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United States Department of Energy

Savannah River Site

**Explanation of Significant Differences for the
Revision 1 Record of Decision Remedial Alternative
Selection for the L-Area Southern Groundwater Operable
Unit (NBN) (U)**

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SITE ASSESSMENT,
REMEDICATION &
REVITALIZATION

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APPROVAL SHEET

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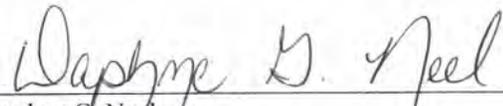
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LIST OF ABBREVIATIONS AND ACRONYMS

ARARs	Applicable or Relevant and Appropriate Requirements
ARF	Administrative Record File
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
ESD	Explanation of Significant Differences
FFA	Federal Facility Agreement
ft	feet
ICs	institutional controls
LAHS	L-Area Hot Shop
LAOCB	L-Area Oil and Chemical Basin
LASG	L-Area Southern Groundwater
LDR	Land Disposal Restriction
LUCs	land use controls
mg/L	Milligram per Liter
MNA	monitored natural attenuation
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
OU	Operable Unit
PCE	tetrachloroethylene
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
TCE	trichloroethylene
USDOE	United States Department of Energy
USEPA	United States Environmental Protection Agency
VOC	volatile organic compound
WSRC	Westinghouse Savannah River Company LLC

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I. INTRODUCTION

This Explanation of Significant Differences (ESD) is being issued by the United States Department of Energy (USDOE), the lead agency for the Savannah River Site (SRS) for remedial activities, with concurrence by the U.S. Environmental Protection Agency (USEPA) – Region 4 and the South Carolina Department of Health and Environmental Control (SCDHEC). The purpose of this ESD is to revise the Waste Disposal and Transport section (page 82 of 88) of the *Record of Decision Remedial Alternative Selection for the L-Area Southern Groundwater Operable Unit* (WSRC 2007) issued in March 2007 to document a Resource Conservation and Recovery Act (RCRA) “contained-in” determination for the groundwater.

Under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Section 117(c), SRS is required to publish an ESD whenever there is a significant change to a component of a remedy specified in a Record of Decision (ROD). Sections 300.435(c)(2)(i) and 300.825(a)(2) of the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) require the lead agency to provide an explanation of the differences and to make this information available to the public in the Administrative Record File (ARF) and information repositories.

L Area is one of five reactor areas at the SRS. L-Reactor operated intermittently between 1954 and 1988. L Lake was constructed in 1985 as a cooling pond for the reactor and covers 1,034 acres (ac) and contains 7 billion gallons of water. Multiple surface

waste units as well as the groundwater were impacted from the historical operations of the reactor. The known surficial source units in and around L Area (i.e., L-Area Hot Shop [LAHS], L-Area Oil and Chemical Basin [LAOCB], Emergency Retention Basin, and the L-Area Reactor Seepage Basin) were previously evaluated individually to assess the impact on local groundwater. Due to the presence of tritium, tetrachloroethylene (PCE) and trichloroethylene (TCE) contamination in groundwater commingled from these multiple source units, the groundwater was administratively separated from the surface units and identified as the L-Area Southern Groundwater Operable Unit (LASG OU) in the SRS Federal Facility Agreement (FFA 1993) as a CERCLA waste unit. (Figures 1 and 2)

The LASG OU encompasses all of the groundwater from the L-Area groundwater divide south to L Lake and covers about 1,250 ac. Two of the source units that contributed to groundwater contamination, LAOCB and LAHS, were known to have used PCE and TCE in degreasing activities.

This ESD does not alter the existing groundwater remedy of Monitored Natural Attenuation with Institutional Controls (MNA/ICs) for LASG OU, but provides clarification on how groundwater potentially containing a RCRA listed waste is to be handled consistent with the RCRA “contained-in” policy.

The ESD is part of the ARF and is available for public review during normal business hours at the following repositories.

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

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

II. SITE HISTORY AND SELECTED REMEDY

LASG OU encompasses all groundwater south of the L Area groundwater divide to L Lake and includes three separate plumes. There are two distinct commingled plumes of volatile organic compounds (VOCs) and tritium extending south from the L-Reactor area and discharging into L-Lake. A separate tritium plume west of the reactor extends south towards the lower areas of L-Lake. Based on extensive groundwater characterization, the refined constituents of concern for groundwater at LASG OU are tritium, PCE, and TCE. Tritium, a radioactive isotope of hydrogen, was produced in the reactor and the VOCs, PCE and TCE, were used as solvents and degreasers. Per the ROD (WSRC 2007), the LASG OU remedial action addresses both commingled VOC and tritium plumes and the tritium plume west of the reactor. The remedy for the LASG OU leaves hazardous substances in place that pose a potential future risk and requires land use restrictions until groundwater is restored to maximum contaminant levels.

The remedy for the LASG OU is MNA/ICs. This remedy employs land use controls (i.e., ICs) to limit

access and exposure to contaminated groundwater and use restrictions via the Site Use/Site Clearance program. Periodic groundwater and surface water monitoring is conducted in each of the plumes and in L Lake on the axis of each plume. Surface water samples are also collected at the head of L Lake and in the spillway from L Lake to evaluate the contribution of upgradient sources and LASG OU's contribution to contaminant levels in the lower reaches of Steel Creek. The analytical results from monitoring are used to evaluate the performance of the natural attenuation processes (i.e., dispersion, dilution, and radioactive decay) and determine if contaminant concentrations are decreasing as predicted.

III. BASIS FOR THE EXPLANATION OF SIGNIFICANT DIFFERENCE

The ROD (WSRC 2007) stated that the LAOCB and the LAHS were the two prior sources of PCE and TCE contamination in the groundwater. PCE and TCE had been used as solvents, and under RCRA they would be considered listed hazardous wastes. Under the USEPA's "contained-in" policy, contaminated media (e.g., groundwater or soil) is considered to contain RCRA hazardous waste: 1) when the media is contaminated with characteristic hazardous waste and exhibits a characteristic of hazardous waste, or 2) when the media is contaminated with hazardous constituents from RCRA-listed hazardous waste. If contaminated environmental media contain listed hazardous waste, then once generated (i.e., removed from the ground) they are subject to all applicable RCRA hazardous waste requirements and must meet the applicable treatment standards in 40 CFR 268.40 (Treatment

Standards for Hazardous Waste) and 40 CFR 268.48 (Universal Treatment Standards for all underlying hazardous constituents) until USEPA and/or an authorized State determines the media no longer “contain” hazardous waste.

In contrast to the “contained-in” policy, the *Waste Disposal and Transport* section (page 82 of 88) of the ROD (WSRC 2007) for the LASG OU stated the following:

“The LAOCB and LAHS were previously identified as containing RCRA-listed PCE and TCE (F001/F002). Other historical sources to the groundwater plumes are not considered RCRA listed. To be consistent across the entire groundwater plume and facilitate MNA monitoring, groundwater will not be considered RCRA hazardous unless it exhibits a RCRA characteristic. Subsequently, waste materials will be managed in accordance with the most current approved revision of the Investigation-Derived Waste Management Plan (WSRC-RP-94-1227). The approach is consistent with the RCRA substantive requirements, protective of human health and the environment and cost effective.”

Per an April 27, 2012 letter from the USEPA, *Contained-in Determination for RCRA-listed Wastes in L-Area Southern Groundwater Operable Unit*, (USEPA 2012), the ROD incorrectly stated that contaminated groundwater containing RCRA-listed hazardous wastes would not be considered RCRA hazardous unless it exhibits a RCRA characteristic. The USEPA recommended that the USDOE request a formal “contained-in” determination for the regulated

hazardous constituents, TCE and PCE, that will be applicable to all groundwater (e.g., purge water, monitoring samples, etc.) generated at LASG OU identified as containing RCRA-listed hazardous wastes (F001/F002).

As a result, the purpose of this ESD is as follows:

1. Document the “contained-in” determination and the levels below which the groundwater at LASG OU will no longer contain a hazardous waste and may be land applied without triggering RCRA Subtitle C requirements; and
2. Document that the concurrence of this ESD will constitute approval by USEPA and SCDHEC of this site-specific “contained-in” determination.
3. Include an Applicable or Relevant and Appropriate Requirements (ARARs) table (see Table 1).

IV. DESCRIPTION OF SIGNIFICANT DIFFERENCES

As previously indicated in the ROD, the LAOCB and LAHS were previously identified as containing RCRA-listed PCE and TCE (F001/F002). The RCRA regulations would therefore be ARARs under CERCLA and be considered applicable to groundwater management. Under the RCRA “contained-in” policy, a determination that the media (groundwater) no longer contains a hazardous waste can be made if the concentrations of the hazardous constituents are below health-based limits.

For the LASG OU, SRS calculated site-specific risks resulting from the exposure of two RCRA-listed

hazardous constituents, PCE and TCE, using a reasonable maximum exposure scenario and conservative, health-based standards. The human receptor scenario is based on the potential exposure of an outdoor worker from groundwater sampling activities. Per the LASG OU Land Use Control Implementation Plan (WSRC 2008), any use of groundwater is prohibited and other exposure scenarios are unlikely.

In order to determine if exposure to groundwater would pose an unacceptable risk to the outdoor worker (i.e. monitoring well sampler) at the LASG OU, SRS calculated site-specific risks resulting from the exposure of PCE and TCE at the RCRA Land Disposal Restriction (LDR) treatment standards levels of 0.056 mg/L and 0.054 mg/L, respectively (40 CFR 268.40). The site-specific risk calculation is based on the annual sampling of LASG OU wells, and other reasonably conservative exposure assumptions which are documented in the *Site Specific Risks Associated with "Contained In" Levels for PCE and TCE at the LASG OU* (SRNS 2013a). As a result, the SRS site-specific calculations found that levels of PCE and TCE at 0.056 mg/L and 0.054 mg/L result in risks of 2.8E-09 and 2.0E-08, respectively, and are protective for the outdoor worker who samples the groundwater monitoring wells. Groundwater with concentrations of PCE and TCE at or below the LDR treatment standard concentration would be considered to no longer contain RCRA-listed hazardous waste for the LASG OU.

Based on these site-specific values, SRS is requesting a "contained-in" determination that groundwater located within the LASG OU containing at or below

0.054 mg/L of TCE and 0.056 mg/L of PCE no longer contain RCRA listed hazardous wastes (F001/F002) and will not be subject to RCRA requirements. No other RCRA hazardous constituents are present in the LASG that are associated with any other RCRA listed waste(s) and the groundwater is not considered a RCRA characteristic hazardous waste.

This "contained-in" determination also considers protection of the environment. The contaminated aquifer at the LASG OU is the water table aquifer. The final remedy, MNA/ICs, does not require any active groundwater treatment. Thus, any purge water generated during the groundwater sampling process may be discharged adjacent to the well, provided there are no other hazardous constituents or radionuclides at levels that would have an environmental impact when it infiltrates back into the same contaminated aquifer. Groundwater sampling data indicate that PCE and TCE concentrations in all wells are below the 0.056 mg/L and 0.054 mg/L "contained-in" limits for PCE and TCE, respectively.

Concurrence of this ESD will constitute approval by USEPA and SCDHEC of the site-specific "contained-in" determination, that groundwater containing at or below 0.056 mg/L and 0.054 mg/L of PCE and TCE, respectively, at the LASG OU no longer contains a RCRA hazardous waste and will not be subject to RCRA requirements (SRNS 2013b).

V. STATUTORY DETERMINATIONS

The remedy selected in the ROD (WSRC 2007) remains unaltered and the statutory determination made in the ROD still applies. The Selected Remedy

is protective of human health and the environment, complies with Federal and State requirements that are applicable or relevant and appropriate to the remedial action, and is cost effective. The ROD remedy for this OU does not satisfy the statutory preference for treatment as a principal element of the remedy because there is no practicable remedial technology capable of reducing the toxicity, mobility, or volume of tritium in the groundwater. The remedy reduces tritium, PCE, and TCE by natural processes, and includes land use controls and monitoring of groundwater to ensure protection of human health and the environment and compliance with ARARs.

VI. PUBLIC PARTICIPATION

The public will be informed of the change to a component of the selected remedy as specified in this ESD through the *SRS Environmental Bulletin*, a newsletter sent to approximately 3,500 citizens in South Carolina and Georgia, and through the *Aiken Standard*, the *Allendale Citizen Leader*, the *Barnwell People Sentinel*, *The State*, and the *Augusta Chronicle* newspapers.

To obtain more information concerning this ESD, contact

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VII. REFERENCES

- FFA, 1993. *Federal Facility Agreement for the Savannah River Site*, Administrative Docket No.89-05-FF (Effective Date August 16, 1993)
- SRNS, 2013a. *Site Specific Risks Associated with "Contained In" Levels for PCE and TCE at the LASG OU (ERD-EN-2013-0010, Revision 0)*, Savannah River Nuclear Solutions, LLC, Savannah River Site, Aiken, SC (March 2013)
- USEPA, 2012. *Contained-in Determination for RCRA-listed Wastes in L-Area Southern Groundwater*, United States Environmental Protection Agency – Region 4, Atlanta, GA (April 27, 2012)
- SRNS, 2013b. *Revised Contained-in Determination for RCRA-listed Wastes in L-Area Southern Groundwater Operable Unit*, CERCLIS Number: 77, ACP-14-100, Savannah River Nuclear Solutions, LLC, Savannah River Site, Aiken, SC (November 25, 2013)
- WSRC, 2007. *Record of Decision Remedial Alternative Selection for the L-Area Southern Groundwater Operable Unit (NBN) (U)*, WSRC-RP-2006-4052, Revision 1, Savannah River Site, Aiken, SC (January 2007)
- WSRC, 2008. *Land Use Control Implementation Plan for L-Area Southern Groundwater Operable Unit (NBN) (U)*, WSRC-RP-2007-4049, Revision 1, Savannah River Site, Aiken, SC (February 2008)
- USEPA, 2012. Letter from the USEPA, April 27, 2012, *Contained-in Determination for RCRA-listed Wastes in L-Area Southern Groundwater Operable Unit*

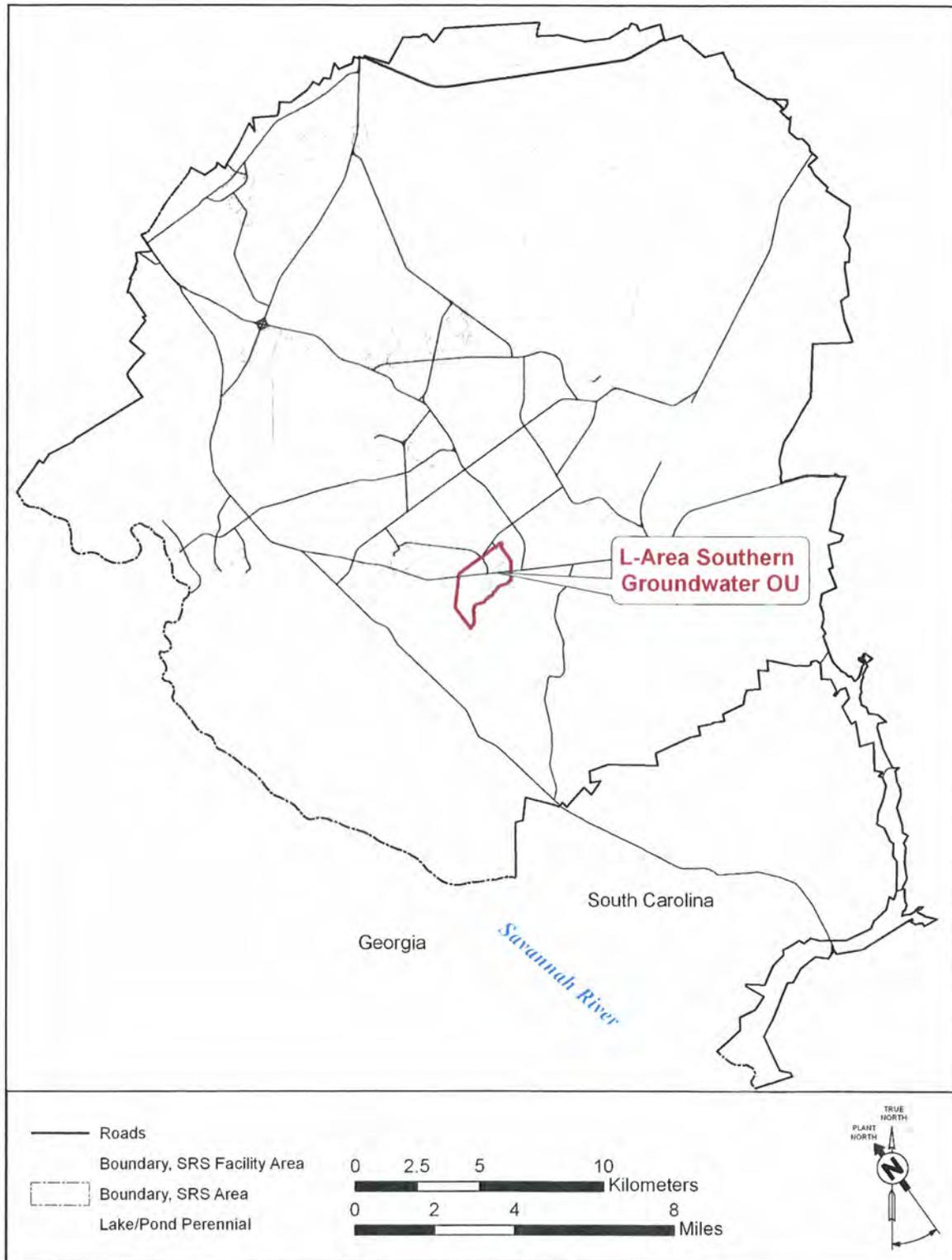


Figure 1. Location of the L-Area Southern Groundwater Operable Unit at the Savannah River Site

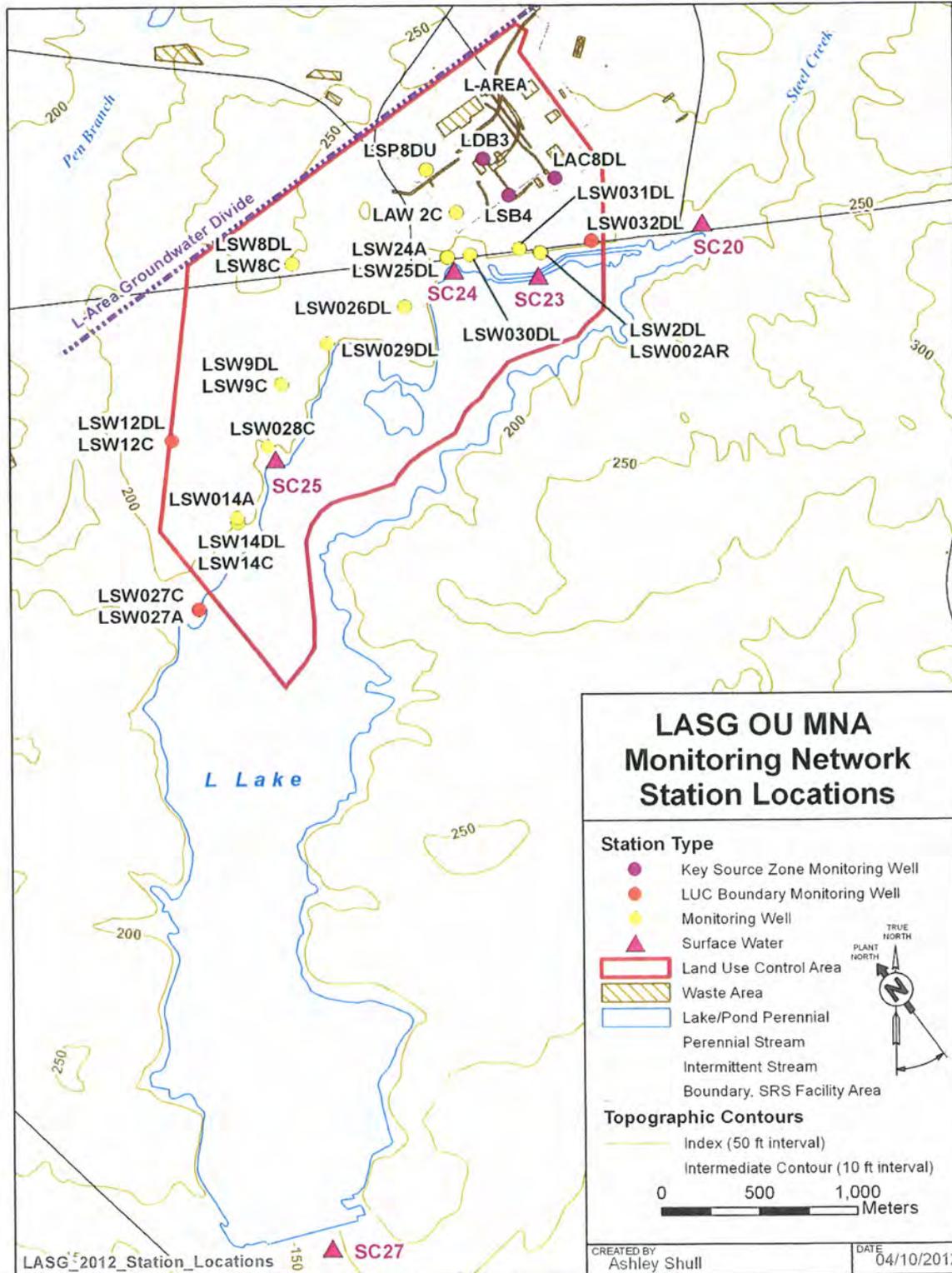


Figure 2. L-Area Southern Groundwater Operable Unit

Table 1. Action-Specific ARARs for LASG OU, SRS, Aiken, South Carolina

Action	Requirements	Prerequisite	Citation
<i>Waste Characterization and Storage—primary and secondary waste (e.g., monitoring well purge water)</i>			
Characterization of solid waste	Must determine if solid waste is a hazardous waste using the following method: Should first determine if waste is excluded from regulation under 40 CFR 261.4; and	Generation of solid waste as defined in 40 CFR 261.2 – applicable	40 CFR 262.11(a) SCDHEC R. 61-79 262.11(a)
	Must determine if waste is listed as hazardous waste under 40 CFR Part 261.	Generation of solid waste which is not excluded under 40 CFR 261.4(a) – applicable	40 CFR 262.11(b) SCDHEC R. 61-79 262.11(b)
	Must determine whether the waste is (characteristic waste) identified in subpart C of 40 CFR Part 261 by either: 1) Testing the waste according to the methods set forth in subpart C of 40 CFR part 261, or according to an equivalent method approved by the Administrator under 40 CFR 260.21; or 2) Applying knowledge of the hazard characteristic of the waste in light of the materials or the processes used.	Generation of solid waste which is not excluded under 40 CFR 261.4(a) – applicable	40 CFR 262.11(c) SCDHEC R. 61-79 262.11(c)
	Must refer to Parts 261, 262, 264, 265, 266, 268, and 273 of Chapter 40 for possible exclusions or restrictions pertaining to management of the specific waste.	Generation of solid waste which is determined to be hazardous waste – applicable	40 CFR 262.11(d) SCDHEC R. 61-79 262.11(d)
Determinations for management of hazardous waste	Must determine each EPA Hazardous Waste Number (waste code) applicable to the waste in order to determine the applicable treatment standards under 40 CFR 268 <i>et seq.</i> <i>Note:</i> This determination may be made concurrently with the hazardous waste determination required in Sec. 262.11 of this chapter.	Generation of hazardous waste for storage, treatment or disposal – applicable	40 CFR 268.9(a) SCDHEC R. 61-79 268.9(a)
	Must determine the underlying hazardous constituents [as defined in 40 CFR 268.2(i)] in the waste.	Generation of RCRA characteristic hazardous waste (and is not D001 non-wastewaters treated by CMBST, RORGS, or POLYM of Section 268.42 Table 1) for storage, treatment or disposal – applicable	40 CFR 268.9(a) SCDHEC R. 61-79 268.9(a)

Table 1. Action Specific ARARs for LASG OU, SRS, Aiken, South Carolina (Continued)

Action	Requirements	Prerequisite	Citation
Waste Characterization and Storage —primary and secondary waste (e.g., monitoring well purge water) (Cont'd)			
Determinations for management of hazardous waste (cont'd)	Must determine if the hazardous waste meets the treatment standards in 40 CFR 268.40, 268.45, or 268.49 by testing in accordance with prescribed methods or use of generator knowledge of waste. <i>Note:</i> This determination can be made concurrently with the hazardous waste determination required in 40 CFR 262.11. (see Footnote 1)	Generation of hazardous waste for storage, treatment or disposal – applicable	40 CFR 268.7(a) SCDHEC R. 61-79 268.7(a) (1)
Temporary storage of hazardous waste in containers	A generator may accumulate hazardous waste at the facility provided that: <ul style="list-style-type: none"> waste is placed in containers that comply with 40 CFR 265.171-173; and the date upon which accumulation begins is clearly marked and visible for inspection on each container container is marked with the words “hazardous waste”; or 	Accumulation of RCRA hazardous waste on site as defined in 40 CFR 260.10 – applicable	40 CFR 262.34(a)(1) and (2) SCDHEC R. 61-79 262.34(a) (1) and (2) 40 CFR 264.34(a)(3) SCDHEC R. 61-79 262.34(a) (3)
	<ul style="list-style-type: none"> container may be marked with other words that identify the contents. 	Accumulation of 55 gal. or less of RCRA hazardous waste or 1 quart of acutely hazardous waste listed in 261.33(e) at or near any point of generation – applicable	40 CFR 262.34(c)(1) SCDHEC R. 61-79 262.34(c) (1)
Use and management of hazardous waste in containers	If container holding waste is not in good condition (e.g. severe rusting, structural defects), or if it begins to leak, must transfer waste into container in good condition.	Storage of RCRA hazardous waste in containers – applicable	40 CFR 265.171 SCDHEC R. 61-79 265.171
	Must use a container made or lined with materials which will not react with, and are otherwise compatible with, the hazardous waste to be stored, so that the ability of the container to contain the waste is not impaired.		40 CFR 265.172 SCDHEC R. 61-79 265.172
	A container holding hazardous waste must always be closed during storage, except when necessary to add or remove waste. A container holding hazardous waste must not be opened, handled, or stored in a manner which may rupture the container or cause it to leak.		40 CFR 265.173(a) and (b) SCDHEC R. 61-79 265.173(a) and (b)

Table 1. Action Specific ARARs for LASG OU, SRS, Aiken, South Carolina (Continued/End)

Action	Requirements	Prerequisite	Citation
Waste Characterization and Storage —primary and secondary waste (e.g., monitoring well purge water) (Cont'd)			
Storage of hazardous waste in container area	Area must have a containment system designed and operated in accordance with 40 CFR 265.175(b).	Storage of RCRA hazardous waste in containers with free liquids – applicable	40 CFR 264.175(a) SCDHEC R. 61-79 264.175(a)
Waste treatment and disposal —primary and secondary waste (e.g., monitoring well purge water)			
Land Disposal of RCRA-hazardous waste	May be land disposed if the waste meets the requirements in the table “Treatment Standards for Hazardous Waste” at 40 CFR 268.40 before land disposal. For example, treatment standard for wastewaters containing F001/F002 solvent waste for PCE and TCE is 0.056 mg/L and 0.054 mg/L, respectively. (see Footnote 1)	Land disposal, as defined in 40 CFR 268.2, of restricted RCRA waste – applicable	40 CFR 268.40(a) SCDHEC R. 61-79 268.40(a)
	All underlying hazardous constituents [as defined in 40 CFR 268.2(i)] must meet the Universal Treatment Standards, found in 40 CFR 268.48 Table UTS prior to land disposal. (see Footnote 1)	Land disposal of restricted RCRA characteristic wastes (D001-D043) that are not managed in a wastewater treatment system that is regulated under the CWA, that is CWA equivalent, or that is injected into a Class I nonhazardous injection well – applicable	40 CFR 268.40(e) SCDHEC R. 61-79 268.40(e)

Footnote 1: USEPA considers contaminated environmental media to no longer contain hazardous waste (1) when they no longer exhibit a characteristic of hazardous waste; and (2) when concentrations of hazardous constituents from listed hazardous wastes are below health-based levels. The determination that any given volume of contaminated media does not contain hazardous waste is called a *contained-in determination*. This ESD documents a contained-in determination for the LASG OU.

ARAR = applicable or relevant and appropriate requirement
 CFR = Code of Federal Regulations
 RCRA = Resource Conservation and Recovery Act of 1976
 CWA = Clean Water Act of 1972
 SCDHEC = South Carolina Department of Health and Environmental Control

USEPA = U.S. Environmental Protection Agency
 UTS = Universal Treatment Standard
 RORGS = Recovery of Organics
 POLYM = Polymerization
 CMBST = Combustion