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

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Revision 1

February 2008

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DISCLAIMER

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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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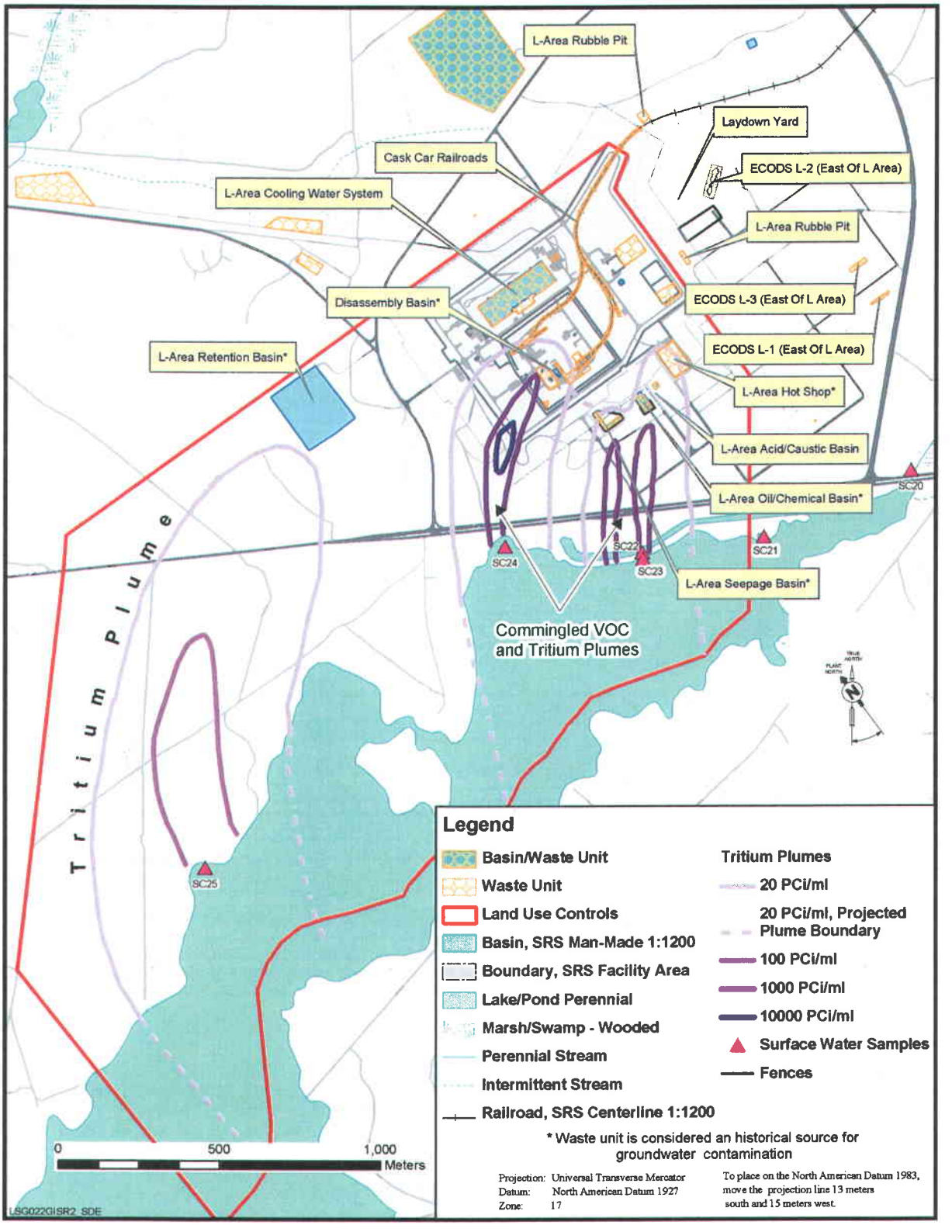

Figure A-1. Land Use Control Implementation Plan As-Built Drawing for LASG OU

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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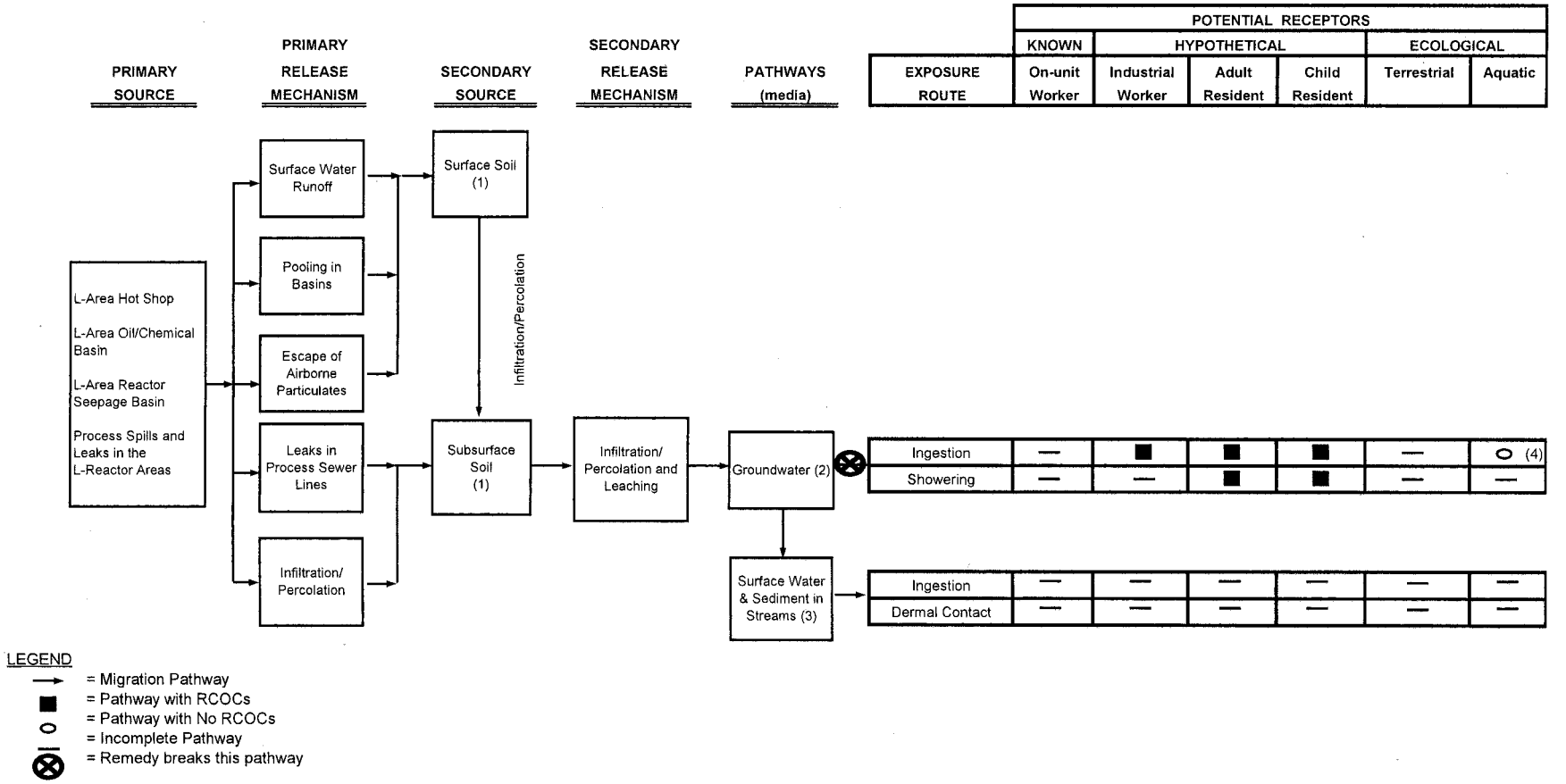

(1) Soils have been or will be addressed with the surface units
(2) Standard exposure scenarios are presented basd on MCL (ARAR) exceedances.
(3) Impact surface water/sediments will be addressed as part of the L-Lake OU in the Steel Creek IOU
(4) Groundwater does not provide an exposure pathway for ecological 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