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Record of Decision
Remedial Alternative Selection 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)

SEMS Number: 93

SRNS-RP-2022-01284

Revision 1

June 2023

SAVANNAH RIVER SITE • AIKEN, SOUTH CAROLINA

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Prepared for
U.S. Department of Energy
and
Savannah River Nuclear Solutions, LLC
Aiken, South Carolina

RECORD OF DECISION
REMEDIAL ALTERNATIVE SELECTION (U)

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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June 2023

Savannah River Site
Aiken, South Carolina

Prepared by:
Savannah River Nuclear Solutions, LLC
for the
U.S. Department of Energy under Contract DE-AC09-08SR22470
Savannah River Operations Office
Aiken, South Carolina

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DECLARATION FOR THE RECORD OF DECISION

Unit Name and Location

Early Construction and Operational Disposal Site N-1 (no building number [NBN]), Central Shops Scrap Lumber Pile (631-2G), and Building 690-N, Process Heat Exchanger Repair Facility (aka Ford Building) Operable Unit
Superfund Enterprise Management System Identification Number: OU-SEMS 93
Savannah River Site
Comprehensive Environmental Response, Compensation and Liability Act
Identification Number: SC1 890 008 989
Aiken, South Carolina
United States Department of Energy

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 (OU) (ECODS N-1, CSSLP, and Ford Building OU) is listed as a Resource Conservation and Recovery Act (RCRA) 3004(u) Solid Waste Management Unit/Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) unit in Appendix C of the Federal Facility Agreement (FFA) for the Savannah River Site (SRS).

The FFA is a legally binding agreement between regulatory agencies (United States Environmental Protection Agency [USEPA] and South Carolina Department of Health and Environmental Control [SCDHEC]) and regulated entities (United States Department of Energy ([USDOE]) that establishes the responsibilities and schedules for the comprehensive remediation of SRS. The media associated with this unit are soil, sediment, surface water, and concrete. Groundwater is not considered a part of the ECODS N-1, CSSLP, and Ford Building OU and will be addressed under the Central Shops Groundwater OU.

Statement of Basis and Purpose

This decision document presents the selected remedial action for the ECODS N-1, CSSLP, and Ford Building OU located at the SRS near Aiken, South Carolina. This remedy was chosen in accordance with CERCLA, as amended by the Superfund Amendments Reauthorization Act, and, to the extent practicable, the National Oil and Hazardous Substances Pollution Contingency Plan (NCP). This decision is based on the information contained in the Administrative Record File (ARF) for this site.

The USEPA, SCDHEC, and USDOE concur with the selected remedy.

Assessment of the Site

There has been a release of contaminants at all three subunits of the ECODS N-1, CSSLP, and Ford Building OU. Asbestos is present in subsurface soils at the ECODS N-1 subunit, arsenic is present in surface soil and sediment at the CSSLP subunit, and cobalt-60 (Co-60) is present in surface soils at the Ford Building subunit, all at levels that pose an unacceptable risk to human health and the environment. In addition, cesium-137 (Cs-137) and polychlorinated biphenyls (PCBs) are present on the remnant concrete slab at the Ford Building subunit beneath a concrete cover system installed during deactivation and decommissioning activities in 2021. The response action selected in this Record of Decision (ROD) is necessary to protect the public health or welfare or the environment from actual or threatened releases of hazardous substances into the environment.

Description of the Selected Remedy

For the ECODS N-1, CSSLP, and Ford Building OU, the selected remedy for the ECODS N-1 subunit is Land Use Controls (LUCs) (Alternative A-2*)* to prevent human exposure to asbestos that is present in subsurface soils. Alternative A-2 was selected at the ECODS N-1 subunit due to the overall protection and effectiveness of the remedy.

For the CSSLP subunit, the selected remedy is Excavation (Hot Spot Removal) and Disposal (Alternative B-4) of arsenic-contaminated surface soil and sediment. This remedial alternative includes releasing any stormwater that may be present from a surface water impoundment area followed by clearing and grubbing, removal and offsite disposal of contaminated media to a depth of 0.3 meters (m) (1 foot [ft]) below ground surface, backfilling with clean fill and placing topsoil to grade, and constructing a stormwater management system. The remedy for Excavation (Hot Spot Removal) and Disposal of arsenic-contaminated surface soil and sediment was selected because of the benefit of supporting unrestricted land use (i.e., no LUCs) at the CSSLP subunit after the remedial action is complete.

The selected remedy for the Ford Building subunit is LUCs (Alternative C-2) to prevent human exposure to Cs-137 and PCBs on the Ford Building remnant concrete slab and Co-60 in surface

soils underlying a portion of the gravel apron surrounding the slab. Alternative C-2 was selected 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 that currently exists over the remnant slab.

LUCs for the ECODS N-1 subunit and Ford Building subunit will be in effect until concentrations of hazardous substances are at levels that allow for unrestricted use and exposure and include the following:

- Warning signs posted at the ECODS N-1 and Ford Building subunits 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.

This remedy was selected because it meets the remedial action objectives, provides overall protection of human health and the environment, complies with Applicable or Relevant and Appropriate Requirements, and is cost-effective. The remedy provides a high level of long-term protection to the radioactive and hazardous constituents that remain in place.

The RCRA permit will be revised to reflect selection of the final remedy using the procedures under 40 CFR Part 270, and South Carolina Hazardous Waste Management Regulations R.61-79.264.101; 270.

Statutory Determinations

Based on the unit *RCRA Facility Investigation/Remedial Investigation (RFI/RI) with Baseline Risk Assessment (BRA) and Corrective Measures Study/Feasibility Study (CMS/FS)* report (Savannah River Nuclear Solutions, LLC [SRNS] 2022a), all three subunits of the ECODS N-1, CSSLP, and Ford Building OU pose a threat to human health and the environment. Therefore, LUCs (Alternative A-2) for the ECODS N-1 subunit, Excavation (Hot Spot Removal) and Disposal (Alternative B-4) for the CSSLP subunit, and LUCs (Alternative C-2) for the Ford Building subunit have been selected as the remedy for the ECODS N-1, CSSLP, and Ford Building OU. Following implementation of excavation (hot spot removal) and disposal of contaminated surface soil and sediment for the CSSLP subunit, the future land use for the CSSLP subunit will be unrestricted and LUCs will only be required for the ECODS N-1 and Ford Building subunits.

Because the remedy for the ECODS N-1 and Ford Building subunit result in hazardous substances remaining on-site above levels that allow for unlimited use and unrestricted exposure, in accordance with Section 121(c) of CERCLA and the NCP, §300.430(f)(5)(iii)(c), a statutory review will be conducted within five years of initiation of the remedial action and every five years thereafter, to ensure that the remedy continues to be protective of human health and the environment. Future land use for the ECODS N-1 and Ford Building subunits will be industrial.

The selected remedy is protective of human health and the environment, complies with federal and state requirements that are legally applicable or relevant and appropriate to the remedial action (unless justified by a waiver), and is cost-effective. The statutory preference for treatment as a principal element of the remedy is not applicable as no principal threat source material refined constituents of concern were identified at the OU.

In the long term, if the property, or any portion thereof, is ever transferred from USDOE, the U.S. Government and/or USDOE will take those actions necessary pursuant to Section 120(h)(1) of CERCLA. Those actions will include in any contract, deed, or other transfer document, notice of the type and quantity of any hazardous substances that were known to have been stored (for more than one year), released, or disposed of on the property. The notice will also include the time at which the storage, release, or disposal took place to the extent such information is available.

In addition, if the property, or any portion thereof, is ever transferred by deed, the U.S. Government will also satisfy the requirements of CERCLA 120(h)(3). The requirements include a description of the remedial action taken, a covenant, and an access clause. These requirements are also consistent with the intent of the RCRA deed notification requirements at final closure of a RCRA facility if contamination will remain at the OU.

LUCs will be implemented through the following:

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

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

In the event of a property lease or interagency agreement, the equivalent restrictions will be implemented as required by CERCLA Section 120(h).

The selected remedy for the ECODS N-1 and Ford Building subunits leave hazardous substances in place that pose a potential future risk and will require land use restrictions for as long as necessary to keep the selected remedy fully protective of human health and the environment. As agreed on March 30, 2000, among the USDOE, USEPA, and SCDHEC, SRS has implemented a Land Use Control Assurance Plan (LUCAP) (Westinghouse Savannah River Company, LLC (WSRC) 1999) to ensure that the LUCs required by numerous remedial decisions at SRS are properly maintained and periodically verified. The OU-specific Land Use Control Implementation Plan (LUCIP) incorporated by reference into this ROD will provide details and specific measures required to implement and maintain the LUCs selected as part of this remedy. The USDOE is responsible for implementing, maintaining, monitoring, reporting upon, and enforcing the LUCs selected under this ROD. The LUCIP, developed as part of this action, will be submitted

concurrently with the Corrective Measures Implementation Plan (CMIP)/Remedial Action Implementation Plan (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 ROD, establishing LUC implementation and maintenance requirements enforceable under CERCLA. The approved LUCIP will establish implementation, monitoring, maintenance, reporting, and enforcement requirements for the OU. The LUCIP will remain in effect unless and until modifications are approved by the USEPA and SCDHEC as needed to be protective of human health and the environment. LUCIP modification will only occur through another CERCLA document.

Data Certification Checklist

This ROD provides the following information:

- Constituents of concern (COCs) and their respective concentrations (Section V).
- Baseline risk represented by the COCs (Section VII).
- Cleanup levels established for the COCs and the basis for the levels (Section VIII).
- Current and reasonably anticipated future land use assumptions used in the BRA and ROD (Section VI).
- Potential land use that will be available at the site as a result of the selected remedy (Section VI).
- Estimated capital, operation and maintenance, and total present-worth cost; discount rate; and the number of years over which the remedy cost estimates are projected (Section IX).
- Key decision factor(s) that led to selecting the remedy (i.e., describe how the selected remedy provides the best balance of tradeoffs with respect to the balancing and modifying criteria) (Section X).

JIMMY MCMILLIAN Digitally signed by JIMMY MCMILLIAN
Date: 2023.08.29 16:44:48 -04'00'

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DECISION SUMMARY
REMEDIAL ALTERNATIVE SELECTION (U)

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)

SEMS Number: 93

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Savannah River Site
Aiken, South Carolina

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Savannah River Operations Office
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LIST OF ABBREVIATIONS AND ACRONYMS

~	approximate, approximately
>, ≥	greater than, greater than or equal to
<	less than
+D	plus daughters
ac	acre
ARAR	applicable or relevant and appropriate requirement
ARF	Administrative Record File
AWQC	ambient water quality criteria
BRA	Baseline Risk Assessment
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CFR	Code of Federal Regulation
COC	constituent of concern
COPC	constituents of potential concern
COPEC	constituents of potential ecological concern
CM	contaminant migration
CMS/FS	corrective measures study/feasibility study
CSM	conceptual site model
CSSLP	Central Shops Scrap Lumber Pile
EPC	exposure point concentration
ERA	ecological risk assessment
ESV	ecological screening value
FFA	Federal Facility Agreement
ft	feet
gal	gallon
ha	hectare
HHRA	human health risk assessment
HI	hazard index
HQ	hazard quotient
HSWA	Hazardous and Solid Waste Amendments
IOU	Integrator Operable Unit
km	kilometer
km^2	square kilometer
L	liter
LANL	Los Alamos National Laboratory
LLC	Limited Liability Company
LOAEL	lowest observed adverse effect level
LUC	Land Use Controls
LUCAP	Land Use Control Assurance Plan

LIST OF ABBREVIATIONS AND ACRONYMS *(continued)*

LUCIP	Land Use Control Implementation Plan
m	meter
mg/kg	milligram per kilogram
MCL	Maximum Contaminant Level
mi^2	square mile
msl	mean sea level
NBN	no building number
NEPA	National Environmental Policy Act
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
ND	non-detect
NOAEL	no observed adverse effect level
O&M	Operations & Maintenance
OU	operable unit
pCi/g	picocurie per gram
pCi/L	picocurie per liter
PCB	polychlorinated biphenyl
PP	Proposed Plan
PRG	preliminary remedial goal
PTSM	principal threat source material
RAO	remedial action objective
RCOC	refined constituent of concern
RCRA	Resource Conservation and Recovery Act
RFI	RCRA Facility Investigation
RI	Remedial Investigation
ROD	Record of Decision
RSL	regional screening level
RSV	refinement screening value
SARA	Superfund Amendments Reauthorization Act
SB/PP	Statement of Basis/Proposed Plan
SCDHEC	South Carolina Department of Health and Environmental Control
SEMS	Superfund Enterprise Management System
SRS	Savannah River Site
TAL	Target Analyte List
TCL	Target Compound List
UCL	upper confidence limit
USDOE	United States Department of Energy
USEPA	United Stated Environmental Protection Agency

LIST OF ABBREVIATIONS AND ACRONYMS *(continued/end)*

USDOE	United States Department of Energy
USEPA	United Stated Environmental Protection Agency
yd	yard

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

Unit Name, Location, and Brief Description

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)
Superfund Enterprise Management System (SEMS) Identification Number: OU-SEMS 93
Savannah River Site (SRS)
Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) Identification Number: SC1 890 008 989
Aiken, South Carolina
United States Department of Energy (USDOE)

Savannah River Site (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 of South Carolina. SRS is located ~40 kilometers (km [25-miles {mi}]) southeast of Augusta, Georgia, and 32 km (20-mi) south of Aiken, South Carolina (Figure 1).

The United States Department of Energy (USDOE) owns SRS, which historically produced tritium, plutonium, and other special nuclear materials for national defense and the space program. Chemical and radioactive wastes have resulted from the nuclear material production processes. Hazardous substances, as defined by the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), are present in the environment at SRS.

USDOE entered into a Federal Facility Agreement (FFA) (FFA 1993) with the United States Environmental Protection Agency (USEPA) and South Carolina Department of Health and Environmental Control (SCDHEC) to ensure that the environmental impacts associated with past and present activities at the site are thoroughly investigated and that appropriate corrective/remedial action is taken as necessary to protect the public health and welfare and the environment. The FFA (FFA 1993) for SRS lists the *Early Construction*

and Operational Disposal Site N-1 (NBN), Central Shops Scrap Lumber Pile (CSSLP) (631-2G), and Building 690-N, Process Heat Exchanger Repair Facility (aka Ford Building) Operable Unit (OU) (ECODS N-1, CSSLP, and Ford Building OU) as a Resource Conservation and Recovery Act (RCRA)/CERCLA Solid Waste Management Unit requiring further evaluation.

The ECODS N-1, CSSLP, and Ford Building OU was evaluated through an investigation process that integrates and combines the RCRA corrective action process with the CERCLA remedial process to determine the actual or potential impact to human health and the environment of releases of hazardous substances to the environment.

II. SITE AND OPERABLE UNIT COMPLIANCE HISTORY

SRS Operational and Compliance History

The primary mission of SRS has been to produce tritium, plutonium, and other special nuclear materials for our nation's defense programs. Production of nuclear materials for the defense program was discontinued in 1988. SRS has provided nuclear materials for the space program, as well as for medical, industrial, and research efforts up to the present. Chemical and radioactive wastes are by-products of nuclear material production processes. These wastes have been treated, stored, and in some cases, disposed at SRS. Past disposal practices have resulted in soil and groundwater contamination.

Hazardous waste materials handled at SRS are managed under RCRA, a comprehensive law requiring responsible management of hazardous waste. Certain SRS activities require SCDHEC operating or post-closure permits under RCRA. SRS received a RCRA hazardous waste permit from SCDHEC, which was most recently renewed on February 11, 2014. Module VIII of the Hazardous and Solid Waste Amendments (HSWA) portion of the RCRA permit mandates corrective action requirements for non-regulated solid waste management units subject to RCRA 3004(u).

On December 21, 1989, SRS was included on the National Priorities List. 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 United States Code Section 9620, USDOE has negotiated the FFA (FFA 1993) with USEPA and SCDHEC to coordinate remedial activities at SRS into one comprehensive strategy, which fulfills these dual regulatory requirements. USDOE functions as the lead agency for remedial activities at SRS, with concurrence by USEPA – Region 4 and SCDHEC.

Operable Unit Operational and Compliance History

The OU consists of the ECODS N-1 subunit, CSSLP subunit, and the Ford Building subunit and its location at the SRS is shown in Figure 2. These three subunits are located in three distinct locations within and near N Area (Central Shops) in an area of relatively flat terrain (Figure 3). The ECODS N-1, CSSLP, and Ford Building OU is located within an industrial area, and the future land use is reasonably anticipated to remain industrial.

Groundwater is not part of the OU and will be addressed under the Central Shops Groundwater OU.

ECODS N-1 Subunit

ECODS N-1 is one of 25 ECODS at SRS that were used during the construction and early operation of SRS for disposal of construction debris and other non-radioactive waste materials. It is located within the Pen Branch watershed. Historical aerial photographs revealed that the area where the subunit is located was farmland prior to construction of the SRS (WSRC 2001). ECODS N-1 is 107 meters (m) (350 feet [ft]) long by 15 m (50 ft) wide. 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 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) above 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.

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. ECODS N-1 is currently a wooded area containing mature pine trees, providing a moderate habitat quality for ecological receptors (Figure 4).

CSSLP Subunit

The CSSLP subunit is located in the Fourmile Branch watershed in N Area (Figure 3). The former scrap lumber pile lies in the southwestern sloping plain adjacent to the Central Shops Burning/Rubble Pits (631-1G and 631-3G) (CSBRPs) and north of a surface water impoundment area (southwestern portion of the subunit), a wetland (southwest of the impoundment area), and intermittent stream (located within the wetland area). The CSSLP subunit is segregated into two areas, the Upland Area (~1.3 hectares (ha) [3.3 acres (ac)]) and the Surface Water Impoundment Area (~0.41 ha [1.02 ac]) (Figure 5). The Upland 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 631-1G and 631-3G CSBRPs, which were closed under a ROD in 2002 (WSRC 2002). Between 1992 and 1994, the Surface Water Impoundment Area was constructed in the southern portion of the CSSLP subunit to capture stormwater runoff from the CSSLP (Figure 5).

Active burning at the CSSLP ended in the mid-2000s. The CSSLP subunit is currently sporadically covered by immature volunteer pine trees and provides marginal habitat quality for ecological receptors.

Ford Building Subunit

The Ford Building (690-N) is located within the N Area facility boundary in the Pen Branch watershed (Figure 3). 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}]. Ancillary equipment and other areas that are also included in the Ford Building subunit are the remnants of 1) 13.8 kV Substation (652-44N), 2) a Fuel Oil Tank Containment Dike, 3) a shielding remnant area, and 4) the Excess Equipment Yard (745-N).

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 last use for the Ford Building (690-N) was to store excess equipment, which was chemically and/or radiologically contaminated, in waste containers (e.g., Sea Land 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. The Ford Building Seepage Basin (904-91G) and associated underground tank and pipeline were characterized and then remediated in 1998 as described in the *Record of Decision Remedial Alternative Selection for the Ford Building Seepage Basin (904-91G) Operable Unit* (WSRC 2000).

In support of the deactivation and decommissioning (D&D) strategy for the facility, concrete and soils data collected in 2014 were used to conduct a human health (HH) risk screening evaluation for the Ford Building (690-N) concrete slab and underlying soils and evaluate contaminant migration (CM) to groundwater (SRNS 2014 and 2019b). The HH screening evaluation identified polychlorinated biphenyls (PCBs) and cesium-137 (Cs-137) in the concrete slab and expansion joint material at levels that warrant concern with respect to HH (SRNS 2019b). No HH constituents of concern (COCs) were identified for underlying soils beneath the concrete slab, and no CM COCs were identified for the concrete slab and underlying soils.

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 2020b). The building 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 centimeter (cm) (6 inch [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 system serves to break the direct exposure pathway to PCBs and Cs-137 in the remnant slab. The concrete cover system also achieves the substantive requirements under 40 CFR 761.62I for risk-based disposal of bulk product waste.

III. HIGHLIGHTS OF COMMUNITY PARTICIPATION

Both RCRA and CERCLA require the public to be given an opportunity to review and comment on the draft permit modification and proposed remedial alternatives. Public participation requirements are listed in Sections 113 and 117 of CERCLA (42 United States Code Sections 9613 and 9617). These requirements include establishment of an Administrative Record File (ARF) that documents the investigation and selection of the remedial alternatives for addressing the ECODS N-1, CSSLP, and Ford Building OU soil, sediment, surface water, and concrete media. The ARF must be established at or near the facility at issue.

The SRS FFA Community Involvement Plan (SRNS 2011) is designed to facilitate public involvement in the decision-making process for permitting, closure, and the selection of remedial alternatives. The plan addresses the requirements of RCRA, CERCLA, and the 1969 National Environmental Policy Act (NEPA). South Carolina Hazardous Waste Management Regulations R.61-79.124 and Section 117(a) of CERCLA, as amended, requires the advertisement of the draft permit modification and notice of any proposed remedial action and provides the public an opportunity to participate in the selection of the remedial action. The *Statement of Basis/Proposed Plan (SB/PP) for the ECODS N-1, CSSLP, and Ford Building OU* (SRNS 2022b), a part of the ARF, highlights key aspects of the investigation and identifies the preferred action for addressing the ECODS N-1, CSSLP, and Ford Building OU.

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

The FFA ARF is available electronically at the following address:

http://www.srs.gov/general/programs/soil/arf/arfirf.html

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 was 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 was also announced on local radio stations.

The SB/PP 45-day public comment period began on February 16, 2023, and ended on April 2, 2023. A Responsiveness Summary, prepared to address any comments received during the public comment period, is provided in Appendix A of the ROD. A Responsiveness Summary will also be available with the final RCRA permit.

IV. SCOPE AND ROLE OF THE OPERABLE UNIT

Due to the complexity and size of multiple waste units in different areas, the SRS is divided into watersheds for the purpose of managing a comprehensive cleanup strategy. The SRS is segregated into six watersheds (i.e., Upper Three Runs, Lower Three Runs, Fourmile Branch, Steel Creek, Pen Branch, and the Savannah River/Floodplain Swamp). 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, and Ford Building subunits are located within the Pen Branch watershed, and the CSSLP subunit is located within the Fourmile Branch watershed (Figure 3).

A release of hazardous substances into the environment has occurred at the ECODS N-1, CSSLP, and Ford Building OU. The response action selected in this ROD is necessary to protect the public health or welfare or the environment from actual or threatened releases of hazardous substances into the environment.

V. OPERABLE UNIT CHARACTERISTICS

Characteristics of the ECODS N-1, CSSLP, and Ford Building are provided below.

Conceptual Site Model

The conceptual site model (CSM) is an objective framework for assessing data pertinent to the investigation. The CSM identifies and evaluates suspected sources of contamination, contaminant release mechanisms, potentially affected media (secondary sources of contamination), potential exposure pathways, and potential human and ecological receptors.

Exposure pathways describe the course a chemical or physical agent can take from the source to the exposed receptor. The following five components constitute an exposure pathway:

1. Source (facility operations, spill, etc.)
2. Exposure medium (soil, sediment, surface water, etc.)
3. Exposure point (soil surface, sediment surface, etc.)
4. Exposure route (ingestion, dermal contact, inhalation, external radiation, etc.)
5. Receptor (resident, worker, wildlife, etc.)

If any of these elements is missing, the pathway is incomplete, and is not considered further in a quantitative risk assessment. A pathway is complete when all five components are

present to permit potential exposure of a receptor to a source of contamination. Exposure analysis is conceptually important in terms of identifying all the potentially complete exposure routes, understanding the nature and extent (as well as fate and transport) of contamination, and developing preliminary remedial alternatives. In a complete pathway, exposure occurs at exposure points that may represent only a small portion of the entire exposure route. If there is no exposure point, then there is no exposure, and the pathway is considered incomplete.

The OU consists of three subunits: ECODS N-1, CSSLP and the Ford Building. Figures 2 and 3 depict the location of the subunits within the SRS. These subunits represent geographically distinct locations within the ECODS N-1, CSSLP and Ford Building OU, each of which contains environmental media to which a receptor may be exposed, that allow for the summary of data and evaluation of potential exposure. This approach allows for remedial decisions to be made on a smaller scale within the larger OU area. Characterization activities for soil, sediment, and surface water media were conducted at the ECODS N-1, CSSLP, and Ford Building OU in 2001, 2019, and 2020. The OU characterization includes soil media for ECODS N-1 subunit, CSSLP subunit (Upland Area), and the Ford Building subunit; and sediment and surface water from the CSSLP subunit (Surface Water Impoundment Area).

Media Assessment

The overall investigative approach that was implemented for the ECODS N-1, CSSLP, and Ford Building OU investigation is described in the combined RFI/RI/BRA/CMS/FS (SRNS 2022a). The Core Team representatives from USDOE, USEPA, and SCDHEC agreed to this combined and accelerated strategy for the ECODS N-1, CSSLP, and Ford Building OU.

Subunit Investigation (Soil, Sediment, and Surface Water Media)

Characterization of the ECODS N-1, CSSLP, and Ford Building OU was conducted primarily in 2001, 2019, and 2020, and is documented in the RFI/RI/BRA/CMS/FS (SRNS

2022a). A brief description of the characterization efforts for each subunit is provided below.

ECODS N-1 Subunit

A Site Evaluation characterization effort was conducted in 2001 with 90 samples collected from three depth intervals at 27 locations for Target Analyte List (TAL) and Target Compound List (TCL) analyses (Figure 4) (WSRC 2001). These data concluded that further investigation was warranted, and ECODS N-1 was moved to the FFA Appendix C. In 2019, a pre-Work Plan characterization effort collected soil samples at the surface (0 to 0.3 meters [m] [0 to 1 feet [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 4). Because of the history of burning at ECODS N-1, analyses for hexavalent chromium (Cr [VI]) were performed on the 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 on biased sampling for locations with previously identified elevated metals from the 2019 characterization sampling (SRNS 2020a). The 2020 characterization also collected subunit-specific background samples. In total, 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 2020 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 4).

Fragments of cementitious paneling were encountered at the ECODS N-1 subunit during the 2020 characterization, and the disposal of asbestos was suspected. Two of the three samples collected at sampling location (ECN1-044) were verified positive for asbestos indicating the potential presence of asbestos within the entire subunit boundary (Figure 4).

CSSLP Subunit

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 5). The soil samples were analyzed for TAL and TCL constituents as well as radiological indicators. In 2020, the RFI/RI Work Plan characterization included 30 soil samples focused on three background locations outside the unit boundary and previously identified locations of elevated metal concentrations at six locations in the CSSLP Upland Area. 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]). 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). The following sediment intervals were sampled: surface (0 to 0.3 m [0 to 1 ft]) and shallow subsurface (0.3 to 1.2 m [1 to 4 ft]).

Ford Building Subunit

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 6) as follows:

- Around the perimeter of the Ford Building, 16 locations using a biased sampling plan for areas of suspected contamination including 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. 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]);

- At the Excess Equipment Yard (745-N), 11 locations 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 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.

Media Assessment Results

The 2019 and 2020 characterization data were used to perform a human health risk assessment (HHRA), an ecological risk assessment (ERA), a Principal Threat Source Material (PTSM) evaluation, and a contaminant migration (CM) to groundwater analysis (SRNS 2022a). Table 1 summarizes the results of these evaluations and identifies refined constituents of concern (RCOCs) for the OU. RCOCs are those constituents that were retained following a weight-of-evidence evaluation and require remedial action.

All three subunits of the ECODS N-1, CSSLP, and Ford Building OU present a problem warranting remedial action. For the ECODS N-1 subunit, although there were no identified RCOCs, asbestos is present in subsurface soils that may pose a risk to human receptors if exposed. For the CSSLP, arsenic in soil in the Upland Area, and sediment in the Surface Water Impoundment Area pose a risk to human health. For the Ford Building subunit, PCBs (Aroclor 1254 and 1260) and Cs-137 plus daughters (+D) were present at the Ford Building remnant concrete slab posing a threat to human health before the engineered concrete cover system was installed in 2021. Cobalt-60 (Co-60) in soil also poses a risk to human health receptors for the Ford Building subunit. A brief description of the media assessment results for each subunit is provided below.

ECODS N-1 Subunit

At the ECODS N-1 subunit, no RCOCs were identified, although asbestos is present in subsurface soils. The potential for human exposure to asbestos is likely should disturbance of subsurface soils occur.

CSSLP Subunit

Arsenic is present in the soil and sediment of the Upland Area and sediment that may potentially pose a threat to human health.

For the Upland Area, arsenic was detected in 25/25 soil samples, with 12 results being estimated values (i.e., J-qualified). Concentrations range from 0.975 mg/kg to 63.1 milligrams per kilogram (mg/kg), with a mean concentration of 9.77 mg/kg. Sample location CSSLP-31 (Figure 5) had the highest detected concentration. Arsenic was identified as a problem warranting action in surface soil for residential and industrial worker receptor scenarios.

For the Surface Water Impoundment Area, arsenic was detected in 4/4 samples present in surface sediment, with no results being estimated values (i.e., J-qualified). Concentrations ranged from 4.12 mg/kg to 8.59 mg/kg, with a mean concentration of 5.94 mg/kg. Sample location CSSLP-20 (Figure 7) had the highest detected concentration. Arsenic was identified as a problem warranting action in sediment for residential and industrial worker receptor scenarios.

Ford Building Subunit

Before an engineered concrete cover system was installed in 2021, PCBs (Aroclor 1254 and 1260) and Cs-137(+D) were identified at the Ford Building remnant concrete slab as problems warranting action (SRNS 2019b). In surface soil, Co-60 was identified as a problem warranting action for the residential and industrial worker scenarios.

Co-60 is a man-made byproduct of reactor operations and does not occur naturally. It has a half-life of 5.3 years. Its presence is consistent with the operational history of Ford Building. Co-60 was detected in 1/7 samples with none being estimated (i.e., J-qualified). Concentrations range from non-detect to 0.545 picocuries per gram (pCi/g), with the

highest concentration located in surface soil at sample location FBFA-21 adjacent to the engineered concrete cover system (Figure 8).

Site-Specific Factors

No site-specific factors requiring special consideration that might affect the remedial action for the ECODS N-1, CSSLP, and Ford Building OU are present at the site. Given the location and concentrations of contamination at the ECODS N-1, CSSLP, and Ford Building OU, there were no known or potential routes of off-site migration that could impact human health or the environment.

VI. CURRENT AND POTENTIAL FUTURE SITE AND RESOURCE USES

Land Uses

According to the SRS Future Use Project Report (USDOE 1996), residential uses of SRS land should be prohibited. The *Land Use Control Assurance Plan for the Savannah River Site* (WSRC 1999) designates the ECODS N-1, CSSLP, and Ford Building OU as being within an industrial area. The future land use is reasonably anticipated to remain industrial with USDOE maintaining control of the land.

Groundwater Uses

Groundwater is not a part of the ECODS N-1, CSSLP, and Ford Building IOU and will be addressed separately as part of the Central Shops Groundwater OU.

VII. SUMMARY OF OPERABLE UNIT RISKS

Baseline Risk Assessment

As a component of the RFI/RI process, a BRA was performed to evaluate risks associated with the ECODS N-1, CSSLP, and Ford Building OU (SRNS 2022a). The BRA estimates what risks the site poses if no action were taken. It provides a basis for taking action and identifies the contaminants and exposure pathways that need to be addressed by the

remedial action. The BRA includes human health and ecological risk assessments. This section of the ROD summarizes the results of the BRA for the ECODS N-1, CSSLP, and Ford Building OU (SRNS 2022a).

Summary of Human Health Risk Assessment

The ECODS N-1, CSSLP, and Ford Building OU is located in N Area (Central Shops) in an area currently designated for industrial use. No current or projected future development of these subunits are 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 were evaluated. 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 (children and adults) that 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.

The future resident receptor scenario also includes a comparison of constituents to surface water threshold levels based on regulatory-based limits (maximum contaminant levels [MCLs]) or risk-based threshold values, as appropriate.

The *future industrial worker* scenario is a standard USEPA exposure scenario which 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. This receptor is referred to as "composite worker" by USEPA and 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 for the majority of time.

Exposure routes associated with soil and sediment include incidental ingestion, inhalation of particulates and vapors, dermal absorption, and external exposure to radiation. The 0 to 0.3 m (0 to 1 ft) surface interval from the ECODS N-1, CSSLP (Upland Area and Surface

Water Impoundment Area) and Ford Building subunits were evaluated for both the residential and industrial worker scenarios in the HHRA.

USEPA publishes regional screening levels (RSLs) for non-radiological constituents and preliminary remediation goals (PRGs) for radiological constituents that are risk-based concentrations (or activity concentrations) that can be used to evaluate potentially contaminated waste sites. RSLs and PRGs combine current USEPA toxicity values with standard exposure factors that represent reasonable maximum exposure conditions to estimate contaminant concentrations in exposure media that the agency considers protective of humans over a lifetime. The concentrations are based on direct exposure pathways for which generally accepted methods, models, and assumptions have been developed for specific land use conditions.

The *USEPA Regional Screening Levels* website (USEPA 2020a) was the source of RSLs used in this assessment. The generic table located on the USEPA website was published in November 2020, and used all default parameters for both the residential and industrial worker scenarios. The RSL website was accessed in February 2021.

The *USEPA Superfund Radionuclide Preliminary Remediation Goals for Superfund* website (USEPA 2020b) was the source of the PRGs used in this assessment. The website was accessed in February 2021. The PRGs for a residential scenario were obtained by using the website calculator function to derive site-specific PRGs. These site-specific PRG values were calculated by using all default parameters as standard input assumptions with the exception of the fruit and vegetable consumption pathways (SRNS 2022a). The PRGs for an industrial worker scenario were obtained from the generic table which assumed all default parameters.

The first step of the formal HHRA for soil (and sediment) was data screening to identify human health constituents of potential concern (COPCs). The maximum detected soil (or sediment) concentration from the 0 to 0.3 m (0 to 1 ft) sample depth interval for each constituent was compared to a residential RSL or PRG screening value and SRS background concentration, if appropriate (i.e., for naturally occurring constituents only).

Constituents that exceeded the soil screening criteria were identified as COPCs and were carried forward to the quantitative risk evaluation.

The quantitative risk assessment was implemented by a streamlined approach which used the RSLs/PRGs to calculate the human health risk estimates for each ECODS N-1, CSSLP, and Ford Building OU subunit.

For carcinogens, the risk estimate was calculated using the following equation:

Cancer Risk = (exposure point concentration / RSL or PRG) x 1E-06

The exposure point concentration (EPC) is identified as the lesser of the maximum detected value or the 95% upper confidence limit (UCL) of the mean concentration. Carcinogenic constituents with an individual cancer risk greater than (>) 1E-06 were identified as human health constituents of concern (COCs).

For noncarcinogens, the hazard estimate was calculated using the following equation:

Noncancer Hazard Quotient = EPC / RSL

If the total hazard index (HI) was less than (<) 1, then no COCs were identified. If the total HI was greater than or equal to (≥) 1, then the constituents were segregated based on relevant target organs. Hazard Quotients (HQs) were summed according to target organs. Constituents were identified as human health COCs if the total organ HQ was > 0.1 and the total organ HI was > 1.

A recommendation of whether a human health COC should be carried forward for further remedial evaluation was based on a thorough analysis of each constituent in an uncertainty discussion. COCs that were not eliminated in the refinement process based on a weight-of-evidence evaluation were identified as human health RCOCs.

For surface water within the CSSLP subunit (Surface Water Impoundment Area), maximum detected concentrations of each constituent were conservatively compared to drinking water MCLs. In the absence of an MCL, the lowest value for the tap water RSL/PRG or promulgated ambient water quality criteria (AWQC) (Federal/State) was used

as a screening threshold. Constituents that exceed the MCL (PRG/RSL or AWQC) thresholds were further evaluated in the refinement of COCs step. No RCOCs were identified for surface water.

There were no RCOCs for the ECODS N-1 unit (soil). Human health RCOCs were identified for the CSSLP subunit (soil and sediment media) and the Ford Building subunit (soil). The Risk Assessment Guidance for Superfund Part D tables are presented for the RCOCs identified in the BRA to support the human health risk discussion. Tables 2a and 2b list the RCOCs and their EPCs for each subunit. Table 3 provides a summary of the cancer toxicity data, and Table 4 and Table 5 provide the calculated risk levels for the future resident and future industrial worker scenarios, respectively.

More specifically, for the Upland Area of the CSSLP subunit, arsenic (risk = 2.41E-05) was identified as a human health RCOC in soil media for the future resident scenario (Table 4). Arsenic (risk = 5.46E-06) was also identified as a human health RCOC in soil for the future industrial worker scenario (Table 5).

For the Surface Water Impoundment Area of the CSSLP subunit, arsenic (risk = 1.22E-05) was identified as a HH RCOC in sediment media for the future resident scenario (Table 4). Arsenic (risk = 2.76E-06) was also identified as a human health RCOC in sediment for the future industrial worker scenario (Table 5).

For the Ford Building subunit, Co-60 (risk = 1.65E-05) was identified as a human health RCOC in soil media for the future resident scenario (Table 4). Cobalt-60 (risk = 1.13E-05) was also identified as a human health RCOC in soil for the future industrial worker scenario (Table 5).

Summary of Ecological Risk Assessment

Ecological risk is associated with the potential for harmful effects to ecosystems resulting from exposure to an environmental stressor. A stressor is any physical, chemical, or biological entity that can induce an adverse response. Stressors may adversely affect

specific natural resources or entire ecosystems, including plants and animals, as well as the environment with which they interact.

The habitats within the ECODS N-1, CSSLP and Ford Building OU support both terrestrial and aquatic/semi-aquatic receptors on a relatively small scale. The media of concern are primarily soil (ECODS N-1, CSSLP Upland Area, Ford Building), sediment (CSSLP Surface Water Impoundment Area), and surface water (CSSLP Surface Water Impoundment Area). Surface (0 to 0.3 m [0 to 1 ft]) and subsurface (0.3 to 1.2 m [1 to 4 ft]) intervals from the ECODS N-1, CSSLP Upland Area, and Ford Building were evaluated (soil, terrestrial receptors) in the ERA. Sediment from the surface 0 to 0.3 m (0 to 1 ft) interval and surface water from the CSSLP subunit, Surface Water Impoundment Area (sediment, aquatic/semi-aquatic and terrestrial receptors) were also evaluated.

Ecological threshold levels are medium- and receptor-specific values that can be used to evaluate (i.e., screen) soil, sediment, and surface water data from potentially contaminated sites. The thresholds are derived from several sources and are used to evaluate No Observed Adverse Effect Level (NOAEL) and Lowest Observed Adverse Effect Level (LOAEL) for wildlife receptors. The ecological screening values (ESVs) in the initial screening-level effects evaluation are based on NOAEL thresholds. For constituents that exceed ESVs and background screening, refinement screening values (RSVs) are used for the refinement-level risk calculation. The RSVs are based on LOAEL thresholds appropriate for refinement of soil, sediment, and surface water constituents.

The threshold values used for the ESV and RSV assessments were derived from three sources: (1) the *USEPA Region 4 Ecological Risk Assessment Supplement Guidance Interim Draft* (USEPA 2018), (2) the Los Alamos National Laboratory (LANL) ECORISK Database Tool (LANL 2017), and (3) the SCDHEC, R.61-68, Water Classifications and Standards (SCDHEC 2020).

The ECODS N-1, CSSLP, and Ford Building OU ERA consisted of steps designed to provide a scientifically based and defensible assessment of exposure and hazard assessment for ecological receptors that will support a risk management decision regarding site remediation. The ERA included a screening-level ecological effects evaluation in which

constituent concentrations in soil, sediment, or surface water were compared to relevant ecological screening levels; constituents that exceeded ESVs or that had no ESV were considered constituents of potential ecological concern (COPECs). COPECs that result from the screening-level evaluation are carried forward to a refinement-level risk (hazard) calculation in which refinement-level HQs are calculated for each COPEC. The refinement-level screening is based on LOAEL thresholds (or chronic levels for surface water) and the 95% upper confidence limit (UCL) on the mean. Analytes that failed the refinement-level screening were considered COPCs. Uncertainties associated with the screening thresholds, background concentrations, nature and extent of contamination, receptor-specific area use factors, age of data, or contaminants that result from the screening and refinement processes were discussed in an uncertainty evaluation. The uncertainty discussion concluded with a determination of whether the constituent should or should not be considered a RCOC.

The screening level ecological effects evaluation for the ECODS N-1, CSSLP, and Ford Building OU indicated that more information was not needed to make remedial decision recommendations for the protection of ecological receptors. Site-specific biological sampling or additional studies were not warranted. No ecological problems warranting action for the ECODS N-1, CSSLP, and Ford Building OU, including soil, sediment and surface water media, were identified.

Summary of the Fate and Transport Analysis

A fate and transport analysis was performed to identify contaminant migration COCs.. Tier I screening was conducted on each subunit modeling the most conservative assumptions including maximum constituent concentrations at the maximum sample depth (i.e., shortest travel time distance in the vadose zone to water table). Tier I constituents predicted to potentially impact groundwater at concentrations exceeding action levels were assessed further, following a less conservative set of assumptions for the Tier II analysis, assessing the impact to groundwater at concentrations exceeding action levels within the evaluation timeframe of 1,000 years. Vadose zone contaminant migration simulations were modeled based on the best available data from previous soil boring activities as well as recent soil

core descriptions for the contaminant migration analysis performed using VZCOMML© and GoldSim®. Results of the CM evaluation revealed no soil contaminants in the vadose zone with the potential to migrate to groundwater and exceed groundwater action levels within 1,000 years. No contaminant migration RCOCs were identified at the ECODS N-1, CSSLP, and Ford Building OU as a result of this evaluation.

Discussion of Principal Threat Source Material

Source materials are those materials that include or contain hazardous substances, pollutants, or contaminants that act as a reservoir for migration of contamination to groundwater, surface water, or air that acts as a source for direct exposure (USEPA 1991). PTSM are defined as those source materials that have a high toxicity or mobility and cannot be reliably contained or present a significant risk to human health or the environment. No threshold level of toxicity/risk has been established to define "principal threat." However, treatment or removal alternatives should be considered for source materials when the cumulative risk for the future industrial worker exceeds 1E-03 for carcinogens or a HI of 10 for noncarcinogens. The identification of PTSM based on mobility is evaluated under the contaminant migration (CM) analysis. In order to determine whether contaminants in soil or sediment at the ECODS N-1, CSSLP, and Ford Building OU may be considered PTSM, a quantitative assessment evaluating the toxicity of the source material was performed.

Data used for the ECODS N-1, CSSLP, and Ford Building OU PTSM evaluation included soil and sediment results from all depth intervals from each subunit, as appropriate. The USEPA default industrial worker was the receptor scenario evaluated under the PTSM evaluation for the ECODS N-1, CSSLP, and Ford Building OU. Given the current and expected future land use of the area where the ECODS N-1, CSSLP, and Ford Building OU is located, the industrial worker is the most likely exposure scenario.

In the preliminary screen, the maximum detected concentration for every constituent from each subunit in the ECODS N-1, CSSLP, and Ford Building OU was determined and used as the EPC. HQs for noncarcinogens and risk estimates for carcinogens were calculated using industrial worker RSLs/PRGs as risk-based threshold levels. Results of the PTSM

evaluation for soil at the ECODS N-1 subunit indicate that the HI is 8.04E+00 and the cumulative risk is 8.27E-05. No PTSM RCOCs were identified for the ECODS N-1 soil medium.

For the CSSLP subunit, results of the PTSM evaluation for soil at the CSSLP Upland Area indicate that the HI is 7.77E-01 and the cumulative risk is 1.54E-04. Results of the PTSM evaluation for sediment at the CSSLP Surface Water Impoundment Area indicate that the HI is 1.59E-01 and the cumulative risk is 3.50E-04. Therefore, no PTSM RCOCs were identified CSSLP subunit (Upland Area soil medium or the CSSLP Surface Water Impoundment Area sediment medium).

Results of the PTSM evaluation for soil at the Ford Building indicate that the HI is 5.35E+00 and the cumulative risk is 1.30E-03. Since the PTSM threshold of 1E-03 was exceeded, an uncertainty analysis was presented to further evaluate the constituents and source(s) that exceed the PTSM criteria. The risk was driven by the Thorium Series (thorium-232) with the maximum detected concentration for each analyte used in the evaluation. An uncertainty evaluation concluded that thorium-232 is a naturally occurring constituent that is common in SRS background soils and is not unit-related. Therefore, no PTSM RCOCs was identified for the Ford Building subunit.

In summary, no PTSM RCOCs were identified for the ECODS N-1, CSSLP, and Ford Building OU.

Conclusion

As determined in the combined RFI/RI/BRA/CMS/FS report (SRNS 2022a), unacceptable risks were identified under the future resident and future industrial worker scenarios for the CSSLP subunit for arsenic contamination in soil and sediment, and the Ford Building subunit for Co-60 in soil. In addition, asbestos is present within the ECODS N-1 subunit that may potentially pose a threat to human health if disturbance of subsurface soils occurs. The response action selected in this ROD is necessary to protect the public health or welfare or the environment from actual or threatened releases of hazardous substances into the environment.

VIII. REMEDIAL ACTION OBJECTIVES AND REMEDIAL GOALS

This section discusses the remedial action objectives (RAOs) and remedial goals (RGs) (i.e., cleanup levels) for the ECODS N-1, CSSLP, and Ford Building OU to protect human health and the environment and mitigate the effects of contamination.

Remedial Action Objectives

RAOs are medium- or OU-specific objectives for protecting human health and the environment. RAOs usually specify potential receptors and exposure pathways and are identified during project scoping once the CSM is understood. RAOs describe what the remediation must accomplish and are used as a framework for developing remedial alternatives. The RAOs are based on the nature and extent of contamination, threatened resources, and the potential for human and environmental exposure. The following RAOs have been identified for the ECODS N-1, CSSLP, and Ford Building OU:

- ECODS N-1 subunit
    - Prevent residential and industrial exposure to asbestos that is 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 Co-60 in surface soils at levels exceeding 1E-06 risk. The primary route of exposure is the incidental ingestion pathway.

    - 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 human health exposure risk under the current configuration (i.e., no exposure pathway) due to the presence of the engineered concrete cover system over the remnant slab.

Cleanup Levels

Preliminary remedial goals (PRGs) serve to provide a range of cleanup levels for each RCOC and are typically identified along with the RAOs. Following public comment and approval of the SB/PP, the PRGs for the selected remedy are documented as final cleanup levels in the ROD. Cleanup levels were previously referred to as RGs in earlier SRS documentation.

Cleanup levels can be qualitative statements or numerical values often expressed as concentrations in soil or groundwater, or actions (installation of engineered barriers, placement of caps and covers, etc.) that achieve the RAO. These cleanup levels are either concentration levels that correspond to a specific risk or hazard or are based on Applicable, or Relevant and Appropriate Requirements (ARARs). Final cleanup levels will be monitored to determine when the remedial action is complete.

PRGs were calculated for the future resident and future industrial worker scenarios that correspond to a target cancer risk of 1.0E-06 at the CSSLP and Ford Building subunits and are presented in Table 6. A cleanup level for asbestos at the ECODS N-1 subunit is not presented in Table 6 because risk-based thresholds are not available at the USEPA RSL website. The most restrictive PRG or background concentration is selected as the final cleanup level.

Figure 7 is a map of the human health RCOC locations at the CSSLP subunit that exceeded the PRGs for a future resident and future industrial worker scenario. Figure 8 is a map of the human health RCOC location that exceeded the cleanup levels for the future industrial worker scenario for the Ford Building subunit.

Applicable or Relevant and Appropriate Requirements

Section 121(d) of CERCLA, as amended by the Superfund Amendments Reauthorization Act (SARA), requires that remedial actions for cleanup of hazardous substances must comply with requirements and standards set forth under Federal and State environmental laws and regulations that are applicable or relevant and appropriate (i.e., ARARs). ARARs include only Federal or State environmental or facility laws and regulations and do not include occupational safety or worker protection requirements. SARA requires that the remedial action for a site meet all ARARs unless a waiver is invoked.

ARARs consist of two sets of requirements: those that are applicable, and those that are relevant and appropriate. Applicable requirements are those substantive standards that specifically address the situation at a CERCLA site and are promulgated under Federal or State environmental laws. If a requirement is not applicable, it may still be relevant and appropriate. "Applicability" is a legal and jurisdictional determination, while the determination of "relevant and appropriate" relies on professional judgment, considering environmental and technical factors at the site. A requirement may be "relevant" in that it covers situations similar to that at the site, but may not be "appropriate" to apply for various reasons and, therefore, not well suited to the site. In some situations, only portions of a requirement or regulation may be judged relevant and appropriate; if a requirement is applicable, however, all substantive parts must be followed. In addition to ARARs, many Federal and State environmental and public health programs include criteria, guidance, and proposed standards that are not legally binding but provide useful approaches or recommendations. Such information is required to-be-considered when cleanup levels are developed.

Key ARARs associated with each alternative are discussed in more detail in the Description of Alternatives section. The complete list of ARARs for the selected remedy are presented

in Table 7 for the ECODS N-1 subunit, Table 8 for the CSSLP subunit, and Table 9 for the Ford Building subunit.

IX. DESCRIPTION OF ALTERNATIVES

This section presents and summarizes the remedial alternatives for the final remedy for the ECODS N-1, CSSLP, and Ford Building OU. The RFI/RI/BRA/CMS/FS for ECODS N-1, CSSLP, and Ford Building OU (SRNS 2022a) included the identification and screening of technologies, development and screening of alternatives, and a detailed analysis 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. Ten remedial alternatives were evaluated in the RFI/RI/BRA/CMS/FS (2022a). Nine alternatives (Alternatives A-1 and A-2 for ECODS N-1 subunit; Alternatives B-1 through B-4 for CSSLP subunit; Alternative C-1 through C-3 subunit) were retained for detailed analysis in the RFI/RI/BRA/CMS/FS (2022a) and are described below. *Alternative A-3, Excavation and Disposal,* for the ECODS N-1 subunit was not retained for the detailed analysis in the RFI/RI/BRA/CMS/FS evaluation due to the presence of asbestos requiring special permits, worker requirements and work controls, and a significantly higher cost. .

Remedy Components, Common Elements, and Distinguishing Features of Each Alternative

ECODS N-1 Subunit (Alternatives A-1 and A-2)

Alternative A-1: No Action

The No Action alternative is required by the NCP 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 RCOCs 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 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

CSSLP Subunit (Alternatives B-1 through B-4)

Alternative B-1: No Action

The 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 RCOCs 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 (Upland Area and Surface Water Impoundment Area). 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 up to ~1,300,000 liters (L) (350,000 gallons [gal]) of stormwater from the Surface Water Impoundment Area, (if present), 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, any 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 7). Specifically, this remedial alternative includes releasing up to ~1,300,000 L (350,000 gal) of stormwater (if present) 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, any 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 (SAP) would include a sampling design as well as sample collection and analytical methods that would be developed and presented in the Corrective Measures Implementation Plan / Remedial Action Implementation Plan (CMIP/RAIP). Alternative B-4 would not require LUCs or five-year remedy reviews because removing the contaminated media would result in concentrations not exceeding levels acceptable for unrestricted use/unlimited exposure.

Summary of Costs

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

Ford Building Subunit (Alternatives C-1 through C-3)

Alternative C-1: No Action

The 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 RCOCs 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 soil 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 SAP to include a sampling design as well as sample collection and analytical methods would be developed and presented in the CMIP/RAIP. Alternative C-3 would require LUCs to maintain the integrity of the concrete cover that exists over the Ford Building remnant slab and 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 $63,358
O&M.....$650,388
Total Present-Worth Cost ...$713,746

X. COMPARATIVE ANALYSIS OF ALTERNATIVES

The NCP (40 Code of CFR 300.430(e)(9)) requires that potential remedial alternatives undergo detailed analysis using relevant evaluation criteria that will be used 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 10.

The potential remedial alternatives have been evaluated against the threshold and primary balancing criterial. Provided below is a summary of the comparison of the alternatives against the CERCLA evaluation criteria. 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 summarized in Table 11 for the ECODS N-1 subunit, Table 12 for the CSSLP subunit, and Table 13 for the Ford Building subunit.

ECODS N-1 Subunit

Overall Protection of Human Health and the Environment

Alternative A-1 – No Action creates a potential for human exposure to asbestos and is not protective. *Alternative A-2 – Land Use Controls* limits exposure to the contaminated media

through the implementation of engineering and administrative controls and is therefore, protective of human health and the environment.

Compliance with ARARs

Alternative A-1 does not achieve the chemical-specific ARAR associated with the asbestos. Alternative A-2 will comply with the asbestos ARARs in Table 7 that are relevant and appropriate to the selected LUCs, which include warning signs, public access controls, and deed notices for asbestos disposal sites.

Short-Term Effectiveness

Alternative A-1 has no controls to prevent exposure in the short-term. Alternative A-2 meets the RAO and poses no risk to the industrial worker or surrounding community and environment during implementation of LUCs.

Long-Term Effectiveness and Permanence

Alternative A-1 does not provide for long-term effectiveness or permanence because an unacceptable residual risk to human health and the environment under future conditions at the ECODS N-1 subunit would remain unchanged. Alternative A-2 will provide long-term effectiveness 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.

Implementability

Alternative A-1 does not require implementation. Alternative A-2 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 Human Health and the Environment

Except for *Alternative B-1 (No Action)*, all alternatives are protective of HH and the environment. *Alternative B-2 (Land Use Controls)* limits exposure to the contaminated media through implementing engineering and administrative controls. *Alternative B-3 (Soil Cover with Land Use Controls)* breaks the exposure pathway by placing clean fill over the contaminated media. *Alternative B-4 (Excavation [Hot Spot Removal] and Disposal)* physically removes the contamination via excavation and offsite disposal and places clean fill to grade.

Compliance with ARARs

There are no ARARs that have been identified 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 stormwater 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. Alternative B-2 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 have injury risk to the industrial worker during implementation that is not present with Alternative B-2. However, health and safety measures typically mitigate the risk. Alternatives B-3 and B-4 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. Alternative B-4 has high long-term effectiveness as this alternative includes excavating contaminated media and leaves no contamination in place. Alternative B-3 is effective 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 have equal implementability due to SRS's considerable experience in administrating both types of alternatives successfully. Alternative B-2 requires only administrative and engineering controls to implement. There is no implementation necessary for Alternative B-1.

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 Huma Health and the Environment

Except for *Alternative C-1 (No Action)*, all alternatives protect HH and the environment. *Alternative C-2 (Land Use Controls)* limits exposure to the contaminated media by implementing engineering and administrative controls. *Alternative C-3 (Excavation [Hot*

Spot Removal] and Disposal) 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 does not prevent exposure. Alternative C-2 poses no risk to the industrial worker or surrounding community during implementation, and has a short implementation time. Alternative C-3 has 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 does not prevent exposure. Alternative C-3 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.

Implementability

Alternative C-3 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 requires only administrative and engineering controls. There is no implementation necessary for Alternative C-1.

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

XI. THE SELECTED REMEDY

Detailed Description of the Selected Remedy

ECODS N-1

For the ECODS N-1 subunit, *Alternative A-2, Land Use Controls* is the selected remedy because it is effective in preventing human exposure to asbestos that is present in the subsurface and will achieve the RAO provided LUCs remain in place.

The following LUC objectives are necessary to ensure protectiveness of Alternative A-2:

- Prevent contact, removal, or excavation of soil within the ECODS N-1 subunit.
- Prohibit the development and use of property for residential housing, elementary secondary schools, childcare facilities and playgrounds.

LUCs is a proven remedy for many other ECODS at SRS. The unit boundary, shown in Figure 4, is the approximate LUC boundary for the ECODS N-1 subunit. The LUC remedy consists of using engineering and administrative controls to prevent/restrict access to the industrial worker and/or future resident from the contaminated media within the ECODS N-1 subunit. LUCs would be implemented at the ECODS N-1 subunit through the use of warning signs indicating the presence of asbestos and no trespassing, excavation permit restrictions, implementation of a LUCIP, and deed restrictions in the event the property is ever sold. Periodic (annual) inspections will be required and periodic maintenance (e.g., sign repair) will be performed to ensure that the LUCs remain protective. Five-year remedy reviews will be required. Alternative A-2 would achieve the RAO and meet ARARs (Table 7) and is determined to be protective of human health and the environment.

LUCs will be maintained until the concentration of hazardous substances in the media is at such levels to allow for unrestricted use and exposure. The timeframe for LUCs is assumed for 30 years of duration as a basis for the cost estimate. However, the duration is undetermined and will likely be longer, as asbestos does not degrade over time.

A LUCIP will be prepared by the USDOE that describes the implementation and maintenance actions for the remedial action, including periodic inspections. Periodic inspections will be performed to ensure warning signs are in place and no unauthorized encroachment onto the controlled area is occurring. Signs will be replaced and/or repaired as needed, and records for site use/site control permits will be maintained within the SRS infrastructure. The USDOE is responsible for implementing, maintaining, monitoring, reporting upon, and enforcing the LUCs. The LUCIP will remain in effect unless and until modifications are approved by the USEPA and SCDHEC as needed to be protective of human health and the environment.

CSSLP Subunit

For the CSSLP subunit, *Alternative B-4, Excavation (Hot Spot Removal) and Disposal* is the selected alternative because it is effective in eliminating human exposure to arsenic-contaminated surface soil in the Upland Area and arsenic-contaminated surface sediments in the Surface Water Impoundment Area. Removal and disposal of arsenic-contaminated

surface soil and sediment are expected to meet the cleanup levels for unrestricted land use. No LUCs or five-year remedy reviews are expected following remedy implementation. Therefore, no further action would be required after the remedial action is complete. Alternative B-4 would achieve the RAOs and meet ARARs (Table 8) and has been determined to be protective of human health and the environment.

The remedy for the CSSLP subunit physically removes the contamination via excavation and offsite disposal and places clean fill to grade to permanently remove the potential risk to human receptors. Excavation will be completed using standard earth-moving equipment. Stormwater management, as well, can be achieved with standard equipment. Excavation and disposal are readily implemented with standard equipment, materials, and conventional construction methods.

Initially the Surface Water Impoundment Area will be emptied of stormwater, if water is present. For the purpose of developing the cost estimate, stormwater management of the ~1,324,894 L (350,000 gal) capacity of rainwater in the Surface Water Impoundment area is assumed to be accomplished by releasing surface water through a best management practice (BMP) stormwater-sediment feature. After the Surface Water Impoundment Area is emptied of stormwater, if present, the limit of disturbance will be ~0.77 ha (1.9 ac) to be cleared and grubbed. Pre-excavation soil samples will then be taken to determine the lateral extent of the area to be excavated, followed by the excavation of ~1,788 m^3 (2,339 yd^3) of contaminated media to a depth of 0.3 m (1 ft) below ground surface. The excavated material will be directly loaded into roll-off containers and staged at the site. Removed wastes will ultimately be hauled to an approved disposal facility such as the Three Rivers Landfill.

After excavation of the soils, the areas will be backfilled using ~1,430 m^3 (1,871 yd^3) of clean fill and 716 m^3 (936 yd^3) of topsoil to fill the excavated areas to grade. The clean fill will be hauled to the site from an on-site borrow pit. The clean fill will be compacted through the use of the earth-moving equipment.

Long-term effectiveness is achieved under this alternative by removing contaminated media identified above the cleanup level, and backfilling the area to grade, thereby reducing potential exposure to the industrial worker and/or future resident. This remedy

permanently removes and disposes of the contaminated soil providing long-term protection. Excavation to remove contaminated media from the unit can be completed in a short timeframe while posing no significant risk to the community. Use of BMPs during construction and transportation of contaminated media off-site will minimize any risk to surrounding communities. Remedial workers will have the greatest risk of exposure during excavation and hauling activities. Strict adherence to the project-specific health and safety plan will mitigate worker exposure to hazardous material while activities are performed.

Ford Building

For the Ford Building subunit, *Alternative C-2, Land Use Controls* is the selected alternative because it is effective in preventing human exposure to Cs-137 and PCBs remaining on the remnant slab beneath the concrete cover system, and Co-60 in surface soils beneath the gravel apron surrounding the concrete cover system. The remnant slab. Alternative C-2 accounts for the short half-life (~5.3 years) of Co-60. The risk to the industrial worker to Co-60 in surface soil will be below the 1E-06 risk level within 20 years, thereby eliminating any long-term requirements other than LUCs to prevent exposure to contaminants on the remnant slab beneath the concrete cover. Alternative C-2 would achieve the RAOs and meet ARARs (Table 9) and is determined to be protective of human health and the environment. The unit boundary, shown in Figure 8, is the approximate LUC boundary for the ECODS N-1 subunit.

The following LUC objectives are necessary to ensure protectiveness of Alternative C-2:

- Prevent contact, removal, or excavation of contaminants in surface soils and at the Ford Building (690-N) remnant concrete slab.

- Prohibit the development and use of property for residential housing, elementary secondary schools, child care facilities and playgrounds.

As with the ECODS N-1 subunit, Alternative C-2 consists of using engineering and administrative controls to prevent/restrict access to the industrial worker and/or future resident from the contaminated media within the Ford Building subunit. LUCs would be implemented through the use of signage (e.g., warning, no trespassing), excavation permit

restrictions, implementation of a LUCIP, and deed restrictions in the event the property is ever sold. Periodic (annual) inspections will be performed to ensure warning signs are in place, degradation of the concrete cover is not occurring, and no unauthorized encroachment onto the controlled area is taking place. Signs will be replaced and/or repaired as needed, any issues identified with the concrete cover system will be resolved, and records for site use/site control permits will be maintained within the SRS infrastructure. LUCs would also include O&M costs for the concrete cover system that exists atop the Ford Building remnant slab. O&M would include annual inspections and required maintenance to maintain the integrity of the existing concrete cover system. The concrete cover system must remain in place to be protective of the industrial worker and/or future resident. Five-year remedy reviews would be required under this alternative.

Long-term effectiveness is achieved under this alternative as long as LUCs are maintained until the concentration of hazardous substances in the media is at such levels to allow for unrestricted use and exposure. For the purposes of making a cost estimate only, the duration for LUCs at this subunit was estimated to be 30 years. However, the actual time requirement is undetermined and will likely be longer, as PCBs do not degrade significantly over time. A LUCIP will be prepared by the USDOE that describes the implementation and maintenance actions for the remedial action including periodic inspections.

Land Use Control Implementation for ECODS N-1 Subunit and Ford Building Subunit

LUCs selected to meet the LUC objectives for the ECODS N-1 subunit and the Ford Building subunit are presented in Table 14 and include the following:

- Signage will be located at the subunit boundaries to alert on-site workers to the presence of hazardous substances and to prevent unauthorized entry and unrestricted uses. The date for installation of the signs will be stated in the OU-specific LUCIP referenced in this ROD.

- Institutional controls (i.e., administrative measures) and use restrictions for on-site workers via the SRS Site Use/Site Clearance Program. Other administrative controls to

ensure worker safety include work controls, worker training, and worker briefings of health and safety requirements.

- SRS access controls to prevent exposure to trespassers, as described in the current 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.

In the long term, if the property, or any portion thereof, is ever transferred from USDOE, the U.S. Government and/or USDOE will take those actions necessary pursuant to Section 120(h)(1) of CERCLA. Those actions will include in any contract, deed, or other transfer document, notice of the type and quantity of any hazardous substances that were known to have been stored (for more than one year), released, or disposed of on the property. The notice will also include the time at which the storage, release, or disposal took place to the extent such information is available.

In addition, if the property, or any portion thereof, is ever transferred by deed, the U.S. Government will also satisfy the requirements of CERCLA 120(h)(3). The requirements include: a description of the remedial action taken, a covenant, and an access clause. These requirements are also consistent with the intent of the RCRA deed notification requirements at final closure of a RCRA facility if contamination will remain at the OU.

LUCs will be implemented at the ECODS N-1 subunit and Ford Building Subunit through the following:

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

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

In the event of a property lease or interagency agreement, the equivalent restrictions will be implemented as required by CERCLA Section 120(h).

As agreed on March 30, 2000, among USDOE, USEPA, and SCDHEC, SRS is implementing a Land Use Control Assurance Plan (LUCAP) (WSRC 1999) to ensure that the LUCs required by numerous remedial decisions at SRS are properly maintained and periodically verified. The OU-specific LUCIP referenced in this ROD will provide details and specific measures required to implement and maintain the LUCs selected as part of this remedy. The USDOE is responsible for implementing, maintaining, monitoring, reporting upon, and enforcing the LUCs selected under this ROD. The LUCIP, developed as part of this action, will be submitted concurrently with the CMIP/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 ROD, establishing LUC implementation and maintenance requirements enforceable under CERCLA and the SRS FFA. The approved LUCIP will establish implementation, monitoring, maintenance, reporting, and enforcement requirements for the OU. The LUCIP will remain in effect unless and until modifications are approved as needed to be protective of human health and the environment. LUCIP modifications will only occur through another CERCLA document. The LUCs shall be maintained until the concentration of hazardous substances associated with the OU have been reduced to levels that allow for unlimited exposure and unrestricted use. Approval by USEPA and SCDHEC is required for any modification or termination of the OU-specific LUCs.

USDOE has recommended that residential use of SRS land be controlled; therefore, future residential use and potential residential water usage will be restricted to ensure long-term protectiveness. LUCs will restrict the ECODS N-1 and Ford Building subunits to future industrial use and will prohibit residential use of the area. Unauthorized excavation will also be prohibited, and the OU subunits will remain undisturbed. LUCs selected as part of

this action will be maintained for as long as they are necessary and termination of any LUCs will be subject to CERCLA requirements for documenting changes in remedial actions.

Cost Estimate for the Selected Remedy

The estimated costs for *Alternative A-2, LUCs* for the ECODS N-1 subunit, *Alternative B-4, Excavation (Hot Spot Removal) and Disposal* for the CSSLP subunit, and *Alternative C-2, LUCs* for the Ford Building subunit is $1,849,937. A detailed, activity-based breakdown of the estimated costs associated with implementing and maintaining the selected remedy is presented in Tables 15 through 17 and summarized below:

Remedy	Total Estimated Cost
Alternative A-2, LUCs	$271,396
Alternative B-4, Excavation (Hot Spot Removal) and Disposal	$900,928
Alternative C-2, LUCs	$677,613
	$1,849,937

The information in the cost estimate for the ECODS N-1, CSSLP, and Ford Building OU is based on the best available information regarding the anticipated scope of the remedial alternatives. Changes in the cost elements are likely to occur as a result of new information and data collected during the engineering design of the remedial alternative. Major changes may be documented in the form of a memorandum in the ARF, an Explanation of Significant Difference to this ROD, or a ROD amendment. This is an order-of-magnitude engineering cost estimate that is expected to be within +50 to –30 percent of the actual project cost.

Estimated Outcomes of Selected Remedy

Based on the information currently available, the USDOE, USEPA, and SCDHEC believe that *Alternative A-2, LUCs* for the ECODS N-1 subunit, *Alternative B-4, Excavation (Hot Spot Removal) and Disposal* for the CSSLP subunit, and *Alternative C-2, LUCs* for the Ford Building subunit, provide the best balance of tradeoffs among the alternatives with respect to the evaluation criteria.

For the ECODS N-1 subunit, *Alternative A-2 (LUCs)* addresses the risk to human receptors by limiting access and restricting excavation at the subunit, thereby eliminating the potential exposure to asbestos in subsurface soils. Alternative A-2 achieves the RAO and has been determined to be protective of human health and the environment. The land use at the ECODS N-1 subunit will remain industrial.

For the CSSLP subunit, *Alternative B-4, Excavation (Hot Spot Removal) and Disposal,* excavation of arsenic-contaminated surface soil in the Upland Area and arsenic-contaminated sediment in the Surface Water Impoundment Area removes the contaminated media thereby eliminating potential human exposure. Alternative B-4 achieves the RAOs and has been determined to be protective of human health and the environment. No LUCs are needed for protection of human health or the environment, and the land use for the CSSLP subunit is expected to be unrestricted following implementation of the remedial action.

For *Alternative C-2 (LUCs)* for the Ford Building subunit, the exposure pathway is broken by controlling access to and prohibiting unrestricted use of the contaminated media and by the presence of the existing concrete cover over the Ford Building remnant slab. The LUCs include annual inspections and maintenance of the existing concrete cover system. Alternative C-2 achieves the RAOs and has been determined to be protective of human health and the environment. The land use at the Ford Building subunit will remain industrial.

For the ECODS N-1 and Ford Building subunits that require LUCs, periodic (annual) inspections will be required and periodic maintenance (e.g., sign repair, concrete cover system repair) will be performed to ensure that the LUCs remain protective. Five-year remedy reviews will be required for both subunits.

Waste Disposal and Transport

The CSSLP subunit is the only unit that has a remedy component requiring waste disposal and transport of contaminated media. For the CSSLP unit, dewatering, staging, and removal of excavated sediment/soils at the unit, and any debris encountered, will be

managed through a site-specific Waste Management Plan as CERCLA waste and disposed of at an approved waste disposal facility. SRS will obtain an acceptability determination from the appropriate Regional Off-Site Rule Coordinator for disposal of CERCLA waste.

Conceptual Site Model

Figure 9 shows a generic CSM for the ECODS N-1, CSSLP, and Ford Building OU that illustrates how the primary exposure routes of concern will be broken/rendered incomplete upon implementation of the selected remedy. The USDOE expects the Selected Remedy to satisfy the statutory requirements in CERCLA Section 121(b) to: 1) be protective of human health and the environment, 2) comply with ARARs, and 3) be cost effective.

XII. STATUTORY DETERMINATIONS

Based on the RFI/RI/BRA/CMS/FS (SRNS 2022a), the ECODS N-1, CSSLP, and Ford Building OU poses a threat to human health and the environment. Therefore, *Alternative A-2, LUCs* for the ECODS N-1 subunit, *Alternative B-4, Excavation (Hot Spot Removal) and Disposal* for the CSSLP subunit, and *Alternative C-2, LUCs* for the Ford Building subunit has been selected as the final remedy for the ECODS N-1, CSSLP, and Ford Building OU. As part of the selected remedy, the future land use of the ECODS N-1 and Ford Building subunits will be industrial use. Implementation of the remedial action at the CSSLP subunit is anticipated to meet the RAO for unrestricted land use.

For the ECODS N-1 and Ford Building subunits, in accordance with Section 121(c) of CERCLA and NCP §300.430(f)(5)(iii)(c), a statutory review will be conducted, within five years of initiation of the remedial action, and every five years thereafter, to ensure that the remedy continues to be protective of human health and the environment. Five year remedy reviews will not be required for the CSSLP subunit if the RAO for unrestricted land use is met.

The selected remedy is protective of human health and the environment, complies with federal and state requirements that are legally applicable or relevant and appropriate to the remedial action (unless justified by a waiver), and is cost-effective. The statutory

preference for treatment as a principal element of the remedy is not applicable as no PTSM RCOCs were identified at the OU.

EXPLANATION OF SIGNIFICANT CHANGES

The remedy/remedies selected in this ROD do not contain any significant changes from the preferred alternatives presented in the SB/PP (SRNS 2022b).

XIII. RESPONSIVENESS SUMMARY

The Responsiveness Summary is included as Appendix A of this document, as appropriate.

XIV. POST-ROD DOCUMENT SCHEDULE AND DESCRIPTION

A summary of the key deliverables and submittal dates for the ECODS N-1, CSSLP, and Ford Building OU is summarized below.

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

XV. REFERENCES

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

LANL, 2017. *ECORISK Database*, Release 4.1, Los Alamos National Laboratory, Los Alamos, NM

SCDHEC, 2020. Water Classifications & Standards, R. 61-68, Bureau of Water, SC

SRNS, 2011. *Savannah River Site Federal Facility Agreement Community Involvement Plan (U),* Revision 7, WSRC-RP-96-120, Savannah River Nuclear Solutions, LLC, Savannah River Site, Aiken, SC

SRNS, 2014. *Characterization Report Building 690-N (Ford Building) and Ancillary Equipment and Facilities*, SDD-2014-00054, Revision 1, Savannah River Nuclear Solutions, LLC, Savannah River Site, Aiken, SC

SRNS, 2019a. *Facility Decommissioning Evaluation Building 690-N, Process Heat Exchanger Repair Facility*, G-FDE-N-00013, Revision 2, Savannah River Nuclear Solutions, LLC, Savannah River Site, Aiken, SC

SRNS, 2019b. *Human Health Risk Screening Evaluation for 690-N Ford Building*, SDD-2019-00030, Revision 0, April 2019, Savannah River Nuclear Solutions, LLC, Savannah River Site, Aiken, SC

SRNS, 2019c. *Closure Cap Design for the 690-N Process Heat Exchanger Repair Facility*, T-CLC-N-00005, Revision 0, November 2019, Savannah River Nuclear Solutions, LLC, Savannah River Site, Aiken, SC

SRNS, 2020a. *RFI/RI Work 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-2020-00041, Revision 1, Savannah River Nuclear Solutions, LLC, Savannah River Site, Aiken, SC

SRNS, 2020b. *Decommissioning Project Final Report Building 690-N, Process Heat Exchanger Repair Facility*, V-PCOR-N-00025, Revision 0, May 18, 2021, Savannah River Nuclear Solutions, LLC, Savannah River Site, Aiken, SC

SRNS, 2022a. *Resource Conservation and Recovery Act Facility Investigation/Remedial Investigation Report with Baseline Risk Assessment and Corrective Measures Study/ Feasibility Study 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-2021-00548, Revision 1, Savannah River Nuclear Solutions, LLC, Savannah River Site, Aiken, SC

SRNS, 2022b. *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 1, Savannah River Nuclear Solutions, LLC, Savannah River Site, Aiken, SC

USEPA, 1991. *A Guide to Principal Threat and Low Level Threat Wastes.* U.S. Environmental Protection Agency OSWER Superfund Publication 9380.3-06FS (November)

USEPA, 2018. *Region 4 Ecological Risk Assessment Supplemental Guidance March 2018 Update*, United States Environmental Protection Agency, Scientific Support Section, Superfund Division, Washington, DC

USEPA, 2020a. *USEPA Regional Screening Levels,* U.S. Environmental Protection Agency, National Center for Environmental Assessment, Arlington, VA, (November 2020 update), accessed February 2021, https://www.epa.gov/risk/regional-screening-levels-rsls

USEPA, 2020b. *Preliminary Remediation Goals for Radionuclides,* U.S. Environmental Protection Agency, Office of Land and Emergency Management, Washington, DC, (October 2020 update), accessed February 2021, https://epa-prgs.ornl.gov/radionuclides

WSRC, 1999. *Land Use Control Assurance Plan for the Savannah River Site*, WSRC-RP-98-4125, Revision 1.1, August 1999, latest update, Savannah River Nuclear Solutions, LLC, Savannah River Site, Aiken, SC

WSRC, 2000. *Record of Decision Remedial Alternative Selection for the Ford Building Seepage Basin (904-91G) Operable Unit*, WSRC-RP-2000- 4156, Revision 1, August 2001, Westinghouse Savannah River Company, Savannah River Site, Aiken, SC

WSRC, 2001. *Site Evaluation Report for Early Construction and Operational Disposal Site (ECODS) N-1 (NBN)*, WSRC-RP-2001-4185, Revision 0, December 2001, Westinghouse Savannah River Company, Aiken, SC

WSRC, 2002. *Record of Decision Remedial Alternative Selection for the Central Shops Burning/Rubble Pits (CSBRP) (631-1G and 631-3G) Operable Unit (U),* WSRC-RP-200-4265, Rev. 1.1, October 2002, Westinghouse Savannah River Company, Aiken, SC

WSRC, 2006. *Background Soils Statistical Summary Report for the Savannah River Site*, ERD-EN-2005-0223 Revision 1, Washington Savannah River Company, Savannah River Site, Aiken, SC

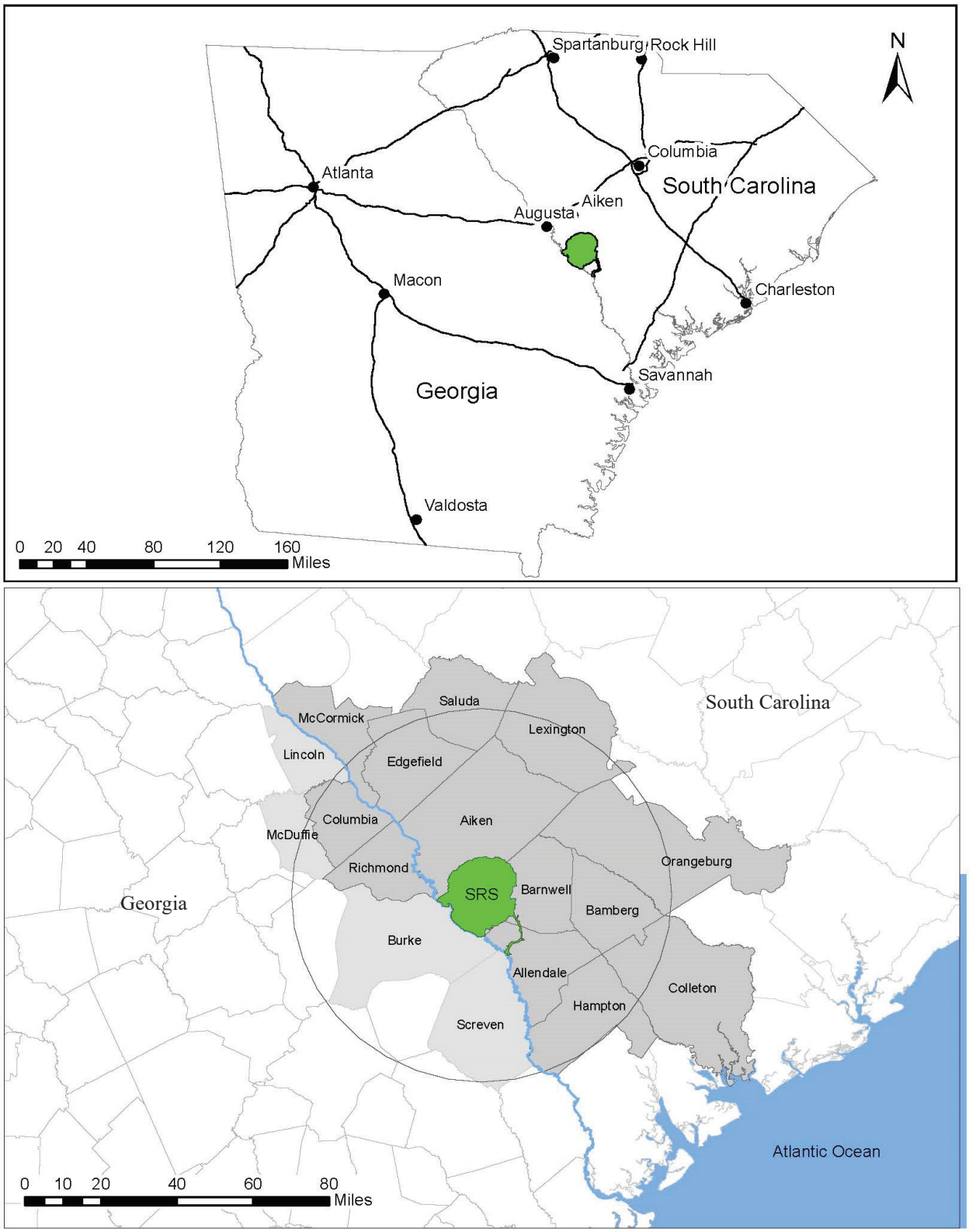


Figure 1. Location of the SRS

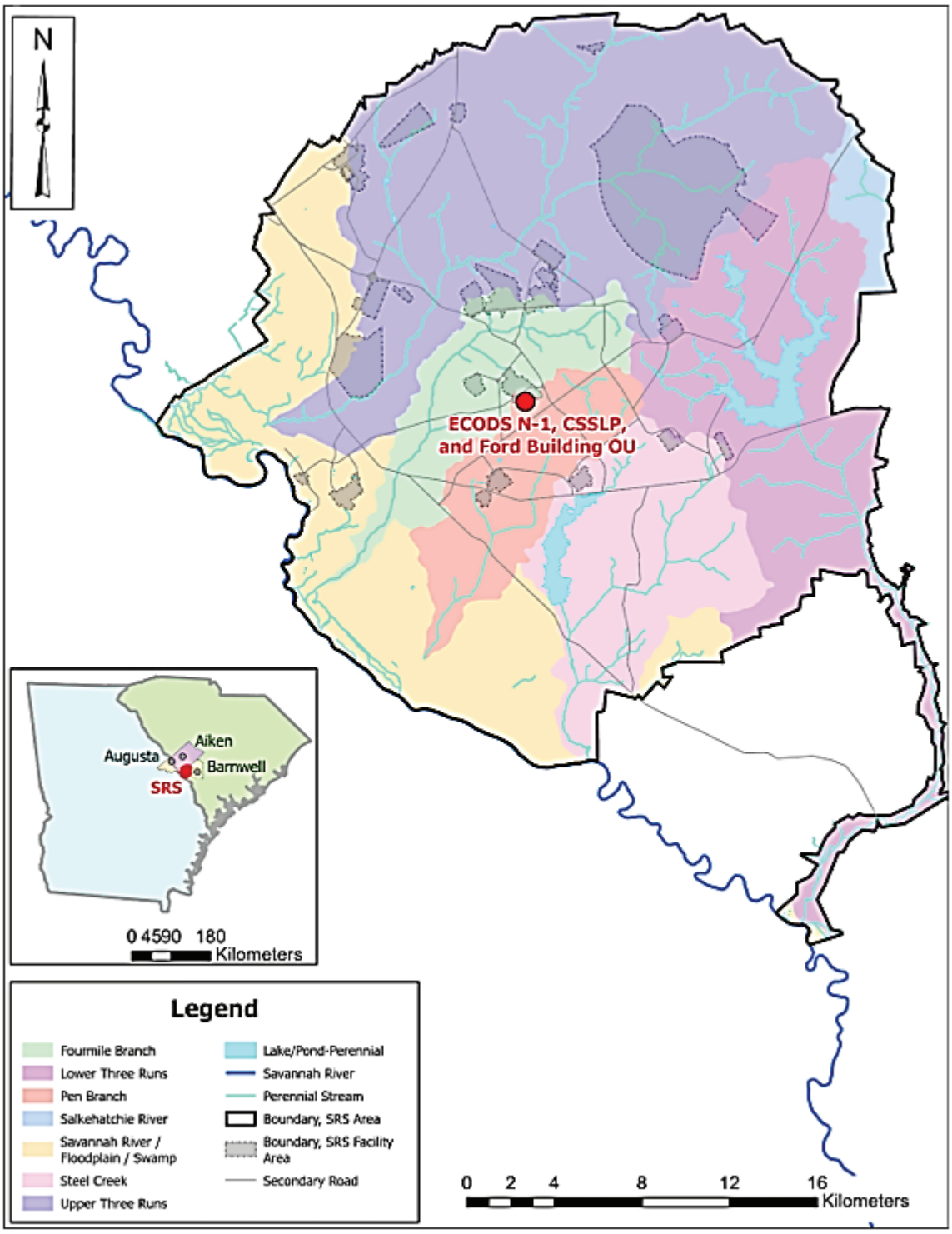


Figure 2. Location of the ECODS N-1, CSSLP, and Ford Building OU at the Savannah River Site

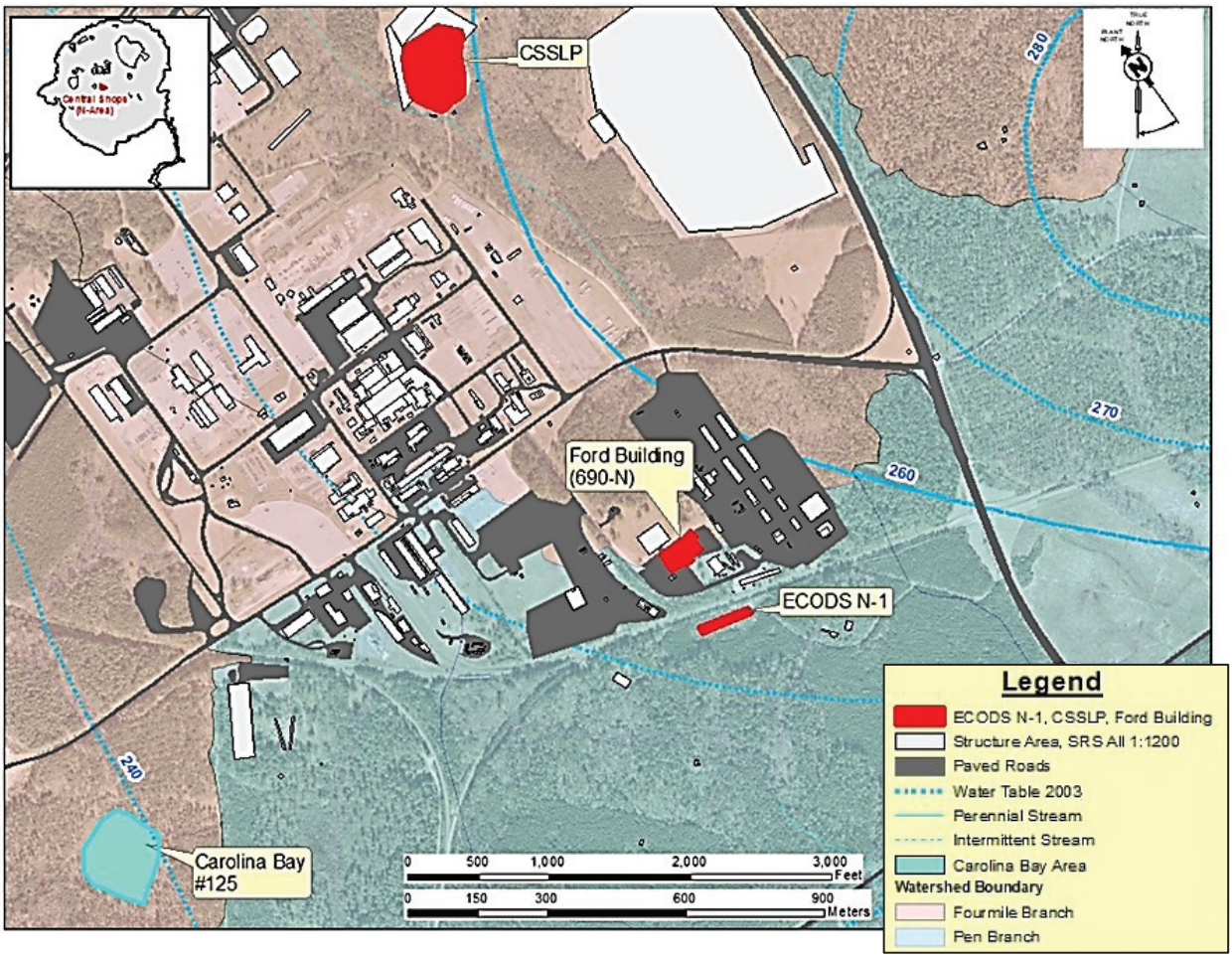


Figure 3. Location of the ECODS N-1, CSSLP, and Ford Building OU (N Area)

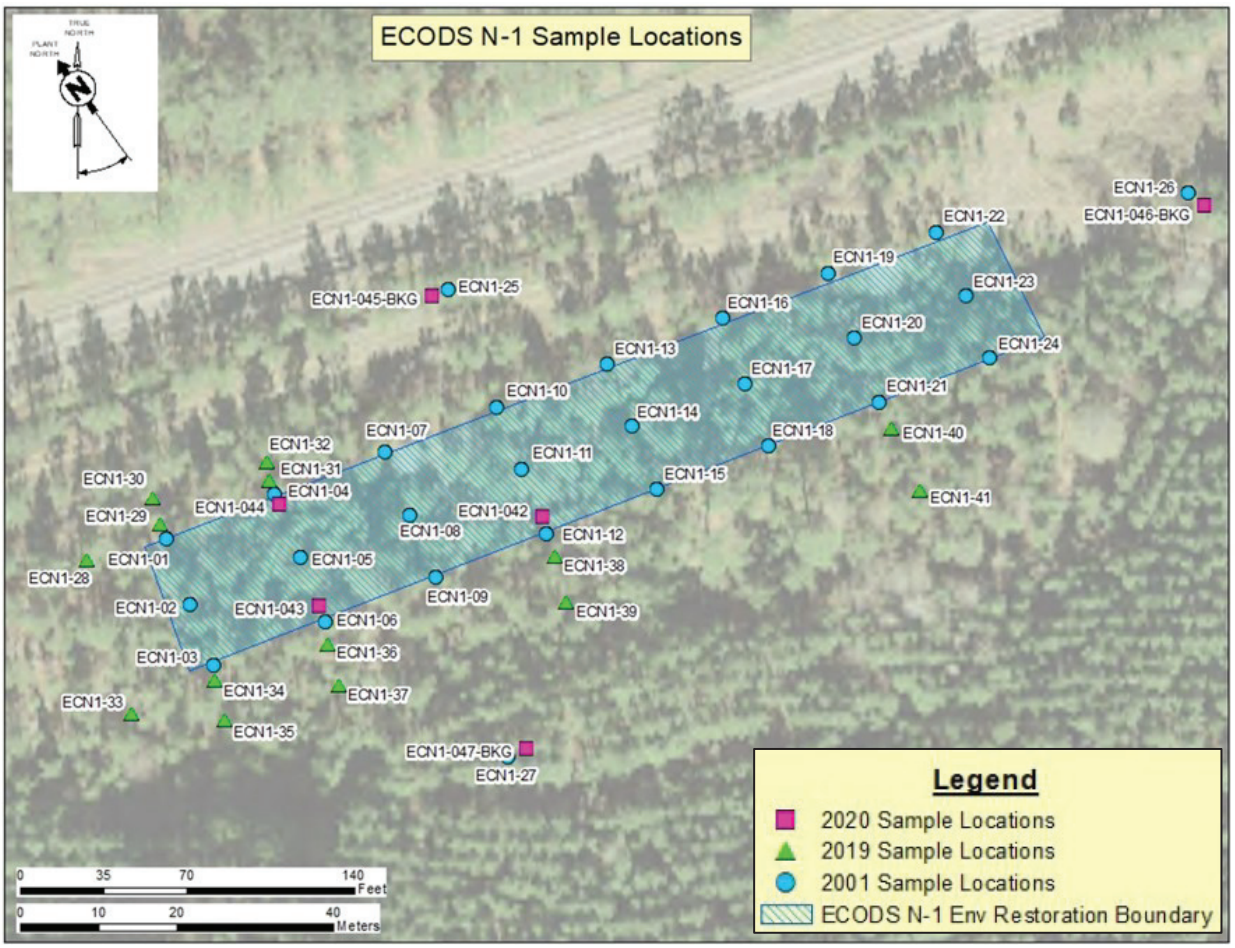


Figure 4. ECODS N-1 Subunit 2001, 2019, and 2020 Sample Locations

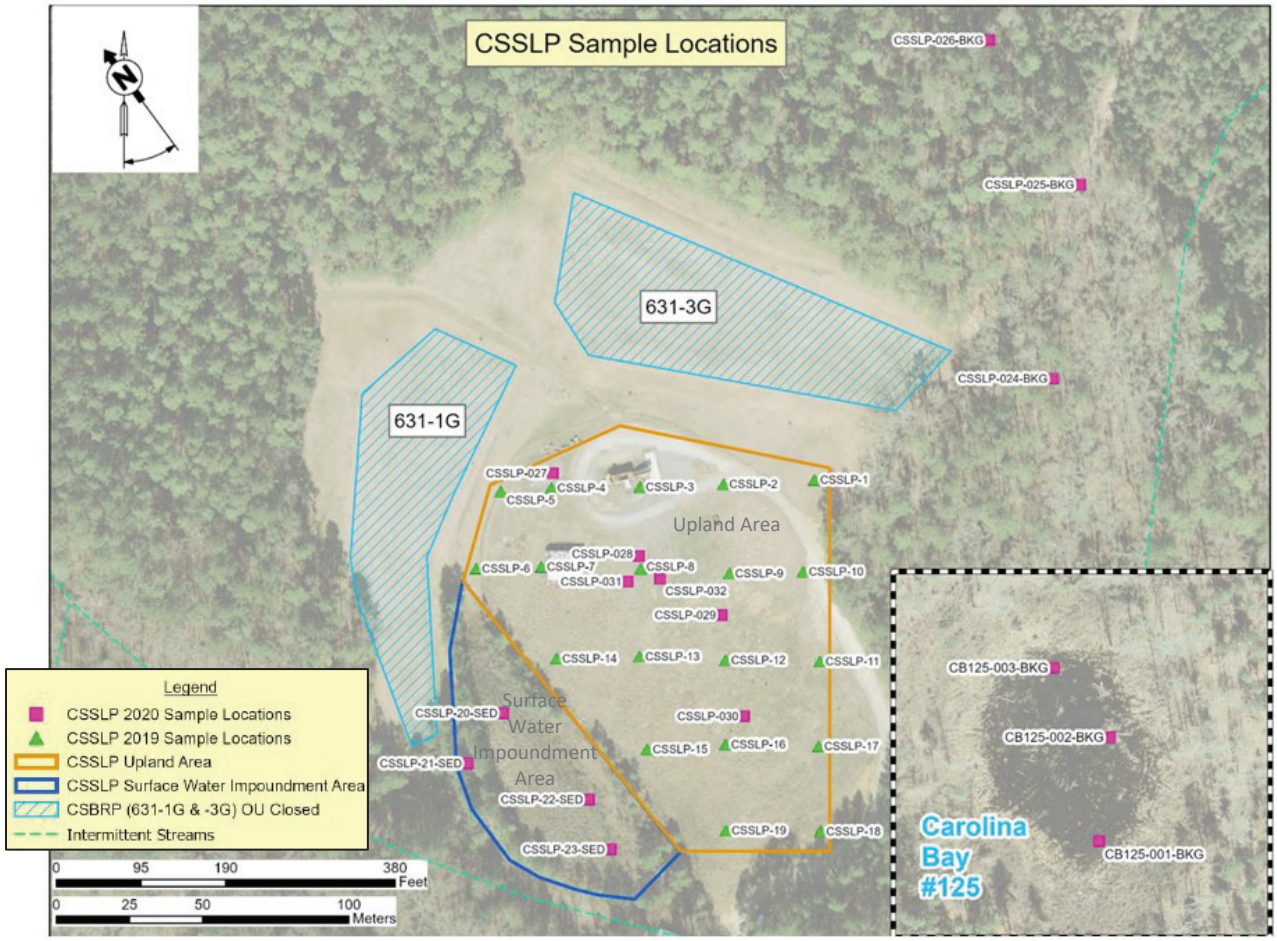


Figure 5. CSSLP Subunit 2019 and 2020 Sample Locations

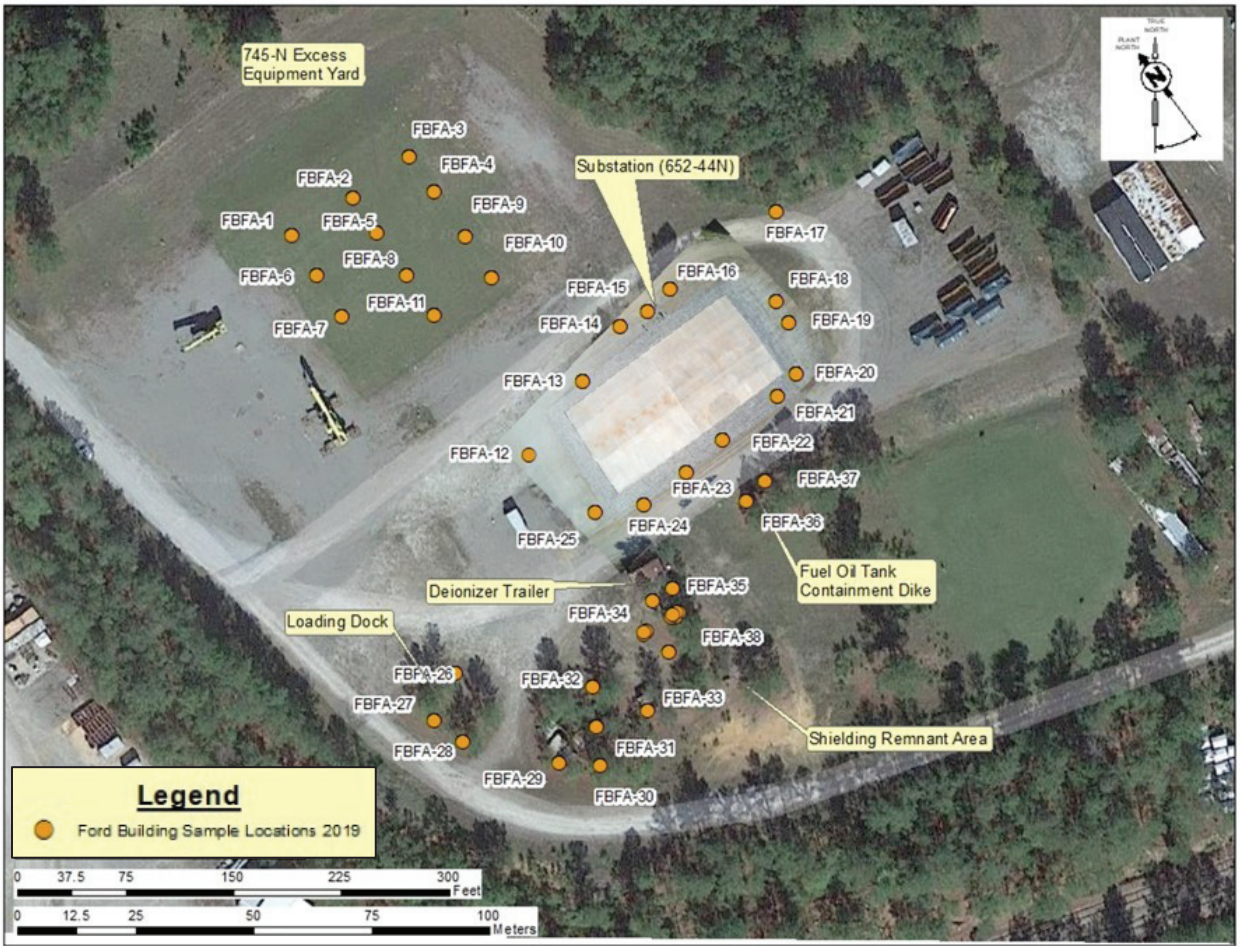


Figure 6. Ford Building Subunit 2019 Sample Locations

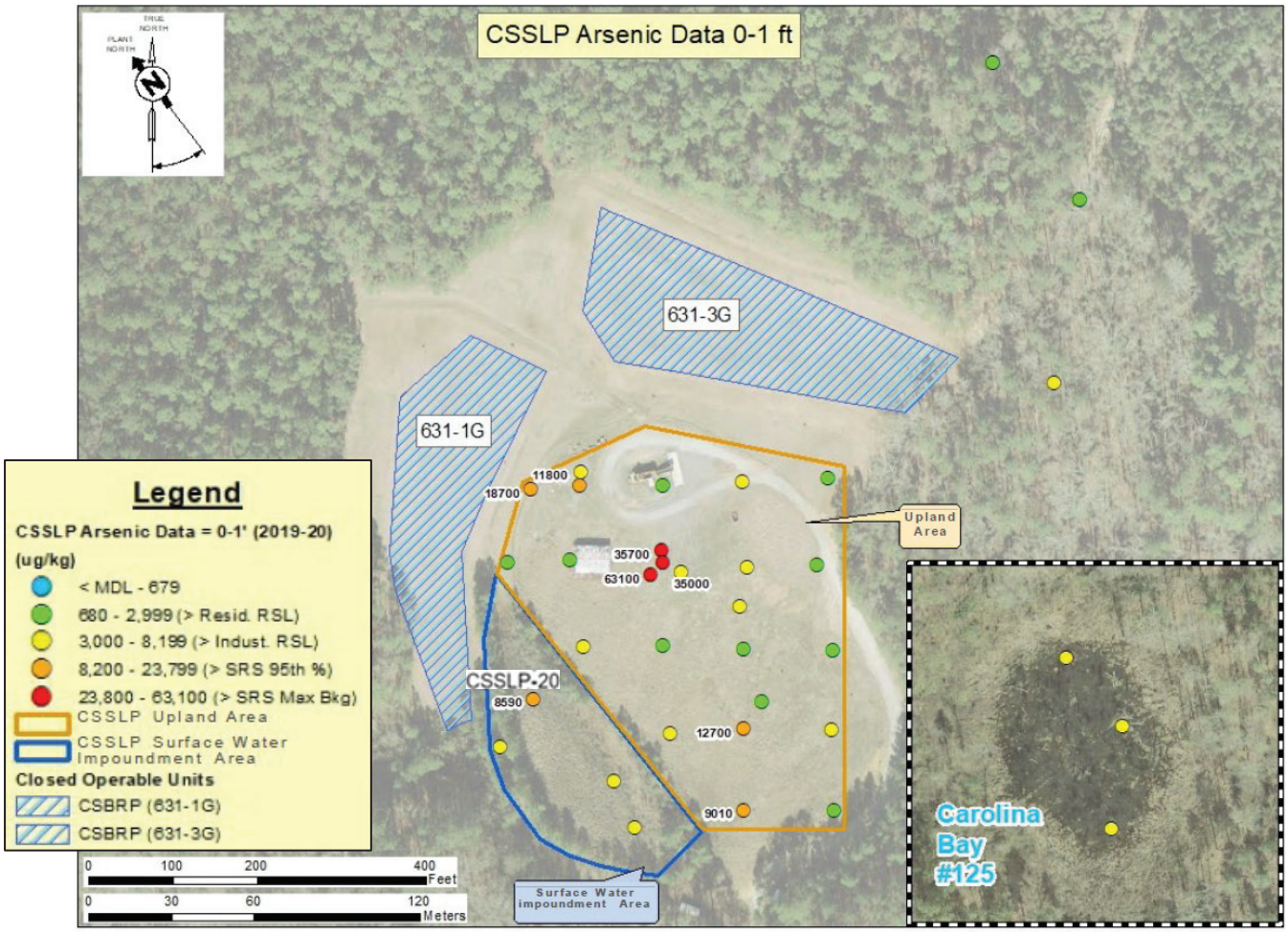


Figure 7. Arsenic Data for Soil and Sediment Media (0 to 0.3 m [0 to 1 ft]) at the CSSLP

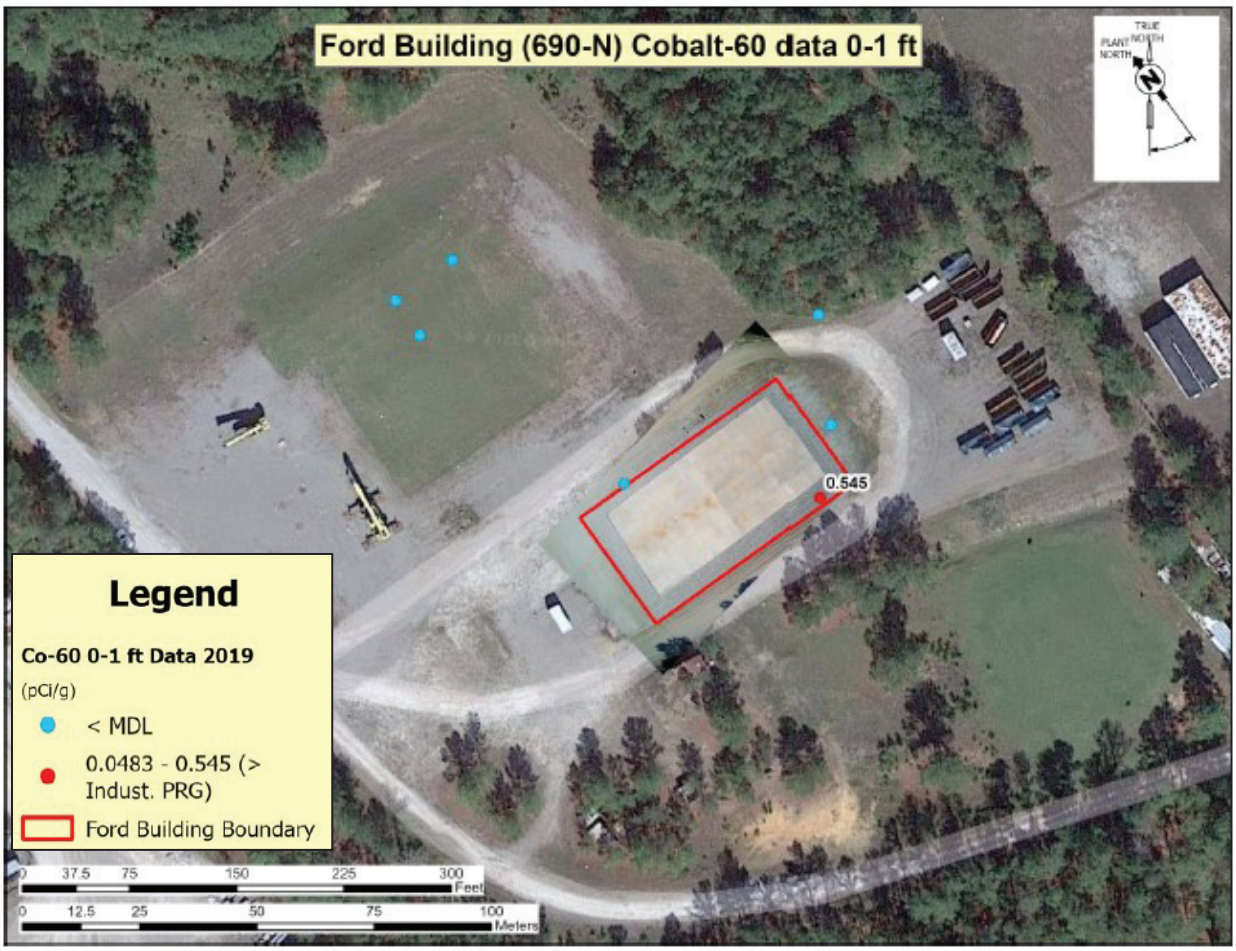
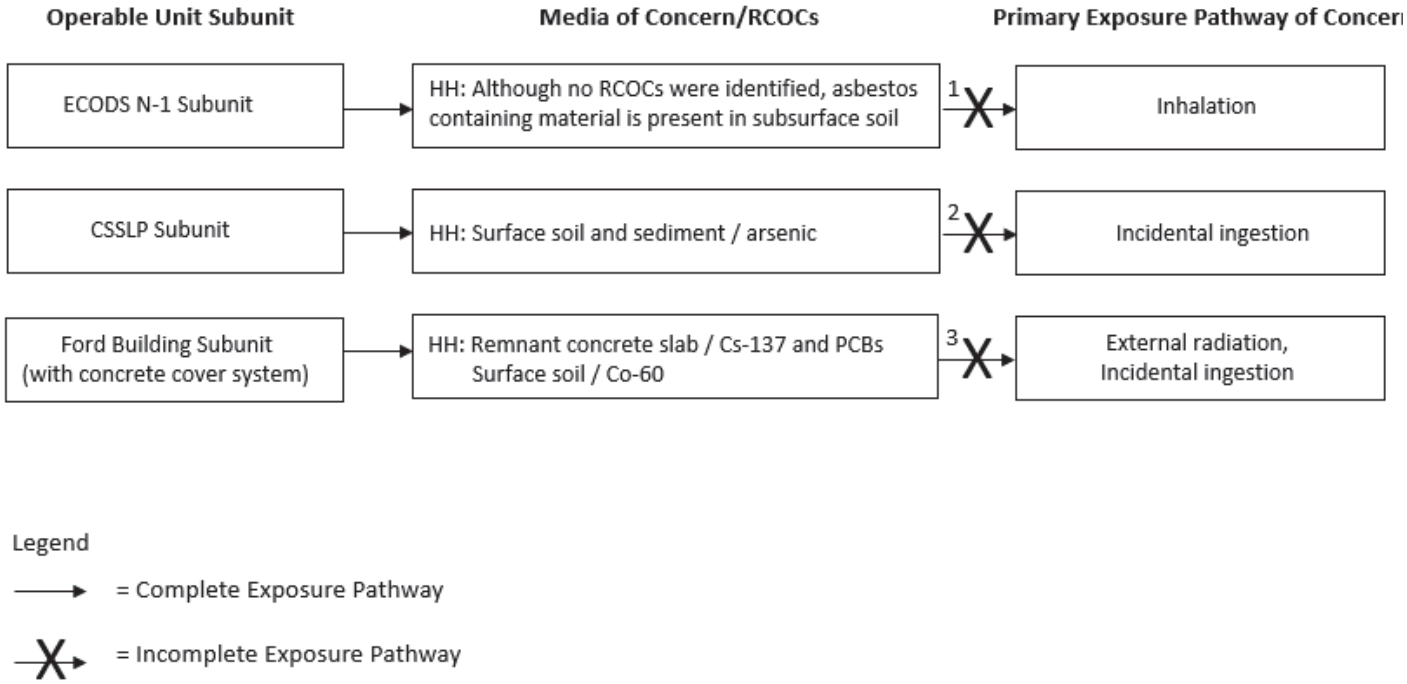


Figure 8. Cobalt-60 Data for Soil Media (0 to 0.3 m [0 to 1 ft]) at the Ford Building



HH – Human health

1. Alternative A-2, LUCs - prevents exposure to asbestos containing materials buried at depth.
2. Alternative B-4, Excavation (Hot Spot Removal) and Disposal - prevents exposure to arsenic in surface soil and sediment; qualifies for unrestricted land use (no LUCs)
3. Alternative C-2, LUCs - prevents exposure to Cs-137 and PCBs on remnant concrete slab and Co-60 in surface soil

Figure 9. ECODS N-1, CSSLP, and Ford Building OU Generic Conceptual Site Model after Completion of Final Remedial Action

Table 1. ECODS N-1, CSSLP, and Ford Building OU Risk Summary

RCOCs	ECODS N-1[1]	CSSLP			Ford Building
	Soil	Soil	Sediment	Surface Water	Soil
CM RCOCs	All depths None	All depths None	All depths None	NA	All depths None
HH RCOCs	0-1 ft None	0-1 ft Arsenic Res risk = 2.41E-05 IW risk = 5.46E-06	0-1 ft Arsenic Res risk = 1.22E-05 IW risk = 2.76E-06	None	0-1 ft Cobalt-60 Res risk = 1.65E-05 IW risk = 1.13E-05
ECO RCOCs	0-1 and 1-4 ft None	0-1 and 1-4 ft None	0-1 ft None	None	0-1 and 1-4 ft None
PTSM RCOCs	All depths None	All depths None	All depths None	NA	All depths None

1 Although no RCOCs were identified for the ECODS N-1 subunit, asbestos is present in subsurface soils that may pose a risk to human receptors if exposed (no surface exposure).

CM = contaminant migration
ECO = ecological
HH = human health
PTSM = principal threat source material
RCOC = refined constituent of concern
NA = not applicable
Res = Resident
IW = Industrial Worker

Table 2a. Summary of Refined Constituents of Concern and Medium-Specific Exposure Point Concentrations: Central Shops Scrap Lumber Pile Subunit (Soil and Sediment)

Scenario Timeframe: Current/Future
Medium: Central Shops Scrap Lumber Pile (631-2G) Upland Area
Exposure Medium: Soil (0-1 ft)

Exposure Route	Constituent of Concern	Concentration Detected		Units	Frequency of Detection	Exposure Point Concentration	Exposure Point Concentration Units	Statistical Measure
		Min	Max					
Soil Onsite – Direct Contact	Arsenic	0.975	63.1	mg/kg	25/25	16.4	mg/kg	95% UCL

Scenario Timeframe: Current/Future
Medium: Central Shops Scrap Lumber Pile (631-2G) Surface Water Impoundment Area
Exposure Medium: Sediment (0-1 ft)

Exposure Route	Constituent of Concern	Concentration Detected		Units	Frequency of Detection	Exposure Point Concentration	Exposure Point Concentration Units	Statistical Measure
		Min	Max					
Sediment Onsite – Direct Contact	Arsenic	4.12	8.59	mg/kg	4/4	8.27	mg/kg	95% UCL

Key
Min = minimum detected concentration
Max = maximum detected concentration
mg/kg = milligrams per kilogram
95% UCL = 95% upper confidence limit of the mean concentration

Table 2b. Summary of Refined Constituents of Concern and Medium-Specific Exposure Point Concentrations: Ford Building Subunit (Soil)

Scenario Timeframe: Current/Future
Medium: Ford Building
Exposure Medium: Soil (0-1 ft)

Exposure Route	Constituent of Concern	Concentration Detected		Units	Frequency of Detection	Exposure Point Concentration	Exposure Point Concentration Units	Statistical Measure
		Min	Max					
Soil Onsite – Direct Contact	Cobalt-60	ND	0.545	pCi/g	1/7	0.545	pCi/g	Max

Key
Min = minimum detected concentration
Max = maximum detected concentration
ND = non-detect
pCi/g = picocuries per gram
95% UCL = 95% upper confidence limit of the mean concentration

Table 3. Cancer Toxicity Data Summary

Pathway: Ingestion, Dermal

Constituent of Concern	Oral Cancer Slope Factor	Dermal Cancer Slope Factor	Slope Factor Units	Weight of Evidence/ Cancer Guideline Description	Source	Date (Mo/Yr)
Arsenic	1.5E+00	---	$(mg/kg\text{-}day)^{-1}$	A	USEPA RSL website	Nov. 2020
Cobalt-60	3.81E-11 (a) 7.33E-12 (b)	---	risk/pCi	A	USEPA PRG website	Oct. 2020

Pathway: Inhalation

Constituent of Concern	Unit Risk	Units	Inhalation Cancer Slope Factor	Units	Weight of Evidence/ Cancer Guideline Description	Source	Date (Mo/Yr)
Arsenic	4.3E-03	$(ug/m^3)^{-1}$	---	---	A	USEPA RSL website	Nov. 2020
Cobalt-60	---	---	1.01E-10	risk/pCi	A	USEPA PRG website	Oct. 2020

Pathway: External (Radiation)

Constituent of Concern	Cancer Slope or Conversion Factor	Exposure Route	Units	Weight of Evidence/ Cancer Guideline Description	Source	Date (Mo/Yr)
Cobalt-60	1.24E-05	External exposure	risk/year per pCi/g	A	USEPA PRG website	Oct. 2020

Key
--- = no information available
A = human carcinogen
mg/kg = milligram per kilogram
ug/m^3 = micrograms per cubic meter
pCi = picocurie
risk/pCi = risk per picocurie
risk/year per pCi/g = risk/year per picocurie per gram
(a) = resident (child + adult) slope factor
(b) = industrial worker (adult) slope

USEPA, 2020. *Regional Screening Levels* website, United States Environmental Protection Agency (November) https://www.epa.gov/risk/regional-screening-levels-rsls. Website accessed February 2021.

USEPA, 2020. *Preliminary Remedial Goals for Radionuclides* website, United States Environmental Protection Agency (October) https://epa-prgs.ornl.radionuclides. Website accessed February 2021.

Table 4. Resident Risk Characterization Summary – Carcinogens

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child/Adult

Medium	Exposure Medium	Exposure Route	Constituent of Concern	Carcinogenic Risk				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total
CSSLP Upland Area	Soil	Ingestion, Inhalation, Dermal Contact	Arsenic	NC	NC	NC	NA	2.41E-05
CSSLP Surface Water Impoundment Area	Sediment	Ingestion, Inhalation, Dermal Contact	Arsenic	NC	NC	NC	NA	1.22E-05
Ford Building	Soil	Ingestion, Inhalation, External Exposure	Cobalt-60	NC	NC	NA	NC	1.65E-05

Key
NA = not applicable.
NC = not calculated. Risk was not calculated separately for each exposure pathway. The USEPA regional screening levels (RSLs) for nonradionuclides and preliminary remediation goals (PRGs) for radionuclides that were used to calculate risk are risk-based concentrations that are derived from standardized equations which combine all of the exposure pathways and assumptions with USEPA toxicity data. Use of the RSL/PRG provides an exposure routes total risk estimate for each constituent.

USEPA, 2020. *Regional Screening Levels* website, United States Environmental Protection Agency (November) https://www.epa.gov/risk/regional-screening-levels-rsls. Website accessed February 2021.

USEPA, 2020. *Preliminary Remedial Goals for Radionuclides* website, United States Environmental Protection Agency (October) https://epa-prgs.ornl.radionuclides. Website accessed February 2021.

Table 5. Industrial Worker Risk Characterization Summary – Carcinogens

Scenario Timeframe: Future
Receptor Population: Industrial Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Route	Constituent of Concern	Carcinogenic Risk				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total
CSSLP Upland Area	Soil	Ingestion, Inhalation, Dermal Contact	Arsenic	NC	NC	NC	NA	5.46E-06
CSSLP Surface Water Impoundment Area	Sediment	Ingestion, Inhalation, Dermal Contact	Arsenic	NC	NC	NC	NA	2.76E-06
Ford Building	Soil	Ingestion, Inhalation, External Radiation	Cobalt-60	NC	NC	NA	NC	1.13E-05

Key
NA = not applicable.
NC = not calculated. Risk was not calculated separately for each exposure pathway. The USEPA regional screening levels (RSLs) for nonradionuclides and preliminary remediation goals (PRGs) for radionuclides that were used to calculate risk are risk-based concentrations that are derived from standardized equations which combine all of the exposure pathways and assumptions with USEPA toxicity data. Use of the RSL/PRG provides an exposure routes total risk estimate for each constituent.

USEPA, 2020. *Regional Screening Levels* website, United States Environmental Protection Agency (November) https://www.epa.gov/risk/regional-screening-levels-rsls. Website accessed February 2021.

USEPA, 2020. *Preliminary Remedial Goals for Radionuclides* website, United States Environmental Protection Agency (October) https://epa-prgs.ornl.radionuclides. Website accessed February 2021.

Table 6. Cleanup Levels (PRGs) for 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	Final Cleanup Level[3]
Central Shops Scrap Lumber Pile								
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 from Appendix F of the RFI/RI BRA CMS/FS (SRSN 2022). A cleanup level for asbestos at the ECODS N-1 subunit is not presented in the table because risk-based thresholds are not available at the USEPA RSL website.
2 – SRS background concentrations from Background Soils Statistical Summary Report for the Savannah River Site (WSRC 2006), Appendix B-2 (all depths interval).
3 – Final Cleanup Level 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 Final Cleanup Level. Source of the Final Cleanup Level is identified in italics.

Table 7. ARARs for the Selected Remedial Alternative for the ECODS N-1 Subunit

Action	Requirements	Prerequisite	Citation(s)
	Institutional Controls / LUCs		
Warning signs for disposal site	Display warning signs at all entrances and at intervals of 100m (328 feet) or less along the property line of the site or along the perimeter of the sections of the site where asbestos-containing waste material was deposited.	Closure of an area that received asbestos-containing waste materials that does not include a natural barrier to adequately deter access by the general public – **relevant and appropriate**	40 CFR § 61.151(b)(1)
	The warning signs must: (i) Be posted in such a manner and location that a person can easily read the legend; and (ii) Conform to the requirements for (20”x14”) upright format signs specified in 29 CFR 1910.145(d)(4) and this paragraph; and (iii) Display the legend as prescribed in § 61.151(b)(1)(iii) located in the lower panel with letter sizes and styles of visibility at least equal to those specified in § 61.151(b)(1)(iii).	Closure of an area that received asbestos-containing waste materials that does not include a natural barrier to adequately deter access by the general public – **relevant and appropriate**	40 CFR § 61.151(b)(1)(i)-(iii)
Fence for disposal site	Fence the perimeter of the site in a manner adequate to deter access by the general public. NOTE: Access control at SRS boundary meets this requirement to deter the general public		40 CFR § 61.151(b)(2)

Table 7. ARARs for the Selected Remedial Alternative for the ECODS N-1 Subunit *(Continued/End)*

Action	Requirements	Prerequisite	Citation(s)
	Institutional Controls / LUCs		
Deed notice for asbestos waste disposal site	Record, in accordance with State law, a notation on the deed to the facility property and on any other instrument that would normally be examined during a title search; this notation will in perpetuity notify any potential purchaser of the property that: • The land has been used for disposal of asbestos-containing waste material; and • The survey plat and record of the location and quantity of asbestos containing waste disposed of within the disposal site required in § 61.154(f) have been filed with the Administrator; and • The site is subject to 40 CFR part 61, Subpart M. NOTE: Recordation of deed notice that informs potential purchaser on the waste disposal site is considered a substantive requirement for post-closure. NOTE: SRS complies with the Land Use Control Assurance Plan (WSRC 1999) to ensure these land use restrictions are maintained, including deed restrictions.	Closure of an inactive disposal area that received asbestos containing waste materials – **relevant and appropriate**	40 CFR § 61.151(e)(1)-(3)

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

Table 8. ARARs for the Selected Remedial Alternative for the CSSLP Subunit

Action	Requirements	Prerequisite	Citation
All Land-disturbing Activities (i.e., excavation, clearing, grading, etc.)			
Managing stormwater 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 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)

Table 8. ARARs for the Selected Remedial Alternative for the CSSLP Subunit *(Continued)*

Action	Requirements	Prerequisite	Citation
	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)*
Waste Characterization – Primary Wastes (e.g., excavated contaminated soil and sediment) and Secondary Wastes (e.g., contaminated equipment, PPE)			
Characterization of ***solid waste*** (all primary and secondary wastes) and listed hazardous waste determination	Must make an accurate determination as to whether that waste is a hazardous waste in order to ensure wastes are properly managed according to applicable RCRA regulations. A hazardous waste determination is made using the following steps: (a) Must be made at the point of waste generation, before any dilution, mixing, or other alteration of the waste occurs, and at any time in the course of its management that it has, or may have, changed its properties as a result of exposure to the environment or other factors that may change the properties of the waste such that the RCRA classification of the waste may change (b) Must determine whether the waste is excluded from regulation under 40 CFR § 261.4 (c) Must use the knowledge of the waste to determine whether waste meets any of the listing descriptions under subpart D of 40 CFR Part 261. Acceptable knowledge that may be used in making an accurate determination as to whether the waste is listed may include waste origin, composition, the process producing the waste, feedstock, and other reliable and relevant information.	Generation of solid waste as defined in 40 CFR § 261.2 – **applicable**	40 CFR § 262.11(a), (b) and (c)

Table 8. ARARs for the Selected Remedial Alternative for the CSSLP Subunit *(Continued/End)*

Action	Requirements	Prerequisite	Citation
Determination of characteristic hazardous waste	The person then must also determine whether the waste exhibits one or more hazardous characteristics as identified in subpart C of 40 CFR part 261 by following the procedures in paragraph (d)(1) or (2) of this section, or a combination of both.	Generation of solid waste which is not excluded under 40 CFR § 261.4(a) – **applicable**	40 CFR § 262.11(d)
Determination of characteristic hazardous waste through knowledge	The person must apply knowledge of the hazard characteristic of the waste in light of the materials or the processes used to generate the waste. Acceptable knowledge may include process knowledge (e.g., information about chemical feedstocks and other inputs to the production process); knowledge of products, by-products, and intermediates produced by the manufacturing process; chemical or physical characterization of wastes; information on the chemical and physical properties of the chemicals used or produced by the process or otherwise contained in the waste; testing that illustrates the properties of the waste; or other reliable and relevant information about the properties of the waste or its constituents. A test other than a test method set forth in subpart C of 40 CFR part 261, or an equivalent test method approved by the Administrator under 40 CFR 260.21, may be used as part of a person's knowledge to determine whether a solid waste exhibits a characteristic of hazardous waste. However, such tests do not, by themselves, provide definitive results. Persons testing their waste must obtain a representative sample of the waste for the testing, as defined at 40 CFR 260.10.		40 CFR § 262.11(d)(1)

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 9. ARARs for the Selected 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)
Waste Generation and Management			
Management of PCB waste (e.g., contaminated PPE, equipment, wastewater)	Any person storing or disposing of PCB waste must do so in accordance with 40 CFR 761, Subpart D.	Generation of waste containing PCBs at concentrations ≥ 50 ppm **– applicable**	40 CFR 761.50(a), specifically 40 CFR 761.50(b)(4)
	PCB bulk product waste shall be disposed of in accordance with paragraph (a), (b), or (c) of 40 CFR 761.62. Under some of these provisions, it may not be necessary to determine the PCB concentration or leaching characteristics of the PCB bulk product waste.	Generation of PCB bulk product waste as defined in 40 CFR 761.3 **– applicable**	40 CFR 761.62

Table 9. ARARs for the Selected Remedial Alternative for the Ford Building Subunit *(Continued/End)*

Action	Requirements	Prerequisite	Citation
Disposal with PCB Bulk Product Waste Left in Place			
Risk-based sampling, storage and/or disposal of PCB bulk product waste	May sample or dispose of bulk product waste in a manner other than prescribed in 40 CFR 761.62(a) or (b), or store bulk product waste in a manner other than prescribed in 40 CFR 761.65, if receive approval in writing from EPA Regional Administrator and EPA finds that the method will not pose an unreasonable risk of injury to human health or the environment. Each application must contain information indicating that, based on technical, environmental or waste specific characteristics or considerations, the proposed sampling, disposal or storage methods will not pose an unreasonable risk of injury to human health or the environment. *NOTE*: Appropriate information required in an application can be provided in a CERCLA document (e.g., 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) **– relevant and appropriate**	40 CFR 761.62(c)
Cap with risk-based disposal of PCB bulk product waste	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.	Cap requirements for the self-implementing on-site cleanup and disposal of PCB remediation waste **– relevant and appropriate**	40 CFR 761.61(a)(7)

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

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Table 10. 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 11. 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	Not Compliant	Compliant
Location-Specific	None identified	None identified
Action-Specific	None identified	None identified
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		
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 12. 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	None identified	None identified	None identified	None identified
Location-Specific	None identified	None identified	None identified	None identified
Action-Specific	None identified	None identified	Compliant	Compliant
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 12. 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 13. 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	Not Compliant	Compliant	Compliant
Location-Specific	None identified	None identified	None identified
Action-Specific	None identified	None identified	Compliant
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 13. 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 14. Land Use Controls

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

Table 14. Land Use Controls *(Continued/End)*

Type of Control	Purpose of Control	Duration	Implementation	Affected Areas[a]
5. Physical Access Controls[f] (e.g., fences, gates, portals)	Control and restrict access to workers and the public to prevent unauthorized access.	Until the concentration of hazardous substances associated with the unit have been reduced to levels that allow for unlimited exposure and unrestricted use.	Controls maintained by USDOE.	Security is provided at site boundaries in accordance with SRS procedures. Signs will be placed at the perimeter of the ECODS N-1 and Ford Building subunits where hazardous substances are left in place at levels requiring land use restrictions.
6. Warning Signs[g]	Provide notice or warning to prevent unauthorized uses.	Until the concentration of hazardous substances associated with the unit have been reduced to levels that allow for unlimited exposure and unrestricted use.	Signage maintained by USDOE.	Warning signs will be posted in accordance with applicable site procedures and will be placed at perimeter of the ECODS N-1 and Ford Building subunits where hazardous substances are left in place at levels requiring land use restrictions.
7. Security Surveillance Measures	Control and monitor access by workers/public.	Until the concentration of hazardous substances associated with the unit have been reduced to levels that allow for unlimited exposure and unrestricted use.	Established and maintained by USDOE Necessity of patrols evaluated upon completion of remedial actions or property transfer.	Patrol of waste management areas identified in this ROD, as necessary.

a - Affected areas – Specific locations for the ECODS N-1 and Ford Building subunits will be identified in the OU-specific LUCIP or subsequent post-ROD documents. Unit boundaries are shown in Figure 4 for the ECODS N-1 subunits and Figure 8 for the Ford Building subunit
b - Property Record Notices – Refers to any non-enforceable, purely informational document recorded along with the original property acquisition records of USDOE and its predecessor agencies that alerts anyone searching property records to important information about residual contamination, waste disposal areas in the property.
c - Property Record Restrictions – Includes conditions and/or covenants that restrict or prohibit certain uses of real property and are recorded along with original property acquisition records of USDOE and its predecessor agencies.
d - Other Notices – Includes information on the location of waste disposal areas and residual contamination depicted on a survey plat, which is provided to a zoning authority (i.e., city planning commission) for consideration in appropriate zoning decisions for non-USDOE property.
e - Site Use Program – Refers to the internal USDOE/USDOE contractor administrative program(s) that requires the permit requestor to obtain authorization, usually in the form of a permit, before beginning any excavation/penetration activity (e.g., well drilling) for the purpose of ensuring that the proposed activity will not affect underground utilities/structures, or in the case contaminated soil or groundwater, will not disturb the affected areas without the appropriate precautions and safeguards.
f - Physical Access Controls – Physical barriers or restrictions to entry.
g - Signs – Posted command, warning or direction.

Table 15. Summary of Present-Value Costs for the Selected Remedy - 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 15. Summary of Present-Value Costs for the Selected Remedy - 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 16. Summary of Present-Value Costs for the Selected Remedy - 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 16. Summary of Present-Value Costs for the Selected Remedy - 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 17. Summary of Present-Value Costs for the Selected Remedy - 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 17. Summary of Present-Value Costs for the Selected Remedy - 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.

APPENDIX A

RESPONSIVENESS SUMMARY

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Responsiveness Summary

The 45-day public comment period for the Statement of Basis/Proposed Plan 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 began on February 16, 2023 and ended on April 2, 2023. No public comments were received.

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