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Statement of Basis/Proposed Plan for the Early Construction and Operational Disposal Site N-1 (NBN), Central Shops Scrap Lumber Pile (631-2G), and Building 690-N, Process Heat Exchanger Repair Facility (aka Ford Building) Operable Unit (U)

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and
Savannah River Nuclear Solutions, LLC
Aiken, South Carolina

CERTIFICATION

Statement of Basis/Proposed Plan for the Early Construction and Operational Disposal Site (N-1) (NBN) Central Shops Scrap Lumber Pile (631-2G). and Building 690-N, Process Heat Exchanger Repair Facility (aka Ford Building) Operable Unit (U)

SRNS-RP-2022-00202, Revision 0, July 2022

[REF: 40CFR270.11 (d)(1)]

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision according to 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, 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."

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Co-Operator with the U. S. Department of Energy
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Date Signed

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TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

LIST OF APPENDICES

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LIST OF ABBREVIATIONS AND ACRONYMS

~	approximate, approximately
ac	acre
ACM	asbestos containing material
ARF	Administrative Record File
ARAR	Applicable or Relevant and Appropriate Requirement
BMP	Best Management Practice
BRA	Baseline Risk Assessment
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CFR	Code of Federal Regulations
cm	centimeter
CM	contaminant migration
CMI	Corrective Measures Implementation
CMS	Corrective Measures Study
COC	constituent of concern
Co-60	cobalt-60
Cr	chromium
Cr (VI)	hexavalent chromium
Cs-137	cesium-137
CSSLP	Central Shops Scrap Lumber Pile
D&D	Deactivation and Decommissioning
ECODS	Early Construction and Operational Disposal Site
EPC	exposure point concentration
FFA	Federal Facility Agreement
FS	Feasibility Study
ft	feet, foot
ft^2	square feet, square foot
gal	gallon
ha	hectare
HH	human health
in.	inch
IOU	Integrator Operable Unit
km	kilometer
L	liter
LLC	limited liability company
LUC	land use control
LUCAP	Land Use Control Assurance Plan
LUCIP	Land Use Control Implementation Plan
m	meter
m^2	square meter
m^3	cubic meter
mg/kg	milligram per kilogram
mi	mile
NBN	no building number
NCP	National Contingency Plan
NPL	National Priorities List
O&M	operations and maintenance
OU	Operable Unit
PCB	polychlorinated biphenyl
pCi/g	picocuries per gram
PRG	Preliminary Remedial Goal, Preliminary Remediation Goal
PTSM	principal threat source material
RAIP	Remedial Action Implementation Plan

LIST OF ABBREVIATIONS AND ACRONYMS *(Continued/End)*

RAO	Remedial Action Objective
RCOC	refined constituents of concern
RCRA	Resource Conservation and Recovery Act
RFI	RCRA Facility Investigation
RG	remedial goal
RI	Remedial Investigation
ROD	Record of Decision
SB/PP	Statement of Basis/Proposed Plan
SCDHEC	South Carolina Department of Health and Environmental Control
SCHWMR	South Carolina Hazardous Waste Management Regulations
SEMS	Superfund Enterprise Management System
SER	Site Evaluation Report
SRNS	Savannah River Nuclear Solutions, LLC
SRS	Savannah River Site
TAL	Target Analyte List
TCL	Target Compound List
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 yards

I. INTRODUCTION AND BACKGROUND

Introduction

This Statement of Basis/Proposed Plan (SB/PP) is being issued by the United States Department of Energy (USDOE), which functions as the lead agency for Savannah River Site (SRS) remedial activities, with concurrence by the United States Environmental Protection Agency (USEPA) and the South Carolina Department of Health and Environmental Control (SCDHEC). The purpose of this SB/PP is to describe the preferred remedial alternative(s) for the Early Construction and Operational Disposal Site (ECODS) N-1 (no building number [NBN]), Central Shops Scrap Lumber Pile (631-2G) (CSSLP), and Building 690-N, Process Heat Exchanger Repair Facility (aka Ford Building) Operable Unit (OU) and to provide for public involvement in the decision-making process.

SRS occupies approximately (~) 800 square kilometers (km^2 [310 square miles {mi^2}]) of land adjacent to the Savannah River, principally in Aiken and Barnwell counties, South Carolina. SRS is ~20 kilometers (km [12 miles {mi}]) southeast of Augusta, Georgia, and ~32 km (20 mi) south of Aiken, South Carolina (Figure 1).

SRS is owned by the USDOE. Savannah River Nuclear Solutions, LLC (SRNS) provides management and operating services. SRS has historically produced tritium, plutonium, and other special nuclear materials for national defense. Chemical and radioactive wastes are byproducts of nuclear material production processes. Hazardous substances, as defined by the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), are currently present in the environment at SRS.

The ECODS N-1, CSSLP, and Ford Building OU is located at the SRS in Barnwell County, South Carolina (Figure 1). A remedial action is needed at each subunit in the OU because contaminants are present that may pose a threat to human health (HH) and the environment. More specifically, asbestos is present in the subsurface at the ECODS N-1 subunit; arsenic is present in surface soil and sediment at the CSSLP subunit; cesium-137 (Cs-137) and polychlorinated biphenyls (PCBs) are present on the remnant concrete slab at the Ford Building subunit, and cobalt-60 (Co-60) is present in surface soils at the Ford Building subunit. The preferred remedial alternative for the ECODS N-1 and Ford Building subunits is land use controls (LUCs). LUCs were selected at these subunits because they are easily implemented and provide adequate protection from human exposure to contaminated media. As part of the selected remedy, the future land use for the ECODS N-1 and Ford Building subunits will be industrial. The preferred remedial alternative for the CSSLP subunit is excavation (hot spot removal) and disposal of contaminated surface soil and sediment. This remedy was selected because it also is effective in preventing exposure of contaminated media to human receptors and eliminates any long-term operations and maintenance at the unit. Following implementation of the preferred remedial alternative at the CSSLP subunit, LUCs will not be required, and the future land use for the CSSLP subunit will be unrestricted.

SRS Compliance History

SRS manages certain waste materials that are regulated under the Resource Conservation and Recovery Act (RCRA), a comprehensive law requiring responsible management of hazardous waste. The ECODS N-1, CSSLP, and Ford Building

OU is a solid waste management unit under RCRA Section 3004(u). SRS received a RCRA hazardous waste permit from the SCDHEC, which was most recently renewed on February 11, 2014 (SC1 890 008 989). Module VIII of the Hazardous and Solid Waste Amendments portion of the RCRA permit mandates corrective action requirements for nonregulated solid waste management units subject to RCRA 3004(u).

On December 21, 1989, SRS was included on the National Priorities List (NPL). The inclusion created a need to integrate the established RCRA Facility Investigation (RFI) program with CERCLA requirements to provide for a focused environmental program. In accordance with Section 120 of CERCLA 42 U.S.C. § 9620, USDOE has negotiated a Federal Facility Agreement (FFA) (FFA 1993) with the USEPA and SCDHEC to coordinate remedial activities at SRS into one comprehensive strategy, which fulfills these dual regulatory requirements. The FFA lists the ECODS N-1, CSSLP, and Ford Building OU as a RCRA/CERCLA unit requiring further evaluation using an investigation/assessment process that integrates and combines the RFI process with the CERCLA Remedial Investigation (RI) process to determine the actual or potential impact to HH and the environment.

Both RCRA and CERCLA require the public to be given an opportunity to review and comment on the draft RCRA permit modification and proposed remedial alternatives. Public participation requirements are listed in South Carolina Hazardous Waste Management Regulations (SCHWMR) R.61-79.124 and Sections 113 and 117 of CERCLA 42 U.S.C. § 9613 and 9617. These requirements include establishment of an Administrative Record File (ARF) that documents the investigation and selection of remedial alternatives and allows for review and comment by the public regarding those alternatives. (See Section II.) The ARF must be established at or near the facility at issue. The SRS FFA Community Involvement Plan (WSRC 2011) is designed to facilitate public involvement in the decision-making process for permitting, closure, and the selection of remedial alternatives. SCHWMR R.61-79.124 and Section 117(a) of CERCLA, as amended, require the advertisement of the draft permit modification and notice of any proposed remedial action, and provide the public an opportunity to participate in the selection of the remedial action.

SCHWMR R.61-79.124 requires that a brief description and response to all significant comments be made available to the public as part of the RCRA Administrative Record. Community involvement in consideration of this evaluation of alternatives for the ECODS N-1, CSSLP, and Ford Building OU is strongly encouraged. All submitted comments will be reviewed and considered. Following the public comment period, a Responsiveness Summary will be prepared to address issues raised during the public comment period. The Responsiveness Summary will be made available with the final RCRA permit modification and the Record of Decision (ROD).

The final remedial decision will be made only after the public comment period has ended and all the comments have been received and considered. The final remedial decision under RCRA will be in the form of a final permit modification, which is made by SCDHEC. Selection of the remedial alternative that will satisfy the FFA requirements will be made by USDOE, in consultation with USEPA and SCDHEC. It is important to note that the final action(s) may be different from the preferred alternative discussed in

this plan, depending on new information or public comments. The alternative chosen will be protective of HH and the environment and comply with all federal and state laws.

II. COMMUNITY PARTICIPATION

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

US Department of Energy
Public Reading Room
Gregg-Graniteville Library
University of South Carolina – Aiken
471 University Parkway
Aiken, South Carolina 29803
(803) 641-3504

Thomas Cooper Library
Government Information and Maps Department
University of South Carolina
1322 Greene Street
Columbia, South Carolina 29208
(803) 777-4841

Hard copies of the SB/PP are available at the following locations:

Reese Library
Government Information Department
Augusta University
2500 Walton Way
Augusta, Georgia 30904
(706) 737-1744

Asa H. Gordon Library
Savannah State University
2200 Tompkins Road
Savannah, Georgia 31404
(912) 358-4324

The RCRA ARF for SCDHEC is available for review by the public at the following locations:

The South Carolina Department of Health and Environmental Control
Bureau of Land and Waste Management
2600 Bull Street
Columbia, South Carolina 29201
(803) 898-2000

The South Carolina Department of Health and Environmental Control
Aiken Environmental Affairs Office
206 Beaufort Street, Northeast
Aiken, South Carolina 29801
(803) 642-1637

The public will be notified of the public comment period through mailings of the *SRS Environmental Bulletin*, a newsletter sent to citizens in South Carolina and Georgia, and through notices in the *Aiken Standard*, *The Augusta Chronicle*, *The People-Sentinel*, and *The State* newspapers. The public comment period will also be announced on local radio stations.

USDOE will provide an opportunity for a public meeting during the public comment period if significant interest is expressed. The public will be notified of the date, time, and location. At the meetings, the proposed action will be discussed, and questions about the action will be answered.

To request a public meeting during the public comment period, to obtain more information concerning this document, or to submit written comments, contact one of the following:

Barbara Smoak
Savannah River Nuclear Solutions, LLC
Savannah River Site
Building 730-1B
Aiken, South Carolina 29808
(803) 952-8060
barbara.smoak@srs.gov

The South Carolina Department of Health and Environmental Control
Attn: Ms. Stacey French, P.E., Director
Division of Waste Management
Bureau of Land and Waste Management
2600 Bull Street
Columbia, South Carolina 29201
(803) 898-2000

Following the public comment period, a ROD will be signed, and a final decision for the SRS RCRA permit will be issued. The ROD and RCRA permit will detail the remedial alternatives chosen for this operable unit and include responses to oral and written comments received during the public comment period in the Responsiveness Summary.

III. OPERABLE UNIT BACKGROUND

This OU is comprised of three subunits: ECODS N-1, CSSLP, and the Ford Building.

ECODS N-1 Subunit

ECODS N-1 is located south of N Area (i.e., Central Shops) within the Pen Branch Watershed (Figure 2). The subunit is ~100 meters (m) long by 15 m wide (350 feet [ft] long by 50 ft wide). ECODS N-1 is one of 25 ECODS at SRS that were identified by a review of early 1950s aerial photographs. These sites were used during the construction and early operation of SRS for disposal of construction debris and other non-radioactive waste materials. Waste disposed of in ECODS N-1 was buried in two trenches, each ~46 m (150 ft) long and located end-to-end. ECODS N-1 was used to dispose of trash and construction debris, some containing asbestos, associated with the construction and operation of N Area. A portion of one pit may have been used as a burn pit for disposing of combustible waste.

As reported in the Site Evaluation Report (SER) for ECODS N-1 (NBN) (WSRC 2001), ECODS N-1 is located in a relatively flat area that slopes gradually to the south. Ground surface elevation at ECODS N-1 is ~88 m (290 ft) mean sea level. Runoff from the subunit runs overland to the south and is collected by an unnamed tributary of Pen Branch, which is 360 m (1,200 ft) to the south. From this point, the unnamed tributary flows south for 1.9 km (1.2 mi) before discharging into Pen Branch, which then flows southwest for an additional 17 km (11 mi) before entering the Savannah River.

Historical aerial photographs revealed that the area where ECODS N-1 is located was farmland before construction began at SRS (WSRC 2001). ECODS N-1 was in use from August 1952 to June 1954. The U.S. Department of Agriculture Forest Service harvested timber and replanted ECODS N-1 in 2000. It is currently a wooded area containing mature pine trees, providing a moderate habitat quality for ecological receptors. A Site Evaluation characterization effort in 2001 collected 90 samples from three depth intervals at 27 locations for Target Analyte List (TAL) and Target Compound List (TCL) analyses (Figure 3). The SER concluded that further investigation was warranted, and ECODS N-1 was moved to the FFA Appendix C. The verified and validated data from the 2001 SER was used to support the baseline risk assessment (BRA) evaluation of the ECODS N-1 subunit.

In 2019, a pre-Work Plan characterization effort collected soil samples at the surface (0 to 0.3 m [0 to 1 ft]), shallow subsurface (0.3 to 1.2 m [1 to 4 ft]), and deep subsurface (2.4 to 3 m [8 to 10 ft] and 3 to 3.7 m [10 to 12 ft]) soils at 14 locations for TAL analysis (Figure 3). Sample locations were biased to locations

that exceeded the screening criteria in the 2001 SER and to vertically and horizontally bound 2001 Site Evaluation locations that had elevated metal results. Because of the history of burning at ECODS N-1, analyses for hexavalent chromium (Cr [VI]) were performed on the 2019 samples that were collected adjacent to the 2001 samples that showed elevated total chromium (Cr) levels at depth (2.4 to 3.0 m [8 to 10 ft]).

The 2020 RFI/RI Work Plan characterization focused biased sampling of locations with elevated metals that the 2019 pre-Work Plan characterization identified. The 2020 characterization also satisfied the need for subunit-specific background samples. In this characterization effort, 24 soil samples were collected from the ECODS N-1 subunit at the surface (0 to 0.3 m [0 to 1 ft]), shallow subsurface (0.3 to 1.2 m [1 to 4 ft]), and deep subsurface (2.4 to 3.0 m [8 to 10 ft], 3.0 to 3.6 m [10 to 12 ft]), and 5.4 to 6 m [18 to 20 ft]). The samples were analyzed for TAL metals, including Cr (VI), from three locations inside the subunit and three background locations outside of the unit boundary (Figure 3).

Suspected asbestos-containing material (ACM) (fragments of cementitious paneling) was encountered at the ECODS N-1 subunit during the 2020 characterization. The material, along with other construction debris, was recovered by hand auger at a depth of ~1 m (3 ft). Two of the three samples collected were verified positive for asbestos, indicating the presence of ACM within the subunit.

CSSLP Subunit

The CSSLP is located in the Fourmile Branch watershed in N Area (Figure 2). The area was cleared in 1951 and used for equipment laydown and rubble storage in addition to an area for burning construction-related material. Before 1951, the area was farmland. Starting in 1975, operating procedures called for the CSSLP to receive inert, nonhazardous materials, including items such as nails, hinges, scrap lumber, poles, crates, pallets, and unsalvageable wood products. Historically, the CSSLP was used to burn various unknown types and quantities of wood, which may have included treated lumber and creosote-treated wood. Historical burning at the CSSLP produced ash that was placed directly into Central Shops Burning/Rubble Pits (631-1G and 631-3G), which were closed under a ROD in 2002 (WSRC 2002). Active burning at the CSSLP ended in the mid-2000s. The CSSLP is currently sporadically covered by immature volunteer pine trees and provides marginal habitat quality for ecological receptors. Before 1996, a surface water impoundment area was created to capture surface water runoff from the CSSLP.

In 2019, a pre-Work Plan characterization effort collected soil samples from the CSSLP subunit at the surface (0 to 0.3 m [0 to 1 ft]), shallow subsurface (0.3 to 1.2 m [1 to 4 ft]), and deep subsurface (2.4 to 3 m [8 to 10 ft]) soils at 19 locations. Sample locations were arranged in a 30 m (100 ft) grid, covering the area of the CSSLP subunit (Figure 4). The soil samples were analyzed for the complete list of TAL and TCL constituents as well as radiological indicators.

In 2020, the RFI/RI Work Plan characterization better defined the nature and extent of contamination at some locations and identified whether elevated metal (including Cr [VI]) results were due to native soil conditions or related to unit operations. Thirty soil samples were collected from the CSSLP (Figure 4). Sample locations within the CSSLP focused on three background locations outside the unit boundary and

previously identified locations of elevated metal concentrations at six locations inside the CSSLP. The following soil intervals were sampled: surface (0 to 0.3 m [0 to 1 ft]), shallow subsurface (0.3 to 1.2 m [1 to 4 ft]), and deep subsurface (2.4 to 3.0 m [8 to 10 ft] and 3.0 to 3.6 m [10 to 12 ft]). All soil samples were analyzed for TAL metals, including Cr (VI). Sediment and surface water data (unfiltered and filtered) were also collected from the CSSLP surface water impoundment area and analyzed for TAL metals, including Cr (VI).

Ford Building Subunit

The Ford Building (690-N) is within the N Area facility boundary in the Pen Branch watershed (Figure 2). The Ford Building (690-N) was a one-story metal frame structure on a concrete pad, covering 900 square meters (m^2) [9,700 square feet {ft^2}]. The building was constructed in the 1950s to test Ford Company-manufactured motor control packages for control rod drive mechanisms before they were installed in the SRS reactors. The primary area of the building consisted of a machine shop with offices, storage rooms, restrooms, and a service area. During the early 1960s, the SRS reactors operated at higher power levels, prompting SRS to convert this facility from a testing facility to a location for heat exchanger repair/rework. A sealed shell was installed inside the original building frame with a ventilation and high-efficiency particulate air filter system to serve as a repair shop for leaking contaminated process water heat exchangers from the reactors. This mission continued until the procurement of new heat exchangers for the SRS reactors in the early 1970s. In the 1980s, the Ford Building (690-N) served the dual purpose of housing construction crews that performed minor repairs and as a place to store miscellaneous equipment and supplies. During the early 1990s, K-Reactor had a minor leak in a heat exchanger, requiring the Ford Building (690-N) to be reactivated for repair work. The facility operated for about six months to accommodate this work and was then closed. The Ford Building's (690-N) last use was to store excess equipment, which was chemically and/or radiologically contaminated, in waste containers (e.g., SeaLand containers) and/or bagged/wrapped in plastic. Services and utilities to the facility included domestic water, fire water, electrical power, sanitary sewer, and process sewer (SRNS 2019a).

The repair work performed in the Ford Building (690-N) generated wastewater contaminated with low levels of radioactivity and trace quantities of non-radioactive organic and inorganic compounds. Workers sent the wastewater to a 22,700 liter (6,000 gallon) underground retention tank adjacent to the Ford Building (690-N), where it was analyzed for radionuclides. Depending on the results, the wastewater was either released to the Ford Building Seepage Basin (904-91G) through an underground process sewer pipeline or transferred to other SRS operations for proper disposal (SRNS 2019a). The process sewer pipeline and underground retention tank were removed in 1998.

In 2014, concrete samples were collected inside the Ford Building (690-N) at 21 locations at two intervals: 0 to 15.2 centimeters (cm) (0 to 6 inches [in.]) and 15.2 to 30.5 cm [6 to 12 in.]). Soil samples were collected at the same 21 locations beneath the concrete slab at two soil intervals: 0 to 15.2 cm (0 to 6 in.) and 15.2 to 30.5 cm (6 to 12 in.). All concrete and soil samples were analyzed for the following constituents: Toxicity Characteristic Leaching Procedure RCRA metals, volatile organic compounds (VOCs), semi-VOCs,

PCBs, gross alpha, nonvolatile beta, tritium, and inorganic anions. Additionally, some samples were analyzed for alpha spectroscopy radionuclides, gamma spectroscopy radionuclides, and beta-emitting specific radionuclides. The concrete and soils data were used to evaluate contaminant migration (CM) to groundwater and to conduct a HH risk screening evaluation for the Ford Building (690-N) concrete slab and underlying soils in support of the deactivation and decommissioning (D&D) strategy for the facility (SRNS 2019b).

The HH screening evaluation for the Ford Building (690-N) concrete slab and underlying soils in support of the D&D strategy identified concrete with PCBs (Aroclor 1254 max in concrete = 15 milligrams per kilogram [mg/kg]) and Cs-137 (max in concrete = 1.75 picocuries per gram [pCi/g]) at levels that warrant concern with respect to HH (SRNS 2019b). No HH constituents of concern (COCs) were identified for underlying soils. No CM COCs were identified as part of the evaluation for the Ford Building (690-N) concrete slab and underlying soils in support of the D&D strategy.

In 2021, the D&D phase of the Ford Building (690-N) was completed and documented in the *Decommissioning Project Final Report Building 690-N, Process Heat Exchanger Repair Facility* (SRNS 2020). The structure was demolished to its slab, and an engineered concrete cover system was installed over the entire concrete remnant slab area extending out 0.3 m (1 ft) from the building edge (SRNS 2019c). The 15 cm (6 in.) concrete cover was designed to be compliant with PCB capping requirements found in Toxic Substances Control Act (40 Code of Federal Regulations [CFR] 761.61[1][7]). The concrete cover breaks the direct exposure pathway to PCBs. As a result of this barrier, PCBs were not identified as chemical-specific Applicable or Relevant and Appropriate Requirement (ARAR) refined constituents of concern (RCOCs) at the Ford Building. This cover also achieves the substantive requirements under 40 CFR 761.62I for risk-based disposal of bulk product waste. The unit does not pose an unreasonable risk of injury to health or the environment.

As part of the 2019 pre-Work Plan characterization, soil samples were taken at the surface (0 to 0.3 m [0 to 1 ft]), shallow subsurface (0.3 to 1.2 m [1 to 4 ft]), and deeper subsurface intervals (2.4 to 3 m [8 to 10 ft], 5.5 to 6.1 m [18 to 20 ft], and 8.5 to 9.0 m [28 to 30 ft]) around the Ford Building (690-N) subunit (Figure 5). The locations and depth intervals are identified as such:

— At the Excess Equipment Yard (745-N), 11 locations, spaced in a 10 to 15 m (30 to 50 ft) grid pattern, were collected from surface (0 to 0.3 m [0 to 1 ft]) and shallow subsurface (0.3 to 1.2 m [1 to 4 ft]) intervals, and one location from deeper subsurface intervals (2.4 to 3 m [8 to 10 ft], 5.5 to 6.1 m [18 to 20 ft], and 8.5 to 9.0 m [28 to 30 ft]);

— Around the perimeter of the Ford Building (690-N), the 13.8 kV Substation, and the Fuel Oil Tank Containment Dike, 16 locations using a biased sampling plan for areas of suspected contamination. Surface (0 to 0.3 m [0 to 1 ft]) and shallow subsurface (0.3 to 1.2 m [1 to 4 ft]) soil samples were collected at all 16 locations. At three of the 16 locations, soil samples were collected at deeper subsurface intervals (2.4 to 3 m [8 to 10 ft], 5.5 to 6.1 m [18 to 20 ft], and 8.5 to 9.0 m [28 to 30 ft]);

— Around the shielding remnant area, 11 locations using a biased sampling plan for areas of suspected contamination. Surface (0 to 0.3 m [0 to 1 ft]) and shallow subsurface (0.3 to 1.2 m [1 to 4 ft]) soil samples were collected at all 11 locations. At one of the locations, soil samples were collected at deeper subsurface intervals (2.4 to 3 m [8 to 10 ft], 5.5 to 6.1 m [18 to 20 ft], and 8.5 to 9.0 m [28 to 30 ft]);

All samples collected as part of the 2019 pre-Work Plan characterization effort were analyzed for the complete list of TAL constituents, TCL organic compounds, PCBs, and the radiological indicator parameters.

IV. SCOPE AND ROLE OF OPERABLE UNIT OR RESPONSE ACTION

To manage a comprehensive cleanup strategy, the site is divided into watersheds because of the complexity and size of multiple waste units located in different areas of the SRS. The SRS is segregated into six watersheds: Upper Three Runs, Lower Three Runs, Fourmile Branch, Steel Creek, Pen Branch, and the Savannah River and Floodplain Swamp (Figure 1). In addition, the SRS also identifies six Integrator Operable Units (IOUs), which are the surface water bodies and associated wetlands that correspond to the six respective watersheds. Waste units within a watershed may be evaluated and remediated individually or grouped with other waste units and evaluated as part of a larger Area OU. Upon disposition of all the waste units within a watershed, a final comprehensive ROD for the corresponding IOU (i.e., surface water and associated wetlands) will be pursued with additional public involvement. The ECODS N-1, CSSLP, and Ford Building OU is located within the Pen Branch and/or Fourmile Branch watersheds (Figure 2).

In 2003, a new strategy for environmental restoration at SRS was developed to accelerate cleanup completion. A key component of the plan is to implement an area-by-area remediation strategy. Through the sequencing of environmental restoration and decommissioning activities, environmental cleanup can be completed for entire areas of the SRS. In the FFA Revision 0 Appendix E for Fiscal Year 2014 submittal, based on a request from the USEPA and SCDHEC, the following subunits were separated from the N Area OU to become a standalone OU (USDOE 2013).

ECODS N-1 Subunit

No HH, ecological, or CM RCOCs were identified at the ECODS N-1 subunit. However, ACM was found in the subsurface soils and, therefore, presents a potential risk to human receptors should exposure occur. No principal threat source material (PTSM) is associated with the ECODS N-1 subunit.

The most likely future land use scenario at the ECODS N-1 is industrial. LUCs would be needed to prevent unrestricted use and protect HH from the buried waste that contains friable asbestos.

CSSLP Subunit

Arsenic was determined to be a potential threat to HH within surface soil and sediment at the CSSLP subunit. No ecological or CM RCOCs were identified at the CSSLP subunit, and no PTSM was found to be present.

Industrial land use is the most likely future land use scenario at the CSSLP, and an excavation (hot spot

removal) and disposal action is proposed to allow for unrestricted use after completion. LUCs and five-year remedy reviews would not be necessary upon completing the remedial action, thereby eliminating any long-term requirements. The proposed remedial action protects HH from elevated levels of arsenic within the subunit.

Ford Building subunit

During characterization in support of the D&D strategy for the Ford Building subunit, PCBs and Cs-137 were found to be present on the remnant concrete slab and expansion joint material. To break the direct exposure pathway and eliminate the exposure risk to HH from PCBs and Cs-137, an engineered concrete cover system was installed over the entire concrete remnant slab (SRNS 2019c). No HH COCs were identified from soils beneath the remnant slab. No CM COCs were identified from the concrete remnant slab or underlying soils in support of the D&D strategy.

Post D&D characterization identified Co-60 in the soils surrounding the remnant slab as a potential threat to HH. No ecological or CM RCOCs were identified for the Ford Building subunit, and no PTSM was found to be present.

Industrial land use is the most likely future land use scenario at the Ford Building subunit. LUCs would be needed to prevent unrestricted use in order to ensure the integrity of the concrete cover system is not compromised and to prevent exposure the identified COCs.

V. SUMMARY OF SITE RISKS

This section identifies the basis for taking action and identifies the contaminants that were retained following a weight-of-evidence evaluation (i.e., RCOCs) and exposure pathways that the remedial actions need to address. Additional information pertaining to the risk assessment is in the RFI/RI/BRA/Corrective Measures Study (CMS)/ Feasibility Study (FS) (SRNS 2022).

Summary of Human Health Risk Assessment

The HH risk assessment evaluates the potential for adverse effects associated with exposure to constituents present at the ECODS N-1, CSSLP, and Ford Building OU. The assessment for each subunit estimates the risk potential in the absence of any remedial action and provides a basis for determining whether a remedial action is necessary.

Each subunit in the OU is in an area currently designated for industrial use. No current or projected future development of the OU is planned, nor is the current land use expected to change. Nevertheless, to support the risk management decision-making, both the residential (unrestricted) and industrial land use scenarios are evaluated.

The hypothetical receptors evaluated include the future resident and the future industrial worker. A description of each is presented below.

The *future resident* receptor scenario evaluates long-term risks to individuals assumed to have unrestricted use of the area. This scenario considers residents (adults and children) who hypothetically live on the subunits and are exposed chronically, both indoors and outdoors, to subunit contaminants. The standard exposure assumptions are 26 years, 350 days

per year, and 24 hours per day. Exposure routes associated with soil and sediment include inhalation of particulates and vapors, external exposure to radiation, dermal absorption, and incidental ingestion.

The future resident receptor scenario is also evaluated for the surface water media. This includes a comparison of constituents to surface water threshold levels based on regulatory-based limits (i.e., maximum contaminant levels) or risk-based threshold values, as appropriate.

The *future industrial worker* scenario is a standard USEPA exposure scenario that addresses long-term risks to workers who are exposed to subunit contaminants within an industrial setting. The standard exposure assumptions are 25 years, 250 days per year, and 8 hours per day. The USEPA refers to this receptor as "composite worker," and it is analogous to the term "industrial worker" used herein. The future industrial worker scenario considers an adult who hypothetically works on-unit in an outdoor setting most of the time. Exposure routes include inhalation, external exposure to radiation, dermal absorption, and incidental ingestion of soil and sediment.

HH RCOCs were identified for the future resident and future industrial worker scenarios at each subunit in the ECODS N-1, CSSLP, and Ford Building OU.

Summary of Ecological Risk Assessment

The ecological risk assessment consists of steps that provide a scientifically based and defensible evaluation of exposure and hazard to ecological resources that will support a risk management decision regarding site remediation.

Ecological risk is associated with the potential for harmful effects to ecological systems resulting from exposure to an environmental stressor. A stressor is any physical, chemical, or biological entity that induces an environmental response. Stressors may adversely affect specific natural resources or entire ecosystems, including plants and animals, as well as the environment with which they interact. There were no ecological RCOCs identified for the ECODS N-1, CSSLP, and Ford Building OU.

Summary of Contaminant Fate and Transport Analysis

A CM analysis determined the potential for groundwater contamination and assessed the migration potential of residual vadose zone contaminants. The analysis did not identify any CM RCOCs and concluded that contaminants are not present in any soil or sediment that would leach to groundwater at concentrations greater than drinking water standards within 1,000 years.

Principal Threat Source Material (PTSM) Evaluation

An evaluation for source materials that are highly toxic was conducted as part of the PTSM assessment in the RFI/RI/BRA/CMS/FS document (SRNS 2022). The quantitative evaluation concluded that there are no contaminants that constitute PTSM at the ECODS N-1, CSSLP, and Ford Building OU.

Problems Warranting Action

As determined in the RFI/RI/BRA/CMS/FS (SRNS 2022), problems warranting action are identified at each subunit in the ECODS N-1, CSSLP, and Ford Building OU under the potential future resident and industrial worker scenarios. There are no ecological,

contaminant migration, or PTSM RCOCs for the three subunits. The HH RCOCs and problems warranting action for each subunit are summarized below.

ECODS N-1 Subunit

- ACM is present in subsurface soils that may pose a risk to human receptors if exposed.

CSSLP Subunit

- Upland Area: Arsenic is present in surface soil (0 to 0.3 [0 to 1 ft]) (exposure point concentration [EPC] = 16.4 mg/kg) at a concentration exceeding the 1E-06 risk level for the resident (risk = 2.4E-05) and industrial worker (risk = 5.5E-06) scenarios (Figure 6).
- Surface Water Impoundment Area: Arsenic is present in surface sediment (0 to 0.3 [0 to 1 ft]) (EPC = 8.27 mg/kg) at a concentration exceeding the 1E-06 risk level for the resident (risk = 1.2E-05) and industrial worker (risk = 2.8E-06) scenarios (Figure 6).

Ford Building Subunit

- Ford Building (690-N) slab: Before an engineered concrete cover system was installed in 2021, PCBs (Aroclor 1254 and 1260) and Cs-137(+D) were present at the Ford Building remnant concrete slab at concentrations that exceed the 1E-06 risk level for the resident and industrial worker scenarios.
- Co-60 is present in surface soil (0 to 1 ft) (EPC = 0.545 pCi/g), exceeding the 1E-06 level of concern for the resident (risk = 5.5E-05) and industrial worker (risk = 1.1E-05) scenarios (Figure 7).

Conclusion

Actual or threatened releases of hazardous substances from this waste unit, if not addressed by the Preferred Alternative or one of the other active measures considered, may present a current or potential threat to public health, welfare, or the environment.

VI. REMEDIAL ACTION OBJECTIVES

Remedial action objectives (RAOs) are media- or OU-specific objectives to protect HH and the environment and serve as framework for developing remedial alternatives. RAOs usually specify potential receptors and exposure pathways. The RAOs are based on the nature and extent of contamination, threatened resources, and the potential for human and environmental exposure. They are identified during project scoping once the conceptual site model is understood and describe what the remediation must accomplish.

The future land use of the ECODS N-1, CSSLP, and Ford Building OU is assumed to be industrial land use with DOE maintaining control of the land. The following RAOs have been identified for the ECODS N-1, CSSLP, and Ford Building OU to support the future land use.

ECODS N-1 Subunit

- Prevent residential and industrial exposure to friable asbestos present in the subsurface. The primary route of exposure is the inhalation pathway.

CSSLP Subunit

- Prevent residential and industrial exposure to arsenic in surface soils in the Upland Area at levels exceeding 1E-06 risk and/or SRS background concentration. The primary route of exposure is the incidental ingestion pathway.

  Prevent residential and industrial exposure to arsenic in surface sediments in the Surface Water Impoundment Area at levels exceeding 1E-06 risk and/or SRS background concentration. The primary route of exposure is the incidental ingestion pathway.

Ford Building Subunit

- Prevent residential and industrial exposure to PCBs and Cs-137 at the Ford Building (690-N) remnant concrete slab at levels exceeding 1E-06 risk and PCB ARAR of 1 mg/kg for free release. There is no HH exposure risk under the current configuration (i.e., no exposure pathway).

- Prevent residential and industrial exposure to Co-60 in surface soils at levels exceeding 1E-06 risk. The primary route of exposure is the external radiation pathway.

Preliminary Remedial Goals

Preliminary Remedial Goals (PRGs) provide a range of cleanup goals for each COC and are typically identified along with the RAOs. These cleanup goals are either concentration levels that correspond to a specific risk or hazard or are based on ARARs. Following public comment and approval of the SB/PP, the PRGs for the selected remedy are documented as final cleanup goals or remedial goals (RGs) in the ROD.

The RFI/RI/BRA/CMS/FS presents a range of HH PRGs corresponding to target cancer risks of 1E-06 (SRNS 2022). PRGs were calculated for the future resident and future industrial worker scenarios and are presented in Table 1.

Applicable or Relevant and Appropriate Requirements

ARARs are cleanup standards, standards of control, and other substantive requirements, criteria or limitations promulgated under federal, state, or local environmental laws. They specifically address a hazardous substance, pollutant, contaminant, remedial action, location, or other circumstance at a CERCLA site. Section 121(d) of CERCLA, as amended by the Superfund Amendments Reauthorization Act, requires that remedial actions comply with requirements and standards set forth under federal and state environmental laws.

Three categories of ARARs are identified to clarify how to identify and comply with environmental requirements. They include action-specific, location-specific, and chemical-specific requirements:

- Action-specific ARARs control or restrict the design, performance, and other aspects of implementing specific remedial activities;

- Location-specific ARARs reflect the physiographic and environmental characteristics of the unit or the immediate area, and may restrict or preclude remedial actions depending on the location or the characteristics of the unit;

- Chemical-specific ARARs are media-specific concentration limits promulgated under federal or state law.

A summary of the ARARs for the preferred alternative for the CSSLP subunit and Ford Building subunit are presented in Tables 2 and 3, respectively. No ARARs were identified at the ECODS N-1 subunit.

VII. SUMMARY OF REMEDIAL ALTERNATIVES

The range of alternatives includes options that 1) restrict exposure to contaminated media; 2) reduce exposure to contaminated media; and 3) eliminate exposure to contaminated media. Remedial alternatives were developed for each subunit as described below. A detailed cost analysis for the proposed alternatives is provided in Appendix A.

ECODS N-1 Subunit

Alternative A-1: No Action

The National Contingency Plan (NCP) requires the No Action alternative to serve as a baseline for comparison with other remedial alternatives. Under this alternative, no effort would be made to control access, limit exposure, or reduce toxicity, mobility, or volume of COCs at the ECODS N-1 subunit. This alternative would leave the ECODS N-1 subunit in its current condition with no additional controls. This alternative does not include five-year remedy reviews.

Summary of Costs

Capital Cost $0
Operation and Maintenance (O&M)..... $0
Total Present-Worth Cost $0

Alternative A-2: Land Use Controls

This alternative uses LUCs to limit access to the entire ECODS N-1 subunit. LUCs have been implemented successfully within SRS and are fully employed in all areas of the site to limit access at the site boundary and on-site facilities. LUCs would be implemented at the ECODS N-1 subunit through warning signs indicating the presence of asbestos-containing material and no trespassing, excavation permit restrictions, a Land Use Control Implementation Plan (LUCIP), and deed restrictions in the event the property is ever sold. This alternative would require five-year remedy reviews.

Summary of Costs

Capital Cost $27,225
O&M $244,170
Total Present-Worth Cost $271,396

Alternative A-3: Excavation and Disposal

Alternative A-3 consists of excavating all contaminated media within the ECODS N-1 subunit and disposing off-site. Specifically, this remedial alternative includes clearing ~0.2 hectare (ha [0.5 acres {ac}]), the removal and offsite disposal of ~4,400 cubic meters (m^3 [5,800 cubic yards {yd^3}]) of contaminated media to a depth of 2 m (8 ft) below the ground surface (the bottom depth of the disposal pits), and backfilling with clean fill to grade. Alternative A-3 would not require LUCs or five-year remedy reviews.

This alternative was not retained for further detailed analysis due to the special permits, worker requirements, and work controls that must be put in place for contact with asbestos. This alternative was also significantly higher in cost due to the excavation of contaminated media from the entire subunit (to the bottom of the disposal pits).

CSSLP Subunit

Alternative B-1: No Action

The NPC requires the No Action alternative to serve as a baseline for comparison with other remedial alternatives. Under this alternative, no effort would be made to control access, limit exposure, or reduce toxicity, mobility, or volume of COCs at the CSSLP subunit. This alternative would leave the CSSLP subunit in its current condition with no additional controls. This alternative does not include five-year remedy reviews.

Summary of Costs

Capital Cost $0
O&M $0
Total Present-Worth Cost $0

Alternative B-2: Land Use Controls

This alternative uses LUCs to limit access to the entire CSSLP subunit. LUCs have been implemented successfully within SRS and are fully employed in all areas of the site to limit access at the site boundary and on-site facilities. LUCs would be implemented at the CSSLP subunit through warning and no trespassing signs, excavation permit restrictions, a LUCIP, and deed restrictions in the event the property is ever sold. This alternative would require five-year remedy reviews.

Summary of Costs

Capital Cost $27,759
O&M $317,802
Total Present-Worth Cost $345,561

Alternative B-3: ...Soil Cover with Land Use Controls

Alternative B-3 consists of using a containment technology in which a 0.6 m (2 ft) soil cover would be placed over the entire area of the CSSLP subunit (Upland Area and Surface Water Impoundment Area). Specifically, this remedial alternative includes releasing ~1,300,000 liters (L [350,000 gallons {gal}]) of stormwater from the Surface Water Impoundment Area, clearing and grubbing ~2.4 ha (5.8 ac), hauling and placing ~10,800 m^3 (14,100 yd^3) of clean soil to grade and contour the soil cover, hauling and placing ~2,100 m^3 (2,800 yd^3) of topsoil to construct a vegetated cover over the footprint, and constructing a stormwater management system. To facilitate installing a soil cover over the existing Surface Water Impoundment Area, the contained stormwater would be managed by releasing water through a stormwater Best Management Practice (BMP) sediment control feature (i.e., check dams, silt fences, etc.) to eliminate sediment migration. Alternative B-3 would also require LUCs to maintain the soil cover and five-year remedy reviews.

Summary of Costs

Capital Cost $2,613,143
O&M $423,908
Total Present-Worth Cost $3,037,051

Alternative B-4: Excavation (Hot Spot Removal) and Disposal

Alternative B-4 consists of excavating contaminated media exceeding the cleanup level and disposing of it off-site (Figure 8). Specifically, this remedial alternative includes releasing ~1,300,000 L (350,000 gal) of stormwater from the Surface Water Impoundment Area, clearing and grubbing ~0.8 ha (1.9 ac), the removal and offsite disposal of ~1,800 m^3

(2,300 yd^3) of contaminated media to a depth of 0.3 m (1 ft) below ground surface, backfilling with ~1,400 m^3 (1,900 yd^3) of clean fill and 720 m^3 (940 yd^3) of topsoil to grade, and constructing a stormwater management system. To complete the excavation of the sediment hot spot within the Surface Water Impoundment Area, contained stormwater will be managed by releasing water through a stormwater BMP sediment control feature (i.e., check dams, silt fences, etc.) to eliminate sediment migration. Pre-excavation sampling would be conducted to confirm the lateral extent of the area to be excavated. A Sampling and Analysis Plan would include a sampling design as well as sample collection and analytical methods that would be developed and presented in the Corrective Measures Implementation/ Remedial Action Implementation Plan (CMI/RAIP). Alternative B-4 would not require LUCs or five-year remedy reviews because removing the contaminated media would result in concentrations not exceeding the cleanup level.

Summary of Costs

Capital Cost $889,606
O&M $11,322
Total Present-Worth Cost $900,928

Ford Building Subunit

Alternative C-1: No Action

The NPC requires the No Action alternative to serve as a baseline for comparison with other remedial alternatives. Under this alternative, no effort would be made to control access, limit exposure, or reduce toxicity, mobility, or volume of COCs at the Ford Building subunit. This alternative would leave the Ford Building subunit in its current condition with no additional controls. This alternative does not include five-year remedy reviews.

Summary of Costs

Capital Cost $0
O&M $0
Total Present-Worth Cost $0

Alternative C-2: Land Use Controls

This alternative uses LUCs to limit access to the Ford Building subunit. LUCs have been implemented successfully within SRS and are fully employed in all areas of the site to limit access at the site boundary and on-site facilities. LUCs would be implemented at the Ford Building subunit through warning and no trespassing signs, a LUCIP, and deed restrictions in the event the property is ever sold. Additionally, a concrete cover exists over the Ford Building remnant slab. Therefore, this alternative would include the need for O&M of the concrete cover. O&M would include inspections and repairs, as needed, to ensure the integrity of the concrete cover. This alternative would require five-year remedy reviews.

Summary of Costs

Capital Cost $27,225
O&M $650,388
Total Present-Worth Cost $677,613

Alternative C-3: Excavation (Hot Spot Removal) and Disposal with LUCs

Alternative C-3 consists of excavating contaminated media exceeding the cleanup level and disposing of it off-site. Specifically, this remedial alternative includes removing ~20 cm (9 in.) of gravel from a 1 m by 1 m (3 ft by 3 ft) area that currently exists adjacent to the Ford Building concrete cover, the

removal and offsite disposal of ~0.3 m^3 (0.4 yd^3) of contaminated media to a depth of 0.3 m (1 ft) below ground surface, backfilling with ~0.2 m^3 (0.3 yd^3) of clean fill and 0.10 m^3 (0.13 yd^3) of topsoil to grade, and replacing the removed gravel to grade. Pre-excavation sampling would be conducted to confirm the lateral extent of the area to be excavated. A Sampling and Analysis Plan to include a sampling design as well as sample collection and analytical methods would be developed and presented in the CMI/RAIP. Alternative C-3 would require LUCs to maintain the integrity of the concrete cover that exists over the Ford Building remnant slab. This alternative would require five-year remedy reviews.

Summary of Costs

Capital Cost $63,358
O&M $650,388
Total Present-Worth Cost $713,746

VIII. EVALUATION OF ALTERNATIVES

This section summarizes the results of the evaluation of the remedial alternatives presented in the RFI/RI/BRA/CMS/FS (SRNS 2022).

The NCP [40 CFR 300.430(e)(9)] requires that potential remedial alternatives undergo detailed analysis using relevant evaluation criteria to select a final remedy. USEPA has established nine evaluation criteria to address the statutory requirements under CERCLA. The criteria fall into categories of threshold criteria, primary balancing criteria, and modifying criteria. The nine evaluation criteria are detailed in Table 4.

Comparative Analysis of Alternatives

The potential remedial alternatives have been evaluated against the threshold and primary balancing criteria. Modifying criteria (i.e. state or support agency acceptance and community acceptance) will be evaluated after the public comment period on the SB/PP. The key advantages and disadvantages for each alternative relative to one another and in relation to the two threshold criteria and five primary balancing criteria are discussed below and included in Table 5 (ECODS N-1 subunit), Table 6 (CSSLP subunit), and Table 7 (Ford Building subunit).

ECODS N-1 Subunit

Overall Protection of HH and the Environment

Only Alternative A-2, is protective of HH and the environment. Alternative A-1 creates a potential for human exposure to asbestos. Alternative A-2 limits exposure to the contaminated media through the implementation of engineering and administrative controls.

Compliance with ARARs

No ARARs exist for Alternative A-1 or A-2.

Short-Term Effectiveness

Alternative A-1 has no controls to prevent exposure in the short term and ranked the lowest. Alternative A-2 ranked high because it poses no risk to the industrial worker or surrounding community during implementation.

Long-Term Effectiveness and Permanence

Alternative A-1 is not effective in the long-term because exposure is not prevented, therefore it ranked lowest. Alternative A-2 ranked above Alternative

A-1 because it remains effective as long as LUCs are in place.

Reduction of Toxicity, Mobility, or Volume through Treatment

None of the alternatives employs any treatment to reduce the toxicity, mobility, or volume of the contaminated media. As such, both alternatives were given an equally low ranking.

Implementability

Alternative A-1 ranked the highest because it does not require implementation. Alternative A-2 ranked slightly lower than Alternative A-1 because it requires only administrative and engineering controls to implement.

Cost

The total present-worth cost for each of the alternatives is provided below:

Alternative A-1 No Action: $0

Alternative A-2 Land Use Controls: $271,396

CSSLP Subunit

Overall Protection of HH and the Environment

Except for Alternative B-1, all alternatives are protective of HH and the environment. Alternative B-2 limits exposure to the contaminated media through implementing engineering and administrative controls. Alternative B-3 breaks the exposure pathway by placing clean fill over the contaminated media. Alternative B-4 physically removes the contamination via excavation and offsite disposal and places clean fill to grade.

Compliance with ARARs

There are no ARARs associated with Alternatives B-1 or B-2. Alternatives B-3 and B-4 use BMPs to achieve the action-specific ARARs to minimize sediment erosion and manage storm water runoff. Alternative B-4, which includes disposal and transportation of solid waste, would meet SCDHEC requirements through an existing approved disposal facility such as Three Rivers Landfill.

Short-Term Effectiveness

Alternative B-1 is not effective in the short-term because it does not prevent exposure. Therefore, it ranked lowest of all the alternatives. Alternative B-2 ranked high because it poses no risk to the industrial worker or surrounding community during implementation and because of the short implementation time. Alternatives B-3 and B-4 were ranked equally, and both slightly lower than Alternative B-2 due to the injury risk to the industrial worker during implementation. However, health and safety measures typically mitigate the risk. Alternatives B-3 and B-4 also take longer to implement than Alternative B-2.

Long-Term Effectiveness and Permanence

Alternative B-1 is not effective in the long-term because it does not prevent exposure. Therefore, it ranked lowest of all the alternatives. Alternative B-4 ranked the highest in long-term effectiveness, as this alternative includes excavating contaminated media and leaves no contamination in place. Alternative B-3 ranked slightly above Alternative B-2 due to the addition of a soil cover to limit direct exposure to the contaminated media; whereas, Alternative B-2 relies primarily on administrative controls.

Reduction of Toxicity, Mobility, or Volume through Treatment

None of the alternatives employs any treatment to reduce the toxicity, mobility, or volume of the contaminated media. As such, all alternatives were given an equally low ranking.

Implementability

Alternatives B-3 and B-4 were ranked equally in terms of implementability due to SRS's considerable experience in administrating both types of alternatives successfully. Alternative B-2 ranked above Alternatives B-3 and B-4 because it requires only administrative and engineering controls to implement. There is no implementation necessary for Alternative B-1; therefore, this alternative ranked highest.

Cost

The total present-worth cost for each of the alternatives is provided below:

Alternative B-1: No Action: $0

Alternative B-2: Land Use Controls: $345,561

Alternative B-3: Soil Cover with LUCs: .$3,037,051

Alternative B-4: Excavation (Hot Spot Removal) and Disposal: ..$900,928

Ford Building Subunit

Overall Protection of HH and the Environment

Except for Alternative C-1, all alternatives protect HH and the environment. Alternative C-2 limits exposure to the contaminated media by implementing engineering and administrative controls. Alternative C-3 physically removes the contamination via excavation and offsite disposal, and limits exposure through engineering and administrative controls to maintain the existing concrete cover.

Compliance with ARARs

Chemical-specific ARARs for Alternatives C-1, C-2, and C-3 include the disposal of PCB bulk product waste. Alternative C-1 does not achieve the chemical-specific ARAR. Alternatives C-2 and C-3 achieve the chemical-specific ARAR through an existing concrete cover designed to comply with PCB capping requirements and through the associated O&M to maintain the integrity of the concrete cover. Action-specific ARARs for Alternative C-3, include characterizing low-level waste, and disposing of and transporting solid waste. These ARARs are achievable through direct or indirect methods to characterize the waste and by using an existing approved disposal facility such as Three Rivers Landfill.

Short-Term Effectiveness

Alternative C-1 is not effective in the short-term because it does not prevent exposure. Therefore, it ranked lowest of all the alternatives. Alternative C-2 ranked the highest because it poses no risk to the industrial worker or surrounding community during implementation, and because of its short implementation time. Alternative C-3 ranked slightly lower than Alternative C-2 due to the potential for injury to the industrial worker during implementation. However, health and safety measures typically mitigate the risk.

Long-Term Effectiveness and Permanence

Alternative C-1 is not effective in the long-term because it does not prevent exposure. Therefore, it ranked lowest of all the alternatives. Alternative C-3

ranked slightly above Alternative C-2 in the long-term because it permanently removes all contaminated media identified in the soils surrounding the slab. However, due to the short half-life (~5.3 years) of Co-60, the risks to the industrial worker will be below 1E-06 within 20 years, thereby eliminating any long-term requirements. Only engineering and administrative controls to limit exposure to contaminants left in place below the existing concrete cover system will be necessary in the long-term. These controls would be implemented under both alternatives.

Reduction of Toxicity, Mobility, or Volume through Treatment

None of the alternatives employs any treatment to reduce the toxicity, mobility, or volume of the contaminated media. As such, all alternatives were given an equally low ranking.

Implementability

Alternative C-3 ranked the lowest regarding implementability because it requires soil from a small area to be excavated, transported, and disposed of, along with engineering and administrative controls to maintain the existing concrete cover. Alternative C-2 ranked slightly better than Alternative C-3 because its implementation requires only administrative and engineering controls. There is no implementation of Alternative C-1; therefore, this alternative ranked highest.

Cost

The total present-worth cost for each of the alternatives is provided below:

Alternative C-1: No Action: $0

Alternative C-2: Land Use Controls: $677,613

Alternative C-3: Excavation (Hot Spot Removal) and Disposal with LUCs: $713,746

IX. PREFERRED ALTERNATIVE

A comparative alternative analysis, provided in Table 8, for the ECODS N-1, CSSLP, and Ford Building OU was developed to quantitatively evaluate the alternatives as they relate to the CERCLA criteria. This analysis does not necessarily select the preferred alternative, although it does attempt to rank the remedies in order of superiority when compared to the CERCLA criteria. The preferred alternative for each subunit is identified below:

ECODS N-1 subunit: Alternative A-2, LUCs to prevent human exposure to friable asbestos that is present in the subsurface. Alternative A-2 was chosen as the preferred remedy at the ECODS N-1 subunit due to the overall protection and effectiveness of the remedy when compared to Alternative A-1. LUCs has also been the selected remedy for many other ECODS sites across SRS.

CSSLP subunit: Alternative B-4, Excavation (Hot Spot Removal) and Disposal of arsenic-contaminated surface soil and sediment to prevent human exposure. Alternative B-4 was the preferred remedy for the CSSLP subunit because of the benefit of not requiring further action after the remedial action is complete, unlike the other alternatives.

Ford Building subunit: Alternative C-2, LUCs to prevent human exposure to Cs-137 and PCBs on the remnant concrete slab and Co-60 in surface soils surrounding the slab. Alternative C-2 was the preferred remedy at the Ford Building subunit due to

the short half-life (~5.3 years) of Co-60. The risks to the industrial worker will be below 1E-06 within 20 years, thereby eliminating any long-term requirements other than LUCs for the concrete cover.

LUCs for the ECODS N-1 subunit and Ford Building subunit include the following:

- Warning signs posted at each subunit around the waste unit boundaries/areas. Operations and maintenance of the signage. Operations and maintenance of the concrete cover over the Ford Building remnant slab.
- Administrative/Worker Access Controls: Includes SRS administrative controls and land use restrictions for onsite workers as implemented under the Site Use/Site Clearance Program and other controls that are in place to ensure worker safety, including work controls/work packages that include worker training, and health and safety requirements and pre-work briefings.
- Engineering controls: SRS access controls that limit and inform SRS workers and inadvertent 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 preferred remedy for the ECODS N-1, CSSLP, and Ford Building OU leaves hazardous substances in place that pose a potential future risk to HH and will require land use restrictions indefinitely. As negotiated with USEPA, and in accordance with USEPA – Region 4 Policy (*Assuring Land Use Controls at Federal Facilities*, April 21, 1998), SRS has developed a Land Use Control Assurance Plan (LUCAP) (WSRC 1999) to ensure that land use restrictions are maintained and periodically verified. The unit-specific LUCIP that will be referenced in the ROD for the ECODS N-1, CSSLP, and Ford Building OU will provide details and specific measures required for the LUCs selected as part of this preferred remedy. The USDOE is responsible for implementing, maintaining, monitoring, reporting upon, and enforcing the LUCs described in this SB/PP. The LUCIP, developed as part of this action, will be submitted concurrently with the CMI/RAIP, as required in the FFA for review and approval by USEPA and SCDHEC. Upon final approval, the LUCIP will be appended to the LUCAP and is considered incorporated by reference into the ECODS N-1, CSSLP, and Ford Building OU ROD, establishing LUC implementation and maintenance requirements enforceable under CERCLA. The approved LUCIP will establish implementation, monitoring, maintenance, reporting, and enforcement requirements for the unit. The LUCIP will remain in effect until modified as needed to be protective of HH and the environment. LUCIP modification will occur only through another CERCLA document. USEPA and SCDHEC approval is required for any modification or termination of the LUCs.

The Preferred Alternative can change in response to public comment or new information obtained before the remedial action is implemented at the individual subunits.

The preferred remedy at the ECODS N-1, CSSLP, and Ford Building OU was selected based on the following:

ECODS N-1 subunit: Alternative A-2, LUCs was selected as the preferred alternative over Alternative A-1, No Action, because it does not achieve the RAOs

identified at the subunit. Individuals would not be provided protection from potentially being exposed to asbestos under Alternative A-1. Alternative A-2 addresses the risk to the human receptors by limiting access and restricting excavation at the waste unit, eliminating the potential exposure to asbestos in subsurface soils. Alternative A-2 does achieve the RAO identified at this subunit. LUCs have also been the selected remedy for many other ECODS sites across SRS and have proven to be effective.

CSSLP subunit: Alternative B-4, Excavation (Hot Spot Removal) and Disposal was selected as the preferred alternative over the other alternatives due to the benefit of no further action being required after the remedial action is completed. Other alternatives would require long-term operations and maintenance to mitigate the risk to HH at the subunit. Alternative B-4 eliminates the potential risk by removing all contaminated media within the surface soils and surface sediments. Implementing this alternative would achieve the identified RAO at the subunit. Alternative B-4 achieves the applicable ARARs discussed in Table 2 by employing BMPs to minimize sediment erosion and to manage storm water runoff. Alternative B-4 would also meet the SCDHEC requirements for disposing of and transporting solid waste, through an existing approved disposal facility such as Three Rivers Landfill.

Ford Building subunit: Alternative C-2, was selected as the preferred remedy at the Ford Building subunit due to the short half-life (~5.3 years) of Co-60. The risk to HH from Co-60 will be below 1E-06 within 20 years, thereby eliminating any long-term requirements other than LUCs for the concrete cover system. Alternative C-3 uses excavation and disposal to address the area of soil that is contaminated with Co-60. However, as mentioned above, LUCs would still be necessary under Alternative C-3 due to the need for continued maintenance of the concrete cover system. The concrete cover system is necessary to prevent an unacceptable exposure to human receptors from Cs-137 and PCBs located on the remnant slab. By implementing only LUCs, as identified under Alternative C-2, the risk from Cs-137 and PCBs as well as Co-60 is addressed by restricting access to the waste site and thereby achieving the identified RAOs. Alternative C-2 also achieves the chemical-specific ARAR discussed in Table 3 through an existing concrete cover designed to be compliant with PCB capping requirements, and through associated O&M to maintain the integrity of the concrete cover.

Based on information currently available, the lead agency believes that Alternative A-2, B-4, and C-2 provides the best balance of trade-offs among the other alternatives with respect to the evaluation criteria. The USDOE expects the Preferred Alternative to satisfy the statutory requirements in CERCLA Section 121(b) to: 1) be protective of HH and the environment, 2) comply with ARARs, and 3) be cost-effective.

X. POST-ROD SCHEDULE

Deliverable	Submittal Date
Submit Rev. 0, Record of Decision	March 20, 2023
Submit Rev. 0, Corrective Measures Implementation/RA Implementation Plan	August 15, 2023
Submit Rev. 0, Land Use Control Implementation Plan	August 15, 2023
Issuance of the Record of Decision	December 12, 2023
Remedial Action Start	December 16, 2024

XI. REFERENCES

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XII. GLOSSARY

Administrative Record File (ARF): A file that is maintained and contains all information used to make a decision on the selection of a response action under the Comprehensive Environmental Response, Compensation and Liability Act. This file is to be available for public review, and a copy is to be established at or near the Site, usually at one of the information repositories. Also a duplicate file is held in a central location, such as a regional or state office.

Applicable or Relevant and Appropriate Requirement (ARARs): Applicable, or Relevant and Appropriate Requirements. Refers to the federal and state requirements that a selected remedy will attain. These requirements may vary from site to site.

Baseline Risk Assessment (BRA): Analysis of the potential adverse health effects (current or future) caused by hazardous substance release from a site in the absence of any actions to control or mitigate these releases.

Characterization: The compilation of all available data about the waste units to determine the rate and extent of CM resulting from the waste site, and the concentration of any contaminants that may be present.

Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), 1980: A federal law passed in 1980 and modified in 1986 by the Superfund Amendments and Reauthorization Act.

Corrective Action: A USEPA requirement to conduct remedial procedures under RCRA 3004(u) at a facility when there has been a release of hazardous waste or constituents into the environment. Corrective action may be required beyond the facility boundary and can be required regardless of when the waste was placed at the facility.

Exposure: Contact of an organism with a chemical or physical agent. Exposure is quantified as the amount of the agent available at the exchange boundaries of the organism (e.g., skin, lungs, digestive tract, etc.) and available for absorption.

Federal Facility Agreement (FFA): The legally binding agreement between regulatory agencies (USEPA and SCDHEC) and regulated entities (USDOE) that sets the standards and schedules for the comprehensive remediation of the SRS.

Land Use Controls (LUC): Legal and/or administrative mechanisms as well as physical installations that modify or guide human behavior at operable units where residual contamination remains in place. Institutional controls and engineering controls are types of land use controls.

Media: Pathways through which contaminants are transferred. Five media to which a release of contaminants may occur are groundwater, soil, surface water, sediments, and air.

National Priorities List (NPL): USEPA's formal list of the nation's most serious uncontrolled or abandoned waste sites, identified for possible long-term remedial response, as established by CERCLA.

Operable Unit (OU): A discrete action taken as one part of an overall site cleanup. The term is also used in USEPA guidance documents to refer to distinct geographic areas or media-specific units within a site. A number of operable units can be used in the course of a cleanup.

Operation and Maintenance (O&M): Activities conducted at a site after a response action occurs to ensure that the cleanup and/or systems are functioning properly.

Overall Protection of Human Health and the Environment: The assessment against this criterion describes how the alternative, as a whole, achieves and maintains protection of human health and the environment.

Proposed Plan (PP): A legal document that provides a brief analysis of remedial alternatives under consideration for the site/operable unit and proposes the preferred alternative. It actively solicits public review and comment on all alternatives under consideration.

Record of Decision (ROD): A legal document that explains to the public which alternative will be used at a site/operable unit. The record of decision is based on information and technical analysis generated during the remedial investigation/ feasibility study and consideration of public comments and community concerns.

Resource Conservation and Recovery Act (RCRA), 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 sites.

Responsiveness Summary: A summary of oral and/or written comments received during the proposed plan comment period and includes responses to those comments. The responsiveness summary is a key part of the ROD, highlighting community concerns.

Statement of Basis (SB): A report describing the corrective measures/remedial actions being conducted pursuant to South Carolina Hazardous Waste Management Regulations, as amended.

Superfund: The common name used for CERCLA; also referred to as the Trust Fund. The Superfund program was established to help fund cleanup of hazardous waste sites. It also allows for legal action to force those responsible for the sites to clean them up.

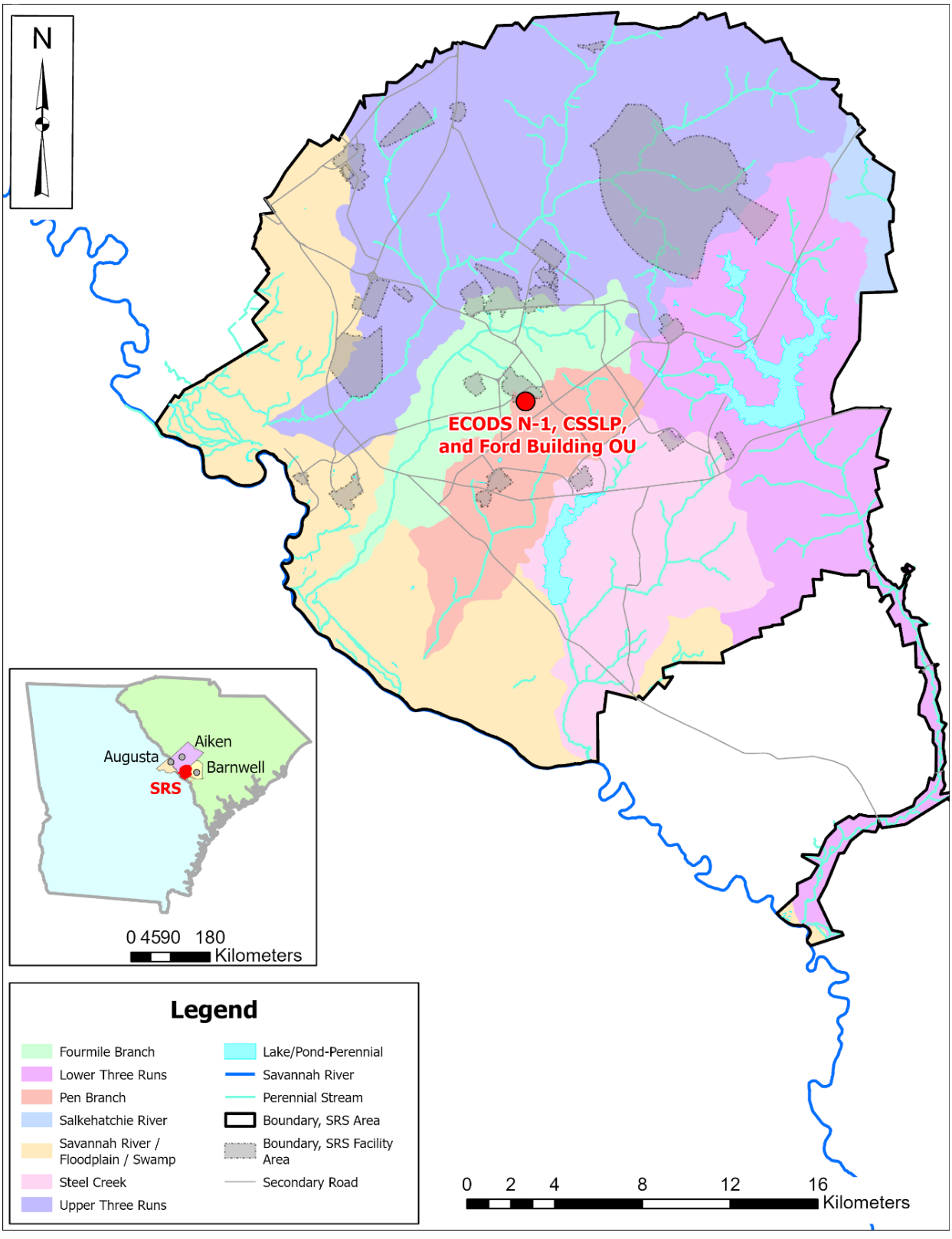

Figure 1. Location of the ECODS N-1, CSSLP, and Ford Building OU within the Savannah River Site

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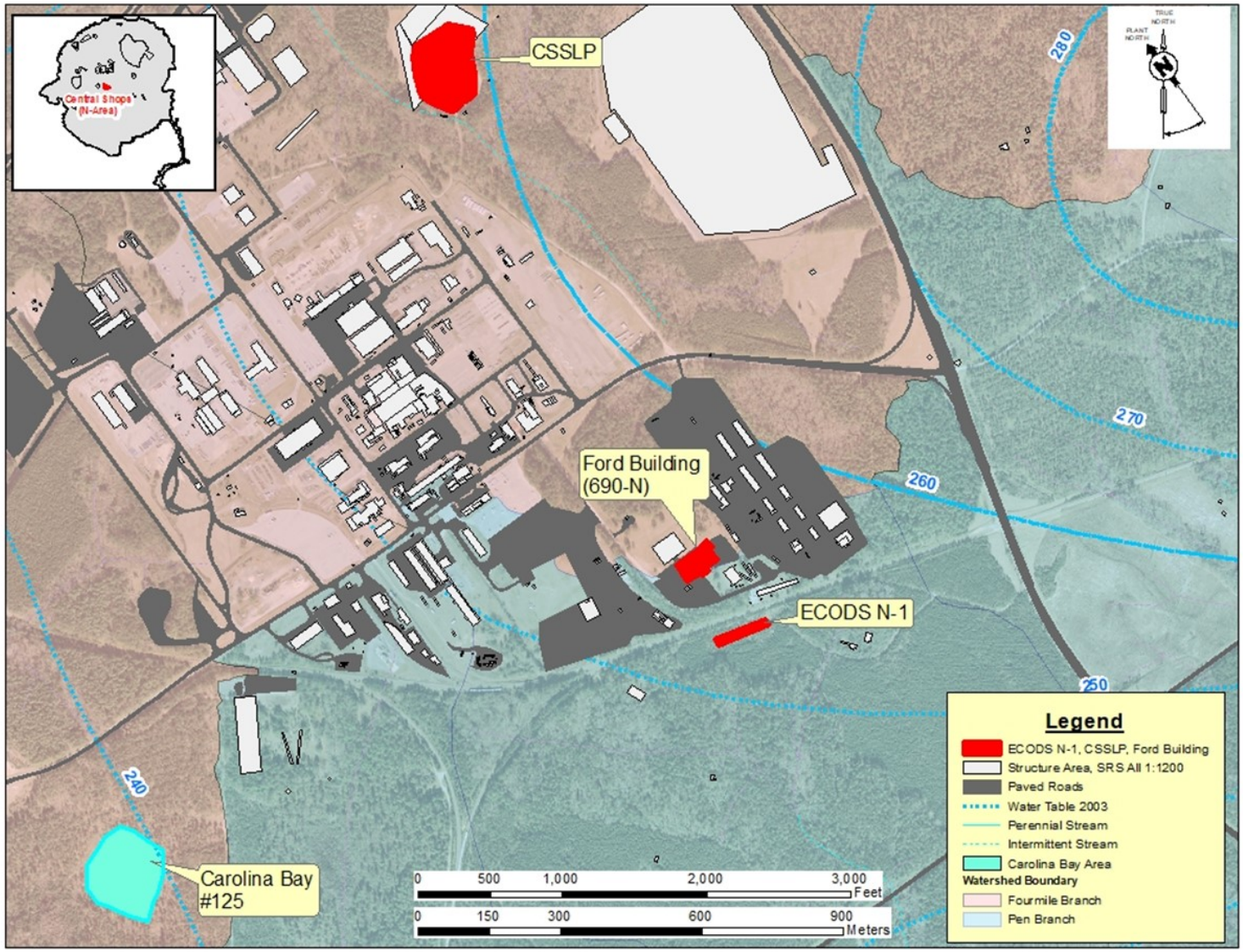

Figure 2. Location of the ECODS N-1, CSSLP, and Ford Building OU in N Area

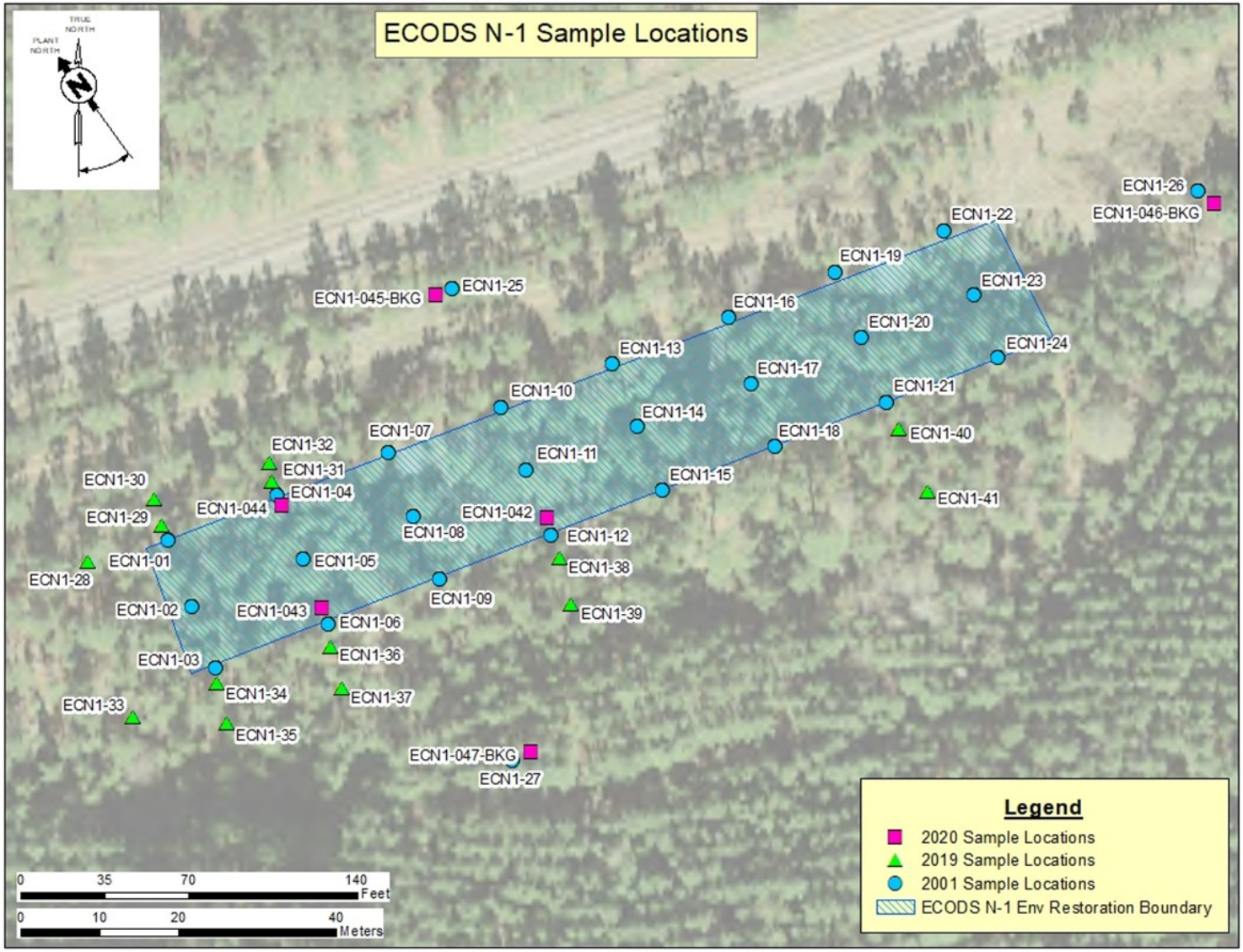

Figure 3. ECODS N-1 Subunit 2001, 2019, and 2020 Sample Locations

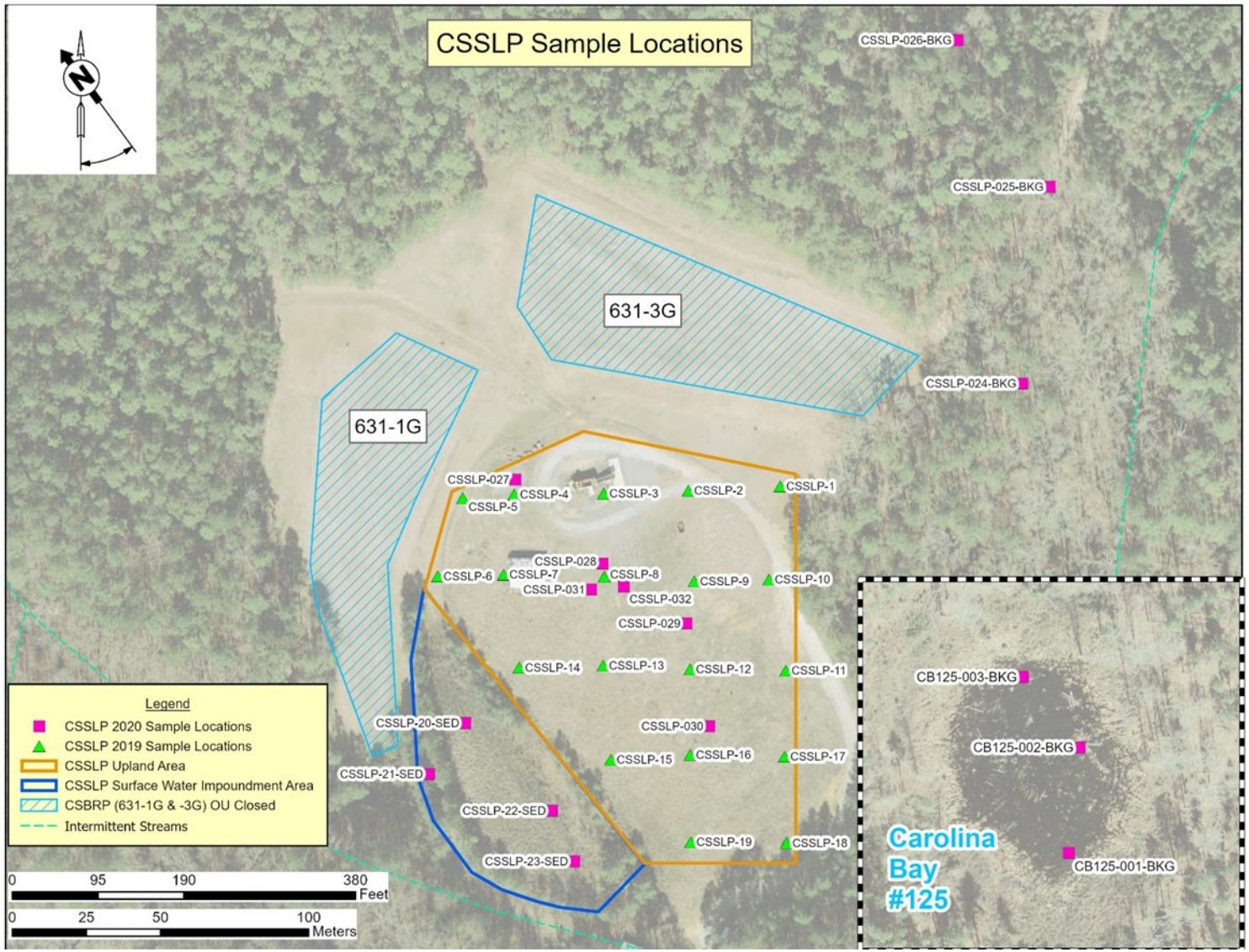

Figure 4. CSSLP Subunit 2019 and 2020 Sample Locations

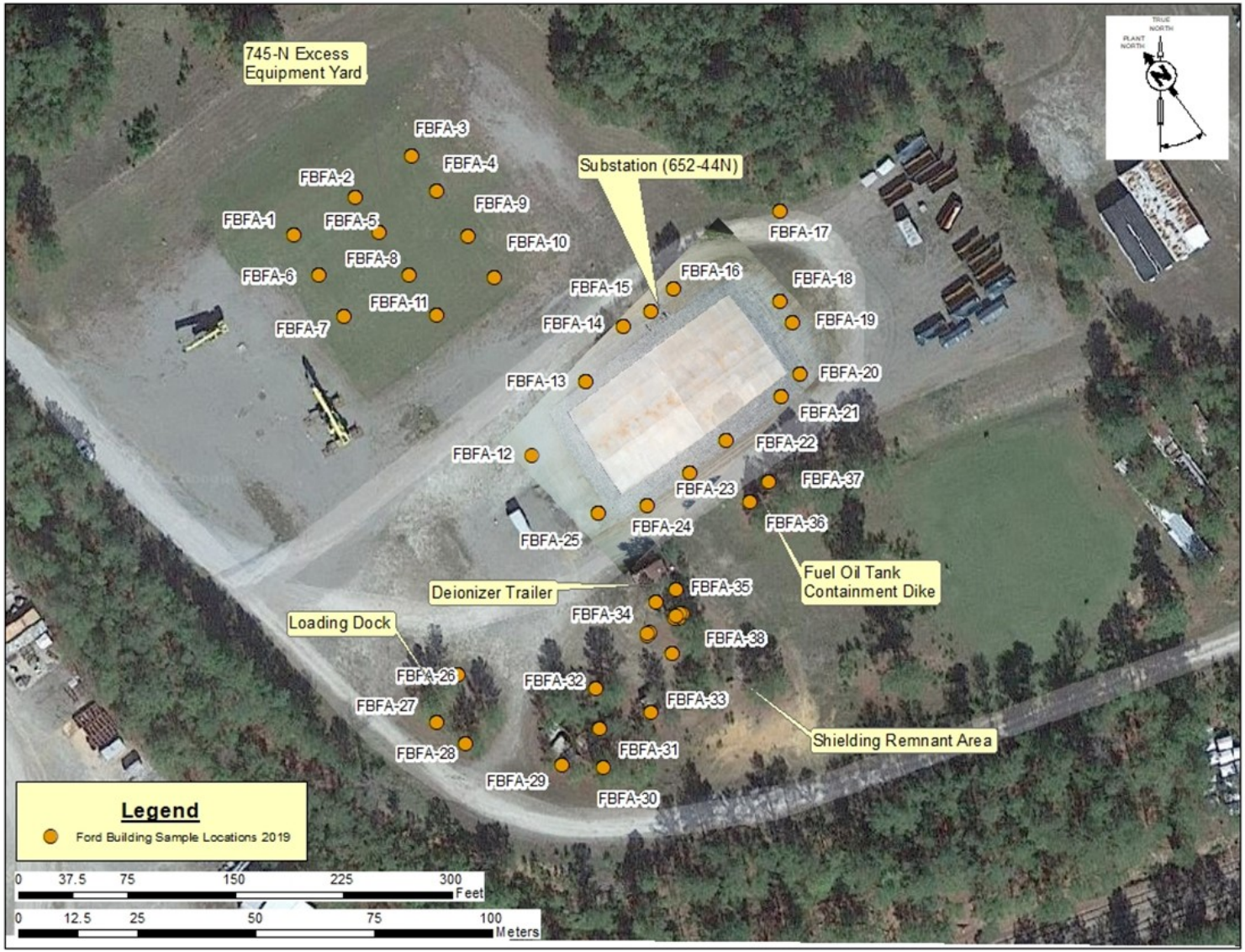

Figure 5. Ford Building Subunit 2019 Sample Locations

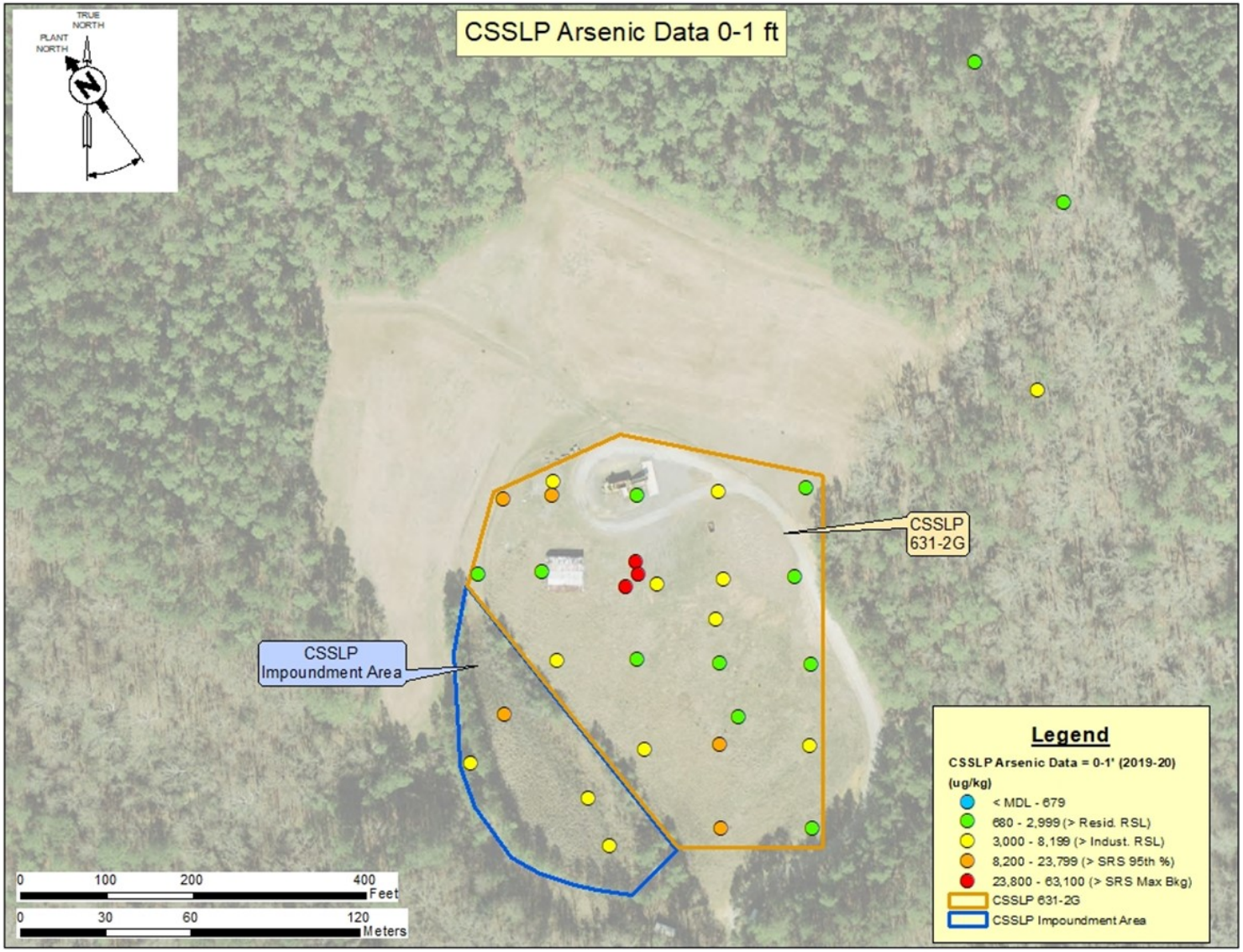

Figure 6. CSSLP Subunit Arsenic Data (0-1 ft)

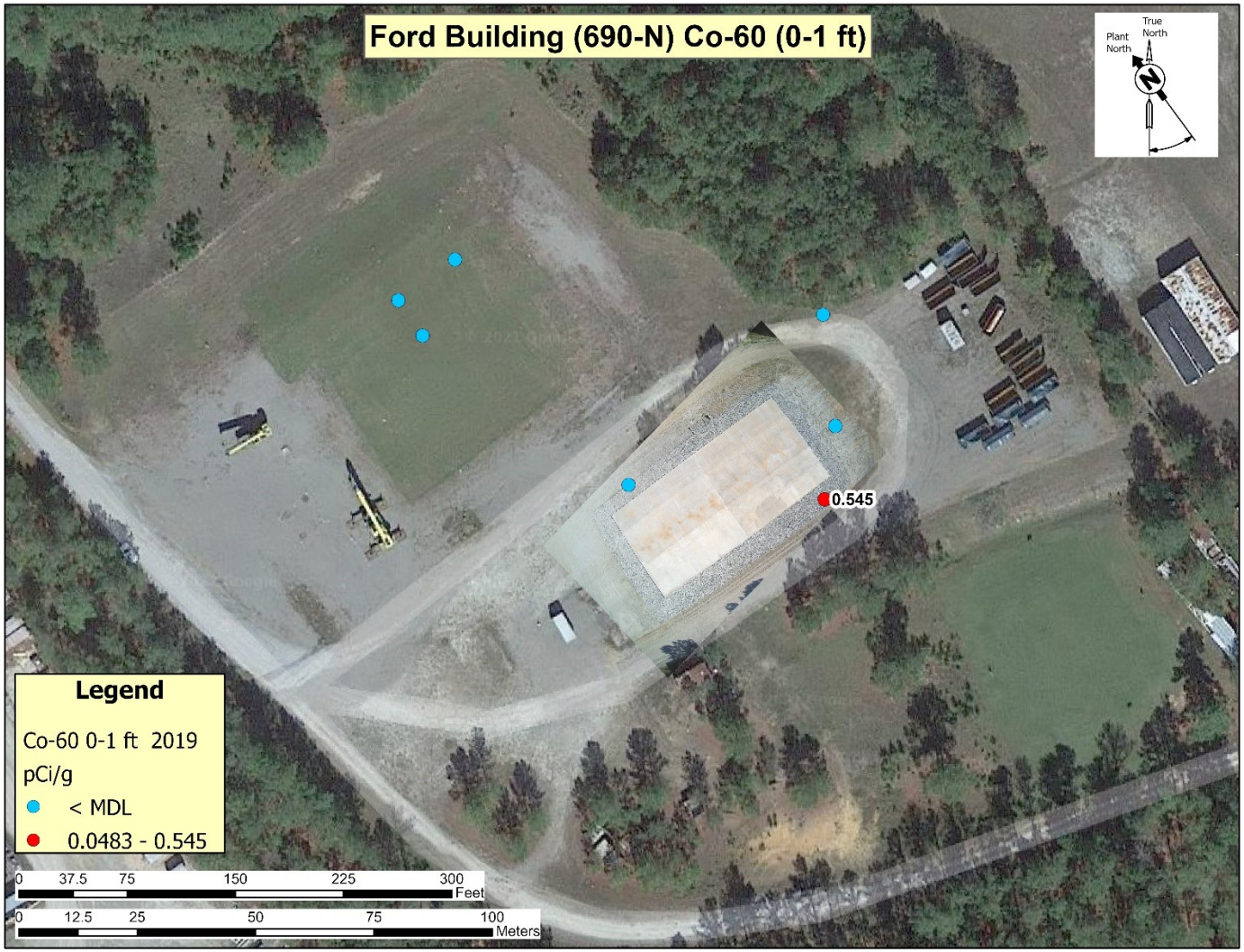

Figure 7. Ford Building Subunit Cobalt-60 Data (0-1 ft)

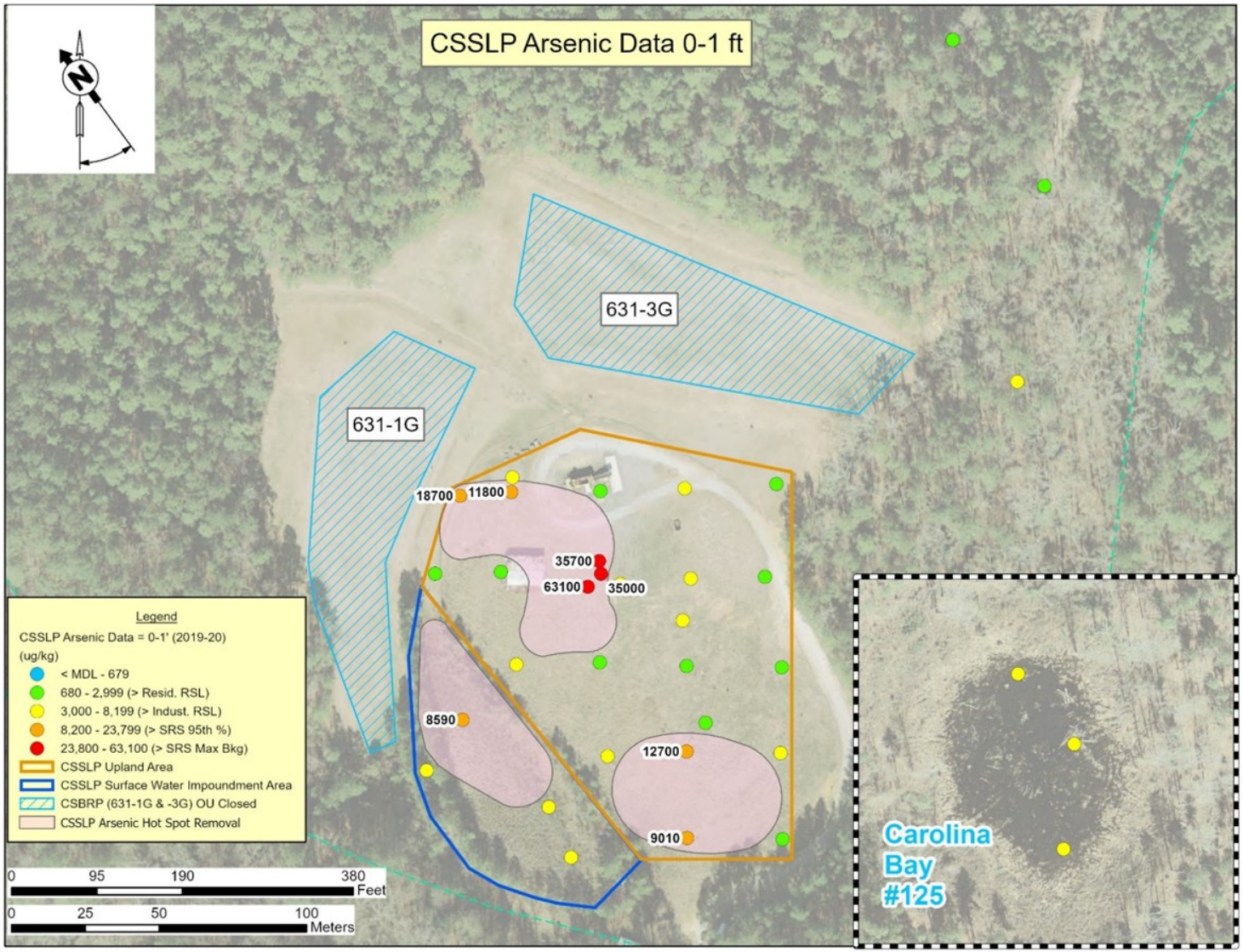

Figure 8. CSSLP Subunit Alternative B-4 (Hotspot Removal) and Disposal

Table 1. Summary of the Preliminary Remedial Goals for the ECODS N-1, CSSLP, and Ford Building OU

Media	HH RCOC	Units	Resident PRG[1]	Industrial Worker PRG[1]	SRS Background 2X Average Concentration	SRS Background 95th percentile[2]	SRS Background Maximum[2]	Most Likely PRG[3]
Central Shops Scrap Lumber Pile (631-2G)								
Soil and Sediment	Arsenic	mg/kg	0.68	3.0	4.5	*8.2*	22.9	**8.2**
Ford Building								
Soil	Cobalt-60	pCi/g	*0.033*	0.048	NA[4]	NA[4]	NA[4]	**0.033**

1 – Resident and Industrial Worker PRGs are identified at risk = 1E-06.
2 – SRS background concentrations from Background Soils Statistical Summary Report for the Savannah River Site (WSRC 2006), Appendix B-2 (all depths interval).
3 – Most Likely PRG is the most restrictive (i.e., residential) risk-based concentration. If the risk-based PRG is less than SRS background, then the SRS 95th percentile is identified as the Most Likely PRG. Source of the Most Likely PRG is identified in italics.
4 – Not applicable; SRS background concentration not available for Cobalt-60

Table 2. Potential ARARs for the Preferred Remedial Alternative for the CSSLP Subunit

Action	Requirements	Prerequisite	Citation
All Land-disturbing Activities (i.e., excavation, clearing, grading, etc.)			
Managing storm water runoff from land-disturbing activities	Must comply with the substantive requirements for stormwater management and sediment control of *NPDES General Permit No. SCR100000* .	Large and small construction activities (as defined in R. 61-9) of more than 1 acre of land – **applicable**	SCDHEC R. 61-9.122.41 NPDES General Permit No. SCR100000
	The stormwater management and sediment control plan shall contain at a minimum the information provided in the following subsections:	Activities involving more than two (2) ac and less than five (5) ac of actual land disturbance which are not part of a larger common plan of development or sale – **applicable**	SCDHEC R. 72-307 I. – *South Carolina Storm Water Management and Sediment Reduction Regulations*
	A plan for temporary and permanent vegetative and structural erosion and sediment control measures which specify the erosion and sediment control measures to be used during all phases of the land disturbing activity and a description of their proposed operation;		SCDHEC R. 72-307 I.(3)(d)
	Provisions for stormwater runoff control during the land disturbing activity and during the life of the facility meeting the following requirements of subsections (e)1 and 2.		SCDHEC R. 72-307 I.(3)(e)
Managing fugitive dust emissions from land disturbing activities	Emissions of fugitive particulate matter shall be controlled in such a manner and to the degree that it does not create an undesirable level of air pollution.	Activities that will generate fugitive particulate matter (Statewide) – **applicable**	SCDHEC R. 61-62.6 Section III(a)- *Control of Fugitive Particulate Matter Statewide*
Waste Characterization and Storage — (e.g., excavated contaminated soils/sediments)			
Characterization of solid waste	Must determine if the solid waste is excluded from regulation under 40 *CFR* 261.4.	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 in subpart D of 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 identified in subpart C of 40 *CFR* Part 261 by using prescribed testing methods or applying generator knowledge based on information regarding material or processes used.	Generation of solid waste that is not listed in subpart D of 40 *CFR* Part 261 and not excluded under 40 *CFR* 261.4 – **applicable**	40 *CFR* 262.11(c) SCDHEC R. 61-79 262.11*(c)*

Table 2. Potential ARARs for the Preferred Remedial Alternative for the CSSLP Subunit *(Continued/End)*

Action	Requirements	Prerequisite	Citation
Waste Treatment and Disposal — (e.g., excavated contaminated soils/sediments, debris)			
Disposal of solid waste	Shall ultimately dispose of solid waste at facilities and/or sites permitted or registered by the Department for processing or disposal of that waste stream.	Generation of solid waste intended for off-site disposal – **relevant and appropriate**	SCDHEC R. 61-107.5(D)(3)
	Must determine whether the waste is identified in subpart C of 40 *CFR* Part 261 by using prescribed testing methods or applying generator knowledge based on information regarding material or processes used.	Generation of solid waste that is not listed in subpart D of 40 *CFR* Part 261 and not excluded under 40 *CFR* 261.4 – **applicable**	40 *CFR* 262.11(c) SCDHEC R. 61-79 262.11*(c)*

ARAR = applicable or relevant and appropriate requirement
CFR = Code of Federal Regulations
NPDES = National Pollutant Discharge Elimination Systema
SCDHEC = South Carolina Department of Health and Environmental Control

Table 3. Potential ARARs for the Preferred Remedial Alternative for the Ford Building Subunit

Action	Requirements	Prerequisite	Citation
Waste treatment and disposal — (e.g., excavated contaminated soils/sediments, debris)			
Disposal of PCB bulk product waste at 690-N	EPA will issue a written decision on each application for a risk-based sampling, disposal, or storage method for PCB bulk product wastes. EPA will approve such an application if it finds that the method will not pose an unreasonable risk of injury to health or the environment. NOTE: Appropriate information required in an application can be provided in a CERCLA document (e.g. Engineering Evaluation/Cost Analysis, Action Memo, FS, PP, or ROD) that is approved or issued by EPA.	Sampling, storage and/or disposal of PCB bulk product waste (as defined in 40 CFR 761.3) – **applicable**	40 CFR Part 761, Section 62, Paragraph (c)
	Cap requirements. A cap means, when referring to on-site cleanup and disposal of PCB remediation waste, a uniform placement of concrete, asphalt, or similar material of minimum thickness spread over the area where remediation waste was removed or left in place in order to prevent or minimize human exposure, infiltration of water, and erosion. A concrete or asphalt cap shall have a minimum thickness of 15 cm (6 inches). A cap must be of sufficient strength to maintain its effectiveness and integrity during the use of the cap surface which is exposed to the environment. A cap shall not be contaminated at a level ≥1 ppm PCB per Aroclor (or equivalent) or per congener. Repairs shall begin within 72 hours of discovery for any breaches which would impair the integrity of the cap.	Risk based disposal of PCB bulk product waste per 40 CFR Part 761, Section 62, Paragraph (c)(1)– **relevant and appropriate**	40 CFR Part 761, Section 61, Paragraph (a)(7)

ARAR = applicable or relevant and appropriate requirement
CFR = Code of Federal Regulations

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Table 4. Description of CERCLA Evaluation Criteria

Threshold Criteria:
• *Overall Protectiveness of* HH *and the Environment* determines whether an alternative eliminates, reduces, or controls threats to public health and the environment through institutional controls, engineering controls, or treatment.
• *Compliance with ARARs* evaluates whether the alternative meets Federal and State environmental statutes, regulations, and other requirements that pertain to the site. ARARs may be waived under certain circumstances. ARARs are divided into chemical-specific, location-specific, and action-specific criteria.
Primary Balancing Criteria:
• *Long-Term Effectiveness and Permanence* considers the ability of an alternative to maintain protection of HH and the environment over time. It evaluates magnitude of residual risk and adequacy of reliability of controls.
• *Reduction of Toxicity, Mobility, or Volume of Contaminants through Treatment* evaluates an alternative's use of treatment to reduce the harmful effects of principal contaminants, their ability to move in the environment, and the amount of contamination present.
• *Short-Term Effectiveness* considers the length of time needed to implement an alternative and the risks the alternative poses to workers, residents, and the environment during implementation.
• *Implementability* considers the technical and administrative feasibility of implementing the alternative, including factors such as the relative availability of goods and services.
• *Cost* includes estimated capital and annual operations and maintenance costs, as well as present worth cost. Present worth cost is the total cost of an alternative over time in terms of today's dollar value. Cost estimates are expected to be accurate within a range of +50 to -30 percent.
Modifying Criteria:
• *State Support/Agency Acceptance* considers whether USEPA and SCDHEC agree with the analyses and recommendations by the USDOE. Approval of the Record of Decision constitutes approval of the selected alternative by the regulatory agencies.
• *Community Acceptance* considers whether the local community agrees with the Preferred Alternative. Comments received on the Statement of Basis/Proposed Plan during the public comment period are an important indicator of community acceptance. Comments from the public are considered in the final remedy selection in the Record of Decision.

Table 5. Comparison of ECODS N-1 Subunit Alternatives against the CERCLA Evaluation Criteria

Criterion	A-1 No Action	A-2 Land Use Controls
Overall Protection of HH and the Environment		
HH	Not protective of the future resident or on-site worker because there are no controls or remediation.	Meets the requirement by limiting exposure to the contaminated media through the use of administrative and engineering controls.
Environment	Not applicable as contaminants are not at levels that pose a threat to the environment.	Not applicable as contaminants are not at levels that pose a threat to the environment.
Compliance with ARARs		
Chemical-Specific	No ARARs exist	No ARARs exist
Location-Specific	No ARARs exist	No ARARs exist
Action-Specific	No ARARs exist	No ARARs exist
Long Term Effectiveness		
Adequacy of Controls	None	Controls are adequate to limit exposure as long as controls are maintained
Permanence	None	LUCs are permanent as long as controls are maintained
Reduction of Mobility, Toxicity, or Volume Through Treatment		
Type of Reduction	No reduction	No reduction
Short-Term Effectiveness		
Amount of Hazardous Material Destroyed or Treated	No reduction	No reduction
Risk to Remedial Worker	No risk	No risk
Risk to Community	None	None
Risk to Environment	None	None
Time to Implement and achieve RAO	Never	6 Months
Implementability Short-Term Effectiveness		
Availability of Materials, Equipment, Contractors	N/A	Readily available
Ability to Construct and Operate the Technology	N/A	Proven technology at SRS
Ability to Obtain Permits/Approvals from Other Agencies	N/A	Prior history with similar permits/approvals at SRS
Cost		
Total Capital Cost	$0	$27,225
Present Worth O&M Cost	$0	$244,170
Total Cost	$0	$271,396

Table 6. Comparison of CSSLP Subunit Alternatives against the CERCLA Evaluation Criteria

Criterion	B-1 No Action	B-2 Land Use Controls	B-3 Soil Cover with LUCs	B-4 Excavation (Hot Spot Removal) and Disposal
Overall Protection of HH and the Environment				
HH	Not protective of the future resident or on-site worker because there are no controls or remediation.	Meets the requirement by limiting exposure to the contaminated media through the use of administrative and engineering controls.	Meets the requirement by placement of a soil cover to eliminate the direct exposure pathways	Meets the requirement by excavation of the contaminated media to eliminate the direct exposure pathways.
Environment	Not applicable as contaminants are not at levels that pose a threat to the environment.	Not applicable as contaminants are not at levels that pose a threat to the environment.	Not applicable as contaminants are not at levels that pose a threat to the environment.	Not applicable as contaminants are not at levels that pose a threat to the environment.
Compliance with ARARs				
Chemical-Specific	No ARARs exist	No ARARs exist	No ARARs exist	No ARARs exist
Location-Specific	No ARARs exist	No ARARs exist	No ARARs exist	No ARARs exist
Action-Specific	No ARARs exist	No ARARs exist	ARARs for control of the minimization of sediment erosion and management of storm water can be achieved.	ARARs for control of the minimization of sediment erosion, management of storm water and transportation of solid waste can be achieved.
Long Term Effectiveness				
Adequacy of Controls	None	Controls are adequate as long as they are maintained	Controls are adequate as long as they are maintained	No controls are required because contaminated media removed
Permanence	No	LUCs are permanent as long as controls are maintained	Cover system is permanent as long as it is maintained	Excavation of media will be permanent
Reduction of Mobility, Toxicity, or Volume through Treatment				
Type of Reduction	No reduction	No reduction	No reduction	No reduction

Table 6. Comparison of CSSLP Subunit Alternatives against the CERCLA Evaluation Criteria *(Continued/End)*

Criterion	B-1 No Action	B-2 Land Use Controls	B-3 Soil Cover with LUCs	B-4 Excavation (Hot Spot Removal) and Disposal
Short-Term Effectiveness				
Amount of Hazardous Material Destroyed or Treated	No reduction	No reduction	No reduction	No reduction
Risk to Remedial Worker	No risk	No risk	Minimal; Health and Safety Plan will be implemented to minimize potential for injury to remedial workers	Minimal; Health and Safety Plan will be implemented to minimize potential for injury to remedial workers
Risk to Community	None	None	None	None
Risk to Environment	None	None	None	None
Time to Implement and achieve RAO	Never	6 Months	12 Months	12 Months
Implementability				
Availability of Materials, Equipment, Contractors	N/A	Readily available	Readily available	Readily available
Ability to Construct and Operate the Technology	N/A	Proven technology at SRS	Proven technology at SRS	Proven technology at SRS
Ability to Obtain Permits/Approvals from Other Agencies	N/A	Prior history with similar permits/approvals at SRS	Prior history with similar permits/approvals at SRS	Prior history with similar permits/approvals at SRS
Cost				
Total Capital Cost	$0	$27,759	$2,613,143	$889,606
Present Worth O&M Cost	$0	$317,802	$423,908	$11,322
Total Cost	$0	$345,561	$3,037,051	900,928

Table 7. Comparison of the Ford Building Subunit Alternatives against the CERCLA Evaluation Criteria

Criterion	C-1 No Action	C-2 Land Use Controls	C-3 Excavation (Hot Spot Removal) and Disposal with LUCs
Overall Protection of HH and the Environment			
HH	Not protective of the future resident or on-site worker because there are no controls or remediation.	Meets the requirement by limiting exposure to the contaminated media through the use of administrative and engineering controls and maintaining the integrity of the existing concrete cover.	Meets the requirement by extraction of the contaminated media to eliminate the direct exposure pathways and the use of administrative and engineering controls to maintain the integrity of the existing concrete cover.
Environment	Not applicable as contaminants are not at levels that pose a threat to the environment.	Not applicable as contaminants are not at levels that pose a threat to the environment.	Not applicable as contaminants are not at levels that pose a threat to the environment.
Compliance with ARARs			
Chemical-Specific	ARAR for sampling, storage and/or disposal of PCB waste is not achieved.	ARAR for sampling, storage and/or disposal of PCB waste can be achieved.	ARAR for sampling, storage and/or disposal of PCB waste can be achieved.
Location-Specific	No ARARs exist	No ARARs exist	No ARARs exist
Action-Specific	No ARARs exist	No ARARs exist	ARAR for transportation of solid waste and characterization of low-level waste can be achieved.
Long Term Effectiveness			
Adequacy of Controls	None	Controls are adequate as long as they are maintained	No controls required because contaminated media removed
Permanence	No	LUCs are permanent as long as controls are maintained	Excavation of media will be permanent
Reduction of Mobility, Toxicity, or Volume Through Treatment			
Type of Reduction	No reduction	No reduction	No reduction
Short-Term Effectiveness			
Amount of Hazardous Material Destroyed or Treated	No reduction	No reduction	No reduction
Risk to Remedial Worker	No risk	No risk	Minimal; Health and Safety Plan will be implemented to protect remedial workers
Risk to Community	None	None	None
Risk to Environment	None	None	None
Time to Implement and achieve RAO	Never	6 Months	9 Months

Table 7. Comparison of the Ford Building Subunit Alternatives against the CERCLA Evaluation Criteria *(Continued/End)*

Criterion	C-1 No Action	C-2 Land Use Controls	C-3 Excavation (Hot Spot Removal) and Disposal with LUCs
Implementability			
Availability of Materials, Equipment, Contractors	N/A	Readily available	Readily available
Ability to Construct and Operate the Technology	N/A	Proven technology at SRS	Proven technology at SRS
Ability to Obtain Permits/Approvals from Other Agencies	N/A	Prior history with similar permits/approvals at SRS	Prior history with similar permits/approvals at SRS
Cost			
Total Capital Cost	$0	$27,225	$63,358
Present Worth O&M Cost	$0	$650,388	$650,388
Total Cost	$0	$677,613	$713,746

Table 8. Comparative Alternative Analysis for the ECODS N-1, CSSLP, and Ford Building OU

Alternatives	Overall Protection of HH	Compliance with RAOs	Compliance with ARARs	Long-Term Effectiveness and Permanence	Reduction of Toxicity, Mobility, or Volume Through Treatment	Short-Term Effectiveness	Implementability	Cost	Overall Ranking (1-20)
ECODS N-1 Subunit									
A-1) No Action	No	No	N/A	1	1	1	5	$0	8
A-2) Land Use Controls*	Yes	Yes	N/A	3	1	5	4	$271,396	13
CSSLP Subunit									
B-1) No Action	No	No	N/A	1	1	1	5	$0	8
B-2) Land Use Controls	Yes	Yes	N/A	3	1	5	4	$345,561	13
B-3) Soil Cover with LUCs	Yes	Yes	Yes	4	1	4	3	$3,037,051	12
B-4) Excavation (Hot Spot Removal) and Disposal*	Yes	Yes	Yes	5	1	4	3	$900,928	13
Ford Building Subunit									
C-1) No Action	No	No	N/A	1	1	1	5	$0	8
C-2) Land Use Controls*	Yes	Yes	N/A	3	1	5	4	$677,613	13
C-3) Excavation (Hot Spot Removal) and Disposal with LUCs	Yes	Yes	Yes	4	1	4	3	$713,746	12

*Preferred Alternative

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APPENDIX A

DETAILED COST ESTIMATES FOR THE PREFERRED ALTERNATIVES

LIST OF TABLES

(Appendix A)

Table A-1. ECODS N-1 – Alternative A-2 - Land Use Controls

Institutional Controls Estimate
Alternative A-2
ECODS N-1 OU Land Use Controls

Item	Quantity	Units	Unit Cost	Total Cost
Direct Capital Costs				
ECODS N-1				
Institutional Controls				
Posting of Warning Signs	4	ea	$50	$200
Land Use Control Implementation Plan	1	ea	$5,000	$5,000
Deed Restrictions	1	ea	$5,000	$5,000
Subtotal - Direct Capital Cost				$10,200
Mobilization/Demobilization	9%	of subtotal direct capital		$918
Site Preparation/Site Restoration	9%	of subtotal direct capital		$918
Total Direct Capital Cost				**$12,036**
Indirect Capital Costs				
Engineering & Design	14%	of direct capital		$1,685
Project/Construction Management	25%	of direct capital		$3,009
Health & Safety	6%	of direct capital		$722
Overhead	30%	of O&M (direct + indirect)		$5,236
Contingency	26%	of O&M (direct + indirect)		$4,538
Total Indirect Capital Cost				**$15,189**
Total Estimated Capital Cost				**$27,225**
Direct O&M Costs	-1.8%	3 Year Discount Rate1		
Annual Costs (Existing System during Post-ROD Design & Const)	2	years O&M		*Years 2020-2021*
Access Controls	1	ea	$500	$500
ECODS N-1 Maintenance	1	ea	$439	$439
Subtotal - Annual Costs				$939
Present Value Cost				$1,930
	-0.3%	30 Year Discount Rate3		
Annual Costs	30	years O&M		*Years 2021-2051*
Access Controls	1	ea	$500	$500
Annual Inspection/Maintenance	1	ea	$439	$439
Subtotal - 30 Year Annual Costs				$939
Present Value Cost				$29,517
Five Year Costs	6	reviews		
Remedy Review	1	ea	$15,000	$15,000
Subtotal - Five Year O&M Costs				$15,000
Present Value Cost				$94,890
Total Present Value Direct O&M Cost				**$126,336**

Table A-1. ECODS N-1 – Alternative A-2 - Land Use Controls *(Continued/End)*

Indirect O&M Costs		
Project/Admin Management	25% of direct O&M	$31,294
Health & Safety	19% of direct O&M	$24,004
Overhead	30% of O&M (direct + indirect)	$37,901
Contingency	20% of O&M (direct + indirect)	$24,636
Total Present Worth Indirect O&M Cost		$117,834
Total Estimated Present Worth O&M Cost		**$244,170**
TOTAL ESTIMATED COST		**$271,396**

Interest rates for costs with 3-year and 30-year durations are based on 2020 SRNS Technical Memorandum ERTEC-2017-00002.

Table A-2. CSSLP – Alternative B-4 – Excavation (Hot Spot Removal) and Disposal

Haul to Three Rivers Landfill Estimate
Alternative B-4
CSSLP Excavation (Hot Spot Removal) and Disposal

Item	Quantity	Units	Unit Cost	Total Cost
Direct Capital Costs				
3RLF				
Landfill Disposal Fees				
CSSLP	2,807	yd^3	$65.00	$182,481
CSSLP				
Clearing and Grubbing				
Clear Vegetation and Debris, Stockpile at Site Perimeter	1.9	ac	$2,600	$5,014
Clear Trees and Grub Stumps, Stockpile at Site Perimeter	1.9	ac	$4,500	$8,678
Access Road	1,320	lf	$12	$15,840
Surface Water				
Manage Contained Stormwater via BMPs	350,000	gals	$0.005	$1,750
Dry Soil	2,339	yd3	$2	$4,679
Excavate, Truck Haul and Dump for Off-Unit Disposal				
Excavate & Load Soil/Sediment for Hauling	2,339	yd3	$3.59	$8,399
Truck Haul Soil/Sediment to Disposal Site	2,807	yd3	$13.30	$37,338
Backfill / Compact at Disposal Site	2,807	yd3	$2.50	$7,018
Confirmation Sampling / Analysis	15	ea	$1,000	$14,700
Stormwater Management	3,649	lf	$25	$91,233
Site Restoration				
Contour Site	1.93	ac	$1,700	$3,278
Common Backfill (8 Inches)	1,871	yd3	$13	$24,329
Topsoil (4 Inches)	936	yd3	$35	$32,751
Fertilizer, Lime, Seed & Mulch	8,422	yd2	$0.75	$6,316
Backfill Sampling / Analysis	3	ea	$1,200	$3,600
Subtotal - Direct Capital Cost				$264,924
Mobilization/Demobilization	9%	of subtotal direct capital		$23,843
Site Preparation/Site Restoration	9%	of subtotal direct capital		$23,843
Total Direct Capital Cost				**$312,611**
Indirect Capital Costs				
Engineering & Design	14%	of direct capital		$43,765
Project/Construction Management	25%	of direct capital		$78,153
Health & Safety	6%	of direct capital		$18,757
Overhead	30%	of O&M (direct + indirect)		$135,986
Contingency	26%	of O&M (direct + indirect)		$117,854
Total Indirect Capital Cost				**$394,515**
Total Estimated Capital Cost				**$889,606**

Table A-4. CSSLP – Alternative B-4 – Excavation (Hot Spot Removal) and Disposal *(Continued/End)*

Direct O&M Costs				
O&M Costs at Ash Basins for Site Restoration	-1.8%	3 Year Discount Rate1		
Annual Costs (Existing System during Post-ROD Design & Const)	2	years O&M		*Years 2020-2021*
Access Controls	1	ea	$500	$500
CSSLP Maintenance	1	ea	$1,743	$1,743
Subtotal - Annual Costs				$2,243
Present Value Cost				**$4,611**
Total Present Value Direct O&M Cost				**$4,611**
Indirect O&M Costs				
Project/Admin Management	45%	of direct O&M		$2,086
Health & Safety	19%	of direct O&M		$876
Overhead	30%	of O&M (direct + indirect)		$2,272
Contingency	20%	of O&M (direct + indirect)		$1,477
Total Present Worth Indirect O&M Cost				$6,711
Total Estimated Present Worth O&M Cost				**$11,322**
TOTAL ESTIMATED COST				**$900,928**

Interest rates for costs with 3-year and 30-year durations are based on 2020 SRNS Technical Memorandum ERTEC-2017-00002.

Table A-3. Ford Building – Alternative C-2 – Land Use Controls

Institutional Controls Estimate
Alternative C-2
Ford Building Land Use Controls

Item	Quantity	Units	Unit Cost	Total Cost
Direct Capital Costs				
FB				
Institutional Controls				
Posting of Warning Signs	4	ea	$50	$200
Land Use Control Implementation Plan	1	ea	$5,000	$5,000
Deed Restrictions	1	ea	$5,000	$5,000
Subtotal - Direct Capital Cost				$10,200
Mobilization/Demobilization	9%	of subtotal direct capital		$918
Site Preparation/Site Restoration	9%	of subtotal direct capital		$918
Total Direct Capital Cost				$12,036
Indirect Capital Costs				
Engineering & Design	14%	of direct capital		$1,685
Project/Construction Management	25%	of direct capital		$3,009
Health & Safety	6%	of direct capital		$722
Overhead	30%	of O&M (direct + indirect)		$5,236
Contingency	26%	of O&M (direct + indirect)		$4,538
Total Indirect Capital Cost				$15,189
Total Estimated Capital Cost				$27,225
Direct O&M Costs				
Direct O&M Costs	-1.8%	3 Year Discount Rate1		
Annual Costs (Existing System during Post-ROD Design & Const)	2	years O&M		*Years 2020-2021*
Access Controls	1	ea	$500	$500
FB Maintenance	1	ea	$405	$405
Subtotal - Annual Costs				$905
Present Value Cost				$1,861
	-0.3%	30 Year Discount Rate3		
Annual Costs	30	years O&M		*Years 2021-2051*
Access Controls	1	ea	$500	$500
Annual Inspection/Maintenance	1	ea	$405	$405
Subtotal - 30 Year Annual Costs				$905
Present Value Cost				$28,468
Concrete Maintenance	6			
Concrete Repair (every fifth year)	1	ea	$20,000	$20,000
Concrete Replacement (every 30 years)	1	ea	$100,000	$100,000
Subtotal - Concrete O&M Costs				$120,000
Present Value Cost				$214,066

Table A-5. Ford Building – Alternative C-2 – Land Use Controls *(Continued/End)*

Five Year Costs		6		
Remedy Review		1 ea	$15,000	$15,000
Subtotal - Five Year O&M Costs				$15,000
	Present Value Cost			$94,890
	Total Present Value Direct O&M Cost			$339,284
Indirect O&M Costs				
Project/Admin Management		9% of direct O&M		$31,294
Health & Safety		19% of direct O&M		$64,464
Overhead		30% of O&M (direct + indirect)		$130,513
Contingency		20% of O&M (direct + indirect)		$84,833
	Total Present Worth Indirect O&M Cost			$311,104
	Total Estimated Present Worth O&M Cost			$650,388
	TOTAL ESTIMATED COST			$677,613

Interest rates for costs with 3-year and 30-year durations are based on 2020 SRNS Technical Memorandum ERTEC-2017-00002.