inspection Checklist in Appendix B. Field inspections will be performed annually. Additional inspections may be necessary in the event of unusual weather or any other condition warranting inspection. For the Gunsite 012 OU, inspections will be performed to ensure that access control signs are in place and maintained. Necessary maintenance (including general housekeeping and repairs) will be performed for items noted in the Field Inspection Checklist in Appendix B, which are found to be in unsatisfactory condition.

Any activity that is inconsistent with the LUC objectives or use restrictions, or any other action that may interfere with the effectiveness of the LUCs will be addressed by the USDOE as soon as practicable, but in no case will the process be initiated later than 10 days after the USDOE becomes aware of the breach. The USDOE will notify USEPA and SCDHEC as soon as practicable but no longer than 10 days after discovery of any activity that is inconsistent with the LUC objectives or use restrictions, or any other action that may interfere with the effectiveness of the LUCs. The USDOE will notify USEPA and SCDHEC regarding how the USDOE has addressed or will address the breach within 10 days of sending USEPA and SCDHEC notification of the breach.

The FFA Annual Progress Report, submitted to the regulatory agencies by USDOE, will provide the status of the LUCs and describe how any LUC deficiencies or inconsistent uses have been addressed. In the event of property transfer or lease, the Annual Report will cite findings on the following: whether the use restrictions and controls referenced above were communicated in the deed(s) or lease restrictions; whether property use conforms with the deed or lease restrictions and controls; and whether the owners and state/local agencies have been notified regarding the deed or lease restrictions and controls. The FFA Annual Progress Report(s) will be used in the preparation of the Five-Year Remedy Review Report.

All other routine maintenance activities will be documented and maintained in files subject to USEPA and SCDHEC review and audit. A copy of the completed inspection form is maintained in the ACP Document Control. The LUCs shall be maintained until the concentration of hazardous substances associated with the unit have been reduced to levels that allow for unlimited exposure and unrestricted use.

The waste unit inspectors are to be trained in Hazardous Waste Operations and Emergency Response (HAZWOPER), RCRA Well Inspections (ACP-specific training), ACP RCRA Waste Unit Inspections, Radiological Worker Training, etc., as applicable for the specific inspection. They will also be trained based on the individual requirements of the regulatory approved closure documents for each waste unit. In addition, the inspectors are to attend yearly refresher courses. Over the years, different personnel may conduct the inspections and maintenance activities.

This unit-specific LUCIP, including the checklist (Appendix B), will be appended to the SRS LUCAP upon final regulatory approval. After completion of the CMIR/RACR the preliminary checklist in the LUCAP will be replaced with the final approved checklist.

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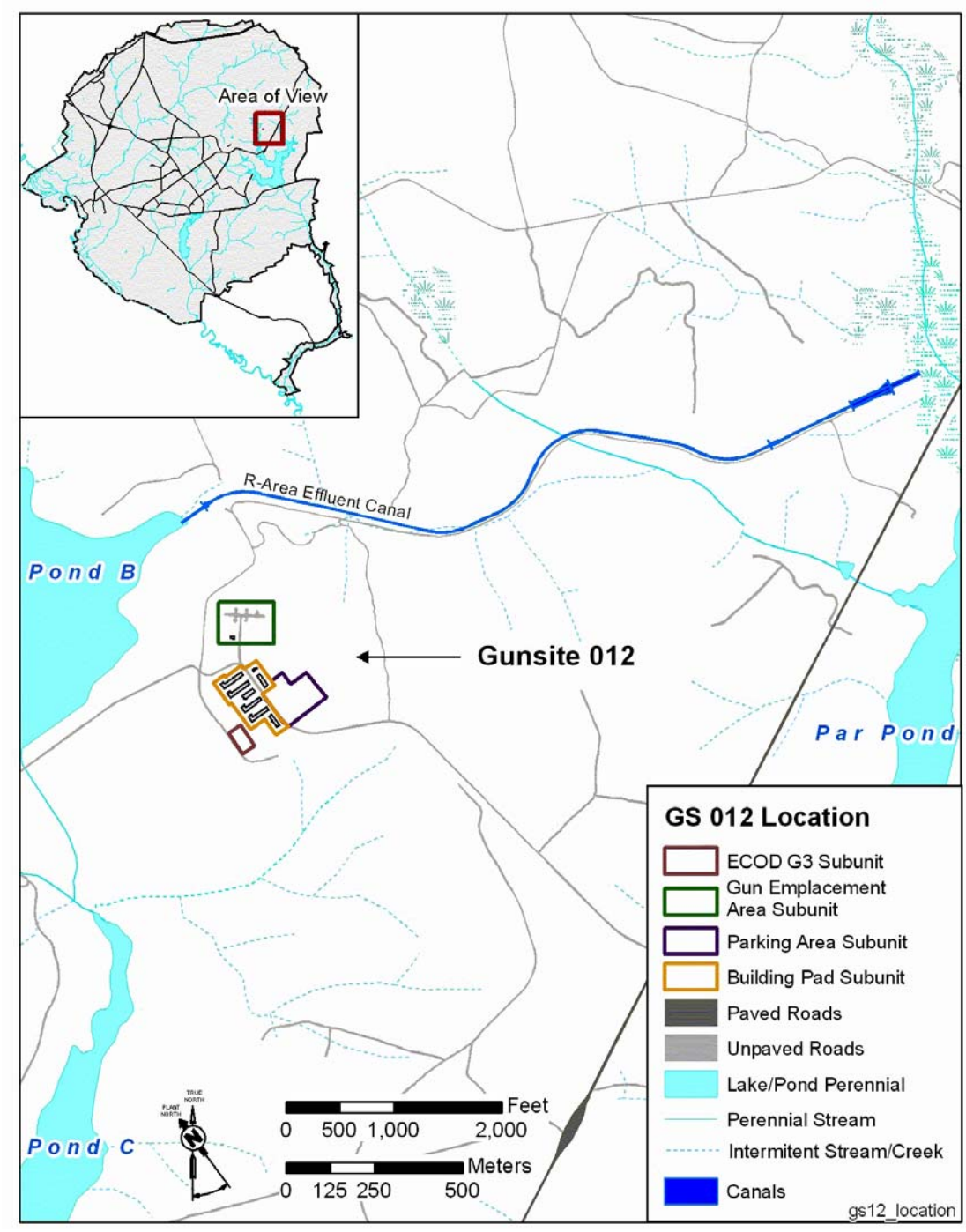


Figure 1. Location of the Gunsite 012 OU Within the Savannah River Site

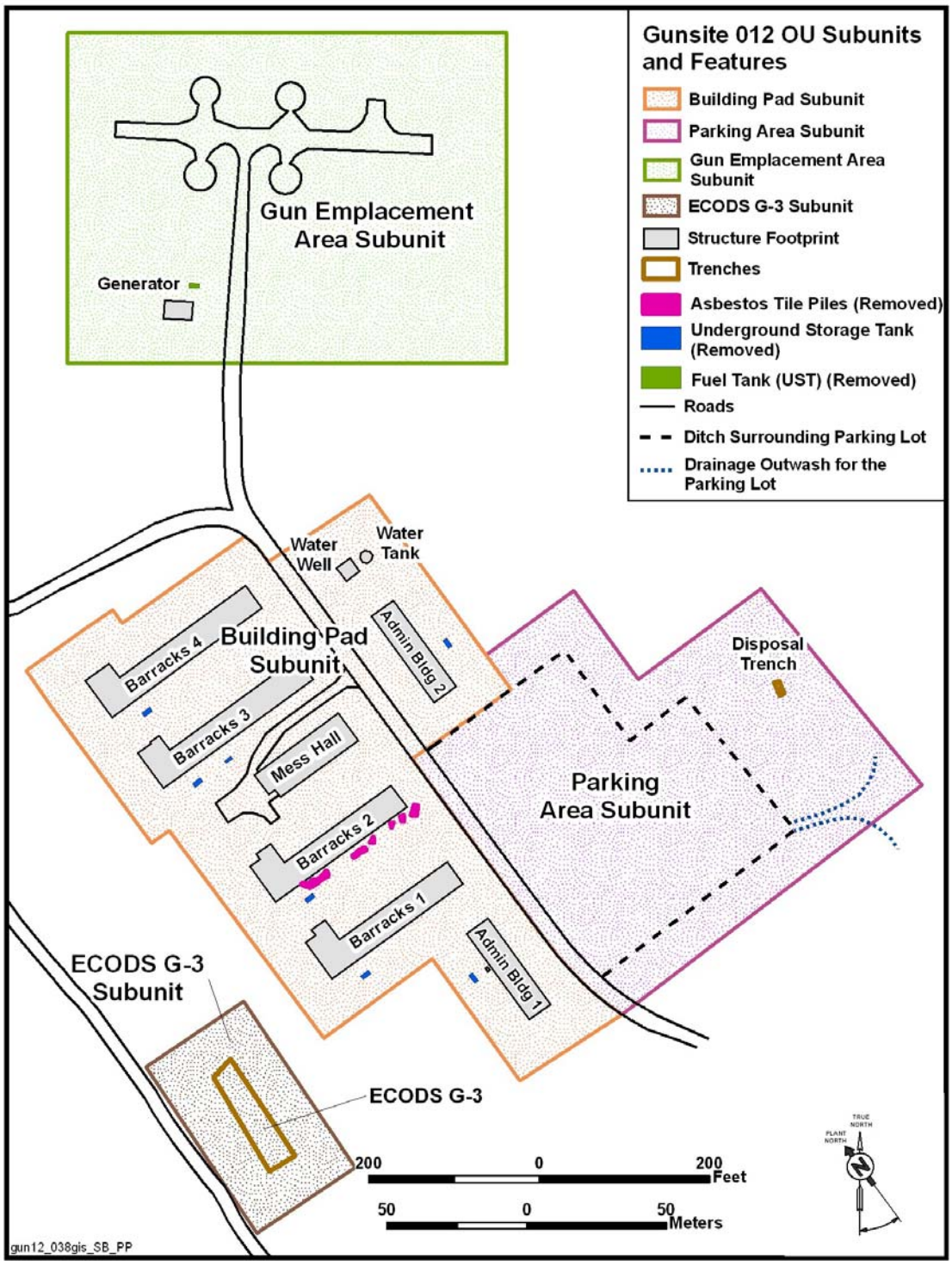


Figure 2. Gunsite 012 OU Subunits and Features



Figure 3. Aerial Photograph of Gunsite 012 During Operation

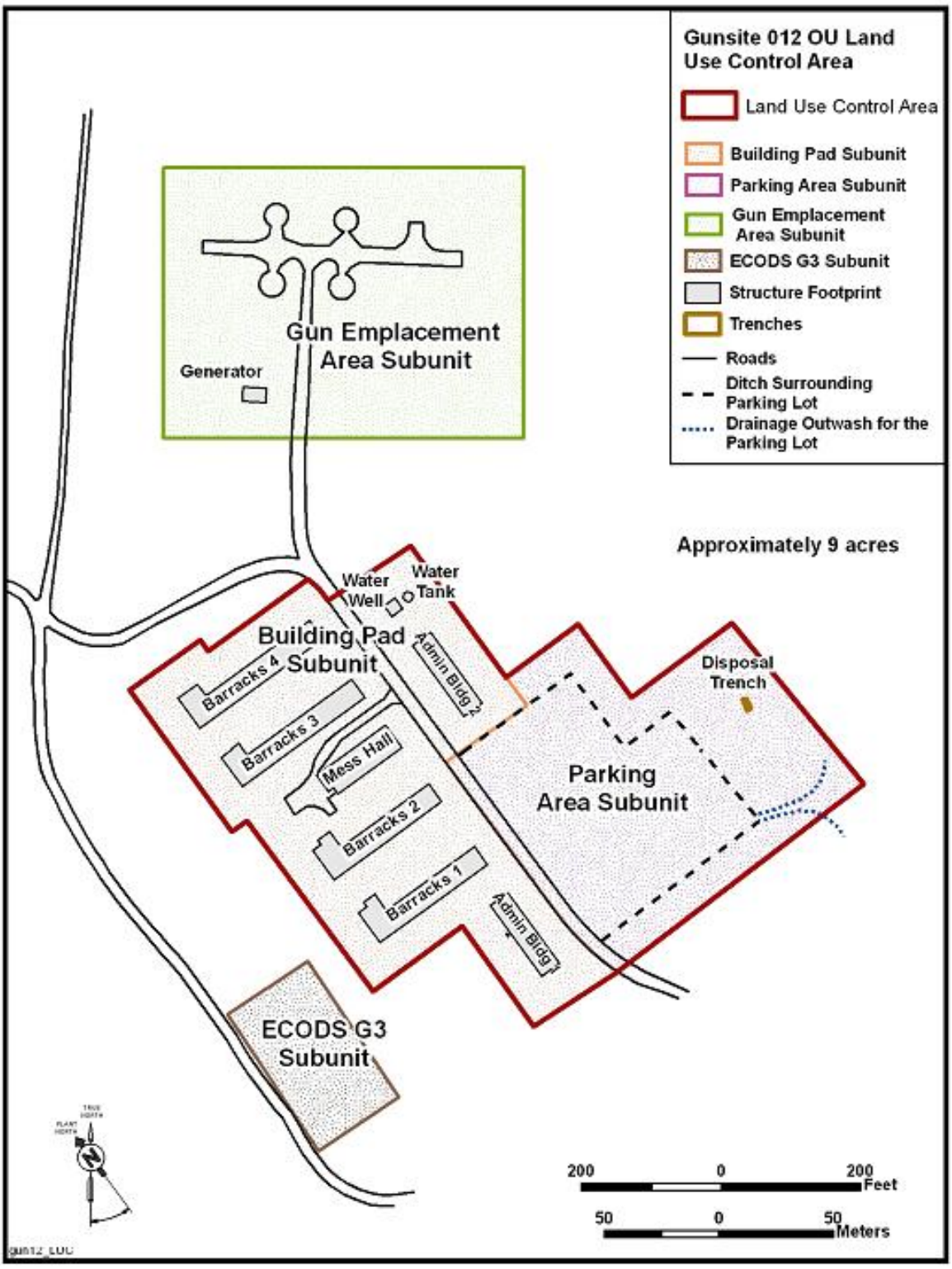


Figure 4. Land Use Control Boundary for the Gunsite 012 OU

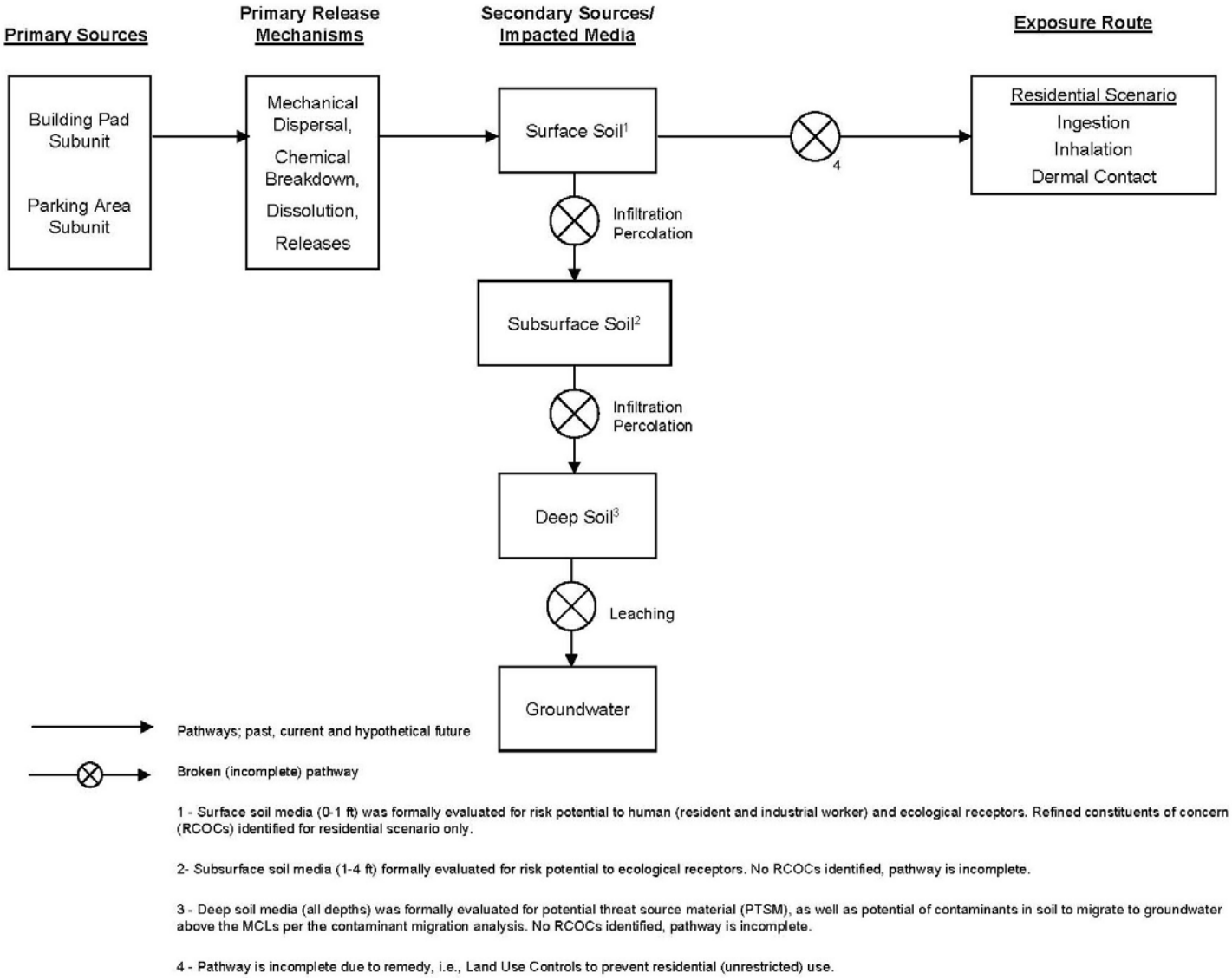


Figure 5. Post-RA Conceptual Site Model for the Building Pad Subunit and the Parking Area Subunit

Table 1. Land Use Controls for the Gunsite 012 OU

Type of Control	Purpose of Control	Duration	Implementation	Affected Areas[a]
1. Property Record Notices[b]	Provide notice to anyone searching records about the existence and location of contaminated areas.	Until the concentration of hazardous substances associated with the unit have been reduced to levels that allow for unlimited exposure and unrestricted use.	Notice recorded by USDOE in accordance with state laws at County Register of Deeds office if the property or any portion thereof is ever transferred to non-federal ownership.	Waste management areas under this LUCIP where hazardous substances are left in place at levels requiring land use restrictions.
2. Property record restrictions[c]: A. Land Use B. Groundwater	Restrict use of property by imposing limitations. Prohibit the use of groundwater.	Until the concentration of hazardous substances associated with the unit have been reduced to levels that allow for unlimited exposure and unrestricted use.	Drafted and implemented by USDOE upon any transfer of affected areas. Recorded by USDOE in accordance with state law at County Register of Deeds office.	Waste management areas under this LUCIP where hazardous substances are left in place at levels requiring land use restrictions.
3. Other Notices[d]	Provide notice to county/city about the existence and location of waste disposal and residual contamination areas for zoning/planning purposes.	Until the concentration of hazardous substances associated with the unit have been reduced to levels that allow for unlimited exposure and unrestricted use.	Notice recorded by USDOE in accordance with state laws at County Register of Deeds office if the property or any portion thereof is ever transferred to non-federal ownership.	Waste management areas under this LUCIP where hazardous substances are left in place at levels requiring land use restrictions.
4. Site Use Program[e]	Provide notice to worker/developer) i.e., permit requestor) on extent of contamination and prohibit or limit excavation/penetration activity.	As long as property remains under USDOE control.	Implemented by USDOE and site contractors. Initiated by permit request.	Waste management areas and remediation systems under this LUCIP where hazardous substances are left in place at levels requiring land use restrictions.
5. Physical Access Controls[f] (e.g., fences, gates, portals)	Control and restrict access to the public to prevent unauthorized access.	Until the hazardous substances associated with the unit no longer pose an unacceptable risk under unlimited exposure and unrestricted use.	Controls maintained by USDOE.	Waste management areas under this LUCIP.

Table 1. Land Use Controls for **the Gunsite 012 OU** *(Continued/End)*

Type of Control	Purpose of Control	Duration	Implementation	Affected Areas[a]
6. Warning Signs[g]	Provide notice or warning to prevent unauthorized uses	Until the concentration of hazardous substances associated with the unit have been reduced to levels that allow for unlimited exposure and unrestricted use.	Signage maintained by USDOE	Warning signs will be posted in accordance with applicable site procedures and will be placed in appropriate areas at the Gunsite 012 OU.
7. Security Surveillance Measures	Control and monitor access by workers/public	Until the concentration of hazardous substances associated with the unit have been reduced to levels that allow for unlimited exposure and unrestricted use.	Established and maintained by USDOE. Necessity of patrols evaluated upon completion remedial actions or property transfer.	Security Surveillance of waste management areas under this LUCIP, as necessary.

[a]Affected Areas – Specific locations identified in the OU-specific LUCIP or subsequent post-ROD documents.

[b]Property Record Notices – Refers to any non-enforceable, purely informational document recorded along with the original property acquisition records of USDOE and its predecessor agencies that alerts anyone searching property records to important information about residual contamination; waste disposal areas in the property.

[c]Property Record Restrictions – Includes conditions and/or covenants that restrict or prohibit certain uses of real property and are recorded along with original property acquisition records of USDOE and its predecessor agencies.

[d]Other Notices – Includes information on the location of waste disposal areas and residual contamination depicted on as survey plat, which is provided to a zoning authority (i.e., city planning commission) for consideration in appropriate zoning decisions for non-USDOE property.

[e]Site Use Program – Refers to the internal USDOE/USDOE contractor administrative program(s) that requires the permit requestor to obtain authorization, usually in the form of a permit, before beginning any excavation/penetration activity (e.g., well drilling) for the purpose of ensuring that the proposed activity will not affect underground utilities/structures, or in the case contaminated soil or groundwater, will not disturb the affected areas without the appropriate precautions and safeguards.

[f]Physical Access Controls – Physical barriers or restrictions to entry.

[g]Signs – Posted command, warning or direction.

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APPENDIX A

ACCESS CONTROL WARNING SIGNS



Figure A-1. Access Control Warning Sign

APPENDIX B

FIELD INSPECTION CHECKLIST

FOR GUNSITE 012 OU

FIELD INSPECTION CHECKLIST

FOR GUNSITE 012 OU

☐ **SCHEDULED** ☐ **UNSCHEDULED**

A= Satisfactory X= Unsatisfactory (Explanation Required)	**A or X**	**Observation of Corrective Action Taken**
1. Verify that the area is accessible for authorized maintenance and inspections.		
2. Verify that the waste unit signs are in acceptable condition, have the correct information, and are legible from a distance of 25 feet.		
3. Verify that there are no excavation, digging, or construction activities within the LUC boundaries.		
4. Verify that signs of burrowing or mounding animals are not present.		
5. Verify that signs of unauthorized human access/ trespassing (i.e., litter or other indications of unauthorized occupancy) are not present.		

Notes: **1)** No inspection and maintenance of existing items (e.g., pads, abandoned wells, curbs, etc.) are required.

2) The LUC requirements do not apply to the main access road.

FIELD INSPECTION CHECKLIST

FOR GUNSITE 012 OU *(Continued/End)*

Inspected by:

_____/_____ Date:_____
(Print Name) (Signature)

Post-Closure Manager:

_____/_____ Date:_____
(Print Name) (Signature)

CAUTION:
The inspector shall notify the Post-Closure Manager and Environmental Compliance Authority (ECA) **IMMEDIATELY** if there has been a breach or compromise of the land use controls of this waste unit. The notification shall be in accordance with SRS post-closure inspection procedures.

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LUCIP for the
R Area Operable Unit (consists of Area on the North Side of Building 105-R, Laydown Area North of 105-R, and Release from the Decontamination of R-Area Reactor Disassembly Basin, NBN, Combined Spills North of Building 105-R, NBN, Cooling Water Effluent Sump, 107-R, Potential Release from R-Area Disassembly Basin, NBN, Potential Release of NaOH/H2SO4 from 183-2R, NBN, R-Area Ash Basin, 188-0R, R-Area Groundwater, R-Area Process Sewer Lines as Abandoned, NBN, R-Area Reactor Area Cask Car Railroad Tracks as Abandoned, NBN)
Land Use Control Implementation Plan for the R Area Operable Unit
(SRNS-RP-2010-01208, Revision 1, February 2011)

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United States Department of Energy

Savannah River Site

Land Use Control Implementation Plan (LUCIP) for the R Area Operable Unit (RAOU) (U)

CERCLIS Number: 95

SRNS–RP–2010-01208

Revision 1

February 2011

Prepared by:
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Prepared for the U. S. Department of Energy Under Contract No. DE-AC09-08SR22470

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LIST OF ACRONYMS AND ABBREVIATIONS

ac	acre
ACP	Area Completion Projects
bgs	below ground surface
BRA	Baseline Risk Assessment
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
Ci	curie
cm	centimeter
CMS/FS	Corrective Measures Study/Feasibility Study
D&D	deactivation and decommissioning
EE/CAs	Engineering Evaluation/Cost Analyses
ESD	Explanation of Significant Difference
FFA	Federal Facility Agreement
ft	feet
ha	hectare
HCA	high contamination area
ICA	isolated contamination area
ISD	in situ decommissioning
km	kilometer
km^2	square kilometer
LTR	Lower Three Runs
LUC	land use control
LUCIP	Land Use Control Implementation Plan
LUCAP	Land Use Control Assurance Plan
m	meter
m^2	square meter
MCL	maximum contaminant level
mg/kg	milligram per kilogram
mi	mile
mi^2	square mile
MNA	monitored natural attenuation
NBN	no building number
NFA	no further action
NTC	non-time critical
OU	operable unit
pCi/g	picocuries per gram
PSA	potential source area
PSL	process sewer line
PTSM	principal threat source material

LIST OF ACRONYMS AND ABBREVIATIONS *(Continued/End)*

RA	remedial action
RAGW	R-Area Groundwater
RAOU	R Area Operable Unit
RBC	Reactor Building Complex
RCRA	Resource Conservation and Recovery Act
RFI/RI	RCRA Facility Investigation/Remedial Investigation
ROD	Record of Decision
RSER	Removal Site Evaluation Report
SCDHEC	South Carolina Department of Health and Environmental Control
SE	site evaluation
SRNS	Savannah River Nuclear Solutions, LLC
SRS	Savannah River Site
USDOE	U.S. Department of Energy
USEPA	U.S. Environmental Protection Agency
UTR	Upper Three Runs
VOC	volatile organic compound
WSRC	Washington Savannah River Company LLC (formerly Westinghouse Savannah River Company LLC)
yd^2	square yard

1.0 INTRODUCTION

This Land Use Control Implementation Plan (LUCIP) has been prepared for the R Area Operable Unit (RAOU) at the Savannah River Site (SRS). The RAOU comprises multiple subunits, Potential Source Areas (PSA), Deactivation and Decommissioning (D&D) facilities, and a Site Evaluation (SE) Area within R Area. The groundwater subunit is included in the RAOU. The D&D facilities and the SE Area were determined to be No Further Action (NFA) sites, however, the selected remedy for the entire RAOU is land use controls (LUCs) along with Monitored Natural Attenuation (MNA) for the groundwater subunit. The purpose of this LUCIP is to describe how the LUCs selected in the Record of Decision (ROD) for the RAOU subunits will be implemented and maintained. The LUC objectives have been documented in the RAOU ROD (SRNS 2010a) and are listed in Section 3.0.

The selected remedy leaves hazardous substances in place that pose a potential future risk and will require land use restrictions until the concentrations of hazardous substances in the soil and groundwater are at levels that allow for unrestricted use. As agreed on March 30, 2000, among the U.S. Department of Energy (USDOE), the U.S. Environmental Protection Agency (USEPA), and South Carolina Department of Health and Environmental Control (SCDHEC), SRS has implemented a Land Use Control Assurance Plan (LUCAP) to ensure that the LUCs required by numerous remedial decisions at SRS are properly maintained and periodically verified. The requirements of that LUCAP also apply to the LUCs that were selected as part of the RAOU remedial action (RA). This document, the RAOU LUCIP, contains the detailed and specific measures required to implement and maintain the LUCs selected as part of this particular remedial decision. The LUCs shall be maintained until the operable unit (OU) is suitable for unlimited exposure and unrestricted use. Approval by USEPA and SCDHEC is required for any modification or termination of the LUCs.

USDOE is responsible for implementing, maintaining, monitoring, reporting, and enforcing the LUCs in accordance with the approved LUCIP. Upon final approval, the LUCIP will be appended to the LUCAP and should be considered incorporated by reference into the RAOU ROD (SRNS 2010a), establishing implementation and maintenance requirements for the LUCs

under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and the SRS Federal Facility Agreement (FFA) (FFA 1993). The LUCIP will remain in effect unless and until modifications are approved by USEPA and SCDHEC as necessary for protection of human health and the environment. This LUCIP will be evaluated for accuracy during the five-year remedy review, and any approved LUCIP modification will be appropriately documented for incorporation by reference into the RAOU ROD.

1.1 Format of LUCIP

The format of this LUCIP is consistent with the FFA protocol format approved by USEPA and SCDHEC in March 2004.

2.0 OVERVIEW OF RAOU REMEDIAL ACTION

2.1 General Description and History of the Unit

SRS occupies approximately 802.8 km^2 (310 mi^2) of land adjacent to the Savannah River, principally in Aiken and Barnwell counties of South Carolina. SRS is located approximately 6.4 km (25 mi) southeast of Augusta, Georgia, and 32.1 km (20 mi) south of Aiken, South Carolina.

The RAOU is located approximately 5 km (3.1 mi) northeast of the geographical center of SRS and about 7.0 km (4.3 mi) northwest of the nearest site boundary (Figure 1). The RAOU is approximately 182 hectares (450 acres), including groundwater plumes, and is located predominantly in the Lower Three Runs (LTR) watershed; however, the northwestern portion of the RAOU is located in the Upper Three Runs (UTR) watershed. The RAOU is situated on a local topographic high that serves as the drainage divide between UTR and LTR. The water table in the RAOU assumes the shape of a mound or ridge, with radial outward flow. In the vicinity of the R-Reactor Building (105-R), the water table ranges between approximately 1 m (3 ft) to 3 m (10 ft) below ground surface (bgs), depending upon seasonal effects and the location within the RAOU.

In December 1953, R-Reactor began operations with a mission of producing nuclear materials for the defense program. SRS reactors were both low pressure and low temperature reactors with heavy water cooling of the core. R-Reactor was shut down in 1964 due to reduced requirements

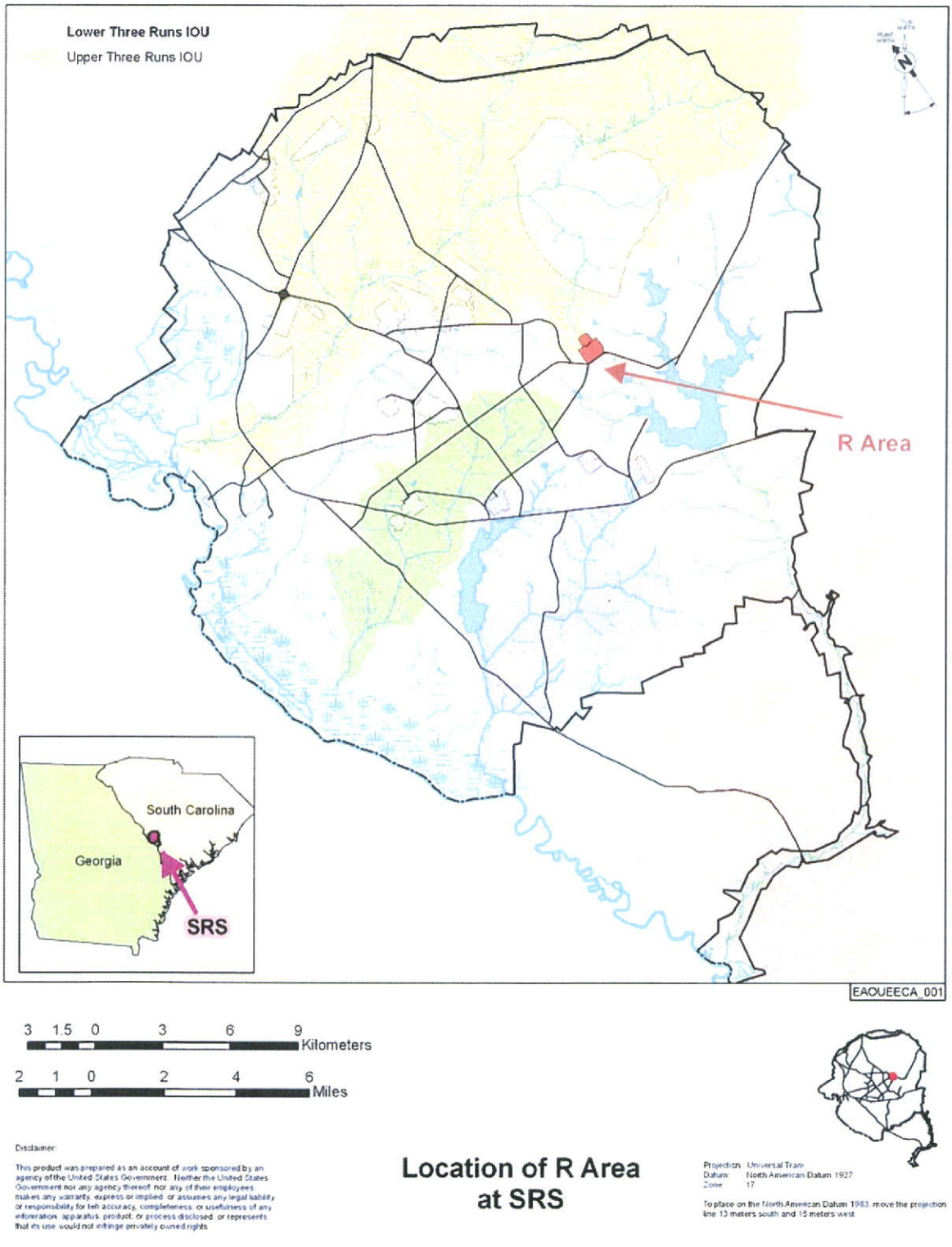


Figure 1. Location of the RAOU within the Savannah River Site

for defense-related products. Immediately following the shutdown, the R-Reactor was de-fueled and all fissile materials were removed. Reactor operations resulted in the generation of chemical and radioactive wastes.

Contamination in R Area has been addressed under an area-wide remedial strategy. As part of this strategy, Resource Conservation and Recovery Act (RCRA)/CERCLA/SE units and D&D facilities (or remnants) in the former R-Area industrial area were consolidated into a single OU (i.e., the RAOU). The characterization evaluation and analysis of the RAOU were documented in the RCRA Facility Investigation/Remedial Investigation (RFI/RI) Report with Baseline Risk Assessment (BRA), and Corrective Measures Study/Feasibility Study (CMS/FS) for RAOU (SRNS 2009a).

The RAOU is comprised of multiple subunits, PSAs, D&D facilities and a SE area, as identified in Figure 2.

Regulatory decisions were previously made on select RAOU subunits. These decisions included Non-Time Critical (NTC) removal actions documented in multiple Removal Site Evaluation Reports (RSER)/Engineering Evaluation/Cost Analyses (EE/CAs) (WSRC 1995a, WSRC 1995b SRNS 2009b, c, d, and e, USDOE 2002). The Cask Car Railroad Tracks, RBC (including the Disassembly Basin), the Process Sewer Lines (PSLs), and the R-Ash Basin are all subunits that were selected for NTC removal actions. The NTC removal actions are scheduled to be completed by 2011. The LUCs for the RAOU were selected based on the assumption of successful completion of the NTC removal actions. The RAGW Subunit and the R-Area Isolated Contamination Area (ICA) PSA have an unacceptable exposure risk to human health and will require LUCs as part of the selected remedy. All other RAOU subunits, presented in the RCRA RFI/RI/BRA/CMS/FS report (SRNS 2009a), were determined to pose no impact to human health (industrial use). However these units will be managed with LUCs to prevent unrestricted land use.

Within the RAOU boundary, six D&D facilities and one SE area were determined to require No Further Action (NFA). These facilities and area pose no impact to human health or the

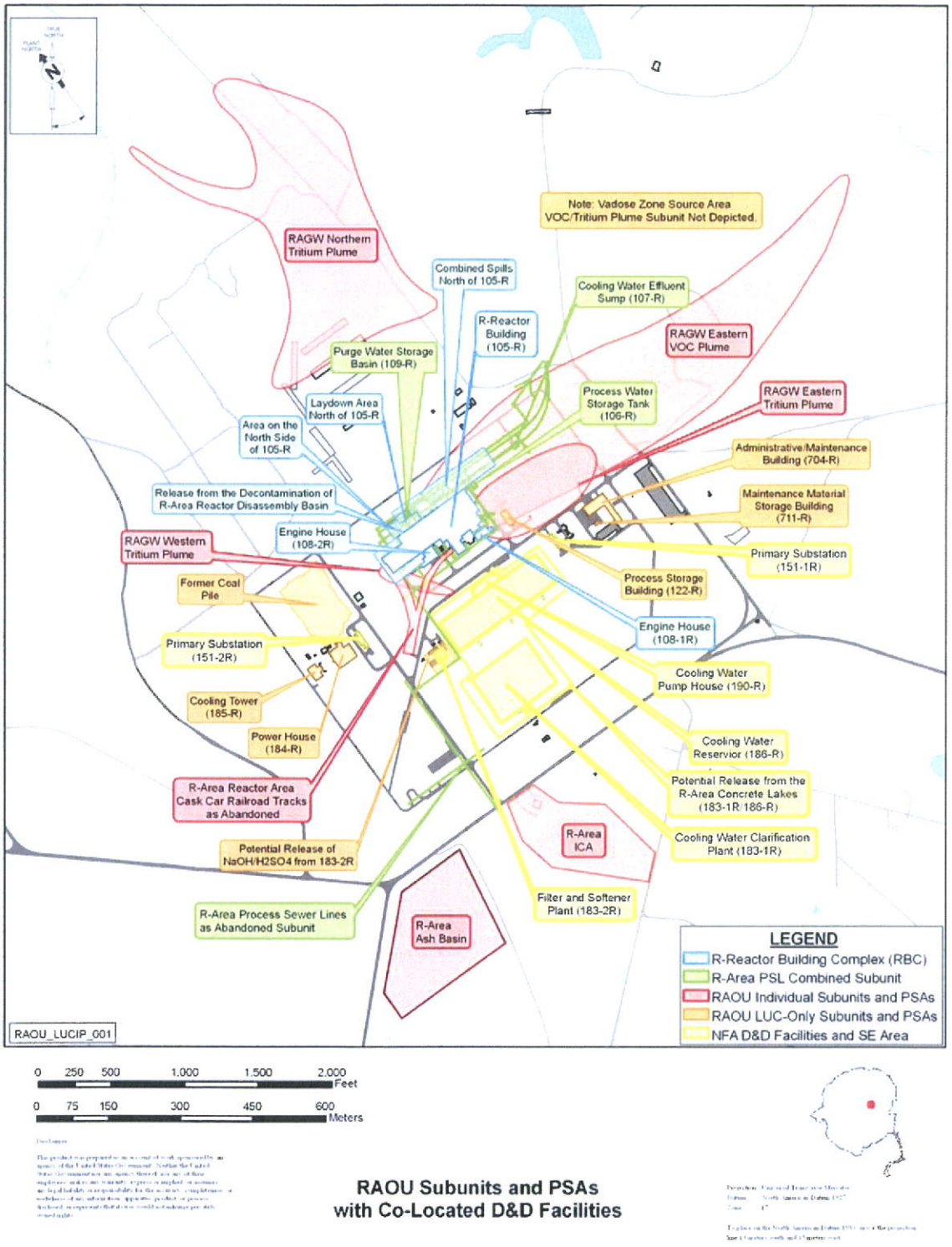


Figure 2. Layout of the R Area Operable Unit with Subunit Groups

environment based on an unrestricted land use scenario. Although LUCs are not required for these subunits, these facilities will be included with the LUCs selected for the RAOU because of their location within the R-Area fence line. Table 1 presents a summary of the regulatory decisions for each of the subunits.

The R Area at SRS is located in an area of historically heavy industrial (nuclear) land use as identified in the LUCAP (WSRC 1999). Remedial action objectives and likely response actions were developed consistent with future industrial non-residential land use. LUCs will restrict use because of the contamination that will be left behind at the RAOU. Appropriate LUCs against unrestricted and/or residential use will be part of all RAs for the RAOU. As detailed herein, land use restrictions to prevent unrestricted use will be placed on the entire area outlined as the RAOU LUC boundary depicted on Figure 3 and further restrictions will be placed to prohibit industrial use in the ICA PSA.

2.2 Nature and Extent of Contamination

Hazardous and radioactive substances at the RAOU have been released into the environment. Subsequent to the completion of the NTC removal actions, hazardous and radioactive wastes will remain in place at some of the subunits. The characterization evaluation and analysis of each of the subunits requiring LUCs in the RAOU are documented in the RFI/RI/BRA/CMS/FS for RAOU (WSRC 2009a). The subunits selected for NTC removal actions, where residual contamination will remain are discussed briefly below.

The **RBC (105-R)** is located centrally within R Area. The RBC Subunit is subdivided into the following four components:

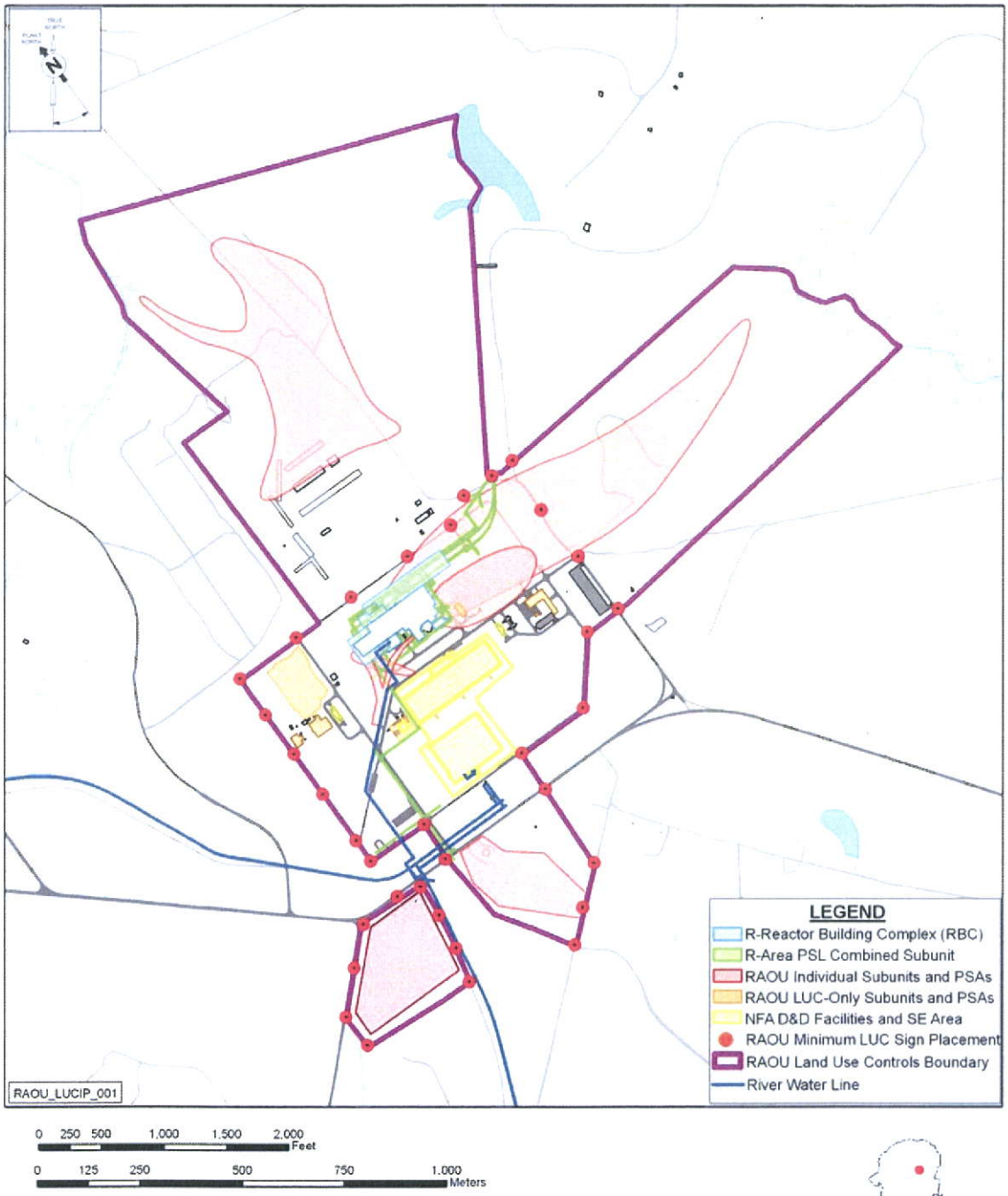
- R-Reactor Building (105-R) including the Engine Houses [108-1R/ 108-2R]) Subunits
- Area on the North Side of Building 105-R, Laydown Area North of 105-R, Release from the Decontamination of R-Area Reactor Disassembly Basin (NBN) Subunits
- Combined Spills North of Building 105-R (NBN) Subunit
- Potential Release from the R-Area Disassembly Basin (105-R) Subunit

Table 1. List and Status of Subunits at the RAOU

FFA Appendix	Combined Subunit Name	RAOU Subunit or PSA Name	Removal Action	Reference Documents	Final Selected Remedy
C.5 Area OU	R-Reactor Building (105-R) Complex	R-Reactor Building (105-R) and Engine Houses (108-1R and 108-2R) Subunits	Dewater Disassembly Basin (DB); Grout Below-Grade areas; Grout Reactor Vessel in place; Concrete cover over grouted Reactor Vessel; Seal exterior openings to Reactor Building; Demolish Above-Grade DB and dispose at the slit trenches; Concrete Cover for DB and contaminated soil;	RSER/EE/CA for the R-Reactor Disassembly Basin (USDOE 2002)); ROD Remedial Alternative Selection for R-Area Operable Unit (SRNS 2010a); RSER/EE/CA for the R-Reactor Building (105-R) Complex (SRNS 2009e).	RAOU LUCs
C.5 Area OU		Area on the North Side of Building 105-R, Laydown Area North of 105-R, Release from the Decontamination of R-Area Reactor Disassembly Basin Subunits			
C.5 Area OU		Combined Spills North of Building 105-R Subunit			
C.5 Area OU		Potential Release from the R-Area Disassembly Basin (105-R) Subunit			
C.5 Area OU	RPSL Combined Subunit	R-Area Process Sewer Lines as Abandoned (NBN) Subunit	Isolation Plugging of R-Reactor RPSLs and Drainage System; Grouting of Manholes, Diversion Boxes, and Tanks; Plug Outfalls; and LUCs.	RSER/EE/CA for the R-Area Process Sewer Lines (SRNS 2009b)	RAOU LUCs
Other PSA		Process Water Storage Tank (106-R) PSA			
C.5 Area OU		Cooling Water Effluent Sump (107-R) Subunit			
C.5 Area OU		Purge Water Storage Basin (109-R) Subunit			
C.5 Area OU	NA	R-Area Reactor Area Cask Car Railroad Tracks as Abandoned (NBN) Subunit	Removal & disposal Cesium-137 (+D) (>10pCi/g); and LUCs.	RSER/EE/CA for the R-Area Reactor Area Cask Car Railroad Tracks (SRNS 2009d)	RAOU LUCs
C.5 Area OU	NA	R-Area Ash Basin (188-R) Subunit	Vegetation Removal; Soil Cover; LUCs	RSER/EE/CA for the R-Area Ash Basin (SRNS 2009c)	RAOU LUCs
C.5 Area OU	NA	R-Area Groundwater (NBN) Subunit	None	RAOU RFI / RI / BRA / CMS / FS (SRNS 2009a)	RAOU LUCs and MNA
Other PSA	NA	R-Area Isolated Contamination Area PSA	None	RAOU RFI / RI / BRA / CMS / FS (SRNS 2009a)	RAOU LUCs (Prevent Industrial Land Use)
C.5 Area OU	NA	Process Storage Building (122-R) Subunit	None	RAOU RFI / RI / BRA / CMS / FS (SRNS 2009a)	RAOU LUCs
C.5 Area OU	NA	Potential Release of NaOH/H2SO4 from 183-2R Subunit	None	RAOU RFI / RI / BRA / CMS / FS (SRNS 2009a)	RAOU LUCs
Other PSA	NA	Power House (184-R) PSA	None	RAOU RFI / RI / BRA / CMS / FS (SRNS 2009a)	RAOU LUCs
Other PSA	NA	Cooling Tower (185-R) PSA	None	RAOU RFI / RI / BRA / CMS / FS (SRNS 2009a)	RAOU LUCs
Other PSA	NA	Former Coal Pile (NBN) PSA	None	RAOU RFI / RI / BRA / CMS / FS (SRNS 2009a)	RAOU LUCs
Other PSA	NA	Administrative and Maintenance Building (704-R) PSA	None	RAOU RFI / RI / BRA / CMS / FS (SRNS 2009a)	RAOU LUCs
Other PSA	NA	Maintenance Material Storage Building (711-R) PSA	None	RAOU RFI / RI / BRA / CMS / FS (SRNS 2009a)	RAOU LUCs
Other PSA	NA	Eastern VOC/Tritium Groundwater Plume PSA	None	RAOU RFI / RI / BRA / CMS / FS (SRNS 2009a)	RAOU LUCs

Table 1. List and Status of Subunits at the RAOU *(Continued/End)*

FFA Appendix	Combined Subunit Name	D&D Facility or SE Area Name	Removal Action	Reference Documents	Final Selected Remedy
K.2 D&D NFA	NA	Primary Substation 151-1R	No Further Action	SRNS 2009f	Not Applicable
K.2 D&D NFA	NA	Primary Substation 151-2R	No Further Action	WSRC 2006a	Not Applicable
K.2 D&D NFA	NA	Cooling Water Clarification Plant (183-1R)	No Further Action	WSRC 2005a	Not Applicable
K.2 D&D NFA	NA	Filter and Softener Plant (183-2R)	No Further Action	WSRC 2005b	Not Applicable
K.2 D&D NFA	NA	Cooling Water Reservoir (186-R)	No Further Action	WSRC 2006b	Not Applicable
K.2 D&D NFA	NA	Cooling Water Pump House (190-R)	No Further Action	WSRC 2006c	Not Applicable
G.2 SE NFA	NA	Potential Release from the R-Area Concrete Lakes (183-1R/186-R)	No Further Action	WSRC 1994	Not Applicable



RAOU Land Use Controls
LUC Boundary

Disclaimer

This product was prepared as an account of work sponsored by an agency of the United States Government. Neither the United States Government nor any agency thereof, nor any of their employees, makes any warranty, express or implied, or assumes any legal liability or responsibility for the accuracy, completeness, or usefulness of any information, apparatus, product, or process disclosed, or represents that its use would not infringe privately owned rights.

Projection: Universal Transverse Mercator
Datum: North American Datum 1927
Zone: 17

To place on the North American Datum 1983, move the projection line 13 meters south and 18 meters west.

Figure 3. Land Use Control Boundary for the R Area Operable Unit

The primary sources of contamination in the RBC subunit are due to the facility operations. Spills, leaks, accidental releases, or simply the operation itself resulted in a release of hazardous and/or radioactive substances. Within the R-Reactor Building (105-R), including the Disassembly Basin, and Engine Houses (108-1R and 108-2R), there is an estimated total of 6.39E+04 Ci of radionuclide inventory/contamination, primarily activation products in the stainless steel and aluminum components of the reactor vessel. Hazardous material is also present in the subunit. Lead and polychlorinated biphenyls constitute the majority of the hazardous inventory. Cesium-137 contamination was found in the soils and on concrete slabs, and near penetrations in the asphalt in an area on the north side of the R-Reactor Building (105-R). The contaminants present an unacceptable risk to human health (industrial worker) and the potential to impact groundwater.

RPSLs are located throughout the RAOU. The RPSLs consist of 6.4 km (4 mi) of underground process and storm sewer lines of various sizes and configuration throughout R Area. The RPSLs as Abandoned (NBN) Subunit has been combined with the Process Water Storage Tank PSA (106-R), the cooling Water Effluent Sump (107-R) Subunit, and the Purge Water Storage Basin (109-R) Subunit because they are interconnected and have similar process histories. No contamination was found in the soils exterior to the RPSL Combined Subunit during characterization efforts. Based on process knowledge and limited data from PSL investigations conducted in R- and C-Reactor Areas, there is a potential for radiological contamination (such as cesium-137 and cobalt-60) to be fixed within the pore spaces of the concrete or trapped in the rust and scale in these lines above principal threat source material (PTSM) thresholds. Any structures outside the RBC (105-R) that came in contact with the RPSLs are also assumed to be contaminated with cobalt-60 and cesium-137.

The **R-Area Reactor Groundwater (NBN)** Subunit comprises three distinct tritium plumes and a VOC plume. The combined area of the RAGW Subunit is approximately 22.3 ha (55 ac). The tritium and VOC concentrations within the RAGW Subunit exceed their respective maximum contaminant levels (MCLs). The area of the plumes exceeding MCLs is shown on Figure 2.

The **R-Area ICA PSA** contains cesium-137 contamination that typically would require active remediation. However, the Core Team agreed that any remedial activity in this area would result in unacceptable damage to the sensitive ecology of the cypress wetland where the contamination is present. This subunit is located south of R Area and comprises an area of approximately 3.44 ha (8.5 ac). LUCs were selected as the remedy for this subunit to prevent future residential use and limit exposure to the industrial worker. The wetland area is not a favorable location for future industrial use.

The **Cask Car Railroad Tracks Subunit** is located southwest of the RBC (105-P). Soils, railroad ties, and railbed material in the Cask Car Railroad Tracks were contaminated with cesium-137 as a result of rainwater carrying the radiological materials from outside of the casks onto the ground surfaces along the tracks. The total area of the Cask Car Railroad Tracks Subunit is approximately 7,625 m^2 (9119 yd^2).

The **R-Ash Basin** is located outside of the southwestern perimeter of R Area south of the RBC (105-R). The R-Ash Basin received coal ash from the R-Area Powerhouse. The ash and associated contaminants are contained within the earthen basin, which is approximately 49,776 m^2/5.0 ha (59,532 yd^2/12.3 ac). The ash thickness in the basin tapers from 4.9 m (16 ft) at the point the coal ash was sluiced into the basin in the north to 0.15 m (0.5 ft) at the lowest point of the basin at the southern end. Arsenic and naturally occurring radionuclides (potassium-40, radium-226, uranium-235, uranium-238), were identified as constituents of concern in the R-Area Ash Basin.

The RCRA RFI/RI Report with BRA, and CMS/FS for RAOU (WSRC 2009a) provides the characterization data and interpretation of the nature and extent of contamination for the remaining eight subunits that are included within the LUC boundary. These subunits were evaluated based on use by a future industrial receptor. No problems warranting action were identified.

The selected remedy for the RAOU leaves radioactive and hazardous substances that pose a potential future risk in place. Land use restrictions will be required until the concentrations of

radioactive and hazardous substances in the soil are at levels that allow for unrestricted use and exposure.

2.3 Remedial Actions Selected

The selected RA for the RAOU is LUCs and MNA. The selected RA is based on successful completion of the NTC removal actions. NTC removal actions have been documented in the RSER/EE/CAs (SRNS 2009b, 2009c, 2009d, 2009e, USDOE 2002). These actions will require long-term maintenance as part of this final action LUCIP to ensure that the remedy remains protective. The removal actions are presented below.

- Excavation and disposal of contaminated media at the R-Reactor Cask Car Railroad Tracks (SRNS 2009d);
- Soil cover over the R-Ash Basin (SRNS 2009c);
- Isolation/plugging of RBC (105-R) PSLs; grouting of associated underground structures, manholes, weirs and boxes; select removal of process equipment external to the RBC (105-R; sealing/plugging of outfalls (SRNS 2009b);
- Dewatering and grouting the R-Reactor Disassembly Basin to stabilize the contaminants (USDOE 2002),
- In Situ Decommissioning (ISD) of the RBC (105-R). ISD of the R-Reactor Building (105-P) Complex entails the following (SRNS 2009e):
  - Leave the Process, the Purification, the Assembly Areas of the RBC (105-R) and the Actuator Tower in place,
  - Grout the contents of the Disassembly Basin to grade,
  - Demolish the above-grade structure of the Disassembly Area to grade-level,
  - Remove the stack above the plus 16.8-m (55-ft) elevations,
  - Construct a new partial roof over the shield door slots to prevent rainwater ingress,

- Grout the Reactor Vessel in place with a constructed concrete cover, sloped to allow water runoff in the event of future rainwater ingress,
- Leave the Process Room, an above-grade structure, in its current state,
- Place a sloped concrete cover over the grouted Disassembly Basin and contaminated soil and slabs in the area north of the R-Reactor Building (105-R),
- Grout all vacant spaces from the 0-m (0-ft) level (grade) down to the minus 15.1-m (49.5-ft) level in place (to the extent practical),
- Grout the Purification Area cells and the below-grade area of Purification in place,
- Seal all RBC exterior openings.

Following successful completion of NTC removal actions, residual hazardous substances will remain at the RAOU. The selected final remedy for the RAOU, as established in the RAOU ROD (SRNS 2010a), includes LUCs. These LUCs are also for the entire RAOU, including the subunits designated in Table 1.

LUCs will include administrative controls (i.e., institutional controls) and engineering controls. LUCs will consist of property record notices and restrictions, Site Use/Site Clearance Program restrictions, and physical access controls. Warning signs will be posted at the LUC boundary as depicted in Figure 3 upon completion of the removal actions. LUCs will also include site maintenance (site inspections, general housekeeping, repair of erosion damage and other routine maintenance as needed).

The post-RA conceptual site model (Figure 4) demonstrates that the exposure pathways to an industrial worker are incomplete following implementation of the RA. According to the *Savannah River Site Future Use Project Report* (USDOE 1996), residential use of SRS land is prohibited.

3.0 LAND USE CONTROL OBJECTIVES

The following RAOU LUC objectives have been developed to ensure the protectiveness of the remedy described above:

- Restrict unauthorized access and prevent contact, removal, or excavation of contaminated waste, pipelines, equipment and buildings
- Prohibit industrial use of the R-Area ICA PSA
- Prohibit the development and use of property for residential housing, elementary schools, childcare facilities and playgrounds
- Maintain the integrity of any current or future remedial or monitoring systems such as soil covers, or groundwater monitoring wells
- Prevent access to or use of contaminated groundwater until cleanup levels are met
- Prevent construction of inhabitable buildings without an evaluation of indoor air quality to address vapor intrusion

Current access controls and deed notification needed to maintain the future land use are described in the following sections of this LUCIP.

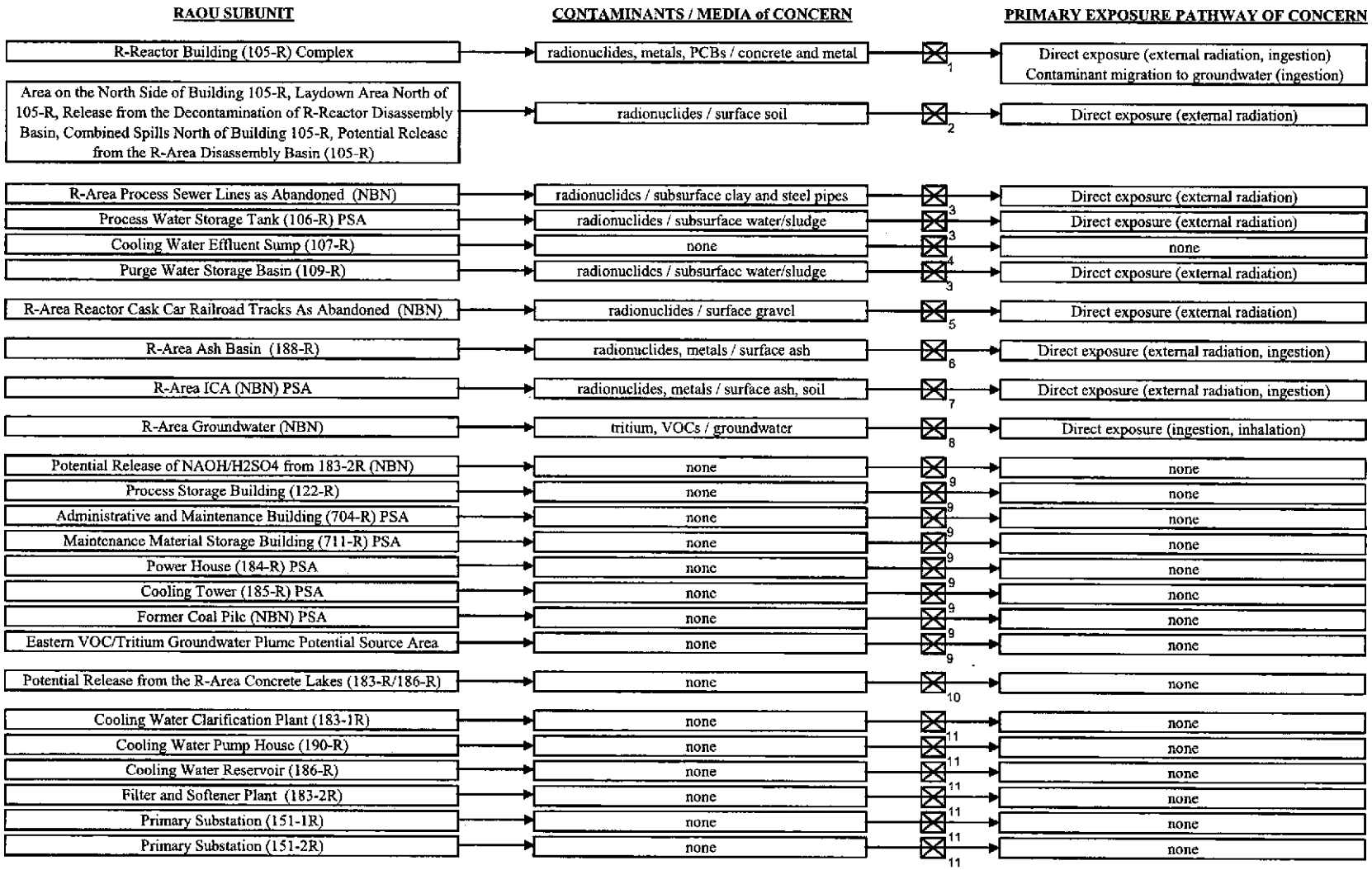


Figure 4. Conceptual Site Model for the R Area Operable Unit Final Action

LEGEND

Symbols: → Complete exposure pathway. ⊠→ Incomplete exposure pathway due to final remedial action.

1 - In Situ Decommissioning with Reactor Vessel grouted in place (SRNS 2009e); RAOU Land Use Controls after completion of removal action .

2 - Concrete Cover (SRNS 2009e), RAOU Land Use Controls after completion of removal action.

3 - Isolation, Plugging of RPSLs and Drainage System; Grouting of Manholes, Diversion Boxes, and Process Tanks; Select Removal of Process Equipment External to the Reactor Building; Sealing/ Plugging of Outfalls (SRNS 2009b), RAOU Land Use Controls after completion of removal action.

4 - No COCs identified for these individual waste units- however they have been combined with the RPSLs because they are interconnected and have similar process histories (SRNS 2009b). RAOU Land Use Controls after completion of removal action.

5 - Excavate, Remove and Cover (SRNS 2009d), RAOU Land Use Controls after completion of removal action.

6 - Soil Cover (SRNS 2009c), RAOU Land Use Controls after completion of removal action.

7 - RAOU Land Use Controls.

8 - Monitored Natural Attenuation, R-Area Land Use Controls.

9 - No COCs based on an industrial land use scenario; RAOU Land Use Controls needed to prevent unrestricted land use.

10 - No COCs per evaluation performed in the Site Evaluation Program (FFA Appendix G.2). No Further Action (unrestricted land use).

11 - No COCs per evaluation performed in the D&D Program (FFA Appendix K.2). No Further Action (unrestricted land use).

Figure 4. Conceptual Site Model for the R Area Operable Unit Final Action *(Continued/End)*

4.0 IMPLEMENTATION OF LAND USE CONTROLS

This section describes the LUCs selected in the ROD to achieve the objectives stated in Section 3.0. A summary of the types of controls is provided in Table 2. USDOE is responsible for implementing, maintaining, reporting on, and enforcing the RAOU LUCs. The LUCIP will become enforceable and will be implemented when approved by USEPA and SCDHEC following the completion of the RA prescribed by the RAOU ROD. USDOE shall notify USEPA and SCDHEC 60 days in advance of any proposed land use changes that are inconsistent with LUC objectives or the selected remedy.

The RAOU will be maintained as an industrial use area, except where industrial use is prohibited in the ICA PSA, by implementation of the property record notices (Section 4.1) and restrictions (Section 4.2), and the use of a certified LUC survey plat (Section 4.3). Figure 3 illustrates approximate RAOU land-use boundary requirements.

The Site Use Program (Section 4.4) will be implemented to prevent onsite worker exposure to contamination left in place at the RAOU. Other existing measures (i.e., Site Clearance Program, worker training, health and safety requirements, work controls) will also be used to ensure worker safety at the RAOU. Physical access controls (Section 4.5) are implemented at the SRS boundary to control and restrict public and trespasser access to the RAOU and to prevent unauthorized entry into the RBC.

Signs at the RAOU will be maintained to alert onsite workers to the presence of hazardous substances. The signs will also convey the restrictions of unauthorized personnel. Access control warning signs will be placed after completion of the removal actions and will be maintained to prevent unknowing entry and unrestricted use at the surface units at the RAOU.

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Table 2. RAOU Land Use Controls

Type of Control	Purpose of Control	Duration	Implementation	Affected Areas[a]
1. Property Record Notices[b]	Provide notice to anyone searching records about the existence and location of contaminated areas.	Until the concentrations of hazardous substances associated with the unit have been reduced to levels that allow for unlimited exposure and unrestricted use	Notice recorded by USDOE in accordance with state laws at County Register of Deeds office if the property or any portion thereof is ever transferred to non-federal ownership.	RAOU where hazardous substances are left in place at levels requiring land use and groundwater restrictions.
2. Property record restrictions[c]: a. Land Use b. Groundwater	Restrict use of property by imposing limitations. Prohibit the use of groundwater.	Until the concentrations of hazardous substances associated with the unit have been reduced to levels that allow for unlimited exposure and unrestricted use	Drafted and implemented by USDOE upon any transfer of affected areas. Recorded by USDOE in accordance with state law at County Register of Deeds office	RAOU where hazardous substances are left in place at levels requiring land use and groundwater restrictions.
3. Other Notices[d]	Provide notice to city &/or county about the existence and location of waste disposal and residual contamination areas for zoning/planning purposes.	Until the concentrations of hazardous substances associated with the unit have been reduced to levels that allow for unlimited exposure and unrestricted use	Notice recorded by USDOE in accordance with state laws at County Register of Deeds office if the property or any portion thereof is ever transferred to non-federal ownership	RAOU where hazardous substances are left in place at levels requiring land use and groundwater restrictions.
4. Site Use Program[e]	Provide notice to worker/developer (i.e., permit requestor) on extent of contamination and prohibit or limit excavation/penetration activity	As long as property remains under USDOE control	Implemented by USDOE and site contractors Initiated by permit request	Subunits at RAOU where remedy components cannot be disturbed, where industrial us is prohibited, and where levels requiring land use and groundwater restrictions.
5. Physical Access Controls[f] (e.g., fences, gates, portals)	Control and restrict access to workers and the public to prevent unauthorized access	Until the concentrations of hazardous substances associated with the unit have been reduced to levels that allow for unlimited exposure and unrestricted use	Controls maintained by USDOE	Security is provided at site boundaries in accordance with SRS procedures.

Table 2. RAOU Land Use Controls *(Continued/End)*

Type of Control	Purpose of Control	Duration	Implementation	Affected Areas[a]
6. Warning Signs[g]	Provide notice or warning to prevent unauthorized uses	Until the concentrations of hazardous substances associated with the unit have been reduced to levels that allow for unlimited exposure and unrestricted use	Signage maintained by USDOE	Warning signs will be posted in accordance with applicable site procedures and will be placed in appropriate areas of the RAOU after completion of the removal actions..
7. Security Surveillance Measures	Control and monitor access by workers/public	Until the concentrations of hazardous substances associated with the unit have been reduced to levels that allow for unlimited exposure and unrestricted use	Established and maintained by USDOE Necessity of patrols evaluated upon completion of RAs	Security and surveillance measures are in place at the SRS boundary in accordance with RCRA-permit requirements.

[a]Affected areas – Specific locations identified in the SRS LUCIP or subsequent post-ROD documents.
[b]Property Record Notices – Refers to any non-enforceable, purely informational document recorded along with the original property acquisition records of USDOE and its predecessor agencies that alerts anyone searching property records to important information about residual contamination or waste disposal areas in the property.
[c]Property Record Restrictions – Includes conditions and/or covenants that restrict or prohibit certain uses of real property and are recoded along with original property acquisition records of USDOE and its predecessor agencies.
[d]Other Notices – Includes information on the location of waste disposal areas and residual contamination depicted on as survey plat, which is provided to a zoning authority (i.e., city planning commission) for consideration in appropriate zoning decisions for non-USDOE property.
[e]Site Use Program – Refers to the internal USDOE/USDOE contractor administrative program(s) that requires the permit requestor to obtain authorization, usually in the form of a permit, before beginning any excavation/penetration activity (e.g., well drilling) for the purpose of ensuring that the proposed activity will not affect underground utilities/structures, or in the case of contaminated soil or groundwater, will not disturb the affected areas without the appropriate precautions and safeguards.
[f]Physical Access Controls – Physical barriers or restrictions to entry.
[g]Signs – Posted command, warning or direction.

4.1 Property Record Notices

In the long term, if the property is ever transferred to non-federal ownership, the United States 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, areas of groundwater contamination that exceed MCLs, and RAs taken on the site. The contract for sale and the deed will contain the notification required by CERCLA Section 120(h).

The deed notification shall notify any potential purchaser that the property has been used for the management and disposal of waste. These requirements are also consistent with the intent of RCRA deed notification requirements at final closure of a RCRA facility if contamination will remain at the unit.

4.2 Property Record Restrictions

The deed shall also include deed restrictions precluding residential use of the property, specifically preventing the installation of any groundwater supply well within the contaminated aquifer so that groundwater containing contaminants exceeding MCLs cannot be used for drinking water and preventing industrial use within the ICA PSA. The deed shall expressly prohibit activities inconsistent with the remedial goals and objectives in the RAOU ROD upon any and all transfers. USDOE shall provide a copy of the executed deeds to the regulatory agencies as soon as practicable after the transfer of fee title, but no later than 30 days. However, the need for these deed restrictions may be re-evaluated 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 or the groundwater contamination levels no longer exceed MCLs. Any re-evaluation of the need for the deed restrictions will be done through an amended ROD.

USDOE shall provide USEPA and SCDHEC at least six-months' notice prior to transfer or sale so that USEPA and SCDHEC can be involved in discussions to ensure that appropriate provisions are included in the transfer terms or conveyance documents to maintain effective

LUCs. If it is not possible for the facility to notify USEPA and SCDHEC at least six months prior to any transfer or sale, then the facility will notify USEPA and SCDHEC as soon as possible but no later than 60 days prior to the transfer or sale of any property subject to LUCs. In addition to the land transfer notice and discussion provisions above, USDOE further agrees to provide USEPA and SCDHEC with similar notice within the same time frames as to federal to federal transfer of property.

4.3 Other Public Notices

The LUCIP identifies the proposed area under land use restrictions in Figure 3 for the RAOU. The LUC boundary depicted in Figure 3 encloses the subunits, PSAs, D&D facilities and SE areas that are subject to restriction because contamination has been left in place. In addition, the LUC boundary encloses the contaminant concentrations in local groundwater that exceed MCLs. All areas of MCL exceedance are enclosed by the RAOU LUC boundary, which also provides a buffer zone around the exceedances. Preparation of a survey plat will be deferred until the site is transferred to non-federal ownership. If the survey plat for the area subject to LUCs is prepared at the time the land is transferred, the description of the groundwater area under restrictive covenant will be more current and accurate. The deferred survey plat will be appended to this LUCIP when it is completed.

4.4 Site Use Program

Under DOE Order 430.1A, *Life Cycle Management* (USDOE 1998), SRS is required to implement an asset management program for the use, maintenance, and disposal of physical assets, including real estate. SRS complies with this order through its Site Use Program, which is conducted in accordance with SRS Manual 1D, *Site Infrastructure and Services Manual*, Procedure 3.02, "Site Real Property Configuration Control" (SRS 2006). All employees, contractors, and visitors at SRS are required to adhere to the Site Use Program. No use of land (i.e., excavation or any other land use) shall be undertaken without prior approval documented by a Site Use Permit. Also, in accordance with SRS Manual 1D, Procedure 3.02, all work at SRS that adds to or modifies features or facilities portrayed on SRS development maps (i.e., plot

plans of facilities/utilities at SRS) will be authorized by a Site Clearance Permit before any activities are conducted. All Site Clearance Requests will be reviewed to verify that either an approved Site Use Permit has been obtained or that the request is sanctioned by an existing Site Use Permit. All land use requirements applicable for the OU will be provided to the Site Use Program for use in determining issuance of Site Clearance Permits. In addition, the Site Use Permit must be amended when the geographic configuration or buffer zone used to establish the permit boundary changes or permitted land use changes.

SRS is responsible for updating, maintaining, and reviewing site maps, including FFA (FFA 1993) OU identifications. If a Site Clearance Request potentially impacts an FFA OU, the Site Clearance Request Form is sent to the appropriate FFA OU reviewer for approval. The roles and responsibilities of each individual are detailed in SRS Manual 1D, *Site Infrastructure and Services Manual*, Procedure 3.02, "Site Real Property Configuration Control" (SRS 2006). Before a Site Clearance Permit is issued, verification of USDOE approval for intended land use must be obtained. The site use and site clearance processes are applicable to all activities and personnel on site (including subcontractors). USDOE will notify USEPA and SCDHEC in advance of any change to any internal procedure, including the Site Use Program, which would affect implementing or maintaining the LUCs. The processes are controlled within the SRS Quality Assurance Program in accordance with SRS 1Q Manual, *Quality Assurance* (SRS 2010). The SRS Quality Assurance Program governs all SRS activities.

SRS identifies all buildings and facilities on maps used in the Site Use Program. This waste unit is identified on these maps as a CERCLA facility. The RAOU LUC boundaries are shown in Figure 3.

Any work proposed in these areas will be strictly controlled, and workers will be trained and briefed about health and safety requirements if work is deemed necessary for maintenance or groundwater or surface water. No change in land use at the RAOU shall be undertaken without USEPA and SCDHEC approval. Proposed excavation activities within the RAOU LUC boundary must be approved by the RAOU facility custodian. Approval by USEPA and SCDHEC is required for any modification or termination of the LUCs and implementation

actions, and USDOE must obtain prior approval from USEPA and SCDHEC before taking any anticipated action that may disrupt the effectiveness of the LUCs or alter or negate the need for LUCs.

4.5 Physical Access Controls

Site-specific physical access controls are required at the RAOU. Specifically, manholes and the sewer connections to those manholes will be grouted in accordance with the RSER/EE/CA (SRNS 2009c). In addition, the entry doors will be sealed to prevent access to the RBC. SRS-wide physical access controls are provided at the SRS boundary as mentioned in Table 2, item 5.

4.6 Warning Signs

To prevent unknowing entry and to ensure that unrestricted use of the waste unit does not occur while the unit is under ownership of the government, access control warning signs will be posted at the unit as shown in Appendix B. Warning signs will not be installed around the groundwater plume because the depth to the contaminated groundwater is a sufficient barrier to prevent exposure. The signs shall be legible for a distance of at least 7.6 m (25 ft). Custodial responsibilities for maintenance and inspection of the RAOU will be maintained by the SRS Post-Closure Maintenance Group. Warning signs will be installed by December 30, 2011 as part of the RAOU construction. The signs will be placed at approximate locations indicated in Figure 3. The final placement of the signage will be documented in the Post-Construction Report.

4.7 Other Access Controls and Security/Surveillance Measures

While under the ownership of USDOE, access control of the entire SRS will be maintained in accordance with the 2000 RCRA Part B Permit Renewal Application, Volume I, Section F.1. This section describes the 24-hour surveillance system (R.61-79.264.14(b)(1)), artificial or natural barriers (R.61-79.264.14(b)(2)(I)), control entry systems (R.61-79.264.14(b)(2)(ii)), and access control warning signs (R.61-79.264.14(c)) in place at the SRS boundary to comply with the security requirements for a RCRA-permitted facility.

4.8 Field Inspection and Maintenance for Land Use Controls

After remediation of the RAOU, inspection, monitoring, and maintenance activities will be required as part of the RA. The RAOU will be inspected annually per the example Field Inspection Checklist (Appendix C) and will include:

- The roof structure of the 105-R RBC to ensure that it is functioning properly. Herbicides will be applied to the 105-R RBC roof structure as necessary to prevent the growth of woody vegetation on the roof structure.
- The doors into the 105-R RBC to ensure that they remain sealed.
- The Disassembly Basin cover to ensure that excessive deterioration has not occurred and that no woody vegetation is growing on the cover.
- The R-Ash Basin cover to verify that significant erosion has not occurred (60.9 cm [2 ft] thickness maintained), to ensure that no woody vegetation is growing on the cover, and to ensure that no burrowing or mounding animals are present.
- The RAOU to ensure no unauthorized excavations, digging, or construction activities within the LUC boundaries have occurred.
- Posted signs.

Additional inspections may be necessary in the event of unusual weather or any other condition warranting inspection. Inspection records will be kept in the operations record file for future access.

Groundwater monitoring will be conducted to ensure that the ISD remedy is performing as expected and that no contaminant migration constituents of concern have impacted groundwater. Groundwater and surface water monitoring will also be conducted as part of the MNA remedy of

the tritium and VOC plumes. The details of these monitoring efforts are described in the MNA Effectiveness Monitoring Plan for the RAGW Subunit (SRNS 2010b).

Maintenance (including site inspections, general housekeeping, and repair of erosion damage) will be performed as needed at RAOU. Annual inspections will ensure that access control signs are in place. Maintenance activities will be documented and maintained in files subject to USEPA and SCDHEC review and audit. A copy of the completed inspection form is maintained in the SRS Document Control Center. The LUCs shall be maintained until the concentration of hazardous substances associated with the unit have been reduced to levels that allow for unlimited exposure and unrestricted use.

The waste unit inspectors are to be trained in Hazardous Waste Operations and Emergency Response, RCRA Well Inspections (ACP-specific training), RCRA Waste Unit Inspections, Radiological Worker Training, etc., as applicable for the specific inspection. They will also be trained based on the individual requirements of the regulatory-approved closure documents for each OU. In addition, the inspectors are to attend yearly refresher courses. Over the years, different personnel may conduct the inspections and maintenance activities.

Any activity that is inconsistent with the LUC objectives or use restrictions, or any other action that may interfere with the effectiveness of the LUCs will be addressed by the USDOE as soon as practicable. In no case will the process be initiated later than 10 days after USDOE becomes aware of the breach. USDOE will notify USEPA and SCDHEC as soon as practicable but no later than 10 days after discovery of any activity that is inconsistent with the LUC objectives or use restrictions, or any other action that may interfere with the effectiveness of the LUCs. The USDOE will notify USEPA and SCDHEC regarding how the USDOE has addressed or will address the breach within 10 days of sending USEPA and SCDHEC notification of the breach. The FFA Annual Progress Report, submitted to the regulatory agencies by USDOE, will provide the status of the LUCs and describe how any LUC deficiencies or inconsistent uses have been addressed. In the event of property transfer or lease, the Annual Report will cite findings on the following: whether the use restrictions and controls referenced above were communicated in the deed(s) or lease restrictions; whether property use conforms with the deed or lease restrictions

and controls; and whether the owners and state/local agencies have been notified regarding the deed or lease restrictions and controls. The FFA Annual Progress Report(s) will be used in the preparation of the Five-Year Remedy Review Report.

This unit-specific LUCIP, including the checklist (Appendix C), will be appended to the SRS LUCAP upon final regulatory approval. After completion of the Post-Construction Report, the preliminary checklist in the LUCAP will be replaced with the final approved checklist.

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WSRC, 2005a. *Decommissioning Project Final Report 183-1R, Clarification Plant (Cooling Water)*, V-PCOR-R-00001, Westinghouse Savannah River Company, Savannah River Site, Aiken, SC

WSRC, 2005b. *Decommissioning Project Final Report 183-2R, Filter and Softener Plant (Standby)*, V-PCOR-R-00004, Westinghouse Savannah River Company, Savannah River Site, Aiken, SC

WSRC, 2006a. *Decommissioning Project Final Report 151-2R, Primary Substation (High Volt 115/13.8)*, V-PCOR-R-00010, Washington Savannah River Company, Savannah River Site, Aiken, SC

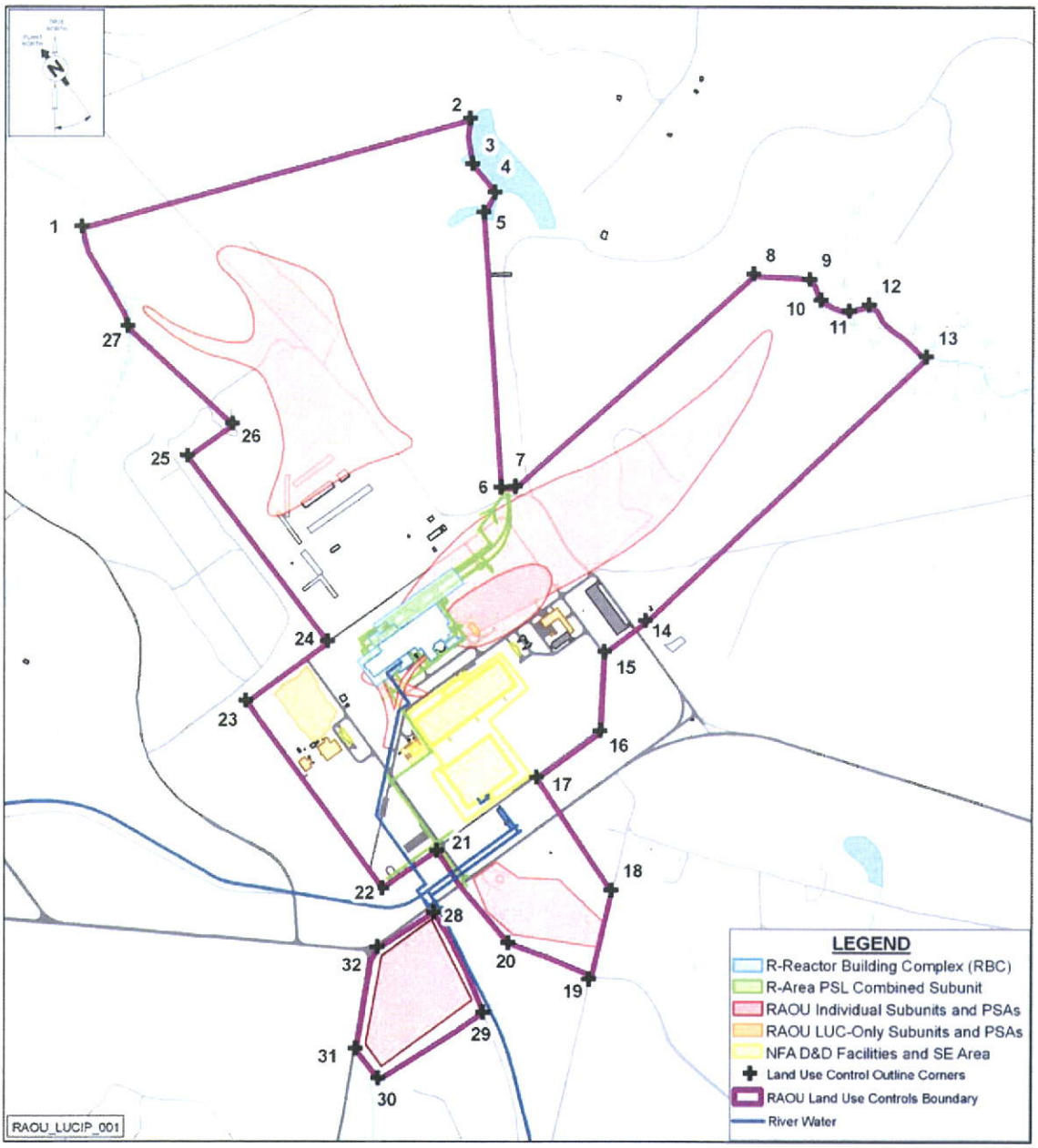
WSRC, 2006b. *Decommissioning Project Final Report 186-R, Cooling Water Reservoir (Standby)*, V-PCOR-R-00007, Washington Savannah River Company, Savannah River Site, Aiken, SC

WSRC, 2006c. *Decommissioning Project Final Report 190-R, Cooling Water Pump House (Standby)*, V-PCOR-R-00008, Washington Savannah River Company, Savannah River Site, Aiken, SC

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APPENDIX A

LAND USE CONTROL BOUNDARY WITH COORDINATES



RAOU Land Use Controls (LUCs) Boundary Vertices for Coordinate Identification

Projection: Universal Transverse Mercator
Datum: North American Datum 1927
Zone: 17

To place on the North American Datum 1983, move the projection line 15 meters south and 15 meters west

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RAOU Land Use Control Boundary Coordinates

LUC Boundary Corner Number*	SRS E	SRS N	UTM E 27	UTM N 27	LONG 27	LAT 27
1	74965.9200	61086.1200	445240.5910	3682642.1210	-81.5881	33.2832
2	77899.7700	59986.9100	446160.4580	3682897.4570	-81.5782	33.2855
3	77707.4200	59688.2400	446166.6330	3682789.3860	-81.5781	33.2845
4	77715.6800	59411.1800	446218.3530	3682722.6140	-81.5776	33.2839
5	77556.6700	59332.6500	446193.2650	3682674.7540	-81.5778	33.2835
6	76406.7500	57522.6900	446234.5640	3682022.6610	-81.5773	33.2776
7	76501.6200	57461.4600	446268.9150	3682024.5910	-81.5770	33.2777
8	78976.2000	57706.3900	446834.5980	3682528.6930	-81.5709	33.2822
9	79306.8600	57416.5400	446968.0330	3682516.5890	-81.5695	33.2821
10	79285.3400	57234.5300	446995.3720	3682467.8910	-81.5692	33.2817
11	79413.3700	57036.4300	447062.4370	3682442.0480	-81.5685	33.2815
12	79565.5300	56984.6200	447109.2120	3682456.5720	-81.5680	33.2816
13	79687.4600	56398.2000	447244.4110	3682333.9740	-81.5665	33.2805
14	76704.6500	56016.2600	446578.0990	3681704.9810	-81.5736	33.2748
15	76303.3400	56007.7100	446480.7700	3681630.9060	-81.5747	33.2741
16	75919.6800	55532.6000	446471.4570	3681445.0630	-81.5748	33.2724
17	75307.8300	55532.4900	446320.7500	3681335.3130	-81.5764	33.2714
18	75260.4700	54478.3300	446498.1270	3681067.1310	-81.5745	33.2690
19	74710.8300	54018.3600	446445.2100	3680855.2520	-81.5750	33.2671
20	74368.7500	54618.5500	446253.3090	3680941.7610	-81.5771	33.2679
21	74342.6800	55528.6000	446083.6860	3681161.2740	-81.5789	33.2699
22	73827.3000	55542.4100	445954.2480	3681072.2540	-81.5803	33.2690
23	73828.7400	57340.2400	445632.1970	3681515.4000	-81.5838	33.2730
24	74610.0900	57340.6800	445824.6020	3681655.6290	-81.5817	33.2743
25	74583.6400	59152.1400	445493.2370	3682097.1330	-81.5853	33.2783
26	75012.5900	59151.0600	445599.1010	3682173.7930	-81.5842	33.2790
27	74800.4500	60247.9400	445350.1390	3682405.9620	-81.5869	33.2810
28	74041.4700	55151.7400	446077.0670	3681014.4190	-81.5790	33.2685
29	73893.2900	54293.4200	446194.4850	3680776.4020	-81.5777	33.2664
30	72934.1600	54361.2700	445946.0390	3680621.1160	-81.5804	33.2650
31	72926.8500	54650.7000	445892.3360	3680691.1040	-81.5809	33.2656
32	73529.5100	55191.7600	445943.7710	3680932.4680	-81.5804	33.2678

*See map titled "RAOU Land Use Controls (LUCs) Boundary Vertices, Appendix A of RAOU LUCIP for loction of corners

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APPENDIX B

TYPICAL ACCESS CONTROL WARNING SIGN

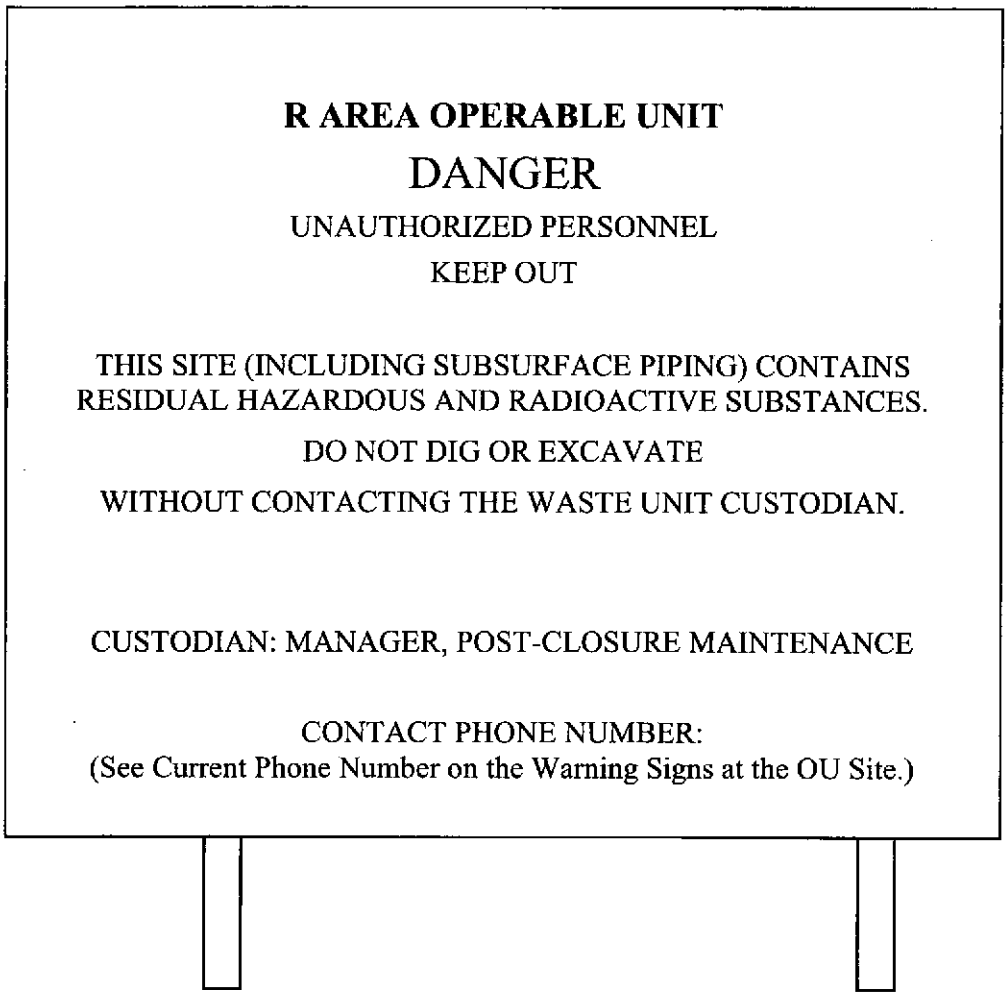


Figure B-1. Typical Access Control Warning Sign

APPENDIX C

RAOU FIELD INSPECTION CHECKLIST

FIELD INSPECTION CHECKLIST

☐ **SCHEDULED** ☐ **UNSCHEDULED**

A= Satisfactory X= Unsatisfactory (Explanation required)	**A or X**	**Observation of Corrective Action Taken**
1. Verify that roads are accessible.		
2. Verify that the waste unit signs are in acceptable condition, have the correct information, and are legible from a distance of 25 feet (ft).		
3. Verify that roof structure of 105-R Reactor Building Complex is free of woody vegetation.		
4. Verify that doors to 105-R Reactor Building Complex are sealed.		
5. Verify that excessive deterioration of the disassembly basin cover has not occurred and that the disassembly basin cover is free of woody vegetation.		
6. Verify that no woody vegetation is growing on the R Ash Basin soil cover. Remove or identify as needed.		
7. Verify that the R Ash Basin soil cover has no signs of unacceptable erosion (subsidence).		
8. Verify that signs of burrowing or mounding animals are not present at the R Ash Basin soil cover.		
9. Verify that there are no unauthorized excavations, digging, or construction activities within the LUC boundaries at RAOU.		

Inspected by:		
(Print Name)	(Signature)	(Date)

Post-Closure Manager:		
(Print Name)	(Signature)	(Date)

CAUTION: The inspector shall notify the Post-Closure Manager and Environmental Compliance Authority **IMMEDIATELY** if there has been a breach or compromise of the land use controls of this waste unit. The notification shall be in accordance with SRS post-closure inspection procedures.

LUCIP for the
F-Area Industrial Solid Waste Landfill
Land Use Control Implementation Plan for the F-Area Industrial Solid Waste Landfill
(WSRS-RP-2000-4086, Revision 0, June 2000)

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United States Department of Energy

Savannah River Site

Land Use Control Implementation Plan for the F-Area Industrial Solid Waste Landfill (U)

WSRC-RP-2000-4086

Revision 0

June 2000

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

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

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FIGURES

FIGURE 1. F-AREA INDUSTRIAL SOLID WASTE LANDFILL IDENTIFICATION SIGN LOCATIONS 7

ACRONYMS

CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CSWE	Central Services Works Engineering
FFA	Federal Facility Agreement
LUC	land use control
LUCAP	Land Use Control Assurance Plan
LUCIP	Land Use Control Implementation Plan
PAH	polynuclear aromatic hydrocarbon
RBCs	risk-based concentrations
RCRA	Resource Conservation and Recovery Act
SCDHEC	South Carolina Department of Health and Environmental Control
SRS	Savannah River Site
US DOE	United States Department of Energy
US EPA	United States Environmental Protection Agency
WSRC	Westinghouse Savannah River Company

LAND USE CONTROL IMPLEMENTATION PLAN (LUCIP) FOR THE F-AREA INDUSTRIAL SOLID WASTE LANDFILL

The F-Area Industrial Solid Waste Landfill LUCIP will be appended to the Savannah River Site (SRS) Land Use Control Assurance Plan (LUCAP) upon approval of the LUCIP.

1.0 REMEDY SELECTION

The F-Area Industrial Solid Waste Landfill (Permit No. 025500-1602, formerly IWP-219) is a 2.3-acre borrow pit where soil removal occurred during early construction of SRS industrial facilities. During the mid 1980s creosote material such as railroad crossties, utility poles, highway guardrail posts, and fence posts were disposed of at the location. Since 1992 no additional waste has been disposed of at the F-Area Industrial Solid Waste Landfill. Due to the volume of materials (approximately 200,000 crossties, poles), it was impossible to close this landfill by original design, therefore with South Carolina Department of Health and Environmental Control (SCDHEC) approval a recycling/reuse effort was begun to reduce the overall volume which would require disposal. This recycling/reuse effort began November 1995 and ended November 1996. This recycling/reuse effort reduced approximately 115,000 pieces (railroad crossties and poles) by about 70%, leaving a balance of approximately 7,000 cubic yards of small unusable pieces of ties and poles at the landfill.

All stormwater drainage from the F-Area Industrial Solid Waste Landfill is directed into an existing stormwater outfall (G-20).

SRS previously submitted a closure plan for this unit to SCDHEC (*Closure and Post-Closure Plan* (Revision 1, dated September 16, 1997). Revision 2 was prepared to replace Revision 1. Revision 2 of the *Closure and Post-Closure Care Plan for SRS F-Area Industrial Solid Waste Landfill* meets the permit requirements as well as the requirements of the new industrial solid waste landfill regulations R.61-107.16, which became effective June 26, 1998.

The proposed closure consists of placement of a final cover system over the entire permitted area (i.e., 2.3 acres) of the landfill. Eighteen (18) inches of the cover

will consist of an infiltration layer of compacted clay material with permeability no greater than 1×10^{-5} cm/sec. There will also be an erosion layer of one (1) foot of earthen material that is suitable for vegetation. The landfill will be graded to allow proper drainage, and the erosion layer will be placed and seeded to establish vegetative cover. The final grade of the landfill will have a slope of approximately 2% to promote positive drainage.

The cover system will reduce the infiltration of stormwater through the waste, eliminate the potential for exposure of the wastes caused by surface runoff and prevent direct contact of stormwater with the waste materials. Construction of the cover system will also adhere to the requirements of the approved engineering plans and specifications.

The closure will prevent human and ecological exposure to polynuclear aromatic hydrocarbon (PAH) contaminants remaining in the soil. The PAHs benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluroanthene, benzo(g,h,i)perylene, dibenzo(a,h)anthiracene, and indeno(1,2,3-c,d)pyrene were found in surface soils exceeding United States Environmental Protection Agency (US EPA) Region III risk-based concentrations (RBCs) for residential ingestion of soil. In addition, the PAHs benzo(a)anthracene, benzo(a)pyrene, and benzo(b)fluroanthene were found in isolated surface soil locations exceeding US EPA Region III RBCs for industrial worker ingestion of soil. Table 3 of Attachment 3.3 of the *Closure and Post-Closure Care Plan for SRS F-Area Industrial Solid Waste Landfill* (G-CLP-F-00001, Revision 2) details these exceedances. Any soils outside of the area to be covered in excess of the industrial RBCs, will be moved within the boundary of the permitted area and covered.

A Fate and Transport Evaluation was performed to assess the potential of unit-related contaminants to transport through vadose zone soils to groundwater and determine their environmental fate. This evaluation is similar to those done under the SRS Federal Facility Agreement (FFA) Program in Chapter 5, "Contaminant Fate and Transport," of RCRA Facility Investigation/Remedial Investigation/Baseline Risk Assessment Reports. The evaluation predicted that the contaminants will biodegrade long before reaching the groundwater under the landfill; therefore, none of the PAHs would reach the aquifer (groundwater

concentration estimated to be 0.00 μg/L) and will not adversely impact groundwater.

The highest concentrations of PAHs remain bound in the first foot of soil at the landfill. Closure of the area by placement of a combination of soil and clay cover, as required by the solid waste permit and the industrial solid waste landfill regulations R.61-107.16, will eliminate the surface soil exposure pathway to human and ecological receptors and surface waters. Vegetation growth on the soil cover will be limited to shallow rooted species to prevent biouptake and potential exposures to contaminated vegetation. Institutional controls will be maintained on the F-Area Industrial Solid Waste Landfill to prevent the potential for future human or ecological perturbation of the closed unit.

2.0 LAND USE CONTROLS

For the F-Area Industrial Solid Waste Landfill, the land use control (LUC) objective necessary to ensure protectiveness of the closure is:

- Prevent direct contact with the landfill soil.

The institutional controls required to prevent unauthorized exposure to the contaminated media at the F-Area Industrial Solid Waste Landfill include the following:

- Controlled access to the F-Area Industrial Solid Waste Landfill through existing SRS security gates and perimeter fences, an existing fence and locked gate at the facility itself, and the site use/site clearance programs,
- Prevention of residential land use (i.e., the area is classified for industrial land use only),
- Signs posted in the area to indicate that waste remains in the vicinity of the F-Area Industrial Solid Waste Landfill above levels allowing for unrestricted land use and to contact the landfill custodian prior to entry, and

- Notification of the use of the facility as a landfill to any future landowner through deed notification or other appropriate instrument, as required under R.61-107.16.61.c.(3).

In the long-term, if the F-Area Industrial Solid Waste Landfill is transferred to non-federal ownership, the need for deed restrictions will be evaluated and performed pursuant to CERCLA 120(h). The need for deed restrictions may be re-evaluated at the time of transfer in the event exposure assumptions differ and/or contamination no longer poses an unacceptable risk under residential use. Proposed changes in deed restrictions will require US EPA and SCDHEC review and approval. The survey plat will be reviewed and updated, as necessary, at the time the site is transferred and will be recorded with the Aiken County recording agency. This proposal is consistent with US EPA guidance and is an effective use of risk management principles.

Each element of the institutional controls corrective action is discussed below.

2.1 Deed Notification

In the event the property is transferred, a deed notification will be filed with Aiken County. A deed notification shall be filed with the appropriate county records in accordance with CERCLA 120(h), which requires the government to create a deed when land on which any hazardous substance was stored, released, or disposed is transferred to non-federal ownership. The transference of the F-Area Industrial Solid Waste Landfill is unlikely. Per CERCLA 120(h)(3)(A), the deed shall contain, to the extent practical, such information as is available based on the complete search of agency files, including the following:

- A notice of the type and quantity of such hazardous substances;
- Notice of the time at which such storage, release, or disposal took place;
- A description of the remedial action taken, if any.

Per CERCLA 120(h)(3)(B), the deed shall also contain a covenant warranting that

- All remedial action necessary to protect human health and the environment with respect to any such substance remaining on the property has been taken before the date of such transfer;
- Any additional remedial action found to be necessary after the date of such transfer shall be conducted by the United States Government;
- A clause granting the United Stated Government access to the property in any case in which remedial action or corrective action is found to be necessary after the date of such transfer.

The SCDHEC industrial solid waste landfill regulations, as well as the criteria established in permit number 025500-1602, are applicable to the F-Area Industrial Solid Waste Landfill.

2.2 Access Controls

2.2.1 On-Site Workers

In accordance with WSRC 1D, *Site Infrastructure and Services Manual*, Procedure 3.02, *Site Real Property Configuration Control*, use of all lands and waters on the SRS shall be coordinated via the Site Use Program. No use of land (i.e., excavation or any other land use) shall be undertaken without prior approval documented by a Site Use Permit. Also, in accordance with Procedure 3.02, all work at SRS that adds to or modifies features or facilities portrayed on the SRS development maps (i.e., plot plans of facilities/utilities at SRS) is authorized by a Site Clearance Permit before any excavation activities. All Site Clearance requests are reviewed to verify that either an approved Site Use Permit has been obtained or that an existing Site Use Permit has sanctioned the request. Verification of US Department of Energy (US DOE) approval for intended land use must be obtained before issuance of a Site Clearance Permit. The Site Use and Site Clearance Processes are applicable to all activities and personnel on site (including subcontractors). The processes are controlled within the SRS Quality Assurance Program.

The SRS identifies all buildings and facilities on maps used in the Site Use/Site Clearance Program and identifies a 200-foot buffer zone around each facility. This facility is identified on these maps as an industrial solid waste landfill.

Any work proposed in this areas will be strictly controlled and workers will be appropriately trained and briefed about health and safety requirements if work is deemed necessary for maintenance. Any changes in the use or disturbance of the F-Area Industrial Solid Waste Landfill will be cleared with the US EPA and SCDHEC before disturbance occurs. To prevent unknowing entry and to ensure that unrestricted use of the landfill does not occur while under the ownership of the government, identification signs will be posted. The signs will be legible from a distance of at least 25 feet and located in the areas as shown on Figure 1.

The signs will read:

F-Area Industrial Solid Waste Landfill

"Danger – Unauthorized Personnel Keep Out. This area was used to manage hazardous substances. Do not dig or excavate. Do not enter without contacting the landfill custodian."

Custodian: Manager, Central Services Works Engineering Roads & Field Services

Phone: (803) 557-4713

2.2.2 Trespassers

Additionally, while under the ownership of the US DOE, access control of the entire SRS will continues to be maintained in accordance with the 1992 RCRA Permit Part B Permit Renewal Application, Volume I, Section F.1. This section describes the 24-hour surveillance system (R.61-79.264.14(b)(1)), artificial or natural barriers (R.61-79.264.14(b)(2)(i)), control entry systems (R.61-79.264.14(b)(2)(ii)), and warning signs (R.61-79.264.14(c)), in place at the SRS boundary to comply with the security requirements of a RCRA-permitted facility.

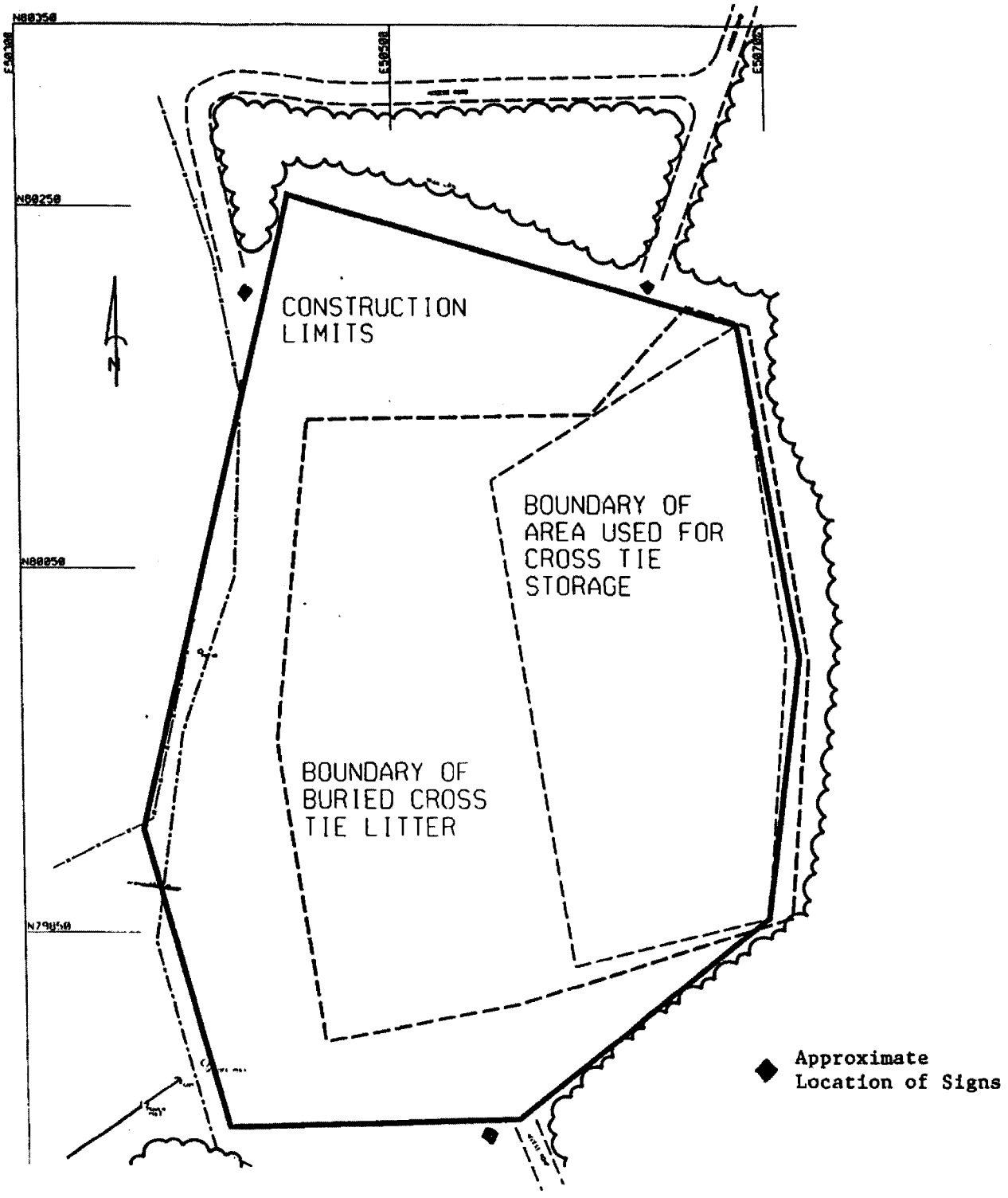


Figure 1. F-Area Industrial Solid Waste Landfill Identification Sign Locations

2.3 Field Walkdowns and Maintenance for Institutional Controls

Monitoring will be performed to verify that LUCIP requirements are being met. Quarterly monitoring of the F-Area Industrial Solid Waste Landfill will be conducted for items such as accuracy and legibility of signs, condition of the fence, security of the gate, visible signs of subsidence or erosion or surface cracking, vegetative cover condition, cover drainage, integrity of run-on and run-off control measures, etc. Subsidence or erosion will be corrected by backfilling the affected area with clean soil and seeding the area to prevent further erosion to conform as closely as possible to the original specifications. The results of any events and/or action that could indicate some potential compromise of institutional controls will be documented in a memorandum to the regulators within 30 days. All other routine maintenance activities (i.e., mowing, etc.) will be documented and maintained in files that are subject to US EPA and SCDHEC review and audit. A copy of the completed inspection form is maintained in the Administrative Record files.

Inspections at the F-Area Industrial Solid Waste Landfill will be performed to ensure that institutional controls remain protective and consistent with all closure/post-closure objectives. The F-Area Industrial Solid Waste Landfill Inspection Sheet is included as Attachment A of this LUCIP.

APPENDIX A

F-AREA INDUSTRIAL SOLID WASTE LANDFILL INSPECTION SHEET

F-AREA INDUSTRIAL SOLID WASTE LANDFILL INSPECTION SHEET

A = Satisfactory X = Unsatisfactory (Comments Required)	**A or X**	**Comments or Corrective Action Taken (See Maintenance Register for Corrected Items)**
Check for potential encroachment (ensure that there is no building on the site).		
Was the access gate locked?		
Is the fence in good condition?		
Does the site have brush or woody vegetation that needs cutting and disposal?		
Does the site need to have the grass cut?		
Are the roads to the site accessible?		
Does the site show signs of erosion or subsidence or surface cracking? Are there any signs of burrowing animals (holes)?		
Does the site have adequate vegetative cover?		
Are the site signs correct and legible?		
Does the site need general cleanup (housekeeping)?		
Are the run-on and run-off control measures adequate and of good integrity?		

Inspected By:_____/_____Date/Time:_____/_____
(Print Name) (Signature)

Accompanied By:_____/_____Date/Time:_____/_____
(Print Name) (Signature)

CSWE Manager:_____/_____Date/Time:_____/_____
(Print Name) (Signature)

Note: US EPA and SCDHEC must be notified within 30 days of identification of any area where any breach or compromise of restrictions placed on this institutional control site has occurred.

LUCIP for the
B Area Operable Unit (consists of 770-U Test Reactor Building (HWCTR), ECODS B-3 (East of B Area, South of Road C), and ECODS B-5 (Adjacent to ECODS B-3)[18]
Land Use Control Implementation Plan for the B Area Operable Unit
(SRNS-RP-2013-00113, Revision 1, January 2014)

[18] ECODS B-3 (East of B Area, South of Road C) and ECODS B-5 (Adjacent to ECODS B-3) are designated as No Action/No Further Action Operable Units.

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United States Department of Energy

Savannah River Site

enterprise·srs

Land Use Control Implementation Plan (LUCIP) for B-Area Operable Unit (U)

CERCLIS Number: 48

SRNS-RP-2013-00113

Revision 1

January 2014

Prepared by:
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Prepared for the U.S. Department of Energy Under Contract No. DE-AC09-08SR22470

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LIST OF ABBREVIATIONS AND ACRONYMS

~	approximately
ac	acre
ACP	Area Completion Projects
ARRA	American Recovery and Reinvestment Act
BAOU	B-Area Operable Unit
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
Ci	curie
CMI/RACR	Corrective Measures Implementation/Remedial Action Completion Report
CSM	Conceptual Site Model
ECA	Environmental Compliance Authority
ECODS	Early Construction and Operational Disposal Sites
FFA	Federal Facility Agreement
ft	feet, foot
ha	hectare
HAZWOPER	Hazardous Waste Operations and Emergency Response
HH	human health
HWCTR	Heavy Water Components Test Reactor
kg	kilogram
lb	pound
LUC	Land Use Control
LUCIP	Land Use Control Implementation Plan
LUCAP	Land Use Control Assurance Plan
m	meter
m^3	cubic meters
MCL	Maximum Contaminant Level
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NTCR	non-time critical removal
OU	Operable Unit
PCB	polychlorinated biphenyl
PCM	Post-Closure Manager
QA	Quality Assurance

LIST OF ABBREVIATIONS AND ACRONYMS *(Continued/End)*

RCRA	Resource Conservation and Recovery Act
ROD	Record of Decision
SCDHEC	South Carolina Department of Health and Environmental Control
SDC	Site Development Control
SLF	Sanitary Landfill
SRNS	Savannah River Nuclear Solutions, LLC
SRS	Savannah River Site
USDOE	United States Department of Energy
USEPA	United States Environmental Protection Agency
WSRC	Washington Savannah River Company, LLC
yd^3	cubic yards

1.0 INTRODUCTION

This Land Use Control Implementation Plan (LUCIP) has been prepared for the B-Area Operable Unit (BAOU) at the Savannah River Site (SRS). The BAOU consists of two subunits within B Area: the Early Construction and Operational Disposal Sites (ECODS) B-3 and B-5 subunit and the Building 770-U Heavy Water Components Test Reactor (HWCTR) subunit. The ECODS B-3 and B-5 subunit covers approximately (~) 0.04 hectare (ha [0.1 acre {ac}]) and the HWCTR subunit covers ~0.8 ha (2 ac). Groundwater is not considered part of the BAOU. The purpose of this LUCIP is to describe how the land use controls (LUCs) selected in the BAOU Record of Decision (ROD) (SRNS 2013) will be implemented and maintained. The LUC objectives have been documented in the BAOU ROD and are listed in Section 3.0.

The selected remedy for the ECODS B-3 and B-5 subunit is No Further Action. In its current state, this subunit poses no risk to human health (HH) and the environment and supports unrestricted land use. Therefore, LUCs are not required at this subunit.

The selected remedy for the HWCTR subunit is LUCs with Groundwater Monitoring. The selected remedy leaves hazardous substances in place that pose a potential future risk and will require land use restrictions until the concentrations of hazardous substances in the below-grade portion of the HWCTR facility are at levels that allow for unrestricted use. Although groundwater is not part of this operable unit (OU), the selected remedy also provides additional assurance regarding the protection of groundwater by the inclusion of an effectiveness monitoring program.

As agreed on March 30, 2000, among the United States Department of Energy (USDOE), the United States Environmental Protection Agency (USEPA), and the South Carolina Department of Health and Environmental Control (SCDHEC), SRS is implementing a Land Use Control Assurance Plan (LUCAP) (WSRC 2013) to ensure that the LUCs required by numerous remedial decisions at SRS are properly maintained and periodically verified. The requirements of that LUCAP also apply to the LUCs that were selected as part of the remedial action for the BAOU. This additional document, the BAOU LUCIP, contains the detailed and specific measures required to implement and maintain the LUCs selected as part of this particular remedial

decision. The LUCs shall be maintained until the HWCTR subunit is suitable for unlimited exposure and unrestricted use. Approval by USEPA and SCDHEC is required for any modification or termination of the LUCs.

USDOE is responsible for implementing, maintaining, monitoring, reporting, and enforcing the LUCs in accordance with the approved LUCIP. Upon final approval, the LUCIP will be appended to the LUCAP and should be considered incorporated by reference into the BAOU ROD, establishing implementation and maintenance requirements for the LUCs under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and the SRS Federal Facility Agreement (FFA) (FFA 1993). The LUCIP will remain in effect unless and until modifications are approved by USEPA and SCDHEC as necessary for protection of HH and the environment. In accordance with Section 121(c) of CERCLA and National Oil and Hazardous Substances Pollution Contingency Plan (NCP) §300.430(f)(5)(iii)(c), a statutory review will be conducted within five (5) years of initiation of the remedial action, and every five (5) years thereafter, to ensure that the remedy continues to be protective of HH and the environment. Any approved LUCIP modification will be appropriately documented for incorporation by reference into the BAOU ROD.

1.1 Format of LUCIP

The format of this LUCIP is consistent with the FFA protocol format approved by the USEPA and SCDHEC in March 2004.

2.0 OVERVIEW OF BAOU REMEDIAL ACTION

2.1 General Description and History of the BAOU

The BAOU is located in the northwest quadrant of the SRS in Aiken County, South Carolina (Figure 1). Funding through the American Recovery and Reinvestment Act (ARRA) of 2009 supported acceleration of the original milestone dates for both of the BAOU subunits, and the USDOE has performed a non-time critical removal (NTCR) action at each in order to achieve the accelerated schedule commitments (SRNS 2010a and SRNS 2010b).

ECODS B-3 and B-5

ECODS B-3 and B-5 were two of the twenty-five (25) ECODS identified at SRS that were used to dispose of waste material associated with the construction of SRS facilities. ECODS B-3 and B-5 were associated with the construction of B Area and are located between B Area and the Sanitary Landfill (SLF) (Figure 2). Construction waste was buried in shallow, elongated trenches, and several trenches were also used as burn pits for combustible waste disposal.

The NTCR action successfully addressed contaminants in the soil (arsenic and five pesticides) and construction waste (potential exposure to buried asbestos) that posed a threat to HH and the environment. The removal action consisted of excavation and off-site disposal of impacted soil and construction debris totaling ~6,537 cubic meters (m^3 [8,550 cubic yards {yd^3}]). The NTCR action met residential cleanup goals. Currently, the ECODS B-3 and B-5 subunit poses no risk to HH and the environment and warrants unrestricted land use.

HWCTR

The HWCTR facility is located on ~0.8 ha (2 ac) in an area formally known as U Area. This area is now part of B Area (Figure 2), which is composed primarily of administrative, protective force operations, laboratory, and warehouse facilities.

The HWCTR facility was a pressurized heavy water reactor designed to test candidate fuel designs for heavy water power reactors. The test reactor was not a defense-related facility like the five (5) production reactors at the SRS. The HWCTR facility operated from March 1962 until December 1964 when operations were terminated and the facility was placed in a standby condition, including the removal of fuel and heavy water.

The NTCR action for HWCTR was "In Situ Decommissioning with Reactor Vessel and Steam Generator Removal." The purpose of the NTCR action was to protect future industrial workers from exposure to radionuclides and hazardous constituents in the reactor vessel, steam generators and associated equipment in the HWCTR facility and to prevent potential migration of radionuclides and hazardous constituents from the HWCTR facility to groundwater above maximum contaminant levels (MCLs).

Under this removal action, the reactor vessel, steam generators, steel containment dome, and all above-grade components of the facility, with the exception of the transfer coffin refueling machine, were removed and disposed of at appropriate disposal facilities. Following removal of these components, the transfer coffin refueling machine was placed in the reactor vessel void space and the below-grade portions of the facility were sealed in place with a grout material to form a stabilized structure. The area was then covered with concrete at the ground surface to prevent infiltration and eliminate direct exposure to contaminants left in place for future industrial workers.

In addition, four groundwater monitoring wells were installed at HWCTR in 2009 to confirm that there was no impact to groundwater from historical releases and to provide a future monitoring network if needed (i.e., if potential sources were not stabilized or removed). The 2009-2010 sampling results acknowledged that there was no historical impact to groundwater from HWCTR operations or a former underground storage tank location.

Signs were installed, ongoing surveillance and maintenance activities were initiated, and LUCs were implemented as part of the NTCR action.

2.2 Nature and Extent of Contamination in the BAOU

ECODS B-3 and B-5

There are no HH, ecological or contaminant migration risks following the NTCR action at the ECODS B-3 and B-5 subunit. This BAOU subunit is suitable for unrestricted use.

HWCTR

Prior to the removal action, ~2,100 curies (Ci) of radioactivity remained in the HWCTR facility. More than 99 percent of the radioactivity in the HWCTR facility was associated with activated metal in the internal structure of the reactor vessel and associated steam generators. It is estimated that following deactivation activities and removal of the above grade structure, the reactor vessel and the steam generators, ~21 Ci remain in the below grade structure. In addition, the facility also contained hazardous materials such as lead, asbestos, and polychlorinated

biphenyls (PCBs) associated with existing equipment or previous operations (e.g., lights, piping, paints, etc.). The estimated mass of PCBs contained in paint and cables remaining in HWCTR is ~45 kilogram (kg [100 pounds {lb}]). All of the residual contamination is limited to the below-grade portions of the facility that were sealed in place with grout material to form the stabilized structure; there is no evidence that contaminants have migrated in the past or will migrate in the future from the facility to the surrounding soil or groundwater media. Following the NTCR action, grouting below-grade and covering portions of the facility at-grade removed exposure pathways for the industrial worker to remaining contaminants while reducing any future risk of contaminant migration to groundwater.

The selected remedy for the HWCTR subunit of the BAOU leaves hazardous substances in place that pose a potential future risk if exposure were to occur and will require land use restrictions until the concentrations of hazardous substances remaining in the below-grade portions of the HWCTR facility are at levels that allow for unrestricted use and exposure.

2.3 Remedial Action Selected

The selected remedy for the ECODS B-3 and B-5 subunit is No Further Action. In its current state, this subunit poses no risk to HH and the environment and supports unrestricted land use.

The selected remedy for the HWCTR subunit is LUCs with Groundwater Monitoring. The NTCR action reduced the HH risk by eliminating the human exposure pathway and minimized the potential of contaminants to migrate to groundwater; however, residual hazardous and radioactive substances, although stabilized in place, remain in the below-grade portions of the HWCTR facility. The future land use will remain industrial. This remedy also provides additional assurance regarding the protection of the groundwater by inclusion of an effectiveness monitoring program.

The post-NTCR action conceptual site model (CSM) for HWCTR (Figure 3) demonstrates that the exposure pathways to an industrial worker are incomplete. This CSM is also applicable following implementation of the remedial action. According to the *Savannah River Site Future Use Project Report* (USDOE 1996), residential use of SRS land should be prohibited.

3.0 LAND USE CONTROL OBJECTIVES

The following LUC objectives for the HWCTR subunit of the BAOU have been developed to ensure the protectiveness of the remedy described above:

- Maintain the integrity of engineering controls which provide an exposure barrier (including in-situ grouting and concrete cover)
- Maintain the integrity of the groundwater monitoring well system
- Restrict or prohibit groundwater use as determined to be necessary based on monitoring results
- Restrict access by posting and maintaining warning signs and enforcing SRS security procedures
- Prohibit the development and use of property for any use other than industrial; no residential use, school use, child care facilities or recreational use shall be allowed

Current access controls and land transfer requirements needed to maintain the future land use are described in the following sections of this LUCIP.

4.0 IMPLEMENTATION OF LAND USE CONTROLS

This section describes the LUCs selected in the ROD to achieve the LUC objectives stated in Section 3.0. A summary of the types of LUCs is provided in Table 1. USDOE is responsible for implementing, maintaining, monitoring, reporting on and enforcing the LUCs required for the HWCTR subunit of the BAOU. The LUCIP will become enforceable and will be implemented when approved by USEPA and SCDHEC following the completion of the remedial action prescribed by the BAOU ROD. USDOE shall notify USEPA and SCDHEC 60 days in advance of any proposed land use changes that are inconsistent with LUC objectives or the selected remedy.

The HWCTR subunit of the BAOU will be maintained as an industrial use area by implementation of the property record notices and restrictions (Section 4.1) and the LUC boundary map (Section 4.2).

The Site Use Program (Section 4.3) will be implemented to prevent onsite worker exposure to contamination left in place at the HWCTR subunit of the BAOU. Other existing measures (i.e., Site Clearance Program, worker training, health and safety requirements, work controls) will also be used to ensure worker safety at the HWCTR subunit. Physical access controls (Section 4.4) are implemented at the SRS boundary to control and restrict public and trespasser access.

The signs that were installed as part of the NTCR action at the HWCTR subunit will be maintained to alert onsite workers to the presence of hazardous substances. The signs also convey the restrictions of unauthorized personnel. The access control warning signs were placed as shown in Figure 4 and will be maintained to prevent unknowing entry and unrestricted use.

4.1 Property Record Notices and Restrictions

In the long term, if the property, or any portion thereof, is ever transferred from the USDOE, the U.S. Government and/or USDOE will take those actions necessary pursuant to Section 120(h)(1) of CERCLA. Those actions will include in any contract, deed, or other transfer document, notice of the type and quantity of any hazardous substances that were known to have been stored (for more than one year), released, or disposed of on the property. The notice will also include the time at which the storage, release, or disposal took place to the extent such information is available.

In addition, if the property, or any portion thereof, is ever transferred by deed, the U.S. Government will also satisfy the requirements of CERCLA 120(h)(3). The requirements include: a description of the remedial action taken, a covenant, and an access class. These requirements are also consistent with the intent of the Resource Conservation and Recovery Act (RCRA) deed notification requirements at final closure of a RCRA facility if contamination will remain at the unit.

LUCs will be implemented through the following:

- The contract, deed, or other transfer document shall also include restrictions precluding residential use of the property. However, the need for these 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 LUCs will be done through an amended ROD with USEPA and SCDHEC review and approval.

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

In the event of a property lease or interagency agreement, the equivalent restrictions will be implemented as required by CERCLA Section 120(h).

USDOE shall provide the USEPA and SCDHEC at least six months notice prior to transfer or sale of property subject to LUCs to ensure that USEPA and SCDHEC can be involved in discussions to ensure that appropriate provisions are included in the transfer documents to maintain effective LUCs. If it is not possible for the USDOE to notify the USEPA and SCDHEC at least six months prior to the transfer or sale, then the facility will notify the USEPA and SCDHEC as soon as possible, but no later than 60 days prior to the transfer or sale of any property subject to LUCs. In addition to the land transfer notice and discussion provisions above, USDOE further agrees to provide the USEPA and SCDHEC with similar notice within the same time frames as to federal-to-federal transfer of property.

4.2 LUC Boundary Maps

This LUCIP identifies the area currently under land use restrictions in Figure 4 for the HWCTR subunit. A final (as-built) survey plat will be developed and certified by a professional land surveyor registered in the State of South Carolina. The final plat will include the boundary coordinates for the area subject to land use restrictions and general locations of access control warning signs. The final as-built survey plat will be submitted to USEPA and SCDHEC in the Corrective Measures Implementation/Remedial Action Completion Report (CMI/RACR).

In addition, if the site is ever transferred to non-federal ownership, a certified survey plat of the HWCTR subunit of the BAOU will be prepared at or near the time of conveyance to support the

LUCIP required restrictive covenants on land use and will be recorded with the appropriate county recording agency.

4.3 Site Use Program

Under DOE Order 430.1A, *Life Cycle Management* (USDOE 1998), SRS is required to implement an asset management program for the use, maintenance, and disposal of physical assets, including real estate. SRS complies with this DOE Order through the Site Use Program which is administered by Site Development Control (SDC) in accordance with SRS Manual 1D, *Site Infrastructure and Services Manual*, Procedure 3.02, "Site Real Property Configuration Control" (SRS 2006). Use of all lands and waters on the SRS are coordinated via the Site Use Program. No use of land (i.e., excavation or any other land use) shall be undertaken without prior approval by the USDOE and documented by a Site Use Permit.

SRS identifies all buildings, facilities, and FFA waste units on SRS site development maps that are maintained by SDC in accordance with SRS Manual 1D. If LUCs are required for an FFA waste unit, the unit-specific LUC boundaries are identified on the SRS site development maps. SDC must verify that any proposed work to be performed on a site is sanctioned by a Site Use Permit and verify that the proposed activity does not conflict with any previously approved land use.

In addition to the management of the use of SRS lands and waters through the Site Use Program, the SDC also administers the Site Clearance Program to control the construction, alteration, or demolition activities at SRS. Before any work that adds or modifies features or facilities portrayed on the SRS site development maps is conducted, a Site Clearance Permit is required. USDOE approval of the intended land via a Site Use Permit must be verified before a Site Clearance Permit is issued. If a Site Clearance request potentially impacts a FFA waste unit, the Site Clearance Request Form is sent to the appropriate FFA reviewer for approval. The FFA reviewer will evaluate the proposed activity to identify any conflicts with the waste unit and to verify that waste unit specific LUCs are not compromised. The roles and responsibilities of the individuals responsible for review and approval of Site Use and Site Clearance permits are

detailed in SRS 1D, Procedure 3.02. All employees, contractors, and visitors at SRS are required to adhere to the Site Use Program and the Site Clearance Program.

The USDOE will notify USEPA and SCDHEC in advance of any change to any internal procedure, including the Site Use Program, which would affect implementing or maintaining the LUCs. Approval by USEPA and SCDHEC is required for any modification or termination of the LUCs and implementation actions, and the USDOE must obtain prior approval from USEPA and SCDHEC before taking any anticipated action that may disrupt the effectiveness of the LUCs or alter or negate the need for LUCs. The Site Use Permit and site development maps must be amended when the geographic configuration or buffer zone used to establish the permit boundary changes or there is a change to the land use. The processes are controlled within the SRS Quality Assurance (QA) Program in accordance with SRS 1Q Manual, *Quality Assurance* (SRS 2007). The SRS QA program governs all SRS activities.

4.4 Physical Access Controls

There are no physical access controls required at the HWCTR subunit of the BAOU because all residual contamination is stabilized below-grade beneath a concrete cover; however, physical access controls are provided at the SRS boundary as mentioned in Table 1, Item 5.

4.5 Warning Signs

To prevent unknowing entry and to ensure that unrestricted use of the HWCTR facility does not occur while under ownership of the USDOE, access control warning signs as shown in Appendix A were posted at the HWCTR subunit as part of the NTCR action (Figure 4). The signs are legible for a distance of at least 7.6 meters (m [25 feet {ft}]).

Custodial responsibilities for maintenance and inspection of the HWCTR subunit of the BAOU will be maintained by the SRS Post-Closure Maintenance Group.

4.6 Other Access Controls and Security/Surveillance Measures

While under the ownership of USDOE, access control of the entire SRS will be maintained in accordance with the 2000 RCRA Part B Permit Renewal Application, Volume I, Section F.1. This section describes the 24-hour surveillance system (R.61-79.264.14(b)(1)), artificial or natural barriers (R.61-79.264.14(b)(2)(I)), control entry systems (R.61-79.264.14(b)(2)(ii)), and access control warning signs (R.61-79.264.14(c)) in place at the SRS boundary to comply with the security requirements for a RCRA-permitted facility.

4.7 Field Inspection and Maintenance for Land Use Controls

Following implementation of the LUCs at the HWCTR subunit, inspection and maintenance activities are required. The HWCTR subunit will be inspected per the Field Inspection Checklist in Appendix B. Field inspections will be performed annually. Additional inspections may be necessary in the event of unusual weather or any other condition warranting inspection. Inspections will be performed to ensure that access control signs are in place, have the correct information, and are legible from a distance of 7.6 m (25 ft). The inspections will verify that excessive deterioration of the concrete cover has not occurred and the cover is free of vegetation, and that there are no unauthorized excavation, digging, or construction activities within the HWCTR boundaries. Necessary repairs will be performed for items in Appendix B that are found to be in unsatisfactory condition.

Any activity that is inconsistent with the LUC objectives or use restrictions, or any other action that may interfere with the effectiveness of the LUCs will be addressed by the USDOE as soon as practicable, but in no case will the process be initiated later than ten (10) days after the USDOE becomes aware of the breach. The USDOE will notify USEPA and SCDHEC as soon as practicable, but no longer than ten (10) days after discovery of any activity that is inconsistent with the LUC objectives or use restrictions, or any other action that may interfere with the effectiveness of the LUCs. The USDOE will notify USEPA and SCDHEC regarding how the USDOE has addressed or will address the breach within ten (10) days of sending USEPA and SCDHEC notification of the breach.

The FFA Annual Progress Report, submitted to the regulatory agencies by USDOE, will provide the status of the LUCs and describe how any LUC deficiencies or inconsistent uses have been addressed. In the event of property transfer or lease, the Annual Report will cite findings on the following: whether the use restrictions and controls referenced above were communicated in the deed(s) or lease restrictions; whether property use conforms with the deed or lease restrictions and controls; and whether the owners and state/local agencies have been notified regarding the deed or lease restrictions and controls. The FFA Annual Progress Report(s) will be used in the preparation of the Five-Year Remedy Review Report.

All other routine maintenance activities will be documented and maintained in files subject to USEPA and SCDHEC review and audit. A copy of the completed inspection form is maintained in the Area Completion Projects (ACP) Document Control. The LUCs shall be maintained until the concentration of hazardous substances associated with the unit have been reduced to levels that allow for unlimited exposure and unrestricted use.

The waste unit inspectors are to be trained in Hazardous Waste Operations and Emergency Response (HAZWOPER), RCRA Well Inspections (ACP-specific training), ACP RCRA Waste Unit Inspections, Radiological Worker Training, etc., as applicable for the specific inspection. They will also be trained based on the individual requirements of the regulatory approved closure documents for each waste unit. In addition, the inspectors are to attend yearly refresher courses. Over the years, different personnel may conduct the inspections and maintenance activities.

This unit-specific LUCIP, including the checklist (Appendix B), will be appended to the SRS LUCAP upon final regulatory approval. After completion of the CMI/RACR, the preliminary checklist in the LUCAP will be replaced with the final approved checklist.

5.0 REFERENCES

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

SRNS, 2010a. *Removal Site Evaluation Report / Engineering Evaluation / Cost Analysis (RSER/EE/CA) for the Early Construction and Operational Disposal Sites (ECODS) B-3 and B-5 Operable Unit (OU) (U),* Revision 1, SRNS-RP-2009-01443, Savannah River Nuclear Solutions, LLC, Savannah River Site, Aiken, SC

SRNS, 2010b. *Removal Site Evaluation Report / Engineering Evaluation / Cost Analysis (RSER/EE/CA) for the Heavy Water Components Test Reactor (HWCTR) (U)*, Revision 1, SRNS-RP-2009-01102, Savannah River Nuclear Solutions, LLC, Savannah River Site, Aiken, SC

SRNS, 2013. *Record of Decision Remedial Alternative Selection for the B-Area Operable Unit (U)*, Revision 1, SRNS-RP-2012-00354, Savannah River Nuclear Solutions, LLC, Savannah River Site, Aiken SC

SRS, 2006. SRS Procedure Manual 1D, *Site Infrastructure and Services Manual (U)*, Procedure 3.02, "Site Real Property Configuration Control," Savannah River Site, Aiken, SC

SRS, 2007. SRS Procedure Manual 1Q, *Quality Assurance (U)*, Savannah River Site, Aiken, SC

USDOE, 1996. *Savannah River Site Future Use Project Report, Stakeholder-Preferred Recommendations for SRS Land and Facilities*, USDOE Savannah River Operations Office, January

USDOE, 1998. DOE Order 430.1A, *Life Cycle Management* (Approved October 14, 1998)

WSRC, 2013. *Land Use Control Assurance Plan for the Savannah River Site*, WSRC-RP-98-4125, Revision 1.1, August 1999, updated March 2013, Savannah River Nuclear Solutions, LLC, Savannah River Site, Aiken, SC

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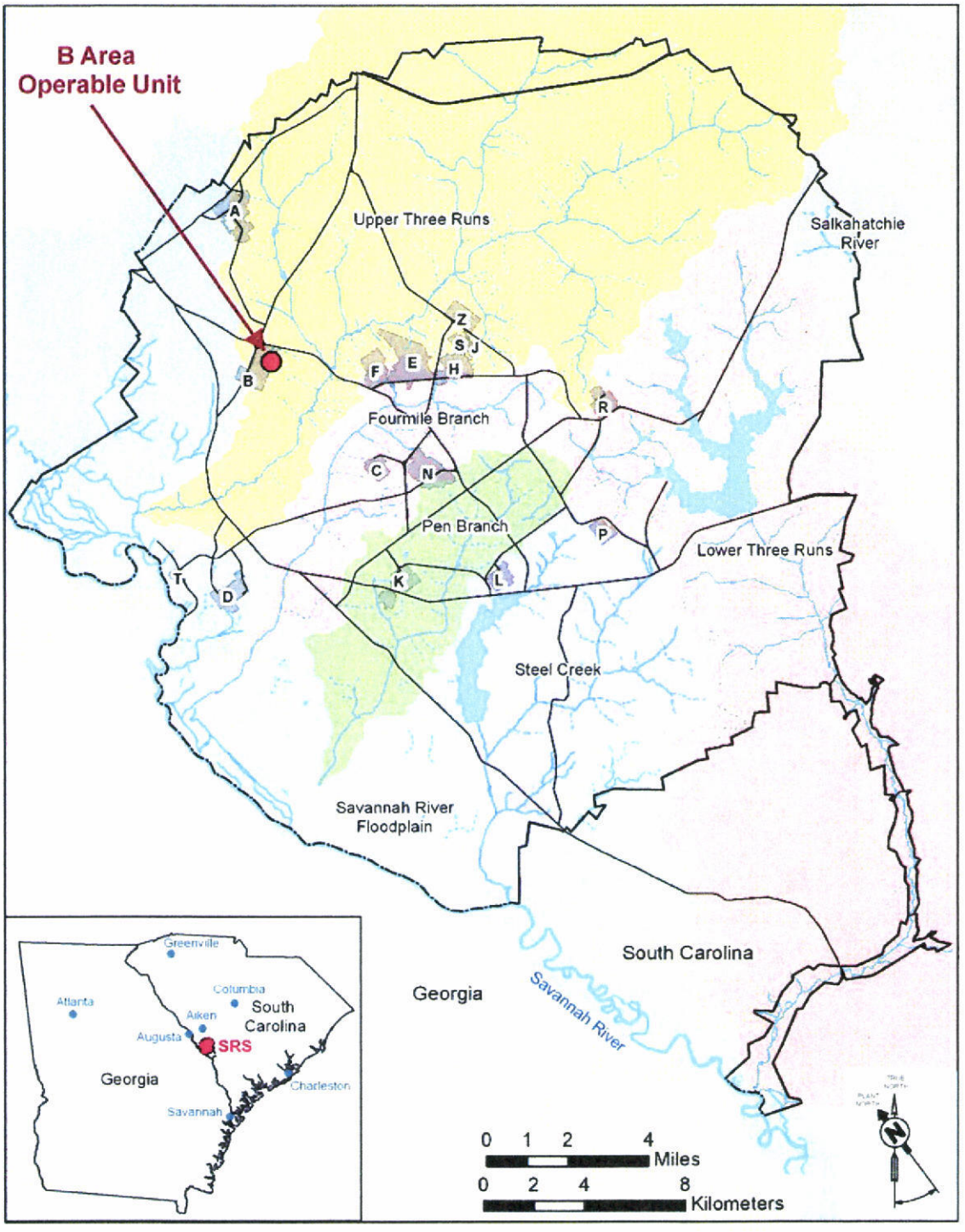
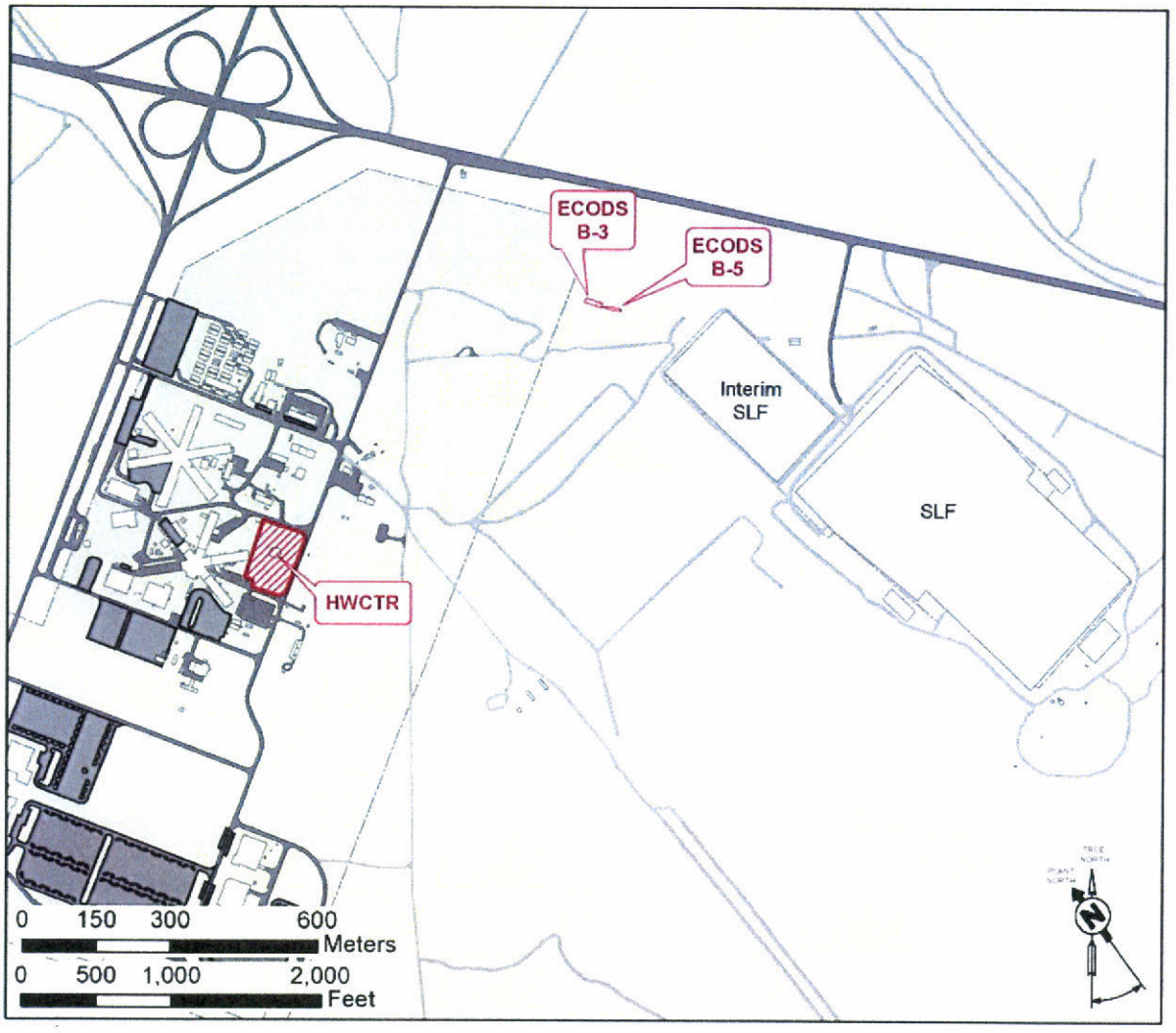


Figure 1. Location of the BAOU within the Savannah River Site and Upper Three Runs Watershed.



SLF = Sanitary Landfill

Figure 2. Location of the BAOU Subunits

ARF-19290

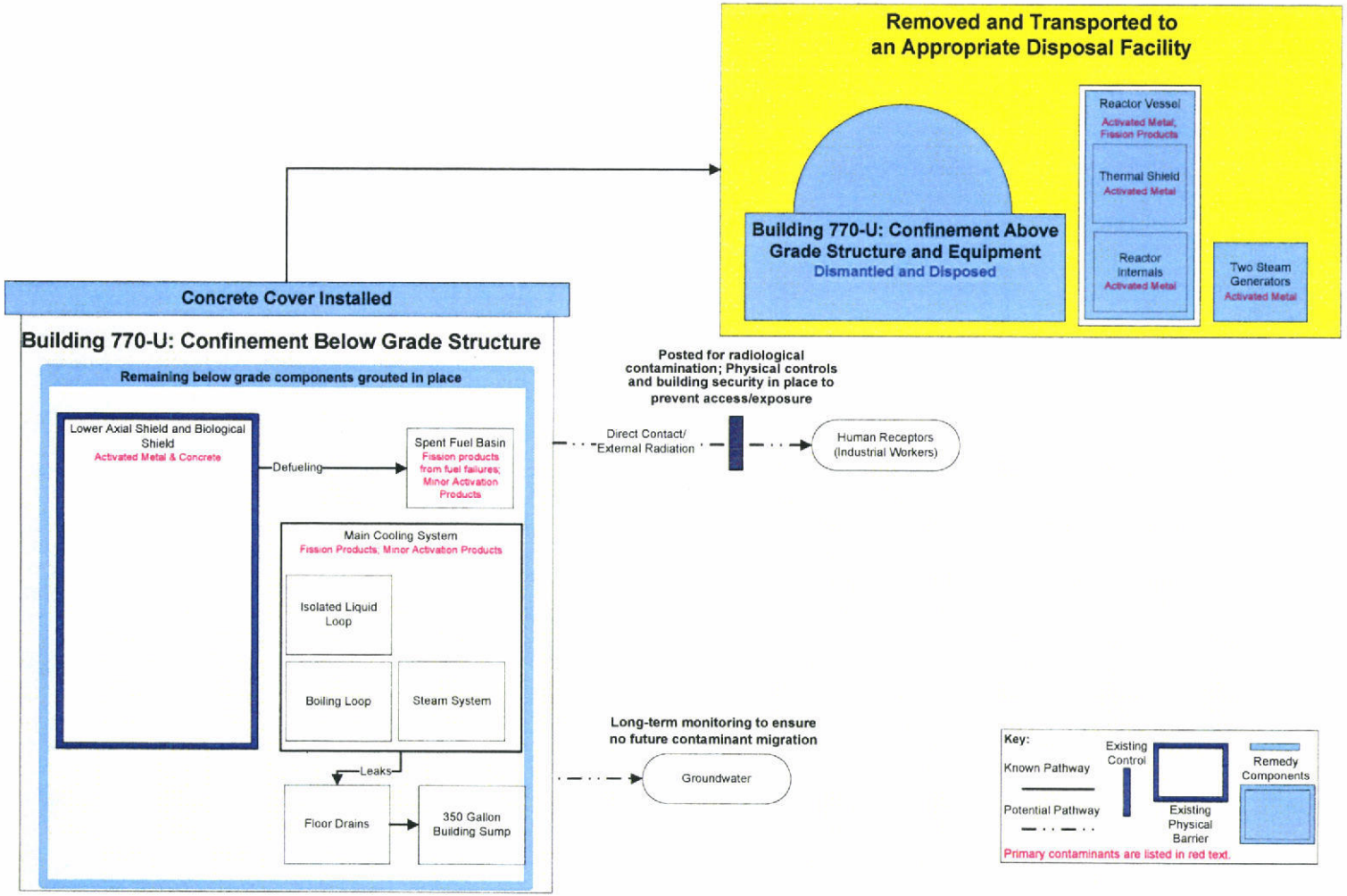


Figure 3. Post-Remedial Action Conceptual Site Model for the HWCTR Subunit of the BAOU

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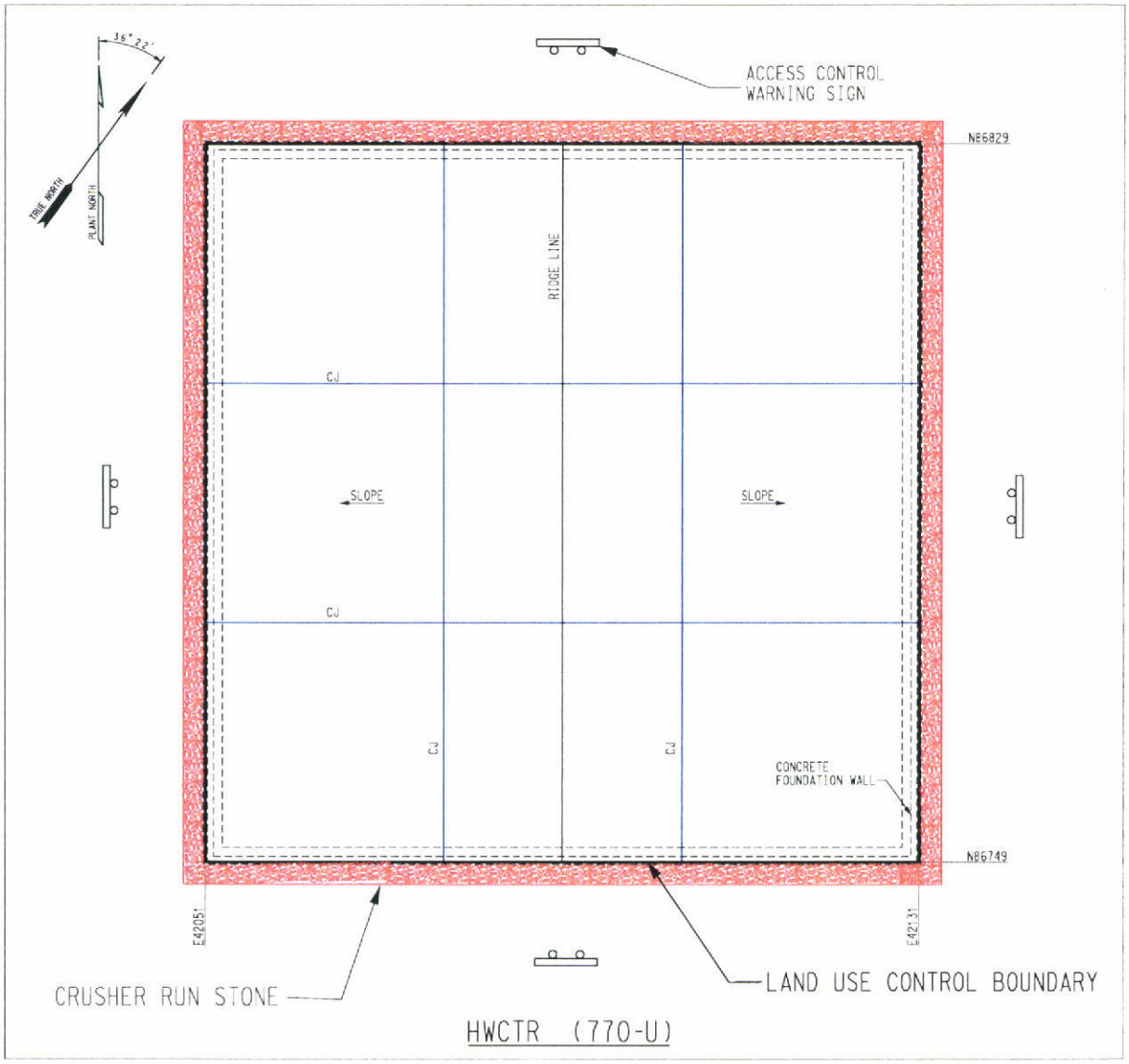


Figure 4. Land Use Control Boundary for the HWCTR Subunit of the BAOU

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Table 1. Land Use Controls for the BAOU

Type of Control	Purpose of Control	Duration	Implementation	Affected Areas[a]
1. Property Record Notices[b]	Provide notice to anyone searching records about the existence and location of contaminated areas.	Until the concentration of hazardous substances associated with the unit have been reduced to levels that allow for unlimited exposure and unrestricted use.	Notice recorded by USDOE in accordance with state laws at County Register of Deeds office if the property or any portion thereof is ever transferred to non-federal ownership.	BAOU area (i.e., HWCTR) under this LUCIP where hazardous substances are left in place at levels requiring land use and/or groundwater restrictions.
2. Property record restrictions[c]: A. Land Use	Restrict use of property by imposing limitations.	Until the concentration of hazardous substances associated with the unit have been reduced to levels that allow for unlimited exposure and unrestricted use.	Drafted and implemented by USDOE upon any transfer of affected areas. Recorded by USDOE in accordance with state law at County Register of Deeds office.	BAOU area (i.e., HWCTR) under this LUCIP where hazardous substances are left in place at levels requiring land use restrictions.
3. Other Notices[d]	Provide notice to county/city about the existence and location of waste disposal and residual contamination areas for zoning/planning purposes.	Until the concentration of hazardous substances associated with the unit have been reduced to levels that allow for unlimited exposure and unrestricted use.	Notice recorded by USDOE in accordance with state laws at County Register of Deeds office if the property or any portion thereof is ever transferred to non-federal ownership.	BAOU area (i.e., HWCTR) under this LUCIP where hazardous substances are left in place at levels requiring land use restrictions.
4. Site Use Program[e]	Provide notice to worker/developer) i.e., permit requestor) on extent of contamination and prohibit or limit excavation/penetration activity.	As long as property remains under USDOE control.	Implemented by USDOE and site contractors. Initiated by permit request.	BAOU area (i.e., HWCTR) and remediation systems under this LUCIP where hazardous substances are left in place at levels requiring land use restrictions.
5. Physical Access Controls[f] (e.g., fences, gates, portals)	Control and restrict access to workers and the public to prevent unauthorized.	Until the concentration of hazardous substances associated with the unit have been reduced to levels that allow for unlimited exposure and unrestricted use.	Controls maintained by USDOE	Security is provided at site boundaries in accordance with SRS procedures.

Table 1. Land Use Controls for the BAOU *(Continued/End)*

Type of Control	Purpose of Control	Duration	Implementation	Affected Areas[a]
6. Warning Signs[g]	Provide notice or warning to prevent unauthorized uses	Until the concentration of hazardous substances associated with the unit have been reduced to levels that allow for unlimited exposure and unrestricted use.	Signage maintained by USDOE	Warning signs will be posted in accordance with applicable site procedures and will be placed in appropriate areas at the HWCTR subunit of the BAOU.
7. Security Surveillance Measures	Control and monitor access by workers/public	Until the concentration of hazardous substances associated with the unit have been reduced to levels that allow for unlimited exposure and unrestricted use.	Established and maintained by USDOE. Necessity of patrols evaluated upon completion remedial actions or property transfer.	Patrol of waste management areas under this LUCIP, as necessary.

[a] Affected areas – Specific locations identified in the OU-specific LUCIP or subsequent post-ROD documents.

[b] Property Record Notices – Refers to any non-enforceable, purely informational document recorded along with the original property acquisition records of USDOE and its predecessor agencies that alerts anyone searching property records to important information about residual contamination; waste disposal areas in the property.

[c] Property Record Restrictions – Includes conditions and/or covenants that restrict or prohibit certain uses of real property and are recorded along with original property acquisition records of USDOE and its predecessor agencies.

[d] Other Notices – Includes information on the location of waste disposal areas and residual contamination depicted on as survey plat, which is provided to a zoning authority (i.e., city planning commission) for consideration in appropriate zoning decisions for non-USDOE property.

[e] Site Use Program – Refers to the internal USDOE/USDOE contractor administrative program(s) that requires the permit requestor to obtain authorization, usually in the form of a permit, before beginning any excavation/penetration activity (e.g., well drilling) for the purpose of ensuring that the proposed activity will not affect underground utilities/structures, or in the case contaminated soil or groundwater, will not disturb the affected areas without the appropriate precautions and safeguards.

[f] Physical Access Controls – Physical barriers or restrictions to entry.

[g] Signs – Posted command, warning or direction.

APPENDIX A

ACCESS CONTROL WARNING SIGNS

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ARF # 17822

Enclosure 2 – HWCTR Access Control Warning Sign

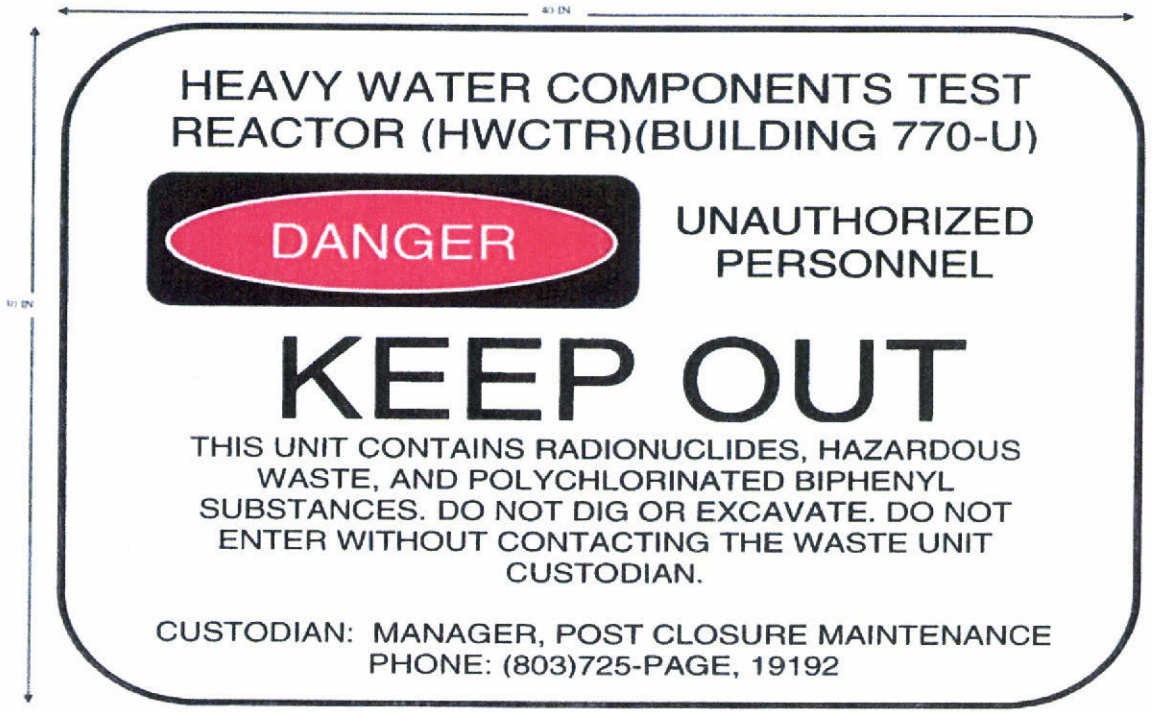


Figure A-1. Access Control Warning Sign

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APPENDIX B

FIELD INSPECTION CHECKLIST FOR HWCTR SUBUNIT OF BAOU

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FIELD INSPECTION CHECKLIST

FOR THE HEAVY WATER COMPONENTS TEST REACTOR (HWCTR) (770-U)

☐ SCHEDULED ☐ UNSCHEDULED

A= Satisfactory X= Unsatisfactory (Explanation required)	A or X	Observation of Corrective Action Taken
1. Verify that the area is accessible for authorized maintenance and inspections.		
2. Verify that the waste unit signs (4) are in acceptable condition, have the correct information, and are legible from a distance of 25 feet.		
3. Verify that excessive deterioration of the concrete cover has not occurred and the cover is free of vegetation.		
4. Verify that there are no unauthorized excavation, digging, or construction activities within the HWCTR boundaries.		

Inspected by:

_____ / _____ _____
(Print Name) (Signature) (Date)

Post-Closure Manager:

_____ / _____ _____
(Print Name) (Signature) (Date)

CAUTION: The inspector shall notify the Post-Closure Manager (PCM) and Environmental Compliance Authority (ECA) **IMMEDIATELY** if there has been a breach or compromise of the land use controls of this waste unit. The notification shall be in accordance with SRS post-closure inspection procedures.

NOTE: Monitoring wells associated with this waste unit are maintained in accordance with ACP Monitoring Well Procedures

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LUCIP for the
Lower Three Runs Integrator Operable Unit (IOU)
Tail Portion (Middle and Lower Subunits)
Early Action Land Use Control Implementation Plan for the
Lower Three Runs Integrator Operable Unit Tail Portion (Middle and Lower Subunits)
(SRNS-RP-2013-00046, Revision 1, August 2013)

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United States Department of Energy

Savannah River Site

Early Action Land Use Control Implementation Plan (EALUCIP) for the Lower Three Runs Integrator Operable Unit Tail Portion (Middle and Lower Subunits) (U)

CERCLIS Number: 35

SRNS-RP-2013-00046

Revision 1

August 2013

Prepared by:
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Aiken, SC 29808

Prepared for U.S. Department of Energy under Contract No. DE-AC09-08SR22470

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

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LIST OF ABBREVIATIONS AND ACRONYMS

ac	acre
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CERCLIS	Comprehensive Environmental Response, Compensation, and Liability Information System
Cs-137	Cesium 137
CSM	conceptual site model
EALUCIP	Early Action Land Use Controls Implementation Plan
ESD	Explanation of Significant Differences
FFA	Federal Facility Agreement
ft	feet, foot
ft^3	cubic feet
GPRA	Government Performance and Results Act
ha	hectare
HH	human health
IROD	Interim Action Record of Decision
IOU	Integrated Operable Unit
km	kilometer
km^2	square kilometer
LLC	Limited Liability Company
LTR	Lower Three Runs
LUC	Land Use Controls
LUCAP	Land Use Controls Assurance Plan
LUCIP	Land Use Controls Implementation Plan
m	meter
m^3	cubic meters
mi	mile
m^2	square mile
PCR	Post-Construction Report
QA	Quality Assurance
RCRA	Resource Conservation and Recovery Act
RSER	Removal Site Evaluation Report
SCDHEC	South Carolina Department of Health and Environmental Control
SDC	Site Development Control
sec	second
SRNS	Savannah River Nuclear Solutions, LLC
SRS	Savannah River Site
USDOE	United States Department of Energy
USEPA	United States Environmental Protection Agency
WSRC	Washington Savannah River Company, LLC (October 2005 to 2008)
WSRC	Westinghouse Savannah River Company, LLC (before October 2005)

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1.0 INTRODUCTION

This Early Action Land Use Control Implementation Plan (EALUCIP) has been prepared for the Lower Three Runs (LTR) Integrator Operable Unit (IOU) Tail Portion at the Savannah River Site (SRS). The LTR IOU Tail Portion is comprised of the Middle and Lower Subunits. The early action addressed a portion of the Middle Subunit and the Lower Subunit and covers approximately 2212 ha (5,466 ac).

An *Explanation of Significant Differences (ESD) for the Revision 0 Interim Action Record of Decision (IAROD) Remedial Alternative Selection: PAR Pond Unit (U); Lower Three Runs Integrator Operable Unit Tail Portion (Middle and Lower Subunit*s) *(U)* documented the selection of an early action remedy to implement land use controls (LUCs) for the completed LTR IOU Middle and Lower Subunits (SRNS 2012a). The early action LUC objectives are listed in Section 3.0. The purpose of this EALUCIP is to describe the LUCs selected in the ESD and how they will be implemented and maintained.

The selected remedy leaves hazardous substances in place that pose a potential future risk and will require land use restrictions until the concentrations of hazardous substances in the soil and sediment are at levels that allow for unrestricted use. As agreed on March 30, 2000, among the United States Department of Energy (USDOE), the United States Environmental Protection Agency (USEPA), and the South Carolina Department of Health and Environmental Control (SCDHEC), SRS implemented a Land Use Control Assurance Plan (LUCAP) (SRNS 2011) to ensure that the LUCs required by numerous remedial decisions at SRS are properly maintained and periodically verified. The requirements of that LUCAP also apply to the LUCs that were selected as part of this early action remedy. This EALUCIP for the LTR IOU Middle and Lower Subunits implements the LUCs selected as part of the remedial decision. The LUCs shall be maintained until the LTR IOU Tail Portion (Middle and Lower Subunits) is suitable for unlimited exposure and unrestricted use. Approval by USEPA and SCDHEC is required for any modification or termination of the LUCs.

USDOE is responsible for implementing, maintaining, monitoring, reporting, and enforcing the LUCs in accordance with the approved EALUCIP. Upon final approval, the EALUCIP will be appended to the LUCAP and should be considered incorporated by reference into the PAR Pond IROD, establishing implementation and maintenance requirements for the LUCs under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and the SRS Federal Facility Agreement (FFA) (FFA 1993). The EALUCIP will remain in effect unless and until modifications are approved by USEPA and SCDHEC as necessary for protection of human health and the environment. In accordance with Section 121(c) of CERCLA and the National Oil and Hazardous Substances Pollution Contingency Plan §300.430(f)(5)(iii)(c), a statutory review will be conducted within five years of initiation of the remedial action, and every five years thereafter, to ensure that the remedy continues to be protective of human health and the environment. Any approved EALUCIP modification will be appropriately documented for incorporation by reference into the PAR Pond IROD.

The format of this EALUCIP is consistent with the FFA protocol format approved by the USEPA and SCDHEC in March 2004.

2.0 OVERVIEW OF EARLY REMEDIAL ACTION

2.1 General Description and History

SRS occupies approximately 802.9 kilometer square (km^2 [310 square miles {mi^2}]) of land adjacent to the Savannah River, principally in Aiken and Barnwell counties of South Carolina. SRS is located approximately 40.2 km (25 mi) southeast of Augusta, Georgia, and 32.1 km (20 mi) south of Aiken, South Carolina (Figure 1).

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

The LTR IOU is located in the southeastern portion of SRS (Figure 1). LTR is a large blackwater stream that originates in the northeast portion of SRS and follows a southerly direction for approximately 40 km (24.5 mi) before it enters the Savannah River. The LTR IOU includes two SRS facility areas: P-Area Operable Unit including P-Reactor (105-P) and R-Area Operable Unit including R-Reactor (105-R). In addition, the upper portion of the LTR IOU contains a 1,012 hectare (ha [2,500 acre {ac}]) man-made impoundment (PAR Pond), several smaller pre-cooler ponds and canal systems. From the PAR Pond Dam, LTR flows through the Middle and Lower Subunits approximately 30 km (19 mi) before it enters the Savannah River (Figures 2 and 3).

LTR IOU is a remote area. The average discharge of LTR at Patterson Mill Road during calendar year 2012 was 0.69 cubic meters (m^3)/second (sec) (24.5 cubic feet [ft^3]/sec). The LTR watershed comprises about 460 km^2 (180 mi^2). Reactor operations ceased in the 1980's and the reactors placed in cold shutdown with no possibility of restart in the 1990's; however, during operations, secondary reactor cooling water, storm water discharges, disassembly basin water purges, and miscellaneous wastewater was discharged into LTR.

Approximately five miles downstream from the PAR Pond dam just above Patterson Mill Road, the SRS boundary narrows, providing a limited buffer of USDOE property along the LTR stream and floodplain. All the SRS property from Patterson Mill Road to the Savannah River is part of the LTR Lower Subunit and consists of an approximate 0.2 - 0.4-km ($^1/_8$ – ¼-mi) wide area on each side of the stream channel. The area from Patterson Mill Road south is bounded on both sides by private property. There are four public road crossings along this portion of LTR (Figure 4) (SRNS 2012b).

In January 1995, an IROD was issued for the PAR Pond unit to address the exposed contaminated sediment that resulted from drawdown of the PAR Pond reservoir that was necessary for repair of the PAR Pond Dam. The interim action determined that refilling and maintaining the water level in PAR Pond at a 61 m (200 ft) elevation was needed to mitigate the potential radiation dose from the exposed contaminated sediment after the dam repairs were completed. The main contaminant in PAR Pond is cesium-137 (Cs-137). Cs-137 will decay

naturally over time and the potential exposure risk from the sediment will be significantly reduced. Subsequent National Environmental Policy Act determinations associated with PAR Pond allow for the natural fluctuation of the water level provided the minimum water level is maintained greater than 59 m (195 ft) elevation and the minimum discharge rate to LTR is 0.028 m^3/sec (5 ft^3/sec).

In September 2004, the USDOE, with agreement from SCDHEC and the USEPA, prepared an Early Action Fact Sheet to document an early remedial action affecting the area from Patterson Mill Road to the Savannah River of LTR IOU (WSRC 2004 and Appendix C). The Early Action Fact Sheet detailed the installation of warning signs and fences to mitigate the potential health risk by discouraging access to, and contact with, the Cs-137 contamination in the stream system.

On February 6, 2007, the SCDHEC issued a Government Performance and Results Act (GPRA) Human Exposure Environmental Indicator letter indicating that human exposure was not under control unless additional actions were taken along the LTR from Patterson Mill Road to the Savannah River. In response, USDOE conducted an early action plan (WSRC 2007, Appendix D) that included posting additional signs and documenting inspections along the from Patterson Mill Road south. Additionally, the USDOE sent a letter to all property owners adjacent to this portion of the LTR IOU Lower Subunit reinforcing and reminding them that trespassing on USDOE property is illegal. This correspondence also cautioned the property owners that Cs-137 contamination is present in stream and floodplain media, and informed the property owners of increased SRS security patrols in the area.

2.2 Nature and Extent of Contamination

The P-Reactor and R-Reactor effluents that discharged into LTR IOU contained tritium, metallic contaminants, and other radiological contaminants. Many of the radiological contaminants are fixated to the sediments and retained in the cooler ponds, including PAR Pond. Migration of sediments downstream of the pond systems did occur resulting in deposition of contaminated sediments and soil within the LTR IOU. Past characterization efforts of the LTR has shown that

Cs-137 is the major contaminant present. In 2009/2010, extensive sampling of the IOU was accelerated as part of the American Recovery and Reinvestment Act mission at SRS.

The sampling was performed in accordance with an approved Sampling and Analysis Plan for the LTR Stream, Floodplain, and Headwaters (SRNS 2009a). The characterization involved an even spacing of sampling transects designed to collect an unbiased population of data from the stream system. The collected data consisted of direct gamma radiation measurements along each transect supplemented with the collection of sediment, sediment/soil, and surface water samples for laboratory analyses.

Based on the analytical sample data from the sediment/soil that was collected in the 2009/2010 characterization efforts, three sampling transects (transects 4, 13, and 23) in the LTR IOU Middle and Lower Subunits were determined to have elevated Cs-137 in excess of the adolescent trespasser receptor benchmark of 23.7 pCi/g (1×10^{-4} risk). Based on laboratory data, the maximum Cs-137 detection in the LTR IOU was 180 pCi/g.

For the sediment/soil evaluation of the adolescent trespasser at the LTR Middle Subunit (Transect 4), there were five Cs-137 exceedances (out of 30 analyses) with a mean ratio of 0.52 (less than 1) and a 16.7% frequency of exceedance based on the soil benchmark (soil benchmark = 23.7 pCi/g). For the LTR Lower Subunit (Transects 13 and 23), there were two benchmark exceedances out of 72 analyses for Cs-137 with a frequency of exceedance of 2.8% and a mean ratio less than one (0.19). The three transects that contained the elevated concentrations of Cs-137 at greater than 23.7 pCi/g are shown in Figure 4.

The adolescent trespasser scenario assumes the receptor is exposed to the contaminated sediment/soil for 18 hours per day, 90 days per year, for a duration of 10 years. The total exposure time equals 16,200 hours. The receptor is described as an adolescent who has access to the contaminated areas (from Patterson Mill Road to the Savannah River) and utilizes the area for wading, hiking, or other recreational activities (SRNS 2012b).

2.3 Early Remedial Actions Selected

Because the Cs-137 contaminated sediment/soil will remain at levels that would continue to pose an unacceptable future risk to adolescent trespassers (>1 x 10^{-4}), a Time Critical Removal Action in the LTR IOU Middle and Lower Subunits was necessary. On January 5, 2012, representatives of USEPA, SCDHEC, and USDOE, reached agreement that addition of LUCs following a Time Critical Removal Action for excavation of the contaminated sediment/soil media in the LTR IOU Middle and Lower Subunits was appropriate to protect human health and the environment.

The Time Critical Removal Action in the LTR IOU Middle and Lower Subunits was conducted for the identified soil/sediment locations in the three areas (transects 4, 13, and 23) that exceed the 1 x 10^{-4} risk (23.7 pCi/g for the adolescent trespasser receptor. The USDOE, USEPA, and SCDHEC agreed that each excavation area would be limited to a maximum one acre, initiated at the sampling points with Cs-137 activities >23.7 pCi/g. Final agreement was reached that the 1 x 10^{-4} risk (23.7 pCi/g for the adolescent trespasser receptor) would be the action level and 12 pCi/g (5 x 10^{-5} risk for an adolescent trespasser) would be used as the cleanup goal for excavation. Sediment/soil within the defined one acre removal areas would be excavated to the depth necessary to achieve the 12 pCi/g cleanup goal and disposed of in a CERCLA approved disposal facility. This action reduced the volume of available Cs-137 in the LTR IOU Middle and Lower Subunits. In addition, the half-life of Cs-137 is 30 years; therefore, residual activities of Cs-137 in the Lower and Middle Subunits will decay naturally over time and the potential exposure risk from the sediment will be significantly reduced. The Time Critical Removal Action (removal of sediment/soil) was documented by a Removal Site Evaluation Report (SRNS 2012b) and followed by an Action Memorandum (USDOE 2012).

The ESD for the LTR IOU Middle and Lower Subunits documents the LUCs that will be implemented following the Time Critical Removal Action. Portions of the LTR Lower Subunit from Patterson Mill Road south to the Savannah River have signs and fencing previously placed as part of the 2004 early action. Table 1 shows the types of LUCs, purposes of control, duration, and affected areas. The early action LUCs for the LTR IOU Middle and Lower Subunits consist of the following:

- Installation of approximately 6.6 miles of new fencing (three strand barbed wire) at the highest probability trespass zones along the LTR IOU Lower Subunit from Patterson Mill Road to the Savannah River including fencing near Transect 13 and Transect 23 (Figure 4).

- Installation of signage along the entire perimeter of the area from Patterson Mill Road to the Savannah River of the LTR IOU Lower Subunit approximately 61 m (200 ft) apart in approximately 1,050 locations to alert on-site workers and the public of the presence of hazardous substances and to prevent unknowing entry and unrestricted use (Figure 4). The signs include both Warning signs and No Trespassing signs (Appendix A, Figures 1a and 1b).

- Security surveillance measures to control and restrict access to the public as part of existing security measures that are in place at the SRS boundary for the LTR IOU Middle and Lower Subunits.

- Institutional controls (i.e., administrative measures) and use restrictions for on-site workers via the Site Use/Site Clearance Program for the LTR IOU Middle and Lower Subunits. Other administrative controls to ensure worker safety include work controls, worker training, and worker briefings of health and safety requirements.

The post-early action conceptual site model (CSM) (Figure 5) demonstrates that the exposure pathways to an adolescent trespasser are incomplete following implementation of the early remedial action. According to the *Savannah River Site Future Use Project Report* (USDOE 1996), residential use of SRS land is prohibited.

3.0 LTR LOWER AND MIDDLE SUBUNITS LAND USE CONTROL OBJECTIVES

The following LUC objective was developed to ensure the protectiveness of the selected early action remedy:

- To prevent exposure of the adolescent trespasser to Cs-137 contaminated sediment/soil in the LTR IOU Middle and Lower Subunits at levels that would exceed a risk of 1×10^{-4}.

Current access controls and land transfer requirements needed to maintain the future land use are described in the following sections of this EALUCIP.

4.0 IMPLEMENTATION OF LAND USE CONTROLS

This section describes the remedial actions prescribed by the ESD to achieve the LUC objective stated in Section 3.0. A summary of the types of LUCs is provided in Table 1. USDOE is responsible for implementing, maintaining, monitoring, reporting and enforcing the LUCs. The EALUCIP will become enforceable and will be implemented when approved by USEPA and SCDHEC following the completion of the remedial actions prescribed by the ESD. USDOE shall notify USEPA and SCDHEC 60 days in advance of any proposed land use changes that are inconsistent with the LUC objective or the selected remedy.

LUCs for the trespasser at the affected area will be maintained by implementation of the property record notices and restrictions (Section 4.1) and the LUC boundary map (Section 4.2). The Site Use Program (Section 4.3) will be implemented to prevent onsite worker exposure to contamination left in place. Other existing SRS measures (i.e. Site Clearance Program, worker training, health and safety requirements, work controls) will also be used to ensure worker safety. Physical access controls (Section 4.4) are implemented at the SRS boundary to control and restrict public and trespasser access. The Middle Subunit is located within the SRS boundary.

Fencing was installed at the highest probability trespass zones on the SRS property from Patterson Mill Road to the Savannah River of the LTR IOU Lower subunit. In addition, access

and warning signs were installed on both sides of the SRS property at approximately 61 m (200 ft) intervals from Patterson Mill Road to the Savannah River. These signs will be maintained to alert onsite workers and trespassers to the presence of hazardous substances. The signs will also convey the restrictions of unauthorized personnel. Access control warning signs have been placed as shown in Figure 4 and maintained to prevent unknowing entry and unrestricted use.

4.1 Property Record Notices and Restrictions

In the long term, if the property, or any portion thereof, is ever transferred from USDOE, the U.S. Government and/or USDOE will take those actions necessary pursuant to Section 120(h)(1) of CERCLA. Those actions will include in any contract, deed, or other transfer document, notice of the type and quantity of any hazardous substances that were known to have been stored (for more than one year), released, or disposed of on the property. The notice will also include the time at which the storage, release, or disposal took place to the extent such information is available.

In addition, if the property, or any portion thereof, is ever transferred by deed, the U.S. Government will also satisfy the requirements of CERCLA 120(h)(3). The requirements include: a description of the remedial action taken, a covenant, and an access class.

LUCs will be implemented through the following:

- The contract, deed, or other transfer document shall also include restrictions precluding residential use of the property. However, the need for these 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 LUCs will be done through an amended ROD with USEPA and SCDHEC review and approval.

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

In the event of a property lease or interagency agreement, the equivalent restrictions will be implemented as required by CERCLA Section 120(h).

USDOE shall provide the USEPA and SCDHEC at least six month notice prior to transfer or sale of property subject to LUCs to ensure that USEPA and SCDHEC can be involved in discussions to ensure that appropriate provisions are included in the transfer documents to maintain effective LUCs. If it is not possible for the USDOE to notify the USEPA and SCDHEC at least six months prior to the transfer or sale, then the facility will notify the USEPA and SCDHEC as soon as possible but no later than 60 days prior to the transfer or sale of any property subject to LUCs. In addition to the land transfer notice and discussion provisions above, USDOE further agrees to provide the USEPA and SCDHEC with similar notice within the same time frames as to federal-to-federal transfer of property.

4.2 LUC Boundary Maps

This LUCIP identifies the proposed area under land use restrictions in Figure 3 for the LTR IOU Middle and Lower Subunits. A final as-built LUC boundary plat has been developed and includes the coordinates for the area subject to land use restrictions and general locations of access control warning signs (Appendix E). This final as-built LUC boundary plat will be submitted to USEPA and SCDHEC in the Removal Action Report.

In addition, if the site is ever transferred to non-federal ownership, a certified survey plat of the LTR IOU will be prepared by a professional land surveyor registered in the State of SC at or near the time of conveyance to support the LUCIP required restrictive covenants on land use. The certified survey plat will be recorded with the appropriate county recording agency.

4.3 Site Use Program

Under DOE Order 430.1A, *Life Cycle Management* (USDOE 1998), SRS is required to implement an asset management program for the use, maintenance, and disposal of physical assets, including real estate. SRS complies with this DOE Order through the Site Use Program which is administered by Site Development Control (SDC) in accordance with SRS Manual 1D,

Site Infrastructure and Services Manual, Procedure 3.02, "Site Real Property Configuration Control" (SRS 2006). Use of all lands and waters on the SRS are coordinated via the Site Use Program. No use of land (i.e., excavation or any other land use) shall be undertaken without prior approval by the USDOE and documented by a Site Use Permit.

SRS identifies all buildings, facilities, and FFA waste units on SRS site development maps that are maintained by SDC in accordance with SRS Manual 1D. If LUCs are required for an FFA waste unit, the unit-specific LUC boundaries are identified on the SRS site development maps. SDC must verify that any proposed work to be performed on a site is sanctioned by a Site Use Permit and verify that the proposed activity does not conflict with any previously approved land use.

In addition to the management of the use of SRS lands and waters through the Site Use Program, the SDC also administers the Site Clearance Program to control the construction, alteration, or demolition activities at SRS. Before any work that adds or modifies features or facilities portrayed on the SRS site development maps is conducted, a Site Clearance Permit is required. USDOE approval of the intended land via a Site Use Permit must be verified before a Site Clearance Permit is issued. If a Site Clearance request potentially impacts a FFA waste unit, the Site Clearance Request Form is sent to the appropriate FFA reviewer for approval. The FFA reviewer will evaluate the proposed activity to identify any conflicts with the waste unit and to verify that waste unit specific LUCs are not compromised. The roles and responsibilities of the individuals responsible for review and approval of Site Use and Site Clearance permits are detailed in SRS 1D, Procedure 3.02. All employees, contractors, and visitors at SRS are required to adhere to the Site Use Program and the Site Clearance Program.

The USDOE will notify USEPA and SCDHEC in advance of any change to any internal procedure, including the Site Use Program, which would affect implementing or maintaining the LUCs. Approval by USEPA and SCDHEC is required for any modification or termination of the LUCs and implementation actions, and the USDOE must obtain prior approval from USEPA and SCDHEC before taking any anticipated action that may disrupt the effectiveness of the LUCs or alter or negate the need for LUCs. The Site Use Permit and site development maps must be

amended when the geographic configuration or buffer zone used to establish the permit boundary changes or there is a change to the land use. The processes are controlled within the SRS Quality Assurance (QA) Program in accordance with SRS 1Q Manual, *Quality Assurance* (SRS 2007). The SRS QA program governs all SRS activities.

4.4 Physical Access Controls

Physical access controls (fencing, security gates) are provided at the SRS boundary of the LTR IOU with the exception of the Lower Subunit. There are no additional physical access controls required at the LTR IOU Middle Subunit and the small portion of the Lower Subunit located within the main SRS boundary fencing. For the remaining LTR IOU Lower Subunit not located within the main SRS boundary fencing (the area from Patterson Mill Road to the Savannah River), additional physical access controls were needed. Fencing (10.6 km [6.6 mi]), consisting of three strand barbed wire, was installed along the highest probability trespass zones on this portion of the LTR Lower Subunit as shown in Figure 4.

4.5 Warning Signs

To prevent unknowing entry and to ensure that unrestricted use of the waste unit does not occur while the unit is under ownership of the USDOE, access control warning signs and USDOE "No Trespassing" signs, are posted along the entire perimeter of the Lower Subunit (from Patterson Mill Road to the Savannah River) at approximately 61 m (200 ft) intervals from the SRS boundary to the Savannah River (Figure 4). Custodial responsibilities for maintenance and inspection will be performed by SRS.

4.6 Other Access Controls and Security/Surveillance Measures

While under the ownership of USDOE, access control of the entire SRS will be maintained in accordance with the 2000 RCRA Part B Permit Renewal Application, Volume I, Section F.1. This section describes the 24-hour surveillance system (R.61-79.264.14(b)(1)), artificial or natural barriers (R.61-79.264.14(b)(2)(I)), control entry systems (R.61-79.264.14(b)(2)(ii)), and

access control warning signs (R.61-79.264.14(c)) in place at the SRS boundary to comply with the security requirements for a RCRA-permitted facility.

4.7 Field Inspection and Maintenance for Land Use Controls

After remediation, only inspection and maintenance activities will be required by this remedial action. Inspections will be performed per the Field Inspection Checklists in Appendix B and the schedule in Table 2. The inspection walkdowns along the entire LTR Lower Subunit boundary (both sides of the creek) from Patterson Mill Road to the Savannah River will be conducted on a continuing five year inspection frequency to look for indications of trespassing and to inspect signs and fencing. Corrective actions will include the removal of unauthorized structures on DOE property. Additional inspections may be necessary in the event of unusual weather or any other condition warranting inspection.

Any activity that is inconsistent with the LUC objectives or use restrictions, or any other action that may interfere with the effectiveness of the LUCs will be addressed by the USDOE as soon as practicable, but in no case will the process be initiated later than 10 days after the USDOE becomes aware of the breach. The USDOE will notify USEPA and SCDHEC as soon as practicable but no longer than 10 days after discovery of any activity that is inconsistent with the LUC objectives or use restrictions, or any other action that may interfere with the effectiveness of the LUCs. The USDOE will notify USEPA and SCDHEC regarding how the USDOE has addressed or will address the breach within 10 days of sending USEPA and SCDHEC notification of the breach.

The FFA Annual Progress Report, submitted to the regulatory agencies by USDOE, will provide the status of the LUCs and describe how any LUC deficiencies or inconsistent uses have been addressed. In the event of property transfer or lease, the Annual Report will cite findings on the following: whether the use restrictions and controls referenced above were communicated in the deed(s) or lease restrictions; whether property use conforms with the deed or lease restrictions and controls; and whether the owners and state/local agencies have been notified regarding the

deed or lease restrictions and controls. The FFA Annual Progress Report(s) will be used in the preparation of the Five-Year Remedy Review Report.

All other routine maintenance activities will be documented and maintained in files subject to USEPA and SCDHEC review and audit. A copy of the completed inspection form is maintained in SRS records. The LUCs shall be maintained until the concentration of hazardous substances associated with the unit have been reduced to levels that allow for unlimited exposure and unrestricted use.

The waste unit inspectors are to be trained as applicable for the specific inspection. They will also be trained based on the individual requirements of the regulatory approved documents for the waste unit. In addition, the inspectors are to attend yearly refresher courses. Over the years, different personnel may conduct the inspections and maintenance activities.

This unit-specific LUCIP, including the checklist (Appendix B), will be appended to the SRS LUCAP upon final regulatory approval. After completion of the final PCR, the preliminary checklist in the LUCAP will be replaced with the final approved checklist.

Upon approval, the inspection, maintenance activities and schedule required by this EALUCIP will supersede the requirements defined in the September 2004, Early Action Fact Sheet (WSRC 2004 and Appendix C) and December 2007, Early Action Fact Sheet (WSRC 2007 Appendix D) in their entirety.

5.0 REFERENCES

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USDOE, 1998. DOE Order 430.1A, *Life Cycle Management* (Approved October 14, 1998)

USDOE, 2012. *DOE Submittal of the Action Memorandum for the time critical removal action for the Lower Three Runs Integrator Operable Unit Tail Portion Middle And Lower Subunits and the Removal Site Evaluation Report for the Lower Three Runs Integrator Operable Unit Tail Portion Middle and Lower Subunits,* SRNS-RP-2012-00118, Revision 1, April 2012, CERCLIS Number 35, ACP-12-150, U.S. Department of Energy, Savannah River Operations Office, Aiken SC

WSRC, 2004. *Lower Three Runs IOU Early Action Fact Sheet*, WSRC-RP-2004-4087, September 20, 2004, ARF # 011467, Westinghouse Savannah River Company, LLC, Savannah River Site, Aiken, SC

WSRC, 2007. *Lower Three Runs IOU Early Action Fact Sheet*, WSRC-RP-2007-4043, December 2007, ARF #15176, Washington Savannah River Company, LLC, Savannah River Site, Aiken, SC

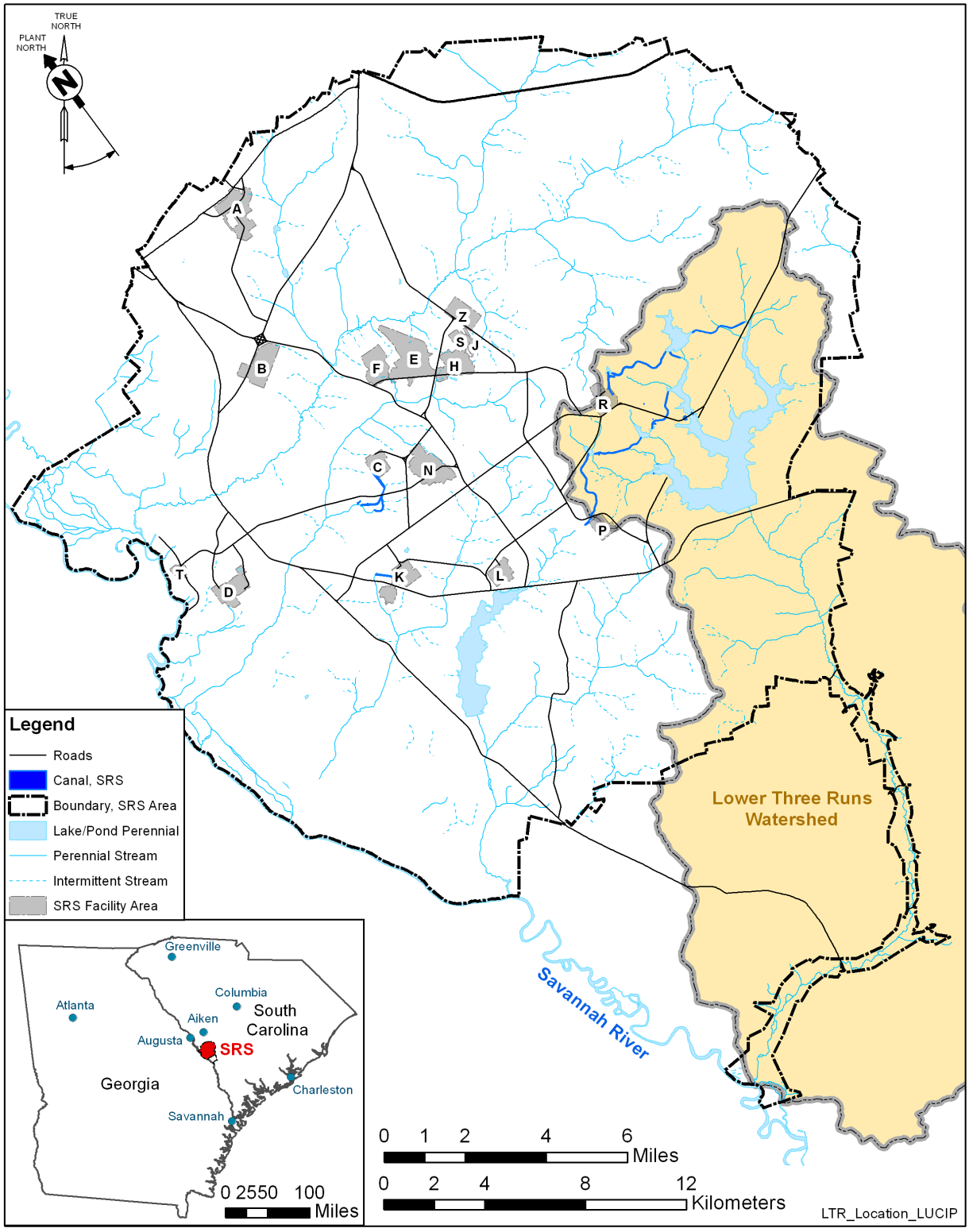


Figure 1. Location of the Lower Three Runs IOU within the Savannah River Site

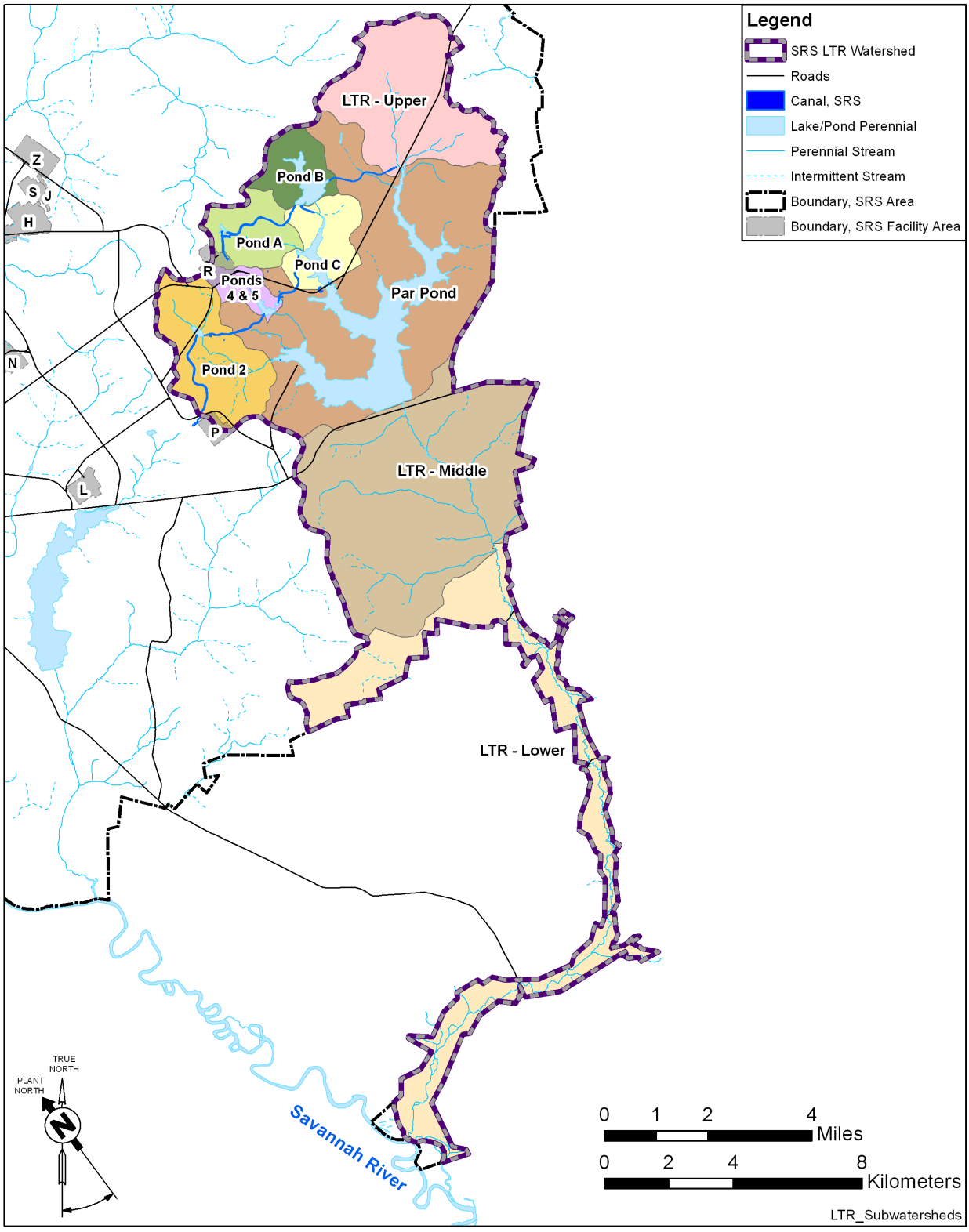


Figure 2. LTR Subunits

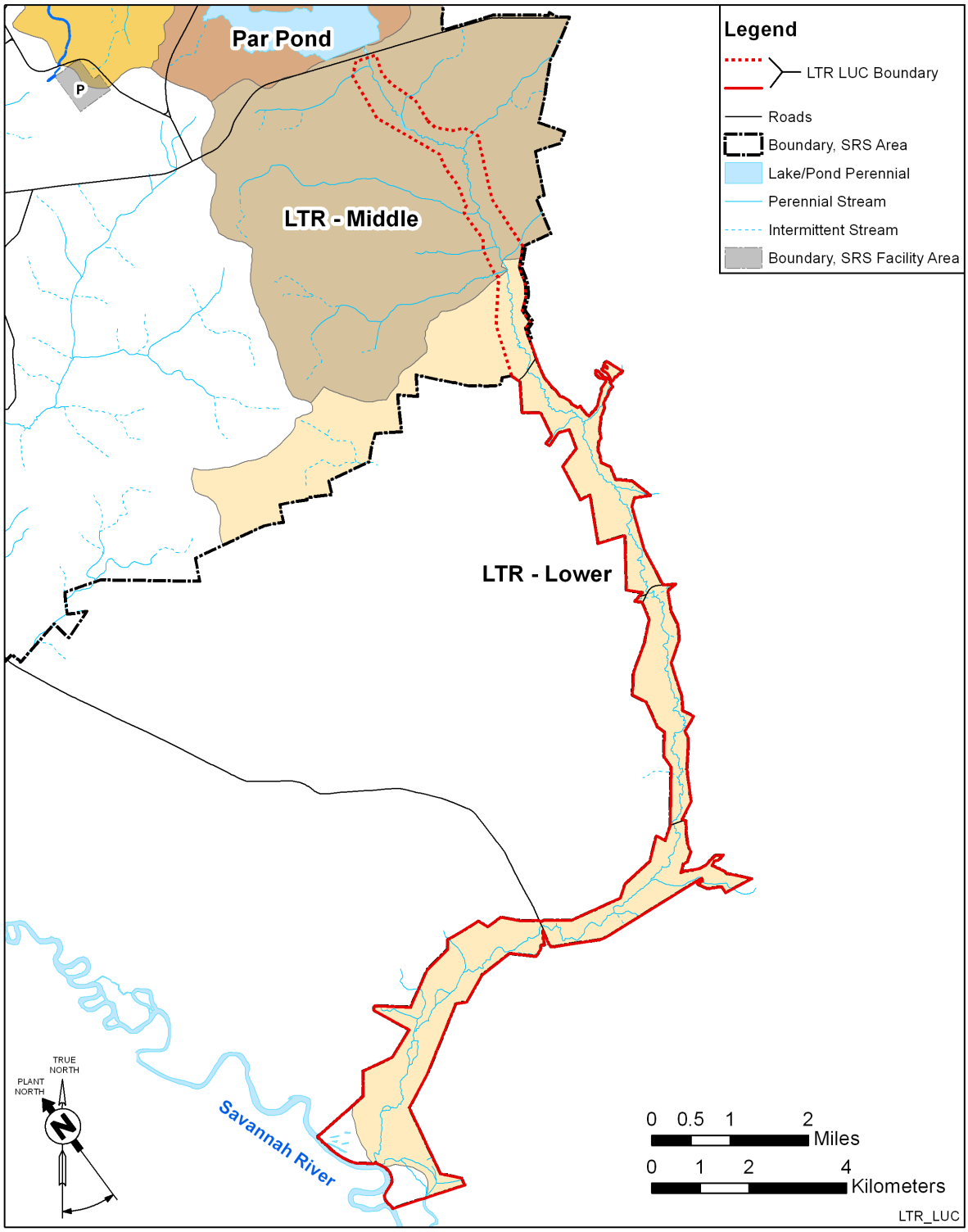


Figure 3. Early Action LUC Boundary Map for the LTR Middle and Lower Subunits

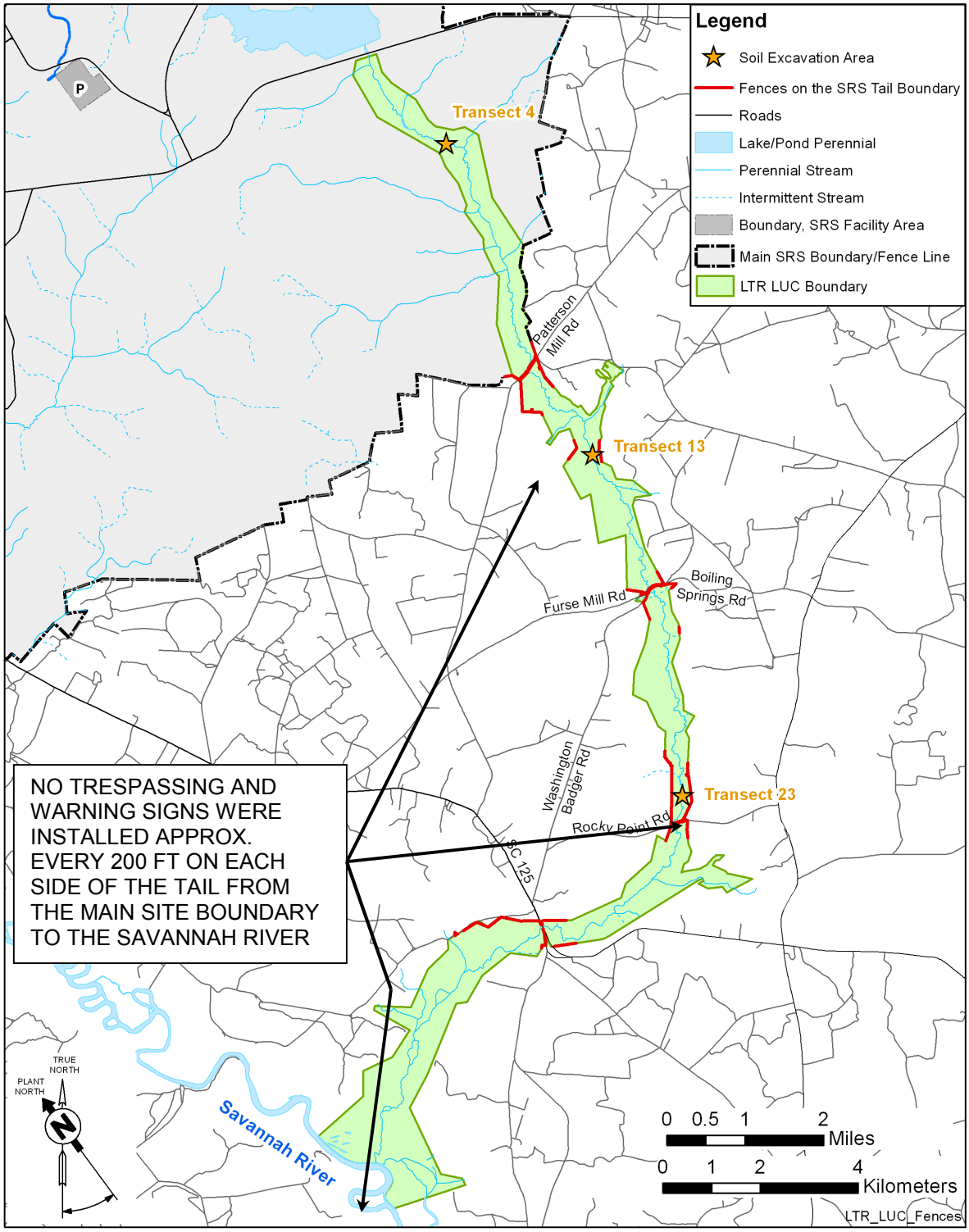


Figure 4. Fences and Signs on the LTR Lower Subunit from Patterson Mill Road to the Savannah River

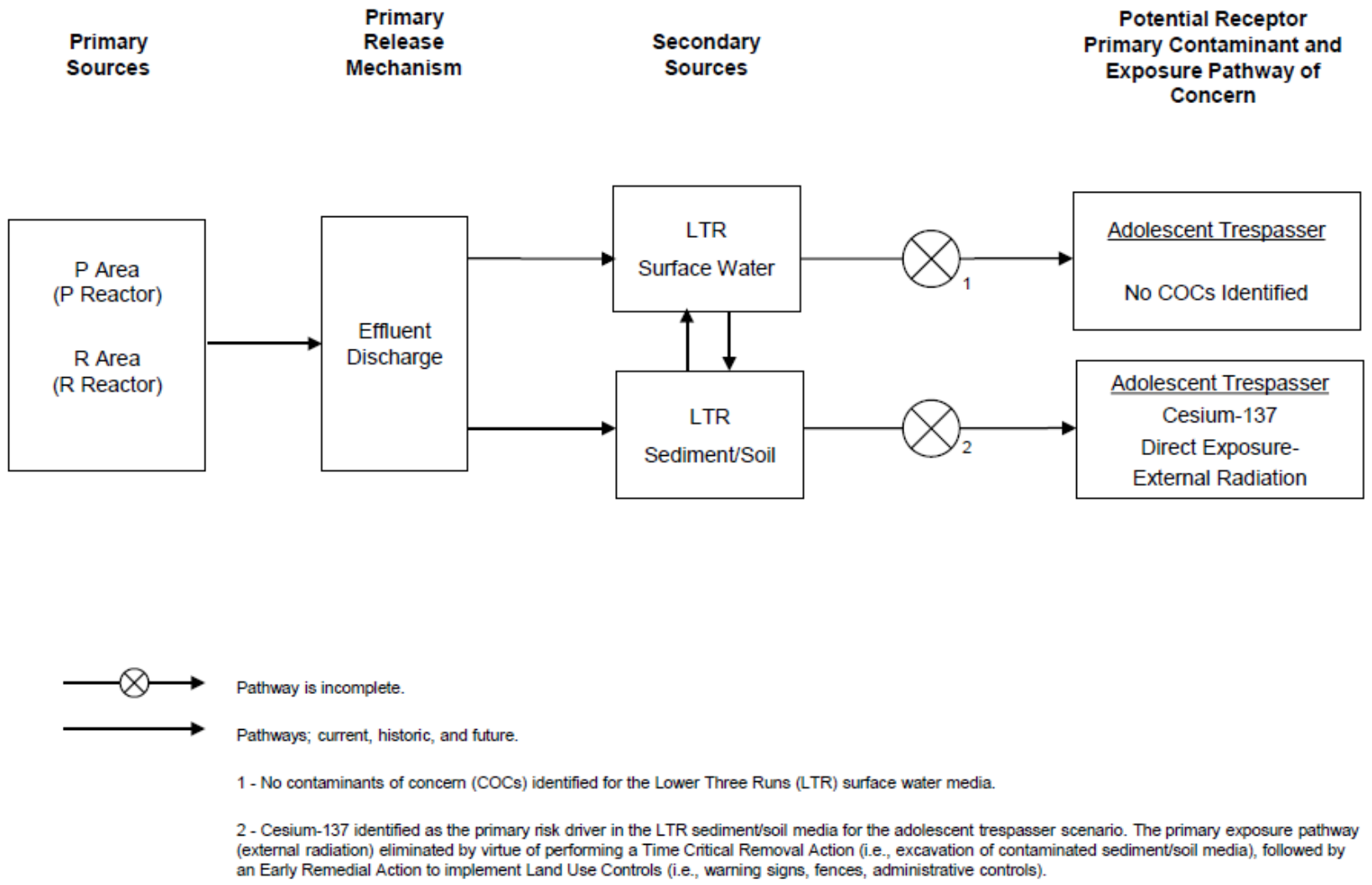


Figure 5. Conceptual Site Model after Completion of the Early Remedial Actions

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Table 1. Land Use Controls for the LTR IOU Middle and Lower Subunits

Type of Control	Purpose of Control	Duration	Implementation	Affected Areas[a]
1. Property Record Notices[b]	Provide notice to anyone searching records about the existence and location of contaminated areas.	Until the concentration of hazardous substances associated with the unit have been reduced to levels that allow for unlimited exposure and unrestricted use.	Notice recorded by USDOE in accordance with state laws at County Register of Deeds office if the property or any portion thereof is ever transferred to non-federal ownership.	At LTR IOU Middle and Lower Subunits where hazardous substances are left in place at levels requiring land use and/or groundwater restrictions.
2. Property record restrictions[c]: A. Land Use	Restrict use of property by imposing limitations.	Until the concentration of hazardous substances associated with the unit have been reduced to levels that allow for unlimited exposure and unrestricted use.	Drafted and implemented by USDOE upon any transfer of affected areas. Recorded by USDOE in accordance with state law at County Register of Deeds office.	At LTR IOU Middle and Lower Subunits, where hazardous substances are left in place at levels requiring land use.
3. Other Notices[d]	Provide notice to city &/or county about the existence and location of waste disposal and residual contamination areas for zoning/planning purposes.	Until the concentration of hazardous substances associated with the unit have been reduced to levels that allow for unlimited exposure and unrestricted use.	Notice recorded by USDOE in accordance with state laws at County Register of Deeds office if the property or any portion thereof is ever transferred to non-federal ownership.	At LTR IOU Middle and Lower Subunits, where hazardous substances are left in place at levels requiring land use and/or groundwater restrictions.
4. Site Use Program[e]	Provide notice to worker/developer (i.e., permit requestor) on extent of contamination and prohibit or limit excavation/penetration activity.	As long as property remains under USDOE control	Implemented by USDOE and site contractors Initiated by permit request	At LTR IOU Middle and Lower Subunits where levels requiring land use and/or groundwater restrictions.
5. Physical Access Controls[f] (e.g., fences, gates, portals)	Control and restrict access to the public to prevent unauthorized access.	Until the concentration of hazardous substances associated with the unit have been reduced to levels that allow for unlimited exposure and unrestricted use.	Controls maintained by USDOE. Any unauthorized structures or items found (i.e. deer stands, swing ropes, etc.) will be removed from DOE property.	Security is provided at site boundaries in accordance with SRS procedures.
6. Warning Signs[g]	Provide notice or warning to prevent unauthorized uses.	Until the concentration of hazardous substances associated with the unit have been reduced to levels that allow for unlimited exposure and unrestricted use.	Signage maintained by USDOE.	Warning signs will be posted in accordance with applicable site procedures and will be placed in appropriate areas of the LTR IOU Middle and Lower Subunits.
7. Security Surveillance Measures	Control and restrict access to the public.	Until the concentration of hazardous substances associated with the unit have been reduced to levels that allow for unlimited exposure and unrestricted use.	Established and maintained by USDOE	Security and surveillance measures are in place at the SRS boundary in accordance with RCRA permit requirements.

[a] Affected areas – Specific locations identified in the LUCIP or subsequent post-ROD documents.
[b] Property Record Notices – Refers to any non-enforceable, purely informational document recorded along with the original property acquisition records of USDOE and its predecessor agencies that alerts anyone searching property records to important information about residual contamination; waste disposal areas in the property.
[c] Property Record Restrictions – Includes conditions and/or covenants that restrict or prohibit certain uses of real property and are recorded along with original property acquisition records of USDOE and its predecessor agencies.
[d] Other Notices – Includes information on the location of waste disposal areas and residual contamination depicted on as survey plat, which is provided to a zoning authority (i.e., city planning commission) for consideration in appropriate zoning decisions for non-USDOE property.
[e] Site Use Program – Refers to the internal USDOE/USDOE contractor administrative program(s) that requires the permit requestor to obtain authorization, usually in the form of a permit, before beginning any excavation/penetration activity (e.g., well drilling) for the purpose of ensuring that the selected activity will not affect underground utilities/structures, or in the case of contaminated soil or groundwater, will not disturb the affected areas without the appropriate precautions and safeguards.
[f] Physical Access Controls – Physical barriers or restrictions to entry.
[g] Signs – Posted command, warning or direction

Table 2. LTR Lower Subunit (Area from Patterson Mill Road to the Savannah River) 10-Year Cycle Inspection Schedule

	INSPECTION SCHEDULE[1]										Total Inspections in a 10 Year Cycle
Year Ending In[2]	0	1	2	3	4	5	6	7	8	9	
Five-Year Remedy Review			X					X			**NA**
Inspection A[3]		A[4]					A[4]				**2**
Inspection B[5]	B	B[6]		B	B	B	B[6]		B	B	**8**

1 The inspection frequency includes observations and reconnaissance of the LTR Lower Subunit from Patterson Mill Road to the Savannah River from 2004-2012, issuance of the first Early Action Fact Sheet, and implementation of these EALUCIP requirements. Observations and recons have shown that trespassing is **infrequent** and occurs mainly at the bridge crossings or easy access areas. There is little evidence of long periods of trespassing except for deer stands; currently there are no deer stands located on the DOE property. DOE has requested additional emphasis by SRS security support (Wackenhut Services, Inc.) in the LTR Lower Subunit from Patterson Mill Road to the Savannah River to include more patrols and helicopter over flights. The USEPA and SCDHEC will be contacted to discuss the need to revise the inspection frequency should conditions change.

2 Represents years in a 10 year cycle. For example, "1" refers to years 2011, 2021, 2031, etc.

3 Inspection "A" Requirements- Inspection of all signs and fences on the Lower Subunit (from Patterson Mill Road to the Savannah River) beginning at the main site boundary to the north and ending at the Savannah River to the south (Figures 3 and 4). Inspections will insure that all signs and fences are in place and signs are legible.

4 For 5 Year Remedy Review reporting, only one (1) inspection is required in either the year preceding or the year of the review.

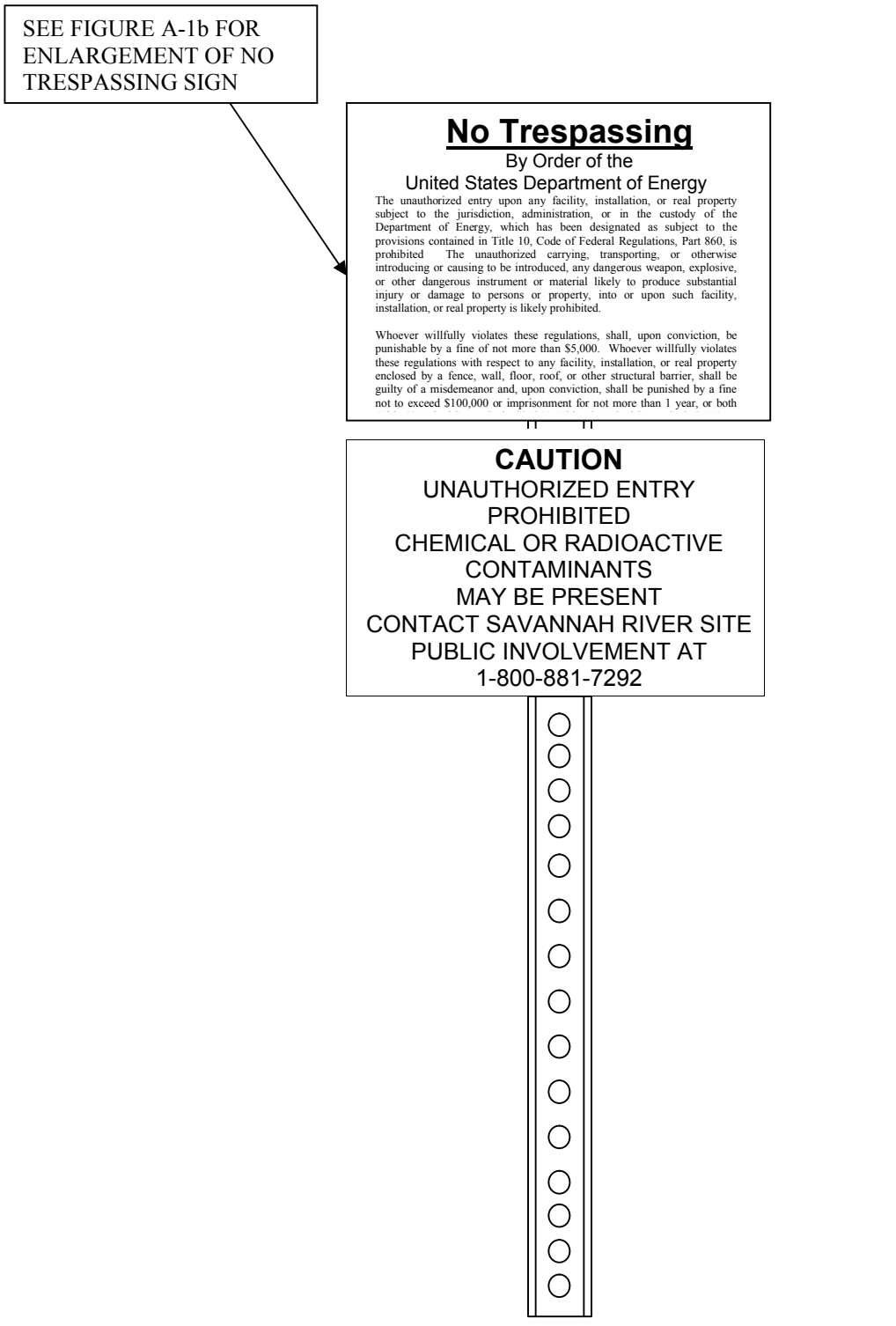
5 Inspection "B" Requirements - Inspections of signs and fences at the four (4) public road crossings for a distance of 1200 ft in each direction (4800 ft total at each public road crossing). Inspections will insure that all signs and fences are in place and signs are legible.

6 Inspection B to be conducted only in the year Inspection A does not occur for the purpose of the Five-Year Remedy review.

APPENDIX A

ACCESS CONTROL WARNINGS SIGNS

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Note: Editorial changes to signs do not require changes to this document.

Figure A-1a. *EXAMPLE* — Access Control Warning Sign

No Trespassing

By Order of the
United States Department of Energy

The unauthorized entry upon any facility, installation, or real property subject to the jurisdiction, administration, or in the custody of the Department of Energy, which has been designated as subject to the provisions contained in Title 10, Code of Federal Regulations, Part 860, is prohibited The unauthorized carrying, transporting, or otherwise introducing or causing to be introduced, any dangerous weapon, explosive, or other dangerous instrument or material likely to produce substantial injury or damage to persons or property, into or upon such facility, installation, or real property is likely prohibited.

Whoever willfully violates these regulations, shall, upon conviction, be punishable by a fine of not more than $5,000. Whoever willfully violates these regulations with respect to any facility, installation, or real property enclosed by a fence, wall, floor, roof, or other structural barrier, shall be guilty of a misdemeanor and, upon conviction, shall be punished by a fine not to exceed $100,000 or imprisonment for not more than 1 year, or both (Title 42 United States Code, 2278(a); Title 18, United States Code 3571)

By authority of Section 229 of the Atomic Energy Act of 1954, as amended (Title 42, United States Code, 2278(a) and Title 10, Code of Federal Regulations, Part 860 of the rules and regulations of the Department of Energy) this facility, installation, or real property has been designated as subject to these regulations by the United States Department of Energy. Trespassers may be subject to the provisions stated above.

Figure A-1b. *EXAMPLE* — Enlargement of No Trespassing Sign

APPENDIX B

FIELD INSPECTION CHECKLISTS

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INSPECTION A

FIELD INSPECTION CHECKLIST

FOR THE LTR IOU LOWER SUBUNIT

(from Patterson Mill Road to the Savannah River**)**

☐ **SCHEDULED** **YEAR** _____ ☐ **UNSCHEDULED**

A = Satisfactory **X** = Unsatisfactory (Explanation required)	**A** or **X**	Observation of Corrective Action Taken
1. Verify that the signs are in acceptable condition, have the correct information, and are legible.		
2. Verify that the fences are in acceptable condition.		
3. Document and provide appropriate notification of the location of any evidence of trespassing within the LUC/Site Boundaries.		
4. Verify that there are no unauthorized structures (e.g. deer stands, rope swings) on DOE property.		

Notes
Items 1 and 2-The general location(s) and description of unsatisfactory condition(s) shall be noted on a map.
Item 3- The general location(s) shall be noted on a map.
Item 4 - Corrective Action must include removal of unauthorized structures.

Inspected by:

_____/_____ Date:_____
(Print Name) (Signature)

Post-Closure Manager:

_____/_____ Date:_____
(Print Name) (Signature)

CAUTION: The inspector shall notify the Post-Closure Manager (PCM) and Environmental Compliance Authority (ECA) **IMMEDIATELY** if there has been a breach or compromise of the land use controls of this waste unit. The notification shall be in accordance with SRS post-closure inspection procedures.

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INSPECTION B

FIELD INSPECTION CHECKLIST
FOR THE LTR IOU Lower Subunit

(At the Four (4) Public Road Crossings from Patterson Mill Road to the Savannah River)

❑ **SCHEDULED** **YEAR** _____ ❑ **UNSCHEDULED**

A = Satisfactory **X** = Unsatisfactory (Explanation required)	**A** or **X**	Observation of Corrective Action Taken
1. Verify that the signs, within the limits of the inspection 1200 ft each way, are in acceptable condition, have the correct information, and are legible.		
2. Verify that the fences, within the limits of the inspection 1200 ft each way are in acceptable condition.		
3. Document and provide appropriate notification of the location of any evidence of trespassing within the limits of the inspection		
4. Verify that there are no unauthorized structures (e.g. deer stands, rope swings) on DOE property within the limits of the inspection.		

Notes
Items 1 and 2-The general location(s) and description of unsatisfactory condition(s) shall be noted on a map.
Item 3- The general location(s) shall be noted on a map.
Item 4 - Corrective Action must include removal of unauthorized structures.

Inspected by:

_____ / _____ Date:_____
(Print Name) (Signature)

Post-Closure Manager:

_____ / _____ Date:_____
(Print Name) (Signature)

CAUTION: The inspector shall notify the Post-Closure Manager (PCM) and Environmental Compliance Authority (ECA) **IMMEDIATELY** if there has been a breach or compromise of the land use controls of this waste unit. The notification shall be in accordance with SRS post-closure inspection procedures.

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APPENDIX C

Lower Three Runs IOU Early Action Fact Sheet

WSRC-RP-2004-4087

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Lower Three Runs IOU **WSRC-RP-2004-4087**
Early Action Fact Sheet **September 20, 2004**

Introduction

This Early Action Fact Sheet is being issued by the United States Department of Energy (USDOE) with concurrence from the United States Environmental Protection Agency (USEPA) and South Carolina Department of Health and Environmental Control (SCDHEC). The purpose of this Early Action Fact Sheet is to describe the proposed early response action for the Lower Three Runs Integrator Operable Unit and to provide for public involvement in the decision-making process.

IOU Program

The Lower Three Runs (LTR) Creek and floodplain is one of six Savannah River Site (SRS) Integrator Operable Units (IOUs) corresponding to each of the major onsite watersheds. The other five IOUs are the Upper Three Runs, Fourmile Branch, Pen Branch, Steel Creek, and the Savannah River & Floodplain Swamp. IOUs are defined as surface water bodies (e.g., streams and lakes) and associated wetlands, including the sediment, floodplain soil, and related biota (animal and plant life). The IOUs are being evaluated to determine if past releases of contamination from SRS pose unacceptable risks to the environment, onsite workers, or off site general public.

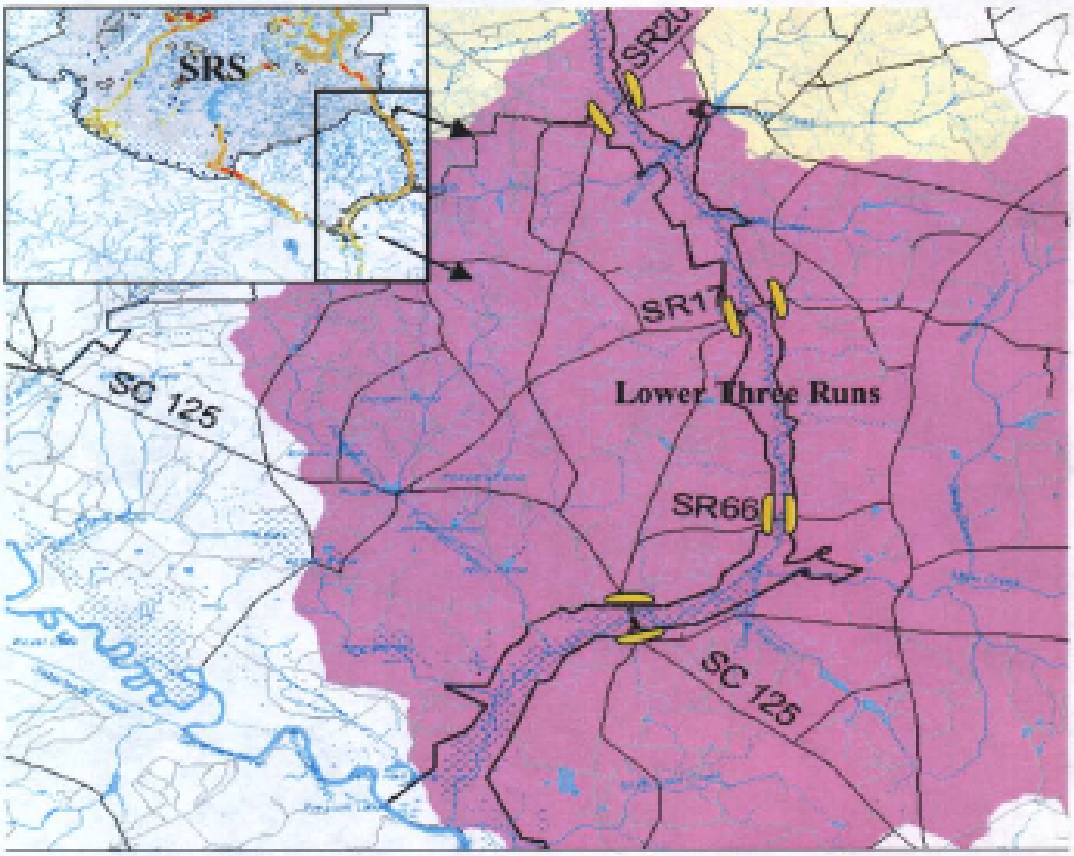
The investigation of IOUs is being performed in three phases. Phase I, which has been completed for all IOUs, included the evaluation of existing data and historical information. Phase II involves the ongoing sampling and evaluation of new data to determine if contamination levels call for consideration of an early response action. Phase III will include the final risk assessment with the final remedial actions to be documented in a Record of Decision.

Lower Three Runs IOU Background

The Lower Three Runs (LTR) IOU is located in the southeastern portion of SRS. P Reactor Area and R Reactor Area are the two primary SRS facilities located within the LTR watershed. In addition, the watershed contains a 2,500-acre lake (PAR Pond) used during reactor operations. From the PAR Pond Dam, Lower Three Runs Stream flows approximately 19 miles before it enters the Savannah River. Between the dam and the Savannah River, the SRS boundary includes a narrow strip

of land known as the Lower Three Runs tail. The tail of Lower Three Runs is bounded on both sides by private property. The tail consists of an approximate 1/8 to 1/4-mile wide densely vegetated buffer on each side of the stream that limits access by trespassers. There are four public road crossings where public access to contamination in the tail is possible. Members of the public entering SRS property at any of these locations are considered trespassers.

The Phase II evaluations of the Lower Three Runs IOU identified deposits of radioactive cesium-137 contamination below PAR Pond Dam and along the LTR tail section. Cesium-137 is a concern to human health because at elevated levels, it can increase the chance of developing cancer.



General Location of the "No Trespassing, No Fishing, and Caution" Signs and Fencing at Road Crossings

Contaminant of Concern

Cesium-137 was deposited throughout the length of the LTR during discharges of contaminated water from P and R Reactors that were shut down in 1991 and 1963, respectively. Cesium-137 quickly binds securely with sediment in the stream.

Risk Evaluation

The level of cesium-137 contamination in the LTR IOU does not present an increased risk of cancer to the off-site general public. However, it was determined that the cesium-137 levels do pose an unacceptable health risk to SRS workers and potential trespassers on SRS that may come in contact with contamination in this area.

The LTR Phase II IOU investigations also include an ecological evaluation. Results from the evaluation indicate that no action is needed at this time to protect the environment (e.g. animal and plant life).

Early Action

Two early response action alternatives were evaluated to address the present risk in the LTR IOU.

- No Action
- Institutional Controls

The no action alternative was determined not to be protective of SRS workers and a trespasser who unintentionally enters SRS property.

The United States Department of Energy (US DOE) with agreement from the United States Environmental Protection Agency (US EPA) and South Carolina Department of Health and Environmental Control (SCDHEC) is proposing to implement the following institutional controls to mitigate the risk by eliminating inadvertent exposure to cesium-137 by SRS workers and unintentional trespassers.

- Installation of warning signs below PAR Pond Dam and at the public road crossings along the LTR tail.
- Installation of fencing at public road crossings.
- Annual inspections of public road crossings to ensure signs and fencing are in place.

The warning signs state, "Caution, Unauthorized Entry Prohibited, Chemical or Radioactive Contaminants May be Present, Contact SRS Public Involvement 1-800-249-8155." The barbed wire fence will be placed on DOE property adjacent to

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the road. These early action will be in place as long as contaminant levels requiring early action remain, or until the final remedial actions are implemented. The cost of implementing this proposed early action is approximately $50,000.

Public Involvement

This document will be available for public comment from September 22, 2004, to October 21, 2004.

If there is interest in discussing this early action approach, a public meeting may be requested. Comments on the Early Action Fact Sheet should be sent to Mr. Jim Moore. For additional information or to request a public meeting contact:

Jim Moore
Westinghouse Savannah River Company
Savannah River Site
Building 742-A
Aiken, SC 29808
1-800-249-8155
jim02.moore@srs.gov

APPENDIX D

***Lower Three Runs IOU Early Action Fact Sheet*, WSRC-RP-2007-4043**

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ARF # 15176

Lower Three Runs IOU **WSRC-RP-2007-4043**
Early Action Fact Sheet **December 2007**

Introduction

This Early Action Fact Sheet is being issued by the United States Department of Energy (DOE) with concurrence from the United States Environmental Protection Agency (EPA) and South Carolina Department of Health and Environmental Control (SCDHEC). The purpose of this Early Action Fact Sheet is to describe the additional proposed early response actions for the Lower Three Runs (LTR) Integrator Operable Unit (IOU) and to provide for public involvement in the decision-making process. The first Early Action Fact Sheet for LTR was issued November 3, 2004.

IOU Program

The LTR Creek and floodplain is one of six Savannah River Site (SRS) IOUs corresponding to each of the major onsite watersheds. IOUs are defined as surface water bodies (e.g., streams and lakes) and associated wetlands, including the sediment, floodplain soil, and related biota (animal and plant life). IOUs are evaluated to determine if past releases of contamination from SRS pose unacceptable risks to the environment, SRS workers, or off-site general public.

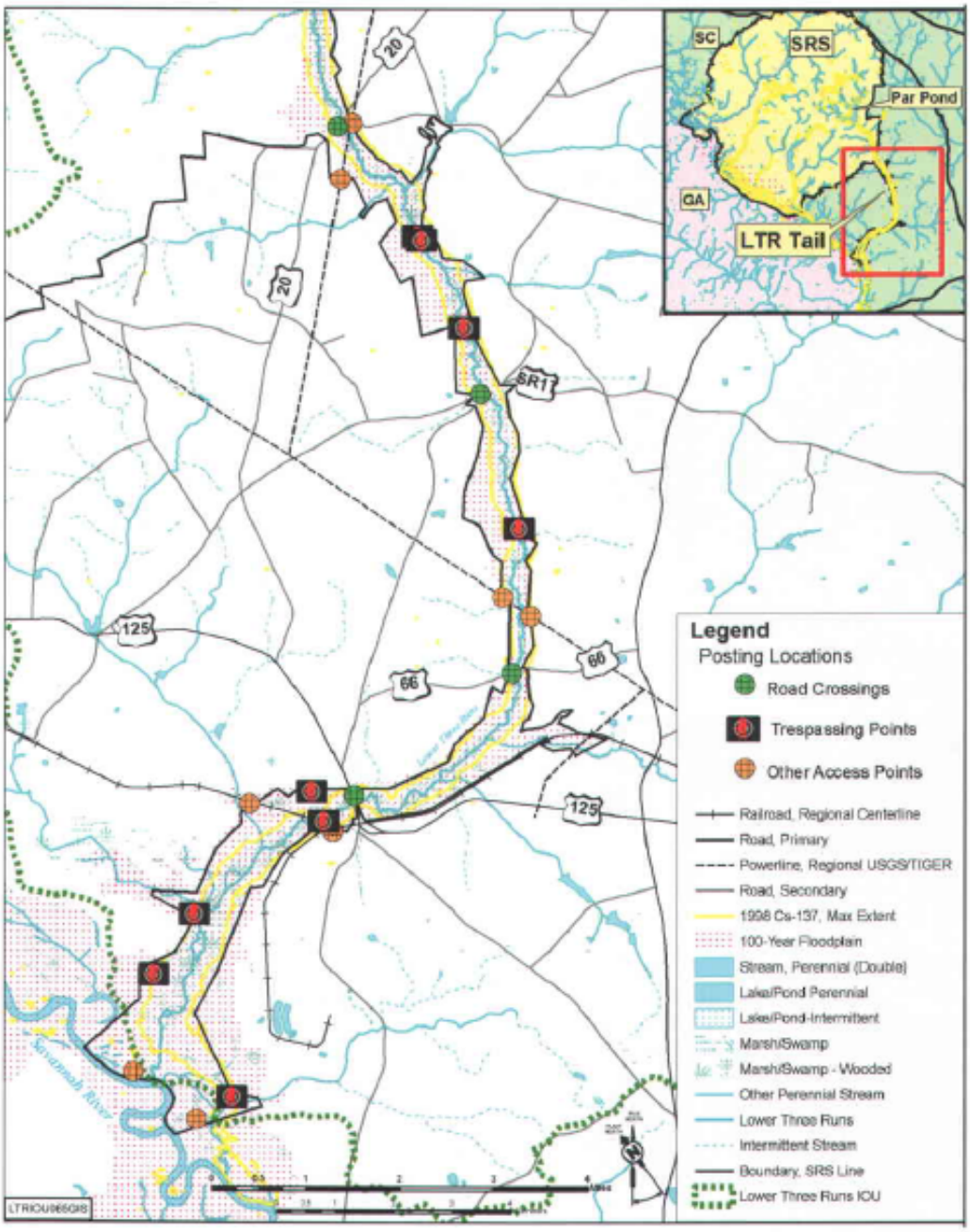
The investigation of IOUs is performed in three phases. Phase I, which has been completed for all IOUs, included the evaluation of existing data and historical information. Phase II involves the ongoing sampling and evaluation of new data to determine if contamination levels call for consideration of an early response action. Phase III will include the final risk assessment with the final remedial decisions to be documented in a Record of Decision. The LTR IOU is in the Phase II stage.

Lower Three Runs IOU Background

The LTR IOU is located in the southeastern portion of SRS (see figure on following page). P-Area Reactor and R-Area Reactor are the two primary SRS facilities located within the LTR watershed. In addition, the watershed contains a 2,500-acre lake (PAR Pond) used by both P Reactor and R Reactor during reactor operations. From the PAR Pond Dam, LTR flows approximately 19 miles south to southwest before it enters the Savannah River. Beginning at State Route 20 (Patterson Mill Bridge), the SRS boundary narrows on both sides of the creek to a strip of land known as the LTR tail. The LTR tail section is owned by DOE and is bounded on both sides by private property. The LTR tail section generally consists of the creek and the 1/8 to 1/4-mile wide densely vegetated floodplain on each side of the creek. There are four public roads, a railroad, and two power lines that cross the LTR tail where public access to contamination in the LTR tail section is possible. However, members of the public entering SRS property at any locations along the LTR tail are trespassing, and are subject to prosecution.

ARF # 15176

Lower Three Runs IOU **WSRC-RP-2007-4043**
Early Action Fact Sheet **December 2007**



Trespassing locations and other potential access points in LTR tail.

ARF # 15176

Lower Three Runs IOU **WSRC-RP-2007-4043**
Early Action Fact Sheet **December 2007**

Contaminant of Concern

Cesium-137 is a radioactive fission product from P Reactor and R Reactor which ceased operations in 1988 and 1964, respectively. Cesium-137 binds securely to stream sediments, and the radioactivity is reduced by one-half every 30 years through decay. The Phase II evaluations of the LTR IOU identified cesium-137 contamination below the PAR Pond Dam in floodplain sediments along the entire length of the LTR tail section. Analysis of fish throughout LTR has also shown the presence of cesium-137.

Risk Evaluation

Cesium-137 is a concern to human health because at elevated levels, it can increase the chance of developing cancer. Cesium - 137 was not found at levels in the LTR IOU that would present an increased risk of cancer to the off-site general public. However, it was determined that the cesium-137 levels could pose an unacceptable health risk (increased cancer incidence of greater than 1 in 10,000) to SRS workers and potential trespassers on the SRS that may have frequent and prolonged contact with contaminated floodplain sediments.

The LTR Phase II IOU investigations also include an ecological evaluation. Results from the evaluation indicate that no early action is needed at this time to protect the environment (e.g. animal and plant life).

Early Action

As specified in the November 3, 2004, Early Action Fact Sheet, actions taken to prevent the inadvertent exposure to cesium-137 by SRS workers and unintentional trespassers included the installation and inspection of warning signs and fencing at public road crossings along the LTR tail section. A reconnaissance survey conducted in 2005 identified evidence of trespassing in the LTR floodplain at locations along the tail section, indicating that the 2004 early actions alone are not adequately protective of an inadvertent trespasser.

The DOE, with agreement from the EPA and SCDHEC, proposes to implement the following additional institutional controls to mitigate the potential risk to unintentional trespassers from exposure to cesium-137:

- Notification of adjacent property owners
- Posting and maintenance of additional signs at likely and observed locations of ingress
- Removal of unauthorized structures (e.g. deer stands, rope swings) on DOE property
- Additional reconnaissance surveys

Annual inspections and maintenance of all signs will be conducted to ensure they are in place and readable. Results of the

inspections and reconnaissance surveys will be documented in subsequent LTR Periodic Reports. Actions (such as additional postings) will be taken in a timely manner (initiated within 30 days) if inspections identify previously unidentified evidence of trespassing.

The warning signs state, "Caution, Unauthorized Entry Prohibited, Chemical or Radioactive Contaminants May be Present, Contact Savannah River Site Public Involvement 1-800-249-8155." Maintenance of signs and removal of unauthorized structures will continue as long as contaminant levels warranting early action remain, or until the final remedial actions are implemented. The cost of implementing these proposed additional early actions is approximately $50,000.

Thus far, signs have been posted at all the trespassing and access points identified in the 2005 reconnaissance (see figure on page 2). Another reconnaissance of the portion of LTR between Patterson Bridge and Hwy. 125 conducted in 2007 found no additional evidence of trespassing activities. Security patrols have also been increased, including helicopter overflights.

Public Involvement – Responsiveness Summary

This document was made available for public comment from January 4, 2008 to February 3, 2008. There were no public comments, questions or request for a public meeting to discuss this early action approach. It will also be presented to the SRS Citizens Advisory Board later this year along with the annual IOU update.

APPENDIX E

As-Built LUC Boundary Plat and Table of Coordinates

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Table E-1 LTR IOU TAIL PORTION (MIDDLE AND LOWER SUBUNITS) Control Point / Monument Coordinates

LTR IOU TAIL PORTION (MIDDLE AND LOWER SUBUNITS) Control Point / Monument Coordinates			
Control Point / Monument Number	**UTM_27_E**	**UTM_27_N**	**Comments**
A	452044.8462	3677175.270	Non Monument Control Point
B	452161.5604	3676805.369	Non Monument Control Point
C	452361.523	3676585.045	Non Monument Control Point
D	452852.0205	3676248.365	Non Monument Control Point
E	453109.9414	3675826.772	Non Monument Control Point
F	453260.7096	3675694.078	Non Monument Control Point
G	453626.7157	3675622.533	Non Monument Control Point
H	453853.2879	3675680.952	Non Monument Control Point
I	454137.7201	3675521.247	Non Monument Control Point
J	454425.6381	3674227.497	Non Monument Control Point
K	454515.1476	3671626.496	Non Monument Control Point
L	454567.0193	3672615.733	Non Monument Control Point
M	454473.5423	3672708.235	Non Monument Control Point
N	454251.5397	3673168.694	Non Monument Control Point
O	454247.5354	3673394.499	Non Monument Control Point
P	453853.6706	3673935.513	Non Monument Control Point
Q	453897.3862	3674081.513	Non Monument Control Point
R	453721.5576	3674522.861	Non Monument Control Point
S	453472.3746	3674854.349	Non Monument Control Point
T	453350.9434	3675139.922	Non Monument Control Point
U	452064.5648	3675883.402	Non Monument Control Point
V	451569.8438	3676733.357	Non Monument Control Point
W	451631.2855	3677045.931	Non Monument Control Point
141	455062.902	3673249.380	Monument Control Point
142	454995.887	3672815.111	Monument Control Point
143	455115.956	3672489.123	Monument Control Point
144	455131.932	3672238.276	Monument Control Point
145	455053.9858	3671939.117	Monument Control Point
146	455217.2322	3671696.633	Monument Control Point
147	455117.9564	3671569.094	Monument Control Point
148	455408.6439	3670758.793	Monument Control Point
149	455504.393	3670553.895	Monument Control Point
150	455692.5408	3670335.320	Monument Control Point
150A	455733.5811	3670302.165	Monument Control Point
151	455831.4105	3670171.364	Monument Control Point
151A	455912.0667	3670143.018	Monument Control Point
151B	456023.5339	3670079.343	Monument Control Point
151C	456064.9345	3670023.259	Monument Control Point
151D	456076.262	3670003.604	Monument Control Point

Table E-1 LTR IOU TAIL PORTION (MIDDLE AND LOWER SUBUNITS) Control Point / Monument Coordinates (continued)

LTR IOU TAIL PORTION (MIDDLE AND LOWER SUBUNITS) Control Point / Monument Coordinates			
Control Point / Monument Number	**UTM_27_E**	**UTM_27_N**	**Comments**
151E	456120.9385	3669979.443	Monument Control Point
151F	456187.7967	3669933.499	Monument Control Point
151G	456242.8586	3669966.098	Monument Control Point
151H	456307.844	3669875.433	Monument Control Point
151I	456367.2278	3669806.296	Monument Control Point
152	456426.1763	3669767.412	Monument Control Point
152A	456429.7553	3669773.715	Monument Control Point
152B	456481.3382	3669831.046	Monument Control Point
153	456561.3239	3669911.463	Monument Control Point
153A	456555.5343	3669921.378	Monument Control Point
153B	456599.2756	3669974.549	Monument Control Point
153C	456641.2722	3670150.193	Monument Control Point
153D	456676.373	3670272.276	Monument Control Point
153E	456682.6679	3670337.094	Monument Control Point
153F	456692.7414	3670366.253	Monument Control Point
153G	456741.1316	3670419.070	Monument Control Point
154	456767.1624	3670471.093	Monument Control Point
154A	456754.9951	3670509.287	Monument Control Point
154B	456677.8878	3670543.315	Monument Control Point
154C	456647.5163	3670540.381	Monument Control Point
154D	456566.083	3670623.244	Monument Control Point
154E	456554.8938	3670694.047	Monument Control Point
154F	456594.9732	3670696.951	Monument Control Point
154G	456732.2045	3670572.676	Monument Control Point
154H	456838.3552	3670513.374	Monument Control Point
154I	456862.8155	3670535.273	Monument Control Point
154J	456792.5432	3670644.782	Monument Control Point
154K	456676.7058	3670721.611	Monument Control Point
154L	456705.3911	3670747.585	Monument Control Point
154M	456717.3455	3670797.935	Monument Control Point
154N	456792.0257	3670746.175	Monument Control Point
154O	456796.4794	3670768.578	Monument Control Point
154P	456730.6623	3670829.851	Monument Control Point
154Q	456788.3023	3670887.875	Monument Control Point
154R	456872.2083	3670836.654	Monument Control Point
154S	456932.2535	3670794.928	Monument Control Point
154T	457108.2742	3670689.971	Monument Control Point
155	456869.4857	3670428.836	Monument Control Point
156	456913.1263	3670365.270	Monument Control Point

Table E-1 LTR IOU TAIL PORTION (MIDDLE AND LOWER SUBUNITS) Control Point / Monument Coordinates (continued)

LTR IOU TAIL PORTION (MIDDLE AND LOWER SUBUNITS) Control Point / Monument Coordinates			
Control Point / Monument Number	**UTM_27_E**	**UTM_27_N**	**Comments**
157	456840.1529	3670279.353	Monument Control Point
158	456812.3338	3670195.048	Monument Control Point
159	456760.955	3670115.930	Monument Control Point
160	456720.5405	3670033.970	Monument Control Point
161	456748.1744	3669941.075	Monument Control Point
162	456675.174	3669753.146	Monument Control Point
163	456639.0005	3669496.956	Monument Control Point
164	456668.0258	3669312.749	Monument Control Point
165	456620.5518	3669236.531	Monument Control Point
166	456609.9107	3669053.166	Monument Control Point
167	456643.6644	3668980.262	Monument Control Point
168	456674.4066	3668812.962	Monument Control Point
169	456871.9655	3668721.856	Monument Control Point
170	456969.2249	3668463.796	Monument Control Point
171	457315.2141	3668432.635	Monument Control Point
172	457686.3149	3668134.223	Monument Control Point
173	457356.85	3668082.055	Monument Control Point
174	457308.2204	3667911.464	Monument Control Point
175	457551.7208	3667039.547	Monument Control Point
176	457943.9477	3666301.421	Monument Control Point
177	458201.2868	3666311.658	Monument Control Point
178	458048.4027	3666176.958	Monument Control Point
179	458113.858	3665750.783	Monument Control Point
180	458250.4307	3665487.305	Monument Control Point
181	458275.4544	3665173.653	Monument Control Point
182	458111.0909	3664706.178	Monument Control Point
183	458336.9702	3664013.336	Monument Control Point
184	458346.7012	3663717.730	Monument Control Point
185	458570.3044	3663599.072	Monument Control Point
186	458389.19	3663298.688	Monument Control Point
187	458464.674	3663148.427	Monument Control Point
188	458429.9978	3662532.419	Monument Control Point
189	458522.6417	3661853.342	Monument Control Point
190	458334.8491	3661487.166	Monument Control Point
191	458417.8911	3661454.369	Monument Control Point
192	458426.4899	3661290.214	Monument Control Point
193	458420.0157	3661256.220	Monument Control Point
194	458446.2809	3660986.030	Monument Control Point
195	458514.1372	3660819.414	Monument Control Point

Table E-1 LTR IOU TAIL PORTION (MIDDLE AND LOWER SUBUNITS) Control Point / Monument Coordinates (continued)

LTR IOU TAIL PORTION (MIDDLE AND LOWER SUBUNITS) Control Point / Monument Coordinates			
Control Point / Monument Number	**UTM_27_E**	**UTM_27_N**	**Comments**
196	458437.4583	3660611.416	Monument Control Point
197	458360.8083	3660562.730	Monument Control Point
198	458307.8567	3660389.421	Monument Control Point
199	458381.3594	3660420.883	Monument Control Point
200	458689.683	3660468.344	Monument Control Point
201	458828.9439	3660549.314	Monument Control Point
202	458932.795	3660672.384	Monument Control Point
203	459016.2833	3660745.017	Monument Control Point
204	459179.1541	3660749.799	Monument Control Point
205	459081.7954	3660648.464	Monument Control Point
206	459000.6492	3660631.768	Monument Control Point
207	458948.6038	3660540.178	Monument Control Point
208	459211.7135	3660416.251	Monument Control Point
209	459251.8508	3660371.358	Monument Control Point
210	459349.0388	3660354.076	Monument Control Point
210A	459765.2204	3660263.870	Monument Control Point
210B	459235.1218	3659977.246	Monument Control Point
210C	459150.8369	3660099.089	Monument Control Point
210D	458850.9667	3660061.807	Monument Control Point
211	458651.2266	3660160.746	Monument Control Point
211A	458757.9816	3660215.439	Monument Control Point
211B	458752.781	3660229.831	Monument Control Point
211C	458742.2113	3660258.390	Monument Control Point
211D	458737.2598	3660272.812	Monument Control Point
212	458619.4424	3660212.564	Monument Control Point
213	456825.5783	3659094.448	Monument Control Point
214	456717.1786	3659037.649	Monument Control Point
215	456647.1207	3659015.325	Monument Control Point
216	455686.8558	3658870.866	Monument Control Point
216A	455646.5074	3658864.868	Monument Control Point
216B	455595.4147	3658936.121	Monument Control Point
216C	455560.2518	3659003.515	Monument Control Point
216D	455474.6523	3659199.582	Monument Control Point
217	455482.8061	3659058.580	Monument Control Point
218	455501.3526	3658912.559	Monument Control Point
218B	455511.5965	3658912.249	Monument Control Point
219	455437.9431	3658903.706	Monument Control Point
220	455439.9081	3658834.185	Monument Control Point
221	455395.4143	3658766.086	Monument Control Point

Table E-1 LTR IOU TAIL PORTION (MIDDLE AND LOWER SUBUNITS) Control Point / Monument Coordinates (continued)

LTR IOU TAIL PORTION (MIDDLE AND LOWER SUBUNITS) Control Point / Monument Coordinates			
Control Point / Monument Number	**UTM_27_E**	**UTM_27_N**	**Comments**
222	455336.4692	3658671.346	Monument Control Point
223	454792.0849	3658738.894	Monument Control Point
224	454220.6286	3658280.036	Monument Control Point
225	453905.495	3657732.234	Monument Control Point
226	453683.7195	3657699.544	Monument Control Point
227	453091.3019	3656242.753	Monument Control Point
228	452728.9537	3655565.826	Monument Control Point
229	453370.5392	3654205.075	Monument Control Point
230	453804.249	3654114.727	Monument Control Point
231	453873.0695	3653981.900	Monument Control Point
232	453420.7547	3653833.971	Monument Control Point
233	453022.5693	3653701.730	Monument Control Point
234	452948.6222	3653680.652	Monument Control Point
235	452389.7447	3653495.815	Monument Control Point
236	450874.8167	3654998.536	Monument Control Point
237	451779.0495	3655804.614	Monument Control Point
238	451775.3782	3656319.002	Monument Control Point
239	452380.1406	3656607.707	Monument Control Point
240	452730.5247	3657160.063	Monument Control Point
241	451998.4068	3657568.844	Monument Control Point
242	452013.7287	3657655.835	Monument Control Point
243	452754.9044	3657628.077	Monument Control Point
244	453103.0091	3658398.799	Monument Control Point
245	453518.755	3658816.238	Monument Control Point
246	453511.436	3659012.318	Monument Control Point
247	453730.9166	3659142.571	Monument Control Point
247A	454145.7196	3659397.410	Monument Control Point
248	454151.4102	3659393.890	Monument Control Point
249	454339.5327	3659277.548	Monument Control Point
250	454607.0546	3659477.043	Monument Control Point
251	455010.0795	3659398.683	Monument Control Point
252	455385.5948	3659406.881	Monument Control Point
253	455430.3848	3659387.581	Monument Control Point
254	455489.4661	3659411.963	Monument Control Point
255	456051.3591	3659412.973	Monument Control Point
256	457064.9147	3659872.490	Monument Control Point
257	457162.3409	3660164.671	Monument Control Point
258	457679.3571	3660626.740	Monument Control Point
259	457809.3494	3661148.940	Monument Control Point

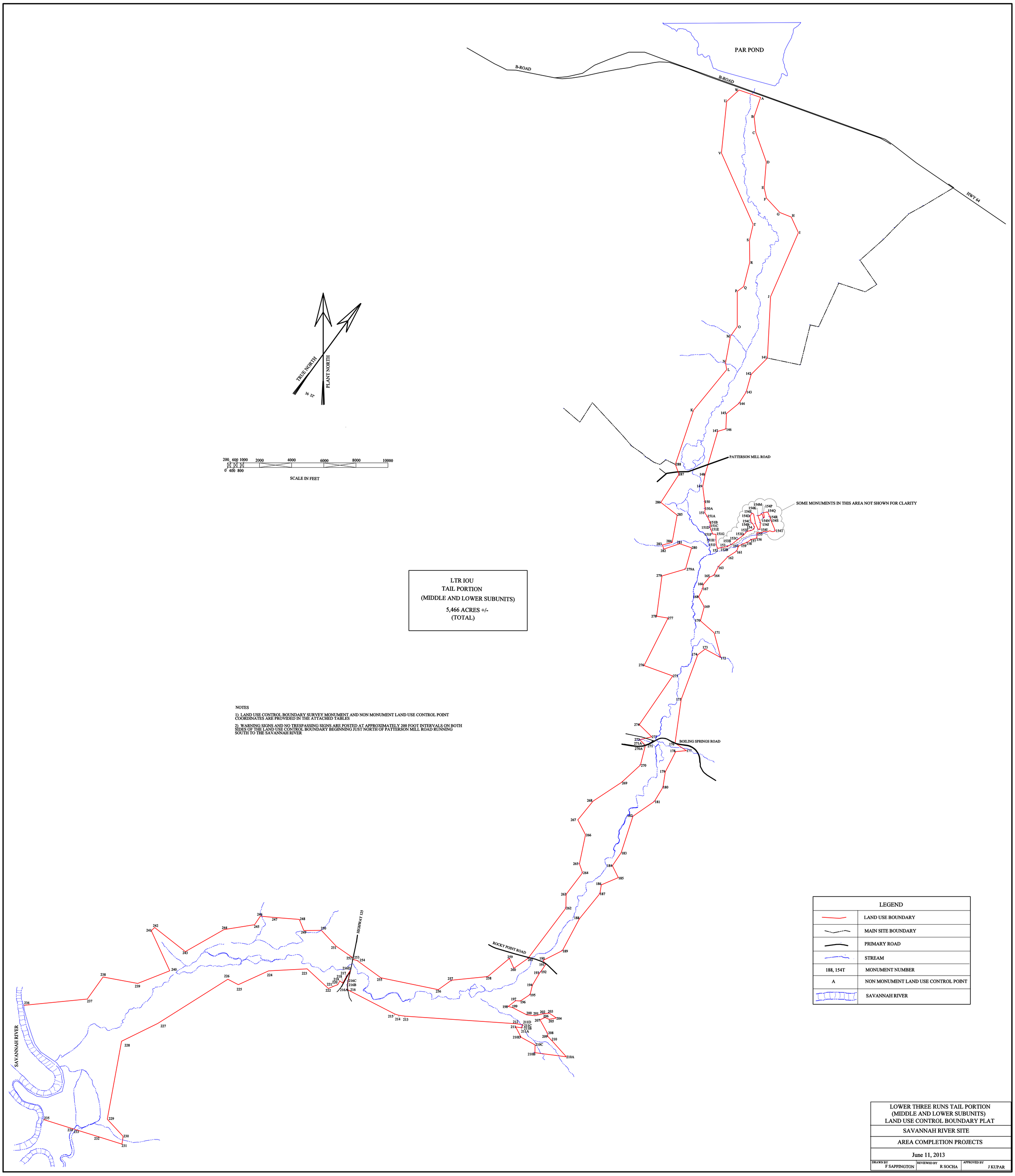
Table E-1 LTR IOU TAIL PORTION (MIDDLE AND LOWER SUBUNITS) Control Point / Monument Coordinates (continued)

LTR IOU TAIL PORTION (MIDDLE AND LOWER SUBUNITS) Control Point / Monument Coordinates			
Control Point / Monument Number	**UTM_27_E**	**UTM_27_N**	**Comments**
260	457987.8447	3661046.075	Monument Control Point
261	458094.5205	3661357.416	Monument Control Point
262	458114.1309	3662550.922	Monument Control Point
263	457963.9426	3662767.357	Monument Control Point
264	457975.4785	3663280.877	Monument Control Point
265	457827.7163	3663383.110	Monument Control Point
266	457595.132	3663897.914	Monument Control Point
267	457311.8387	3664039.441	Monument Control Point
268	457336.0849	3664496.109	Monument Control Point
269	457564.3204	3665106.580	Monument Control Point
270	457660.6374	3665581.591	Monument Control Point
270A	457522.909	3665924.975	Monument Control Point
271	457516.4962	3665940.288	Monument Control Point
271A	457498.562	3665943.173	Monument Control Point
272	457365.4422	3665962.470	Monument Control Point
273	457519.2151	3666141.835	Monument Control Point
274	457191.1291	3666190.570	Monument Control Point
275	457160.4794	3667310.637	Monument Control Point
276	456604.2547	3667149.690	Monument Control Point
277	456441.5223	3668146.650	Monument Control Point
278	456245.6998	3668047.572	Monument Control Point
279	455877.9935	3668724.575	Monument Control Point
280	456016.5527	3669488.343	Monument Control Point
281	455790.3082	3669418.116	Monument Control Point
282	455607.0098	3669158.327	Monument Control Point
283	455538.9949	3669204.669	Monument Control Point
284	455659.3446	3669354.322	Monument Control Point
285	455430.8787	3669829.550	Monument Control Point
286	455039.2811	3669841.850	Monument Control Point
287	455004.1966	3670475.963	Monument Control Point
288	454836.2178	3670587.227	Monument Control Point

Lower Three Runs Tail Portion

(Middle and Lower Subunits)

Land Use Control Boundary Plat


PAR POND
B-ROAD
B-ROAD
HWY 64
TRUE NORTH
PLANT NORTH
36° 22'
200 600 1000 2000 4000 6000 8000 10000
0 400 800
SCALE IN FEET
PATTERSON MILL ROAD
SOME MONUMENTS IN THIS AREA NOT SHOWN FOR CLARITY
BOILING SPRINGS ROAD
ROCKY POINT ROAD
HIGHWAY 125
SAVANNAH RIVER
LTR IOU
TAIL PORTION
(MIDDLE AND LOWER SUBUNITS)
5,466 ACRES +/-
(TOTAL)
NOTES
1) LAND USE CONTROL BOUNDARY SURVEY MONUMENT AND NON MONUMENT LAND USE CONTROL POINT COORDINATES ARE PROVIDED IN THE ATTACHED TABLES
2) WARNING SIGNS AND NO TRESPASSING SIGNS ARE POSTED AT APPROXIMATELY 200 FOOT INTERVALS ON BOTH SIDES OF THE LAND USE CONTROL BOUNDARY BEGINNING JUST NORTH OF PATTERSON MILL ROAD RUNNING SOUTH TO THE SAVANNAH RIVER
LEGEND
LAND USE BOUNDARY
MAIN SITE BOUNDARY
PRIMARY ROAD
STREAM
188, 154T MONUMENT NUMBER
A NON MONUMENT LAND USE CONTROL POINT
SAVANNAH RIVER
LOWER THREE RUNS TAIL PORTION
(MIDDLE AND LOWER SUBUNITS)
LAND USE CONTROL BOUNDARY PLAT
SAVANNAH RIVER SITE
AREA COMPLETION PROJECTS
June 11, 2013
DRAWN BY F SAPPINGTON
REVIEWED BY R SOCHA
APPROVED BY J KUPAR

LUCIP for the
C-Area Operable Unit Early Action (consists of Potential Release from C-Area Disassembly Basin, Potential Release from C-Area Reactor Cooling Water System, C-Area Cask Car Railroad Tracks as Abandoned, ECODS C-1, C-Area Process Sewer Lines as Abandoned)
Land Use Control Implementation Plan for the C-Area Operable Unit Early Action
SRNS-RP-2015-00034, Revision 1, September 2015

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United States Department of Energy

Savannah River Site

Early Action Land Use Control Implementation Plan for the C-Area Operable Unit (U)

CERCLIS Number: 79

SRNS-RP-2015-00034

Revision 1

September 2015

Prepared By:
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Prepared for the U.S. Department of Energy Under Contract No. DE-AC09-08SR22470

DISCLAIMER

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

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LIST OF ABBREVIATIONS AND ACRONYMS

~	approximately
ACP	Area Completion Projects
ARAR	applicable, or relevant and appropriate requirement
CAOU	C-Area Operable Unit
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CM	contaminant migration
+D	plus daughters
D&D	deactivation and decommissioning
EACMIR/RACR	Early Action Corrective Measures Implementation Report / Remedial Action Completion Report
EALUCIP	Early Action Land Use Control Implementation Plan
EAROD	Early Action Record of Decision
ECODS	Early Construction and Operational Disposal Site
ERA	ecological risk assessment
FFA	Federal Facility Agreement
HH	human health
HHRA	human health risk assessment
km, km^2	kilometer, square kilometers
LUC	land use control
LUCAP	Land Use Control Assurance Plan
mi, mi^2	miles, square miles
NTCR	non-time critical removal
OU	operable unit
PAH	polycyclic aromatic hydrocarbon
PCB	polychlorinated biphenyl
PSA	Potential Source Area
PTSM	principal threat source material
QA	Quality Assurance
RCOC	refined constituent of concern
RCRA	Resource Conservation and Recovery Act
RG	remedial goal
SCDHEC	South Carolina Department of Health and Environmental Control
SDC	Site Development Control
SRNS	Savannah River Nuclear Solutions, LLC
SRS	Savannah River Site
TCR	total cumulative risk
U.S.	United States
USDOE	United States Department of Energy
USEPA	United States Environmental Protection Agency
WSRC	Washington Savannah River Company, LLC

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1.0 INTRODUCTION

This Early Action Land Use Control Implementation Plan (EALUCIP) has been prepared for the C-Area Operable Unit (CAOU) at the Savannah River Site (SRS). The CAOU comprises multiple subunits, Potential Source Areas (PSAs), and deactivation and decommissioning (D&D) facilities within C Area. Groundwater is not considered part of the scope of the CAOU. An Early Action Record of Decision (EAROD) documented the selection of an early action remedy to implement land use controls (LUCs) for portions of the CAOU (SRNS 2015). The purpose of this EALUCIP is to describe how the LUCs selected in the CAOU EAROD will be implemented and maintained. The LUC objectives have been documented in the CAOU EAROD and are listed in Section 3.0.

The selected remedy leaves hazardous substances in place that pose a potential future risk and will require land use restrictions until the concentrations of hazardous substances in the contaminated media (i.e., soil, gravel, concrete and steel) are at levels that allow for unrestricted use. As agreed on March 30, 2000, among the United States Department of Energy (USDOE), the United States Environmental Protection Agency (USEPA), and the South Carolina Department of Health and Environmental Control (SCDHEC), SRS is implementing a Land Use Control Assurance Plan (LUCAP) (WSRC 1999) to ensure that the LUCs required by numerous remedial decisions at SRS are properly maintained and periodically verified. The requirements of that LUCAP also apply to the LUCs that were selected as part of the early action remedy for the CAOU. This additional document, the CAOU EALUCIP, contains the detailed and specific measures required to implement and maintain the LUCs selected as part of this particular remedial decision. The LUCs shall be maintained until the operable unit (OU) is suitable for unlimited exposure and unrestricted use. Approval by USEPA and SCDHEC is required for any modification or termination of the LUCs.

USDOE is responsible for implementing, maintaining, monitoring, reporting, and enforcing the LUCs in accordance with the approved EALUCIP. Upon final approval, the EALUCIP will be appended to the LUCAP and should be considered incorporated by reference into the CAOU EAROD, establishing implementation and maintenance requirements for the LUCs under the

Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and the SRS Federal Facility Agreement (FFA) (FFA 1993). The EALUCIP will remain in effect unless and until modifications are approved by USEPA and SCDHEC as necessary for protection of human health (HH) and the environment. In accordance with Section 121(c) of CERCLA and National Oil and Hazardous Substances Pollution Contingency Plan §300.430(f)(5)(iii)(c), a statutory review will be conducted within five years of initiation of the remedial action, and every five years thereafter, to ensure that the remedy continues to be protective of HH and the environment. Any approved EALUCIP modification will be appropriately documented for incorporation by reference into the CAOU EAROD.

The format of this EALUCIP is consistent with the FFA protocol format approved by the USEPA and SCDHEC in March 2004.

2.0 OVERVIEW OF CAOU EARLY REMEDIAL ACTION

2.1 General Description and History of the CAOU

SRS occupies approximately (~) 802.9 km^2 (310 mi^2) of land adjacent to the Savannah River, principally in Aiken and Barnwell counties of South Carolina. SRS is located ~40.2-km (25-mi) southeast of Augusta, Georgia, and 32.1-km (20-mi) south of Aiken, South Carolina.

The CAOU is one of several OUs identified at SRS. It is located within the Fourmile Branch watershed (Figure 1). In 1955, C-Reactor began operations with a mission of producing nuclear materials for the defense program. SRS reactors were both low pressure and low temperature reactors with heavy water cooling of the core. C-Reactor was placed on cold standby in 1987, followed by shutdown due to reduced requirements for defense-related products. Reactor operations resulted in the generation of chemical and radioactive wastes. The C-Reactor is currently used as a storage site for tritiated-moderator water in tanks and for cask car refurbishment.

The CAOU is located in an area currently designated for industrial land use and is expected to remain industrial in the future. The *Early Action Record of Decision Remedial Alternative Selection for the C-, K-, L-, and R-Reactor Complexes* (SRNS 2009) selected in situ

decommissioning as the preferred end-state, with current LUCs in place for the C-Reactor Complex as specified by the *Early Action Land Use Control Implementation Plan (EALUCIP) for the C-, K-, and L-Reactor Complexes* (SRNS 2010).

Several CAOU subunits have undergone removal actions. Non-Time Critical Removal (NTCR) actions were completed for the C-Area Reactor Area Cask Car Railroad Tracks as Abandoned subunit and the C-Area Process Sewer Lines as Abandoned subunit in June 2011 and May 2012, respectively. A NTCR action was also completed for the C-Reactor (105-C) Disassembly Basin to evaporate the basin water and grout the basin to ground surface in September 2012. This NTCR action also included removal and evaporation of the tritiated water from the Containment Tank (C803-7-1). Upon future completion of ongoing missions at the C-Reactor Building Complex, the details of the final in situ decommissioning remedy will be selected in the final CAOU Record of Decision.

The CAOU subunits, PSAs, and D&D facilities are grouped based on potential future land use scenarios. Figure 2 identifies the subunits and the D&D facilities associated with the CAOU. The three D&D facilities (Air Compressor Building [607-9C], Effluent Monitoring Building [614-2C], and Gatehouse Entrance at Building 105 [701-2C]) are listed on Appendix K.2 and require no further action.

In addition, no action is required for the following subunits located outside the C Area perimeter fence line that have been determined to pose no threat to HH (residential and industrial) or the environment:

- Building 904-89G, Retention Basin for 100-C Containment (including Containment Tank C803-7-1 [no building number]); and
- Outfall C-01.

Groundwater is not part of the CAOU. Groundwater is being addressed separately under the C-Area Groundwater OU.

Subunits located within the C Area perimeter fence line were evaluated for industrial land use only since this area will not support unrestricted land use due to proximity to the reactor building complex. Therefore, all subunits inside the perimeter fence will require LUCs as part of any remedial decision to prevent unrestricted land use. For risk management purposes, subunits and PSAs outside the C Area perimeter fence were evaluated for both the industrial and residential land use scenarios since some of these units may be able to support unrestricted land use if residual risks do not pose a threat to HH and the environment.

The early remedial action selected in the EAROD is LUCs for the following subunits located within the C Area perimeter fence line to prevent unrestricted use and/or meet remedial goals (RGs):

- Building 717-C, Contaminated Maintenance Facility;
- C-Area Process Sewer Lines as Abandoned (including the Process Water Storage Tank [106-C], Cooling Water Effluent Sump [107-C], and Storage Basin [109-C]);
- C-Area Reactor Area Cask Car Railroad Tracks as Abandoned;
- Potential Release from C-Area Disassembly Basin (including the Pre-Manufactured Metal Shelter [710-C]); and
- Potential Release from C-Area Reactor Cooling Water System (186/190-C).

In addition, LUCs are the selected early remedial action at the following subunits located outside the C Area perimeter fence line to prevent unrestricted use and/or meet RGs:

- Early Construction and Operational Disposal Site (ECODS) C-1; and
- Outfall C-03.

2.2 Nature and Extent of Contamination in CAOU

A detailed description of the nature and extent of contamination associated with each of the CAOU subunits can be found in the *RCRA Facility Investigation / Remedial Investigation (RFI/RI) Report with Baseline Risk Assessment (BRA) and Focused Corrective Measures Study / Feasibility Study (CMS/FS) for the C-Area Operable Unit (U)* (SRNS 2014). Table 1

summarizes the results of the human health risk assessment (HHRA), ecological risk assessment (ERA), principal threat source material (PTSM) evaluation and contaminant migration (CM) to groundwater analysis and identifies refined constituents of concern (RCOCs) for each subunit that requires remedial action.

Subunits located inside the C Area perimeter fence line for which RCOCs were determined include:

- *Building 717-C, Contaminated Maintenance Facility:* surface concrete media, RCOCs identified for the future industrial worker scenario include cesium-137 and strontium-90, with a total cumulative risk (TCR) = 1.2E-05.

- *C-Area Cask Car Railroad Tracks as Abandoned:* surface soil/gravel media, cesium-137 identified as a RCOC for the future industrial worker scenario with a risk = 2.8E-06.

- *C-Area Process Sewer Lines as Abandoned*: potential exposure to fixed radiological contaminants within the subsurface pipelines (concrete/steel media).

The other subunits located within the current C Area perimeter fence line [i.e., Potential Release from C-Area Disassembly Basin and Potential Release from C-Area Reactor Cooling Water System (186/190-C)] were determined to have no problems warranting action under the industrial land use scenario. However, these subunits will be managed with LUCs because of their proximity to the C-Reactor Building (105-C).

Subunits located outside the perimeter fence line for which RCOCs were determined include:

- *ECODS C-1:* surface soil media, RCOCs identified for the future resident scenario include Aroclor 1254 and polycyclic aromatic hydrocarbons (PAHs) that include benzo(a)pyrene and benzo(b)fluoranthene, with a TCR = 2.2E-05. Aroclor 1254 was also identified as a RCOC for the future industrial worker scenario with a risk = 3.6E-06.

- *Outfall C-03:* surface soil media, cesium-137 identified as a RCOC for the future resident scenario with a risk = 1.9E-05 and the future industrial worker scenario with a risk = 1.2E-05.

No ecological or CM RCOCs were identified for any of the subunits that comprise the CAOU.

The following remedial action objectives were developed for CAOU:

- Prevent future resident exposure to contaminated media or structures located within the perimeter fence line.

- Prevent industrial worker exposure to cesium-137(+D) and strontium-90(+D) contaminated concrete that exceed 1E-06 risk levels at Building 717-C, Contaminated Maintenance Facility subunit.
- Prevent industrial worker exposure to fixed radiological contamination in concrete and/or steel inside the inactive C-Area Process Sewer Lines as Abandoned that exceeds a 1.0E-06 risk or PTSM levels.
- Prevent industrial worker exposure to cesium-137(+D) in rail bed gravels and soils that exceed 1E-06 risk levels at the C-Area Reactor Area Cask Car Railroad Tracks as Abandoned subunit.
- Prevent residential and industrial worker exposure to Aroclor 1254 in soils that exceed the polychlorinated biphenyl (PCB) applicable, or relevant and appropriate requirement (ARAR) and 1E-06 risk at ECODS C-1 subunit.
- Prevent residential exposure to PAHs in surface soil that exceed 1E-06 risk at ECODS C-1 subunit.
- Prevent residential and industrial worker exposure to cesium-137(+D) in surface soil at Outfall C-03 subunit.

The selected remedy for portions of the CAOU leaves hazardous substances that pose a potential future risk and will require land use restrictions until the concentrations of hazardous substances in the contaminated media (i.e., soil, gravel, concrete and steel) are at levels that allow for unrestricted use and exposure.

2.3 Early Remedial Action Selected

LUCs will be implemented to limit access to and the use of the contaminated portions of the CAOU so human exposure to contaminated media is controlled within acceptable limits for the industrial worker and/or future resident. LUCs do not remove or eliminate receptor exposure potential by removal or treatment of hazardous substances – only exposure is controlled. Through administrative and engineering controls, work activities are limited and controlled by the use of work clearance permits throughout the area of contamination. LUCs restrict access to, contact with, and excavation of the contaminated media. Warning signs will be posted informing personnel to contact the waste unit custodian prior to conducting work to prevent contact with hazardous substances. LUCs prevent the current and future industrial worker from being exposed to hazardous substances in the contaminated media. Deed restrictions will be in place to prevent future industrial uses that result in unacceptable exposure to contaminated media and to prohibit future residential housing, elementary and secondary schools, childcare facilities and playground uses of the property.

The post-early remedial action conceptual site model (Figure 3) demonstrates that the exposure pathways to an industrial worker are incomplete following implementation of the early action remedy. According to *the Savannah River Site Future Use Project Report* (USDOE 1996), residential use of SRS land is prohibited.

3.0 LAND USE CONTROL OBJECTIVES

The following CAOU LUC objectives have been developed to ensure the protectiveness of the remedy described above:

- Restrict unauthorized worker access to prevent contact, removal, or excavation of contaminated media (i.e., soil / gravel / concrete / steel).
- Prohibit the development and use of property for residential housing, elementary and secondary schools, child care facilities and playgrounds.

Current access controls and land transfer requirements needed to maintain the future land use are described in the following sections of this EALUCIP.

4.0 IMPLEMENTATION OF LAND USE CONTROLS

This section describes the LUCs selected in the EAROD to achieve the LUC objectives stated in Section 3.0. Table 2 contains a summary of the LUCs, including the purpose, duration, implementation, and affected areas. USDOE is responsible for implementing, maintaining, reporting on and enforcing the LUCs required for the CAOU. The EALUCIP will become enforceable and will be implemented when approved by USEPA and SCDHEC following the completion of the early remedial actions prescribed by the CAOU EAROD. USDOE shall notify USEPA and SCDHEC 60 days in advance of any proposed land use changes that are inconsistent with LUC objectives or the selected remedy.

The affected areas in the CAOU will be maintained as industrial use areas by implementation of the property record notices and restrictions (Section 4.1) and the LUC boundary map (Section 4.2).

The Site Use Program (Section 4.3) will be implemented to prevent onsite worker exposure to contamination left in place at the CAOU. Other existing measures (i.e. Site Clearance Program, worker training, health and safety requirements, work controls) will also be used to ensure worker safety at the CAOU. Physical access controls (Section 4.4) are implemented at the SRS boundary to control and restrict public and trespasser access to the CAOU.

Signs at the affected areas in the CAOU will be maintained to alert onsite workers to the presence of hazardous substances. The signs will also convey the restrictions of unauthorized personnel. Access control warning signs will be placed and maintained around the CAOU to prevent unknown entry and unrestricted use.

4.1 Property Record Notices and Restrictions

The term ‘Property Record Notice,’ as used in this LUCIP, refers to nonenforceable, information device(s) included in or recorded by USDOE along with a property transfer document(s) alerting anyone searching the records to important information about the contamination present in the CAOU, as depicted in Figure 4. The term ‘Deed Restriction,’ as used in this LUCIP, refers to conditions and/or covenants running with the land that restrict or prohibit certain uses of real

property as necessitated by residual contamination, and in accordance with federal and state law. In the long term, if the property, or any portion thereof, is ever transferred from USDOE, the U.S. Government and/or USDOE will take those actions necessary pursuant to Section 120(h)(1) of CERCLA. Those actions will include in any contract, deed, or other transfer document, notice of the type and quantity of any hazardous substances that were known to have been stored (for more than one year), released, or disposed of on the property. The notice will also include the time at which the storage, release, or disposal took place to the extent such information is available.

In addition, if the property, or any portion thereof, is ever transferred by deed, the U.S. Government will also satisfy the requirements of CERCLA 120(h)(3). The requirements include: a description of the remedial action taken, a covenant, and an access class. These requirements are also consistent with the intent of the Resource Conservation and Recovery Act (RCRA) deed notification requirements at final closure of a RCRA facility if contamination will remain at the unit.

LUCs will be implemented through the following:

- The contract, deed, or other transfer document shall also include restrictions to prevent future industrial uses that result in unacceptable exposure to contaminated media and to prohibit future residential housing, elementary and secondary schools, childcare facilities and playground uses of the property. If any portion of CAOU is transferred to non-federal ownership, the deed(s) (or other transfer document) will contain appropriate provisions to ensure that the use restrictions continue to run with the land and are enforceable by the USDOE against the Grantee (including any successors and/or assigns). The deed(s) will provide that any lease or subsequent deed executed by the Grantee for the parcel(s) within CAOU must include land use restrictions that are no less restrictive than the use restrictions described in this LUCIP. However, the need for these restrictions may be re-evaluated 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 re-evaluation

of the LUCs will be done through an amended EAROD with USEPA and SCDHEC review and approval.

- In addition, if the Site is ever transferred to nonfederal ownership, a survey plat of the OU depicting the areas subject to LUCs as indicated on Figure 4 will be prepared, certified by a professional land surveyor, and recorded with the appropriate county recording agency.

In the event of a property lease or interagency agreement, the equivalent restrictions will be implemented as required by CERCLA Section 120(h).

USDOE shall provide the USEPA and SCDHEC at least a six month notice prior to transfer or sale of property subject to LUCs to ensure that USEPA and SCDHEC can be involved in discussions to ensure that appropriate provisions are included in the transfer documents to maintain effective LUCs. If it is not possible for the USDOE to notify the USEPA and SCDHEC at least six months prior to the transfer or sale, then the facility will notify the USEPA and SCDHEC as soon as possible, but no later than 60 days prior to the transfer or sale of any property subject to LUCs. In addition to the land transfer notice and discussion provisions above, USDOE further agrees to provide the USEPA and SCDHEC with similar notice within the same time frames as to federal-to-federal transfer of property. The USDOE shall provide a copy of executed deed or transfer assembly to USEPA and SCDHEC.

4.2 LUC Boundary Maps

This LUCIP identifies the proposed areas under land use restrictions in Figure 4. Following field implementation of the early remedial action, a final (as-built) survey plat for each of these areas will be developed and certified by a professional land surveyor registered in the State of South Carolina. The final plat will include the boundary coordinates for the area subject to land use restrictions and general locations of access control warning signs. The final as-built survey plats will be submitted to USEPA and SCDHEC in the Early Action Corrective Measures Implementation Report / Remedial Action Completion Report (EACMIR/RACR).

In addition, if the Site is ever transferred to non-federal ownership, a certified survey plat of the OU will be prepared at or near the time of conveyance to support the EALUCIP required

restrictive covenants on land use and will be recorded with the appropriate county recording agency.

4.3 Site Use Program

Under USDOE Order 430.1A, *Life Cycle Management* (USDOE 1998), SRS is required to implement an asset management program for the use, maintenance, and disposal of physical assets, including real estate. SRS complies with this USDOE Order through the Site Use Program which is administered by Site Development Control (SDC) in accordance with SRS Manual 1D, *Site Infrastructure and Services Manual*, Procedure 3.02, "Site Real Property Configuration Control" (SRS 2006). Use of all lands and waters on the SRS are coordinated via the Site Use Program. No use of land (i.e., excavation or any other land use) shall be undertaken without prior approval by the USDOE and documented by a Site Use Permit.

SRS identifies all buildings, facilities, and FFA waste units on SRS site development maps that are maintained by SDC in accordance with SRS Manual 1D. If LUCs are required for an FFA waste unit, the unit-specific LUC boundaries are identified on the SRS site development maps. SDC must verify that any proposed work to be performed on a site is sanctioned by a Site Use Permit and verify that the proposed activity does not conflict with any previously approved land use.

In addition to the management of the use of SRS lands and waters through the Site Use Program, the SDC also administers the Site Clearance Program to control the construction, alteration, or demolition activities at SRS. Before any work that adds or modifies features or facilities portrayed on the SRS Site development maps is conducted, a Site Clearance Permit is required. USDOE approval of the intended land via a Site Use Permit must be verified before a Site Clearance Permit is issued. If a Site Clearance request potentially impacts a FFA waste unit, the Site Clearance Request Form is sent to the appropriate FFA reviewer for approval. The FFA reviewer will evaluate the proposed activity to identify any conflicts with the waste unit and to verify that waste unit specific LUCs are not compromised. The roles and responsibilities of the individuals responsible for review and approval of Site Use and Site Clearance permits are

detailed in SRS Manual 1D, Procedure 3.02. All employees, contractors, and visitors at SRS are required to adhere to the Site Use Program and the Site Clearance Program.

The USDOE will notify USEPA and SCDHEC in advance of any change to any internal procedure, including the Site Use Program, which would affect implementing or maintaining the LUCs. Approval by USEPA and SCDHEC is required for any modification or termination of the LUCs and implementation actions, and the USDOE must obtain prior approval from USEPA and SCDHEC before taking any anticipated action that may disrupt the effectiveness of the LUCs or alter or negate the need for LUCs. The Site Use Permit and site development maps must be amended when the geographic configuration or buffer zone used to establish the permit boundary changes or there is a change to the land use. The processes are controlled within the SRS Quality Assurance (QA) Program in accordance with SRS 1Q Manual, *Quality Assurance* (SRS 2007). The SRS QA Program governs all SRS activities.

4.4 Physical Access Controls

There are no physical access controls, including fencing, required at the affected areas of the CAOU. Physical access controls are provided at the SRS boundary as mentioned in Table 2, Item 5.

4.5 Warning Signs

To prevent unknowing entry and to ensure that unrestricted use of the waste unit does not occur while the unit is under ownership of the USDOE, access control warning signs as shown in Appendix A will be posted at the unit. Approximate sign locations for the affected CAOU areas are indicated in Figure 4. Warning signs will not be posted on a portion of the west side of the Outfall-C-03 subunit since this area is not accessible due to the steep terrain. Installation of the access control warning signs will follow the CAOU construction schedule as identified in the CAOU EAROD with an early remedial action start date of January 5, 2016. In addition, the final placement of the signage will be documented in the EACMIR/RACR. The signs will be legible for a distance of at least 7.6 meters (25 feet).

Custodial responsibilities for maintenance and inspection of the CAOU will be maintained by the SRS Post-Closure Maintenance Group.

4.6 Other Access Controls and Security/Surveillance Measures

While under the ownership of USDOE, access control of the entire SRS will be maintained in accordance with the 2013 RCRA Permit Renewal Application, Volume I, Section F.1. This section describes the 24-hour surveillance system (R.61-79.264.14(b)(1)), artificial or natural barriers (R.61-79.264.14(b)(2)(I)), control entry systems (R.61-79.264.14(b)(2)(ii)), and access control warning signs (R.61-79.264.14(c)) in place at the SRS boundary to comply with the security requirements for a RCRA-permitted facility.

4.7 Field Inspection and Maintenance for Land Use Controls

After remediation of the CAOU, only inspection and maintenance activities will be required by this early remedial action.

The affected areas of the CAOU will be inspected per the Field Inspection Checklist in Appendix B. Field inspections will be performed annually. Additional inspections may be necessary in the event of unusual weather or any other condition warranting inspection. Inspections will be performed to ensure that access control signs are in place and undamaged. Necessary repairs will be performed for items in Appendix B that are found to be in unsatisfactory condition.

Any activity that is inconsistent with the LUC objectives or use restrictions, or any other action that may interfere with the effectiveness of the LUCs will be addressed by the USDOE as soon as practicable, but in no case will the process be initiated later than 10 days after the USDOE becomes aware of the breach. The USDOE will notify USEPA and SCDHEC as soon as practicable, but no longer than 10 days after discovery of any activity that is inconsistent with the LUC objectives or use restrictions, or any other action that may interfere with the effectiveness of the LUCs. The USDOE will notify USEPA and SCDHEC regarding how the USDOE has addressed or will address the breach within 10 days of sending USEPA and SCDHEC notification of the breach.

The FFA Annual Progress Report, submitted to the regulatory agencies by USDOE, will provide the status of the LUCs and describe how any LUC deficiencies or inconsistent uses have been addressed. In the event of property transfer or lease, the annual report will cite findings on the following: whether the use restrictions and controls referenced above were communicated in the deed(s) or lease restrictions; whether property use conforms with the deed or lease restrictions and controls; and whether the owners and state/local agencies have been notified regarding the deed or lease restrictions and controls. The FFA Annual Progress Report(s) will be used in the preparation of the Five-Year Remedy Review Report(s) to evaluate the effectiveness of the remedy.

All other routine maintenance activities will be documented and maintained in files subject to USEPA and SCDHEC review and audit. A copy of the completed inspection form is maintained in the Area Completion Projects (ACP) Document Control. The LUCs shall be maintained until the concentration of hazardous substances associated with the unit have been reduced to levels that allow for unlimited exposure and unrestricted use.

The waste unit inspectors are to be trained in Hazardous Waste Operations and Emergency Response RCRA Well Inspections (ACP-specific training), ACP RCRA Waste Unit Inspections, Radiological Worker Training, etc., as applicable for the specific inspection. They will also be trained based on the individual requirements of the regulatory approved closure documents for each waste unit. In addition, the inspectors are to attend yearly refresher courses. Over the years, different personnel may conduct the inspections and maintenance activities.

This unit-specific EALUCIP, including the checklist (Appendix B), will be appended to the SRS LUCAP upon final regulatory approval. After completion of the EACMIR/RACR, the preliminary checklist in the LUCAP will be replaced with the final approved checklist.

5.0 REFERENCES

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

SRNS, 2009. *Early Action Record of Decision Remedial Alternative Selection for the C-, K-, L-, and R-Reactor Complexes (U),* SRNS-RP-2009-00707, Revision 1, September 2009, Savannah River Nuclear Solutions LLC, Savannah River Site, Aiken, SC

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WSRC, 1999. *Land Use Control Assurance Plan for the Savannah River Site*, WSRC-RP-98-4125, Revision 1.1, August 1999, latest update, Savannah River Nuclear Solutions, LLC, Savannah River Site, Aiken, SC

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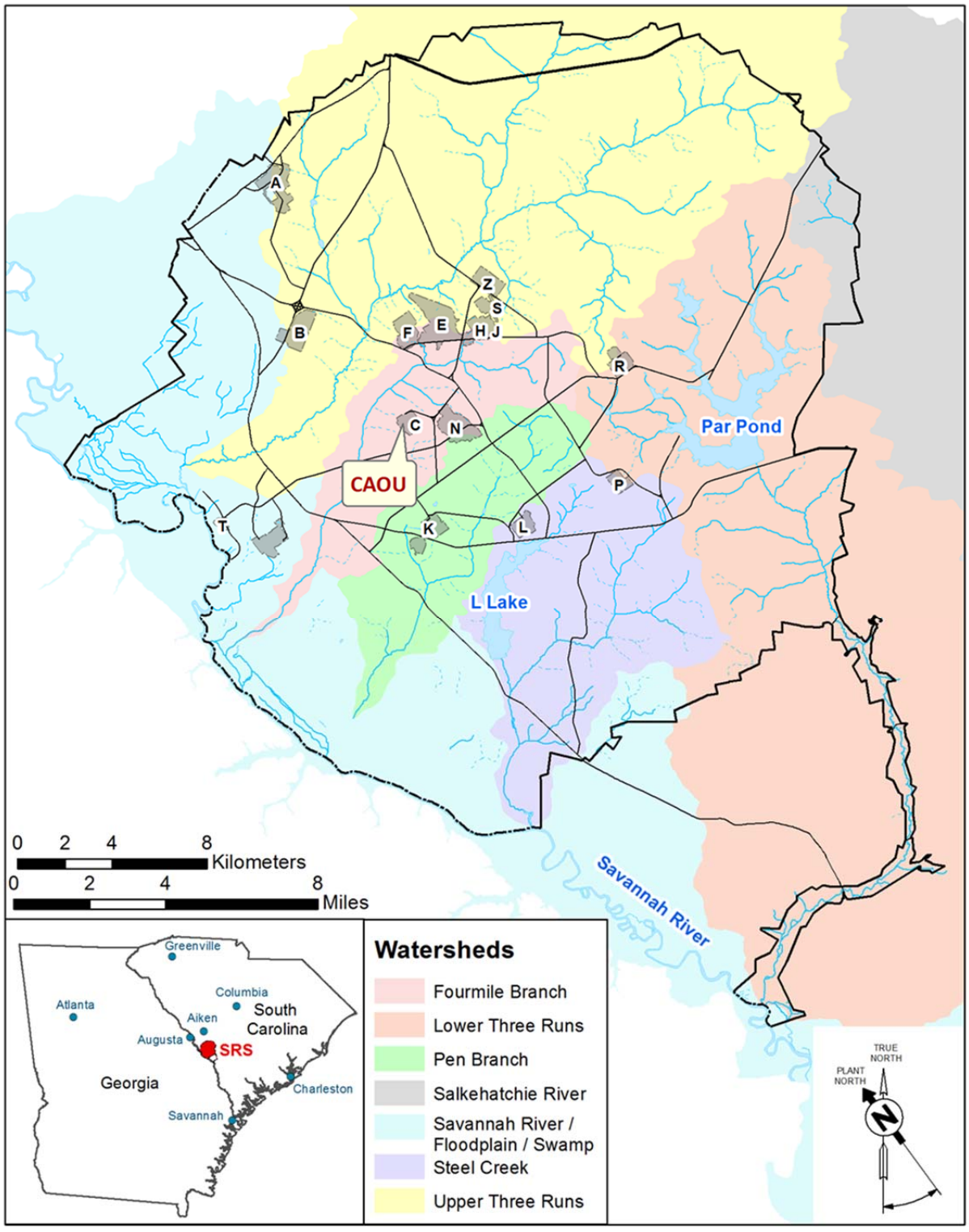


Figure 1. Location of the CAOU within the Savannah River Site

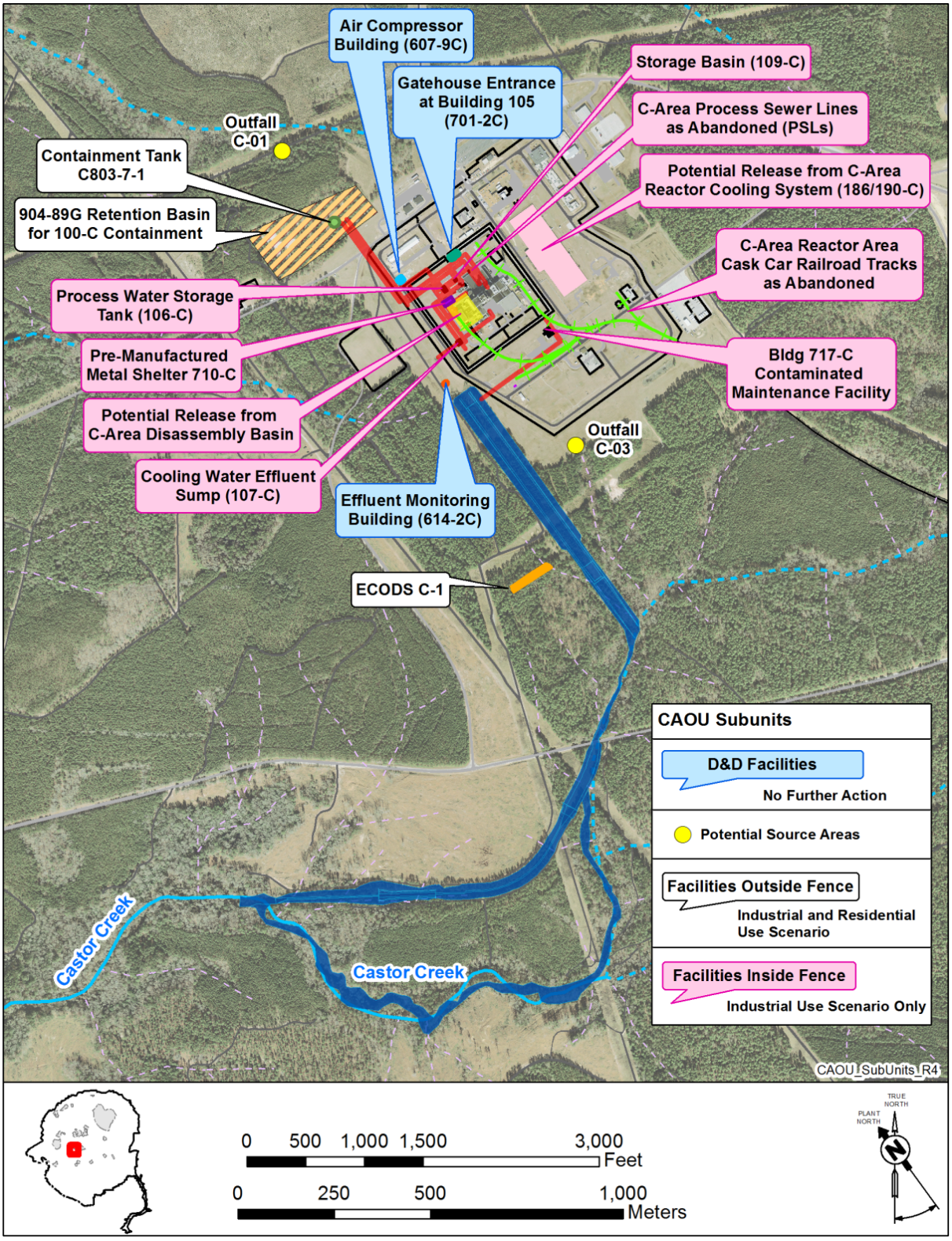
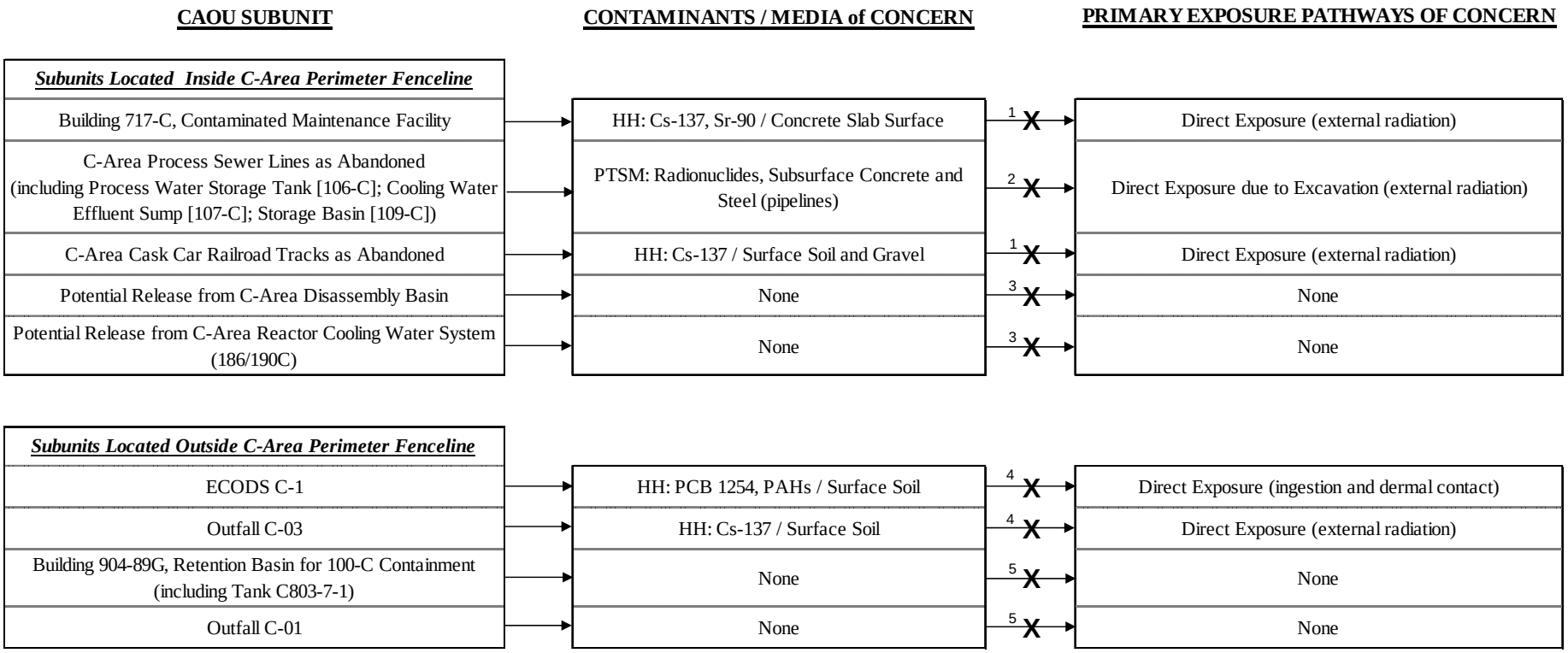


Figure 2. Location of the CAOU Subunits



HH = human health risk assessment
PTSM = principal threat source material
1 - COCs identified based on an evaluation of the industrial land use scenario; CAOU Land Use Controls required to prevent land disturbance activities and unrestricted land use.
2 - Radionuclides qualitatively identified as PTSM due to fixed contamination inside buried pipelines; CAOU Land Use Controls required to prevent land disturbance activities and unrestricted land use.
3 - No COCs identified based on an evaluation of the industrial land use scenario; CAOU Land Use Controls required to prevent unrestricted land use.
4 - COCs identified based on an evaluation of the residential and industrial land use scenarios; CAOU Land Use Controls required to prevent land disturbance activities and unrestricted land use.
5 - No COCs identified based on either the residential or industrial land use scenario; Land Use Controls are not required and unrestricted use is permitted (No Action).

Figure 3. Post-Early Remedial Action Conceptual Site Model for the CAOU

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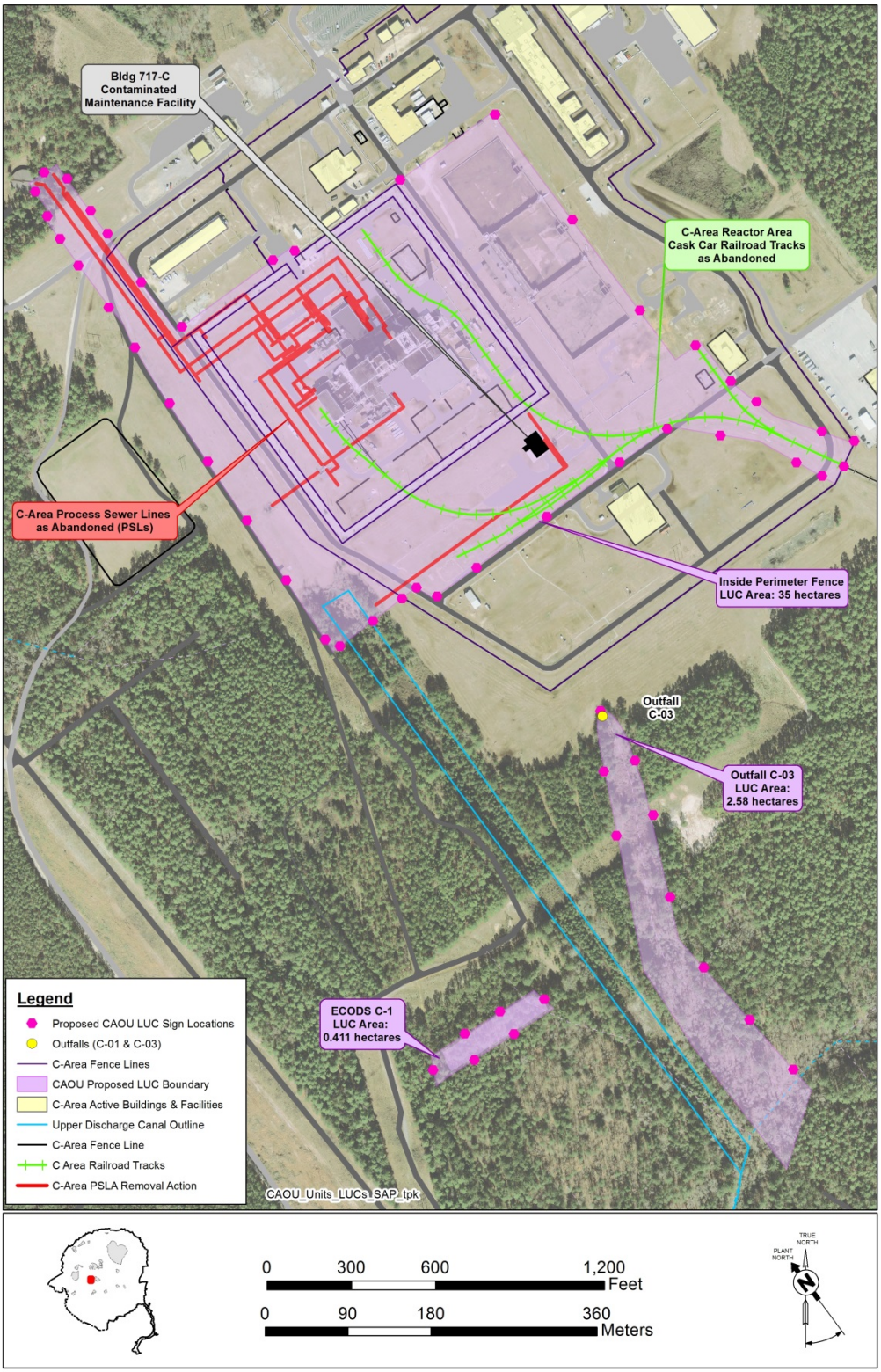


Figure 4. Approximate LUC Boundaries for CAOU Subunits

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Table 1. CAOU Risk Summary

Subunit	Media	ARAR[1]	PTSM[2]	HHRA[3]	ERA[4]	CM[5]
Building 717-C, Contaminated Maintenance Facility	Soil	None	None	*Resident*: NC *Worker:* None	NC	None
	Concrete	None	None	*Resident:* NC *Worker*: **Cs-137 (risk = 9.3E-06); Sr-90 (risk = 2.2E-06); TCR = 1.2E-05**	NC	None
C-Area Process Sewer Lines as Abandoned	Concrete / Steel	None	**Radionuclides**[6]	*Resident:* NC *Worker*: None (potential risk to fixed radiological contamination)	NC	None
C-Area Reactor Area Cask Car Railroad Tracks as Abandoned	Soil/Gravel	None	None	*Resident:* NC *Worker:* **Cs-137 (risk = 2.8E-06)**	NC	None
Potential Release from C-Area Disassembly Basin	Soil	None	None	*Resident:* NC *Worker*: None	NC	None
Potential Release from C-Area Reactor Cooling Water System (186/190C)	Soil/Sediment	None	None	*Resident*: NC *Worker:* None	NC	None
	Surface Water	None	None	*Resident:* NC *Worker:* None	NC	NC
Building 904-89G, Retention Basin for 100-C Containment	Soil	None	None	*Resident:* None *Worker:* None	None	None
ECODS C-1	Soil	**PCB 1254**	None	*Resident:* **PCB 1254 (risk = 1.2E-05); Benzo(a) pyrene (risk = 8.5E-06); Benzo(b)fluoranthene (risk = 1.5E-06); TCR = 2.2E-05** *Worker:* **PCB 1254 (risk = 3.6E-06)**	None	None
Outfall C-01	Soil	None	None	*Resident:* None *Worker:* None	None	None
Outfall C-03	Soil	None	None	*Resident:* **Cs-137 (risk = 1.9E-05)** *Worker:* **Cs-137 (risk = 1.2E-05)**	None	None

1 - ARAR = applicable or relevant and appropriate requirement
2 - PTSM = principal threat source material evaluation
3 - HHRA = human health risk assessment
4 - ERA = ecological risk assessment
5 - CM = contaminant migration analysis
6 - radionuclides qualitatively identified as PTSM due to fixed contamination inside the pipelines

NC = not calculated for this receptor or this media- for the HHRA, a quantitative residential evaluation was not required for the subunits inside the fence. For the ERA, a quantitative evaluation was not performed for the subunits located inside the fence because the exposure pathways were considered incomplete for wildlife receptors.
TCR = total cumulative risk

Table 2. Land Use Controls for the CAOU

Type of Control	Purpose of Control	Duration	Implementation	Affected Areas[a]
1. Property Record Notices[b]	Provide notice to anyone searching records about the existence and location of contaminated areas.	Until the concentration of hazardous substances associated with the unit have been reduced to levels that allow for unlimited exposure and unrestricted use.	Notice recorded by USDOE in accordance with state laws at County Register of Deeds office if the property or any portion thereof is ever transferred to non-federal ownership.	Waste management areas/subunits identified in this EALUCIP where hazardous substances are left in place at levels requiring land use restrictions.
2. Property record restrictions[c]: A. Land Use	Restrict use of property by imposing limitations.	Until the concentration of hazardous substances associated with the unit have been reduced to levels that allow for unlimited exposure and unrestricted use.	Drafted and implemented by USDOE upon any transfer of affected areas. Recorded by USDOE in accordance with state law at County Register of Deeds office.	Waste management areas/subunits identified in this EALUCIP where hazardous substances are left in place at levels requiring land use restrictions.
3. Other Notices[d]	Provide notice to city and/or county about the existence and location of waste disposal and residual contamination areas for zoning/planning purposes.	Until the concentration of hazardous substances associated with the unit have been reduced to levels that allow for unlimited exposure and unrestricted use.	Notice recorded by USDOE in accordance with state laws at County Register of Deeds office if the property or any portion thereof is ever transferred to non-federal ownership.	Waste management areas/subunits identified in this EALUCIP where hazardous substances are left in place at levels requiring land use restrictions.
4. Site Use Program[e]	Provide notice to worker/developer (i.e., permit requestor) on extent of contamination and prohibit or limit excavation/penetration activity.	As long as property remains under USDOE control.	Implemented by USDOE and Site contractors. Initiated by permit request.	Waste management areas/subunits identified in this EALUCIP where hazardous substances are left in place at levels requiring land use restrictions.
5. Physical Access Controls[f] (e.g., fences, gates, portals)	Control and restrict access to workers and the public to prevent unauthorized access.	Until the concentration of hazardous substances associated with the unit have been reduced to levels that allow for unlimited exposure and unrestricted use.	Controls maintained by USDOE.	Fencing and security is provided at SRS Site boundaries in accordance with SRS procedures. Additional physical access controls, including fencing, is not required at the affected areas of the CAOU.

Table 2. Land Use Controls for the CAOU *(Continued/End)*

Type of Control	Purpose of Control	Duration	Implementation	Affected Areas[a]
6. Warning Signs[g]	Provide notice or warning to prevent unauthorized uses.	Until the concentration of hazardous substances associated with the unit have been reduced to levels that allow for unlimited exposure and unrestricted use.	Signage maintained by USDOE.	Warning signs will be posted in accordance with applicable Site procedures and will be placed in appropriate areas at the CAOU.
7. Security Surveillance Measures	Control and monitor access by workers/public.	Until the concentration of hazardous substances associated with the unit have been reduced to levels that allow for unlimited exposure and unrestricted use.	Established and maintained by USDOE. Necessity of patrols evaluated upon completion of remedial actions or property transfer.	Patrol of waste management areas/subunits identified in this EALUCIP, as necessary.

[a]Affected areas – Specific locations identified in the OU-specific EALUCIP.
[b]Property Record Notices – Refers to any non-enforceable, purely informational document recorded along with the original property acquisition records of USDOE and its predecessor agencies that alerts anyone searching property records to important information about residual contamination; waste disposal areas in the property.
[c]Property Record Restrictions – Includes conditions and/or covenants that restrict or prohibit certain uses of real property and are recorded along with original property acquisition records of USDOE and its predecessor agencies.
[d]Other Notices – Includes information on the location of waste disposal areas and residual contamination depicted on as survey plat, which is provided to a zoning authority (i.e., city planning commission) for consideration in appropriate zoning decisions for non-USDOE property.
[e]Site Use Program – Refers to the internal USDOE/USDOE contractor administrative program(s) that requires the permit requestor to obtain authorization, usually in the form of a permit, before beginning any excavation/penetration activity (e.g., well drilling) for the purpose of ensuring that the proposed activity will not affect underground utilities/structures, or in the case contaminated soil or groundwater, will not disturb the affected areas without the appropriate precautions and safeguards.
[f]Physical Access Controls – Physical barriers or restrictions to entry.
[g]Signs – Posted command, warning or direction.

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APPENDIX A

ACCESS CONTROL WARNING SIGNS

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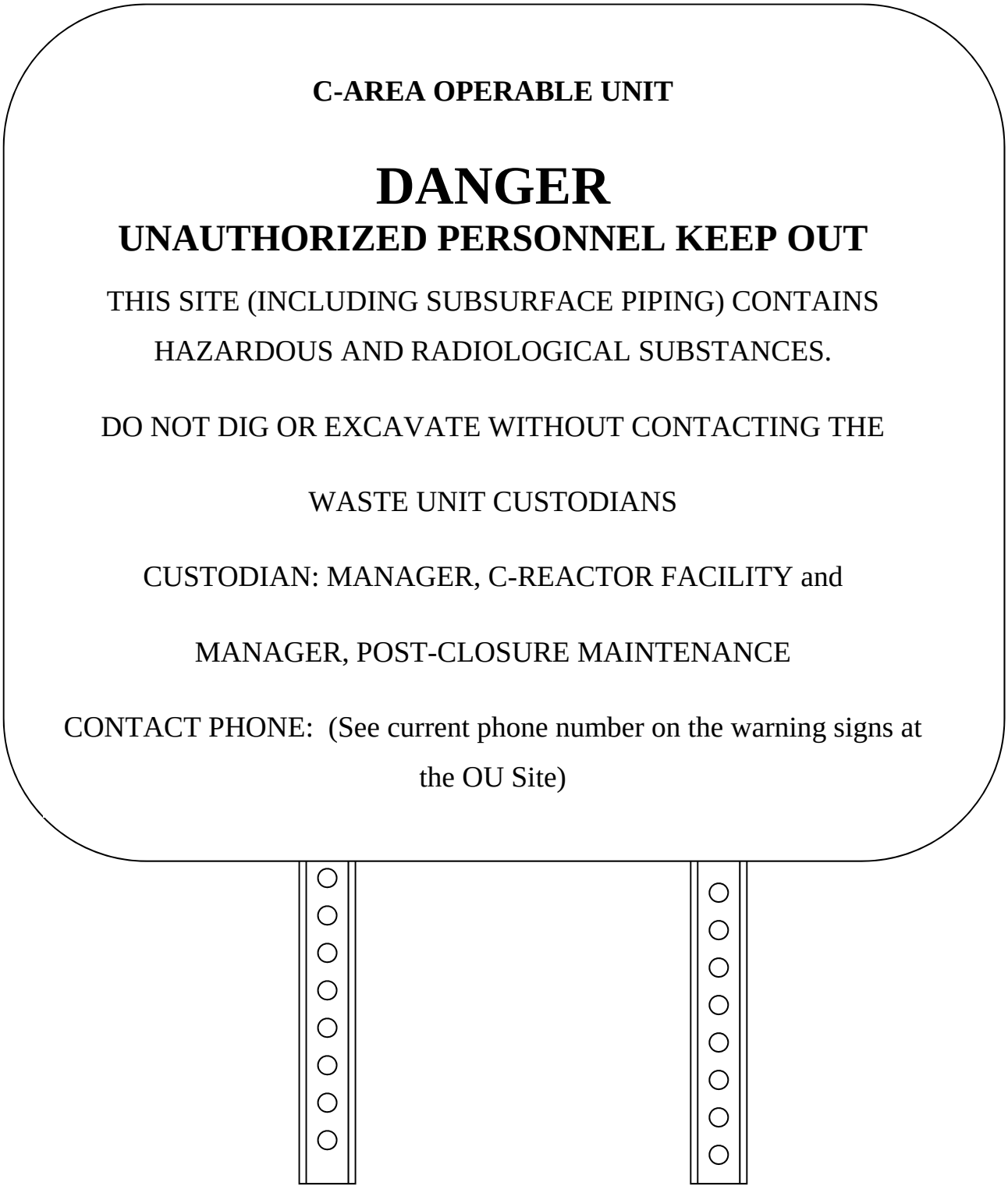


Figure A-1. Access Control Warning Sign for the CAOU Subunits

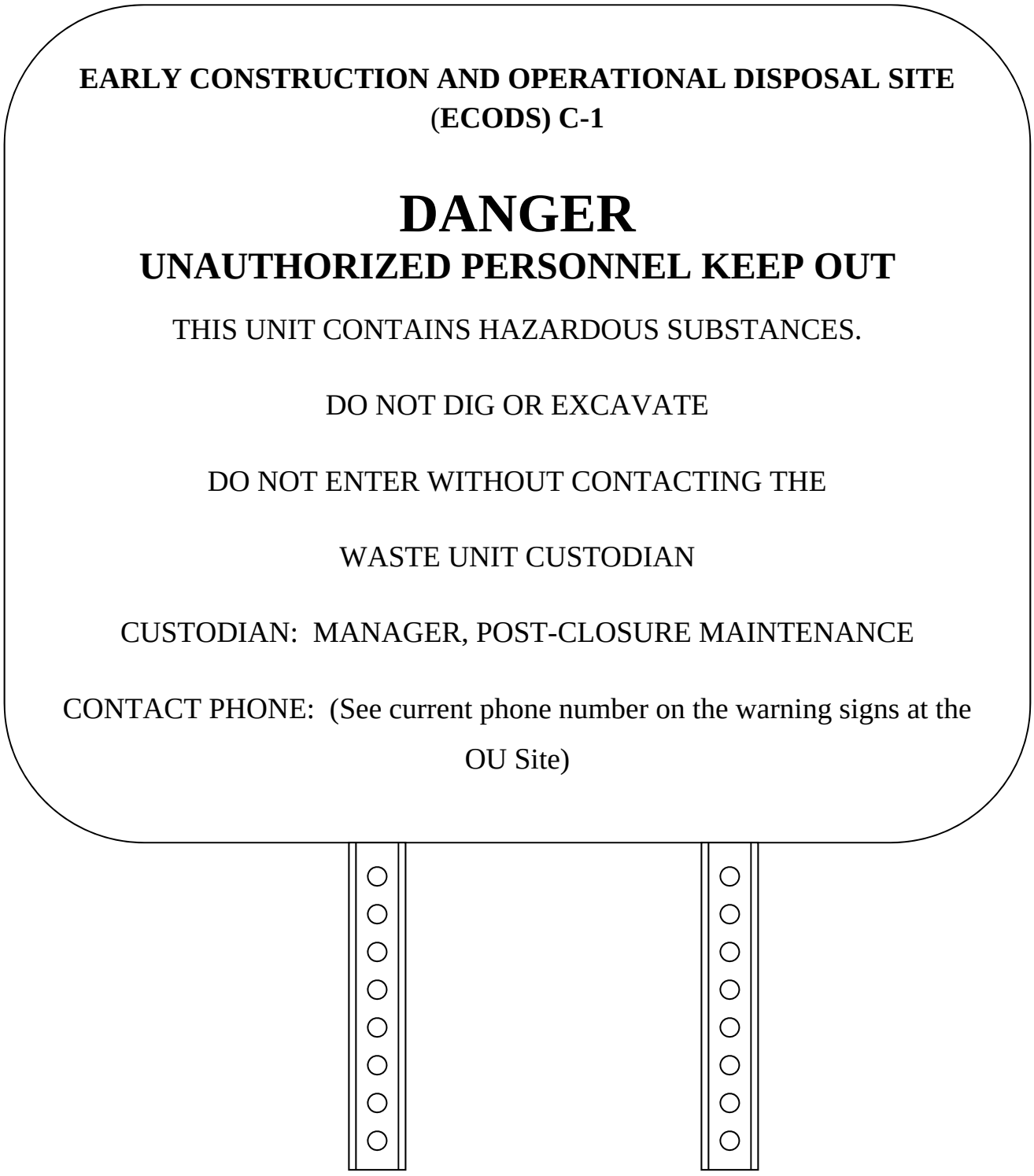


Figure A-2. Access Control Warning Sign for ECODS C-1



Figure A-3. Access Control Warning Sign for Outfall C-03

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APPENDIX B

FIELD INSPECTION CHECKLIST

FOR C-AREA OPERABLE UNIT

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FIELD INSPECTION CHECKLIST

FOR C-AREA OPERABLE UNIT

☐ **SCHEDULED** ☐ **UNSCHEDULED**

A= Satisfactory X= Unsatisfactory (Explanation required)	A or X	Observation of Corrective Action Taken
1. Verify that the roads are accessible.		
2. Verify that the waste unit signs are in acceptable condition, have the correct information, and are legible from a distance of 25 feet.		
3. Verify that there are no unauthorized excavation, digging, or construction activities within the boundaries.		

Inspected by:

_____/_____ Date:_____
(Print Name) (Signature)

Post-Closure Manager:

_____/_____ Date:_____
(Print Name) (Signature)

CAUTION: The inspector shall notify the Post-Closure Manager (PCM) and Environmental Compliance Authority (ECA) **IMMEDIATELY** if there has been a breach or compromise of the land use controls of this waste unit. The notification shall be in accordance with SRS post-closure inspection procedures.

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LUCIP for the
Wetland Area at Dunbarton Bay
Land Use Control Implementation Plan for the Wetland Area at Dunbarton Bay in Support of Steel Creek Integrator Operable Unit (U)
SRNS-RP-2018-00479, Revision 1, November 2018

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Land Use Control Implementation Plan for the Wetland Area at Dunbarton Bay in Support of Steel Creek Integrator Operable Unit (U)

SEMS Number: 71

SRNS-RP-2018-00479

Revision 1

November 2018

SAVANNAH RIVER SITE • AIKEN, SOUTH CAROLINA

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LIST OF ABBREVIATIONS AND ACRONYMS

~	approximate, approximately
ac	acres
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CM	contaminant migration
EC&ACP	Environmental Compliance and Area Completion Projects
FFA	Federal Facility Agreement
ft	feet
ha	hectare
IOU	Integrator Operable Unit
km	kilometer
km^2	square kilometer
LUC	Land Use Control
LUCIP	Land Use Control Implementation Plan
LUCAP	Land Use Control Assurance Plan
m	meter
m^3	cubic meter
mi	mile
mi^2	square mile
PAB	P-Area Ash Basin
PCR/RACR	Post Construction Report/Remedial Action Completion Report
PTSM	principal threat source material
QA	Quality Assurance
RA	remedial action
RCOC	refined constituent of concern
RCRA	Resource Conservation and Recovery Act
ROD	Record of Decision
SCDHEC	South Carolina Department of Health and Environmental Control
SDC	Site Development Control
SRNS	Savannah River Nuclear Solutions, LLC
SRS	Savannah River Site
USDOE	United States Department of Energy
USEPA	United States Environmental Protection Agency
WADB	Wetland Area at Dunbarton Bay
WSRC	Washington Savannah River Company, LLC
yd	yard
yd^3	cubic yard

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1.0 INTRODUCTION

This Land Use Control Implementation Plan (LUCIP) has been prepared for the Wetland Area at Dunbarton Bay (WADB) at the Savannah River Site (SRS). The WADB covers approximately (~) 15.4 hectares (ha) (38 acres [ac]). Groundwater is not considered part of the scope of the WADB. The purpose of this LUCIP is to describe how the land use controls (LUCs) selected in the WADB Record of Decision (ROD) (SRNS 2018) will be implemented and maintained. The LUC objectives have been documented in the WADB ROD and are listed in Section 3.0.

The selected remedy leaves hazardous substances in place that pose a potential future risk and will require land use restrictions until the concentrations of hazardous substances in the ash/soil media are at levels that allow for unrestricted use. As agreed on March 30, 2000, among the United States Department of Energy (USDOE), the United States Environmental Protection Agency (USEPA), and the South Carolina Department of Health and Environmental Control (SCDHEC), SRS is implementing a Land Use Control Assurance Plan (LUCAP) (WSRC 1999) to ensure that the LUCs required by numerous remedial decisions at SRS are properly maintained and periodically verified. The requirements of that LUCAP also apply to the LUCs that were selected as part of the remedial action (RA) for WADB. This additional document, the WADB LUCIP, contains the detailed and specific measures required to implement and maintain the LUCs selected as part of this particular remedial decision. The LUCs shall be maintained until the WADB is suitable for unlimited exposure and unrestricted use. Approval by USEPA and SCDHEC is required for any modification or termination of the LUCs.

USDOE is responsible for implementing, maintaining, monitoring, reporting, and enforcing the LUCs in accordance with the approved LUCIP. Upon final approval, the LUCIP will be appended to the LUCAP and should be considered incorporated by reference into the WADB ROD, establishing implementation and maintenance requirements for the LUCs under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and the SRS Federal Facility Agreement (FFA) (FFA 1993). The LUCIP will remain in effect unless and until modifications are approved by USEPA and SCDHEC as necessary for protection of human health and the environment. In accordance with Section 121(c) of CERCLA and National Oil and

Hazardous Substances Pollution Contingency Plan §300.430(f)(5)(iii)(c), a statutory review will be conducted within five years of initiation of the remedial action, and every five years thereafter, to ensure that the remedy continues to be protective of human health and the environment. Any approved LUCIP modification will be appropriately documented for incorporation by reference into the WADB ROD.

1.1 Format of LUCIP

The format of this LUCIP is consistent with the FFA protocol format approved by the USEPA and SCDHEC in March 2004.

2.0 OVERVIEW OF WADB REMEDIAL ACTION

2.1 General Description and History of the WADB

SRS occupies ~803 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 ~40.2-km (25-mi) southeast of Augusta, Georgia, and 32-km (20-mi) south of Aiken, South Carolina.

The WADB is located southeast of the P-Area Ash Basin (PAB) within the Steel Creek Integrator Operable Unit (IOU) boundary near the headwaters of Meyers Branch and extends into Dunbarton Bay, which is located south of Powerline Road (also referred to Ash Flow Road). The dominant feature of the WADB is a Carolina bay called Dunbarton Bay (Figure 2).

In the summer of 2010, an area of ash overflow was discovered during the removal activities at the PAB. The ash deposition area begins on the south side of the PAB and extends in a southerly direction for ~762 m (2,500 ft) into Dunbarton Bay. The depth of ash deposition is variable and ranges from 0.15 to 0.9 m (0.5 to 3 ft) in thickness. The area of ash deposition is ~15.4 ha (38 ac), which has a total volume of ~61,332 m^3 (80,220 yd^3) of ash. However, due to the proximity of the disposition area to the Dunbarton Bay, a 30-m (100-ft) buffer area has been established to protect the sensitive ecosystem of the Dunbarton Bay during execution of activities in support of the selected remedy.

2.2 Nature and Extent of Contamination in WADB

A detailed description of the nature and extent of contamination associated with the WADB can be found in the Focused Corrective Measures Study/Feasibility Study Report for the Wetland Area at Dunbarton Bay in Support of Steel Creek Integrator Operable Unit (U) (SRNS 2013). A summary of the results from the human health risk assessment, ecological risk assessment, principal threat source material (PTSM) evaluation, and contaminant migration (CM) evaluation is provided below:

Ash/Soil

The environmental setting precludes any residential (unrestricted) or industrial land use in the future. Therefore, the most likely receptor scenario is an onsite worker (i.e., a worker who is conducting research, collecting samples, performing maintenance, etc.). However, in order to support risk management decisions, the standard (i.e., default) unrestricted (i.e., residential) and industrial land use scenarios, as well as the site-specific IOU onsite worker and adolescent trespasser scenarios were evaluated in the risk assessment. The potential risk to the four human receptors evaluated exceeds 1.0E-06 for exposure to contaminants in the surface ash/soil interval of 0 to 0.3 m [0 to 1 ft] and are summarized below.

Arsenic, cesium-137 (+D), potassium-40, radium-226 (+D), and uranium-238 (+D) were identified as human health refined constituents of concern (RCOCs) for both the future resident scenario and the future industrial worker scenario. Arsenic, cesium-137 (+D), potassium-40, and radium-226 (+D) were identified as human health RCOCs for both the IOU onsite worker and the trespasser. No PTSM RCOCs were identified for the ash/soil media at Dunbarton Bay. No ecological RCOCs for either the ash/soil media were identified. No CM RCOCs were identified for the ash/soil media. Although groundwater is not part of the WADB scope, groundwater was evaluated to support the CM analysis for the ash/soil media. No RCOCs were identified for the groundwater. No constituents were identified as human health or ecological RCOCs for the surface water media.

Site-Specific Factors

A 30-m (100-ft) buffer was established around the Dunbarton Bay to be protective of the environment of the bay, thus preventing damage and destruction to its sensitive ecosystem during

remedial activities at the WADB. The selected remedy removes the contaminated media north of the 30-m buffer, but leaves approximately 10.1 ha (25 ac) in the buffer area and the protected Dunbarton Bay wetlands south of the buffer area unchanged and at elevated levels of contamination.

The selected remedy for the WADB leaves hazardous substances in place that pose a potential future risk and will require land use restrictions until such a time as it can be shown that concentrations of hazardous substances in the ash/soil media are at levels that allow for unrestricted use and exposure.

2.3 Remedial Action Selected

As stated in the ROD, the selected RA for the WADB includes the following elements:

The selected remedy for the WADB is excavation of 16,820 m^3 (22,000 yd^3) of ash and contaminated soil media from the boundary of the PAB to the edge of the 30-m (100-ft) buffer at Dunbarton Bay. Excavated waste will be transported to an approved containment facility located off-SRS property. The Three Rivers Solid Waste Authority Class Three Landfill (Three Rivers Landfill - Permit #024202-1101) is permitted to receive the material. The 30-m (100-ft) buffer is used to protect Dunbarton Bay's sensitive ecosystem from damage caused by construction activities. Additionally, the selected remedy includes LUCs for 10 ha (25 ac) which includes Dunbarton Bay and a 30-m (100-ft) buffer area. This area will remain undisturbed and not excavated, with all ash/soil constituents of concern remaining in place.

The post-RA conceptual site model (Figure 3) demonstrates that the exposure pathways to an IOU onsite worker are incomplete following implementation of the RA. According to the *Savannah River Site Future Use Project Report* (USDOE 1996), residential use of SRS land is prohibited.

3.0 LAND USE CONTROL OBJECTIVES

The following WADB LUC objectives, have been developed to ensure the protectiveness of the remedy described above:

- Prevent contact, removal or excavation of ash/contaminated soil media;
- Maintain the integrity of any current or future remedial system or monitoring system; and

- Prohibit the development and use of property for residential housing, elementary and secondary schools, child care facilities and playgrounds.

Current access controls and land transfer requirements needed to maintain the future land use are described in the following sections of this LUCIP.

4.0 IMPLEMENTATION OF LAND USE CONTROLS

This section describes the LUCs selected in the ROD to achieve the LUC objectives stated in Section 3.0. A summary of the types of LUCs controls is provided in Table 1. USDOE is responsible for implementing, maintaining, reporting on and enforcing the LUCs required for the WADB. The LUCIP will become enforceable and will be implemented when approved by USEPA and SCDHEC following the completion of the RAs prescribed by the WADB ROD. USDOE shall notify USEPA and SCDHEC 60 days in advance of any proposed land use changes that are inconsistent with LUC objectives or the selected remedy.

Unexcavated portions of the WADB will be maintained as an industrial use area by implementation of the property record notices and restrictions (Section 4.1) and the LUC boundary map (Section 4.2).

The Site Use Program (Section 4.3) will be implemented to prevent onsite worker exposure to contamination left in place at the WADB. Other existing measures (i.e. Site Clearance Program, worker training, health and safety requirements, work controls) will also be used to ensure worker safety at the WADB. Physical access controls (Section 4.4) are implemented at the SRS boundary to control and restrict public and trespasser access to the WADB.

Signs at the WADB will be maintained to alert onsite workers to the presence of hazardous substances. The signs will also convey the restrictions of unauthorized personnel. Access control warning signs will be placed and maintained around the WADB to prevent unknowing entry and unrestricted use.

4.1 Property Record Notices and Restrictions

In the long term, if the property, or any portion thereof, is ever transferred from the USDOE, the U.S. Government and/or USDOE will take those actions necessary pursuant to Section 120(h)(1) of CERCLA. Those actions will include in any contract, deed, or other transfer document, notice of the type and quantity of any hazardous substances that were known to have been stored (for more than one year), released, or disposed of on the property. The notice will also include the time at which the storage, release, or disposal took place to the extent such information is available.

In addition, if the property, or any portion thereof, is ever transferred by deed, the U.S. Government will also satisfy the requirements of CERCLA 120(h)(3). The requirements include: a description of the remedial action taken, a covenant, and an access class. These requirements are also consistent with the intent of the Resource Conservation and Recovery Act (RCRA) deed notification requirements at final closure of a RCRA facility if contamination will remain at the unit.

LUCs will be implemented through the following:

- The contract, deed, or other transfer document shall also include restrictions to prevent removal or excavation of ash/contaminated soil media, prevent future industrial uses that result in unacceptable exposure to contaminated media, and prohibit future residential housing, elementary and secondary schools, childcare facilities and playground uses of the property. The need for these 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 LUCs 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 WADB depicting the area subject to LUCs will be prepared, certified by a professional land surveyor, and recorded with the appropriate county recording agency.

In the event of a property lease or interagency agreement, the equivalent restrictions will be implemented as required by CERCLA Section 120(h).

USDOE shall notify the USEPA and SCDHEC at least six months prior to transfer or sale of the property subject to LUCs to ensure that USEPA and SCDHEC can be involved in discussions to ensure that appropriate provisions are included in the transfer documents to maintain effective LUCs. If it is not possible for the USDOE to notify the USEPA and SCDHEC at least six months prior to the transfer or sale, then the facility will notify the USEPA and SCDHEC as soon as possible but no later than 60 days prior to the transfer or sale of any property subject to LUCs. In addition to the land transfer notice and discussion provisions above, USDOE further agrees to provide the USEPA and SCDHEC with similar notice within the same time frames as to federal-to-federal transfer of property.

4.2 LUC Boundary Maps

Figure 4 of this LUCIP identifies the proposed area under land use restrictions for the WADB. Following field implementation of the remedial action, a final (as-built) survey plat is developed and certified by a professional land surveyor registered in the State of South Carolina. The final plat will include the boundary coordinates for the area subject to land use restrictions and general locations of access control warning signs. The final as-built survey plat will be submitted to USEPA and SCDHEC in the Post Construction Report /Remedial Action Completion Report (PCR/RACR).

In addition, if the site is ever transferred to non-federal ownership, a certified survey plat of the waste unit will be prepared at or near the time of conveyance to support the LUCIP required restrictive covenants on land use and will be recorded with the appropriate county recording agency.

4.3 Site Use Program

Under USDOE Order 430.1A, *Life Cycle Management* (USDOE 1998), SRS is required to implement an asset management program for the use, maintenance, and disposal of physical assets, including real estate. SRS complies with this USDOE Order through the Site Use Program which is administered by Site Development Control (SDC) in accordance with SRS Manual 1D, *Site Infrastructure and Services Manual*, Procedure 3.02, “Site Real Property Configuration Control" (SRS 2006). Use of all lands and waters on the SRS are coordinated via the Site Use Program.

No use of land (i.e., excavation or any other land use) shall be undertaken without prior approval by the USDOE and documented by a Site Use Permit.

SRS identifies all buildings, facilities, and FFA waste units on SRS site development maps that are maintained by SDC in accordance with SRS Manual 1D. If LUCs are required for an FFA waste unit, the unit-specific LUC boundaries are identified on the SRS site development maps. SDC must verify that any proposed work to be performed on a site is sanctioned by a Site Use Permit and verify that the proposed activity does not conflict with any previously approved land use.

In addition to the management of the use of SRS lands and waters through the Site Use Program, the SDC also administers the Site Clearance Program to control the construction, alteration, or demolition activities at SRS. Before any work that adds or modifies features or facilities portrayed on the SRS site development maps is conducted, a Site Clearance Permit is required. USDOE approval of the intended land via a Site Use Permit must be verified before a Site Clearance Permit is issued. If a Site Clearance request potentially impacts a FFA waste unit, the Site Clearance Request Form is sent to the appropriate FFA reviewer for approval. The FFA reviewer will evaluate the proposed activity to identify any conflicts with the waste unit and to verify that waste unit specific LUCs are not compromised. The roles and responsibilities of the individuals responsible for review and approval of Site Use and Site Clearance permits are detailed in SRS Manual 1D, Procedure 3.02. All employees, contractors, and visitors at SRS are required to adhere to the Site Use Program and the Site Clearance Program.

The USDOE will notify USEPA and SCDHEC in advance of any change to any internal procedure, including the Site Use Program, which would affect implementing or maintaining the LUCs. Approval by USEPA and SCDHEC is required for any modification or termination of the LUCs and implementation actions, and the USDOE must obtain prior approval from USEPA and SCDHEC before taking any anticipated action that may disrupt the effectiveness of the LUCs or alter or negate the need for LUCs. The Site Use Permit and site development maps must be amended when the geographic configuration or buffer zone used to establish the permit boundary changes or there is a change to the land use. The processes are controlled within the SRS Quality

Assurance (QA) Program in accordance with SRS 1Q Manual, *Quality Assurance* (SRS 2007). The SRS QA program governs all SRS activities.

4.4 Physical Access Controls

There are no physical access controls required at the WADB; however, physical access controls are provided at the SRS boundary as mentioned in Table 1, item 5.

4.5 Warning Signs

To prevent unknowing entry and to ensure that unrestricted use of the waste unit does not occur while the unit is under ownership of the USDOE, access control warning signs as shown in Appendix A will be posted at the unit. Installation of the access control warning signs will follow the WADB construction schedule as described in the Corrective Measures Implementation/ Remedial Action Implementation Plan.

Five proposed locations have been selected for the access control warning signs as shown in Figure 4. These locations range between 46-m and 61-m (15-ft and 200-ft) apart from each other and are positioned at likely ingress points. Access to this area is from either of two secondary roads, the Powerline Road (SRS Road 74-28) or an unpaved secondary road that intersects Road B (SRS Road 74-30). Signs along the Powerline Road ingress points will be oriented to the north and signs along SRS Road 74-30 will be oriented to the west. The final placement of the signage will be documented in the PCR/RACR. Waste unit warning signs for SRS are designed to be legible for a distance of at least 7.6 m (25 ft).

Custodial responsibilities for maintenance and inspection of the WADB will be maintained by the SRS Post-Closure Maintenance Group.

4.6 Other Access Controls and Security/Surveillance Measures

While under the ownership of USDOE, access control of the entire SRS will be maintained in accordance with the SRS RCRA Part B Permit Renewal Application, Volume I, Section F.1. This section describes the 24-hour surveillance system (R.61-79.264.14(b)(1)), artificial or natural barriers (R.61-79.264.14(b)(2)(I)), control entry systems (R.61-79.264.14(b)(2)(ii)), and access

control warning signs (R.61-79.264.14(c)) in place at the SRS boundary to comply with the security requirements for a RCRA-permitted facility.

4.7 Field Inspection and Maintenance for Land Use Controls

After remediation of the WADB, only inspection and maintenance activities will be required by this RA. Maintenance activities will be performed for items in Appendix B that are found to be in unsatisfactory condition.

The WADB will be inspected per the Field Inspection Checklist in Appendix B. Due to the low levels of contaminants and their presence within a wetland, field inspections will be performed every five years. Additional inspections may be necessary in the event of unusual weather (e.g., storms with significant wind force or ice storms that could result in tree damage to access control signs) or any other condition warranting inspection. For the WADB, inspections will be performed to ensure that access control signs are in place and are legible.

Any activity that is inconsistent with the LUC objectives or use restrictions, or any other action that may interfere with the effectiveness of the LUCs will be addressed by the USDOE as soon as practicable, but in no case, will the process be initiated later than 10 days after the USDOE becomes aware of the breach. The USDOE will notify USEPA and SCDHEC as soon as practicable but no longer than 10 days after discovery of any activity that is inconsistent with the LUC objectives or use restrictions, or any other action that may interfere with the effectiveness of the LUCs. The USDOE will notify USEPA and SCDHEC regarding how the USDOE has addressed or will address the breach within ten days of sending USEPA and SCDHEC notification of the breach.

The FFA Annual Progress Report, submitted to the regulatory agencies by USDOE, will provide the status of the LUCs and describe how any LUC deficiencies or inconsistent uses have been addressed. In the event of property transfer or lease, the Annual Report will cite findings on the following: whether the use restrictions and controls referenced above were communicated in the deed(s) or lease restrictions; whether property use conforms with the deed or lease restrictions and controls; and whether the owners and state/local agencies have been notified regarding the deed or

lease restrictions and controls. The FFA Annual Progress Report(s) will be used in the preparation of the Five-Year Remedy Review Report(s) to evaluate the effectiveness of the remedy.

All other routine maintenance activities will be documented and maintained in files subject to USEPA and SCDHEC review and audit. A copy of the completed inspection form is maintained in the Environmental Compliance and Area Completion Projects (EC&ACP) Document Control. The LUCs shall be maintained until the concentration of hazardous substances associated with the unit have been reduced to levels that allow for unlimited exposure and unrestricted use.

The waste unit inspectors are to be trained in Hazardous Waste Operations and Emergency Response, RCRA Well Inspections (EC&ACP-specific training), EC&ACP RCRA Waste Unit Inspections, Radiological Worker Training, etc., as applicable for the specific inspection. They will also be trained based on the individual requirements of the regulatory approved closure documents for each waste unit. In addition, the inspectors are to attend yearly refresher courses. Over the years, different personnel may conduct the inspections and maintenance activities.

This unit-specific LUCIP, including the checklist (Appendix B), will be appended to the SRS LUCAP upon final regulatory approval. After completion of the PCR/RACR, the preliminary checklist in the LUCAP will be replaced with the final approved checklist.

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5.0 REFERENCES

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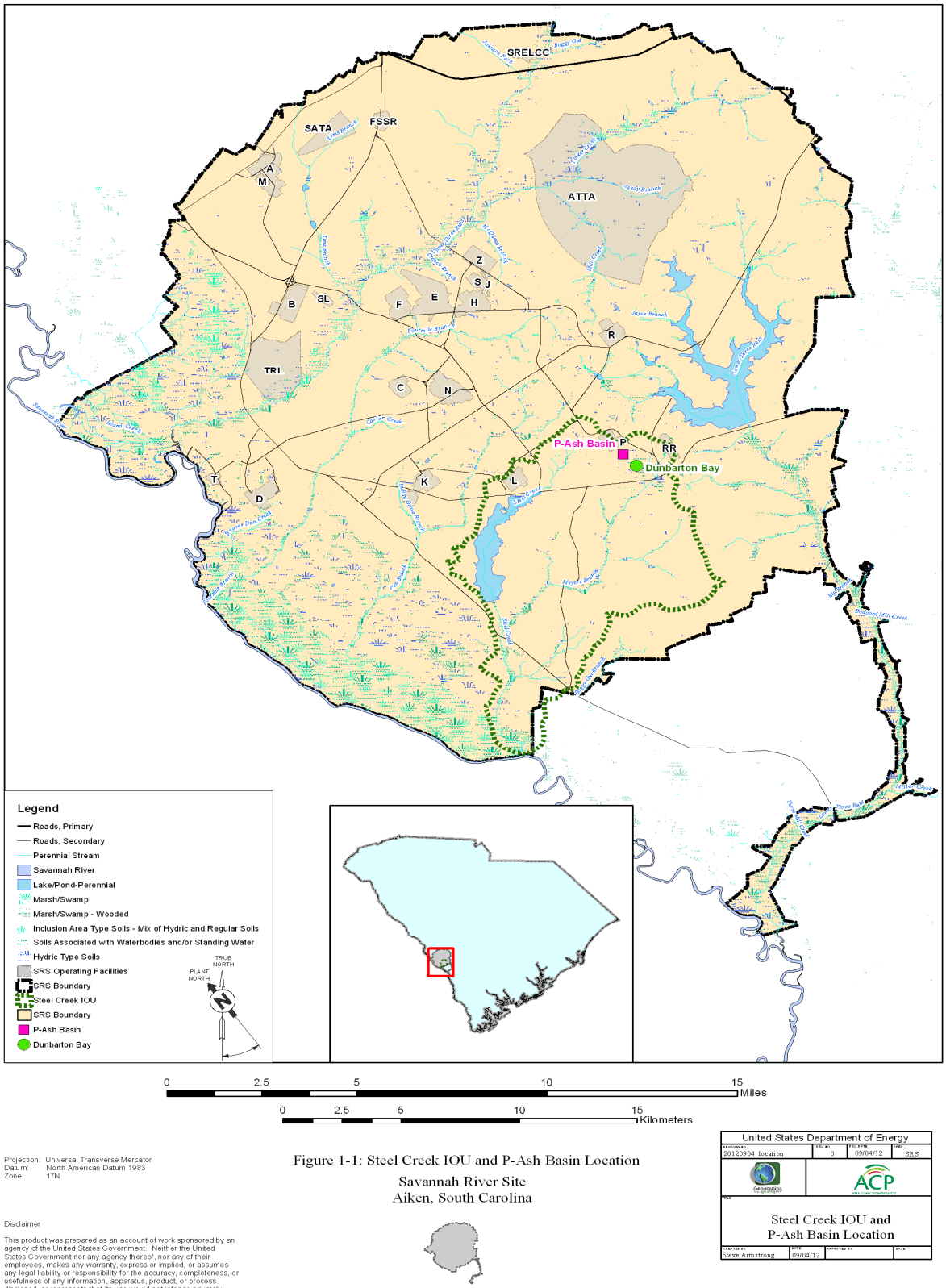


Figure 1-1: Steel Creek IOU and P-Ash Basin Location
Savannah River Site
Aiken, South Carolina

Figure 1. Location of the WADB within the Savannah River Site

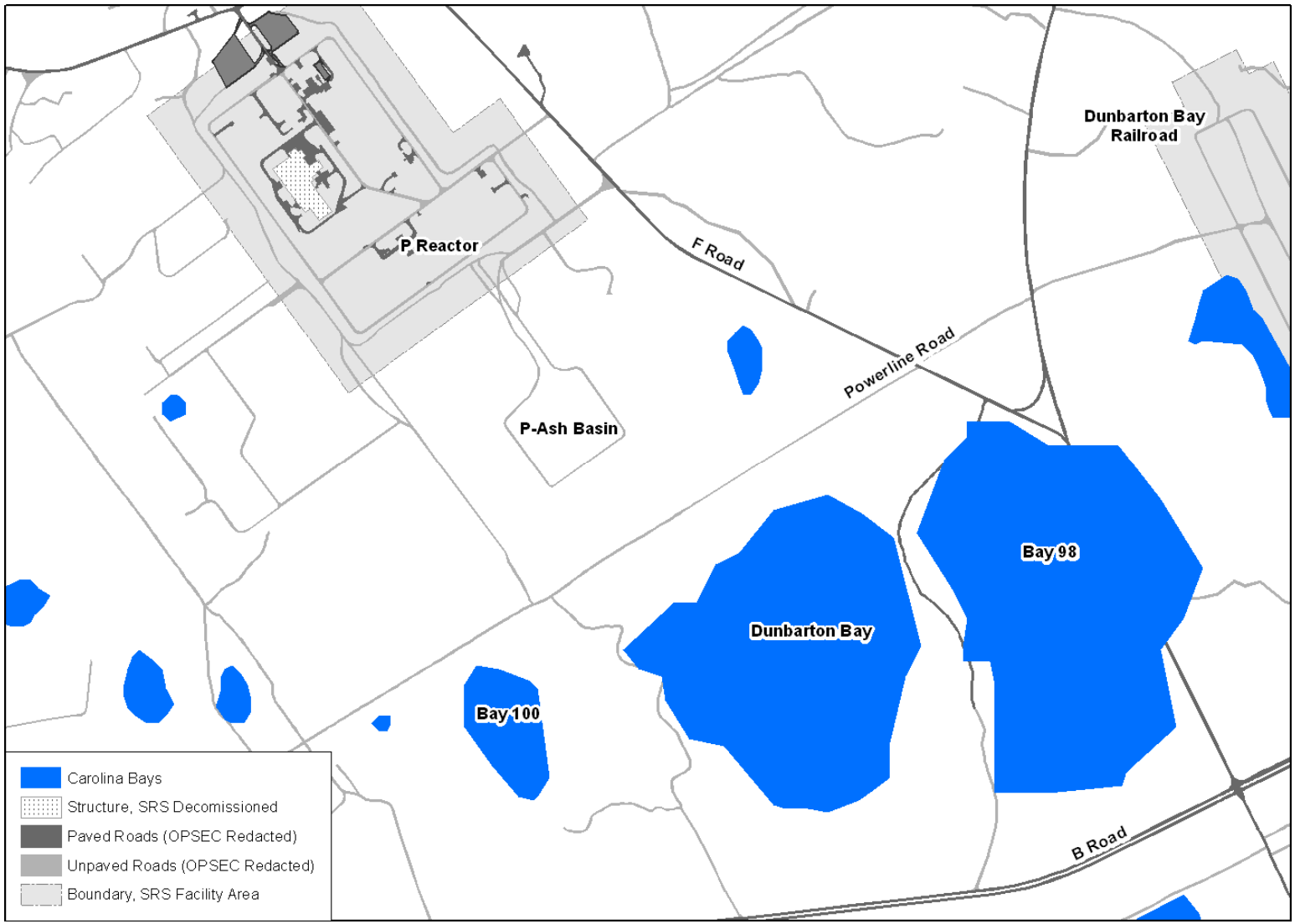
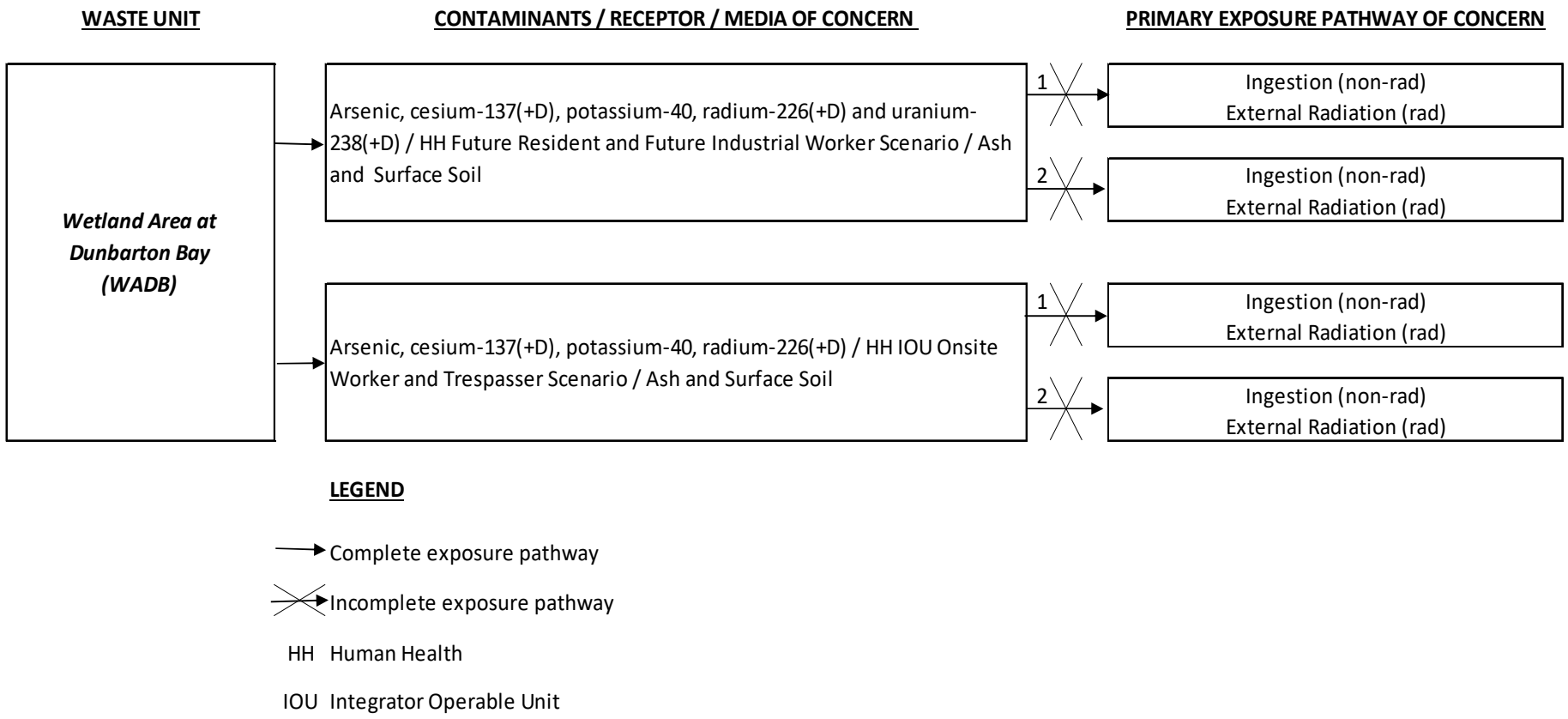


Figure 2. Location of the Carolina Bays Near WADB



1 - Excavation and Disposal of contaminated soil/ash up to 30-m (100-ft) wetland buffer area per the ROD (SRNS 2018a). No LUCs required (unrestricted land use).

2 - LUCs within Dunbarton Bay Wetland and 30-m (100-ft) buffer area per the ROD (SRNS 2018a).

Figure 3. Post-Remedial Action Conceptual Site Model for the WADB

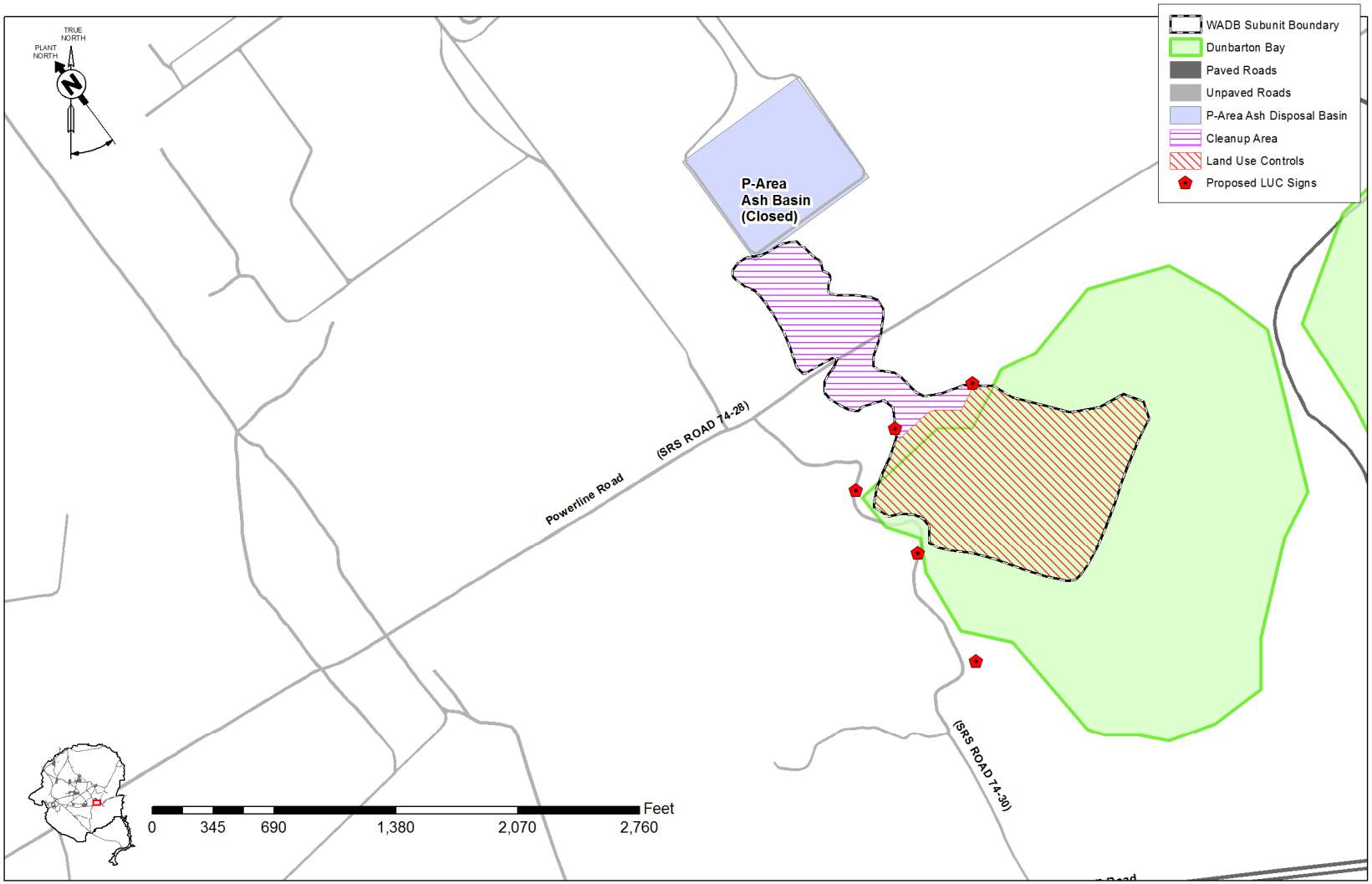


Figure 4. Land Use Control Boundary for the WADB

Table 1. Land Use Controls for the WADB

Type of Control	Purpose of Control	Duration	Implementation	Affected Areas[a]
1. Property Record Notices[b]	Provide notice to anyone searching records about the existence and location of contaminated areas.	Until the concentration of hazardous substances associated with the unit have been reduced to levels that allow for unlimited exposure and unrestricted use.	Notice recorded by USDOE in accordance with state laws at County Register of Deeds office if the property or any portion thereof is ever transferred to non-federal ownership.	Waste management areas under this LUCIP where hazardous substances are left in place at levels requiring land use restrictions.
2. Property record restrictions[c for]: A. Land Use B. Surface Water	Restrict use of property by imposing limitations.	Until the concentration of hazardous substances associated with the unit have been reduced to levels that allow for unlimited exposure and unrestricted use.	Drafted and implemented by USDOE upon any transfer of affected areas. Recorded by USDOE in accordance with state law at County Register of Deeds office.	Waste management areas under this LUCIP where hazardous substances are left in place at levels requiring land use restrictions.
3. Other Notices[d]	Provide notice to county/city about the existence and location of waste disposal and residual contamination areas for zoning/planning purposes.	Until the concentration of hazardous substances associated with the unit have been reduced to levels that allow for unlimited exposure and unrestricted use.	Notice recorded by USDOE in accordance with state laws at County Register of Deeds office if the property or any portion thereof is ever transferred to non-federal ownership.	Waste management areas under this LUCIP where hazardous substances are left in place at levels requiring land use restrictions.
4. Site Use Program[e]	Provide notice to worker/developer) i.e., permit requestor) on extent of contamination and prohibit or limit excavation/penetration activity.	As long as property remains under USDOE control.	Implemented by USDOE and site contractors. Initiated by permit request.	Waste management areas and remediation systems under this LUCIP where hazardous substances are left in place at levels requiring land restrictions.
5. Physical Access Controls[f] (e.g., fences, gates, portals)	Control and restrict access to workers and the public to prevent unauthorized.	Until the concentration of hazardous substances associated with the unit have been reduced to levels that allow for unlimited exposure and unrestricted use.	Controls maintained by USDOE	Security is provided at site boundaries in accordance with SRS procedures. Additional physical access controls, including fencing, is not required at the WADB.

Table 1. Land Use Controls for the WADB *(Continued/End)*

Type of Control	Purpose of Control	Duration	Implementation	Affected Areas[a]
6. Warning Signs[g]	Provide notice or warning to prevent unauthorized uses	Until the concentration of hazardous substances associated with the unit have been reduced to levels that allow for unlimited exposure and unrestricted use.	Signage maintained by USDOE	Warning signs will be posted in accordance with applicable site procedures and will be placed in appropriate areas at the WADB.
7. Security Surveillance Measures	Control and monitor access by workers/public	Until the concentration of hazardous substances associated with the unit have been reduced to levels that allow for unlimited exposure and unrestricted use.	Established and maintained by USDOE. Necessity of patrols evaluated upon completion remedial actions or property transfer.	Patrol of waste management areas under this LUCIP, as necessary.

[a]Affected areas – Specific locations identified in the-specific LUCIP or subsequent post-ROD documents.

[b]Property Record Notices – Refers to any non-enforceable, purely informational document recorded along with the original property acquisition records of USDOE and its predecessor agencies that alerts anyone searching property records to important information about residual contamination; waste disposal areas in the property.

[c]Property Record Restrictions – Includes conditions and/or covenants that restrict or prohibit certain uses of real property and are recorded along with original property acquisition records of USDOE and its predecessor agencies.

[d]Other Notices – Includes information on the location of waste disposal areas and residual contamination depicted on as survey plat, which is provided to a zoning authority (i.e., city planning commission) for consideration in appropriate zoning decisions for non-USDOE property.

[e]Site Use Program – Refers to the internal USDOE/USDOE contractor administrative program(s) that requires the permit requestor to obtain authorization, usually in the form of a permit, before beginning any excavation/penetration activity (e.g., well drilling) for the purpose of ensuring that the proposed activity will not affect underground utilities/structures, or in the case contaminated soil or groundwater, will not disturb the affected areas without the appropriate precautions and safeguards.

[f]Physical Access Controls – Physical barriers or restrictions to entry.

[g]Signs – Posted command, warning or direction.

APPENDIX A

ACCESS CONTROL WARNING SIGNS



Figure A-1. Access Control Warning Sign

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APPENDIX B

FIELD INSPECTION CHECKLIST FOR WADB

☐ **SCHEDULED** ☐ **UNSCHEDULED**

A= Satisfactory **X**= Unsatisfactory (Explanation required)	**A** or **X**	Observation of Corrective Action Taken
1. Verify that the roads are accessible.		
2. Verify that the waste unit signs [five signs] are in acceptable condition, have the correct information, and are legible from a distance of 25 feet.		
3. Verify that there are no excavation, digging, or construction activities in the area.		

Inspected by:

_____/_____ Date:_____
(Print Name) (Signature)

Post-Closure Manager:

_____/_____ Date:_____
(Print Name) (Signature)

CAUTION: The inspector shall notify the Post-Closure Manager and Environmental Compliance Authority **IMMEDIATELY** if there has been a breach or compromise of the land use controls of this waste unit. The notification shall be in accordance with SRS post-closure inspection procedures.

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LUCIP for the
D-Area Operable Unit Second Early Action
(consists of the 488-1D Ash Basin [including Inlet Basins], 488-2D Ash Basin, 488-4D Ash Landfill, and 489-D Coal Pile Runoff Basin [southern 75%])[19]
Second Early Action Land Use Control Implementation Plan
for the D-Area Operable Unit (U))
SRNS-RP-2020-00759, Revision 1, November 2020

[19] No remedial action is needed for the 489-D Coal Pile Runoff Basin (Southern 75%) or the Inlet Basins portion of 488-1D Ash Basin.

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Second Early Action Land Use Control Implementation Plan for the D-Area Operable Unit (U)

SEMS Number: 63

SRNS-RP-2020-00759

Revision 0

November 2020

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LIST OF ABBREVIATIONS AND ACRONYMS

~	approximate, approximately
ac	acre
BRA	Baseline Risk Assessment
CA	Cost Analysis
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CPRB	Coal Pile Runoff Basin
CSM	conceptual site model
D&D	deactivation and decommissioning
DAOU	D-Area Operable Unit
EA	Early Action
EE	Engineering Evaluation
FFA	Federal Facility Agreement
ft	feet
EE/CA	Engineering Evaluation/Cost Analysis
ha	hectare
HAZWOPER	Hazardous Waste Operations and Emergency Response
HH	human health
km	kilometer
LLC	Limited Liability Company
LUC	Land Use Controls
LUCAP	Land Use Controls Assurance Plan
LUCIP	Land Use Controls Implementation Plan
m	meter
mi	mile
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NPDES	National Pollution Discharge and Elimination System
OU	operable unit
PCR	Post-Construction Report
QA	Quality Assurance
RCRA	Resource Conservation and Recovery Act
RFI	RCRA Facility Investigation
RI	Remedial Investigation
ROD	Record of Decision
RSER	Removal Site Evaluation Report
SCDHEC	South Carolina Department of Health and Environmental Control
SDC	Site Development Control
SEMS	Superfund Enterprise Management System
SRNS	Savannah River Nuclear Solutions, LLC
SRS	Savannah River Site
USDOE	United States Department of Energy
USEPA	United States Environmental Protection Agency
WP	Work Plan
WSRC	Washington Savannah River Company, LLC (October 2005 to present)
WSRC	Westinghouse Savannah River Company, LLC (before October 2005)

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1.0 INTRODUCTION

This Second Early Action (EA) Land Use Control Implementation Plan (LUCIP) has been prepared for D-Area Operable Unit (DAOU) at the Savannah River Site (SRS). The DAOU is comprised of multiple subunits and includes both deactivation and decommissioning (D&D) facilities and closed facilities associated with the operation of the 484-D Powerhouse. The DAOU is approximately (~) 85 hectare (ha) (290 acres [ac]). Groundwater is not considered part of the scope of the DAOU. Two EA Record of Decisions (ROD) documented the selection of early action remedies to implement land use controls (LUCs) for completed DAOU subunits (SRNS 2011a, SRNS 2020). The purpose of this Second EA LUCIP is to describe how the LUCs selected in the DAOU Second EA ROD for the 488-1D Ash Basin (including Inlet Basins), 488-2D Ash Basin, 488-4D Ash Landfill, and the 489-D Coal Pile Runoff Basin (CPRB) (Southern 75%) subunits will be implemented and maintained. The second early action LUC objectives have been documented in the DAOU Second EA ROD and are listed in Section 3.0.

The selected remedy leaves hazardous substances in place that pose a potential future risk and will require land use restrictions until the concentrations of hazardous substances in the soil are at levels that allow for unrestricted use. As agreed on March 30, 2000, among the United States Department of Energy (USDOE), the United States Environmental Protection Agency (USEPA), and the South Carolina Department of Health and Environmental Control (SCDHEC), SRS is implementing a Land Use Control Assurance Plan (LUCAP) (WSRC 1999) to ensure that the LUCs required by numerous remedial decisions at SRS are properly maintained and periodically verified. The requirements of the LUCAP also apply to the LUCs that were selected as part of the early action remedy for the DAOU. This additional document, the DAOU Second EA LUCIP, contains the detailed and specific measures required to implement and maintain the LUCs selected as part of this particular remedial decision. The LUCs shall be maintained until the operable unit (OU) is suitable for unlimited exposure and unrestricted use. Approval by USEPA and SCDHEC is required for any modification or termination of the LUCs.

USDOE is responsible for implementing, maintaining, monitoring, reporting, and enforcing the LUCs in accordance with the approved Second EA LUCIP. Upon final approval, the Second EA

LUCIP will be appended to the LUCAP and should be considered incorporated by reference into the Second DAOU EA ROD, establishing implementation and maintenance requirements for the LUCs under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and the SRS Federal Facility Agreement (FFA) (FFA 1993). The Second EA LUCIP will remain in effect unless and until modifications are approved by USEPA and SCDHEC as necessary for protection of human health (HH) and the environment. In accordance with Section 121(c) of CERCLA and National Oil and Hazardous Substances Pollution Contingency Plan (NCP) §300.430(f)(5)(iii)(c), a statutory review will be conducted within five years of initiation of the remedial action, and every five years thereafter, to ensure that the remedy continues to be protective of HH and the environment. Any approved Second EA LUCIP modification will be appropriately documented for incorporation by reference into the DAOU Second EA ROD.

The format of this Second EA LUCIP is consistent with the FFA protocol format approved by the USEPA and SCDHEC in March 2004.

2.0 OVERVIEW OF EARLY REMEDIAL ACTION

2.1 General Description and History of the DAOU

SRS occupies ~803 kilometers (km^2)[(310 square miles (mi^2)] of land adjacent to the Savannah River, principally in Aiken and Barnwell counties of South Carolina (Figure 1). SRS is located ~40.2-km (25-mi) southeast of Augusta, Georgia, and 32-km (20-mi) south of Aiken, South Carolina.

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

The DAOU is located in the southwest quadrant of the SRS, ~914-m (3,000-ft) east of the nearest site boundary, the Savannah River (see Figure 1). The DAOU is ~85 ha (290 ac) and is composed

of multiple subunits and includes both D&D facilities and closed facilities associated with the 484-D Powerhouse as identified in Figure 2.

The Second EA LUCIP applies to the following four DAOU subunits: 488-1D Ash Basin (including Inlet Basins), 488-2D Ash Basin, 488-4D Ash Landfill and the 489-D CPRB (Southern 75%) subunits of the DAOU. Cleanup goals established for the DAOU subunits (including goals identified for the early removal actions) are based on industrial land use. Therefore, hazardous substances will remain at the DAOU at levels that pose a threat to HH and prevent unrestricted land use. Unrestricted land use was achieved for some subunits. The response action selected in the Second EA ROD is necessary to protect the public health or welfare or the environment from actual or threatened releases of hazardous substances into the environment.

During a teleconference held on September 15, 2010, SCDHEC identified a problem with proceeding with a final ROD for the DAOU given that the 484-D Powerhouse would still be operational after approval of the ROD. Therefore, the USDOE, USEPA, and SCDHEC agreed to pursue EA RODs to allow the project to remain on track and achieve the targeted footprint reduction. The scope of the EA RODs address LUCs of completed DAOU subunits and areas. The final ROD for DAOU will include the LUCs for all remaining subunits and areas, specifically the remedial decision for the 484-D Powerhouse building and ancillary subunits. Final LUCs required for the 484-D Powerhouse building and associated facilities will be addressed by the appropriate remedial decision after D&D of the Powerhouse building is complete. Table 1 provides a summary of administrative paths for DAOU subunits and areas as established in the EA RODs (SRNS 2011a, SRNS 2020).

An EA ROD Remedial Alternative Selection for the DAOU (SRNS 2011a) integrated the outcomes of the completed removal actions and selected the final action (LUCs) to prevent unrestricted use for the Bubble Tower Subunit, Moderator Processing Subunit, 489-D CPRB (Northern 25%), D-Area Asbestos Pit (including restrictions against land disturbance), and D-Area Process Sewer Lines as Abandoned inside the area fence. The unit-specific EA LUCIP (SRNS 2011b) referenced in the EA ROD provides details and specific measures required to implement and maintain the LUCs selected as part of this remedy.

2.2 Nature and Extent of Contamination

There had not been any prior CERCLA documentation specific to the 488-1D Ash Basin, 488-2D Ash Basin and 488-4D Ash Landfill subunits before submittal of the removal action documents (SRNS 2016, SRNS 2014a, SRNS 2014b, respectively) for each subunit. However, previous remedial investigations (RIs) and baseline risk assessments (BRAs) performed by SRS yield consistent conclusions for coal and/or ash contaminated media which typically contain toxic metals, such as arsenic, and naturally-occurring radionuclides. These historical results were used to presumptively identify the problems warranting action at these subunits. The problems warranting action for the 489-D CPRB are documented in the Resource Conservation and Recovery Act (RCRA) Facility Investigation/Remedial Investigation (RFI/RI) Work Plan (WP) and BRA for the DAOU (SRNS 2009). A summary of the nature and extent of contamination for the DAOU subunits selected for early remedial action as identified in Table 1 is presented below.

488-1D Ash Basin Subunit (including Inlet Basins)

The 488-1D Ash Basin was an unlined, earthen containment structure that was built generally on existing grade (ground elevation). Powerhouse ash slurry flowed via an ash sluice line from the 484-D Powerhouse into one of two Inlet Basins identified as Inlet Basin #1 (northern) and Inlet Basin #2 (southern), each ~1.2 ha (3 ac) in size. The bulk of ash settled out of the slurry in the Inlet Basins and the remaining wastewater flowed into the eastern end of the 488-1D Basin (~14 ha [35 ac]). As the wastewater level increased in the 488-1D Ash Basin, the wastewater flowed through a pipe located at the western end of the basin into the 488-2D Ash Basin for polish settling of any remaining solids.

As part of the early removal action, ash from the western end of the 488-1D Ash Basin was consolidated into the eastern end of the 488-1D Ash Basin and a geosynthetic cover system was constructed over the east end 488-1D Ash Basin. The Inlet Basins were excavated and backfilled.

488-2D Ash Basin Subunit

The 488-2D Ash Basin (6 ha [15 ac]), served as the final settling stage for the treatment of the 484-D Powerhouse operation ash contaminated wastewater. This basin received the overflow

wastewater from the 488-1D Ash Basin and provided final settling of the solids as the water flowed from the western end of the 488-2D Ash Basin to the discharge pipe located at the eastern end of the 488-2D Ash Basin. As the water flowed from west to east, the flow distance, along with the settling velocity of solids, provided sufficient removal of any remaining solids to ensure compliance with the National Pollution Discharge and Elimination System (NPDES) discharge permit at Outfall D-01C. The 488-2D Ash Basin discharged the treated water into the D-Area Discharge Canal at the D-01C Outfall which eventually flowed into Beaver Dam Creek.

As part of the early removal action, ash from the 488-2D Ash Basin was consolidated into the 488-4D Ash Landfill and regraded with common fill and stabilized by vegetation. 488-2D is now a stormwater detention basin that controls stormwater discharges originating from both the 488-1D and 488-4D cover systems.

488-4D Ash Landfill Subunit

The 488-4D Ash Landfill was an 8.9-ha (22-ac) basin that was initially part of the SRS As-Built Construction Permit #7295 and the associated 1991 SRS permit-to-operate for existing SRS wastewater facilities. Per agreement with SCDHEC, the basin was permitted in November 2007 as a Class Two Solid Waste Landfill under Solid Waste Landfill Permit #025800-1602 to accept ash waste for disposal. All storm water drainage was directed into the infiltration basin located within the western end of the landfill which had an overflow channel that directed any contaminated water to the 488-2D Ash Basin for treatment (settling). The water was combined with the 488-1D Ash Basin wastewater, treated per the 488-2D Ash Basin IWT permit, and released through NPDES Outfall D-01C.

As part of the early removal action, ash from outside the western boundary of the 488-4D Ash Landfill, ash from surrounding roads/berms, and ash from the 488-2D Ash Basin was consolidated into the 488-4D Ash Landfill. A geosynthetic SCDHEC Class 3 Solid Waste Landfill cover system was then constructed over the 488-4D Ash Landfill.

489-D Coal Pile Runoff Basin – Southern 75% Subunit

The 489-D CPRB is located in the southern portion of the DAOU and has a total area of ~5.7 ha (14 ac). During operation of the 484-D Powerhouse, runoff storm water from the 484-17D Coal Storage Area was collected through a network of drainage ditches and flowed to the 489-D CPRB via storm sewers for settling. The remedy for this basin was accomplished under the scope of two separate action memorandums. The Northern 25% section of the 489-D CPRB was addressed by the removal action completed in 2010 (US DOE 2010b) with LUCs, and the remaining Southern 75% section removal action was completed in 2018 with a final remedy of No Action (USDOE 2015).

As part of the early removal action, coal fines and contaminated soil from the 489-D CPRB was consolidated into the 488-4D Ash Landfill. 489-D CPRB was regraded with common fill and stabilized by vegetation. 489-D CPRB is now a stormwater retention basin that controls stormwater discharges originating from the adjacent closed 484-17D Coal Storage Area.

2.3 Early Remedial Actions Selected

The current land use for the DAOU is industrial with USDOE maintaining control of the land as long as necessary to keep the selected remedy fully protective of HH and the environment. As documented in the Second EA ROD for the DAOU, the selected early remedial action is LUCs to prevent unrestricted use for the 488-1D Ash Basin (excluding Inlet Basins which were closed with no unrestricted use), 488-2D Ash Basin, and the 488-4D Ash Landfill subunits of the DAOU. The EA LUC remedy is the final remedial action for the 488-1D Ash Basin, 488-2D Ash Basin, and the 488-4D Ash Landfill. This remedy effectively balances short-term effectiveness, implementability, and cost criteria, while providing a high level of long-term protection to hazardous contaminants that will remain at the site above levels that would allow for unrestricted use.

The selected remedial alternative for the 489-D CPRB (Southern 75%) and the area where the Inlet Basins were formally located is No Action. In their current state, these subunits pose no

unacceptable risk requiring a response action to HH and the environment and support unrestricted land use.

Table 2 shows the types of LUCs, purposes of control, duration, and affected areas. The early action LUCs for the DAOU will consist of the following:

- Signage is located at the 488-1D Ash Basin, 488-2D Ash Basin and 488-4D Ash Landfill subunit boundaries to alert on-site workers to the presence of hazardous substances and to prevent unauthorized entry and unrestricted uses. The signs were installed in 2019. The approximate area of LUCs are shown in Figure 3. Appendix C provides a site map with the SRS site coordinates of the LUC boundaries and sign locations.

- Institutional Controls (i.e., administrative measures) and use restrictions for on-site workers via the Site Use/Site Clearance Program. Other administrative controls to ensure worker safety include work controls, worker training, and worker briefings of health and safety requirements.

- SRS access controls to prevent exposure to trespassers, as described in the 2013 RCRA Permit Renewal Application, Volume I, Section F.1, which describes the security procedures and equipment, 24-hour surveillance system, artificial or natural barriers, control entry systems, and warning signs in place at the SRS boundary.

The post-remedial action conceptual site model (CSM) (Figure 4) demonstrates that the exposure pathways to human and ecological receptors are incomplete following implementation of the remedial action. According to the *Savannah River Site Future Use Project Report* (USDOE 1996), residential use of SRS land is prohibited.

3.0 DAOU LAND USE CONTROL OBJECTIVES

The following DAOU LUC objectives have been developed to ensure the protectiveness of the selected EA remedy:

- Prevent contact, removal, or excavation of coal and coal-combustion waste that is buried underneath the engineered cover systems as well as protect against disturbance of soil overlaying the caps;

- Prohibit the development and use of property for residential housing, elementary and secondary schools, childcare facilities and playgrounds;

- Maintain the integrity of any current or future remedial or monitoring system, such as soil covers or groundwater monitoring wells;

- Prevent construction of inhabitable buildings without an evaluation of indoor air quality to address vapor intrusion; and

- Prevent construction of facilities or structures on/above the engineered cover systems.

Current access controls and land transfer requirements needed to maintain the future land use are described in the following sections of this LUCIP.

4.0 IMPLEMENTATION OF LAND USE CONTROLS

This section describes the remedial actions prescribed by the Second EA ROD to achieve the LUC objectives stated in Section 3.0. A summary of the types of LUCs controls is provided in Table 2. USDOE is responsible for implementing, maintaining, reporting on and enforcing the LUCs. The LUCIP will become enforceable and will be implemented when approved by USEPA and SCDHEC following the completion of the remedial actions prescribed by the EA ROD. USDOE shall notify USEPA and SCDHEC 60 days in advance of any proposed land use changes that are inconsistent with LUC objectives or the selected remedy.

The affected area will be maintained as an industrial use area by implementation of the property record notices and restrictions (Section 4.1) and the LUC boundary map (Section 4.2). The Site Use Program (Section 4.3) will be implemented to prevent onsite worker exposure to contamination left in place. Other existing measures (i.e., Site Clearance Program, worker training, health and safety requirements, work controls) will also be used to ensure worker safety.

Physical access controls (Section 4.4) are implemented at the SRS boundary to control and restrict public and trespasser access.

Signs will be maintained to alert onsite workers to the presence of hazardous substances. The signs will also convey the restrictions of unauthorized personnel. Access control warning signs have been placed as shown in Appendix C and will be maintained to prevent unknowing entry and unrestricted use.

4.1 Property Record Notices and Restrictions

In the long term, if the property, or any portion thereof, is ever transferred from USDOE, the U.S. Government and/or USDOE will take those actions necessary pursuant to Section 120(h)(1) of CERCLA. Those actions will include in any contract, deed, or other transfer document, notice of the type and quantity of any hazardous substances that were known to have been stored (for more than one year), released, or disposed of on the property. The notice will also include the time at which the storage, release, or disposal took place to the extent such information is available.

In addition, if the property, or any portion thereof, is ever transferred by deed, the U.S. Government will also satisfy the requirements of CERCLA 120(h)(3). The requirements include: a description of the remedial action taken, a covenant, and an access class. These requirements are also consistent with the intent of the RCRA deed notification requirements at final closure of a RCRA facility if contamination will remain at the unit.

LUCs will be implemented through the following:

- The contract, deed, or other transfer document shall also include restrictions precluding residential use of the property. However, the need for these 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 LUCs will be done through an amended ROD with USEPA and SCDHEC review and approval.

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

In the event of a property lease or interagency agreement, the equivalent restrictions will be implemented as required by CERCLA Section 120(h).

USDOE shall provide the USEPA and SCDHEC at least a six month notice prior to transfer or sale of property subject to LUCs to ensure that USEPA and SCDHEC can be involved in discussions to ensure that appropriate provisions are included in the transfer documents to maintain effective LUCs. If it is not possible for the USDOE to notify the USEPA and SCDHEC at least six months prior to the transfer or sale, then the facility will notify the USEPA and SCDHEC as soon as possible but no later than 60 days prior to the transfer or sale of any property subject to LUCs. In addition to the land transfer notice and discussion provisions above, USDOE further agrees to provide the USEPA and SCDHEC with similar notice within the same time frames as to federal-to-federal transfer of property.

4.2 LUC Boundary Maps

This Second EA LUCIP identifies the proposed areas under land use restrictions in Appendix C. Following field implementation of the remedial action, a final (as-built) survey plat is developed and certified by a professional land surveyor registered in the State of South Carolina. The final plat will include the boundary coordinates for the area subject to land use restrictions and general locations of access control warning signs. The final as-built survey plat will be submitted to USEPA and SCDHEC in the final action DAOU Post-Construction Report (PCR).

In addition, if the site is ever transferred to non-federal ownership, a certified survey plat of the OU will be prepared at or near the time of conveyance to support the EA LUCIP required restrictive covenants on land use and will be recorded with the appropriate county recording agency.

4.3 Site Use Program

Under USDOE Order 430.1A, *Life Cycle Management* (USDOE 1998), SRS is required to implement an asset management program for the use, maintenance, and disposal of physical assets, including real estate. SRS complies with this USDOE Order through the Site Use Program which is administered by Site Development Control (SDC) in accordance with SRS Manual 1D, *Site Infrastructure and Services Manual*, Procedure 3.02, "Site Real Property Configuration Control" (SRS 2006). Use of all lands and waters on the SRS are coordinated via the Site Use Program. No use of land (i.e., excavation or any other land use) shall be undertaken without prior approval by the USDOE and documented by a Site Use Permit.

SRS identifies all buildings, facilities, and FFA waste units on SRS site development maps that are maintained by SDC in accordance with SRS Manual 1D. If LUCs are required for an FFA waste unit, the unit-specific LUC boundaries are identified on the SRS site development maps. SDC must verify that any proposed work to be performed on a site is sanctioned by a Site Use Permit and verify that the proposed activity does not conflict with any previously approved land use.

In addition to the management of the use of SRS lands and waters through the Site Use Program, the SDC also administers the Site Clearance Program to control the construction, alteration, or demolition activities at SRS. Before any work that adds or modifies features or facilities portrayed on the SRS site development maps is conducted, a Site Clearance Permit is required. USDOE approval of the intended land via a Site Use Permit must be verified before a Site Clearance Permit is issued. If a Site Clearance request potentially impacts a FFA waste unit, the Site Clearance Request Form is sent to the appropriate FFA reviewer for approval. The FFA reviewer will evaluate the proposed activity to identify any conflicts with the waste unit and to verify that waste unit specific LUCs are not compromised. The roles and responsibilities of the individuals responsible for review and approval of Site Use and Site Clearance permits are detailed in SRS 1D, Procedure 3.02. All employees, contractors, and visitors at SRS are required to adhere to the Site Use Program and the Site Clearance Program.

The USDOE will notify USEPA and SCDHEC in advance of any change to any internal procedure, including the Site Use Program, which would affect implementing or maintaining the LUCs. Approval by USEPA and SCDHEC is required for any modification or termination of the LUCs and implementation actions, and the USDOE must obtain prior approval from USEPA and SCDHEC before taking any anticipated action that may disrupt the effectiveness of the LUCs or alter or negate the need for LUCs. The Site Use Permit and site development maps must be amended when the geographic configuration or buffer zone used to establish the permit boundary changes or there is a change to the land use. The processes are controlled within the SRS Quality Assurance (QA) Program in accordance with SRS 1Q Manual, *Quality Assurance* (SRS 2007). The SRS QA program governs all SRS activities.

4.4 Physical Access Controls

- Controlled physical access into D Area. A primary road leads into D Area with access to the area controlled by a locked gate. Only authorized personnel may enter.
- Physical access controls (fencing) are also provided at the SRS boundary as mentioned in Table 2, Item 5.

4.5 Warning Signs

To prevent unknowing entry and to ensure that unrestricted use of the waste unit does not occur while the unit is under ownership of the USDOE, monuments and access control warning signs, as worded in Appendix A, will be posted at the unit. Installation of the access control warning signs was completed in 2019. A total of 12 signs are located as depicted in Appendix C. The final placement of the signage will be documented in the final EA PCR. The signs will be legible for a distance of at least 7.6 m (25 ft). Custodial responsibilities for maintenance and inspection will be performed by the SRS Post-Closure Maintenance Group.

4.6 Other Access Controls and Security/Surveillance Measures

While under the ownership of USDOE, access control of the entire SRS will be maintained in accordance with the 2000 RCRA Part B Permit Renewal Application, Volume I, Section F.1. This

section describes the 24-hour surveillance system (R.61-79.264.14(b)(1)), artificial or natural barriers (R.61-79.264.14(b)(2)(I)), control entry systems (R.61-79.264.14(b)(2)(ii)), and access control warning signs (R.61-79.264.14(c)) in place at the SRS boundary to comply with the security requirements for a RCRA-permitted facility.

4.7 Field Inspection and Maintenance for Land Use Controls

After remediation, only inspection and maintenance activities will be required by this remedial action. Inspections will be performed annually per the Field Inspection Checklist in Appendix B. Additional inspections may be necessary in the event of unusual weather or any other condition warranting inspection.

Any activity that is inconsistent with the LUC objectives or use restrictions, or any other action that may interfere with the effectiveness of the LUCs will be addressed by the USDOE as soon as practicable, but in no case will the process be initiated later than 10 days after the USDOE becomes aware of the breach. The USDOE will notify USEPA and SCDHEC as soon as practicable but no longer than 10 days after discovery of any activity that is inconsistent with the LUC objectives or use restrictions, or any other action that may interfere with the effectiveness of the LUCs. The USDOE will notify USEPA and SCDHEC regarding how the USDOE has addressed or will address the breach within 10 days of sending USEPA and SCDHEC notification of the breach.

The FFA Annual Progress Report, submitted to the regulatory agencies by USDOE, will provide the status of the LUCs and describe how any LUC deficiencies or inconsistent uses have been addressed. In the event of property transfer or lease, the Annual Report will cite findings on the following: whether the use restrictions and controls referenced above were communicated in the deed(s) or lease restrictions; whether property use conforms with the deed or lease restrictions and controls; and whether the owners and state/local agencies have been notified regarding the deed or lease restrictions and controls. The FFA Annual Progress Report(s) will be used in the preparation of the Five-Year Remedy Review Report.

All other routine maintenance activities will be documented and maintained in files subject to USEPA and SCDHEC review and audit. A copy of the completed inspection form is maintained

in SRS records. The LUCs shall be maintained until the concentration of hazardous substances associated with the unit have been reduced to levels that allow for unlimited exposure and unrestricted use.

The waste unit inspectors are to be trained in Hazardous Waste Operations and Emergency Response (HAZWOPER), RCRA Well Inspections, RCRA Waste Unit Inspections, Radiological Worker Training, etc., as applicable for the specific inspection. They will also be trained based on the individual requirements of the regulatory approved closure documents for each waste unit. In addition, the inspectors are to attend yearly refresher courses. Over the years, different personnel may conduct the inspections and maintenance activities.

This unit-specific LUCIP, including the checklist (Appendix B), will be appended to the SRS LUCAP upon final regulatory approval. After completion of the final PCR, the preliminary checklist in the LUCAP will be replaced with the final approved checklist.

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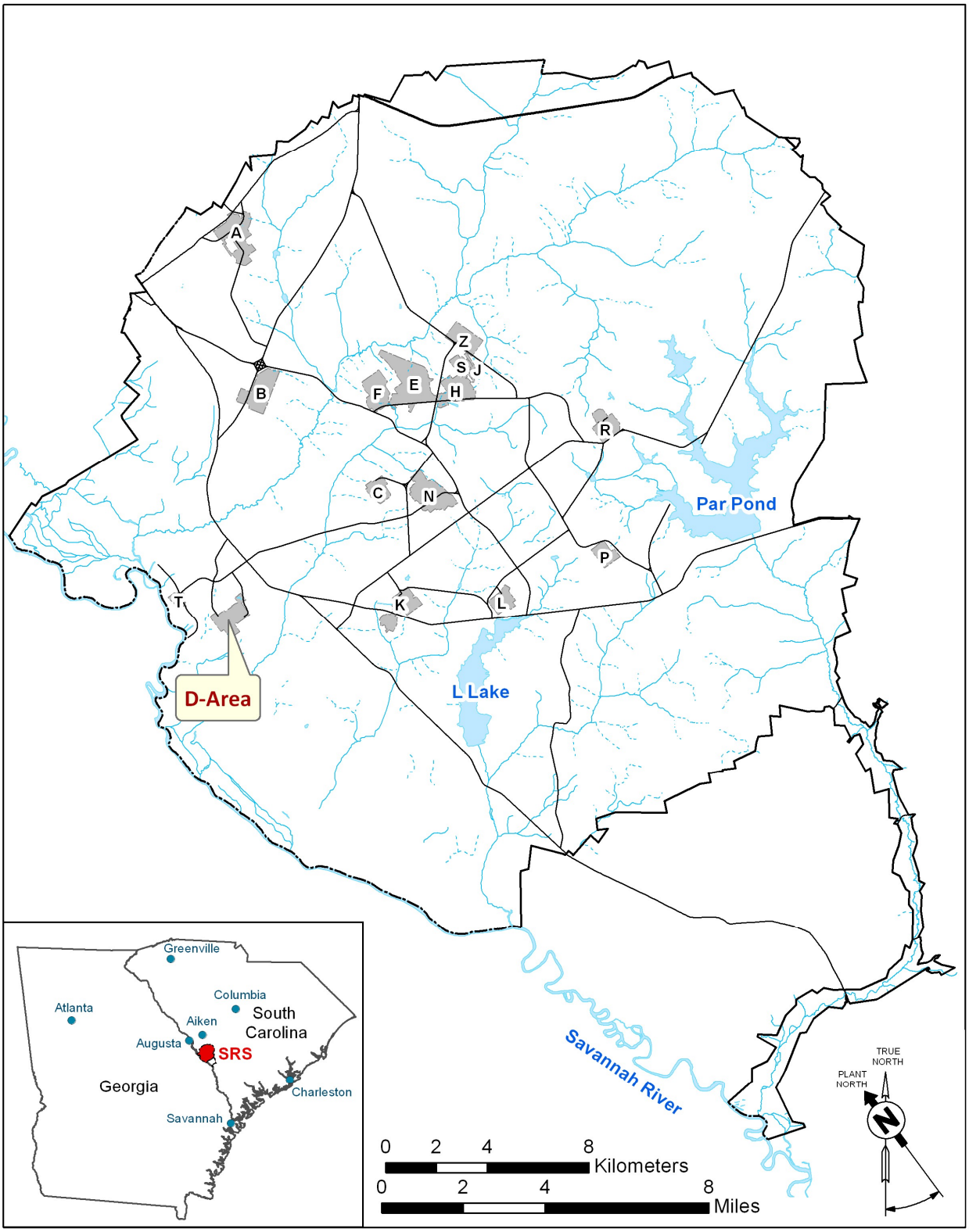


Figure 1. Location of the DAOU within the Savannah River Site

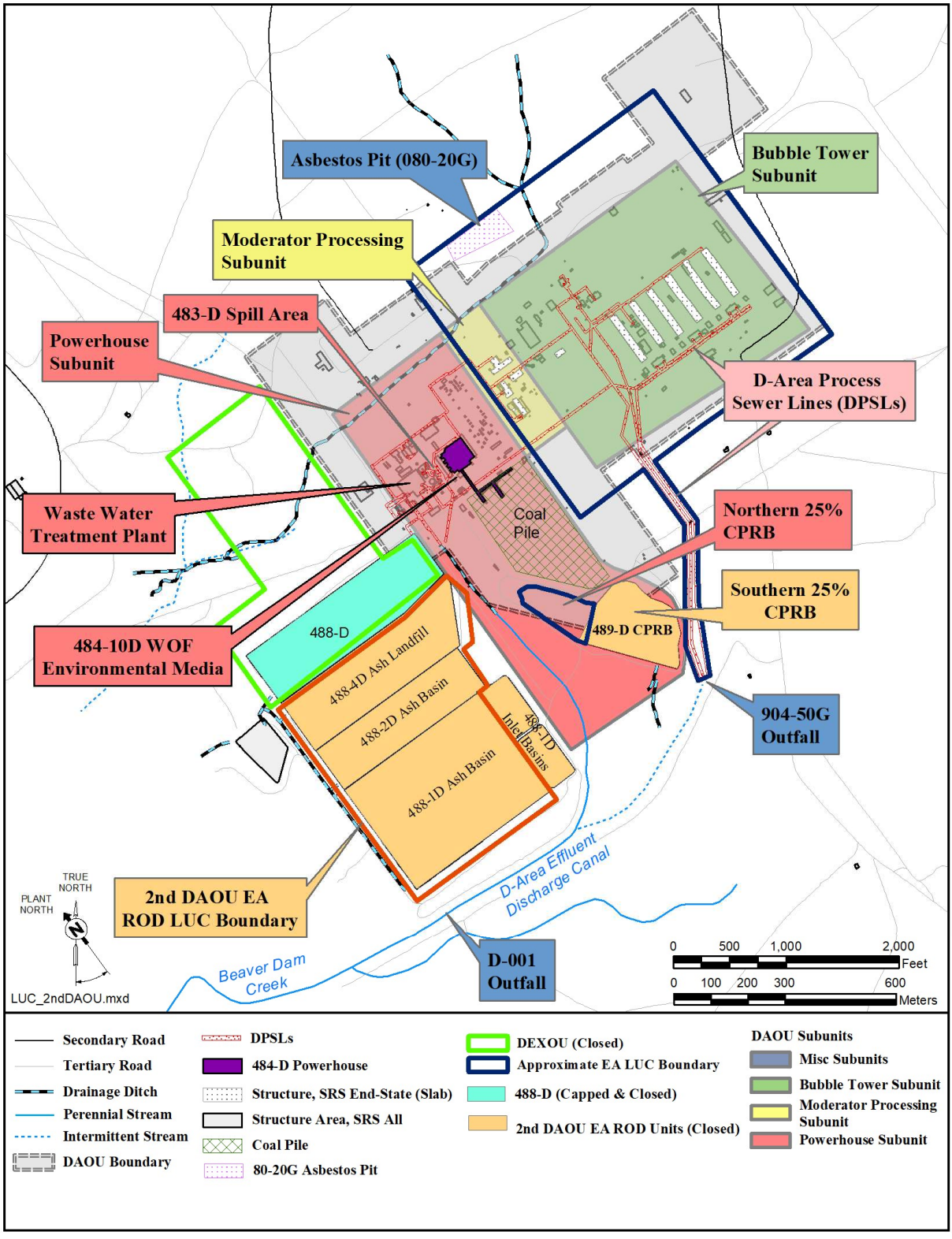


Figure 2. Site Areas and Subunits In and Around the DAOU

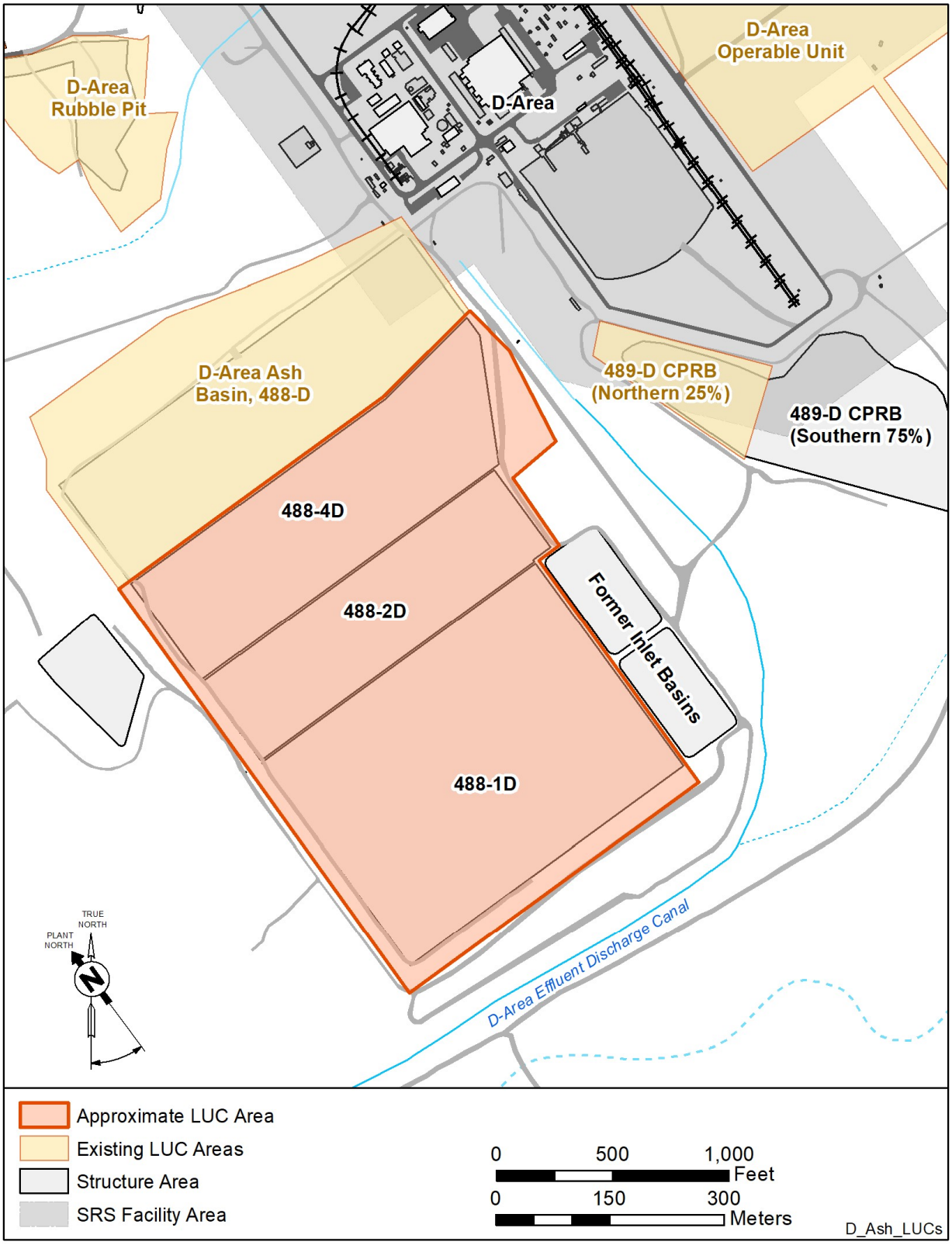
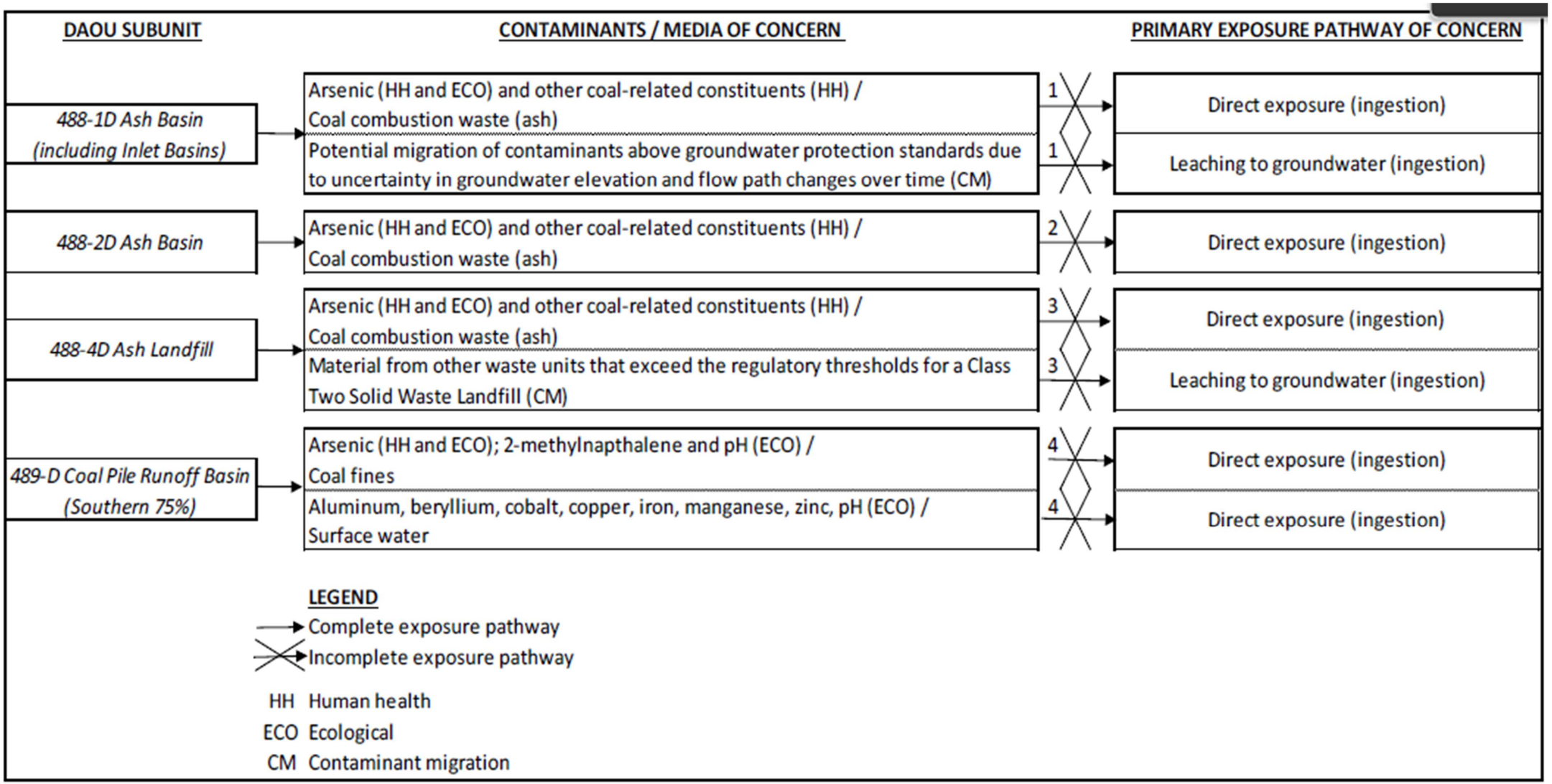


Figure 3. Approximate Areas of Land Use Controls

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1. Ash Consolidation and Geosynthetic Cover System per RSER/EE/CA (SRNS 2016); 488-1D Ash Basin - LUCs required after completion of early removal action to prevent land disturbance activities and unrestricted land use. Inlet Basins - No LUCs required, meets the criteria for unrestricted land use.
2. Ash Removal per RSER (SRNS 2014a); 488-2D Ash Basin - LUCs required after completion of early removal action to prevent unrestricted land use.
3. Geosynthetic Cover System per RSER/EE/CA (SRNS 2014b); 488-4D Ash Landfill - LUCs required after completion of early removal action to prevent land disturbance activities and unrestricted land use.
4. Excavation and Disposal per Revision 3 Action Memorandum for the Non-Time Critical Removal Action for the D-Area Coal Pile Runoff Basin (489-D) (USDOE 2015); No LUCs required, meets the criteria for unrestricted land use.

Figure 4. Generic Conceptual Site Model after Completion of the Early Remedial Actions

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Table 1. Summary of Administrative Paths for the DAOU Subunits

SUBUNIT/AREA	ADMINISTRATIVE PATH					
	EA ROD[1]	Second[2] EA ROD	Final ROD	IOU	GW OU	Remedial Decision
Ash Basin (488-D)						Geosynthetic Cover/GW Monitoring/ LUCs (DEXOU ROD 2004)
Ash Basin (488-1D) (including Inlet Basins)		X				LUCs; No Action for the Inlet Basins portion
Ash Basin (488-2D)		X				LUCs
Ash Basin (488-4D)		X				LUCs
Powerhouse Subunit	X		X			
489-D CPRB - Northern 25%	X					LUCs
489-D CPRB - Southern 75%		X				No Action
484-D Powerhouse Building			X			
484-10D WOF Building			X			
484-10D WOF Environmental Media			X			
Ash Sluice Lines			X			
D-Area Coal Storage Area (484-17D)[3]			X			
483-D Combined Spills			X			
Bubble Tower Subunit	X					LUCs
Moderator Processing Subunit	X					LUCs
Miscellaneous Units						
D-006 Outfall (Petroleum Release Site)				X		
904-50G Outfall	X					No Action
D-Area Asbestos Pit (80-20G)	X					LUCs
DIPSLs	X					LUCs
Electrical Transformers	X					No Action
Miscellaneous Buildings	X					No Action
D-Area Rubble Pit (431-2D)						LUCs (DEXOU ROD 2004)
D-Area Oil Seepage Basin						GW Monitoring/LUCs (DAOSB ROD 1998)
D Area Groundwater					X	
Ash Area Adjacent to and Easterly of D-Area Ash Basins 488-1D and 488-2D				X		

1. EA ROD for DAOU, SRNS-RP-2010-00162, Rev 1.1, June 2011.
2. Second EA ROD for DAOU, SRNS-RP-2018-00461, Rev 1, July 2020, subunits in **bold** font are the subject of this document.
3. D-Area Coal Storage Area (484-17D) also referred to as D-Area Coal Pile in SRS documentation
.

Table 2. Land Use Controls for the DAOU

Type of Control	Purpose of Control	Duration	Implementation	Affected Areas[a]
1. Property Record Notices[b]	Provide notice to anyone searching records about the existence and location of contaminated areas.	Until the concentration of hazardous substances associated with the unit have been reduced to levels that allow for unlimited exposure and unrestricted use.	Notice recorded by USDOE in accordance with state laws at County Register of Deeds office if the property or any portion thereof is ever transferred to non-federal ownership.	At DAOU, where hazardous substances are left in place at levels requiring land use and/or groundwater restrictions.
2. Property record restrictions[c]: A. Land Use B. Groundwater	Restrict use of property by imposing limitations. Prohibit the use of groundwater.	Until the concentration of hazardous substances associated with the unit have been reduced to levels that allow for unlimited exposure and unrestricted use.	Drafted and implemented by USDOE upon any transfer of affected areas. Recorded by USDOE in accordance with state law at County Register of Deeds office.	At DAOU, where hazardous substances are left in place at levels requiring land use and/or groundwater restrictions.
3. Other Notices[d]	Provide notice to city &/or county about the existence and location of waste disposal and residual contamination areas for zoning/planning purposes.	Until the concentration of hazardous substances associated with the unit have been reduced to levels that allow for unlimited exposure and unrestricted use.	Notice recorded by USDOE in accordance with state laws at County Register of Deeds office if the property or any portion thereof is ever transferred to non-federal ownership.	At DAOU, where hazardous substances are left in place at levels requiring land use and/or groundwater restrictions.
4. Site Use Program[e]	Provide notice to worker/developer (i.e., permit requestor) on extent of contamination and prohibit or limit excavation/penetration activity.	As long as property remains under USDOE control	Implemented by USDOE and site contractors Initiated by permit request	At DAOU where levels requiring land use and/or groundwater restrictions.
5. Physical Access Controls[f] (e.g., fences, gates, portals)	Control and restrict access to the public to prevent unauthorized access.	Until the concentration of hazardous substances associated with the unit have been reduced to levels that allow for unlimited exposure and unrestricted use.	Controls maintained by USDOE.	Security is provided at site boundaries in accordance with SRS procedures.
6. Warning Signs[g]	Provide notice or warning to prevent unauthorized uses.	Until the concentration of hazardous substances associated with the unit have been reduced to levels that allow for unlimited exposure and unrestricted use.	Signage maintained by USDOE.	Warning signs will be posted in accordance with applicable site procedures and will be placed in appropriate areas of the DAOU.
7. Security Surveillance Measures	Control and restrict access to the public.	Until the concentration of hazardous substances associated with the unit have been reduced to levels that allow for unlimited exposure and unrestricted use.	Established and maintained by USDOE Necessity of patrols evaluated upon completion of remedial actions.	Security and surveillance measures are in place at the SRS boundary in accordance with RCRA permit requirements.

[a] Affected areas – Specific locations identified in the LUCIP or subsequent post-ROD documents.
[b] Property Record Notices – Refers to any non-enforceable, purely informational document recorded along with the original property acquisition records of USDOE and its predecessor agencies that alerts anyone searching property records to important information about residual contamination; waste disposal areas in the property.
[c] Property Record Restrictions – Includes conditions and/or covenants that restrict or prohibit certain uses of real property and are recorded along with original property acquisition records of USDOE and its predecessor agencies.
[d] Other Notices – Includes information on the location of waste disposal areas and residual contamination depicted on as survey plat, which is provided to a zoning authority (i.e., city planning commission) for consideration in appropriate zoning decisions for non-USDOE property.
[e] Site Use Program – Refers to the internal USDOE/USDOE contractor administrative program(s) that requires the permit requestor to obtain authorization, usually in the form of a permit, before beginning any excavation/penetration activity (e.g., well drilling) for the purpose of ensuring that the selected activity will not affect underground utilities/structures, or in the case of contaminated soil or groundwater, will not disturb the affected areas without the appropriate precautions and safeguards.
[f] Physical Access Controls – Physical barriers or restrictions to entry.
[g] Signs – Posted command, warning or direction.

APPENDIX A

ACCESS CONTROL WARNINGS SIGNS

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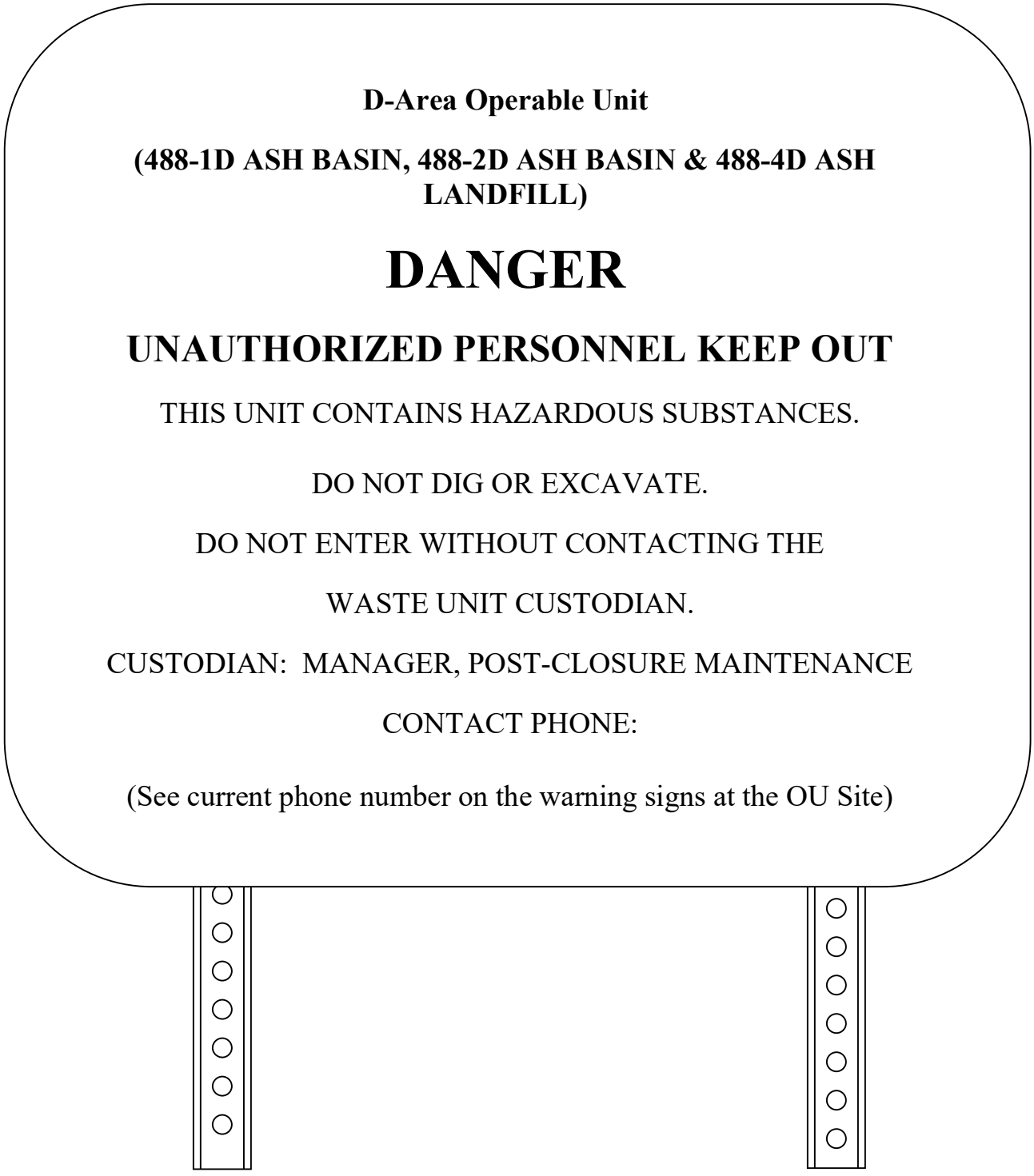


Figure A-1. ***EXAMPLE* — Access Control Warning Sign**

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APPENDIX B

FIELD INSPECTION CHECKLIST

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ANNUAL FIELD INSPECTION CHECKLIST FOR DAOU SECOND EARLY ACTION

☐ **SCHEDULED** ☐ **UNSCHEDULED**

A = Satisfactory **X** = Unsatisfactory (Explanation required)	**A** or **X**	Observation of Corrective Action Taken
1. Verify that the roads are accessible for authorized maintenance and inspections.		
2. Verify that the waste unit signs (12) are in acceptable condition, have the correct information, and are legible from a distance of 25 feet.		
3. Verify that there are no unauthorized excavation, digging, or construction activities within the LUC Boundaries.		
4. Verify integrity of drainage systems and required land grading for proper drainage is maintained and they are free of excessive erosion, sediment buildup, and any debris restricting water flow.		
5. Verify that no woody vegetation is growing on D-Area Ash Basins (488-1D and 488-2D) and D-Area Ash Landfill (488-4D). Remove or identify as needed.		
6. Verify that the grass density D-Area Ash Basins (488-1D and 488-2D) and D-Area Ash Landfill (488-4D) has no bare spots more than 3 by 3 feet in area. The height of the vegetative cover should not impair the visual inspection of the soil cover. This verification will be determined by the inspector.		
7. Verify that the soil cover at the D-Area Ash Basins (488-1D and 488-2D) and D-Area Ash Landfill (488-4D) have no signs of unacceptable erosion or depressions (subsidence).		
8. Verify that signs of burrowing or mounding animals are not present at the D-Area Ash Basins (488-1D and 488-2D) and D-Area Ash Landfill (488-4D).		

Inspected by:

_____ / _____ Date:_____
(Print Name) (Signature)

Post-Closure Manager:

_____ / _____ Date:_____
(Print Name) (Signature)

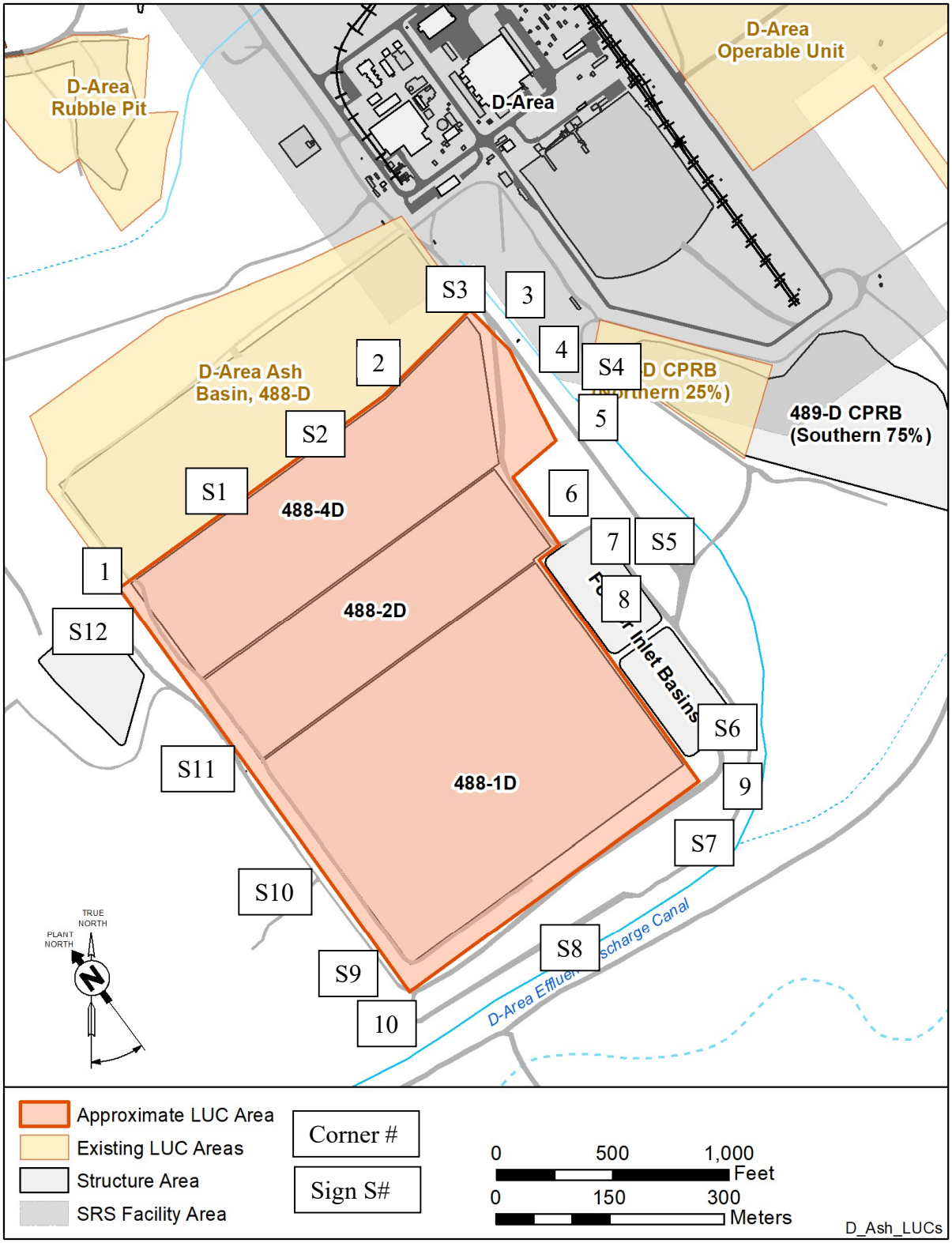
CAUTION: The inspector shall notify the Post-Closure Manager (PCM) and Environmental Compliance Authority (ECA) **IMMEDIATELY** if there has been a breach or compromise of the land use controls of this waste unit. The notification shall be in accordance with SRS post-closure inspection procedures.

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APPENDIX C

LAND USE CONTROL BOUNDARIES AND WARNING SIGN LOCATIONS

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Note: For SRS site coordinates of LUC boundary and sign locations see next page.

SRS Site Coordinates for LUC Boundary and Sign Location

SRS Site Coordinates
DAOU ASH BASINS

Land Use Control Boundaries		
1	N	64289.56
	E	17596.00
2	N	64289.55
	E	18997.58
3	N	64367.68
	E	19508.15
4	N	64142.08
	E	19562.87
5	N	63761.49
	E	19352.38
6	N	63752.51
	E	19244.66
7	N	63370.14
	E	19232.78
8	N	63365.53
	E	19130.79
9	N	62188.99
	E	19130.76
10	N	62189.00
	E	17595.99

DAOU ASH BASINS

Sign Locations		
S1	N	64304.67
	E	18015.47
S2	N	64304.99
	E	18950.69
S3	N	64365.92
	E	19511.91
S4	N	64146.46
	E	19563.93
S5	N	63349.58
	E	19143.28
S6	N	62298.08
	E	19150.15
S7	N	62187.35
	E	19051.93
S8	N	62178.46
	E	18319.11
S9	N	62199.23
	E	17580.70
S10	N	62810.02
	E	17557.50
S11	N	63516.29
	E	17585.07
S12	N	64012.76
	E	17549.62

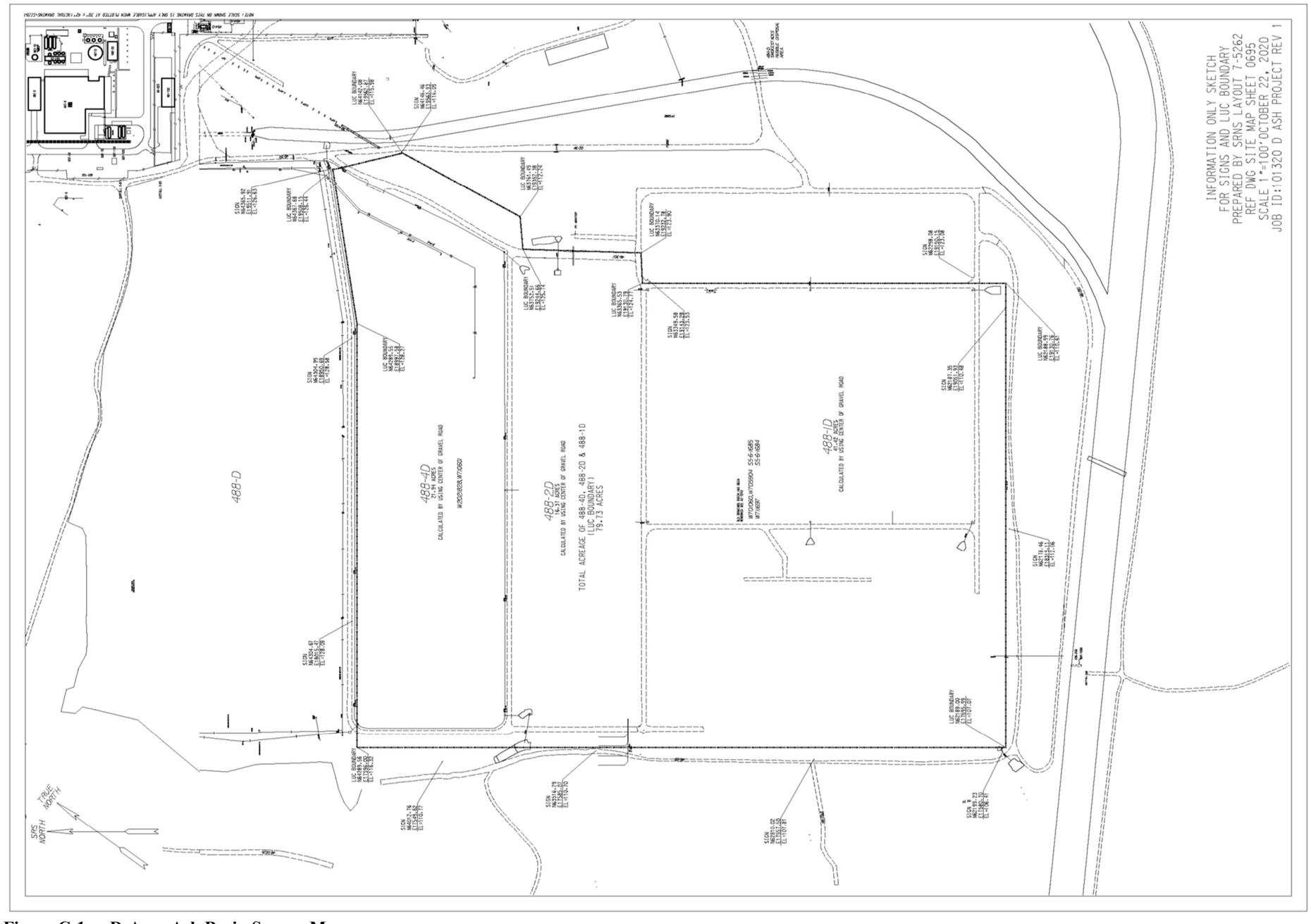


Figure C-1. D-Area Ash Basin Survey Map

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LUCIP for the
Lower Three Runs Integrator Operable Unit (Upper Subunit)
(consists of PAR Pond [Including the Pre-Cooler Ponds and Canals], 685-G and Old R-Area Discharge Canal, NBN)[20]
Land Use Control Implementation Plan
for the Lower Three Runs Integrator Operable Unit (U))
SRNS-RP-2022-00017, Revision 1, August 2022

[20] The LUCIP for the Lower Three Runs Integrator Operable Unit (Upper Subunit) (SRNS-RP-2022-00017, Revision 1, August 2022) was approved by South Carolina Department of Health and Environmental Control and United States Environmental Protection Agency on September 22, 2022 and October 4, 2022, respectively. However, the LUCs will not be implemented until Spring of 2023.

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Land Use Control Implementation Plan for the Lower Three Runs Integrator Operable Unit (Upper Subunit) (U)

SEMS Number: 35

SRNS-RP-2022-00017

Revision 1

August 2022

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This document was prepared in conjunction with work accomplished under Contract No. DE-AC09-08SR22470 with the U.S. Department of Energy.

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Savannah River Nuclear Solutions, LLC
Aiken, South Carolina

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LIST OF ABBREVIATIONS AND ACRONYMS

~	approximate, approximately
ACP	Area Completion Projects
BRA	Baseline Risk Assessment
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
EA	exposure area
EALUCIP	Early Action Land Use Control Implementation Plan
ESD	Explanation of Significant Differences
FFA	Federal Facility Agreement
IOU	Integrator Operable Unit
km	kilometer
km^2	square kilometer
LTR	Lower Three Runs
LUC	Land Use Control
LUCIP	Land Use Control Implementation Plan
LUCAP	Land Use Control Assurance Plan
mi	mile
mi^2	square mile
MNR	Monitored Natural Recovery
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
OU	Operable Unit
PCR	Post Construction Report
PTSM	principal threat source material
QA	Quality Assurance
RA	Remedial Action
RCOC	Refined constituent of concern
RCRA	Resource Conservation and Recovery Act
RI	Remedial Investigation
ROD	Record of Decision
SCDHEC	South Carolina Department of Health and Environmental Control
SDC	Site Development Control
SEMS	Superfund Enterprise Management System
SRNS	Savannah River Nuclear Solutions, LLC
SRS	Savannah River Site
USDOE	United States Department of Energy
USEPA	United States Environmental Protection Agency
WSRC	Washington Savannah River Company, LLC

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1.0 INTRODUCTION

This Land Use Control Implementation Plan (LUCIP) has been prepared for the Upper subunit of the Lower Three Runs Integrator Operable Unit (LTR IOU) at the Savannah River Site (SRS). The LTR IOU is comprised of three subunit areas (i.e., Upper, Middle, and Lower subunits) within the LTR watershed at the SRS. The LTR watershed encompasses approximately (~) 460 square kilometers (km^2 [180 square miles {mi^2}]). Land use controls (LUCs) for the Middle and Lower subunits of the LTR IOU were previously implemented by the *Early Action Land Use Control Implementation Plan (EALUCIP) for the Lower Three Runs Integrator Operable Unit Tail Portion (Middle and Lower subunits) (U)* (SRNS 2013) and are established as the final remedial action (RA) for those subunits in the LTR IOU Record of Decision (ROD) (SRNS 2021). The purpose of this LUCIP is to describe how the LUCs selected in the LTR IOU ROD (SRNS 2021) for the Upper subunit will be implemented and maintained. The LUC objectives for the Upper subunit are listed in Section 3.0. Groundwater is not considered part of the scope of the LTR IOU.

The selected remedy leaves hazardous substances in place that pose a potential future risk and will require land use restrictions until the concentrations of hazardous substances in the sediment/soil and biota are at levels that allow for unrestricted use. As agreed on March 30, 2000, among the United States Department of Energy (USDOE), the United States Environmental Protection Agency (USEPA), and the South Carolina Department of Health and Environmental Control (SCDHEC), SRS is implementing a Land Use Control Assurance Plan (LUCAP) (WSRC 1999) to ensure that the LUCs required by numerous remedial decisions at SRS are properly maintained and their effectiveness periodically verified. The requirements of that LUCAP also apply to the LUCs that were selected as part of this RA for the LTR IOU Upper subunit. This LUCIP for the LTR IOU Upper subunit contains the detailed and specific measures required to implement and maintain the LUCs selected as part of this remedial decision. The LUCs shall be maintained until the LTR IOU Upper subunit is suitable for unlimited exposure and unrestricted use. Approval by USEPA and SCDHEC is required for any modification or termination of the LUCs.

USDOE is responsible for implementing, maintaining, monitoring, reporting, and enforcing the LUCs in accordance with the approved LUCIP. Upon final approval, the LUCIP will be appended to the LUCAP and should be considered incorporated by reference into the LTR IOU ROD,

establishing implementation and maintenance requirements for the LUCs under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and the SRS Federal Facility Agreement (FFA) (FFA 1993). The LUCIP will remain in effect unless and until modifications are approved by USEPA and SCDHEC as necessary for protection of human health and the environment. In accordance with Section 121(c) of CERCLA and National Contingency Plan §300.430(f)(5)(iii)(c), a statutory review will be conducted within five years of initiation of the RA, and every five years thereafter, to ensure that the remedy continues to be protective of human health and the environment. Any approved LUCIP modification will be appropriately documented for incorporation by reference into the LTR IOU ROD (SRNS 2021).

1.1 Format of LUCIP

The format of this LUCIP is consistent with the FFA protocol format approved by the USEPA and SCDHEC in March 2004.

2.0 OVERVIEW OF LOWER THREE RUNS INTEGRATOR OPERABLE UNIT REMEDIAL ACTION

2.1 General Description and History of the Lower Three Runs IOU

SRS occupies ~803 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 ~ 40.2-km (25-mi) southeast of Augusta, Georgia, and 32-km (20-mi) south of Aiken, South Carolina.

The LTR IOU watershed is located in the southeastern portion of SRS. LTR is a large blackwater stream containing ponds and tributary systems that are designated as freshwater. The stream originates in the northeast portion of SRS and follows a southerly direction for ~40 kilometers (km [24.5 miles {mi}]), discharging into the Savannah River.

The LTR IOU is delineated into Upper, Middle, and Lower subunits (Figure 2). The Upper subunit, which is the subject of this LUCIP, is located upgradient of the PAR Pond Dam and includes PAR Pond and the pre-cooler ponds and canal system (Figure 2). The Middle and Lower subunits are located below the PAR Pond Dam. The Lower subunit includes and bounds the LTR

stream system by a narrow buffer of USDOE property, an area referred to as the "tail portion" of the LTR IOU. As previously discussed, LUCs for the Middle and Lower subunits are in place as per the 2013 EALUCIP (SRNS 2013) and established as final in the LTR IOU ROD (SRNS 2021).

The LTR stream system received effluent discharges from reactor operations in both R Area and P Area. R-Reactor began operations in 1953 and was followed by P-Reactor in 1954. Both received cooling water from the Savannah River via the river water distribution system. R-Reactor discharged reactor effluent directly into Joyce Branch, while P-Reactor discharged reactor effluent directly into Steel Creek. In 1958, PAR Pond and a series of pre-cooler ponds and a canal system were constructed to address the cooling water requirements of both R- and P-Reactors. Effluent from R-Reactor was routed to the R-Area Discharge Canal and pre-cooler Pond B where it discharged into what was identified as the north arm of PAR Pond (Figure 3). This effluent pathway was used for R-Reactor discharge from 1961 until the reactor was shut down in 1964. Since the shutdown of R-Reactor, R-Area Discharge Canal and Pond B have remained essentially undisturbed.

PAR Pond also served as a heat exchange/cooling reservoir for P-Reactor until 1988. Heated water was released through a series of man-made canals and smaller impoundments into the pre-cooler Pond C and released into PAR Pond (Figure 3). Effluent discharges from P-Reactor ceased in 1987. As with the R-Area Discharge Canal, the associated canal system and pre-cooler ponds have remained essentially undisturbed since the termination of P-Reactor discharges to PAR Pond.

2.2 Nature and Extent of Contamination in Lower Three Runs IOU

A detailed description of the nature and extent of contamination associated with the Upper subunit of the LTR IOU can be found in the *Feasibility Study for the Lower Three Runs Integrator Operable Unit* (U) (SRNS 2020). A summary of the results from the human health risk assessment, ecological risk assessment, and principal threat source material (PTSM) evaluation for the Upper subunit is provided below.

Liquid releases before and after the construction of PAR Pond and the pre-cooler ponds and canal system included process leaks, reactor disassembly basin purges, and thermal discharges contaminated primarily with cesium-137 (Cs-137), but also tritium, metallic contaminants, and

other radiological contaminants in much smaller quantities. Past characterization efforts have shown that Cs-137 is the major contaminant in the LTR IOU.

In 2009/2010, extensive sampling of the Upper subunit was undertaken to augment previously collected data to support the risk evaluation. The sampling was performed as outlined in approved Sampling and Analysis Plans (SRNS 2010, SRNS 2016) and included sampling of sediment/soil, surface water, and fish (i.e., biota). The sampling included the canals, pre-cooler ponds, PAR Pond, and the Lower Three Runs stream system below PAR Pond dam. Stream channel/floodplain sediment and floodplain/wetland soil (i.e., sediment/soil) are combined as a single medium and referred to as "sediment/soil." The results of the characterization activities and human health and ecological risk evaluations are documented in the 2017 *Remedial Investigation/Baseline Risk Assessment (RI/BRA) for the Lower Three Runs IOU* (SRNS 2017). As detailed in the Feasibility Study and RI/BRA, the refined contaminants of concern (RCOC) are Cs-137 and, to a lesser degree cobalt-60 (Co-60), in sediment/soil media. In addition, Cs-137 and mercury were identified as RCOCs in fish tissue; however, the presence of mercury is the result of atmospheric deposition and from the use of water from the Savannah River, containing elevated levels of mercury, as part of the river water distribution system, not from SRS operations.

The selected remedy for the LTR IOU leaves hazardous substances in place within the sediment/soil that poses a potential future exposure risk to the onsite worker and fish tissue that poses a potential ingestion risk to a hypothetical recreational fisherman and will require land use restrictions until the concentrations of hazardous substances in the sediment/soil and fish tissue are at levels that allow for unrestricted use and exposure.

2.3 Remedial Action Selected

As stated in the ROD, RA for the Middle and Lower subunits was previously addressed and documented in the *Explanation of Significant Differences (ESD) for the Revision 0 Interim Action Record of Decision Remedial Alternative Selection: PAR Pond Unit (U); Lower Three Runs Integrator Operable Unit Tail Portion (Middle and Lower Subunits) (U)* (SRNS 2012). As documented in the ESD, no additional data collection, risk assessment, or response evaluation is necessary for the Middle and Lower subunits, and the RA of LUCs is documented as the final

action for the Middle and Lower subunits in the LTR IOU ROD. The LUCs for the Middle and Lower subunits are in place as per the 2013 EALUCIP (SRNS 2013).

Due to the variability of environmental conditions and large scale of the LTR IOU, the Upper subunit is segregated into the following nine individual exposure areas (EAs) (Figure 4):

- EA1 includes Pond A and the R-Area Discharge Canal
- EA2 consists of the section of the canal system between Pond A and Pond B.
- EA3 includes Pond B and the overflow canal connecting Pond B to Pond C.
- EA4 consists of the section of the canal system between Pond B and the North Arm of PAR Pond.
- EA5 consists of Joyce Branch (also known as the Old R-Area Discharge Canal).
- EA6 consists of PAR Pond.
- EA7 includes Pond 2 and the Discharge Canal between P Area and Ponds 4 and 5.
- EA8 includes Ponds 4 and 5 and the Discharge Canal between Ponds 4 and 5 to Pond C.
- EA9 consists of Pond C.

As such, the Upper subunit required multiple RAs to address the nature and extent of contamination within the LTR IOU system. LUCs with Monitored Natural Recovery (MNR) is the selected alternative for all nine EAs (EA1 through EA9). Excavation, Treatment and Disposal of PTSM Sediment/Soil is the selected alternative for the PTSM location in EA1 (Pond A – Including R Discharge Canal) to reduce potential exposure and mitigate sediment/soil migration; Maintain Water in Ponds is the selected alternative for EA3 (Pond B) and EA6 (PAR Pond) to maintain water levels in Pond B, PAR Pond, and Pond C to reduce potential exposure and mitigate sediment/soil migration. Water levels in Pond B, PAR Pond, and Pond C will be maintained by performing inspections and necessary maintenance on the individual dams for each pond system. Inspections will note any significant water level drops and will be reported in the five-year remedy reviews or earlier as conditions warrant. In addition, appropriate signage will be posted at viable surface water bodies within the Upper subunit that maintain fishable fish populations, i.e., Pond B, Pond C, and PAR Pond.

A separate monitoring plan will be submitted to monitor the decay of Cs-137 and Co-60 at all nine EAs and will be implemented in accordance with the *Monitored Natural Recovery Effectiveness Plan for the Lower Three Runs Integrator Operable Unit – Upper Subunit (U)* , SRNS-RP-2022-00085, Revision 0, March 2022. MNR will also include consideration of biological sampling and passive sampling techniques to assess bioavailability of Cs-137 and mercury. Monitoring data will be presented in the five-year remedy reviews and will be used to document the effectiveness of the RA or evaluate the need for further actions.

The post-RA conceptual site model (Figure 5) demonstrates that the exposure pathways to an onsite worker (external exposure to radiation) and hypothetical recreational fisherman (ingestion of fish tissue) are incomplete following implementation of the RA. According to the *Savannah River Site Future Use Project Report* (USDOE 1996), residential use of SRS land is prohibited.

3.0 LAND USE CONTROL OBJECTIVES

The following LUC objectives for the Upper subunit, as documented in the LTR IOU ROD, have been developed to ensure the protectiveness of the RAs.

- Prevent contact, removal, or excavation of sediment/soil within the LTR IOU.
- Prohibit the development and use of property for residential use.
- Prevent fishing within the LTR IOU.

Current access controls and land transfer requirements needed to maintain the future land use are described in the following sections of this LUCIP.

4.0 IMPLEMENTATION OF LAND USE CONTROLS

This section describes the LUCs selected in the ROD to achieve the LUC objectives stated in Section 3.0. A summary of the types of LUCs controls is provided in Table 1. USDOE is responsible for implementing, maintaining, reporting on and enforcing the LUCs required for the LTR IOU. The LUCIP will become enforceable and will be implemented when approved by USEPA and SCDHEC following the completion of the RAs prescribed by the LTR IOU ROD.

USDOE shall notify USEPA and SCDHEC 60 days in advance of any proposed land use changes that are inconsistent with LUC objectives or the selected remedy.

The LTR IOU will be maintained as an industrial use area by implementation of the property record notices and restrictions (Section 4.1) and the LUC boundary map (Section 4.2).

The Site Use Program (Section 4.3) will be implemented to prevent onsite worker exposure to contamination left in place at the LTR IOU. Other existing measures (i.e., Site Clearance Program, worker training, health and safety requirements, work controls) will also be used to ensure worker safety at the LTR IOU. Physical access controls (Section 4.4) are implemented at the SRS boundary to control and restrict public and trespasser access to the LTR IOU Upper subunit.

Signage posted at LTR IOU Upper subunit access points include access control signs with no unauthorized fishing warnings. These signs will be maintained to alert onsite workers to the presence of hazardous and radiological substances and prevent unknowing entry and unrestricted use. The signs will also convey the restrictions of unauthorized personnel. Access gates will be placed and maintained on access roads leading to known, accessible PTSM locations that remain within the Joyce Branch stream of the LTR IOU to prevent unknowing entry and unrestricted use.

A monitoring program will be initiated as defined by the *Monitored Natural Recovery Effectiveness Plan for the Lower Three Runs Integrator Operable Unit – Upper Subunit (U)* (SRNS 2022) SEMS Number: 35 (SRNS-RP-2022-00085, Revision 1, August 2022).

4.1 Property Record Notices and Restrictions

In the long term, if the property, or any portion thereof, is ever transferred from USDOE, the U.S. Government and/or USDOE will take those actions necessary pursuant to Section 120(h)(1) of CERCLA. Those actions will include in any contract, deed, or other transfer document, notice of the type and quantity of any hazardous substances that were known to have been stored (for more than one year), released, or disposed of on the property. The notice will also include the time at which the storage, release, or disposal took place to the extent such information is available.

In addition, if the property, or any portion thereof, is ever transferred by deed, the U.S. Government will also satisfy the requirements of CERCLA 120(h)(3). The requirements include: a description

of the RA taken, a covenant, and an access class. These requirements are also consistent with the intent of the Resource Conservation and Recovery Act (RCRA) deed notification requirements at final closure of a RCRA facility if contamination will remain at the unit.

LUCs will be implemented through the following:

- The contract, deed, or other transfer document shall also include restrictions precluding residential use of the property. However, the need for these 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 LUCs 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 IOU will be prepared, certified by a professional land surveyor, and recorded with the appropriate county recording agency.

In the event of a property lease or interagency agreement, the equivalent restrictions will be implemented as required by CERCLA Section 120(h).

USDOE shall provide the USEPA and SCDHEC at least a six month notice prior to transfer or sale of property subject to LUCs to ensure that USEPA and SCDHEC can be involved in discussions to ensure that appropriate provisions are included in the transfer documents to maintain effective LUCs. If it is not possible for the USDOE to notify the USEPA and SCDHEC at least six months prior to the transfer or sale, then the facility will notify the USEPA and SCDHEC as soon as possible but no later than 60 days prior to the transfer or sale of any property subject to LUCs. In addition to the land transfer notice and discussion provisions above, USDOE further agrees to provide the USEPA and SCDHEC with similar notice within the same time frames as to federal-to-federal transfer of property.

4.2 LUC Boundary Maps

This LUCIP identifies the proposed area under land use restrictions in Figure 6 for the LTR IOU. Following field implementation of the RA, a final as built map will be developed to include the

boundary for the area subject to land use restrictions and general locations of access control warning signs and gates. The final as built map will be submitted to USEPA and SCDHEC in the Post-Construction Report (PCR).

In addition, if the site is ever transferred to non-federal ownership, a certified survey plat of the IOU will be prepared at or near the time of conveyance to support the LUCIP required restrictive covenants on land use and will be recorded with the appropriate county recording agency.

4.3 Site Use Program

Under DOE Order 430.1A, *Life Cycle Management* (USDOE 1998), SRS is required to implement an asset management program for the use, maintenance, and disposal of physical assets, including real estate. SRS complies with this USDOE Order through the Site Use Program which is administered by Site Development Control (SDC) in accordance with SRS Manual 1D, *Site Infrastructure and Services Manual*, Procedure 3.02, "Site Real Property Configuration Control" (SRS 2006). Use of all lands and waters on the SRS are coordinated via the Site Use Program. No use of land (i.e., excavation or any other land use) shall be undertaken without prior approval by the USDOE and documented by a Site Use Permit.

SRS identifies all buildings, facilities, and FFA waste units on SRS site development maps that are maintained by SDC in accordance with SRS Manual 1D. If LUCs are required for an FFA waste unit, the unit-specific LUC boundaries are identified on the SRS site development maps. SDC must verify that any proposed work to be performed on a site is sanctioned by a Site Use Permit and verify that the proposed activity does not conflict with any previously approved land use.

In addition to the management of the use of SRS lands and waters through the Site Use Program, the SDC also administers the Site Clearance Program to control the construction, alteration, or demolition activities at SRS. Before any work that adds or modifies features or facilities portrayed on the SRS site development maps is conducted, a Site Clearance Permit is required. USDOE approval of the intended land via a Site Use Permit must be verified before a Site Clearance Permit is issued. If a Site Clearance request potentially impacts a FFA waste unit, the Site Clearance Request Form is sent to the appropriate FFA reviewer for approval. The FFA reviewer will

evaluate the proposed activity to identify any conflicts with the waste unit and to verify that waste unit specific LUCs are not compromised. The roles and responsibilities of the individuals responsible for review and approval of Site Use and Site Clearance permits are detailed in SRS 1D, Procedure 3.02. All employees, contractors, and visitors at SRS are required to adhere to the Site Use Program and the Site Clearance Program.

The USDOE will notify USEPA and SCDHEC in advance of any change to any internal procedure, including the Site Use Program, which would affect implementing or maintaining the LUCs. Approval by USEPA and SCDHEC is required for any modification or termination of the LUCs and implementation actions, and the USDOE must obtain prior approval from USEPA and SCDHEC before taking any anticipated action that may disrupt the effectiveness of the LUCs or alter or negate the need for LUCs. The Site Use Permit and site development maps must be amended when the geographic configuration or buffer zone used to establish the permit boundary changes or there is a change to the land use. The processes are controlled within the SRS Quality Assurance (QA) Program in accordance with SRS 1Q Manual, *Quality Assurance* (SRS 2007). The SRS QA program governs all SRS activities.

4.4 Physical Access Controls

The Upper subunit of the LTR IOU is located within the main SRS boundary fencing where physical access controls (fencing, security gates) are provided. There are two locations in EA5 (Joyce Branch) where PTSM has been located within the stream's boundary. In addition to signage, access gates will be installed at two vehicle entrance roads approaching these locations (see Figure 7) as a physical reminder to the onsite worker that contamination is still present in the stream bed. The access gates will be put into place during the installation of the signs for the Upper subunit as discussed in Section 4.5.

4.5 Warning Signs

To prevent unknowing entry and to ensure that unrestricted use of the waste unit does not occur while the unit is under ownership of the USDOE, access control warning signs as shown in Appendix A will be posted at the unit. No Unauthorized Fishing as part of the warning will be for viable surface water bodies (Pond B, Pond C, and PAR Pond) that maintain consumable fish

populations. Soil contamination area signs may also be posted, at the discretion of the Radiological Protection Department, where applicable, in accordance with SRS radiological control procedures. Installation of the signage will follow the LTR IOU construction schedule as described in the Remedial Action Implementation Plan and will be completed by May 2024. In addition, the final placement of the signage will be document in the final PCR. The signs will be legible for a distance of at least 7.6 meters (25 feet). Figure 7 depicts the locations of the warning signs as well as the access gates.

Custodial responsibilities for maintenance and inspection of the LTR IOU will be maintained by the SRS Post-Closure Maintenance Group.

4.6 Other Access Controls and Security/Surveillance Measures

While under the ownership of USDOE, access control of the entire SRS will be maintained in accordance with the 2013 RCRA Permit Renewal Application, Volume I, Section F.1. This section describes the 24-hour surveillance system (R.61-79.264.14(b)(1)), artificial or natural barriers (R.61-79.264.14(b)(2)(I)), control entry systems (R.61-79.264.14(b)(2)(ii)), and access control warning signs (R.61-79.264.14(c)) in place at the SRS boundary to comply with the security requirements for a RCRA-permitted facility.

4.7 Field Inspection and Maintenance for Land Use Controls

After remediation of the Upper subunit of the LTR IOU, monitoring (MNR), inspection and maintenance activities will be required by this RA.

The LTR IOU will be inspected per the Field Inspection Checklist in Appendix B. Field inspections will be completed every five years. Additional inspections may be necessary in the event of unusual weather or any other condition warranting inspection. For the LTR IOU, inspections will be performed to ensure that access signs are in place and are legible, all gates are in place and in working order, and any evidence of trespassing is documented and reported.

Any activity that is inconsistent with the LUC objectives or use restrictions, or any other action that may interfere with the effectiveness of the LUCs will be addressed by the USDOE as soon as practicable, but in no case will the process be initiated later than 10 days after the USDOE becomes

aware of the breach. The USDOE will notify USEPA and SCDHEC as soon as practicable but no longer than 10 days after discovery of any activity that is inconsistent with the LUC objectives or use restrictions, or any other action that may interfere with the effectiveness of the LUCs. The USDOE will notify USEPA and SCDHEC regarding how the USDOE has addressed or will address the breach within 10 days of sending USEPA and SCDHEC notification of the breach.

The FFA Annual Progress Report, submitted to the regulatory agencies by USDOE, will provide the status of the LUCs and describe how any LUC deficiencies or inconsistent uses have been addressed. In the event of property transfer or lease, the Annual Report will cite findings on the following: whether the use restrictions and controls referenced above were communicated in the deed(s) or lease restrictions; whether property use conforms with the deed or lease restrictions and controls; and whether the owners and state/local agencies have been notified regarding the deed or lease restrictions and controls. The FFA Annual Progress Report(s) will be used in the preparation of the Five-Year Remedy Review Report.

All other routine maintenance activities will be documented and maintained in files subject to USEPA and SCDHEC review and audit. A copy of the completed inspection form is maintained in the Area Completion Projects (ACP) Document Control. The LUCs shall be maintained until the concentration of hazardous substances associated with the unit have been reduced to levels that allow for unlimited exposure and unrestricted use.

The waste unit inspectors are to be trained in Hazardous Waste Operations and Emergency Response, ACP RCRA Waste Unit Inspections, Radiological Worker Training, etc., as applicable for the specific inspection. They will also be trained based on the individual requirements of the regulatory approved closure documents for each waste unit. In addition, the inspectors are to attend yearly refresher courses. Over the years, different personnel may conduct the inspections and maintenance activities.

This unit-specific LUCIP, including the checklist (Appendix B), will be appended to the SRS LUCAP upon final regulatory approval. After completion of the PCR, the preliminary checklist in the LUCAP will be replaced with the final approved checklist.

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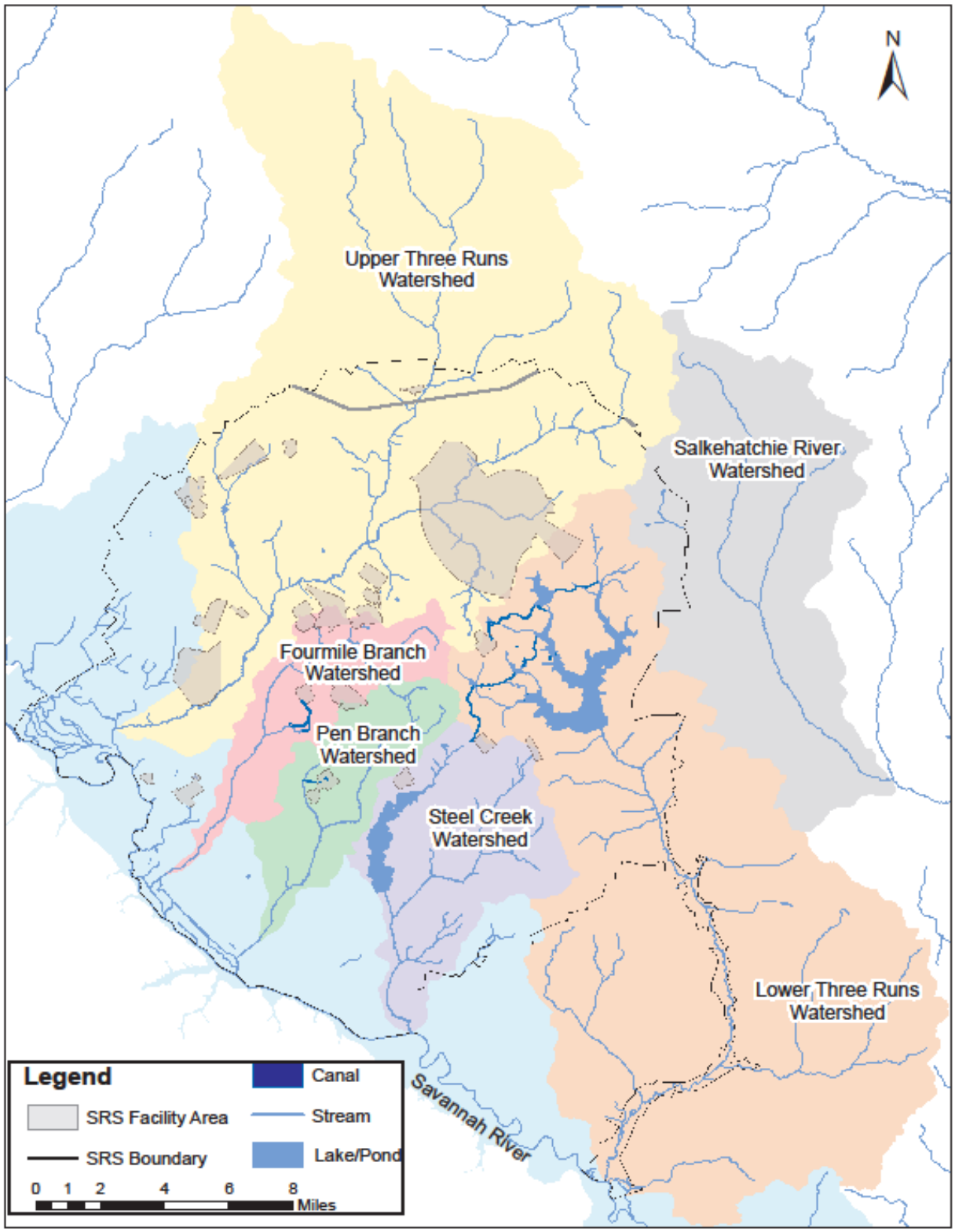


Figure 1. Location of the Lower Three Runs Integrator Operable Unit within the Savannah River Site

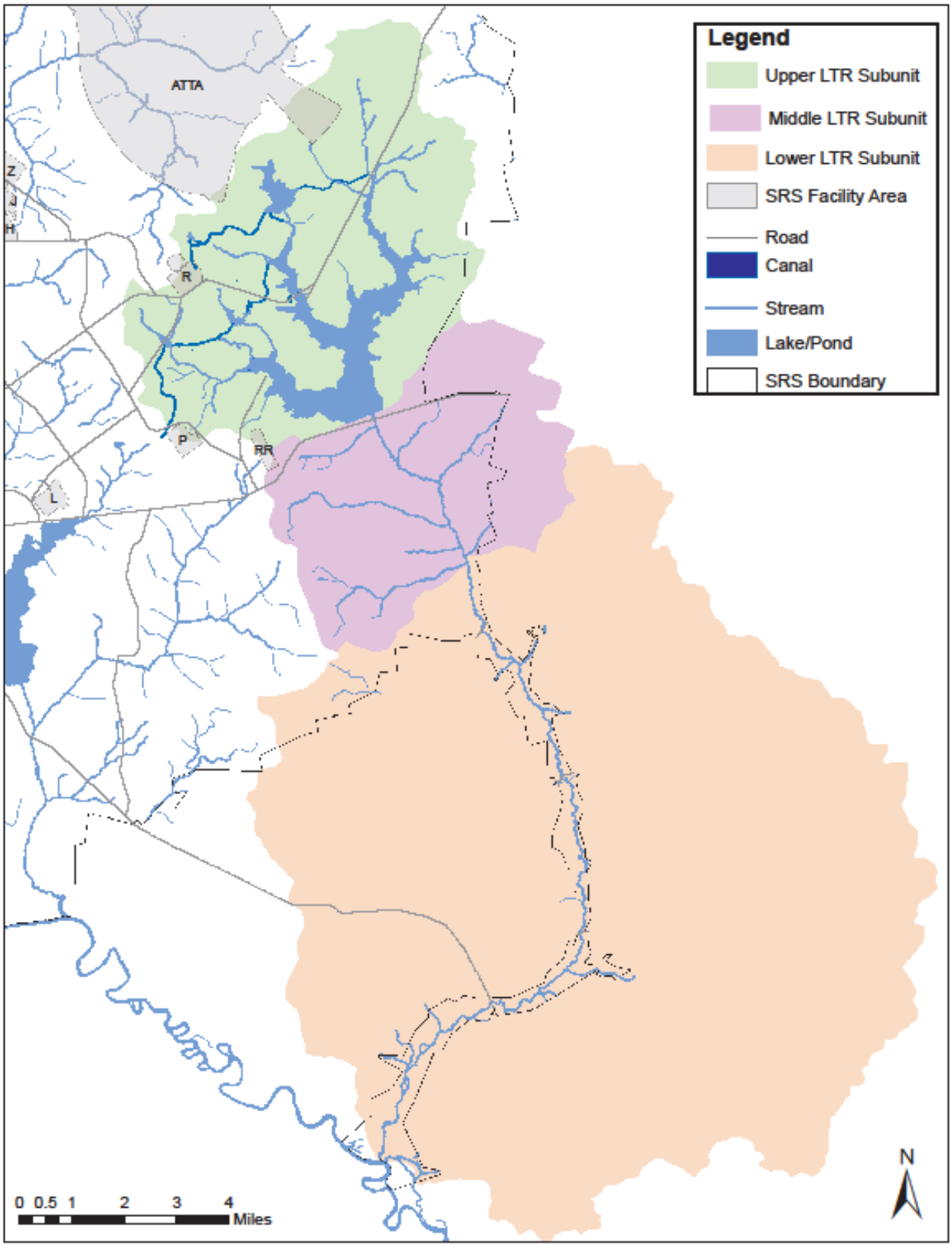


Figure 2. Location of the Lower Three Runs Integrator Operable Unit Subunits

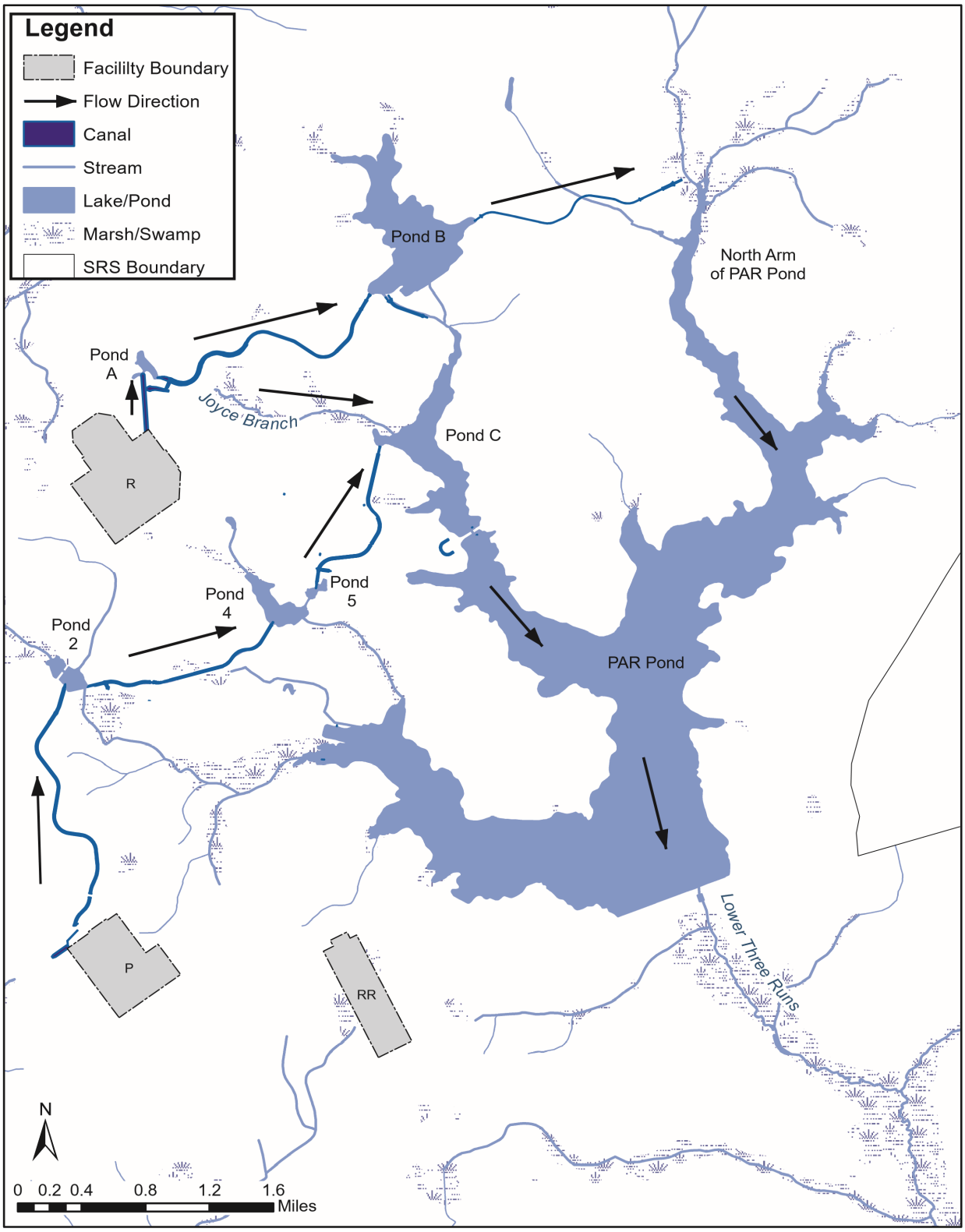


Figure 3. Historical Flow Pattern for the Lower Three Runs Integrator Operable Unit Upper Subunit

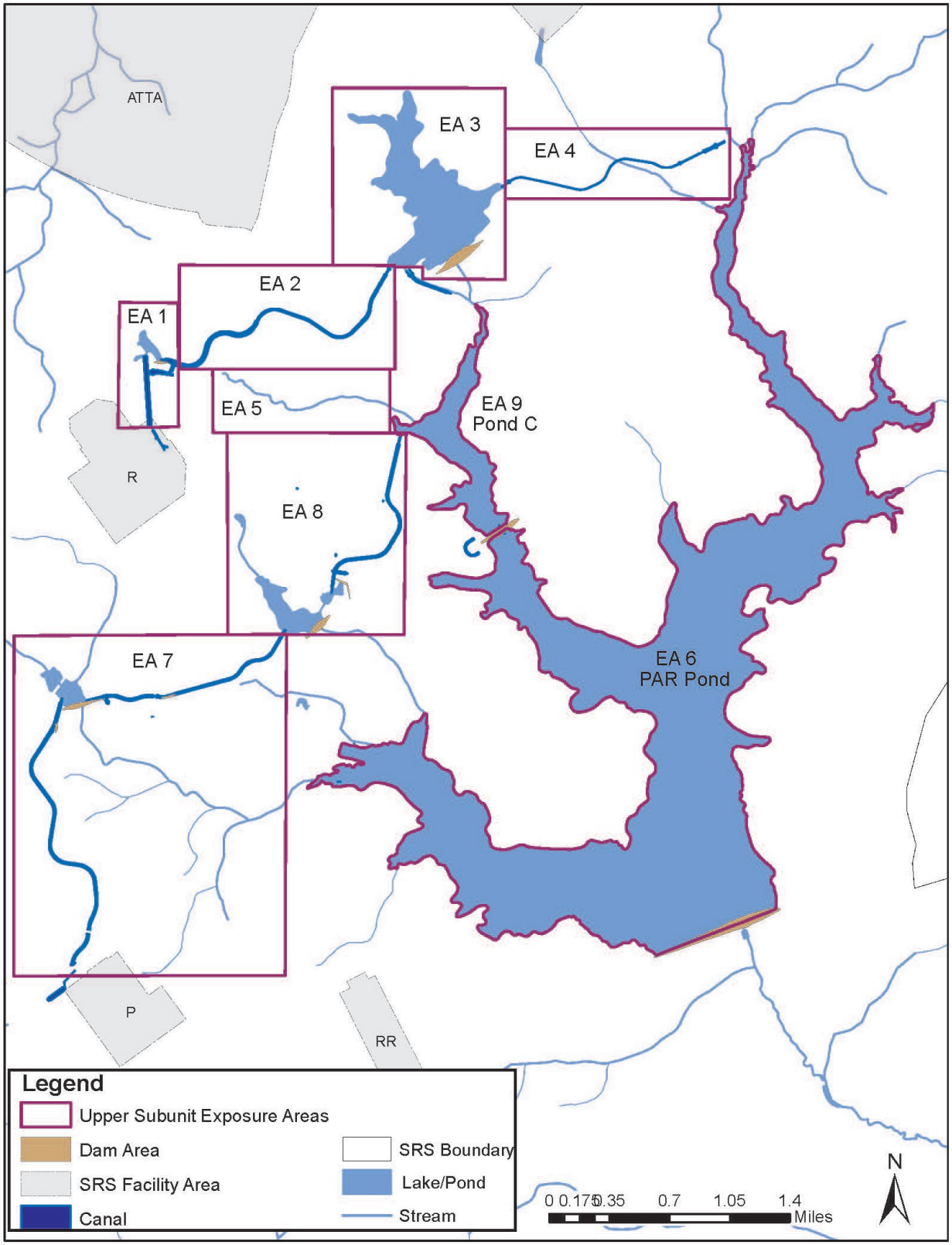


Figure 4. Exposure Areas for the Upper Subunit of the Lower Three Runs Integrator Operable Unit

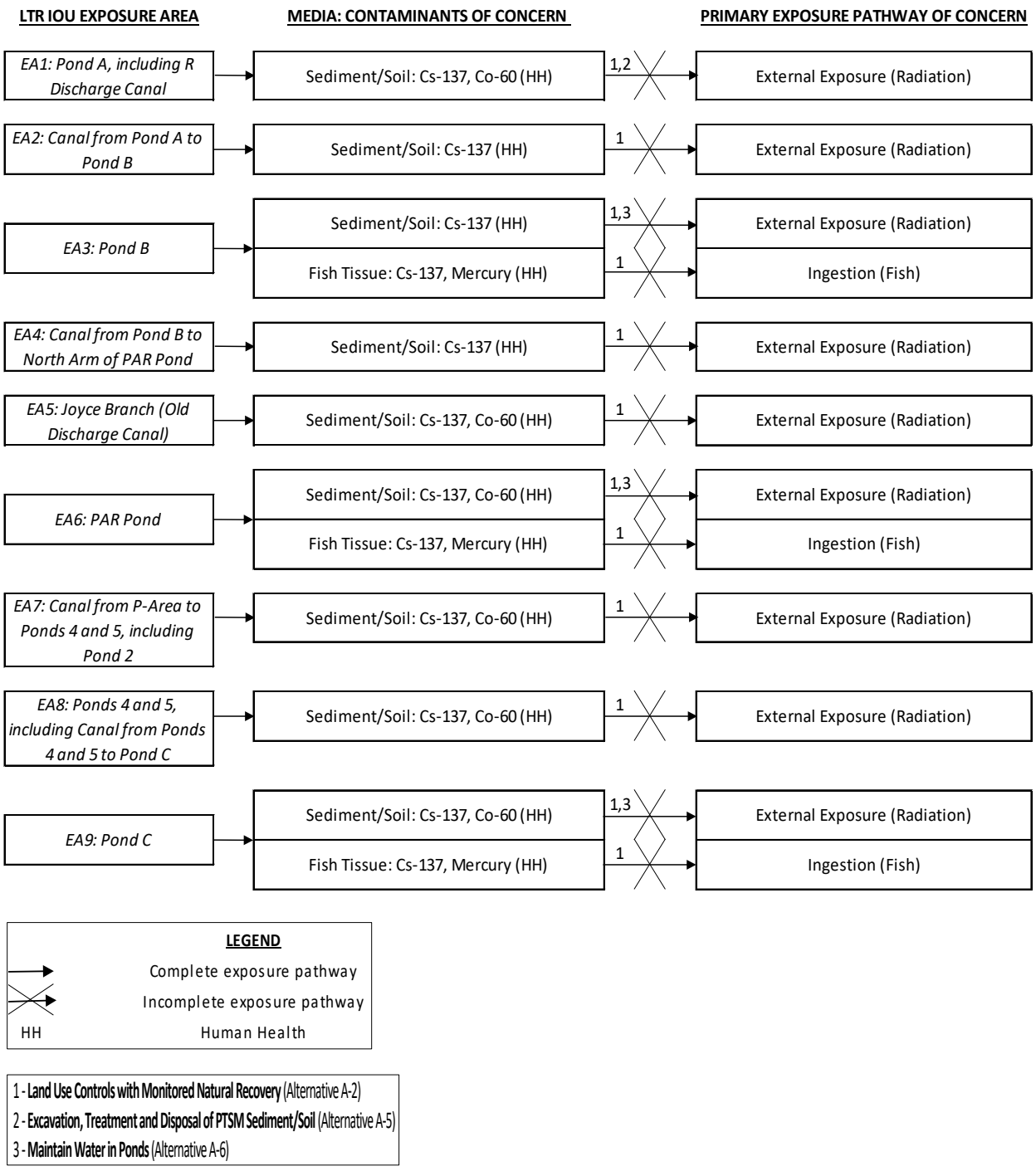


Figure 5. Post-Remedial Action Conceptual Site Model for the Lower Three Runs Integrator Operable Unit

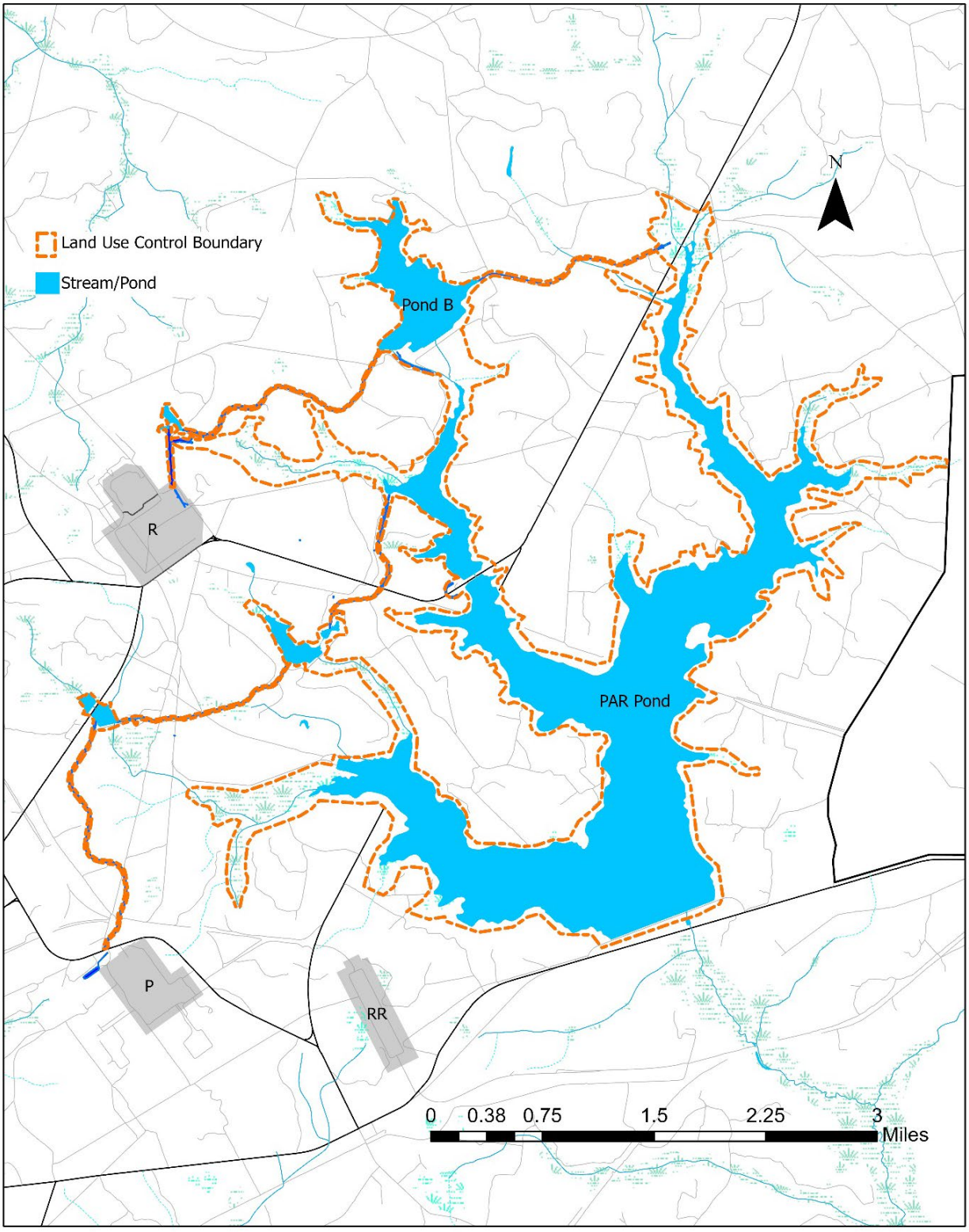


Figure 6. Land Use Control Boundary for the Lower Three Runs Integrator Operable Unit – Upper Subunit

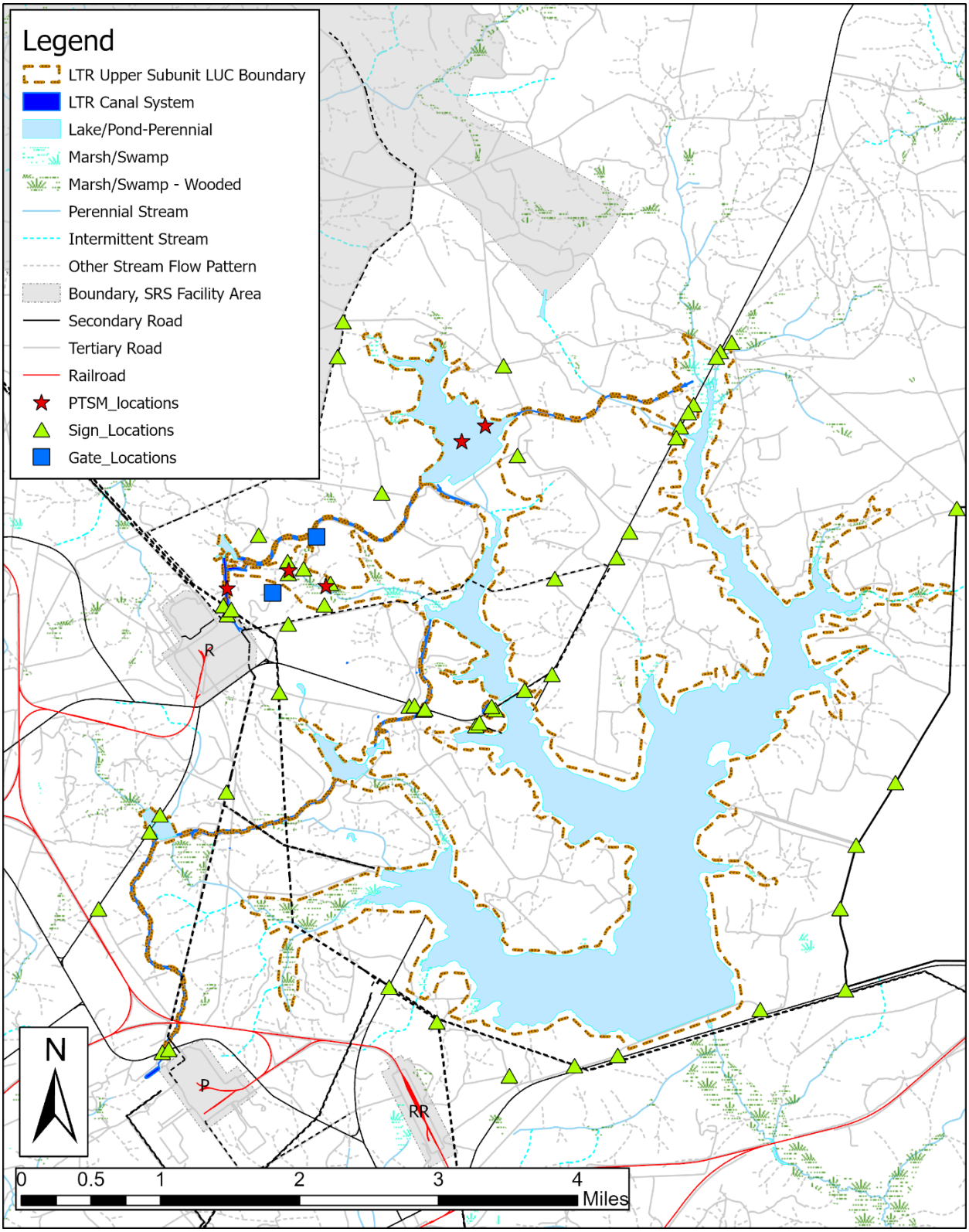


Figure 7. Warning Signs and Gate Locations of Upper Subunit

Table 1. Land Use Controls for the Lower Three Runs Integrator Operable Unit

Type of Control	Purpose of Control	Duration	Implementation	Affected Areas[a]
1. Property Record Notices[b]	Provide notice to anyone searching records about the existence and location of contaminated areas.	Until the concentration of hazardous substances associated with the unit have been reduced to levels that allow for unlimited exposure and unrestricted use.	Notice recorded by USDOE in accordance with state laws at County Register of Deeds office if the property or any portion thereof is ever transferred to non-federal ownership.	LTR IOU as identified in this ROD where hazardous substances are left in place at levels requiring land use restrictions.
2. Property record restrictions[c]: A. Land Use	Restrict use of property by imposing limitations.	Until the concentration of hazardous substances associated with the unit have been reduced to levels that allow for unlimited exposure and unrestricted use.	Drafted and implemented by USDOE upon any transfer of affected areas. Recorded by USDOE in accordance with state law at County Register of Deeds office.	LTR IOU as identified in this ROD where hazardous substances are left in place at levels requiring land use restrictions.
3. Other Notices[d]	Provide notice to city and/or county about the existence and location of waste disposal and residual contamination areas for zoning/planning purposes.	Until the concentration of hazardous substances associated with the unit have been reduced to levels that allow for unlimited exposure and unrestricted use.	Notice recorded by USDOE in accordance with state laws at County Register of Deeds office if the property or any portion thereof is ever transferred to non-federal ownership.	LTR IOU as identified in this ROD where hazardous substances are left in place at levels requiring land use.
4. Site Use Program[e]	Provide notice to worker/developer (i.e., permit requestor) on extent of contamination and prohibit or limit excavation/penetration activity.	As long as property remains under USDOE control	Implemented by USDOE and site contractors Initiated by permit request	LTR IOU as identified in this ROD where hazardous substances are left in place at levels requiring land use.

Table 1. Land Use Controls for the Lower Three Runs Integrator Operable Unit *(Continued/End)*

Type of Control	Purpose of Control	Duration	Implementation	Affected Areas[a]
5. Physical Access Controls[f] (e.g., fences, gates)	Control and restrict access to workers and the public to prevent unauthorized access.	Until the concentration of hazardous substances associated with the unit have been reduced to levels that allow for unlimited exposure and unrestricted use.	Controls maintained by USDOE.	Security is provided at site boundaries in accordance with SRS procedures. Gates will be installed at access points to Joyce Branch. Signs will be placed at road access points leading to the LTR IOU.
6. Warning Signs[g]	Provide notice or warning to prevent unauthorized uses.	Until the concentration of hazardous substances associated with the unit have been reduced to levels that allow for unlimited exposure and unrestricted use.	Signage maintained by USDOE.	Warning signs will be posted in accordance with applicable site procedures and will be placed at access roads leading to the LTR IOU.
7. Security Surveillance Measures	Control and monitor access by workers/public.	Until the concentration of hazardous substances associated with the unit have been reduced to levels that allow for unlimited exposure and unrestricted use.	Established and maintained by USDOE Necessity of patrols evaluated upon completion of RAs or property transfer.	Patrol of LTR IOU as identified in this ROD, will be conducted as necessary.

[a]Affected areas – Specific locations identified in the OU-specific LUCIP or subsequent post-ROD documents.
[b]Property Record Notices – Refers to any non-enforceable, purely informational document recorded along with the original property acquisition records of USDOE and its predecessor agencies that alerts anyone searching property records to important information about residual contamination; waste disposal areas in the property.
[c]Property Record Restrictions – Includes conditions and/or covenants that restrict or prohibit certain uses of real property and are recorded along with original property acquisition records of USDOE and its predecessor agencies.
[d]Other Notices – Includes information on the location of waste disposal areas and residual contamination depicted on as survey plat, which is provided to a zoning authority (i.e., city planning commission) for consideration in appropriate zoning decisions for non-USDOE property.
[e]Site Use Program – Refers to the internal USDOE/USDOE contractor administrative program(s) that requires the permit requestor to obtain authorization, usually in the form of a permit, before beginning any excavation/penetration activity (e.g., well drilling) for the purpose of ensuring that the proposed activity will not affect underground utilities/structures, or in the case contaminated soil or groundwater, will not disturb the affected areas without the appropriate precautions and safeguards.
[f]Physical Access Controls – Physical barriers or restrictions to entry.
[g]Signs – Posted command, warning or direction.

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APPENDIX A

WARNING SIGNS

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Figure A-1. Access Control Warning Sign.

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APPENDIX B

FIELD INSPECTION CHECKLIST FOR LOWER THREE RUNS IOU

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FIELD INSPECTION CHECKLIST
FOR
LOWER THREE RUNS IOU

☐ **SCHEDULED** ☐ **UNSCHEDULED**

A= Satisfactory **X**= Unsatisfactory (Explanation required)	**A** or **X**	Observation of Corrective Action Taken
1. Verify that the roads are accessible.		
2. Verify that signage [55] are in acceptable condition, have the correct information, and are legible from a distance of 25 feet.		
3. Verify that gates are closed, secure and in good condition.		
4. Verify that there are no unauthorized excavation, digging, or construction activities that are disturbing the contaminated soil/sediment within the LUC boundary		
5. Verify that there is no evidence of trespassing within the LUC boundary (e.g., cans, bottles, fishing-tackle)		

Inspected by:

(Print Name) (Signature) (Date)

Post-Closure Manager:

(Print Name) (Signature) (Date)

CAUTION:

The inspector shall notify the Post-Closure Manager (PCM) and Environmental Compliance Authority (ECA) **IMMEDIATELY** if there has been a breach or compromise of the land use controls of this waste unit. The notification shall be in accordance with SRS post-closure inspection procedures.

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APPENDIX C

MAPS AND TABLES OF WASTE UNITS WITHIN EACH WATERSHED

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Figure C- 1. Fourmile Branch Watershed Operable Units

The information on Figure 2 and Figure C – 1 has been combined on one figure. Please see Figure 2, located within the body of the LUCAP.

Table C- 1 Fourmile Branch Watershed Operable Units

Unit No.	Unit Name
1	TANK 105-C HAZARDOUS WASTE MANAGEMENT FACILITY
3	F-AREA HAZARDOUS WASTE MANAGEMENT FACILITY (F-AREA SEEPAGE BASIN, 904-41G)
4	F-AREA HAZARDOUS WASTE MANAGEMENT FACILITY (F-AREA SEEPAGE BASIN, 904-42G)
5	F-AREA HAZARDOUS WASTE MANAGEMENT FACILITY (F-AREA SEEPAGE BASIN, 904-43G)
6	H-AREA ACID/CAUSTIC BASIN, 904-75G
7	H-AREA HAZARDOUS WASTE MANAGEMENT FACILITY (H-AREA SEEPAGE BASIN, 904-44G)
8	H-AREA HAZARDOUS WASTE MANAGEMENT FACILITY (H-AREA SEEPAGE BASIN, 904-46G)
9	H-AREA HAZARDOUS WASTE MANAGEMENT FACILITY (H-AREA SEEPAGE BASIN, 904-45G)
10	H-AREA HAZARDOUS WASTE MANAGEMENT FACILITY (H-AREA SEEPAGE BASIN, 904-56G)
18[a]	***OLD RADIOACTIVE WASTE BURIAL GROUND (INCLUDING SOLVENT TANKS 650-01E-22E) 643-E***
19	F & H-AREA HAZARDOUS WASTE MANAGEMENT FACILITIES (GROUNDWATER)
27[a]	***WARNER'S POND, 685-23G***
28[a]	***H-AREA RETENTION BASIN, 281-3H***
29[a]	***HP-52 PONDS, NBN***
43	211-FB PU-239 RELEASE, 081-F
51[a]	***C-AREA BURNING/RUBBLE PIT, 131-C***
53[a]	***C-AREA REACTOR SEEPAGE BASINS, 904-66G***
54[a]	***C-AREA REACTOR SEEPAGE BASINS, 904-67G***
55[a]	***C-AREA REACTOR SEEPAGE BASINS, 904-68G***
57	CENTRAL SHOPS BURNING/RUBBLE PIT, 631-5G
58[a]	***CENTRAL SHOPS BURNING/RUBBLE PIT, 631-1G***
59[a]	***CENTRAL SHOPS BURNING/RUBBLE PIT, 631-3G***
73[a]	***F-AREA RETENTION BASIN, 281-3F***
80	H-AREA HAZARDOUS WASTE MANAGEMENT FACILITY (H-AREA INACTIVE PROCESS SEWER LINE 081-H)
82	HYDROFLUORIC ACID SPILL, 631-4G
103	MIXED WASTE MANAGEMENT FACILITY (GROUNDWATER)
132	SRL OIL TEST SITE, 080-16G
146	C-AREA REACTOR GROUNDWATER
210	C-AREA ASH PILE, 188-0C
225	SPILL ON 02/01/57 OF UNKNOWN OF SEEPAGE BASIN PIPE LEAK FROM 904-44G, NBN
239	ARSENIC TREATED WOOD STORAGE AREA, NBN
240[a]	***POTENTIAL RELEASE FROM C-AREA DISASSEMBLY BASIN, 105-C***
242[a]	***POTENTIAL RELEASE FROM C-AREA REACTOR COOLING WATER SYSTEM, 186/190-C***
244	CENTRAL SHOPS SCRAP LUMBER PILE, 631-2G
261	COMBINED SPILLS FROM 241-84H, NBN
262	COMBINED SPILLS FROM 241-H, NBN
263	COMBINED SPILLS FROM 242-F, NBN
264	COMBINED SPILLS FROM 242-H, NBN

Unit No.	Unit Name
266	COMBINED SPILLS FROM 643-G, NBN
274	DITCH TO OUTFALL H-13 (TRIBUTARY TO FOURMILE CREEK), NBN
275	DIVERSION BOX – RADIOACTIVITY FROM 907-1H, NBN
277	F-AREA ASH BASIN, 288-1F
280	F-AREA RETENTION BASIN, 281-08F
283	F-AREA TANK FARM, 241-F
285	H-AREA ACID/CAUSTIC BASIN (GROUNDWATER)
292	H-AREA ASH BASIN, 288-0H
293	H-AREA RETENTION BASIN, 281-08H
298	H-AREA TANK FARM, 241-H
309	MISCELLANEOUS RUBBLE PILE, 631-7G
311	NEW SALVAGE YARD, 741-G
332	SPILL ON 10/07/85 OF 20,000 GALLONS OF CONTAMINATED WATER FROM 244-H, NBN
345	SANDBLAST AREA CMH-003, NBN
348	SANDBLAST AREA CMH-004, NBN
354	SANDBLAST AREA CMN-001, NBN
375	SPILL ON 01/19/80 OF UNKNOWN OF CHROMATED WATER FROM H-AREA PUMP HOUSE, NBN
376	SPILL ON 01/19/83 OF 1000 FT2 OF RADIOACTIVE SPILL
380	SPILL ON 10/01/71 OF 100 SQ FT OF FLUSH WATER – RAD, NBN
381	SPILL ON 10/16/81 OF 30 GAL OF LOW LEVEL WASTE FROM TRAILER, NBN
383	SPILL ON 11/10/81 OF 500 GAL OF CHROMATED WATER FROM 243-H, NBN
386	SPILL ON 11/24/89 OF 10 MCI OF CS – 137 FROM 254-8H, NBN
390	SPILL ON 02/01/69 OF UNKNOWN OF WASTE TANK SPILL, NBN
398[a]	***SPILL ON 02/08/78 OF UNKNOWN OF H-AREA PROCESS SEWER LINE CAVE-IN, NBN***
399	SPILL ON 03/01/66 OF 500 SQ FT OF FLUSH WATER – RAD, NBN
403	SPILL ON 03/28/87 OF <15000 GAL OF CHROMATED WATER FROM 241-24H, NBN
405[a]	***SPILL ON 03/08/78 OF UNKNOWN OF SEEPAGE BASIN PIPE LEAK IN H-AREA SEEPAGE BASIN***
411	SPILL ON 04/14/81 OF 3 GAL OF CONTAMINATED FLUSH WATER, NBN
412	SPILL ON 04/18/80 OF UNKNOWN OF CHROMATED WATER FROM VALVE HOUSE 3, NBN
417[a]	***SPILL ON 05/01/56 OF UNKNOWN OF RETENTION BASIN PIPE LEAK, NBN***
418	SPILL ON 05/01/71 OF UNKNOWN OF SEEPAGE BASIN PIPE LEAK, NBN
423	SPILL ON 05/02/85 OF 10 GAL OF COOLING WATER FROM TANK FARM, NBN
431	SPILL ON 05/28/81 OF 9000 GAL OF CHROMATED WATER, NBN
432	SPILL ON 05/30/78 OF UNKNOWN OF SUMP OVERFLOW, NBN
438	SPILL ON 06/26/75 OF 250 CU FT OF RAD CONTAMINATED SOIL, NBN
442	SPILL ON 06/06/79 OF <1 GAL OF CONTAMINATED LIQUID, NBN
459	STORMWATER OUTFALL H-013, NBN
475[a]	***C-AREA REACTOR AREA CASK CAR RAILROAD TRACKS AS ABANDONED, NBN***
489	C-AREA ASH PILE OFF POWERLINE ROAD, NBN
490	SPILL ON 04/57 OF RAD LIQUID FROM SOLVENT TRAILER, NBN
499	CENTRAL SHOPS OPEN DISPOSAL TRENCH
502[a]	***HEAVY EQUIPMENT WASH BASIN***
511	C-AREA REACTOR DISCHARGE CANAL, NBN
522[a]	***ECODS C-1 (NEAR C-AREA REACTOR DISCHARGE CANAL)***
531	ECODS H-1 (WEST OF MAIN H-AREA FACILITIES)

Unit No.	Unit Name
554	H-AREA PROCESS SEWER LINES AS ABANDONED, NBN
555[a]	***C-AREA PROCESS SEWER LINES AS ABANDONED, NBN***
565	N-AREA PROCESS SEWER LINES AS ABANDONED, NBN
566[a]	***OLD C-AREA BURNING/RUBBLE PIT, NBN***
577[a]	***C-REACTOR COMPLEX EARLY ACTION***

[a] – land use controls/institutional controls are part of the selected remedy

Figure C- 2. Lower Three Runs Watershed Operable Units

The information on Figure 3 and Figure C – 2 has been combined on one figure. Please see Figure 3, located within the body of the LUCAP.

Table C- 2. Lower Three Runs Watershed Operable Units

Unit No.	Unit Name
17	P-AREA ACID/CAUSTIC BASIN, 904-78G
39	GUNSITE 218 RUBBLE PILE, 631-23G
42	108-4R OVERFLOW BASIN, 108-4R
107[a]	***P-AREA BINGHAM PUMP OUTAGE PIT, 643-4G***
110	PAR POND (INCLUDING THE PRE-COOLER PONDS AND CANALS), 685-G
111	PAR POND SLUDGE LAND APPLICATION SITE, 761-5G
113[a]	***R-AREA BINGHAM PUMP OUTAGE PITS, 643-10G***
114[a]	***R-AREA BINGHAM PUMP OUTAGE PITS, 643-8G***
115[a]	***R-AREA BINGHAM PUMP OUTAGE PITS, 643-9G***
116[a]	***R-AREA BURNING/RUBBLE PITS, 131-1R***
117[a]	***R-AREA BURNING/RUBBLE PITS, 131-R***
118	R-AREA RUBBLE PILE, 631-25G
163[a]	***GUNSITE 012 RUBBLE PILE, NBN***
230	R-AREA CONCRETE LAKE, 183-1R/186R
231[a]	***AREA ON THE NORTH SIDE OF BUILDING 105-R, NBN***
233[a]	***LAYDOWN AREA NORTH OF 105-R, NBN***
271[a]	***COOLING WATER EFFLUENT SUMP, 107-R***
288[a]	***R-AREA GROUNDWATER, NBN***
312	OLD R-AREA DISCHARGE CANAL, NBN
316[a]	***P-AREA REACTOR COOLING WATER SYSTEM, 186/190-P***
324[a]	***POTENTIAL RELEASE OF NAOH/H2 SO4 FROM 183-2R, NBN***
329[a]	***R-AREA ASH BASIN, 188-0R***
330[a]	***R-AREA DISASSEMBLY BASIN, 105-R***
337	RUBBLE PILE ACROSS FROM GUNSITE 012, NBN
478[a]	***R REACTOR AREA: R-AREA REACTOR AREA CASK CAR RAILROAD TRACKS AS ABANDONED, NBN***
505[a]	***LOWER THREE RUNS INTEGRATOR OPERABLE UNIT (IOU) TAIL PORTION (MIDDLE AND LOWER SUBUNITS)***
513[a]	***RELEASE FROM THE DECONTAMINATION OF R-AREA REACTOR DISASSEMBLY BASIN, NBN***
517[a]	***COMBINED SPILLS NORTH OF BUILDING 105-R, NBN***
540[a]	***ECODS R-1A, -1B, -1C (EAST OF R REACTOR)***
544	ECODS G-3 (ADJACENT TO GUNSITE 012, NBN)
546	DUNBARTON RAILROAD YARD, NBN
547	P-AREA COAL PILE, NBN
550[a]	***R-AREA UNKNOWN PIT #1 (RUNK-1), NBN***
551[a]	***R-AREA UNKNOWN PIT #2 (RUNK-2), NBN***
552[a]	***R-AREA UNKNOWN PIT #3 (RUNK-3), NBN***
556[a]	***R-AREA PROCESS SEWER LINES AS ABANDONED, NBN***

[a] – land use controls/institutional controls are part of the selected remedy

Figure C- 3. Pen Branch Watershed Operable Units

The information on Figure 4 and Figure C – 3 has been combined on one figure. Please see Figure 4, located within the body of the LUCAP.

Table C- 3. Pen Branch Watershed Operable Units

Unit No.	Unit Name
11	K-AREA ACID/CAUSTIC BASIN, 904-80G
61[a]	***CMP PITS, 080-170G***
62[a]	***CMP PITS, 080-171G***
63[a]	***CMP PITS, 080-180G***
64[a]	***CMP PITS, 080-181G***
65[a]	***CMP PITS, 080-182G***
66[a]	***CMP PITS, 080-183G***
67[a]	***CMP PITS, 080-190G***
75[a]	***FORD BUILDING SEEPAGE BASIN, 904-91G***
77	G-AREA OIL SEEPAGE BASIN, 761-13G
83[a]	***K-AREA BINGHAM PUMP OUTAGE PIT, 643-1G***
84[a]	***K-AREA BURNING/RUBBLE PIT, 131-K***
87[a]	***K-AREA REACTOR SEEPAGE BASIN, 904-65G***
88[a]	***K-AREA RUBBLE PILE, 631-20G***
89	K-AREA SLUDGE LAND APPLICATION SITE, 761-4G
91[a]	***L-AREA BINGHAM PUMP OUTAGE PITS, 643-2G***
92[a]	***L-AREA BINGHAM PUMP OUTAGE PITS, 643-3G***
99	L-AREA RUBBLE PIT, 131-4L
148	L-AREA ASH BASIN 188-0L
169 [b]	L-AREA RUBBLE PILE, 131-3L
222	SPILL ON 01/01/57 OF <1 CI OF BETA - GAMMA, NBN
286	K-AREA ACID/CAUSTIC BASIN (GROUNDWATER)
299	K-AREA AREA OF CONCERN, NBN
300	K-AREA ASH BASIN, 188-0K
301	K-AREA DISASSEMBLY BASIN, 105-K
302	K-AREA REACTOR COOLING WATER SYSTEM, 186/190-K
305	L-AREA REACTOR COOLING WATER SYSTEM, 186/190-L
460	K-AREA REACTOR DISCHARGE CANAL, NBN
476	K REACTOR AREA: K-AREA REACTOR AREA CASK CAR RAILROAD TRACKS AS ABANDONED, NBN
514	COMBINED SPILLS FROM 105-K, 106-K, AND 109-K, NBN
519	K-AREA REACTOR GROUNDWATER (INCLUDING TRITIUM ANOMALY)
525	ECODS N-1 (SOUTH OF N AREA)
532	ECODS K-1 (SOUTHEAST OF FORMER LAYDOWN YARD AT K AREA)
533	ECODS K-2 (NORTHWEST OF K AREA FACILITIES)
534	ECODS K-3 (SOUTHEAST OF K AREA IN FORMER LAYDOWN YARD)
545[a]	***ECODS N-2***
583[a]	***K-AREA REACTOR COMPLEX EARLY ACTION***

[a] – land use controls/institutional controls are part of the selected remedy
[b] – L-Area Rubble Pile (131-3L) Groundwater Plume Operable Unit was designated as a No Action OU in FY2018 and was removed from the LUCAP.

Figure C- 4. Savannah River and Floodplain Swamp Watershed Operable Units

The information on Figure 5 and Figure C – 4 has been combined on one figure. Please see Figure 5, located within the body of the LUCAP.

Table C-4. Savannah River and Floodplain Swamp Watershed Operable Units

Unit No.	Unit Name
25[a]	*TNX GROUNDWATER, 082-G*
26[a]	*D-AREA OIL SEEPAGE BASIN, 631-G*
32[a]	*D-AREA BURNING/RUBBLE PITS, 431-1D*
33[a]	*D-AREA BURNING/RUBBLE PITS, 431-D*
41[a]	*SILVERTON ROAD WASTE SITE, 731-3A*
68[a]	*D-AREA ASH BASIN, 488-D*
69[a]	*D-AREA COAL PILE RUNOFF BASIN, 489-D*
70[b]	D-AREA WASTE OIL FACILITY, 484-10D
100[a]	*M-AREA SETTLING BASIN INACTIVE PROCESS SEWERS TO MANHOLE 1, 081-M*
104[a]	*NEW TNX SEEPAGE BASIN, 904-102G*
106[a]	*OLD TNX SEEPAGE BASIN, 904-076G*
127[a]	*SPILL ON 01/12/53 OF 1/2 TON OF URANYL NITRATE, NBN*
139[a]	*TNX BURYING GROUND, 643-5G*
211[a]	*D-AREA ASBESTOS PIT, 080-20G*
229	UNIDENTIFIED TRASH PILE, NBN
238	*D-AREA ASH BASIN, 488-1D (INCLUDING INLET BASINS)*
265	COMBINED SPILLS FROM 483-D AND ASSOCIATED AREAS, NBN
272[a]	*D-AREA ASH BASIN, 488-2D*
273[a]	*D-AREA RUBBLE PIT, 431-2D*
310[a]	*NEUTRALIZATION SUMP, 678-T*
326[a]	*POTENTIAL RELEASE OF TCT, TET TCE, HNO3, U, HEAVY METALS FROM 321-M ABANDONED SEWER LINE, NBN*
349	SANDBLAST AREA CMD-002, NBN
352	SANDBLAST AREA CMM-008, NBN
415	SPILL ON 04/25/87 OF 15 GAL OF WATER - RAD, NBN
440	SPILL ON 06/28/84 OF 100 GAL OF CHILLED WATER, NBN
458	STORMWATER OUTFALL A-024, NBN
465	UNDERGROUND SUMP 321 M #001 321-M
466	UNDERGROUND SUMP 321 M #002 321-M
467[a]	*X-001 OUTFALL DRAINAGE DITCH, NBN*
500[a]	*TNX OUTFALL DELTA, LOWER DISCHARGE GULLY, AND SWAMP, NBN*
520	D-AREA UPGRADIENT SOURCES
543	ECODS D-1 (NEAR D-AREA RUBBLE PILE, 431-2D)
548[a]	*D-AREA ASH BASIN, 488-4D*
558	D-AREA PROCESS SEWER LINES AS ABANDONED, NBN
559[a]	*TNX-AREA PROCESS SEWER LINES AS ABANDONED, NBN*
570[a]	*D-006 PETROLEUM RELEASE SITE, NBN*

[a] – land use controls/institutional controls are part of the selected remedy
[b] – This entry is for the environmental media associated with the 484-10D Facility.

Figure C- 5. Steel Creek Watershed Operable Units

The information on Figure 6 and Figure C – 5 has been combined on one figure. Please see Figure 6, located within the body of the LUCAP.

Table C-5. Steel Creek Watershed Operable Units

Unit No.	Unit Name
94	L-AREA HOT SHOP (INCLUDING SANDBLAST AREA CML-003, NBN), 717-G
96[a]	***L-AREA OIL/CHEMICAL BASIN, 904-83G***
98	L-AREA RUBBLE PIT, 131-1L
108[a]	***P-AREA BURNING/RUBBLE PIT, 131-P***
126[a]	***SPILL ON 03/15/79 OF 5500 GALLONS OF CONTAMINATED WATER, NBN***
143	P-AREA REACTOR GROUNDWATER
303	POTENTIAL RELEASE FROM L-AREA DISASSEMBLY BASIN, 105-L
306[a]	***L-AREA REACTOR SEEPAGE BASIN, 904-064G***
307	L LAKE, NBN
313[a]	***P-AREA ASH BASIN, 188-0P***
314[a]	***P-AREA DISASSEMBLY BASIN, 105-P***
315	P-AREA EROSION CONTROL SITE, 131-1P
316 a	***POTENTIAL RELEASE FROM P-AREA REACTOR COOLING WATER SYSTEM, 186/190-P***
317[a]	***P-AREA REACTOR SEEPAGE BASIN, 904-061G***
318[a]	***P-AREA REACTOR SEEPAGE BASIN, 904-062G***
319[a]	***P-AREA REACTOR SEEPAGE BASIN, 904-063G***
391	SPILL ON 02/01/83 OF 50 GAL OF OIL - RAD, NBN
452	SPILL ON 09/21/84 OF 200 GAL OF WATER -RAD, NBN
462	P-AREA REACTOR DISCHARGE CANAL, NBN
477[a]	***P-AREA REACTOR AREA CASK CAR RAILROAD TRACKS AS ABANDONED, NBN***
479	L-AREA REACTOR AREA CASK CAR RAILROAD TRACKS AS ABANDONED, NBN
487[a]	***L-AREA SOUTHERN GROUNDWATER, NBN***
509[a, b]	***WETLAND AREA AT DUNBARTON BAY, NBN***
518	GUN EMPLACEMENT 407A & 407B RUBBLE PILE, NBN
535[a]	***ECODS L-1***
536	ECODS L-2 (EAST OF L AREA)
537	ECODS L-3 (EAST OF L AREA)
538	ECODS P-1 (SOUTH OF P AREA)
539[a]	***ECODS P-2 (SOUTH OF P AREA)***
557[a]	***P-AREA PROCESS SEWER LINES AS ABANDONED, NBN***
560	L-AREA PROCESS SEWER LINES AS ABANDONED, NBN
584[a]	***L REACTOR COMPLEX EARLY ACTION***

[a] – land use controls/institutional controls are part of the selected remedy
[b] – This unit number is associated with Steel Creek Integrator Operable Unit (IOU), which includes the Wetland Area at Dunbarton Bay (WADB). Portions of the WADB have been remediated; Steel Creek IOU has not.

Figure C- 6. Upper Three Runs Watershed Operable Units

The information on Figure 7 and Figure C – 6 has been combined on one figure. Please see Figure 7, located within the body of the LUCAP.

Table C- 6. Upper Three Runs Watershed Operable Units

Unit No.	Unit Name
2	F-AREA ACID/CAUSTIC BASIN, 904-47G
12	M-AREA HAZARDOUS WASTE MANAGEMENT FACILITY (LOST LAKE)
13	M-AREA HAZARDOUS WASTE MANAGEMENT FACILITY (M-AREA SETTLING BASIN, 904-51G)
15	METALLURGICAL LABORATORY HAZARDOUS MANAGEMENT FACILITY, 904-110G
16	MIXED WASTE MANAGEMENT FACILITY (INCLUDING THE RCRA REGULATED PORTIONS OF LLRWF 643-7E), 643-28E
21	NON-RADIOACTIVE WASTE DISPOSAL FACILITY (AKA SANITARY LANDFILL RCRA PORTION), 740-G
22	NON-RADIOACTIVE WASTE DISPOSAL FACILITY (AKA SANITARY LANDFILL) (GROUNDWATER), 740-G
23	M-AREA HAZARDOUS WASTE MANAGEMENT FACILITY: A/M AREA GROUNDWATER PORTION, 904-110G
24	SRL GROUNDWATER
34[a]	***F-AREA BURNING/RUBBLE PITS, 231-1F***
35[a]	***F-AREA BURNING/RUBBLE PITS, 231-2F***
36[a]	***F-AREA BURNING/RUBBLE PITS, 231-F***
45[a]	***A-AREA BURNING/RUBBLE PITS, 731-1A***
46[a]	***A-AREA BURNING/RUBBLE PITS, 731-A***
47	A-AREA COAL PILE RUNOFF BASIN, 788-3A
48[a]	***A-AREA MISCELLANEOUS RUBBLE PILE, 731-6A***
49[a]	***A-AREA RUBBLE PIT, 731-2A***
56	M-AREA HAZARDOUS WASTE MANAGEMENT FACILITY (CAROLINA BAY)
72	F-AREA HAZARDOUS WASTE MANAGEMENT FACILITY (F-AREA INACTIVE PROCESS SEWER LINE 081-1F)
79	H-AREA COAL PILE RUNOFF BASIN, 289-H
101[a]	***MISCELLANEOUS CHEMICAL BASIN, 731-4A***
102	METALS BURNING PITS, 731-5A
105[a]	***OLD F-AREA SEEPAGE BASIN, 904-49G***
119[a]	***R-AREA REACTOR SEEPAGE BASIN, 904-57G***
120[a]	***R-AREA REACTOR SEEPAGE BASIN, 904-58G***
121[a]	***R-AREA REACTOR SEEPAGE BASIN, 904-59G***
122[a]	***R-AREA REACTOR SEEPAGE BASIN, 904-60G***
123[a]	***R-AREA REACTOR SEEPAGE BASIN, 904-103G***
124[a]	***R-AREA REACTOR SEEPAGE BASIN, 904-104G***
131	SRL 904-A PROCESS TRENCH, 904-A
133[a]	***SRL SEEPAGE BASINS, 904-53G1***
134[a]	***SRL SEEPAGE BASINS, 904-53G2***
135[a]	***SRL SEEPAGE BASINS, 904-54G***
136[a]	***SRL SEEPAGE BASINS, 904-55G***
141	F-AREA INACTIVE PROCESS SEWER LINES FROM BUILDING TO THE SECURITY FENCE, 081-1F
142	H-AREA INACTIVE PROCESS SEWER LINES FROM BUILDING TO THE SECURITY FENCE, 081-H
208	ADVANCED TACTICAL TRAINING AREA (ATTA) FIRING RANGES, NBN
234[a]	***313-M AND 320-M INACTIVE CLAY PROCESS SEWERS TO TIMS BRANCH, NBN***
236	A-AREA ASH PILE, 788-0A

Unit No.	Unit Name
237[a]	***A-AREA ASH PILE, 788-2A***
260	COMBINED SPILLS FROM 211-H, NBN
270	COMBINED SPILLS FROM 701-1F SPILL, NBN
276	F-AREA ASH LANDFILL, 288-0F
279	F-AREA RAILROAD CROSSTIE PILE, NBN
284	F-AREA ACID/CAUSTIC BASIN (GROUNDWATER)
294	H-AREA RETENTION BASIN, 281-1H
295	H-AREA RETENTION BASIN, 281-2H
308	LOW LEVEL RADIOACTIVE DRAIN LINES, 772-F
339	S-AREA EROSION CONTROL SITE, NBN
340[a]	***SALVAGE YARD, 741-A***
343	SANDBLAST AREA CMF-001, NBN
344	SANDBLAST AREA CMH-001, NBN
346	SANDBLAST AREA CMH-002, NBN
347	SANDBLAST AREA CMM-002, NBN
359	SMALL ARMS TRAINING AREA (SATA), NBN
374	SPILL ON 01/12/87 OF <100 GM OF MERCURY NORTH OF 211-H, NBN
387	SPILL ON 12/01/71 OF 1000 GAL OF RAD WATER FROM 773-A, NBN
394	SPILL ON 02/25/85 OF 20000 CM OF WATER VAPOR - RAD, NBN
414	SPILL ON 04/24/91 OF .11 CI OF PU 239, 772-1F
429	SPILL ON 05/26/88 OF 10 GAL OF ETHYLENE GLYCOL-RAD FROM 772-F, NBN
435	SPILL ON 06/01/59 OF <1 CI OF SEGREGATED SOLVENT FROM 211-F, NBN
436	SPILL ON 06/16/87 OF ~1 GAL OF WATER - RAD, NBN
456	STEED POND, NBN
457	STORMWATER OUTFALL A-002, NBN
465[a]	***UNDERGROUND SUMP 321 M #001 321-M***
466[a]	***UNDERGROUND SUMP 321 M #002 321-M***
480	SANDBLAST AREA CMM-003, NBN
481	A-001 OUTFALL, NBN
483	STORMWATER OUTFALL A-013, NBN
484	M-AREA HAZARDOUS WASTE MANAGEMENT FACILITY: M-AREA VADOSE ZONE, 643-28G
485	COMBINED SPILLS FROM 221-F, NBN
497	SANDBLAST AREA CMM-001, NBN
512	COMBINED SPILLS FROM 221-H, NBN
517	COMBINED SPILLS NORTH OF BUILDING 105-R, NBN
521	ECODS A-2 (NEAR SANDBLAST AREA CMM-001, NBN)
523	ECODS F-1 (SOUTHEAST OF F-AREA ASH BASIN, 276-0F)
524	ECODS F-3 (EAST OF ECOD F-1)
526	ECODS B-1A, 1B (SOUTH OF B AREA)
527	ECODS B-2 (SOUTH OF B AREA)
528[a]	***ECODS B-3 (EAST OF B AREA, SOUTH OF ROAD C)***
529	ECODS B-4 (EAST OF B AREA, SOUTH OF ROAD C)
530[a]	***ECODS B-5 (ADJACENT TO ECODS B-3)***
541	ECODS G-1 (ADJACENT TO GUNSITE 072 RUBBLE PILE, 080-31G)
542	ECODS G-2 (ADJACENT TO FORESTRY FACILITIES)

Unit No.	Unit Name
549	GENERAL SEPARATIONS AREA EASTERN GROUNDWATER OPERABLE UNIT (FORMERLY KNOWN AS H-AREA GROUNDWATER OPERABLE UNIT)
562	A-AREA PROCESS SEWER LINES AS ABANDONED, NBN
563	F-AREA PROCESS SEWER LINES AS ABANDONED, NBN
564	H-AREA PROCESS SEWER LINES AS ABANDONED, NBN
571	LOW LEVEL RADIOACTIVE WASTE DISPOSAL FACILITY (NON-HAZARDOUS WASTE DISPOSAL PORTION OF 643-7E), 643-7E
593[a]	***770-U TEST REACTOR BUILDING (HWCTR)***

[a] – land use controls/institutional controls are part of the selected remedy

APPENDIX D

SAMPLE LAND USE CONTROL LANGUAGE FOR INCLUSION IN DECISION DOCUMENTS

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The following language is intended as sample language to be considered for inclusion in decision documents (e.g., proposed plans, records of decision) that have land use controls as part of the final selected remedy. This language may be modified as necessary for waste unit specific requirements.

This language should be considered for inclusion in the Executive Summary, The Preferred Alternative, and the Post-ROD Document Schedule sections of proposed plans and in the Declaration (Description of the Selected Remedy), The Selected Remedy, and the Post-ROD Document Schedule sections of records of decision, as indicated below.

Proposed Plan Executive Summary and The Preferred Alternative and Record of Decision Declaration (Description of the Selected Remedy)

Based upon the investigation, the remedial action objectives are to (*note: this list is just for sample purposes only and should be modified to meet waste unit specific requirements):*

- reduce the risk to human health and the environment and
- achieve remedial goals for soil

The LUC objective(s) necessary to ensure the protectiveness of the preferred alternative is (*note: this list is just for sample purposes only and should be modified to meet waste unit specific requirements):*

- prevent contact, removal, or excavation of buried waste in the area;
- preclude residential use of the area; and
- prevent unauthorized access to contaminated groundwater in the area.

Record of Decision The Selected Remedy Section Language

The (insert waste unit name) is in an (industrial or residential – choose one) zone as identified on the Proposed SRS Future Land Use Map of the *SRS FFA Implementation Plan* (FFA, 1993) for both current and anticipated future land use. However, USDOE has recommended that residential use of SRS land in the vicinity of the (insert area name (i.e., A Area, P Area, etc.) be controlled; therefore, future residential use, potential residential water usage, and other controls will be taken to ensure long-term protectiveness. Institutional controls will restrict the (insert waste unit name) to future industrial use and will prohibit residential use of the area. Unauthorized excavation will also be prohibited and the waste unit will remain undisturbed. Institutional Controls will be maintained until such time that they are deemed unnecessary.

In accordance with the USEPA Region-4 Land Use Controls (LUCs) Policy, a LUC Assurance Plan (LUCAP) for the SRS has been developed and approved by the USEPA and the SCDHEC. Based upon the results of the (insert waste unit name) [baseline risk assessment, or the presence of buried source material that constitutes a leachability threat, or to prevent the excavation of buried source material – choose as applicable] the selected remedial alternative for this operable unit incorporates LUCs and therefore, a LUC Implementation Plan (LUCIP) for the (insert waste unit name) will be developed and submitted to the regulators for approval. The unit-specific LUCIP will be submitted with the (insert the name of the post-ROD document that the LUCIP will be submitted with) in accordance with the post-ROD document schedule provided in Figure (insert the post-ROD

schedule figure number). The LUCIP details how SRS will implement, maintain, and monitor the land use control elements of the (insert waste unit name) ROD to ensure that the remedy remains protective of human health and the environment. Upon regulatory approval, the (insert waste unit name) LUCIP will be appended to the SRS LUCAP.

The LUC objective(s) necessary to ensure the protectiveness of the preferred alternative is (*note: this list is just for sample purposes only and will be modified to meet waste unit specific requirements)*:

- prevent contact, removal, or excavation of buried waste in the area;
- preclude residential use of the area; and
- prevent unauthorized access to contaminated groundwater in the area.

The institutional controls required to prevent unauthorized exposure to the contaminated media at the (insert waste unit name) include the following *(note: this list is just for sample purposes only and will be modified to meet waste unit specific requirements)*:

- controlled access to the (insert waste unit name) through existing SRS security gates and perimeter fences and the site use/site clearance program;
- installation of warning signs at the most probable access points to contact the waste unit custodian prior to entry;
- general maintenance of the waste unit, including signs and visible markers, to identify the waste unit; and
- evaluation of the need for deed notifications/restrictions if the property is ever transferred to non-federal ownership, as required under CERCLA Section 120(h).

In addition, a survey plat of the area under LUCs will be prepared, certified by a professional land surveyor, and included with the post-ROD documents. In the case of LUCs and groundwater, an appropriate survey will be provided to delineate the groundwater under LUCs.

Other actions to be performed if the property is ever transferred to non-Federal ownership include a deed notification disclosing former waste management and disposal activities, as well as any remedial actions taken at the waste unit, and any continuing groundwater monitoring commitments. The deed notification will, in perpetuity, notify any potential purchaser that the property has been used for the management and disposal of (list what items were disposed at the unit – e.g., construction debris, etc.), including hazardous substances. These requirements are also consistent with the intent of the RCRA deed notification required at final closure of the RCRA facility, if contamination would remain at the unit. *(If the unit is a CERCLA only unit, then the previous sentence should be replaced with the following: RCRA deed notification requirements are not required for this waste unit since it does not require a RCRA permit modification per the SRS FFA, Appendix C.)* The deed will also include 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 contamination no longer poses an unacceptable risk under residential use. Any reevaluation of the need for deed restrictions would be done through an amended ROD with the USEPA and the SCDHEC

approval. In addition, the survey plat will be reviewed and updated, as necessary, at the time the site is transferred and will be recorded with the appropriate county recording agency.

The post-ROD document, (list the post-ROD document(s) that will be submitted for the waste unit), will be submitted to the USEPA and the SCDHEC within approximately (insert time period for issuance – e.g. 180 days, one month, four months, etc.) after the issuance of the ROD. The (insert name of post-ROD document) will describe (insert words that detail what the post-ROD document will do). The regulatory review period, SRS revision period, and final regulatory review and approval period will be X days, Y days, and Z days, respectively.

Record of Decision – Section II Site and Operable Unit Compliance History, SRS Compliance History Subsection

(*Note: The following paragraphs should be added after the second paragraph in this subsection.)*

By separate Memorandum of Agreement (MOA) dated (insert date), the USEPA, the SCDHEC, and the USDOE agreed to implement facility-wide, certain periodic site inspection, certification, and notification procedures set forth in a LUCAP, developed pursuant to the USEPA Region 4 LUCs Policy. These procedures are designed to ensure the maintenance by USDOE-SRS personnel of any site-specific LUCs, set forth in a response action decision document, deemed necessary for future protection of human health and the environment. A fundamental premise underlying execution of that MOA was that through USDOE-SRS's substantial good-faith compliance with the procedures called for in the LUCAP, reasonable assurances would be provided to USEPA and SCDHEC as to the permanency of those remedies, which included the use of specific LUCS.

Although the terms and conditions of the LUCAP MOA are not specifically incorporated or made enforceable herein by reference, it is understood and agreed upon by USDOE-SRS, USEPA, and SCDHEC that the contemplated permanence of the remedy reflected herein is in part dependent upon USDOE's substantial good-faith compliance with the

specific LUC maintenance commitments reflected therein. Should such compliance not occur or should the MOA be terminated, it is understood that the protectiveness of the remedy concurred in may be reconsidered and that additional measures may need to be taken to adequately ensure necessary future protection of human health and the environment.

Statement of Basis/Proposed Plan and Record of Decision Post-ROD Schedule Language

A (list the post-ROD document(s) that will be submitted for the waste unit), will be submitted to the USEPA and the SCDHEC after the issuance of the ROD. The (insert name of post-ROD document) will describe (insert words that detail what the post-ROD document will do).

The post-ROD document schedule is illustrated in Figure XX. Key components of the schedule include the following *(note: this list is just for sample purposes only and will be modified to meet waste unit specific requirements)*:

1. The (insert post-ROD document name) for the (insert waste unit name) will be submitted for USEPA and SCDHEC review (insert time period) after issuance of the ROD. This report will contain the LUCIP as part of the submittal.

2. USEPA and SCDHEC review of the Revision 0 (insert post-ROD document name) will be completed X days after submittal of the document.

3. SRS revision of the (insert post-ROD document name) will be completed Y days after receipt of all regulatory comments.

4. USEPA and SCDHEC final review and approval of the Revision 1 (insert post-ROD document name) will be completed Z days after submittal of the document.

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APPENDIX E

MEMORANDUM OF AGREEMENT

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MEMORANDUM OF AGREEMENT

IMPLEMENTATION OF A LAND USE CONTROLS ASSURANCE PLAN FOR THE UNITED STATES DEPARTMENT OF ENERGY SAVANNAH RIVER OPERATIONS OFFICE

Section 1
PURPOSE AND SCOPE

This Memorandum of Agreement (MOA) is entered into by the Unites States Department of Energy Savannah River Operations Office (SR), the United States Environmental Protection Agency Region IV office (EPA Region IV), and the South Carolina Department of Health and Environmental Control (SCDHEC). The purpose of this MOA, together with the attached "Land Use Control Assurance Plan" (LUCAP), is to establish and implement procedures to assure the long-term effectiveness of Land Use Controls (LUCs) being relied upon to protect human health and the environment at certain contaminated portions of the Savannah River Site (SRS) undergoing remediation pursuant to the Federal Facility Agreement for SRS. Consistent with the purposes as set forth in the LUCAP, SR, EPA Region IV, and SCDHEC are entering into the MOA as means to implement the provisions of the LUCAP.

Section 2
RESPONSIBILITIES

The responsibilities of the Parties under this MOA shall be set forth in the attached "Land Use Control Assurance Plan for the Savannah River Site" which LUCAP is fully incorporated herein. The Parties agree to act in good faith in carrying out their responsibilities under the LUCAP.

Section 3
MODIFICATION

Any minor modifications to this MOA and/or the LUCAP incorporated herein shall be made effective upon the written approval of the Parties' Federal Facilities Agreement Project Managers. Any major modification shall be made effective upon the written approval by each of the signatories to this MOA (or their successors). A modification will be considered major if so determined by any of the three Parties hereto.

Section 4
TERMINATION

This MOA shall terminate at such time as the undersigned representatives of the Parties or their successors mutually concur that the objectives of the Parties pursuant to this agreement have been fulfilled. Alternatively, any Party may withdraw from this MOA upon sixty (60) days written notice to the other Parties. This 60-day notice requirement is for the purpose of allowing the Parties an opportunity to discuss any issues contributing to a Party's desire to withdraw from this agreement in the interest of reaching resolution so that the agreement can continue. It is understood that, should SR withdraw from this MOA, EPA and/or SCDHEC may, consistent with applicable law, reconsider any remedy(ies) associated with any SRS area having a LUC in place at the time of such withdrawal.

Signature Blocks:

Greg Rudy, Manager
U.S. Department of Energy, Savannah River Operations Office

Date: 10/15/99

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

Date: 11/29/99

John H. Hankinson, Jr., Regional Administrator
U.S. Environmental Protection Agency, Region IV

Date: 3/26/2000

APPENDIX F

RECORD OF MODIFICATIONS AND UPDATES

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Table F- 1. Record of Modifications and Updates

Date	Pages Changed	Modification or Update
03/25/2000	Not Applicable	LUCAP was declared effective.
01/12/2002	Tables	All applicable tables were updated.
01/12/2002	Appendix B	The following unit-specific LUCIPs were added: • A-Area Burning/Rubble Pit, 731-1A, • A-Area Burning/Rubble Pit, 731-A, • A-Area Rubble Pit, 731-2A, • C-Area Reactor Seepage Basin, 904-66G, • C-Area Reactor Seepage Basin, 904-67G, • C-Area Reactor Seepage Basin, 904-68G, • K-Area Reactor Seepage Basin, 904-65G, • L-Area Bingham Pump Outage Pit, 643-2G, • L-Area Bingham Pump Outage Pit, 643-3G, • Metals Burning Pit, 731-5A, • Miscellaneous Chemical Basin, 731-4A, • P-Area Bingham Pump Outage Pit, 643-4G, • SRL Seepage Basin, 904-51G1, • SRL Seepage Basin, 904-53G2, • SRL Seepage Basin, 904-54G, and • SRL Seepage Basin, 904-55G
06/25/2003	Tables and Figures	All applicable tables and figures were updated.
06/25/2003	Appendix B	To aid in the update of the LUCAP, Appendix B was changed from numbered pages to Tabbed inserts. Each unit-specific LUCIP is located behind a tab. The following unit-specific LUCIPs were added: • Ford Building Seepage Basin, 904-91G, and • L-Area Reactor Seepage Basin, 904-064G
06/25/2003	Appendix C	The figures in Appendix C duplicated the information contained in the Figures 2 to 7. The figures were combined and the figures in Appendix C were eliminated.

Table F- 1. Record of Modifications and Updates *(continued)*

Date	Pages Changed	Modification or Update
10/31/2003	Tables and Figures	All applicable tables and figures were updated.
10/31/2003	Appendix B	The following unit-specific LUCIPs were added:: • A-Area Miscellaneous Rubble Pile, 731-6A, • Central Shops Burning/Rubble Pits, 631-1G, –3G, • F-Area Retention Basin, 281-3F, • L-Area Oil and Chemical Basin, 904-83G, • Old F-Area Seepage Basin, 904-49G, • P-Area Burning/Rubble Pit, 131-P, and • R-Area Bingham Pump Outage Pits, 643-8G, -9G, -10G and R-Area Unknowns, RUNK-1, -2, and -3
03/15/2004	Tables and Figures	All applicable tables and figures were updated.
03/15/2004	Appendix B	The following unit-specific LUCIPs were added: • General Separations Area Consolidation Unit and • L-Area Hot Shop (Including Sandblast Area CML-003, NBN), 717-G
04/30/2004	Section 3.3	The name, title, and phone number of the point of contact was updated.
04/30/2004	Tables and Figures	All applicable tables and figures were updated.
04/30/2004	Appendix B	The following unit-specific LUCIPs were added: • P-Area Rector Seepage Basins, 904-61G, -62G, and -63G, • L-Area Reactor Seepage Basin, 904-064G, and • L-Area Rubble Pile, 131-3L
08/01/2004	Tables and Figures	All applicable tables and figures were updated.
08/01/2004	Appendix B	The following unit-specific LUCIP was added: • TNX Groundwater (082-G), Old TNX Seepage Basin (904-076G), and New TNX Seepage Basin (904-102G)
01/03/2005	Tables and Figures	All applicable tables and figures were updated.
01/03/2005	Appendix B	The following unit-specific LUCIP was added: • R-Area Reactor Seepage Basins
01/03/2005	Appendix G	The 2004 Land Use Controls Certification was added.

Table F- 1. Record of Modifications and Updates *(continued)*

Date	Pages Changed	Modification or Update
04/15/2005	Tables and Figures	All applicable tables and figures were updated.
04/15/2005	Appendix B	The following unit-specific LUCIP was added: • R-Area Burning/Rubble Pits (131-R and -1R) and R-Area Rubble Pile (631-25G)
01/08/2008	Appendix B, Tables and Figures	All applicable tables and figures were updated and the Unit-Specific LUCIPs were added.
10/22/2009	Appendix B, Tables and Figures	All applicable tables and figures were updated and the Unit-Specific LUCIPs were added.
02/03/2011	Appendix B, Tables and Figures	All applicable tables and figures were updated and the Unit-Specific LUCIPs were added
10/5/2011	Appendix B, Tables and Figures	All applicable tables and figures were updated and the Unit-Specific LUCIPs were added.
01/26/2012	Appendix B	Added F-Area Industrial Solid Waste Landfill LUCIP.
03/15/2013	Appendix B, Tables and Figures	All applicable tables and figures were updated.
03/15/2013	Appendix G	The 2012 Land Use Controls Certification was added.
03/15/2014	Tables and Figures	All applicable tables and figures were updated.
03/15/2014	Appendix B	Added B-Area Operable Unit LUCIP. Added as-built drawings to Section 2.0 of Final Remediation Report for the D-Area Burning/Rubble Pits (431-D and 431-lD); Section 2.0 of Final Remediation Report for the F-Area Burning/Rubble Pits (231-F, 231-lF, and 231-2F); Section 2.0 of Final Remediation Report for the Silverton Road Waste Unit (731-3A); Land Use Control Implementation Plan for R-Area Reactor Seepage Basins (904-57G, -58G,,-59G, -60G, -103G, and -104G); and Land Use Control Implementation Plan for the Chemical, Metals, and Pesticides Pits Operable Unit (080-170G, 080-180G, 080-181G, 080-182G, 080-183G, and 080-190G).
03/15/2014	Appendix G	The 2013 Land Use Controls Certification was added.

Table F- 1. Record of Modifications and Updates *(continued/end)*

Date	Pages Changed	Modification or Update
08/27/2014	Tables and Figures	All applicable tables and figures were updated.
08/17/2014	Appendix B	The following unit-specific LUCIP was added: • Lower Three Runs Tail Portion (Middle and Lower Subunits) L-Area Hot Shop, 717-G, OU was designated as a No Action OU in Fiscal Year (FY) 2014 and was removed from the LUCAP.
12/07/2015	Tables and Figures	All applicable tables and figures were updated.
12/07/2015	Appendix B	The following unit-specific LUCIP was added: • C-Area Operable Unit Early Action
12/07/2015	Appendix G	The 2015 Land Use Controls Certification was added.
02/15/2018	Appendix G	The 2017 Land Use Controls Certification was added.
02/23/2023	Tables and Figures	All applicable tables and figures were updated.
02/23/2023	Section 2.2	Update the site procedure reference.
02/23/2023	Section 2.3	Revised Environmental Restoration (ER) to Area Completion Projects (ACP).
02/23/2023	Sections 3.5 and 3.6	Changed 5-year ROD review to 5-year remedy review since it's the remedies discussed in the RODs that are being reviewed.
02/23/2023	Appendix B	L-Area Rubble Pile, 131-3L, OU was designated as a No Action OU in FY2018 and was removed from the LUCAP. The following unit-specific LUCIPs were added. • Wetland Area at Dunbarton Bay, • D-Area OU Second Early Action, and • Lower Three Runs IOU (Upper Subunit)
02/23/2023	Appendix G	The 2022 Land Use Controls Certification was added.

APPENDIX G

ANNUAL LAND USE CERTIFICATION REQUIRED UNDER SECTION 3.9

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Land Use Controls Units

During Fiscal Year (FY) 2000, the Parties approved the Land Use Control Assurance Plan (LUCAP) for Savannah River Site (SRS) and signed its associated Memorandum of Agreement. The LUCAP is updated periodically to include additional approved unit-specific Land Use Control Implementation Plans (LUCIPs). The unit-specific LUCIPs detail how SRS will implement, maintain, and monitor the land use control (LUC) elements of the selected remedy to ensure that the remedy remains protective of human health and the environment.

Records of Decision (RODs) have been issued for some Resource Conservation and Recovery Act (RCRA)/Comprehensive Environmental Response, Compensation, and Liability Act Units at the SRS in which the selected alternative is or includes LUCs. To assure United States Environmental Protection Agency, South Carolina Department of Health and Environmental Control, and the public that United States Department of Energy (USDOE) is maintaining the LUCs as stipulated, the Manager, Savannah River Operations Office, shall annually certify these units. These units are currently being controlled in accordance with the unit-specific RODs, unit-specific LUCIPs, and in accordance with the LUCAP for SRS.

Unit-specific LUCs were not part of the interim remedies at the E-Area Low-Level Waste Facility (LLWF) (Slit Trench Disposal Units 1 to 5) Operable Unit (OU) and the F-Area Tank Farm (FTF) OU (Waste Tanks 5, 6, and 17 to 20). The E-Area LLWF and the FTF OU are currently in the operational phase, and OU-specific LUCs are deferred until final closure of the entire E-Area LLWF and FTF OUs. SRS facility security and administrative controls that restrict unauthorized access to these operating facilities were not previously recognized as part of the interim remedies. In the *Fifth Five-Year Remedy Review Report for Savannah River Site Operable Units with Geosynthetic or Stabilization/Solidification Cover Systems* (SRNS-RP-2016-00610, Revision 1.1, December 2017), USDOE recommended revising the Federal Facility Agreement Annual Progress Report list of LUC Units to include these OUs to recognize SRS facility security and administrative controls that restrict unauthorized access as providing long-term protection of human health and the environment.

The H-Area Tank Farm (HTF) OU (Waste Tank 16) Interim ROD (IROD) (SRR-CWDA-2015-00157, Revision 1, July 2016) was issued in August 2016. The HTF OU (Waste Tank 12) Explanation of Significant Difference to the IROD (SRR-CWDA-2016-00107, Revision 0, December 2016) was issued in April 2017. A remedy evaluation was premature for inclusion in the *Fifth Five-Year Remedy Review Report for Savannah River Site Operable Units with Geosynthetic or Stabilization/ Solidification Cover Systems* (SRNS-RP-2016-00610, Revision 1.1, December 2017). However, the same conditions apply to the operational HTF OU as to the E-Area LLWF and FTF OUs. Therefore, these OUs were added to the list below to certify long-term protectiveness through compliance with the SRS facility security and administrative controls. A remedy evaluation for the HTF OU (Waste Tanks 12 and 16) was discussed for the first time in the *Sixth Five-Year Remedy Review Report for Savannah River Site Operable Units with Geosynthetic or Stabilization/ Solidification Cover Systems* (SRNS-RP-2021-04229, Revision 1, July 2022). Additional slit trench disposal units and waste tanks will be added as interim remedies are implemented.

Unit-specific LUCs were not part of the interim remedy at the C-Area Groundwater (CAGW) OU. The electrical resistance heating with soil vapor extraction interim remedy was determined to be protective of human health and the environment in the short-term. However, for the remedy to be protective in the long-term, additional remedial actions, including LUCs (if needed), will need to be implemented at CAGW OU. SRS facility security and administrative controls that restrict unauthorized access to this OU were not previously recognized as part of the interim remedy. In the *Sixth Five-Year Remedy Review Report for Savannah River Site Operable Units with Groundwater Remedies* (SRNS-RP-2019-00511, Revision 1, July 2020), USDOE recommended revising the FFA Annual Progress Report list of LUC Units to include this OU to recognize SRS facility security and administrative controls that restrict unauthorized access as providing long-term protection of human health and the environment. Therefore, the CAGW OU was added to the list below.

The FY2022 certification is applicable to the following RCRA/CERCLA Units.

Unit Name	SRS Index Number(s)	SEMS Number(s)
A-Area Burning/Rubble Pits (731-A, -1A) and Rubble Pit (731-2A) and the Miscellaneous Chemical Basin/Metals Burning Pit (731-4A and -5A) OU (includes A-Area Ash Pile, 788-2A)	45, 46, 49, 101, 102, 237	28
A-Area Miscellaneous Rubble Pile (731-6A) OU	48	30
B-Area OU (consisting of Heavy Water Components Test Reactor [Building 770-U] and Early Construction and Operational Disposal Site [ECODS] B-3 [East of B Area, South of Road C] [no building number {NBN}] and ECODS B-5 [Adjacent to ECODS B-3] [NBN])	528, 530, 2003	48
C-, K-, and L-Reactor Complexes Early Action	577, 583, 584	79, 90, 91
C-Area Burning/Rubble Pit (131-C) and Old C-Area Burning Rubble Pit (NBN) OU	51, 566	31
C-Area OU Early Action (consisting of C-Area Process Sewer Lines as Abandoned [NBN], C-Area Reactor Area Cask Car Railroad Tracks as Abandoned [NBN], ECODS C-1 [Near C-Area Reactor Discharge Canal {NBN}], Potential Release from C-Area Disassembly Basin [NBN], Potential Release from C-Area Reactor Cooling Water System [186/190-C])	555, 475, 522, 240, 242	79
C-Area Groundwater OU (NBN)[3]	146	82
C-Area Reactor Seepage Basins (904-66G, -67G, and -68G) OU	53, 54, 55	60
Central Shops Burning/Rubble Pits (631-1G and -3G) OU	58, 59	50
Chemicals, Metals, and Pesticides Pits (080-170G, -171G, -180G, -182G, -183G, and -190G) OU	61, 62, 63, 64, 65, 66, 67	24
D-Area Burning/Rubble Pits (431-D and -1D) OU	32, 33	15
D-Area Expanded OU (consisting of D-Area Rubble Pit [431-2D] and D-Area Ash Basin [488-D])	68, 273	67
D-Area Oil Seepage Basin (631-G) OU	26	27
DAOU Early Action (consisting of D-Area Asbestos Pit [080-20G] and D-Area Coal Pile Runoff Basin [489-D] [Northern 25%])	69, 211	63
DAOU Second Early Action (consisting of D-Area Ash Basins [488-1D {including Inlet Basins} and 488-2D], D-Area Ash Landfill [488-4D], and D-Area Coal Pile Runoff Basin [489-D] [Southern 75%])	238, 272, 548, 211	63
E-Area Low-Level Waste Facility (643-26E) OU (Slit Trench Disposal Units 1 to 5)	592	86
ECODS L-1, N-2, P-2, and R-1A, -1B, -1C OU	535, 539, 545, 540	22
F-Area Burning/Rubble Pits (231-F, -1F, and -2F) OU	34, 35, 36	14
F-Area Industrial Solid Waste Landfill (F-Area Railroad Crosstie Pile) (NBN)	279	N/A*
F-Area Retention Basin (281-3F) OU	73	23
F-Area Tank Farm OU (Waste Tanks 5 to 6, 17 to 20)	283, 580	23
Ford Building Seepage Basin (904-91G) OU	75	58

Unit Name	SRS Index Number(s)	SEMS Number(s)
General Separations Area Consolidation Unit (consisting of Old Radioactive Waste Burial Ground [ORWBG] [including Solvent Tanks 650-01E to 650-22E] [643-E], HP-52 Ponds, H-Area Retention Basin [281-3H] and Spill on 05/01/1956 of Unknown of Retention Basin Pipe Leak [NBN], Warner's Pond [685-23G] and Spill on 03/08/1978 of Unknown of Seepage Basin Pipe Leak in H-Area Seepage Basin [NBN], and Spill on 02/08/78 of Unknown of H-Area Process Sewer Line Cave-In [NBN])	18, 29, 28, 417, 27, 405, 398	32
Gunsite 012 OU (consisting of Gunsite 012 Rubble Pile [NBN], Rubble Pile Across from Gunsite 012 [NBN], and ECODS G-3 [Adjacent to Gunsite 012] [NBN])	163, 337, 544	78
H-Area Tank Farm OU (Waste Tanks 12 and 16)	298, 582	89
Heavy Equipment Wash Basin (NBN) OU	502	53
K-Area Bingham Pump Outage Pit (643-1G) OU	83	20
K-Area Burning/Rubble Pit (131-K) and K-Area Rubble Pile (631-20G) OU	84, 88	40
K-Area Reactor Seepage Basin (904-65G) OU	87	55
L- and P-Area Bingham Pump Outage Pits (643-2G, -3G, and -4G) OU	91, 92, 107	26, 39
L-Area Oil and Chemical Basin (904-83G) OU	96	17
L-Area Reactor Seepage Basin (904-64G) OU	306	65
L-Area Southern Groundwater (NBN) OU	487	77
Lower Three Runs Integrator Operable Unit (IOU) Tail Portion (Middle and Lower Subunits)	505	35
Lower Three Runs IOU (Upper Subunit)4	110, 312, 505	35
M-Area OU (consisting of Potential release of Heavy Metals from 321-M Abandoned Sewer Line [NBN], Salvage Yard [741-A], Underground Sump 321-M #001, and Underground Sump 321-M #002)	585, 326, 340, 465, 466	92
M-Area Settling Basin Inactive Process Sewer Lines OU (081-M)	100, 234	19
Old F-Area Seepage Basin (904-49G) OU	105	16
P-Area Burning/Rubble Pit (131-P) OU	108	59
P-Area OU (consisting of Spill on 03/15/79 of 500 Gallons of Contaminated Water [NBN], P-Area Ash Basin [188-0P], Potential Release from P-Area Disassembly Basin [105-P], Potential Release from the P-Area Reactor Cooling Water System [186/190-P], P-Area Reactor Area Cask Car Railroad Tracks as Abandoned [NBN], P-Area Process Sewer Lines as Abandoned [NBN])	126, 313, 314, 316, 477, 557, 587	94
P-Area Reactor Seepage Basins (904-61G, -62G, and -63G) OU	317, 318, 319	66
R-Area Bingham Pump Outage Pits (643-8G, -9G, and -10G) and R-Area Unknown Pits #1, #2, #3 (RUNK-1, -2, and -3) OU	113, 114, 115, 550, 551, 552	38
R-Area Burning/Rubble Pits (131-R and 131-1R) and R-Area Rubble Pile (631-25G) OU	117, 116, 118	43

Unit Name	SRS Index Number(s)	SEMS Number(s)
R-Area OU (consisting of Area on the North Side of Building 105-R, Laydown Area North of 105-R, and Release from the Decontamination of R-Area Reactor Disassembly Basin [NBN], Combined Spills North of Building 105-R [NBN], Cooling Water Effluent Sump [107-R], Potential Release from R-Area Disassembly Basin [NBN], Potential Release of $NaOH/H_2SO_4$ from 183-2R [NBN], R-Area Ash Basin [188-0R], R-Area Groundwater, R-Area Process Sewer Lines as Abandoned [NBN], and R-Area Reactor Area Cask Car Railroad Tracks as Abandoned [NBN])	231, 233, 271, 288, 324, 329, 330, 478, 513, 517, 556, 588	95
R-Area Reactor Seepage Basins (904-57G, -58G, -59G, -60G, -103G, and -104G) OU	119, 120, 121, 122, 123, 124	25
Silverton Road Waste Site (731-3A)	41	13
Savannah River Laboratory Seepage Basins (904-53G1, -53G2, -54G, and -55G) OU	133, 134, 135, 136	47
T-Area OU (consisting of Neutralization Sump [678-T], TNX Outfall Delta, Lower Discharge Gully, and Swamp [NBN], TNX-Area Process Sewer Lines and Tile Fields as Abandoned [NBN], and X-001 Outfall Drainage Ditch [NBN] [See USDOE Letter SGP-05-128 for list of decommissioned facilities added to T-Area Completion])	589, 310, 500, 559, 467	96
TNX OU (consisting of TNX Burying Ground [643-5G] [including Spill on 01/12/53 of 1/2 Ton of Uranyl Nitrate], New TNX Seepage Basin [904-102G], Old TNX Seepage Basin [904-076G], and TNX Groundwater [082-G])	139, 104, 106, 25, 127	21, 29
Wetland Area at Dunbarton Bay in Support of Steel Creek IOU[5]	509	71

* N/A = Not Applicable SEMS = Superfund Enterprise Management System

Notes:

1. The L-Area Hot Shop OU (717-G) was designated as a No Action OU in FY2014 and was removed from this LUC certification list.
2. The L-Area Rubble Pile (131-3L) OU was designated as a No Action OU in FY2018 and was removed from this LUC certification list.
3. The E-Area LLWF, FTF, HTF , and CAGW OUs were added to the list to certify long-term protectiveness through compliance with the SRS facility security and administrative controls.
4. The LUCIP for the Lower Three Runs Integrator Operable Unit (Upper Subunit) (SRNS-RP-2022-00017, Revision 1, August 2022) was approved by South Carolina Department of Health and Environmental Control and United States Environmental Protection Agency on September 22, 2022 and October 4, 2022, respectively. However, the LUCs will not be implemented until Spring of 2023.
5. The LUCIP for the Wetland Area at Dunbarton Bay in Support of Steel Creek IOU (SRNS-RP-2018-00479, Revision 1, November 2018) was approved in FY2019. The signs were installed on January 8, 2020. Per the regulatory approved LUCIP, the field inspections will be performed every five years. Additional inspections may be necessary in the event of unusual weather (e.g., storms with significant wind force or ice storms that could result in tree damage to access control signs) or any other condition warranting inspection.

USDOE-SR Certification for Land Use Controls

I certify that the Savannah River Site has maintained compliance with all unit-specific Land Use Control Implementation Plans in accordance with the *Land Use Control Assurance Plan for the Savannah River Site.*

Signature: Michael D. Budney Digitally signed by Michael D. Budney Date: 2022.11.22 09:18:30 -05'00' Date: November 22, 2022

Michael D. Budney
Savannah River Site Manager